

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

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The International Seismological Summary.

1940 October, November, December.

INTERNATIONAL GEODETIC AND GEOPHYSICAL UNION, ASSOCIATION OF SEISMOLOGY.

FORMERLY THE BULLETIN OF THE
BRITISH ASSOCIATION SEISMOLOGY COMMITTEE.

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

This last quarter of 1940 contains 99 determined Epicentres, of which 53 are repetitions from previous Epicentres.

Cases of abnormal focal depth are noticed as below :—

Oct.	1d. 10h.	28·0S.	70·7W.	Suggested Deep
	2d. 3h.	9·5N.	83·9W.	Suggested Deep
	3d. 4h.	20·5S.	70·5W.	Suggested Deep
	6d. 15h. 35m.	20·5S.	70·5W.	0·010
	6d. 15h. 38m.	20·5S.	70·5W.	0·010
	7d. 6h.	5·5N.	126·0E.	0·010
	21d. 22h.	45·7N.	26·8E.	0·010
	22d. 6h.	45·7N.	26·8E.	0·010
	23d. 2h.	1·8S.	77·7W.	Suggested Deep
	24d. 20h.	35·5S.	71·0W.	0·010
	27d. 10h.	20·5S.	70·5W.	0·020
	28d. 1h.	31·0S.	68·0W.	0·015
	30d. 11h.	21·5S.	179·0W.	0·080
	Nov.	4d. 8h.	36·3N.	71·0E.
7d. 13h.		30·3N.	138·5E.	0·070
8d. 12h.		45·7N.	26·8E.	0·010
10d. 1h.		45·7N.	26·8E.	0·010
11d. 6h.		45·7N.	26·8E.	0·010
18d. 12h.		34·0N.	135·5E.	0·005
19d. 20h.		45·7N.	26·8E.	0·010
20d. 17h.		36·3N.	71·0E.	0·025
22d. 13h.		43·7N.	131·5E.	0·080
23d. 14h.		45·7N.	26·8E.	0·010
26d. 22h.	36·5N.	139·5E.	0·015	

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Dec.	22d. 18h.	15°0S.	69°5W.	0·020
	25d. 23h.	36·3N.	71·0E.	0·025
	30d. 20h.	34·2N.	136·8E.	0·050

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

October, 1951.

KEW OBSERVATORY,
RICHMOND,
SURREY.

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1940 OCTOBER, NOVEMBER, DECEMBER.

October 1d. 10h. 42m. 44s. Epicentre 28°·0S. 70°·7W.

Felt at La Serena, Coquimbo, Copiapo (Chili).

Epicentre : 26°·2S. 71°·2W. depth 350km. (U.S.C.G.S.).
30°·0S. 72°·5W. depth 60km. (Pasadena).

See Annales de l'Institut de Physique du Globe de Strasbourg, Tome V, 2eme partie, Seismologie, 1940, Strasbourg, 1948, p.14.

A = +·2923, B = -·8346, C = -·4670 ; δ = +9 ; h = +2 ;
D = -·944, E = -·331 ; G = -·154, H = +·441, K = -·884.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.
La Paz	11·7	12	e 2	54	+ 3	i 5	18	+14	—	—	6·3
La Plata	12·9	126	i 3	6	- 1	i 5	28	- 5	5 58	SS	6·1
Huancayo	16·4	344	i 3	59 _a	+ 6	i 6	59	+ 3	i 8 47	P _c P	—
Rio de Janeiro	25·3	84	i 5	29	- 1	i 9	45	- 9	—	—	i 12·7
Balboa Heights	37·7	347	e 7	23	+ 4	—	—	—	—	—	—
San Juan	46·3	7	e 8	55	+26	e 14	34	-42	e 9 35	pP	e 19·6
Bermuda	60·2	7	e 10	14	+ 2	e 18	23	- 2	—	—	—
Columbia	62·4	351	—	—	—	e 20	40	sS	e 23 3	SS	—
Cape Girardeau	67·3	345	i 10	58	- 1	e 19	49	- 5	i 11 16	pP	—
Philadelphia	67·7	357	e 10	59	- 2	e 19	56	- 2	—	—	e 28·6
Pittsburgh	68·6	354	i 11	7	0	i 15	30	PPP	i 11 44	pP	—
Florissant	68·9	344	i 11	5	- 4	e 20	7	- 6	i 11 20	pP	—
Harvard	70·1	0	i 11	16	0	—	—	—	—	—	—
Tucson	71·0	325	i 11	21	- 1	i 20	58	S _c S	i 11 42	P _c P	i 29·2
Chicago, U.S.C.G.S.	71·2	347	i 11	20	- 3	e 19	50	-50	i 11 34	P _c P	e 31·7
Toronto	71·8	354	11	24	- 2	20	43	- 3	—	—	30·3
East Machias	72·5	4	11	30	0	e 20	54	0	e 21 18	PS	—
Lincoln	72·6	341	e 11	22	- 9	e 19	46	?	e 11 49	P _c P	e 29·7
Ottawa	73·2	357	e 11	33	- 2	e 20	58	- 4	28 46	SSS	e 35·3
Shawinigan Falls	74·2	359	11	41	+ 1	21	33	+19	—	—	—
Cape Town	74·3	120	—	—	—	20	9	-66	—	—	e 35·3
Seven Falls	74·8	0	e 11	47	+ 3	e 21	41	+21	—	—	—
Palomar	75·1	322	i 11	43 _a	- 3	—	—	—	—	—	—
Riverside	75·9	322	e 11	49 _a	- 1	—	—	—	—	—	—
Mount Wilson	76·4	322	i 11	53 _a	0	—	—	—	—	—	—
Pasadena	76·4	322	i 11	52 _a	- 1	e 21	39	+ 1	e 12 8	pP	e 36·3
Santa Barbara	77·5	321	i 11	59 _a	0	—	—	—	—	—	—
Haiwee	77·8	323	e 12	0	- 1	—	—	—	—	—	—
Salt Lake City	78·3	329	e 12	2	- 1	e 23	25	sS	e 12 19	P _c P	e 32·4
Tinemaha	78·7	323	i 12	4	- 2	—	—	—	—	—	—
Logan	79·1	330	i 12	8	0	e 22	5	- 2	i 12 26	P _c P	e 41·1
Fresno	79·2	322	e 12	13	+ 5	e 22	32	+24	—	—	—
Lick	80·7	322	e 12	18	+ 2	—	—	—	—	—	—
Santa Clara	80·9	322	i 12	22	+ 5	e 22	46	+20	—	—	e 39·4
Berkeley	81·4	322	e 12	2	-18	e 22	28	- 3	—	—	e 38·5
Bozeman	82·0	333	e 12	23	0	e 23	0	+23	e 12 40	P _c P	—
Ukiah	82·8	322	e 12	46	+19	e 22	29	-16	e 24 29	sS	—
Butte	82·9	333	e 12	28	0	e 22	43	- 3	e 15 58	PP	e 34·6
Lisbon	87·8	44	—	—	—	23	17	[- 2]	—	—	44·0
San Fernando	88·2	47	—	—	—	i 23	41	+ 3	e 23 19	SKS	46·3
Seattle	88·4	328	—	—	—	e 26	49	?	e 29 11	SS	e 36·9
Victoria	89·6	328	13	0	- 1	24	6	+15	16 36	PP	44·3
Granada	90·4	47	i 13	7 _a	+ 3	23	40	[+ 5]	13 21	pP	e 41·7
Almeria	90·9	48	e 13	6	- 1	e 25	6	PS	—	—	45·3
Toledo	91·6	45	e 13	11	+ 1	—	—	—	16 43	PP	41·3

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.
Clermont-Ferrand	99.3	43	e 13 47	+ 2	—	—	—	e 48.3
Oxford	99.9	36	—	—	24 9	[-18]	—	e 49.3
Kew	100.3	37	—	—	e 25 16	- 7	—	e 42.3
Paris	100.5	40	e 14 4	+ 9	27 16?	PS	—	—
Sitka	100.9	330	e 18 14	PP	i 24 58	[+27]	e 25 56	PS e 41.5
Uccle	102.5	38	—	—	e 24 35	[- 4]	—	e 55.3
Rome	103.4	50	e 15 18	?	i 24 41	[- 2]	e 27 25	PS e 44.3
De Bilt	103.6	37	e 14 6	+ 2	e 27 23	PS	e 17 46	PKP e 50.3
Prague	108.0	43	—	—	e 23 53	?	—	—
Potsdam	108.1	39	—	—	e 26 52	S	e 28 28	PS e 48.5
Helwan	112.4	67	e 19 37	PP	(26 28)	{+ 6}	(30 10)	PPS —
Istanbul	114.7	55	19 43	PP	29 27	PS	—	e 76.3
Ksara	118.0	65	20 16?	PP	e 30 5	PS	—	—
Baku	130.2	59	19 31	[+19]	29 25	{+64}	32 4	PS 56.3
Sverdlovsk	135.3	36	19 23	[+ 1]	28 44	{- 9}	32 3	PS 58.3
Tashkent	144.4	56	i 19 39	[+ 1]	29 46	{ 0}	40 40	SS —
Tchimkent	144.9	55	e 19 40	[+ 1]	—	—	—	—
Colombo	E. 145.1	121	19 10	[-29]	—	—	—	e 67.3
Kodalkanal	E. 145.3	113	e 19 16?	[-24]	—	—	—	—
Bombay	145.4	97	i 19 41	[+ 1]	i 29 47	{- 5}	i 23 36	PP —
Andijan	147.2	57	19 48	[+ 5]	—	—	—	—
Frunse	148.3	52	19 53	[+ 9]	—	—	—	—
Agra	E. 152.3	84	20 5	[+14]	42 54	SS	23 21	SKP —
Vladivostok	156.3	315	19 56	[0]	—	—	—	—
Calcutta	N. 160.3	101	e 21 19	?	—	—	—	—

Additional readings :—

La Paz iPZ = +2m.59s.

Huancayo i = +4m.4s., +4m.12s., +7m.19s., +8m.27s., and +12m.51s., iS_cS = +15m.52s.

Rio de Janeiro iPN = +5m.32s.

San Juan ePP = +10m.36s.

Bermuda e = +14m.17s. and +25m.23s.

Cape Girardeau esSE = +20m.9s.

Pittsburgh iZ = +11m.21s., isSN = +21m.29s.

Florissant iP_cPNZ = +11m.26s., iPPZ = +14m.0s., iNZ = +15m.42s., ePSEN = +20m.27s., esSE = +20m.35s., iN = +21m.26s.

Tucson ipP = +11m.49s., i = +13m.40s., ePPP = +15m.47s., i = +16m.11s., i = +25m.33s.

Chicago U.S.C.G.S. ePP = +14m.8s., esS = +21m.45s., eSS = +24m.38s.

Lincoln e = +11m.31s., i = +21m.12s., esS = +21m.51s.

Mount Wilson i = +12m.12s.

Pasadena iZ = +12m.12s., isPZ = +12m.23s., eE = +13m.29s., ePPE = +14m.49s., eSSN = +26m.16s.

Logan e = +13m.18s., ePP = +13m.42s., eSS = +27m.42s.

Berkeley iPZ = +12m.18s., eSN = +22m.34s., iSE = +22m.49s.

Bozeman ePP = +15m.32s., ePS = +23m.43s.

Butte ePS = +23m.49s.

Lisbon SN = +23m.36s.

San Fernando eN = +23m.23s.

Seattle e = +27m.7s. and +29m.53s.

Victoria PS = +25m.20s.

Granada PP = +16m.48s., SKKS = +24m.8s., S = +24m.34s., PS = +25m.49s., PPS = +26m.42s., eSS = +31m.58s., SSS = +35m.8s.

Sitka e = +18m.30s. and +20m.29s., esS = +27m.32s.

Rome eSKKS = +25m.22s., iS = +25m.54s., eE = +29m.6s.

Potsdam eE = +28m.34s.

Helwan PPE = +23m.57s., SKKS is given as PPPEN, PPS as SKS, PSE = +33m.26s.

Baku PKP = +22m.43s. (iPP).

Sverdlovsk SS = +39m.46s.

Bombay i = +19m.56s. and +20m.11s.

Agra SKKSE = +30m.25s., PSKSE = +34m.8s.

Long waves were also recorded at Scoresby Sund, Warsaw, Honolulu, Upsala, Edinburgh, Bucharest, Stuttgart, and Hamburg.

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October 1d. 21h. 38m. 23s. Epicentre 60°·5S. 160°·0E. (as on 1938, October 9d.).

A = -·4651, B = +·1693, C = -·8689; δ = -3; h = -9;
D = +·342, E = +·940; G = +·816, H = -·297, K = -·495.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.	
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.	
Christchurch	18·6	30	4	13k	- 8	7	15	-31	7	31	L _g	8·6
Wellington	21·3	32	4	52 _a	+ 2	8	47	+ 4	5	15	PP	10·2
Arapuni	24·5	31	5	13	- 9	—	—	—	e 6	7	PPP	9·8
Riverview	27·3	345	e 5	49	+ 1	—	—	—	—	—	—	e 11·4
Sydney	27·3	345	e 5	49	+ 1	e 10	19	- 8	—	—	—	—
Adelaide	29·1	322	e 6	2	- 2	i 11	11	+15	7	17	PPP	15·6
Brisbane	33·4	349	i 6	43	+ 1	i 12	13	+10	e 7	19	PP	13·9
Perth	40·6	295	14	0	S	(14	0)	+ 6	16	55	SSS	17·9
La Plata	80·0	149	—	—	—	22	7	-10	33	7	L _g	38·6
Cape Town	80·7	211	—	—	—	e 22	30	+ 6	e 23	7	PS	38·0
Manila	81·1	322	e 12	30	+12	19	46	?	—	—	—	—
Colombo	E. 91·1	282	e 17	7	PP	—	—	—	—	—	—	—
La Paz	Z. 94·1	134	i 13	21k	- 1	24	43	+12	i 17	0	PP	43·8
Rio de Janeiro	94·8	159	e 13	37	+12	i 24	42	+ 6	—	—	—	—
Kodaikanal	E. 95·2	281	e 13	37?	+10	—	—	—	—	—	—	—
Huancayo	95·5	127	—	—	—	e 24	8	[+ 4]	i 26	7	PS	i 40·3
Calcutta	N. 100·8	296	e 19	49	PPP	e 26	45	PS	—	—	—	—
Hyderabad	N. 100·9	285	—	—	—	27	2	PS	—	—	—	—
Bombay	104·9	281	e 18	53	PP	—	—	—	—	—	—	e 57·6
Agra	E. 109·4	291	e 17	52	PKP	i 28	8	PS	i 28	54	PPS	45·4
Pasadena	115·3	65	e 19	51	PP	i 29	47	PS	—	—	—	e 47·2
Mount Wilson	Z. 115·4	65	e 19	56	PP	—	—	—	—	—	—	—
Berkeley	116·6	60	—	—	—	e 29	29	PS	e 35	50	SS	e 56·1
Tucson	117·1	72	e 18	58	[+11]	i 29	50	PS	e 20	5	PP	48·9
Seattle	124·7	53	—	—	—	e 26	9	[+ 4]	e 37	37	sS	e 59·1
Victoria	124·9	52	—	—	—	e 25	37?	[-28]	e 37	47	SS	e 51·6
San Juan	126·7	121	—	—	—	e 32	41	PPS	e 38	29	SS	e 53·2
Butte	127·4	61	e 21	59	PP	—	—	—	—	—	—	e 58·3
Bozeman	127·8	63	e 22	3	PP	e 26	45	[+31]	—	—	—	e 34·3
Sitka	128·2	38	—	—	—	e 31	16	PS	—	—	—	e 60·2
Cape Girardeau	131·5	86	e 22	37	PKS	—	—	—	—	—	—	—
St. Louis	E. 132·2	83	e 22	26	PKS	e 38	46	SS	43	36	SSS	—
Helwan	134·3	252	e 19	25	[+ 5]	31	43	PS	—	—	—	—
Ksara	135·4	259	19	37?	[+15]	—	—	—	e 23	7	PKS	—
Bermuda	139·4	113	—	—	—	e 41	24	SSP	e 45	22	SSS	e 66·2
Philadelphia	140·6	96	e 24	29	?	e 25	56	[-44]	e 35	2	PPS	e 40·5
Toronto	141·3	88	e 22	15	PP	e 41	16	SS	—	—	—	e 60·6
Ottawa	144·4	89	e 19	33	[- 5]	e 41	37	SS	e 47	7	SSS	59·6
Istanbul	144·5	260	19	33	[- 5]	41	44	SS	23	53	PP	e 71·6
Seven Falls	148·0	91	e 20	25	[+41]	e 41	54	SS	e 47	25	SSS	59·6
East Machias	148·1	98	e 20	39	[+55]	e 27	23	[+32]	e 22	29	?	e 68·6
Sofia	148·5	256	e 20	1	[+16]	—	—	—	e 23	37?	PP	74·6
Rome	152·8	241	i 20	5	[+14]	i 26	18	[-39]	e 43	12	SS	e 69·8
Almeria	153·8	212	20	15	[+22]	27	29	[+31]	23	51	PKS	55·6
Granada	154·4	211	20	10 _a	[+16]	27	26	[+27]	23	13	PP	71·5
San Fernando	154·4	205	e 20	40	[+46]	e 32	18	?	—	—	—	68·1
Warsaw	156·2	267	e 20	37?	[+41]	—	—	—	—	—	—	e 81·6
Lisbon	157·1	201	21	22	?	36	59	PPS	46	9	SSP	67·4
Toledo	157·1	213	e 20	32	[+35]	30	59	(+ 2)	25	31	?	—
Chur	158·0	243	e 20	28	[+30]	—	—	—	—	—	—	—
Stuttgart	159·6	248	e 20	49	[+49]	e 43	2	?	—	—	—	e 83·6
Clermont-Ferrand	159·9	232	e 20	17	[+16]	—	—	—	—	—	—	e 68·6
Potsdam	160·2	259	e 20	12	[+11]	e 36	37	PPS	—	—	—	e 52·1
Upsala	161·4	283	—	—	—	e 45	37?	SSP	e 50	37?	SSS	—
Hamburg	162·4	260	e 20	37?	[+34]	—	—	—	—	—	—	e 68·6
Paris	162·6	238	e 20	37?	[+34]	e 39	37?	?	—	—	—	—
Uccle	163·3	245	e 20	19	[+15]	e 45	7	SS	—	—	—	e 68·6
De Bilt	163·8	250	e 20	21	[+17]	e 45	7	SS	—	—	—	e 66·6
Kew	165·7	239	e 20	7?	[+ 1]	e 30	37?	(-64)	e 28	25	PPP	e 45·6
Ivigtut	166·3	75	e 24	39	PP	—	—	—	—	—	—	—

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	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Oxford	166.4	237	—	—	e 28 41	PPP	e 44 49	SS
Stonyhurst	168.4	242	e 25 57	?	e 46 17	SS	—	e 58.6
Scoresby Sund	169.9	6	i 24 42	PP	e 31 58	{ - 4 }	e 43 23	P'P'
Edinburgh	170.0	250	—	—	e 48 17	SSP	—	—
Aberdeen	E. 170.2	258	—	—	i 26 53	[-19]	e 46 44	SS e 71.6

Additional readings:—

Wellington iZ = +5m.47s., +7m.22s., and +8m.13s., L_q = +9m.7s., P_cS? = +12m.31s., S_cS? = +16m.27s.
 Adelaide P_cP = +9m.15s., SS = +12m.44s., i = +14m.36s., +14m.51s., +15m.7s., and +15m.27s.
 Brisbane eN = +10m.25s., iN = +12m.25s.
 Perth PP = +14m.11s.
 La Plata N = +22m.25s.
 Cape Town E = +32m.45s.
 La Paz iPS = +25m.59s., iPPS = +26m.31s., SSZ = +31m.23s.
 Rio de Janeiro eE = +16m.37s., eSN = +24m.46s.
 Huancayo i = +24m.57s., iSS = +31m.20s.
 Agra iE = +34m.27s.
 Berkeley ePSN = +29m.52s., eZ = +31m.28s., eSSE = +36m.17s., eL_qE = +47m.37s., eL_qN = +48m.2s., eN = +50m.34s.
 Tucson i = +20m.7s. and +22m.1s., eSS = +35m.41s.
 Cape Girardeau eE = +22m.50s., eN = +23m.31s.
 Helwan ePZ = +21m.49s., PPEN = +27m.10s., PPPE = +30m.19s.
 Rome iZ = +20m.33s., +21m.48s., and +22m.41s., iE = +22m.46s., iPPPN? = +28m.5s., iN = +31m.46s., +40m.25s., and +41m.4s., eSSE = +44m.42s., eE = +49m.16s., eSSSE = +51m.16s., eE = +53m.22s., +56m.31s., and +60m.46s., iL_q = +64m.24s.
 Almeria i = +21m.13s., PPP = +24m.41s., i = +31m.1s., PS = +32m.6s., PPS = +34m.3s., SS = +39m.51s., SSS = +44m.13s.
 Granada SKKS = +30m.13s., i = +38m.13s., SS = +41m.45s., SSS = +46m.43s.
 San Fernando ePPN = +21m.25s., eSSN = +40m.31s.
 Stuttgart eN = +23m.7s. and +25m.57s.
 Potsdam eE = +31m.55s.
 Hamburg eZ = +25m.38s., eE = +58m.37s.
 Kew eZ = +22m.7s., eNZ = +22m.37s., eEZ = +25m.49s., eN = +42m.7s.?
 Oxford e = +29m.42s.
 Aberdeen eE = +37m.50s., iE = +38m.14s. and +57m.59s.
 Long waves were also recorded at Prague, Algiers, Santa Clara, Budapest, Bergen, Honolulu, Ukiah, Salt Lake City, Lincoln, and Harvard.

Oct. 1d. Readings also at 0h. (La Paz), 1h. (Rome), 3h. (La Paz), 9h. (Pennsylvania), 11h. (Christchurch and near Triest), 13h. (Potsdam, Agra, Mount Wilson, Tucson, and near Mizusawa), 14h. (near Triest, Ksara, De Bilt, Baku, Erevan, Grozny, and Sotchi), 19h. (Palomar, Mount Wilson, Tucson (2), Pasadena, and Riverside), 20h. (Honolulu, Bozeman, Seattle, Berkeley, Mount Wilson, Tucson, Pasadena, and Riverside), 21h. (Paris and Philadelphia), 22h. (Scoresby Sund and near Mizusawa).

Oct. 2d. 0h. 50m. 15s. Epicentre 3°·5S. 151°·5E. (as on 1938 Aug. 31d.).

A = -·8772, B = +·4763, C = -·0606; δ = +1; h = +7;
 D = +·477, E = +·879; G = +·053, H = -·029, K = -·998.

	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Brisbane	23.7	177	i 5 21	+ 7	i 19 45	+18	—	—
Riverview	N. 30.2	180	—	—	e 11 9	- 4	—	e 16.4
Sydney	30.2	180	e 4 57	-77	e 9 45	-88	—	—
Manila	35.2	302	e 7 9	+11	14 28	SS	—	—
Christchurch	44.0	158	18 45	SSS	21 47	?	—	23.4
Vladivostok	49.7	341	e 8 50	- 6	i 16 0	- 4	—	24.4
Agra	E. 77.0	299	e 11 48	- 8	i 21 23	-22	—	—
Bombay	80.4	289	e 12 12	- 3	e 22 0	-21	—	—
Sitka	83.8	32	—	—	e 23 36	+41	—	—
Andijan	84.1	311	e 12 35	+ 1	—	—	—	—
Tashkent	86.4	311	e 12 36	- 9	e 23 6	[- 4]	—	e 41.8
Tchimbkent	86.4	313	e 12 42	- 3	—	—	—	—
Victoria	89.4	42	—	—	e 24 45?	PS	—	37.8
Pasadena	Z. 92.2	55	i 13 26	+13	—	—	—	—
Riverside	Z. 92.9	55	e 13 28	+12	—	—	—	—

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.
Sverdlovsk	93.4	326	—	—	23 48	[- 4]	30 15 SS	44.8
Tucson	98.3	57	i 18 0	PP	—	—	—	i 46.3
Istanbul	116.4	315	—	—	e 35 27	SS	—	—
Rome	z. 127.1	322	—	—	e 23 56	PPP	—	—

Additional readings:—

Brisbane ePE = +5m.27s.

Christchurch L_g = +22m.5s.

Sverdlovsk SSS = +35m.3s.

Long waves were also recorded at Arapuni, Wellington, Honolulu, Berkeley, Baku, and other European stations.

Oct. 2d. 3h. 15m. 44s. Epicentre 9°·5N. 83°·9W.

A = +·1048, B = -·9809, C = +·1640; δ = +4; h = +7;
D = -·994, E = -·106; G = +·017, H = -·163, K = -·986.

Suggested depth 50kms.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
San Juan	19.4	61	e 4 34	+ 4	e 8 10	+ 6	e 4 49 PP	e 10.2
Huancayo	23.0	159	e 5 11	+ 4	e 19 25	+11	e 5 40 PP	i 11.3
Columbia	24.5	6	e 5 26	+ 4	e 9 56	+16	—	e 11.0
Cape Girardeau	28.2	351	e 5 52	- 4	e 10 8	-33	e 6 40 PP	—
St. Louis	29.6	351	i 6 5	- 4	e 10 59	- 5	i 6 11 pP	—
Florissant	29.8	351	e 6 6	- 5	e 11 19	+12	i 6 17 pP	—
La Paz	30.2	148	i 6 18	+ 4	i 11 26	+13	—	15.9
Pittsburgh N.W.	31.0	7	e 6 20	- 1	—	—	17 26 PP	e 11.7
Philadelphia	31.4	14	e 7 12	+47	e 11 52	+20	—	e 14.8
Chicago U.S.C.G.S.	32.4	354	7 30	PP	e 11 44	- 4	e 13 40 SS	e 17.9
Fordham	32.5	16	e 6 34	0	—	—	i 7 50 PP	e 16.8
Lincoln	33.2	343	—	—	e 11 34	-26	—	e 14.2
Buffalo	33.6	8	i 6 44	0	—	—	i 6 53 pP	e 19.7
Tucson	33.7	317	i 6 44	- 1	e 12 35	+27	i 8 2 PP	e 14.5
Toronto	34.3	6	6 49	- 1	12 11	- 6	—	17.3
Vermont	36.1	13	e 8 48	PPP	(e 12 59)	+14	—	e 13.0
Ottawa	36.5	10	7 8	- 1	12 54	+ 3	8 46 PPP	e 18.3
East Machias	38.0	19	e 7 22	+ 1	e 13 28	+14	e 8 41 PP	e 15.6
La Jolla	z. 38.5	313	e 7 24	- 2	—	—	—	—
Palomar	z. 38.5	314	i 7 22 _a	- 4	—	—	—	—
Seven Falls	39.1	13	9 4	PP	13 28	- 3	16 28 SS	20.3
Riverside	39.2	314	e 7 31	0	—	—	—	—
Mount Wilson	z. 39.8	314	i 7 35 _a	- 1	—	—	—	—
Pasadena	39.9	314	i 7 35 _a	- 2	e 13 40	- 3	e 9 42 PP	e 18.3
Santa Barbara	41.1	313	e 7 46	- 1	—	—	—	—
Tinemaha	41.4	318	i 7 50	0	—	—	—	—
Bozeman	42.9	333	e 10 35	PPP	e 14 41	+14	—	18.8
Berkeley	44.6	315	—	—	e 14 44	- 8	—	e 22.3
Victoria	51.0	327	e 9 16?	+10	e 19 16?	SS	—	25.3
Toledo	76.2	51	i 11 52	0	—	—	—	36.8
Granada	76.6	54	i 11 56 _k	+ 2	21 56	+16	22 29 PPS	35.9
Almeria	77.5	55	e 18 25	?	—	—	—	—
Aberdeen	E. 77.6	33	—	—	e 34 28	?	—	—
Paris	80.6	42	i 12 14	- 2	—	—	—	38.3
Clermont-Ferrand	81.1	45	i 12 19	+ 1	—	—	—	e 39.3
Uccle	81.6	40	e 12 19 _a	- 2	e 22 46	+13	—	e 39.3
De Bilt	82.0	38	i 12 23 _a	0	e 23 46	PS	e 28 16?	SS e 39.3
Basle	84.1	43	e 12 42	+ 8	—	—	—	—
Stuttgart	85.0	42	e 12 34	- 4	—	—	—	—
Chur	85.5	43	e 12 40	- 1	—	—	—	—
Copenhagen	z. 85.8	34	i 12 42	0	—	—	—	—
Jena	86.1	40	e 12 42	- 2	—	—	—	—
Potsdam	86.8	38	e 12 46	- 1	e 23 26	+ 1	—	e 41.8
Rome	z. 88.4	49	i 12 55	0	—	—	—	—
Istanbul	100.6	45	e 17 16?	PP	—	—	—	—

For Notes see next page.

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NOTES TO OCTOBER 2d. 3h. 15m. 44s.

Additional readings :—

San Juan i = +8m.27s.
 Huancayo i = +10m.36s.
 Cape Girardeau iN = +6m.7s., eE = +9m.48s.
 St. Louis eE = +10m.30s., eSE = +11m.14s., iSE = +11m.34s., iE = +12m.46s.
 Florissant iPPZ = +7m.10s., iZ = +7m.27s. and +10m.2s., isSZ = +11m.51s., iZ = +12m.39s., eN = +13m.10s., iN = +13m.13s., iZ = +13m.19s.
 Ottawa eE = +15m.46s.
 East Machias iPPP = +9m.8s.
 Granada PPS = +22m.43s.
 De Bilt eSSS = +31m.16s.?
 Stuttgart i = +12m.38s., eZ = +12m.47s.
 Jena ePEN = +12m.45s., eN = +12m.48s., eZ = +12m.53s., eE = +12m.56s.
 Potsdam eE = +13m.16s.
 Long waves were also recorded at Agra, Scoresby Sund, and other American and European stations.

Oct. 2d. 10h. Undetermined Pacific shock.

Apia ePE? = 23m.53s., eSE = 26m.47s., eE = 29m.48s., 30m.52s. and 32m.51s.
 Christchurch P = 26m.22s., S = 30m.44s., LqE = 31m.32s., LNz = 33m.32s.
 Wellington P? = 27m.30s., S = 29m.54s., L = 31m.
 Arapuni S = 29m.36s.
 Sydney e = 33m.48s.
 Riverview eN = 34m.0s., eLN = 38m.6s.
 Brisbane eN = 35m.12s., eE = 35m.18s.
 Mount Wilson ePZ = 36m.23s.
 Pasadena ePZ = 36m.24s., eLZ = 63m.
 Riverside ePZ = 36m.24s.
 Palomar ePZ = 36m.25s.
 Tinemaha ePZ = 36m.32s.
 Tucson iP = 36m.42s., iL = 64m.14s.
 Copenhagen eP = 43m.51s.
 Adelaide iN = 44m.10s., i = 45m.0s. and 47m.20s.
 Agra eE = 45m.27s.
 Huancayo eS = 47m.40s., eL = 77m.10s.
 Victoria e = 47m.54s., L = 70m.
 Salt Lake City eSKS = 48m.3s., eL = 73m.18s.
 Berkeley eN = 59m.31s., iN = 60m.3s., eLE = 63m.30s.
 Long waves were also recorded at Santa Clara, Ukiah, Kodaikanal, Bombay, De Bilt, Paris, and Potsdam.

Oct. 2d. Readings also at 0h. (La Paz), 4h. (Mount Wilson, Pasadena, Riverside, Tucson, and near Apia), 5h. (Istanbul), 6h. (Agra), 7h. (Ksara), 8h. (La Paz), 11h. (near Agra), 14h. (Irkutsk), 15h. (near Berkeley (2)), 16h. (near Mizusawa), 21h. (near Berkeley and Lick).

Oct. 3d. 1h. 3m. 26s. Epicentre 19°·4N. 120°·8E.

A = -·4833, B = +·8108, C = +·3302; $\delta = +1$; $h = +5$;
 D = +·859, E = +·512; G = -·169, H = +·284, K = -·944.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Manila	4·8	178	i 1 12	- 3	i 2 12	0	—	—
Phu-Lien	13·4	278	e 3 12	- 2	—	—	—	—
Vladivostok	25·4	19	e 5 32	+ 1	—	—	—	16·6
Andijan	46·3	308	e 8 24	- 5	e 16 27	?	—	—
Tchimkent	48·7	310	i 8 49	+ 1	—	—	—	—
Tashkent	48·8	308	i 8 49	0	e 15 56	+ 4	—	e 26·4
Samarkand	50·2	306	e 9 1	+ 1	—	—	—	—
Sverdlovsk	57·7	326	i 9 54	- 1	e 17 53	0	—	27·6

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

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Oct. 3d. 4h. 56m. 10s. Epicentre 20°·5S. 70°·5W. (foreshock of Oct. 4d. 7h.)

A = +·3129, B = -·8836, C = -·3481; δ = -17; h = +5;
D = -·943, E = -·334; G = -·116, H = +·328, K = -·937.

Pasadena suggests depth 150kms.

	Δ	Az.	P.		O - C.	S.		O - C.	Supp.		L.	
			m.	s.	s.	m.	s.	m.	s.	m.		
La Paz	4·6	30	i 1	16 _a	+ 4	1 2	10	+ 3	—	—	i 2·5	
Huancayo	9·6	330	e 2	38	PP	e 5	10	S _g	—	—	i 5·9	
San Juan	38·9	8	—	—	—	e 13	7	-21	—	—	e 16·5	
Cape Girardeau	60·2	344	e 10	5	- 7	e 18	14	-11	e 10	30	pP	—
Pittsburgh	61·2	353	e 10	43	+24	i 18	34	- 4	i 19	18	sS	—
St. Louis	61·7	344	e 10	20	- 2	e 18	37	- 7	e 10	46	pP	—
Tucson	65·1	324	i 10	45	0	e 19	19	- 8	e 13	15	PP	e 27·6
La Jolla	z. 69·4	320	e 11	11	- 1	—	—	—	—	—	—	—
Palomar	z. 69·5	321	i 11	12 _k	0	—	—	—	i 11	32	pP	—
Riverside	70·2	321	i 11	17 _k	0	—	—	—	11	43	pP	—
Mount Wilson	70·8	321	i 11	21 _k	+ 1	—	—	—	i 11	48	pP	—
Pasadena	70·8	321	i 11	19 _k	- 1	—	—	—	i 11	48	pP	—
Haiwee	z. 72·0	322	i 11	27	- 1	—	—	—	—	—	—	—
Tinemaha	72·9	322	i 11	32	- 1	—	—	—	e 11	59	pP	—
Rome	98·4	49	—	—	—	e 24	0	[-19]	—	—	—	—

Additional readings :—

Cape Girardeau esSEN = +18m.56s.

St. Louis ePPN = +12m.36s., iN = +18m.40s.

Tucson i = +11m.11s. and +11m.30s., ePPP = +14m.45s., eS_cS = +20m.16s.

Rome eE = +24m.24s., iE = +24m.49s.

Long waves were also recorded at Lick.

Oct. 3d. Readings also at 2h. (Ksara), 3h. (near Balboa Heights), 4h. (Tucson), 5h. (Budapest), 6h. (near Mizusawa), 8h. (near Trieste), 11h. (near Ottawa), 12h. (near Lick and Branner), 14h. (Huancayo, Riverview, Copenhagen, Arapuni, Wellington, Riverside, Mount Wilson, Pasadena, Haiwee, and Tucson), 15h. (Tinemaha, Potsdam, Paris, De Bilt, near Bucharest, Sofia, Haiwee, Tucson, Pasadena, Mount Wilson, Riverside, Palomar, and Rome), 16h. (near New Plymouth, and Wellington), 17h. (Sverdlovsk, Tashkent, Helwan, Rome, and Ksara), 18h. (near New Plymouth, Tuai, Christchurch, Hastings, and Wellington), 21h. (Ksara), 23h. (Palomar, Tucson, Riverside, Mount Wilson, and Pasadena).

Oct. 4d. 4h. 35m. 51s. Epicentre 30°·5N. 91°·5E. (as on 1940 Sept. 3d.).

A = -·0226, B = +·8628, C = +·5050; δ = -4; h = +2;
D = +1·000, E = +·026; G = -·013, H = +·505, K = -·863.

	Δ	Az.	P.		O - C.	S.		O - C.	Supp.		L.	
			m.	s.	s.	m.	s.	m.	s.	m.		
Calcutta	N. 8·4	200	e 2	14 _k	+ 8	i 4	14	S*	—	—	—	
Agra	12·3	258	2	57	- 2	5	15	- 3	—	—	—	
Phu-Lien	16·7	122	e 3	56	- 1	e 7	20	SS	—	—	i 9·2	
Almata	17·2	322	4	3	0	7	18	+ 4	—	—	9·8	
Hyderabad	N. 17·6	225	4	14	+ 6	7	53	SS	8	24	SS	9·6
Frunse	18·3	318	i 4	15	- 2	7	48	+ 9	—	—	10·2	
Andijan	18·6	308	4	21	0	7	57	+ 9	—	—	14·6	
Bombay	N. 20·5	240	i 4	47	+ 5	i 8	45	SS	i 9	16	SSS	11·0
Tashkent	20·9	308	e 4	48	+ 2	i 8	40	+ 5	—	—	i 12·0	
Tchimkent	21·2	310	4	49	0	8	50	+ 9	—	—	13·2	
Semipalatinsk	21·6	342	4	50	- 4	8	44	- 5	—	—	11·2	
Samarkand	22·0	302	i 4	55	- 3	9	1	+ 5	—	—	13·2	
Irkutsk	23·7	20	5	10	- 4	19	32	+ 5	—	—	12·8	
Kodaikanal	E. 24·0	219	e 5	23	+ 6	i 9	49	+17	—	—	i 12·3	
Zi-ka-wei	E. 25·7	82	e 5	35	+ 2	10	9	+ 8	—	—	—	
Colombo	E. 25·9	208	5	57	PP	10	30	+26	—	—	—	
Dairen	26·1	64	6	54	PPP	10	18	+11	—	—	—	
Manila	31·4	115	i 6	33 _k	+ 8	12	24	+52	—	—	18·7	
Sverdlovsk	34·0	331	e 6	45	- 3	12	10	- 3	—	—	16·6	
Vladivostok	34·4	59	e 6	47	- 4	i 12	32	+13	—	—	18·0	

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.
Kobe	36.8	72	14 33	?	18 51	?	—	—
Grozny	38.3	304	7 27	+ 3	13 22	+ 3	—	—
Moscow	45.3	321	8 19	- 2	14 57	- 5	—	—
Ksara	46.6	290	e 8 40	+ 8	e 16 0	+39	—	—
Pulkovo	49.7	325	e 8 55	- 1	e 16 2	- 2	—	e 23.4
Helwan	51.4	286	e 9 9	0	i 16 29	+ 1	—	—
Bucharest	52.4	306	—	—	e 16 9?	-33	—	31.2
Sofia	54.7	303	e 9 39	+ 6	—	—	—	e 23.2
Warsaw	54.9	315	—	—	e 17 9?	- 7	—	e 29.6
Upsala	56.2	325	—	—	e 21 9?	SS	—	e 28.2
Triest	60.8	310	e 10 2	-14	e 21 30	?	e 22 31	SS e 29.2
Hamburg	61.2	319	—	—	e 25 9?	SSS	—	e 33.4
Rome	62.7	304	10 59	+30	18 52	- 5	e 12 57	PP e 30.2
Toledo	75.0	308	e 11 44	- 1	e 21 17	- 6	14 15	PP
Granada	76.0	306	—	—	i 27 37	?	—	43.8

Additional readings:—

Calcutta eS*N = +4m.57s., eS₂N = +5m.57s., eP_cPN = +8m.22s.

Bombay L₂N = +9m.39s.

Helwan iE = +19m.17s., eE = +20m.39s.

Warsaw eE = +18m.9s.?, eZ = +21m.9s.?

Triest eSSS = +24m.54s.

Rome SS = +23m.4s.

Long waves were also recorded at Koti, Sendai, Tokyo, College, Sitka, Huancayo, La Paz, Salt Lake City, and other European stations.

Oct. 4d. 7h. 54m. 46s. Epicentre 20°·5S. 70°·5W. (as on 1940 Oct. 3d.).

A = +.3129, B = -.8836, C = -.3481; δ = -17; h = +5;
D = -.943, E = -.334; G = -.116, H = +.328, K = -.937.

	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
La Paz	4.6	30	i 1 11	- 1	—	—	—	—
Huancayo	9.6	330	e 2 18	- 3	—	—	i 2 37	PP
La Plata	18.1	144	4 14	0	7 56	SS	4 24	PP 9.8
Balboa Heights	30.6	343	e 6 26	+ 8	e 11 31	+11	—	20.2
Fort de France	36.2	17	e 6 59	- 7	i 12 40	- 7	8 5	PP e 17.2
Port au Prince	38.9	358	i 7 56	+27	i 13 46	+18	—	—
San Juan	38.9	8	e 7 31	+ 2	i 13 18	-10	i 9 9	PP i 15.7
Bermuda	52.8	7	e 8 55	-24	i 16 19	-28	i 18 21	S _c S
Columbia	55.1	350	e 9 37	+ 1	i 17 19	+ 1	i 20 47	SS e 22.8
Georgetown	59.4	355	i 10 21	+15	i 18 16	+ 1	—	—
Cape Girardeau	60.2	344	e 10 5	- 7	e 18 39	+14	i 10 17	pP
Philadelphia	60.3	357	e 10 5	- 8	i 18 20	- 6	e 22 6	SS e 25.0
Fordham	61.1	358	e 10 12	- 6	i 18 33	- 4	i 20 1	S _c S e 29.5
Pittsburgh	61.2	353	i 10 17	- 2	e 18 38	0	i 10 41	pP
Pennsylvania	61.3	354	i 10 26	+ 6	i 18 40	+ 1	—	e 30.3
St. Louis	61.7	344	i 10 14	- 8	i 18 39	- 5	i 10 30	pP
Florissant	61.9	344	i 10 17	- 7	i 18 45	- 2	i 10 31	pP
Weston	62.6	0	i 10 29	+ 1	i 18 55	- 1	—	—
Harvard	62.7	0	i 10 26	- 3	i 19 10	+13	i 10 38	pP
Buffalo	63.6	353	i 10 29	- 6	i 19 20	+12	i 10 53	pP
Chicago U.S.C.G.S.	64.0	346	e 10 35	- 3	i 19 4	- 9	e 22 59	SS 28.9
Toronto	64.4	353	e 10 37	- 3	i 19 21	+ 3	26 44	SSS e 32.2
Vermont	64.7	359	10 44	+ 2	e 19 18	- 4	e 12 32	PP e 26.7
East Machias	65.0	3	i 10 58	+14	i 19 33	+ 7	i 11 10	P _c P e 26.2
Halifax	65.1	7	10 45	0	19 24	- 3	26 38	SSS 32.2
Tucson	65.1	324	i 10 45	0	e 19 19	- 8	i 11 19	P _c P
Lincoln	65.7	339	e 10 54	+ 6	i 19 31	- 3	e 13 8	PP e 26.9
Ottawa	65.7	356	e 10 44	- 4	i 19 34	0	20 6	PS e 29.2
Shawinigan Falls	66.8	359	10 53	- 3	e 19 50	+ 2	13 50	PP e 34.2
Seven Falls	67.3	0	11 4	+ 5	i 19 57	+ 3	13 56	PP 30.2
La Jolla	69.4	320	e 11 9	- 3	e 20 23	+ 5	—	—
Palomar	69.5	321	e 11 8	- 4	—	—	—	—
Riverside	70.2	321	i 11 12	- 5	e 20 29	+ 1	i 38 40	P'P'
Mount Wilson	70.8	321	e 11 15	- 5	e 20 32	- 3	i 38 43	P'P'
Pasadena	70.8	321	e 11 16	- 4	e 20 30	- 5	e 25 4	SS e 29.0

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		Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.
		°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.
Santa Barbara		71.9	319	e 11	33	+ 6	e 20	45	- 3	—	—	—
Haiwee		72.0	322	e 11	25	- 3	e 20	57	+ 8	e 38	50	P'P'
Salt Lake City		72.1	328	e 11	29	+ 1	i 20	52	+ 2	e 11	49	P _c P
Logan		72.8	330	e 11	34	+ 2	i 21	0	+ 2	—	—	e 30.1
Tinemaha		72.9	322	e 11	30	- 3	e 21	3	+ 4	i 38	57	P'P'
Fresno	N.	73.5	321	e 11	42	+ 6	i 21	31	PS	e 14	20	PP
Lick	E.	75.0	320	e 11	50	+ 5	e 21	21	- 2	—	—	—
Santa Clara		75.2	320	e 11	57	+11	e 21	36	+11	—	—	e 37.3
Branner		75.4	320	e 11	54	+ 7	e 21	28	+ 1	—	—	e 41.8
Bozeman		75.5	332	e 11	59	+11	i 21	27	- 1	e 14	49	PP
Berkeley		75.7	320	e 11	46	- 3	i 21	38	+ 8	i 12	2	P _c P
Butte		76.4	332	e 11	55	+ 2	e 21	38	0	e 16	29	PPP
Ukiah		77.1	321	e 12	10	+13	e 21	33	-13	e 12	55	pP
Cape Town		78.0	122	12	12	+10	21	59	+ 4	15	12	PP
Ferndale		78.7	321	e 12	38	+32	e 22	10	+ 7	e 22	34	PS
Saskatoon		78.9	338	12	20	+13	e 22	6	+ 1	27	44	SS
Lisbon		82.3	45	e 12	24	- 1	22	58	+18	23	40	PS
Seattle		82.8	328	e 13	26	pP	i 23	16	sS	—	—	39.9
San Fernando		83.0	47	12	0	-28	i 22	26	-21	—	—	—
Victoria	E.	83.3	328	e 12	37	+ 7	i 22	55	+ 5	15	25	PP
Ivigtut		83.4	11	i 12	54	pP	e 21	22	?	i 15	5	PP
Granada		85.2	48	i 12	40k	+ 1	22	52	[-10]	13	30	pP
Almeria		85.8	49	e 12	55	+13	23	16	+ 1	13	13	P _c P
Toledo		86.2	46	i 12	41	- 3	22	57	[-11]	16	14	PP
Algiers		89.7	51	i 13	14	+13	23	42	-11	16	40	PP
Clermont Ferrand		93.6	43	e 13	21	+ 2	—	—	—	17	10	PP
Oxford		93.8	35	e 13	34	+14	23	55	[+ 1]	e 17	23	—
Wellington		93.8	222	13	39	+19	23	59	[+ 5]	14	2	pP
Christchurch		94.0	220	13	48	+27	24	5	[+ 9]	26	5	PS
Kew		94.2	35	i 13	29k	+ 7	e 24	4	[+ 8]	i 13	40	P _c P
Stonyhurst		94.2	33	13	14	- 8	i 24	1	[+ 5]	i 17	14	PP
Sitka		94.5	330	e 13	31	+ 8	e 24	2	[+ 4]	i 17	28	PP
Paris		94.6	39	e 13	31	+ 7	e 24	14?	[+15]	e 17	2	PP
Edinburgh		94.8	31	e 13	25	0	—	—	—	17	18	PP
Honolulu		94.8	290	e 12	28	-57	i 24	40	+ 4	i 31	44	SSP
Arapuni		94.9	226	—	—	—	25	32	PS	—	—	45.2
Aberdeen		96.0	30	i 15	51	?	i 24	11	[+ 4]	i 17	42	PP
Uccle		96.5	37	e 13	34	+ 2	24	18	[+ 9]	17	31	PP
Neuchatel		96.6	41	e 13	33	0	e 24	18	[+ 8]	—	—	—
Basle		96.7	41	e 13	37	+ 4	e 24	4	[- 6]	—	—	—
Scoresby Sund		96.9	14	i 12	31	-63	23	37	[-34]	i 17	30	PP
Zurich		97.7	41	e 13	39	+ 1	e 24	3	[-12]	e 17	55	PP
Chur		98.2	42	e 13	37	- 3	—	—	—	e 17	44	PP
Rome		98.4	49	14	3k	+22	24	28	[+ 9]	i 17	51	PP
De Bilt		98.5	36	i 13	42a	0	i 24	33	[+14]	e 17	19	PP
Stuttgart		98.6	41	e 13	40	- 2	e 24	24	[+ 4]	e 17	34	PP
Heligoland		99.8	35	e 14	12	+25	e 24	36	[+10]	e 18	3	PP
Triest		100.5	45	e 14	23	+32	i 24	36	[+ 7]	i 18	6	PP
Bergen		100.8	28	i 14	17	+25	e 24	43	[+12]	i 18	20	PP
Hamburg		100.8	36	e 14	5a	+13	i 24	41	[+10]	e 18	5	PP
Jena		100.8	39	e 14	14	+22	i 24	44	[+13]	e 18	2	PP
Potsdam		102.2	37	e 13	58	0	i 24	47	[+ 9]	i 18	5	PP
Prague		102.3	40	(e 17	42)	PKP	(e 24	51)	[+13]	(e 18	14)	PP
Copenhagen		102.8	34	e 14	11	+10	24	52	[+12]	18	28	PP
College		103.1	334	e 18	36	PP	e 25	4	[+22]	e 31	45	?
Ogyalla	E.	104.1	44	e 16	17	?	e 27	55	PS	e 18	29	PP
	N.	104.1	44	e 18	35	PP	i 28	41	PPS	e 20	21	PPP
Budapest		104.5	45	e 18	27	PP	e 25	5	[+17]	e 28	44	PPS
Kecskemet	Z.	104.8	45	e 17	34	PKP	—	—	—	e 18	40	PP
Sofia		106.3	50	e 18	38	PP	e 25	0	[+ 4]	e 28	44	PPS
Upsala		106.6	31	e 18	36	PP	e 25	2	[+ 4]	e 28	36	PPS
Warsaw		106.8	39	14	31a	P	e 25	13	[+15]	18	37	PP
Tananarive		107.8	118	e 19	11	PP	27	6	PS	29	15	PPS
Bucharest	E.	108.7	48	e 18	45	PKP	25	13	[+ 6]	e 19	7	PP
	N.	108.7	48	e 18	49	PKP	25	15	[+ 8]	e 19	14	PP

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	Δ °	Az. °	P.		O-C. s.	S.		O-C. s.	Supp.		L. m.	
			m.	s.		m.	s.		m.	s.		
Helwan	109.9	65	14	50	P	25	20	[+ 8]	22	2	PPP	54.9
Istanbul	110.2	52	14	40	P	29	6	PPS	19	12	PP	59.8
Pulkovo	112.9	32	e 15	3	P	i 25	25	[+ 1]	19	29	PP	52.8
Sydney	112.9	217	e 20	32	PPP	e 24	38	[-46]				
Riverview	113.0	217	e 19	46	PP	e 26	51	{+25}	e 29	22	PS	e 52.7
Ksara	114.4	62	e 19	55	PP	e 29	35	PS				
Simferopol	114.4	49	18	57	[+15]							
Theodosia	115.9	49	e 18	58	[+13]							
Brisbane	116.4	223	e 20	32	PP	e 25	44	[+ 7]	i 30	8	PPS	
Moscow	116.8	37	19	1	[+15]	25	46	[+ 7]	20	2	PP	
Adelaide	118.3	207				e 30	14	PS	i 36	54	SSP	55.6
Platigorsk	120.8	50	20	40	PP	26	5	[+12]				
Grozny	122.7	51	20	53	PP							
Baku	126.0	54	e 20	9	PP							
Perth	127.5	187	21	44	PP							66.3
Sverdlovsk	129.0	32	16	17	P	26	44	[+27]	i 21	23	PP	53.2
Samarkand	139.0	52	e 19	28	[- 1]				21	28	PP	
Tchimbkent	140.1	47	e 19	36	[+ 5]				e 23	34	PKS	
Tashkent	140.2	49	19	35	[+ 4]	26	37	[- 2]	e 22	43	PP	e 41.2
Semipalatinsk	142.3	30	e 19	41	[+ 7]							
Andijan	142.6	49	e 20	11	[+36]	e 33	24	PS				67.2
Frunse	143.3	44	e 20	10	[+34]				23	32	PKS	68.2
Almata	144.6	42	e 19	41	[+ 3]							
Sapporo	145.1	318	20	3	[+24]							
Bombay	145.5	86	e 19	47	[+ 7]	e 30	1	{+ 8}	e 23	42	PP	69.5
Mori	146.1	316	e 18	39	[-62]	e 20	8	?				
Mizusawa	147.1	310	e 19	48	[+ 5]	20	15	?				
Kodaikanal	E. 147.5	102	e 19	57	[+14]	30	2	{- 2}	35	40	PPS	67.1
Sendai	147.6	308	19	45	[+ 2]							69.7
Irkutsk	148.0	6	i 20	5	[+21]	e 26	55	[+ 4]	e 23	31	PP	66.2
Colombo	E. 148.3	111	19	50	[+ 5]							70.1
Tokyo Cen. Met. Ob.	149.5	305	e 20	8	[+21]							i 71.2
Yokohama	149.6	304	e 20	15	[+28]							
Dehra Dun	N. 150.1	64	e 20	8	[+21]							e 76.3
Nagano	150.2	308	23	9	PP							71.2
Agra	E. 150.5	70	e 20	1	[+13]	30	59	{+38}	23	46	PP	
Hyderabad	E. 150.5	90	20	15	[+27]	30	29	{+ 8}	23	48	PP	
Vladivostok	150.7	323	19	56	[+ 8]	29	49	{-33}	23	25	PP	e 74.2
Kobe	153.3	306	20	6	[+14]	24	17	?				
Kotl	155.0	305	20	26	[+32]							
Calcutta	N. 160.2	80	e 20	37	[+36]	e 45	45	SS	e 25	14	PP	e 77.2
Manila	167.7	243	i 20	22k	[+14]	32	0	{+ 9}	23	38	SKP	79.2
Taito	168.9	282	20	37	[+29]							
Phu-Lien	177.4	83	e 20	31	[+19]							

Additional readings:—

Huancayo i = +2m.44s. and +3m.24s.
 La Plata Z = +4m.44s., E = +8m.20s.
 Fort de France SS = +14m.41s.
 San Juan i = +7m.46s., iP_cP = +9m.32s., i = +13m.48s., isS = +14m.23s.
 Bermuda iP = +9m.4s., i = +11m.14s., iSS = +19m.24s., i = +20m.16s.
 Columbia i = +9m.58s. and +17m.49s.
 Cape Girardeau eN = +10m.35s., eE = +18m.13s. and +18m.28s., iE = +18m.49s.
 Philadelphia i = +10m.14s., e = +12m.47s. and +13m.56s., i = +20m.11s.
 Fordham i = +10m.19s.
 Pittsburgh is = +18m.43s., isS = +19m.19s.
 Pennsylvania e = +11m.8s. and +12m.48s.
 St. Louis iZ = +10m.19s., iPZ = +10m.42s., iP_cPZ = +10m.58s., IPPZ = +12m.52s.,
 iN = +17m.54s., eE = +18m.26s., isSE = +19m.2s.
 Florissant iZ = +11m.39s., IPPZ = +12m.51s., iE = +18m.35s., +18m.43s., and
 +18m.59s., isSE = +19m.12s., iE = +19m.56s.
 Harvard eN = +12m.48s. and +16m.18s.
 Buffalo i = +14m.0s., IPPP = +14m.16s., isS = +20m.1s.
 Chicago U.S.C.G.S. e = +10m.45s., i = +10m.59s., e = +15m.9s., iZ = +20m.31s.,
 e = +24m.42s. and +26m.27s.
 Toronto eE = +28m.14s.?
 Vermont e = +19m.2s., is = +19m.23s., esS = +20m.37s., e = +22m.29s.
 East Machias isP = +11m.44s., IPP = +13m.10s., is_cS = +19m.40s., i = +20m.53s.

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Halifax iN = +11m.5s.
 Tucson iPP = +11m.41s., i = +13m.37s., e = +14m.46s., iS_cS = +20m.18s., i = +24m.31s.
 Lincoln isS = +20m.42s.
 Ottawa SSSE = +26m.32s.
 Shawinigan Falls i = +11m.8s., e = +30m.26s.
 Seven Falls SS = +24m.32s., SSS = +27m.32s.
 Riverside iZ = +17m.41s. and +17m.49s.
 Mount Wilson iZ = +11m.27s., +17m.44s., and +17m.53s., iPKZ, PKP, Z = +39m.38s.
 Pasadena iZ = +11m.27s. and +17m.45s., iN = +20m.40s., eSSE = +25m.4s., iPKP, PKPZ = +38m.44s., iPKP, PKP, Z = +39m.43s.
 Haiwee iZ = +17m.52s.
 Salt Lake City ipP = +12m.26s., i = +15m.42s. and +20m.59s., isS = +21m.28s., i = +21m.39s., iSS = +25m.58s.
 Tinemaha iZ = +17m.56s.
 Fresno iN = +12m.11s.
 Lick eE = +22m.24s.
 Branner ePN = +11m.59s., iN = +13m.20s., eSE = +21m.36s.
 Bozeman i = +12m.24s., eSS = +27m.5s.
 Berkeley iPEZ = +11m.54s., iZ = +13m.52s., iPPN = +14m.58s., iSE = +21m.41s., iN = +25m.7s., iSSSE = +28m.46s.
 Butte e = +12m.17s. and +16m.29s., isS = +22m.34s., i = +23m.31s., eSS = +26m.41s.
 Ukiah iS_cS = +21m.52s.
 Cape Town E = +22m.7s.
 Ferndale eE = +12m.48s.
 Lisbon ePN = +12m.29s., E = +13m.30s. and +17m.44s., SN = +23m.7s., PSN = +23m.43s., E = +27m.52s.
 Seattle eSS = +26m.43s., i = +28m.56s.
 San Fernando iE = +12m.36s., iSN = +22m.52s.
 Victoria SSE = +27m.56s.
 Ivigtut ipPP = +15m.50s., esS = +22m.52s., i = +23m.3s., +23m.22s., and +33m.38s.
 Granada P_cP = +12m.49s., sP = +13m.48s., PP = +16m.0s., PPP = +17m.24s., pPPP = +18m.6s., sS = +23m.37s., SS = +28m.28s.
 Almeria i = +13m.2s., PPP = +18m.24s., iS = +23m.40s., PS = +24m.28s., PPS = +24m.53s., SS = +29m.40s.
 Toledo S = +23m.50s.
 Algiers iS = +24m.22s., i = +28m.49s., SS = +37m.14s.?
 Clermont-Ferrand i = +13m.33s.
 Oxford iS = +24m.28s.
 Wellington PPiZ = +17m.42s., pPPZ = +18m.1s., SKKS? = +24m.16s., S = +24m.56s., PS = +26m.34s., SS = +31m.34s., SSS = +35m.4s.
 Christchurch SN = +24m.51s., SE = +25m.2s., SSNZ = +31m.12s., L_qN = +38m.20s.
 Kew PPZ = +17m.14s., S = +24m.39s., ePSZ = +25m.29s., eNZ = +26m.39s., eE = +26m.53s., ePKKPEN = +31m.13s., eSSEN = +31m.14s.?, eSSSZ = +35m.14s.?, eL_q = +38.2m.
 Stonyhurst i = +24m.39s. and +26m.9s., e = +31m.14s., i = +35m.8s.
 Sitka iS = +24m.20s., i = +24m.49s., e = +25m.17s. and +26m.29s., iSS = +30m.58s.
 Paris eSKKS = +24m.40s.
 Edinburgh PPP = +19m.23s.
 Honolulu ePP = +15m.58s.
 Aberdeen iEN = +23m.32s., iPSN = +24m.42s., iE = +31m.11s., iE = +36m.22s.
 Uccle SKKS = +24m.49s., S = +25m.21s., iN = +26m.3s., PPSZ = +27m.25s., SS = +31m.47s.
 Basle eS = +25m.4s.
 Scoresby Sund iPP = +16m.36s., i = +22m.59s., SS = +39m.46s.
 Zurich eS = +25m.18s.
 Rome iN = +14m.8s., iS?E = +25m.45s., iN = +25m.50s., iPSE? = +26m.26s., iE = +27m.15s., iPPSE? = +27m.58s., iN = +28m.22s., iE = +29m.13s., SS? = +30m.14s.
 De Bilt eSS = +30m.54s.
 Stuttgart ePZ = +13m.46s., ePN = +13m.54s., iPPE = +17m.50s., eE = +23m.8s., eN = +23m.14s., iSN = +25m.0s., ePSN = +25m.40s., eSSE = +31m.19s., eSSSE = +35m.34s.
 Heligoland eN = +30m.47s., eEN = +32m.27s.
 Trieste iPPP = +20m.16s., iSKKS = +25m.18s., iS = +25m.58s., iPS = +27m.3s., iPPS = +27m.59s., e = +28m.14s., iSS = +32m.41s., e = +33m.16s., iSSS = +36m.23s.
 Bergen eSS = +32m.37s.
 Hamburg eZ = +30m.2s., eSSE = +32m.2s.
 Jena eN = +18m.14s., e = +20m.14s. and +23m.42s., iEN = +24m.14s., eN = +26m.0s., eE = +26m.4s.
 Potsdam iPZ = +14m.5s., ePEN = +14m.14s., iZ = +18m.18s., iE = +19m.8s., iZ = +23m.15s., iN = +23m.30s., iSKSN = +24m.53s., iSKKSN = +25m.20s., iSN = +26m.0s., iN = +26m.7s., iPSE = +27m.11s., iZ = +27m.19s., iPPSE = +28m.13s., iN = +28m.15s., iE = +28m.52s., iN = +31m.30s., iSSE = +32m.27s., iSSPZ = +32m.58s.
 Prague: All readings have been reduced by 30m., ePS = (+27m.8s.), ePPS = (+27m.32s.), eSS = (+33m.8s.).

Continued on next page.

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Copenhagen +17m.56s. and +26m.7s.
 Budapest iE = +18m.50s., eE = +25m.14s., eN = +31m.14s. ?
 Upsala SKKSE = +25m.35s., eN = +26m.20s., eE = +29m.28s., eSSN = +33m.38s., eSSE = +33m.58s., eE = +42m.16s.
 Warsaw ePPE = +18m.53s., iE = +28m.26s., iZ = +29m.50s.
 Tananarive EN = +23m.20s., SSE = +34m.50s., L₃ = +46m.2s.
 Bucharest iE = +22m.15s., SKKSE = +25m.50s., SE = +26m.39s., PSEN = +28m.12s., PPSN = +28m.57s., PPSE = +29m.3s.
 Helwan PKPZ = +18m.29s., PSEN = +29m.14s., PPSE = +30m.20s., SSE = +35m.20s.
 Pulkovo PKP = +18m.44s., PS = +29m.1s.
 Sydney e = +29m.14s.
 Riverview eE = +19m.54s. and +26m.59s., eSSN = +36m.23s., eL₄N = +47m.44s.
 Brisbane iN = +30m.2s.
 Moscow eS = +27m.27s., PS = +29m.50s.
 Adelaide i = +30m.54s.
 Perth i = +24m.59s., +29m.29s., +36m.9s., +43m.32s., and +52m.51s.
 Sverdlovsk iPKP = +19m.25s., PS = +31m.11s.
 Tashkent PS = +32m.57s.
 Bombay eE = +21m.46s., iE = +48m.1s. and +54m.1s.
 Kodaikanal iSSE = +43m.8s.
 Irkutsk PS = +34m.21s.
 Agra eN = +20m.11s., PKP₂E = +20m.17s., PPS₁E = +39m.33s., SSE = +43m.39s.
 Hyderabad SKSPE = +34m.7s., SSE = +43m.52s.
 Vladivostok PPP = +26m.30s.
 Calcutta ePKP₂N = +21m.29s.
 Manila PPNZ = +25m.34s., iEN = +32m.17s., PSKS = +36m.0s., SS = +46m.48s.
 Long waves were also recorded at Apia and Miyazaki.

October 4d. 9h. South America :—

Huancayo eP = 35m.29s., i = 36m.29s., 37m.28s., and 37m.46s.
 La Plata P = 37m.18s., SE = 41m.6s., SN = 41m.12s., L = 43m.6s.
 Riverview eN = 43m.0s.
 St. Louis iPZ = 43m.16s., iZ = 43m.27s., eSN = 51m.41s., eN = 51m.55s.
 Tucson eP = 43m.53s., iP_cP = 44m.31s.
 Riverside iPZ = 44m.26s.
 Mount Wilson iPZ = 44m.30s.
 Pasadena iP = 44m.30s.
 Haiwee eP = 44m.37s.
 Tinemaha ePNZ = 44m.42s.
 Long waves were recorded at Sitka.

Oct. 4d. Readings also at 1h. (Agra), 6h. (Calcutta), 7h. (Tucson, Huancayo, La Paz, Mount Wilson, Pasadena, and Riverside), 8h. (Huancayo and Mizusawa), 12h. (near Almata, Andijan, Frunse, Samarkand, Tashkent, Tchimkent, and near La Paz (2)), 13h. (La Paz), 14h. (Manila, Vladivostok, Almata, Tashkent, Tchimkent, Samarkand, and Sverdlovsk), 15h. and 17h. (La Paz), 18h. (La Plata, Huancayo (2), and near La Paz (3)), 19h. (La Paz (2) and Manila), 22h. (Huancayo, San Juan, La Paz, and La Plata).

October 5d. 14h. 38m. 43s. Epicentre 9°·5N. 83°·9W. (as on 1940, October 2d.).

A = +·1048, B = -·9809, C = +·1640 ; δ = +4 ; h = +7 ;
 D = -·994, E = -·106 ; G = +·017, H = -·163, K = -·986.

	Δ	Az.	P.	O - C.	S.	O - C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Balboa Heights	4·3	97	e 1 12	+ 4	e 2 2	+ 2	—	2·4
San Juan	19·4	61	i 4 30	0	i 8 22	SS	i 9 49	PP i 10·1
Fort de France	22·8	76	i 5 8	+ 3	i 9 27	+16	5 36	PP e 16·2
Huancayo	23·0	159	i 5 6k	- 1	i 9 25	+11	1 6 0	PPP
Columbia	24·5	6	e 5 25	+ 3	e 9 33	- 7	—	e 11·3
Cape Girardeau	28·2	351	i 5 53	- 3	e 11 7	+26	e 12 17	SSS
Bermuda	28·7	35	e 6 4	+ 3	—	—	e 7 17	PPP e 11·9
St. Louis	29·6	351	i 6 6	- 3	i 11 11	+ 7	i 6 57	PP
Florissant	z. 29·8	351	i 6 8	- 3	—	—	i 7 31	PPP
Georgetown	29·9	11	i 6 13	+ 1	e 11 23	+14	7 3	PP
La Paz	30·2	148	i 6 17k	+ 3	i 11 13	0	13 46	SSS 15·9
Philadelphia	31·4	14	i 6 24	- 1	e 11 30	- 2	e 7 11	PP 16·3
Chicago, J.S.A.	32·4	354	e 6 29	- 5	e 11 40	- 8	17 39	PP
Chicago, U.S.C.G.S.	32·4	354	e 6 27	- 7	e 11 40	- 8	e 7 29	PP e 17·4
Fordham	32·5	16	i 6 34	0	i 12 0	+11	i 7 46	PP 17·4

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Lincoln	33.2	343	e 6 40	0	e 12 1	+ 1	e 7 52	PP e 13.9
Buffalo	33.6	8	i 6 43	- 1	i 12 9	+ 3	i 7 46	PP 17.1
Tucson	33.7	317	i 6 42 _a	- 3	i 11 39	-29	i 8 8	PPP 13.0
Toronto	34.3	6	e 6 46	- 4	e 12 10	- 7	8 9	PP 18.3
Harvard	34.6	15	e 6 53	0	e 12 17	- 5	e 8 14	PP e 17.3
Vermont	36.1	13	e 8 32	PP	e 12 50	+ 5	e 15 47	SSS e 17.9
Ottawa	36.5	10	7 8	- 1	e 12 55	+ 4	8 45	PPP e 17.3
East Machias	38.0	19	i 7 23	+ 2	i 13 39	+25	e 9 9	PP e 16.2
Shawinigan Falls	38.1	12	7 22	0	e 13 21	+ 5	8 53	PP 21.3
La Jolla	38.5	313	e 7 20	- 6	—	—	—	—
Palomar	z. 38.5	314	i 7 24 _k	- 2	—	—	i 9 37	P _c P —
Seven Falls	39.1	13	7 32	+ 1	13 37	+ 6	9 19	PPP 19.3
Halifax	39.2	22	e 8 59	PP	—	—	—	20.3
Riverside	39.2	314	i 7 32 _k	+ 1	—	—	i 9 40	P _c P —
Mount Wilson	39.8	314	i 7 36 _k	0	—	—	—	—
Salt Lake City	39.8	326	7 33	- 3	e 13 33	- 9	—	e 16.1
Pasadena	39.9	314	i 7 37 _k	0	—	—	—	—
Haiwee	40.7	316	e 7 43	- 1	—	—	e 9 25	P _c P —
Tinemaha	41.4	318	i 7 50	0	—	—	i 9 47	P _c P —
Bozeman	42.9	333	e 10 34	PPP	e 14 42	+15	—	e 18.0
Butte	43.9	333	e 8 16	+ 6	e 14 48	+ 6	—	—
Santa Clara	44.1	315	i 8 14	+ 2	e 15 8	+23	—	e 23.4
Berkeley	44.6	315	i 8 14	- 2	i 14 55	+ 3	i 17 7	SS e 24.8
Ukiah	45.8	317	e 8 34	+ 9	e 15 29	+20	—	e 21.9
Seattle	50.0	327	—	—	e 15 11	-58	e 19 8	SS —
La Plata	E. 50.5	152	8 59	- 3	16 10	- 6	23 17	L _q 29.2
	N. 50.5	152	9 5	+ 3	16 5	-11	10 5	P _c P 29.3
Victoria	51.0	327	e 9 0	- 6	e 18 56	?	—	25.3
Rio de Janeiro	51.2	129	e 8 59	- 8	i 16 26	+ 1	—	i 25.8
Sitka	61.7	331	e 10 23	+ 1	—	—	e 14 18	PPP e 29.7
College	70.5	336	e 11 21	+ 3	e 20 32	0	—	e 29.1
San Fernando	74.5	55	e 11 54	+12	e 21 22	+ 5	—	33.3
Toledo	76.2	51	11 52	0	i 21 39	+ 3	14 50	PP 30.8
Granada	76.6	54	i 11 54 _k	0	i 21 47	+ 7	12 12	P _c P 36.9
Stonyhurst	77.3	37	—	—	e 22 17?	+29	—	e 35.3
Almeria	77.5	55	e 11 48	-11	21 33	-17	12 12	pP 35.3
Aberdeen	77.6	33	—	—	e 27 23	SS	—	e 36.6
Kew	78.6	39	e 12 7	+ 2	e 22 26	PS	—	e 27.3
Paris	80.6	42	i 12 16	0	—	—	—	38.3
Clermont-Ferrand	81.1	45	e 12 19	+ 1	—	—	—	e 39.3
Uccle	81.6	40	i 12 20 _a	- 1	22 34	+ 1	23 20	PS e 36.3
De Bilt	82.0	38	i 12 23	0	e 22 41	+ 4	i 12 34	pP 36.3
Hamburg	84.7	36	i 12 37 _a	0	e 23 5	+ 1	—	e 41.3
Stuttgart	85.0	42	i 12 38 _a	0	e 23 7	0	—	e 41.3
Copenhagen	85.8	34	e 12 43	+ 1	23 19	+ 4	—	—
Jena	86.1	40	i 12 45	+ 1	—	—	—	—
Potsdam	86.8	38	i 12 48 _a	+ 1	i 23 34	+ 9	i 12 56	P _c P 38.6
Upsala	87.6	30	—	—	e 22 17?	?	e 27 13	?
Rome	88.4	49	i 12 58 _a	+ 3	i 23 37	- 3	e 16 27	PP —
Triest	88.6	44	i 13 56	+60	e 23 43	+ 1	i 14 7	P _c P e 38.7
Warsaw	91.5	36	e 13 10	0	e 23 40	[- 2]	i 25 23	PS e 42.3
Christchurch	106.3	227	17 35	PKP	27 56	PS	34 15	SSP 48.2
Helwan	106.5	55	e 18 53	PP	i 28 5	PS	—	—
Manila	145.6	314	i 19 42 _a	[+ 2]	—	—	i 21 11	PP 67.3

Additional readings:—

- San Juan i = +4m.41s. and +9m.22s.
- Huancayo i = +6m.58s., +8m.36s., and +10m.31s.
- Columbia e = +7m.1s.
- Cape Girardeau iPPN = +6m.5s., iN = +7m.41s.
- Bermuda e = +8m.54s.
- St. Louis iZ = +6m.16s., iP_cPZ = +9m.5s., iSSN = +12m.57s., iSSSN = +13m.25s., iE = +13m.57s.
- Florissant iZ = +6m.18s.
- Georgetown PPP = +7m.33s.
- Philadelphia e = +11m.2s., +13m.38s., and +14m.57s.
- Chicago J.S.A. SS = +13m.17s.
- Chicago U.S.C.G.S. e = +15m.17s.

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Fordham iPPP = +8m.6s.
 Buffalo iPPP = +8m.2s.
 Tucson i = +7m.1s., +7m.28s., and +8m.45s.
 Toronto SS = +15m.5s.
 Vermont i = +8m.42s.
 Ottawa 1E = +13m.11s., SSE = +14m.59s., SSSN = +15m.23s.
 East Machias e = +7m.33s.
 Seven Falls SS = +16m.48s.
 Berkeley eN = +8m.26s., eE = +14m.23s., eN = +14m.40s., iSN = +14m.58s.
 La Plata SSN = +20m.17s.?
 Rio de Janeiro ePE = +9m.5s.
 Granada PPP = +16m.43s., PS = +22m.36s.
 Almeria PP = +14m.42s., PPP = +16m.32s., S_cS = +23m.4s.
 Aberdeen eN? = +35m.17s.
 Uccle SSE = +28m.12s.
 De Bilt eSSE = +28m.17s.?
 Jena eE = +12m.58s., eN = +13m.27s.
 Potsdam eZ = +22m.23s., iSKKSE = +23m.25s., eSSSE = +33m.6s., iZ = +35m.25s.
 Rome PPS = +25m.10s., iSSE = +30m.1s., eSSSN = +32m.44s.
 Trieste iPP = +16m.37s., iSKS = +24m.1s., iPS = +24m.16s.
 Warsaw eN = +28m.27s., eE = +30m.41s. and +32m.59s.
 Upsala eE = +23m.12s.
 Christchurch S = +28m.46s., L_q = +41m.20s.
 Long waves were also recorded at Agra, Bergen, Ivigtut, Honolulu, Pennsylvania, Scoresby Sund, and Prague.

Oct. 5d. 14h. 44m. 32s. Epicentre 37°·2N. 69°·3E. (as on 1940 April 14d.).

A = +·2822, B = +·7469, C = +·6020; δ = -10; h = -1;
 D = +·935, E = -·353; G = +·213, H = +·563, K = -·798.

Epicentre attributed by U.S.S.R.; 37°·5N. 69°·5E.

	Δ	Az.	P.	P-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Samarkand	3·1	324	i 0 54	+ 3	i 1 43	S _g	i 1 3	P _g
Tashkent	4·1	0	e 1 8	+ 3	i 2 21	S _g	i 1 19	P _g
Andijan	4·3	33	e 1 8	0	—	—	e 1 25	P _g
Tchimkent	5·1	2	e 1 20	0	—	—	—	—
Frunse	7·0	34	1 45	- 1	2 51	-17	e 2 8	P*
Almata	8·4	42	2. 2	- 4	—	—	—	—
Agra	12·4	141	e 5 19	S	(e 5 19)	- 2	—	—
Semipalatinsk	15·4	27	3 37	- 3	—	—	—	8·0
Bombay	18·5	169	e 4 29	+10	e 8 5	+21	—	e 9·5
Grozny	19·0	296	e 4 30	+ 4	—	—	—	—
Sverdlovsk	20·5	346	e 4 44	+ 2	i 8 21	- 6	—	—
Piatigorsk	21·0	298	e 4 58	+11	—	—	—	—
Calcutta	N. 22·0	126	e 5 15	+17	e 9 36	+40	e 8 53	P _c P
Kodaikanal	E. 27·8	162	—	—	e 9 28?	?	—	—
Colombo	E. 31·7	160	—	—	e 13 19	SS	—	e 17·2

Additional readings:—

Andijan P_gP_g = +1m.32s.
 Frunse eP_gP_g = +2m.16s., S_g = +3m.30s.
 Agra P_gE = +5m.42s., S = +6m.43s., S* = +7m.29s.
 Calcutta eSSN = +10m.26s.

Oct. 5d. 17h. 17m. 13s. Epicentre 9°·5N. 83°·9W. (as at 14h.).

A = +·1048, B = -·9809, C = +·1640; δ = +4; h = +7;

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Balboa Heights	4·3	97	e 1 8	0	e 2 1	+ 1	—	—
San Juan	19·4	61	i 4 38	+ 8	e 8 27	SS	—	e 8·9
Huancayo	23·0	159	e 5 10	+ 3	e 9 4	-10	—	e 10·6
Philadelphia	31·4	14	e 1 35	?	e 11 39	+ 7	e 7 26	PP
Tucson	33·7	317	e 6 43	- 2	—	—	e 7 18	PP
Ottawa	36·5	10	e 7 7	- 2	—	—	—	17·8

Additional readings:—

Philadelphia e = +2m.37s.
 Long waves were also recorded at Potsdam and Chicago.

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Oct. 5d. Readings also at 0h. and 1h. (La Paz), 2h. (La Paz and Huancayo), 4h. (La Plata, La Paz, Huancayo, Riverside, Mount Wilson, Pasadena, Haiwee, and Tinemaha), 5h. (La Paz and Huancayo), 6h. (near Fresno, Lick, Branner, Ksara, and Helwan), 7h. (near Wellington, New Plymouth, La Paz, Ksara, Helwan, and Huancayo), 8h. (Calcutta, Kodaikanal, near Manila, and Tashkent), 9h. (Frunse, Upsala, Agra, Bombay, Andijan, Moscow, College, Palomar, Tashkent, Ksara, Tinemaha, Haiwee, Pasadena, Mount Wilson, Riverside, La Jolla, Sverdlovsk (2), Tucson, Ottawa, and Berkeley), 10h. (Ksara and Helwan), 12h. (La Paz (2)), 13h. (Rome and Bermuda), 14h. (near Mizusawa, Ksara, and Helwan), 15h. (Huancayo, Balboa Heights, and La Paz), 17h. (La Paz), 18h. (St. Louis), 20h. (La Paz), 21h. (La Paz, near Triest, and Huancayo), 22h. (La Paz (2), near Branner, and Berkeley), 23h. (Helwan and Ksara).

Oct. 6d. 15h. 35m. 17s. Epicentre 20°·5S. 70°·5W. (as on 1940 Oct. 4d.).

$$A = +.3129, B = -.8836, C = -.3481; \quad \delta = -17; \quad h = +5;$$

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
La Paz	z. 4·6	30	1 4	- 5	1 2 6	+ 5	—	2·5
Huancayo	9·6	330	e 2 20	+ 3	e 4 12	+ 8	e 4 28 SS	—
Tucson	65·1	324	e 10 30	- 2	—	—	—	—
Riverside	z. 70·2	321	i 11 4	0	—	—	—	—
Mount Wilson	z. 70·8	321	e 11 7	- 1	—	—	—	—
Pasadena	z. 70·8	321	e 11 8	0	—	—	—	—
Haiwee	z. 72·0	332	e 11 15	0	—	—	—	—

Huancayo also gives $i = +4m.54s.$ and $+5m.4s.$

Oct. 6d. 15h. 38m. 27s. Epicentre 20°·5S. 70°·5W. (as at 15h. 35m.).

$$A = +.3129, B = -.8836, C = -.3481; \quad \delta = -17; \quad h = +5.$$

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
La Paz	4·6	30	i 1 4 _a	- 5	1 1 58	- 3	—	2·4
Huancayo	9·6	330	i 2 15	- 2	1 4 14	+10	—	—
La Plata	E. 18·1	177	e 4 12 _k	+ 6	7 45	SS	4 33 PP	9·8
	N. 18·1	144	e 4 13 _k	+ 7	7 33?	+11	4 33 PP	9·9
	z. 18·1	144	e 4 17	+11	—	—	—	9·4
Rio de Janeiro	E. 25·5	102	i 5 33	+12	1 9 52	+13	—	1 12·9
Balboa Heights	30·6	343	e 5 33?	-34	—	—	—	—
San Juan	38·9	8	e 7 18	0	1 12 59	- 9	—	e 16·2
Bermuda	52·8	7	e 9 20	+12	16 17	-10	e 18 52	e 25·7
Columbia	55·1	350	e 9 34	+10	e 16 58	0	e 20 49 SS	—
Cape Girardeau	60·2	344	e 9 58	- 2	e 18 0	- 4	e 10 40	pP
Philadelphia	60·3	357	e 9 57	- 4	e 18 1	- 5	e 22 18	SS
Fordham	61·1	358	e 10 5	- 1	1 18 17	+ 1	1 18 54	PS
St. Louis	61·7	344	e 10 5	- 5	e 18 23	0	—	—
Florissant	61·9	344	1 10 9	- 3	e 18 23	- 3	e 18 47	PS
Weston	62·6	0	e 10 14	- 2	1 18 35	0	—	—
Harvard	62·7	0	e 10 16	- 1	e 18 36	0	e 20 8	S _e S
Buffalo	63·6	353	1 10 22	- 1	1 18 53	+ 6	—	—
Vermont	64·7	359	e 10 38	+ 8	1 19 5	+ 4	e 13 9	PP
East Machias	65·0	3	e 10 38	+ 6	1 19 9	+ 5	e 13 3	PP
Tucson	65·1	324	1 10 31	- 1	1 19 11	+ 5	1 12 57	PP
Lincoln	65·7	339	—	—	e 19 12	- 1	e 22 57	SS
Ottawa	65·7	356	10 35	- 1	19 15	+ 2	23 33	SS
Shawinigan Falls	66·8	359	10 41	- 2	19 31	+ 5	—	—
Seven Falls	67·3	0	10 49	+ 3	1 19 34	+ 2	—	31·6
La Jolla	69·4	320	e 10 58	- 2	—	—	—	—
Riverside	70·2	321	e 11 4	0	—	—	—	—
Mount Wilson	70·8	321	e 11 7 _k	- 1	—	—	—	—
Pasadena	70·8	321	e 11 8 _k	0	e 20 23	+ 9	—	—
Santa Barbara	71·9	319	e 11 16	+ 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.
Haiwee	72.0	322	e 11	17	+ 2	e 20	37	+10	—	—	—
Tinemaha	72.9	322	i 11	21	+ 1	—	—	—	—	—	—
Fresno	73.5	321	e 11	27	+ 3	—	—	—	—	—	—
Bozeman	75.5	332	e 12	22	pP	e 21	11	+ 5	e 22	8	sS e 29.7
Ukiah	77.1	321	—	—	—	e 21	58	sS	—	—	e 42.6
Cape Town	78.0	122	—	—	—	e 22	3	sS	—	—	—
Lisbon	82.3	45	15	41 [†]	PP	e 22	39 [†]	sS	26	53	SS 37.8
Seattle	82.8	328	e 20	48	?	e 22	39	+16	e 24	6	PPS e 49.8
San Fernando	83.0	47	e 12	33	+17	i 22	39	+14	—	—	46.0
Victoria	83.3	328	e 12	22	+ 5	i 22	37	+ 9	—	—	37.6
Granada	85.2	48	i 12	30 ^k	+ 3	i 22	51	+ 4	15	43	PP e 42.8
Almeria	85.8	49	e 12	47	+17	22	58	+ 5	13	2	pP 38.6
Toledo	86.2	46	e 12	36	+ 4	i 23	5	+ 8	24	1	PS 39.6
Algiers	89.7	51	—	—	—	e 23	3	[- 5]	—	—	e 42.3
Christchurch	94.0	220	13	25	pP	22	52	[-38]	31	21	SS 44.0
Kew	94.2	35	—	—	—	i 23	47	[+16]	e 30	38	SS e 40.6
Stonyhurst	94.2	33	—	—	—	i 23	49	[+18]	—	—	e 44.6
Paris	94.6	39	—	—	—	e 23	49	[+15]	—	—	47.6
Aberdeen	96.0	30	—	—	—	i 23	58	[+14]	i 31	2	SS e 42.7
Scoresby Sund	96.9	14	—	—	—	e 23	32	[-16]	—	—	e 50.0
Rome	98.4	49	e 13	38 ^a	+10	i 24	12	[+15]	i 17	29	PP e 50.0
Stuttgart	98.6	41	—	—	—	e 24	11	[+13]	—	—	e 54.6
Triest	100.5	45	e 13	50	+12	i 24	22	[+16]	i 26	41	PS —
Hamburg	100.8	36	—	—	—	e 23	42	[-26]	—	—	e 53.6
Potsdam	102.2	37	i 17	59 ^k	PP	i 24	29	[+14]	e 32	22	SS i 48.1
College	103.1	334	—	—	—	e 24	30	[+12]	e 27	56	PS —
Sofia	106.3	50	e 18	33	PP	e 24	45	[+12]	e 33	33 [?]	SS 58.6
Upsala	106.6	31	—	—	—	e 24	39	[+ 5]	—	—	—
Warsaw	106.8	39	—	—	—	i 24	49	[+14]	—	—	e 56.6
Bucharest	108.7	48	—	—	—	e 25	0	[+16]	—	—	57.2
Helwan	109.9	65	e 18	54	PP	28	51	PS	25	8	PPP —
Istanbul	110.2	52	e 16	33	?	27	30	?	—	—	58.6
Pulkovo	112.9	32	19	11	PP	25	15	[+15]	28	55	PS e 49.4
Ksara	114.4	62	e 19	48	PP	e 29	20	PS	—	—	—
Tchinkent	140.1	47	e 19	37	[+19]	—	—	—	e 23	2	PP —
Tashkent	140.2	49	e 19	30	[+12]	e 29	16	SKKS	22	24	PP 93.7
Andijan	142.6	49	e 19	42	[+20]	—	—	—	e 22	57	PP —
Frunse	143.3	44	e 19	57	[+34]	—	—	—	e 22	50	PP —
Bombay	145.5	86	i 19	36	[+10]	i 29	47	SKKS	i 22	56	PP —
Kodaikanal	147.5	102	(e 19	33 [†])	[+ 3]	—	—	—	—	—	—
Colombo	148.3	111	19	50	[+19]	—	—	—	—	—	77.4
Agra	150.5	70	e 19	48	[+13]	30	11	SKKS	23	23	SKP —
Hyderabad	150.5	90	—	—	—	30	15	SKKS	—	—	—
Vladivostok	150.7	323	e 19	43	[+ 8]	30	14	SKKS	i 23	29	PP 74.3
Calcutta	160.2	80	e 21	6	?	—	—	—	—	—	—
Manila	167.7	243	i 20	14 ^a	[+19]	31	48	?	25	5	PP 79.6

Additional readings :—

- Huancayo iS = +3m.14s.
- La Plata E PPP = +5m.21s., +5m.51s., and +9m.3s.
- La Plata N PPP = +5m.33s., +8m.9s., and +9m.9s.
- San Juan e = +7m.50s. and +8m.47s., i = +14m.52s.
- Bermuda e = +12m.34s., +18m.22s., and +21m.37s.
- Cape Girardeau eE = +18m.3s. and +18m.30s.
- Philadelphia e = +14m.58s., iS = +19m.46s., e = +24m.38s.
- Fordham iP = +10m.14s.
- St. Louis iPN = +10m.13s., eE = +25m.38s.
- Florissant iPZ = +10m.14s., iZ = +10m.55s., eE = +19m.41s. and +19m.58s.
- Harvard eZ = +10m.48s.
- Vermont esS = +20m.13s., e = +26m.10s.
- East Machias esS = +20m.23s., e = +22m.54s.
- Tucson i = +11m.8s., +14m.28s., and +20m.23s.
- Ottawa eE = +20m.27s., SSSE = +25m.33s.
- Bozeman e = +16m.2s., eSS = +25m.48s.
- Lisbon N = +23m.25s.
- Granada PPP = +17m.57s., PS = +24m.3s., PPS = +24m.34s., SS = +27m.56s., SSS = +31m.48s.
- Almeria PP = +15m.58s., PPP = +17m.54s., ScS = +23m.16s., SS = +28m.20s., SSS = +31m.44s.

Continued on next page.

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Christchurch S = +24m.40s., L_qN = +39m.32s.
 Aberdeen iN = +31m.6s.
 Rome S = +25m.1s., i = +30m.58s., iSSE = +31m.27s.
 Trieste eS = +25m.19s., eSS = +31m.53s.
 Potsdam eNZ = +24m.33s., iN = +25m.31s.
 Sofia eN = +19m.33s.?, eE. +29m.3s.
 Upsala eN = +25m.57s.
 Warsaw eN = +26m.15s.
 Bucharest eN = +25m.3s.
 Helwan iE = +26m.3s., SE = +30m.39s., iEN = +34m.24s.
 Pulkovo SS = +35m.9s.
 Tashkent PS = +32m.54s.
 Kodaikanal PKP has been increased by 10 minutes.
 Agra iE = +34m.48s., SSE = +42m.23s.
 Vladivostok SKSP = +33m.46s.
 Long waves were also recorded at Phu-Lien, Sverdlovsk, Clermont-Ferrand, De Bilt, Tananarive, Honolulu, and Sitka.

October 6d. Readings also at 0h. (La Paz (2)), 4h. (near Mizusawa), 6h. (Ksara and Helwan), 8h. (Calcutta, Kodaikanal, Bombay, Agra (2), and La Paz), 9h. (La Paz), 10h. (Baku, Agra, Ksara, Helwan, Rome, and Tashkent), 11h. (Sverdlovsk), 13h. (La Paz), 16h. (Haiwee, Tinemaha, Riverside, Mount Wilson, and La Paz), 17h. (near Tuai, Salt Lake City, and La Paz), 18h. (Pasadena, near Fresno, Branner, La Jolla, Riverside, Mount Wilson, and near Tucson), 20h. (near Frensdale), 21h. (Rome), 22h. (La Paz), 23h. (Tchimkent, Frunse, Andijan, Tucson, and Tashkent).

October 7d. 1h. Undetermined shock.

Hastings P = 26m.0s., 26m.10s., S = 26m.20s.
 Arapuni P = 26m.0s., S = 26m.21s., 26m.27s., 26m.33s., and 26m.39s.
 Bunnythorpe P = 26m.0s., 26m.4s., 26m.9s., and 26m.18s., S = 26m.28s.
 Tuai P = 26m.7s. and 26m.22s., S = 26m.25s.
 Wellington P = 26m.29s., 26m.35s., 26m.45s., 26m.55s., and 27m.3s., S = 27m.7s.
 Christchurch P = 27m.5s., 27m.10s., 27m.15s., and 27m.34s., S = 28m.9s., 28m.20s., 28m.23s., and 28m.27s.
 Riverview eN = 30m.5s., eZ = 30m.16s., iN = 34m.55s.
 Pasadena ePZ = 38m.41s.
 Mount Wilson ePZ = 38m.42s., iPPZ = 42m.31s.
 Riverside ePZ = 38m.43s., ePPZ = 42m.31s.
 Haiwee ePZ = 38m.47s., ePPZ = 42m.38s.
 Tucson iP = 38m.57s., i = 45m.39s., eSKS = 49m.14s., i = 55m.28s., iSS = 56m.32s., eL = 65.1m.
 Helwan iZ = 45m.8s. and 49m.27s.
 Granada PP = 47m.26s., SKS = 52m.53s., eS = 55m.13s., SKSP = 57m.37s., PPS = 59m.40s.

October 7d. 6h. 43m. 3s. Epicentre 5°·5N. 126°·0E. (as on 1939, March 4d.).

A = -·5851, B = +·8054, C = +·0952; $\delta = +7$; $h = +7$;
 D = +·809, E = +·588; G = -·056, H = +·077, K = -·996.

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.		O - C.	S.		O - C.	Supp.		L. m.
			m.	s.		m.	s.		m.	s.	
Manila	10·3	332	1 2	31 k	+ 5	1 4	33	sS	—	—	—
Taihoku	19·9	348	4	28	+ 2	—	—	—	—	—	—
Naha	20·6	3	4	33	0	8	20	+ 7	—	—	—
Phu-Lien	24·2	311	e 5	12	+ 4	9	23	+ 6	1 5	40	PP
Zi-ka-wei	25·9	352	e 5	22	- 3	1 9	49	+ 4	1 10	5	sS
Miyazaki	26·8	10	5	31	- 2	9	50	-10	—	—	18·4
Hukuoka	28·2	8	e 5	52	+ 6	e 9	59	-24	—	—	(16·3)
Kobe	30·3	15	6	0	- 4	10	48	- 8	—	—	—
Yokohama	32·3	20	e 6	11	-11	—	—	—	—	—	—
Tokyo, Cen. Met. Ob.	32·6	20	e 7	23	PP	—	—	—	—	—	—
Nagano	33·0	17	6	23	- 5	—	—	—	—	—	—
Sendai	35·3	20	6	42	- 5	12	4	-10	—	—	—
Mizusawa	N. 36·2	19	e 6	32	-23	e 12	33	+ 6	—	—	—
Vladivostok	37·8	7	i 7	6	- 2	i 12	51	- 1	7	34	pP
Perth	38·5	193	7	17	+ 3	13	0	- 2	8	4	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.	
Mori	38.7	17	e 7	15	- 1	—	—	—	19	38	PPP	—
Calcutta	40.1	299	e 7	23	- 5	i 13	36	+10	e 9	31	PPP	—
Adelaide	41.9	165	i 7	43	+ 1	i 13	47	- 6	9	3	PP	—
Brisbane	41.9	142	i 7	39	- 3	i 13	39	-14	i 16	51	SS	—
Riverview	45.8	150	i 8	12	- 2	—	—	—	i 18	42	pP	—
Sydney	45.8	150	e 8	15	+ 1	i 14	42	- 7	i 18	13	SSS	—
Colombo	45.9	274	8	14	0	i 14	54	+ 3	—	—	—	—
Hyderabad	47.9	288	8	36	+ 6	15	20	+ 1	10	24	PP	24.3
Kodaikanal	48.3	279	i 8	35 ^k	+ 2	i 15	27	+ 2	10	23	PP	22.7
Irkutsk	49.9	342	8	46	0	15	48	+ 1	e 9	12	pP	—
Agra	50.4	301	e 8	45	- 4	15	53	- 1	18	23	S _c S	—
Bombay	53.5	290	i 9	12	- 1	i 16	37	+ 1	i 11	29	PP	—
Almata	57.2	320	e 9	44	+ 5	e 17	37	+12	—	—	—	—
Frunse	58.6	318	e 9	49	0	17	47	+ 3	—	—	—	—
Semipalatinsk	58.8	328	e 9	50	0	—	—	—	—	—	—	—
Andijan	59.3	315	e 9	52	- 2	i 17	55	+ 2	—	—	—	—
Tashkent	61.7	315	i 10	12	+ 2	e 18	26	+ 3	e 10	41	pP	33.1
Samarkand	62.9	312	e 10	16	- 2	e 18	35	- 4	—	—	—	—
Christchurch	64.4	143	9	19 ^a	-69	18	51	- 6	9	48	pP	26.8
Wellington	64.4	141	—	—	—	18	46	-11	i 20	6	PPS	25.9
Sverdlovsk	72.1	329	11	15	- 1	20	24	- 5	11	42	pP	32.6
Honolulu	75.2	69	e 11	24	-10	e 21	8	+ 5	e 15	8	pPP	—
Baku	75.9	311	12	0	pP	21	9	- 2	—	—	—	37.9
Grozny	79.2	313	e 12	4	+ 8	e 21	45	- 1	17	0	PPP	—
Piatigorsk	81.1	313	e 12	19	+13	e 22	5	- 1	—	—	—	—
College	83.4	25	—	—	—	e 22	21	- 8	—	—	—	—
Moscow	84.6	325	12	21	- 3	22	35	- 6	12	49	pP	—
Ksara	87.1	303	e 12	45	+ 9	e 23	10	+ 5	e 13	39	pP	—
Pulkovo	88.2	330	e 12	39	- 2	e 22	55	[- 4]	24	11	sS	e 47.3
Sitka	90.1	32	—	—	—	i 23	15	[+ 5]	—	—	—	—
Bucharest	93.2	314	—	—	—	24	57 [?]	sS	—	—	—	54.9
Upsala	94.4	331	e 15	38	?	i 23	30	[- 3]	—	—	—	e 45.9
Warsaw	94.8	323	e 13	9	- 3	i 23	36	[0]	e 17	46	PP	e 36.0
Potsdam	99.4	325	—	—	—	e 23	57	[- 4]	—	—	—	e 48.2
Victoria	99.4	40	17	27	PP	24	2	[+ 1]	27	7	PPS	45.9
Hamburg	100.6	327	—	—	—	e 24	3	[- 4]	—	—	—	e 53.9
Jena	100.8	323	—	—	—	e 24	5	[- 3]	—	—	—	—
Scoresby Sund	101.2	349	i 22	55	?	—	—	—	—	—	—	—
Triest	101.3	318	e 20	44	PPP	i 24	7	[- 2]	—	—	—	e 25.1
Stuttgart	103.0	322	e 13	34	-15	e 24	14	[- 4]	—	—	—	—
Rome	103.5	315	e 14	13	+22	i 24	21	[+ 1]	18	47	PP	38.6
Chur	103.6	321	e 24	15	S	(e 24 15)	[- 6]	—	—	—	—	—
Branner	103.7	49	—	—	—	e 24	22	[+ 1]	—	—	—	—
Zurich	104.0	321	e 24	20	S	(e 24 20)	[- 3]	—	—	—	—	—
Lick	104.1	49	—	—	—	e 24	26	[+ 3]	—	—	—	—
Uccle	104.9	326	—	—	—	e 25	39	S	—	—	—	e 49.9
Tinemaha	106.8	49	—	—	—	e 24	36	[+ 1]	—	—	—	—
Paris	107.0	325	—	—	—	e 27	57 [?]	PS	—	—	—	—
Butte	107.1	38	—	—	—	e 24	37	[+ 1]	—	—	—	—
Kew	107.1	328	—	—	—	i 24	40	[+ 4]	—	—	—	e 43.9
Haiwee	107.3	50	e 14	6	P	e 24	38	[+ 1]	e 18	12	PKP	—
Pasadena	107.8	51	i 14	14	P	i 24	39	[- 1]	i 18	22	PKP	e 49.7
Mount Wilson	107.9	51	e 14	14	P	e 24	41	[+ 1]	e 18	21	PKP	—
Bozeman	108.2	38	—	—	—	e 24	42	[0]	e 34	19	SS	—
Riverside	z. 108.5	51	e 14	19	P	—	—	—	e 29	40	PKKP	—
Tucson	114.3	50	e 18	27	[- 1]	i 28	49	PS	i 20	9	pPP	e 42.0
Toledo	115.6	318	e 20	52	pPP	—	—	—	—	—	—	69.0
Granada	116.7	317	22	46	PPP	30	42	SKKS	35	9	SS	—
St. Louis	124.7	34	e 18	36	[-12]	e 25	31	[-11]	e 30	59	PS	—
Seven Falls	125.5	13	e 18	51	[+ 1]	e 37	46	SS	—	—	—	66.9
Shawinigan Falls	125.6	15	e 18	50	[0]	e 27	25	?	—	—	—	—
Ottawa	125.7	18	e 18	50	[0]	e 27	27	?	—	—	—	57.9
Harvard	z. 129.6	15	e 19	1	[+ 3]	—	—	—	e 22	10	PP	—
Balboa Heights	150.8	59	e 18	57 [?]	[-38]	—	—	—	—	—	—	—
San Juan	153.4	26	e 20	35	pPKP	e 33	9	PS	e 24	11	PP	—

For Notes see next page.

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NOTES TO OCTOBER 7d. 6h. 43m. 3s.

Additional readings :—

Zi-ka-wei IN = +5m.27s.
 Hukuoka L is given as S.
 Mizusawa eSE = +12m.24s.
 Vladivostok sS = +13m.43s.
 Perth PPP = +8m.35s., SS = +14m.55s.
 Calcutta IsSN = +17m.27s.
 Adelaide P_cPN = +9m.47s., i = +14m.36s., SSN = +16m.22s., i = +16m.57s., S_cS = +17m.27s.
 Brisbane iSE = +13m.45s., iSSE = +16m.57s.
 Hyderabad SSN = +18m.11s.
 Irkutsk sS = +16m.38s.
 Bombay ePN = +9m.16s., iN = +17m.32s. and +18m.48s.
 Christchurch sSEN = +19m.45s.
 Wellington i = +23m.6s.
 Sverdlovsk sS = +21m.6s.
 Honolulu e = +12m.42s.
 Moscow sS = +23m.29s.
 Pulkovo iS = +23m.13s.
 Sitka i = +23m.37s.
 Upsala eE = +13m.42s., eN = +24m.5s.
 Warsaw eZ = +23m.42s., iEN = +24m.14s. and +25m.14s.
 Potsdam iSKSEN = +24m.0s., iSE = +24m.32s., iN = +24m.56s.
 Victoria SS = +32m.27s.
 Hamburg iEN = +24m.9s.
 Trieste eSS = +24m.43s.
 Stuttgart eSN = +25m.24s.
 Rome eSKS = +25m.29s., e = +32m.51s., SSE = +34m.57s.
 Haiwee ePKKPZ = +29m.44s.
 Pasadena iPKKPZ = +29m.43s.
 Mount Wilson ePKKPZ = +29m.42s.
 Bozeman e = +25m.33s., eS = +26m.23s., e = +29m.45s.
 Tucson i = +21m.55s. and +24m.29s., e = +26m.3s., i = +38m.29s.
 St. Louis iZ = +19m.9s. and +20m.19s., eE = +27m.9s.
 Long waves were also recorded at San Fernando and De Bilt.

Oct. 7d. Readings also at 0h. (Sverdlovsk), 2h. (Pasadena, Mount Wilson, Riverside, Haiwee, and La Paz), 4h. (near Algiers, La Paz, Rome, and Granada), 6h. (Bucharest, Rome, La Paz (2), and Huancayo), 7h. (La Plata, La Paz (2), and near Trieste), 8h. (near Ferndale (2), Huancayo (2), La Paz (3), and Tucson), 9h. (Mizusawa), 10h. (Calcutta, Bombay, and Kodaikanal), 11h. (near Apia and near Trieste (2)), 12h. (La Paz), 14h. (Huancayo, and La Paz (2)), 15h. (near Berkeley), 16h. (Manila), 17h. (La Paz), 18h. (near Tucson and near Granada), 20h. (La Paz, Huancayo, and Tucson), 22h. (Tucson and near Apia).

Oct. 8d. Readings at 0h. (La Paz and near Trieste), 1h. (Tucson), 2h. (near Trieste), 4h. (La Paz and Huancayo), 7h. (La Paz (2) and Huancayo), 8h. (La Paz), 11h. and 12h. (near Trieste), 15h. (La Paz), 16h. (near La Paz, Zi-ka-wei, and near Rome), 17h. (near Trieste, Ksara, and near Mizusawa), 18h. and 19h. (Tucson), 20h. (near La Paz), 22h. (near Mizusawa).

Oct. 9d. Readings at 0h. (La Paz), 2h. (Wellington), 3h. (Riverside, Huancayo, Tucson, Pasadena, Mount Wilson, and Tinemaha), 5h. and 8h. (2) (La Paz), 15h. (near Mizusawa, La Paz, and near Branner), 16h. (near Mizusawa), 17h. (near Lick and La Paz), 19h. (near Mizusawa), 21h. (near Branner).

Oct. 10d. 5h. 57m. 10s. Epicentre 33°·8N. 118°·6W. (as given by Pasadena).

A = -·3986, B = -·7311, C = +·5537; δ = -3; h = +1;
 D = -·878, E = +·479; G = -·265, H = -·486, K = -·833.

	Δ	Az.	P.	O-C.	S.	O-C.
	°	°	m. s.	s.	m. s.	s.
Pasadena	0·5	46	10 11k	- 3	10 17	- 6
Mount Wilson	0·6	47	10 14k	- 1	10 21	- 5
Riverside	1·0	79	10 21a	0	10 34	- 2
Santa Barbara	1·1	305	10 26	+ 4	10 44	+ 5
La Jolla	E. 1·5	130	e 0 27	- 1	10 48	- 1
Palomar	Z. 1·5	107	10 28	0	—	—
Haiwee	2·4	13	10 43	+ 2	11 16	S*
Tinemaha	3·3	3	10 56	+ 3	e 1 48	S*
Tucson	6·7	98	11 57	P*	—	—

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Oct. 10d. Readings also at 2h. (La Paz), 3h. (near Mizusawa), 5h. (Manila, near Mizusawa), Sverdlovsk, Tinemaha, Haiwee, Palomar, Riverside, Mount Wilson, and Pasadena), 9h. (near Trieste), 12h. (Samarkand), 14h. (La Paz), 16h. (La Paz, near Rome and Trieste), 17h. (Tucson), 18h. (near Mizusawa), 19h. (near St. Louis and Manila), 20h. (near Branner), 21h. (Manila).

Oct. 11d. 1h. 37m. 9s. Epicentre $41^{\circ}0N$. $33^{\circ}5E$. (as on 1938, May 31d.).

A = +.6312, B = +.4178, C = +.6535; $\delta = +3$; $h = -2$;
D = +.552, E = -.834; G = +.545, H = +.361, K = -.757.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.						
			m.	s.		m.	s.		m.	s.							
Istanbul	3.4	272	0	50	-	5	1	39	+ 2	1	22	P _g S _g	—				
Yalta	3.5	8	1	9	P _g	e	1	52	S*	—	—	—	—				
Sebastopol	3.6	0	1	9	P _g	e	1	55	S*	—	—	—	—				
Simferopol	4.0	6	1	10	+ 6	e	1	50	- 2	e	2	0	S*	—			
Theodosia	4.2	19	1	9	+ 2	e	1	59	+ 2	—	—	—	—				
Bucharest	6.4	305	e	1	35	-	3	e	2	47	-	6	1	2	9	P _g	3.8
Ksara	7.4	164	e	2	25	P _g	e	4	15	S _g	—	—	—	—	—	—	
Sofia	7.8	286	e	2	3	+ 5	e	3	51	S*	e	3	12	?	—	—	
Helwan	E. 11.3	188	—	—	—	—	e	5	27	SSS	—	—	—	—	—	16.6	
Moscow	15.0	9	3	45	PP	e	6	28	+ 5	—	—	—	—	—	—	—	
Triest	15.1	295	i	6	47	SS	—	—	—	—	—	—	—	—	—	(18.1)	
Rome	15.8	278	—	—	—	—	e	7	21	SSS	—	—	—	—	—	e 8.2	
Sverdlovsk	23.6	39	5	17	+ 4	—	—	—	—	—	—	—	—	—	—	12.9	

Additional readings:—

Sebastopol P_g = +1m.24s.

Bucharest eZ = +2m.5s., eP_gZ = +2m.12s., eZ = +2m.31s., S*Z = +3m.3s., S*EN = +3m.7s.

Triest L given as S.

Long waves were also recorded at De Bilt.

Oct. 11d. 7h. 53m. 9s. Epicentre $60^{\circ}0N$. $150^{\circ}5W$. (as on 1937, October 24d.).

A = -.4374, B = -.2474, C = +.8646; $\delta = +6$; $h = -9$;
D = -.492, E = +.870; G = -.753, H = -.426, K = -.503.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.				
			m.	s.		m.	s.		m.	s.					
College	5.0	11	e	1	23	+ 5	e	2	37	S*	e	2	44	S _g	—
Sitka	8.4	103	i	2	11	+ 5	i	3	35	- 8	i	2	22	PP	i 5.1
Victoria	19.5	114	4	36	+ 5	i	8	26	SS	i	4	53	PP	—	9.6
Seattle	20.5	114	—	—	—	e	7	40	-47	—	—	—	—	—	i 12.9
Butte	26.3	104	e	5	54	+15	e	10	11	0	—	—	—	—	i 10.6
Bozeman	27.3	104	e	6	4	+16	e	10	29	+ 2	—	—	—	—	e 14.5
Fresno	N. 30.5	126	e	6	19	+ 2	—	—	—	—	—	—	—	—	—
Salt Lake City	30.6	112	e	6	19	+ 1	i	11	6	-14	i	7	47	PPP	e 12.9
Tinemaha	30.8	123	i	6	22k	+ 2	—	—	—	—	i	9	15	P _c P	—
Haiwee	31.7	123	i	6	30	+ 3	—	—	—	—	i	9	18	P _c P	—
Santa Barbara	32.5	127	i	6	36k	+ 2	—	—	—	—	—	—	—	—	—
Mount Wilson	33.3	125	i	6	43k	+ 2	—	—	—	—	—	—	—	—	—
Pasadena	33.4	125	i	6	43k	+ 1	—	—	—	—	i	8	17	PPP	e 16.1
Riverside	z. 33.8	125	i	6	46k	0	—	—	—	—	i	9	23	P _c P	—
Palomar	z. 34.6	125	i	6	52k	- 1	—	—	—	—	—	—	—	—	—
Lincoln	38.0	95	e	7	40	+19	e	13	16	+ 2	—	—	—	—	e 20.8
Tucson	38.1	118	i	7	24k	+ 2	i	13	17	+ 1	i	8	45	PP	i 15.2
Chicago, U.S.C.G.S.	41.8	87	e	9	46	PP	e	14	17	+ 6	i	9	54	PPP	e 20.9
Florissant	42.7	92	i	7	59	- 1	e	14	28	+ 4	i	9	56	P _c P	—
St. Louis	42.9	92	i	7	50	-12	e	17	29	SSS	e	9	39	P _c P	e 21.5
Cape Girardeau	N. 44.2	94	e	8	13	+ 1	—	—	—	—	e	9	58	PP	—
Toronto	44.5	78	e	8	35	+20	e	14	50	- 1	e	18	5	SS	25.8
Scoresby Sund	44.8	22	e	13	36	?	e	16	54	?	—	—	—	—	e 22.7
Ottawa	45.1	74	8	20	0	0	15	14	+15	10	21	PP	—	—	e 20.9
Buffalo	45.3	78	e	8	23	+ 2	—	—	—	i	10	1	PP	—	e 23.8

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Shawinigan Falls	45.6	70	8 24	0	—	—	—	22.9
Seven Falls	46.1	69	8 27	- 1	15 36	+22	10 34 PP	24.2
Pittsburgh	46.7	82	e 8 32	0	e 15 18	- 4	e 8 42 pP	—
Vermont	46.9	73	e 8 35	+ 1	e 15 51	+26	e 10 27 PP	e 24.4
Vladivostok	48.1	286	—	—	18 33	SS	—	24.9
Harvard	49.2	73	e 8 51	- 1	e 16 8	+10	e 11 2 PP	e 24.9
Fordham	49.3	76	i 8 54	+ 1	e 16 3	+ 4	—	e 24.8
Georgetown	49.3	80	i 8 51	- 2	e 15 56	- 3	11 6 PP	—
East Machias	49.5	69	e 11 9	PP	e 16 24	PPS	—	e 19.8
Philadelphia	50.0	78	e 11 4	PP	e 15 58	-11	e 19 51 SS	e 24.6
Irkutsk	53.0	313	e 9 19	- 2	e 16 43	- 7	—	e 25.9
Pulkovo	60.6	359	—	—	18 27	- 3	—	—
Sverdlovsk	60.9	341	10 17	0	18 31	- 3	—	26.9
Copenhagen	63.9	12	i 10 35	- 2	—	—	—	—
Moscow	64.4	355	10 39	- 1	i 19 17	- 1	—	—
San Juan	71.5	85	—	—	e 20 14	-29	—	—
Balboa Heights	72.8	102	—	—	e 19 51?	-67	—	—
Andijan	73.6	328	e 11 35	- 2	e 21 2	- 5	—	—
Tashkent	73.9	330	i 11 38	- 1	i 21 4	- 6	—	42.0
Simferopol	75.3	358	11 45	- 2	—	—	—	—
Yalta	75.8	357	11 53	+ 3	—	—	—	—
Samarkand	76.0	331	e 11 48	- 3	e 21 24	-10	—	—
Grozny	76.2	348	11 56	+ 4	—	—	—	—
Helwan	90.5	359	i 13 6	+ 1	i 23 57	- 2	—	—
Huancayo	93.1	108	i 13 16	- 1	e 24 10	-12	e 25 56 PS	e 43.0

Additional readings :—

Sitka e = +4m.19s.
 Salt Lake City i = +6m.38s.
 Tinemaha iZ = +9m.30s.
 Haiwee iZ = +9m.32s.
 Santa Barbara iZ = +6m.54s.
 Pasadena iZ = +7m.1s., +9m.22s., and +9m.36s.
 Riverside iZ = +9m.37s.
 Tucson i = +7m.44s., iPPP = +9m.20s., i+9m.41s.
 Chicago, U.S.C.G.S. e = +17m.21s.
 Florissant iZ = +8m.19s., eE = +17m.53s.
 St. Louis eN = +8m.6s. and +14m.55s.
 Toronto e = +23m.13s.
 Ottawa SSS = +18m.9s.
 Buffalo i = +8m.36s., +8m.57s., and +10m.12s., e = +22m.53s.
 Seven Falls SS = +18m.52s.
 Pittsburgh ePPN = +10m.43s., eSS = +18m.40s.
 Vermont eSS = +18m.40s.
 Fordham i = +10m.16s.
 Georgetown +19m.39s.
 Philadelphia e = +21m.14s.
 Long waves were also recorded at Paris, Ukiah, Columbia, Bermuda, La Paz, and De Bilt.

Oct. 11d. 18h. 41m. 10s. Epicentre 42°-1S. 73°-3W.

A = +.2139, B = -.7128, C = -.6679; δ = -7; h = -2;
 D = -.958, E = -.287; G = -.192, H = +.640, K = -.744.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
La Plata	E. 14.0	64	i 3 26 _a	+ 4	6 8	+ 9	3 44 PP	8.8
	N. 14.0	64	i 3 27 _a	+ 5	6 20	+21	3 43 PP	8.7
	Z. 14.0	64	i 3 28 _a	+ 6	6 50	SS	3 41 PP	8.3
La Paz	25.9	12	i 5 38 _a	+ 3	i 10 23	+19	6 20 PP	14.5
Huancayo	30.0	356	i 6 13	+ 1	i 11 12	+ 2	1 6 58 PP	i 11.8
Rio de Janeiro	31.5	63	i 6 18	- 8	i 11 39	+ 5	—	i 14.6
Balboa Heights	51.1	353	e 8 50?	-16	—	—	—	—
San Juan	60.5	8	e 10 17	+ 3	i 18 24	- 5	e 12 28 PP	i 25.2
Tacubaya	65.7	334	e 10 50	+ 2	e 19 37	+ 3	—	e 31.6
Cape Town	E. 69.4	117	e 11 25	+13	21 2	PPS	—	30.2

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	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.	
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.	
Bermuda	74.4	8	e 11	42	0	i 21	15	- 1	e 14	21	PP	e 35.4
Columbia	76.1	354	e 11	56	+ 5	e 21	29	- 6	e 26	30	SS	e 32.0
Christchurch	76.3	223	11	56 ^k	+ 4	21	33	- 4	22	25	S _c S	34.5
Wellington	76.8	226	11	54	- 1	21	35	- 7	14	52	PP	34.8
Arapuni	78.5	229	—	—	—	21	50	-11	—	—	—	36.3
Cape Girardeau	80.4	347	e 12	12	- 3	e 22	15	- 6	—	—	—	—
Georgetown	80.7	358	i 12	15	- 1	i 22	23	- 1	—	—	—	i 33.0
Tucson	81.6	329	i 12	20 ^a	- 1	i 22	34	+ 1	i 15	34	PP	e 34.2
Philadelphia	81.7	359	i 12	22	0	i 22	32	- 2	i 14	56	PP	e 33.3
St. Louis	81.8	347	e 12	17	- 5	i 22	26	- 9	—	—	—	—
Florissant	82.0	347	e 12	19	- 4	i 22	32	- 5	i 12	25	P _c P	—
Pittsburgh	82.4	355	e 12	25	0	i 22	42	+ 1	i 15	41	PP	—
Fordham	82.6	0	i 12	24	- 2	i 22	45	+ 2	—	—	—	e 42.1
Pennsylvania	82.6	357	—	—	—	e 22	50	+ 7	—	—	—	—
Harvard	84.2	2	i 12	34	0	i 23	0	+ 1	e 24	4	PS	e 33.8
Chicago, U.S.C.G.S.	84.5	349	e 12	35	- 1	i 22	57	- 5	—	—	—	e 33.2
Buffalo	84.8	356	i 12	33	- 4	—	—	—	e 24	4	PPS	e 39.3
Palomar	85.1	325	i 12	39	0	—	—	—	—	—	—	—
Lincoln	85.2	343	e 12	37	- 2	i 23	16	+ 7	e 28	59	SS	i 34.6
Toronto	85.5	356	e 12	39	- 2	23	7	[+ 3]	29	28	SS	43.8
Riverside	85.8	324	e 12	41	- 1	e 22	33	[- 33]	—	—	—	—
Vermont	86.2	0	e 12	48	+ 4	e 23	20	+ 1	e 16	10	PP	e 35.8
Mount Wilson	86.3	325	i 12	42 ^a	- 3	—	—	—	—	—	—	—
Pasadena	86.3	325	e 12	44 ^a	- 1	e 23	3	[- 7]	—	—	—	e 35.3
East Machias	86.7	5	e 12	53	+ 6	i 23	29	+ 5	e 16	16	PP	e 35.7
Halifax	86.8	8	—	—	—	e 23	23	- 2	e 28	56	SS	42.8
Apia	87.0	254	—	—	—	e 34	11	SSS	—	—	—	e 40.2
Ottawa	87.1	358	12	48	- 1	23	26	- 2	16	5	PP	e 38.8
Haiwée	87.9	326	e 12	53	0	—	—	—	—	—	—	—
Shawinigan Falls	88.3	1	12	53	- 2	23	44	+ 5	—	—	—	48.8
Seven Falls	88.9	2	e 16	38	PP	i 23	47	+ 3	29	34	SS	39.8
Tinemaha	88.9	326	e 12	56	- 2	—	—	—	—	—	—	—
Fresno	89.2	324	—	—	—	e 27	58	?	—	—	—	—
Salt Lake City	89.6	332	e 13	8	+ 7	e 23	25	[- 5]	e 16	50	PP	e 37.4
Logan	90.4	331	i 13	5	+ 1	e 23	33	[- 2]	—	—	—	42.8
Santa Clara	90.7	323	e 13	15	+ 9	e 24	16	+15	—	—	—	e 44.7
Berkeley	91.2	323	e 13	8	0	e 23	47	[+ 7]	—	—	—	e 43.2
Ukiah	92.7	323	e 13	13	- 2	e 24	24	+ 6	e 31	16	SS	e 44.0
Bozeman	93.7	334	e 13	34	+14	i 23	57	[+ 3]	e 17	28	PP	i 43.6
Riverview	94.1	216	e 17	50	PP	e 23	55	[- 1]	e 25	51	PS	e 42.6
Sydney	94.1	216	—	—	—	e 23	56	[0]	e 29	20	SS	—
Butte	94.4	335	e 13	32	+ 9	e 23	50	[- 8]	e 26	48	PPS	e 37.7
Adelaide	98.0	206	—	—	—	i 24	13	[- 4]	i 32	35	SSP	45.7
Tananarive	98.4	124	—	—	—	e 33	35	?	—	—	—	47.6
Brisbane	98.6	221	—	—	—	i 24	14	[- 6]	—	—	—	—
Lisbon	99.3	46	19	40	PPP	24	31	[+ 7]	—	—	—	46.2
San Fernando	99.3	49	e 18	2	PP	e 24	42	[+18]	e 27	3	PS	51.8
Seattle	99.3	328	—	—	—	e 25	34	+20	e 31	46	SS	e 41.6
Victoria	100.5	328	e 14	2	+11	e 24	8	[-21]	e 26	59	PS	—
Granada	101.3	50	i 18	5 ^a	PP	25	4	-27	21	14	PPP	50.0
Almeria	101.7	51	i 17	37	PP	27	49	PPS	17	49	pP	48.8
Toledo	102.9	48	e 18	21	PP	i 27	40	PS	20	27	PPP	45.1
Algiers	104.9	54	e 18	40	PP	e 24	50 [?]	[0]	27	50 [?]	PS	—
Ivigtut	105.0	12	e 18	29	PP	e 26	26	+24	e 36	59	SSS	—
Clermond-Ferrand	110.8	47	e 19	16	PP	—	—	—	—	—	—	e 54.8
Sitka	112.0	328	e 18	16	[-21]	i 28	59	PS	e 19	46	PP	e 47.0
Paris	112.4	44	e 14	44	P	e 29	2	PS	e 19	22	PP	53.8
Kew	112.6	40	e 14	52	P	e 25	20	[- 2]	e 19	25	PP	e 51.8
Stonyhurst	113.2	37	e 19	40	PP	i 29	5	PS	e 39	50 [?]	SSS	52.8
Neuchatel	113.6	48	e 19	35	PP	—	—	—	—	—	—	—

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	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.	
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.	
Rome	113.8	55	e 14	56	P	e 25	32	[+ 5]	i 19	38	PP	e 49.2
Basle	114.7	47	e 19	40	PP	e 29	31	PS	—	—	—	—
Chur	114.7	48	e 18	44	[+ 2]	—	—	—	—	—	—	54.8
Zurich	114.7	47	e 19	40	PP	e 29	37	PS	—	—	—	—
Uccle	115.2	42	e 14	58	P	e 25	41	[+ 8]	i 19	53	PP	e 48.8
Aberdeen	115.4	35	i 19	46	PP	i 29	31	PS	i 35	20	SS	e 55.7
De Bilt	115.7	41	e 14	59	P	i 29	46	PS	e 19	50	PP	e 60.8
Stuttgart	115.9	47	e 19	50	PP	e 25	35	[0]	e 29	42	PS	e 51.8
Triest	116.7	52	i 19	56	PP	(i 25	48)	[+10]	(i 29	55)	PS	—
Scoresby Sund	118.2	17	e 18	55	[+ 6]	e 35	22	SS	—	—	—	e 53.8
Jena	118.4	46	—	—	—	e 29	50	PS	—	—	—	e 48.8
Hamburg	119.0	42	e 20	14	PP	—	—	—	—	—	—	e 52.8
Prague	119.4	48	e 19	53	PP	e 25	48	[0]	e 30	5	PS	e 52.8
Helwan	119.6	75	e 20	17	PP	25	58	[+10]	—	—	—	—
Potsdam	119.9	45	e 15	14	P	e 30	10	PS	—	—	—	e 55.8
Bergen	120.4	34	—	—	—	e 36	50?	SSP	—	—	—	58.8
Budapest	N. 120.8	52	—	—	—	e 30	25	PS	—	—	—	e 57.8
Sofia	121.0	59	e 20	20	PP	e 26	4	[+11]	e 22	50	PPP	—
College	121.3	331	e 20	30	PP	e 36	33	SS	—	—	—	49.6
Bucharest	123.6	58	e 20	50	PP	—	—	—	—	—	—	32.5
Istanbul	123.9	63	20	29	PP	(27 58)	{ +18}	—	30	49	PS	e 70.8
Warsaw	124.1	48	e 20	39	PP	30	50?	PS	—	—	—	58.8
Ksara	125.0	74	e 20	57	PP	27	53	{ + 6}	—	—	—	—
Upsala	125.6	38	e 22	8	PPP	e 30	44	PS	e 37	50	SS	e 54.8
Simferopol	128.9	60	19	10	[0]	—	—	—	22	33	PKS	71.8
Pulkovo	131.7	41	19	15	[0]	26	22	[- 2]	21	32	PP	64.3
Erevan	134.1	70	19	25	[+ 5]	—	—	—	21	58	PP	—
Moscow	134.5	47	19	22	[+ 2]	26	26	[- 4]	21	53	PP	59.8
Piatigorsk	134.5	64	22	15	PP	—	—	—	22	55	PKS	—
Colombo	E. 137.6	138	22	12	PP	—	—	—	—	—	—	66.2
Kodaikanal	E. 139.2	132	e 20	5?	[+ 36]	41	34	SS	i 23	3	PP	66.3
Bombay	143.1	118	i 19	37	[+ 1]	i 29	58	{ +19}	i 22	51	PP	68.9
Hyderabad	E. 145.6	127	19	43	[+ 3]	30	10	{ +17}	23	12	PP	—
Manila	149.9	208	i 19	54k	[+ 7]	—	—	—	—	—	—	71.8
Samarkand	150.1	82	e 19	55	[+ 7]	—	—	—	e 23	27	PKS	84.8
Agra	E. 152.2	113	e 19	53	[+ 2]	30	42	{ +12}	23	26	PKS	—
Tashkent	152.2	79	i 19	51	[0]	30	42	{ +12}	23	45	PKS	—
Andijan	154.3	81	e 19	58	[+ 4]	—	—	—	—	—	—	84.8
Calcutta	N. 155.2	136	e 19	59	[+ 4]	e 30	51	{ + 4}	e 24	8	PP	e 75.9
Frunse	156.4	77	e 19	58	[+ 2]	—	—	—	—	—	—	82.8
Almata	158.1	75	e 20	12	[+ 13]	—	—	—	—	—	—	—
Phu-Lien	158.8	180	e 24	34	PP	—	—	—	—	—	—	—
Vladivostok	161.4	281	24	30	PP	27	37	[+ 31]	37	50	PPS	75.7
Irkutsk	169.7	8	e 20	24	[+ 15]	32	6	{ + 5}	e 25	6	PP	e 77.8

Additional readings:—

La Plata E. SS = +6m.50s. and +7m.44s.
 La Plata N. PPP = +3m.51s., +4m.13s., and +7m.40s.
 La Plata z. +7m.40s.
 La Paz iN = +10m.48s., iSSN = +11m.30s.
 Huancayo i = +6m.24s., +7m.20s., +7m.39s., +9m.14s., and +10m.21s.
 San Juan iS_eS = +20m.17s., e = +22m.57s.
 Bermuda eSS = +25m.29s.
 Christchurch PNZ = +11m.59s., SS = +26m.24s., L_q = +31m.28s.
 Wellington pP?Z = +12m.1s., iZ = +12m.35s. and +17m.13s., S_eS = +22m.35s., SS = +26m.40s., SSS = +30m.5s., L_q = +31.8m.
 Tucson i = +12m.35s., e = +14m.5s., iPPP = +17m.30s., i = +23m.6s., iSS = +28m.2s.
 Philadelphia e = +21m.50s., +23m.23s., and +27m.17s., eSS = +28m.0s.
 St. Louis iZ = +12m.31s.
 Florissant iZ = +12m.53s., iN = +22m.37s., eSSN = +28m.8s.
 Pittsburgh iSS = +28m.38s.
 Harvard iN = +23m.7s.
 Chicago, U.S.C.G.S. e = +25m.54s. and +26m.50s.
 Buffalo i = +12m.52s., e = +13m.26s., i = +14m.12s., +14m.59s., and +15m.24s.
 Lincoln e = +32m.27s.
 Toronto e = +35m.2s.
 Vermont iS = +23m.24s., e = +27m.16s.

Continued on next page.

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

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East Machias $i = +24m.5s.$ and $+24m.43s.$, $eSS = +29m.18s.$
 Apia $e = +35m.56s.$
 Ottawa $SS = +29m.14s.$
 Seven Falls $e = +17m.50s.$ and $+36m.11s.$
 Salt Lake City $iS = +23m.47s.$, $i = +24m.30s.$, $eSS = +29m.55s.$
 Berkeley $ePE = +13m.11s.$, $iPZ = +13m.16s.$, $eSZ = +24m.2s.$
 Ukiah $e = +26m.7s.$
 Bozeman $iS = +24m.34s.$, $eSS = +31m.18s.$
 Riverview $eE = +31m.2s.$
 Butte $eS = +24m.38s.$
 Adelaide $iN = +43m.8s.$
 Brisbane $eN = +32m.2s.$, $eE = +32m.8s.$
 Lisbon $SN = +24m.40s.?$
 San Fernando $eSSE = +32m.58s.$
 Victoria $e = +32m.4s.$ and $+42m.50s.?$
 Granada $PPS = +28m.2s.$
 Almeria $PP = +20m.49s.$, $PPP = +22m.37s.$, $SS = +33m.13s.$, $SSS = +36m.45s.$
 Sitka $i = +30m.10s.$, $iSS = +35m.7s.$, $i = +39m.15s.$
 Paris $iPPP = +21m.49s.$, $L_q = +50.8m.$
 Kew $ePPNZ = +22m.17s.$, $eSKKSEN = +26m.20s.$, $eSN = +27m.25s.$, $ePSEN = +29m.1s.$, $ePKKPZ = +29m.21s.$, $ePPSZ = +30m.15s.$, $eSSEN = +35m.20s.$, $eSSSE = +39m.50s.?$, $eL_qEN = +47.8m.$
 Rome $iZ = +19m.53s.$, $iEN = +22m.14s.$, $eSKKS = +26m.36s.$, $iS = +27m.32s.$, $iPS = +29m.21s.$, $iSSN = +35m.29s.$, $e = +35m.51s.$, $iSSS = +39m.42s.$
 Uccle $ePP = +18m.35s.$, $eSKKS = +26m.58s.$, $iE = +27m.49s.$, $PS = +29m.24s.$, $iSS = +35m.52s.$
 Aberdeen $iN = +27m.51s.$, $eE = +34m.15s.$, $eSSSE = +37m.50s.$, $iN = +39m.40s.$, $eN = +48m.55s.$, $eE = +51m.47s.$
 De Bilt $ePPP = +22m.40s.$, $ePPS = +30m.56s.$, $eSS = +34m.50s.?$
 Stuttgart $eSN = +28m.0s.$, $eSSN = +36m.10s.$
 Trieste $eP = +20m.2s.$, $iPKP = +22m.44s.$, SKS given as iPP , $iSKP = +27m.2s.$, PS given as $iSKS$, $iPPP = +28m.5s.$, $iSKKS = +32m.28s.$, $eS = +33m.8s.$, $eSKP = +34m.2s.$, $iPS = +35m.22s.$, $iPPS = +36m.40s.$, $eSS = +42m.39s.$, $eSSS = +47m.39s.$
 Scoresby Sund $iPS = +28m.40s.$
 Prague $e = +36m.56s.$ and $+40m.8s.$
 Helwan $PSE = +32m.32s.$
 Potsdam $ePSN = +30m.14s.$
 Sofia $eSEN = +30m.26s.$
 Bucharest $eN = +20m.56s.$
 Istanbul $SKKS$ given as PPP .
 Warsaw $eE = +21m.3s.$
 Upsala $eN = +28m.50s.?$, $ePSE = +31m.14s.$, $ePPSE = +32m.32s.$, $eSSN = +37m.56s.$
 Pulkovo $PS = +31m.26s.$
 Moscow $PS = +32m.36s.$
 Kodaikanal $SSSE = +46m.40s.$
 Bombay $iE = +23m.3s.$, $iPKSEN = +23m.15s.$, $iSKSPE = +33m.7s.$, $iPPSE = +35m.35s.$, $iSSEN = +41m.52s.$
 Hyderabad $SKSPE = +33m.21s.$, $SSE = +41m.59s.$
 Agra $PSKSE = +33m.56s.$, $iE = +38m.55s.$, $SSE = +43m.22s.$
 Tashkent $SKSP = +34m.1s.$
 Calcutta $ePKP_2N = +20m.30s.$, $iPSKSN = +34m.34s.$, $ePPSN = +37m.52s.$, $eSSN = +44m.10s.$
 Vladivostok $eSKKS = +31m.14s.$
 Irkutsk $SKSP = +35m.56s.$
 Long waves were also recorded at Ferndale, Baku, Tchimkent, Ogyalla, Branner, Edinburgh, and Honolulu.

Oct. 11d. Readings also at 5h. (near Berkeley, Fresno, Branner, Lick, and Tucson), 6h. (Salt Lake City), 9h. (near Berkeley), 14h. (near Wellington), 15h. (near Tuai, Wellington, Christchurch, and near Berkeley), 16h. (Tucson), 18h. (Balboa Heights), 19h. (Wellington), 22h. (near Harvard).

Oct. 12d. 5h. Local Japanese shock.

Tokyo Imperial University gives epicentre $35^{\circ}57'N$. $139^{\circ}81'E$.

Tokyo, Imp. Univ. $P = 26m.22s.$, $S = 26m.31s.$
 Kamakura $P = 26m.23s.$, $S = 26m.33s.$
 Kiyosumi $P = 26m.23s.$, $S = 26m.33s.$
 Komaba $P = 26m.23s.$, $S = 26m.32s.$
 Koyama $P = 26m.23s.$, $S = 26m.37s.$
 Mitaka $P = 26m.23s.$, $S = 26m.32s.$
 Titibu $P = 26m.23s.$, $S = 26m.37s.$
 Togane $P = 26m.23s.$, $S = 26m.34s.$
 Tukubasan $P = 26m.23s.$, $S = 26m.34s.$

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Oct. 12d. Readings also at 0h. (Tucson), 1h. (near Mizusawa), 2h. (Palomar, Harvard, St. Louis, San Juan, Pasadena, Riverside, Mount Wilson, Tinemaha, Tucson, Haiwee, and La Paz), 3h. (Fresno, Uccle, Pasadena, Riverside, Mount Wilson, Tinemaha, Haiwee, and Tucson (2)), 4h. (Rome), 5h. (near Apia, near Balboa Heights, Huancayo, Pasadena, Riverside, Mount Wilson, Tinemaha, Haiwee, La Paz (2), La Plata, and Tucson), 7h. (Lick), 12h. (near Tananarive, Christchurch (2), La Paz, and near Trieste), 13h. (La Paz), 14h. (Manila), 15h. (near Trieste), 17h. (near Mizusawa), 20h. and 22h. (Tucson).

Oct. 13d. Readings at 3h. (Rome), 6h. (near Mizusawa), 12h. (near Algiers and near La Paz), 13h. (Haiwee, Riverside, Mount Wilson, Pasadena, Palomar, Tinemaha, Tucson, Victoria, Granada, Brisbane, Riverview, Christchurch, and Wellington), 14h. (Berkeley, Harvard, Potsdam, De Bilt, Uccle, and San Fernando), 17h. (Tucson and St. Louis), 19h. (Harvard, near Ottawa, Shawinigan Falls and Seven Falls, Frunse, near Andijan, and Samarkand), 21h. (Tucson and near La Paz), 22h. (Tucson), 23h. (La Paz, near Branner, and Tinemaha).

Oct. 14d. Readings at 0h. (Tucson), 2h. (Tucson, Riverview, Christchurch, Brisbane, La Paz, Palomar, Haiwee, Tinemaha, Riverside, Pasadena, and Mount Wilson), 3h. (Tucson, Tinemaha, Riverside, Mount Wilson, Berkeley, and Rome), 4h. (near Lick), 6h. (Tucson, Huancayo, La Paz, Palomar, Haiwee, Tinemaha, Riverside, Pasadena, and Mount Wilson), 8h. (Fresno, Santa Barbara, Tucson, Pasadena, Palomar, Haiwee, Tinemaha, Riverside, Mount Wilson, and near La Paz), 9h. (Stuttgart and Tucson), 13h. (Triest), 14h. (Bucharest, near Istanbul, Ksara, and Rome), 16h. (Tucson, Pasadena, Palomar, Haiwee, Tinemaha, Riverside, and Mount Wilson), 20h. (Tucson), 22h. (Tucson and La Paz).

Oct. 15d. 6h. 35m. 34s. Epicentre $55^{\circ}5N$. $165^{\circ}0E$.

$$A = -.5496, B = +.1473, C = +.8223; \quad \delta = -7; \quad h = -7;$$

$$D = +.259, E = +.966; \quad G = -.794, H = +.213, K = -.569.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Sapporo	19.7	241	4 38	+ 4	—	—	—	—
Mizusawa	22.8	233	(5 13)	+ 8	5 13	P	—	—
Sendai	23.6	233	5 16	+ 3	9 37	+12	—	—
Nagano	26.2	236	5 42	+ 4	—	—	—	—
Nagoya	28.0	234	5 52	- 3	—	—	—	—
Osaka	29.1	236	6 11	+ 7	—	—	—	—
Berkeley	50.5	79	e 9 13	+11	—	—	—	—
Bozeman	51.1	64	e 15 31	?	e 20 34	SSS	—	—
Lick	51.2	79	e 9 17	+10	—	—	—	—
Sverdlovsk	52.5	318	9 15	- 2	16 37	- 6	—	23.4
Tinemaha	53.3	76	i 9 24	+ 1	—	—	—	—
Haiwee	54.1	76	e 9 30	+ 1	—	—	—	—
Scoresby Sund	54.2	4	—	—	16 34	-32	—	e 27.0
Santa Barbara	54.4	79	e 9 32	+ 1	—	—	—	—
Mount Wilson	55.5	78	e 9 39	0	—	—	—	—
Pasadena	55.5	78	i 9 40	+ 1	—	—	—	e 30.4
Riverside	56.0	78	i 9 43	0	—	—	—	—
Frunse	56.3	298	e 9 50	+ 5	—	—	—	—
Palomar	z. 56.8	78	e 9 49	+ 1	—	—	—	—
Andijan	59.0	298	e 10 0	- 4	—	—	—	32.4
Pulkovo	59.5	336	—	—	e 18 11	- 5	—	e 32.3
Tashkent	60.1	300	e 10 9	- 2	e 18 18	- 6	—	e 30.8
Tucson	60.9	74	i 10 18	+ 1	—	—	—	—
Moscow	61.1	149	e 10 19	+ 1	e 18 30	- 7	—	—
Rome	80.2	339	—	—	e 21 27	†	—	e 29.3

Additional readings :—

Mizusawa P = +3m.38s.

Tinemaha i = +9m.35s.

Haiwee i = +9m.41s.

Scoresby Sund e = +18m.56s.

Santa Barbara i = +9m.43s.

Mount Wilson iZ = +9m.45s., i = +9m.50s.

Pasadena i = +9m.45s., iEZ = +9m.50s.

Riverside i = +9m.53s.

Palomar iZ = +9m.59s.

Tucson e = +10m.41s.

Long waves were also recorded at Agra, Baku, Irkutsk, Paris, Uccle, La Plata, Warsaw, De Bilt, San Juan, Potsdam, and Huancayo.

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Oct. 15d. Readings also at 0h. (Huancayo and La Paz), 1h. (Samarkand, Tashkent, Frunse, and near Andijan), 2h. (La Paz), 7h. (La Paz), 8h. (Tucson, Palomar, Riverside, Mount Wilson, Haiwee, Tinemaha, and Pasadena), 9h. (near Manila), 18h. (Tucson, Palomar, Riverside, Mount Wilson, Haiwee, Tinemaha, and Pasadena), 20h. (La Paz).

Oct. 16d. 13h. 17m. 35s. Epicentre 42°·9N. 11°·7E. (as on 1940 June 19d.).

Intensity VIII-IX at Radicofani, Celle sul Rigo, Abbadia San Salvatore. Radius of Macro seismic area between 40 and 150 kms. Epicentre 42°51'N. 11°40·5'E. depth 33kms.

Maurizio Giorgi.

Il terremoto del Monte Amiata del 16 Ottobre, 1940, XVIII. "La Ricerca Scientifica," Anno 12, No. 11, Novembre, 1941, XX, p. 1146 Public. de l'Institut de Geophysique de Rome, No. 73, Isoseismic Chart, p. 4.

$$A = +.7195, B = +.1490, C = +.6782; \quad \delta = -16; \quad h = -3; \\ D = +.203, E = -.979; \quad G = +.664, H = +.138, K = -.735.$$

		Δ	Az.	P.		O-C.		S.		O-C.		Supp.		L.
				m.	s.	s.	m. s.	s.	m. s.	s.	m. s.			
Rome		1.2	150	i 0	23 _a	- 1	i 0	42	+ 1	—	—	—	—	—
Triest		3.2	28	i 0	48	- 4	i 1	39	S*	i 1	1	P _g	—	—
Chur		4.3	339	e 1	8	0	—	—	—	—	—	—	—	—
Zurich		5.0	334	e 1	17	- 1	—	—	—	—	—	—	—	—
Ravensburg		5.1	344	e 1	23	+ 3	i 2	18	- 2	e 1	30	P*	—	—
Neuchatel		5.3	323	e 1	23	+ 1	—	—	—	e 1	45	P _g	—	—
Basle		5.5	330	e 1	24	- 1	—	—	—	—	—	—	—	e 3.4
Ebingen		5.7	339	e 1	27	- 1	e 2	43	+ 8	e 1	53	P _g	—	—
Stuttgart		6.2	343	e 1	33	- 2	i 3	6	S*	e 1	54	P*	—	e 4.2
Clermont-Ferrand		6.8	297	e 1	44	0	—	—	—	—	—	—	—	—
Budapest	E.	7.0	46	1	52	+ 6	i 2	59	- 9	i 3	41	S*	—	3.9
Kecskemet	Z.	7.0	52	e 1	52	+ 6	e 3	30	S*	—	—	—	—	—
Prague		7.4	350	e 2	28	P _g	e 4	12	S _g	—	—	—	—	—
Jena		8.1	358	e 1	59	- 3	e 3	39	+ 4	e 4	13	S*	—	e 4.4
Paris		8.8	316	e 2	35	PPP	e 4	26	S*	—	—	—	—	5.4
Uccle		9.4	330	e 2	32	PP	i 4	29	SS	—	—	—	—	e 4.9
Potsdam		9.6	7	e 1	58	-23	i 4	19	+ 7	i 4	44	S*	—	—
Hamburg		10.8	355	—	—	—	e 4	37	SS	—	—	—	—	e 6.5
Heligoland	N.	11.6	349	—	—	—	e 5	13	SS	—	—	—	—	—
Toledo		12.2	261	e 3	0	+ 2	e 6	16	L	—	—	—	—	(e 6.3)
Almeria		12.4	246	e 3	2	+ 1	5	44	SS	3	14	PP	—	7.4
Granada		13.0	251	i 3	14 _a	+ 5	5	51	+16	3	29	PPP	—	i 6.6
Upsala		17.4	11	e 4	5	- 1	e 7	23	+ 4	—	—	—	—	e 9.2
Moscow		21.0	44	4	45	- 2	e 8	37	0	—	—	—	—	11.0
Sverdlovsk		33.7	48	6	45	0	e 12	5	- 3	—	—	—	—	16.9
Tucson		88.5	314	e 12	55	- 1	—	—	—	—	—	—	—	—

Additional readings:—

Ravensburg iP_gN = +1m.43s., iE = +1m.46s., eN = +2m.47s.
 Ebingen eN = +1m.38s., eE = +2m.27s., eS_g = +3m.3s., eEZ = +3m.9s., eN = +3m.13s.
 Stuttgart eNW = +1m.41s., e = +1m.59s., iP_g = +2m.2s., i = +2m.5s. and +2m.8s.,
 eN = +3m.0s., iS* = +3m.14s., iS_gNW = +3m.17s., eE = +3m.25s.
 Clermont-Ferrand i = +1m.50s.
 Budapest iE = +2m.42s.
 Kecskemet eZ = +4m.4s.
 Jena eN = +2m.36s., +3m.9s., and +3m.47s.
 Potsdam eP*N = +2m.25s., eP_gZ = +2m.49s., eS*E = +3m.58s., iE = +4m.38s. and
 +4m.57s., iZ = +5m.6s., iE = +5m.9s., iN = +5m.18s.
 Almeria PPP = +3m.26s., P_gP = +8m.15s.
 Granada i = +4m.11s., SS = +6m.18s.
 Long waves were also recorded at Tashkent, Pulkovo, and other European stations.

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Oct. 16d. 23h. 59m. 44s. Epicentre 46°·4N. 9°·9E.

Intensity IV in la Haute-Engadine. Macroseismic radius 25kms. Epicentre 46°·4N. 9°·9E. (Strasbourg).

E. Wanner.

Jahresbericht des Erdbebenendienstes der Schweiz im Jahre, 1940, Annalen der Schweizer. Met. Zentralanstalt 1940, No. 5, p. 2, Zurich, 1941, Macroseismic Chart, Fig. 6.

$$A = +.6818, B = +.1190, C = +.7218; \quad \delta = +1; \quad h = -4;$$

$$D = +.172, E = -.985; \quad G = +.711, H = +.124, K = -.692.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Chur	0.5	331	e 0 11	- 3	e 0 19	- 4	—	—
Ravensburg	1.4	352	e 0 28	+ 1	i 0 48	+ 2	—	—
Zurich	1.4	317	e 0 28	+ 1	e 0 48	+ 2	—	—
Ebingen	1.9	340	e 0 30	- 4	e 1 0	+ 1	e 0 38	P _g
Basle	2.0	306	e 0 37	+ 2	e 1 7	S _g	—	—
Neuchatel	2.1	285	e 0 40	+ 3	e 1 14	S _g	—	—
Stuttgart	2.4	349	e 0 44	+ 3	e 1 10	- 2	e 0 47	P _g
Triest	2.8	106	e 0 37	-10	e 1 14	- 8	e 0 50	P*
Jena	4.6	12	e 1 26	P*	—	—	—	e 1.5
Clermont-Ferrand	4.7	264	e 1 16	+ 2	—	—	e 1 33	P _g e 3.6

Additional readings :—

Ravensburg eEN = +45s.

Ebingen eS_g = +1m.5s., iS_gZ = +1m.8s.

Stuttgart eP_g = +51s., eS = +55s., eS* = +1m.18s., i = +1m.24s., iNE = -1m.28s.

Triest eP* = +44s., eP_gP_g = +56s., iS* = +1m.26s., iS_g = +1m.29s.

Oct. 16d. Readings also at 6h. (Fresno), 11h. (Mizusawa), 13h. (Tucson), 14h. (Palomar, Riverside, Haiwee, Mount Wilson, Tinemaha, and Pasadena), 16h. (near Branner), 17h. (Fresno and near Tucson), 22h. (Manila), 23h. (Granada, Toledo, Potsdam, Rome, Ksara, Santa Barbara, Berkeley, Haiwee, Christchurch, La Jolla, Fresno, Tucson, Palomar, Riverside, Mount Wilson, Tinemaha, and Pasadena.)

Oct. 17d. Readings at 4h. (Tucson), 5h. (Balboa Heights), 8h. (near Manila), 10h. (Tucson), 12h. (Balboa Heights), 13h. (near La Paz), 17h. (La Paz and Ksara), 19h. (near Fresno), 22h. (Tanalarive).

Oct. 18d. 12h. 25m. 44s. Epicentre 38°·5N. 45°·0E. (as on 1937, March 7d.).

$$A = +.5548, B = +.5548, C = +.6199; \quad \delta = -12; \quad h = -1;$$

$$D = +.707, E = -.707; \quad G = +.438, H = +.438, K = -.785.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Erevan	1.7	347	i 0 35	+ 4	i 1 1	+ 7	—	—
Grozny	4.9	3	1 36	P _g	e 2 42	S _g	—	—
Piatigorsk	5.7	347	1 34	+ 6	2 40	+ 5	—	—
Istanbul	12.5	286	3 3	+ 1	(5 28)	+ 5	—	10.1
Helwan	14.2	235	i 3 21k	- 3	7 28	L	3 48	PP (7.5)
Bucharest	15.4	296	e 3 36	- 4	6 36	+ 4	e 4 5	PP
Sofia	17.0	291	e 3 58	- 3	e 7 5	- 5	—	e 9.1
Moscow	18.0	347	4 14	+ 1	7 32	0	—	—
Tashkent	18.9	74	i 4 34	+10	i 8 18	SS	—	e 13.4
Kecskemet	z. 20.3	301	4 40	0	—	—	—	—
Budapest	20.9	303	5 46	+60	9 42	+67	—	14.3
Sverdlovsk	21.1	24	e 4 55	+ 7	8 50	+11	—	11.1
Andijan	21.2	75	e 5 2	PP	—	—	e 5 48	PPP 13.4
Ogyalla	E. 21.6	304	5 20	PP	8 58	+ 9	9 32	SS e 14.3
Warsaw	21.6	317	4 51a	- 3	8 49	0	—	e 12.3

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	22.8	70	5	21	PP	9	35	SS	—	—	14.3
Pulkovo	23.3	341	e 5	13	+ 3	i 9	20	0	—	—	e 11.4
Triest	24.2	297	i 5	16	- 3	i 9	38	+ 3	i 5	50	PP
Prague	24.6	297	e 5	22	- 1	e 9	49	+ 7	—	—	e 14.3
Rome	25.0	289	e 5	29	+ 2	i 9	47	- 2	e 6	0	PP e 12.7
Potsdam	26.1	313	e 5	25	-12	i 10	17	+10	i 6	3	PP
Jena	26.6	310	e 5	46	+ 4	e 10	16	0	i 11	34	SS e 15.3
Upsala	27.5	330	e 6	24	PP	i 10	59	+29	—	—	e 13.3
Stuttgart	27.7	304	e 5	49	- 3	e 10	52	+19	—	—	e 15.3
Hamburg	28.3	314	e 5	59	+ 2	i 11	48	SS	—	—	e 16.6
Agra	E. 29.8	103	e 6	26	+15	11	20	+13	13	5	SSS
De Bilt	30.7	310	e 6	46	+27	e 11	16	- 5	e 13	16	SSS e 14.3
Bombay	31.0	122	e 6	36	+15	e 11	43	+17	e 7	30	PP 15.5
Uccle	31.0	307	e 6	16	- 5	i 11	25	- 1	—	—	e 14.3
Granada	38.0	284	i 12	48	S	(i 12	48)	-26	—	—	—
Calcutta	N. 40.2	101	—	—	—	e 14	4	+16	e 18	12	? e 18.9
Vladivostok	63.0	55	—	—	—	19	15	+14	26	28	SSS 33.9

Additional readings:—

Istanbul S given as PP ; L given as S.

Helwan PPPZ = +3m.56s., SSE = +8m.21s.

Bucharest iE = +4m.40s., SSE = +6m.58s.

Budapest ePE = +5m.49s.

Warsaw SZ = +8m.53s.

Triest ePPP = +6m.2s., iPCP = +9m.50s., iSS = +10m.20s.

Rome e = +7m.13s.

Potsdam iPZ = +5m.36s., ePPN = +5m.47s., iSSSZ = +10m.25s.

Jena eN = +10m.52s.

Hamburg e = +11m.8s.

Bombay eN = +12m.36s., iE = +14m.24s.

Granada iPP = +14m.59s.

Long waves were also recorded at Bergen, Paris, Huancayo, Scoresby Sund, Aberdeen, Bozeman, Lisbon, Ksara, Tananarive, Kew, Irkutsk, and Samarkand.

Oct. 18d. Readings also at 1h., 5h., and 7h. (La Paz), 11h. (Huancayo), 12h. (Christchurch), 13h. (near Fresno), 15h. (Tinemaha and Tucson), 16h. (near La Paz), 19h. (Riverview and Christchurch), 22h. (Riverview), 23h. (near Tananarive).

Oct. 19d. 10h. Undetermined shock.

Apia eP = 59m.25s., eS = 61m.15s.

Christchurch P = 61m.9s., S = 65m.22s., L₀E = +66m.32s., L = 67.7m.

Wellington P₁Z = 64m.8s., S = 66m.23s., L = 67.5m.

Sydney e = 66m.0s.

La Paz ePZ = 66m.53s., LZ = 100m.

Pasadena ePZ = 67m.50s.

Mount Wilson iPZ = 67m.51s.

Riverside ePZ = 67m.53s.

Palomar iPZ = 67m.54s.

Haiwee ePZ = 67m.59s.

Tinemaha iPZ = 68m.1s.

Tucson iP = 68m.13s., e = 78m.16s., eL = 97.2m.

Riverview eN = 70m.48s., eLN = 72.0m.

Huancayo eS = 80m.35s., e = 87m.0s.

Long waves were also recorded at San Fernando.

Oct. 19d. Readings also at 4h. (Manila), 5h. (Tucson), 7h. (Tinemaha, Tucson, Pasadena, Mount Wilson, Haiwee, and near Ottawa), 8h. (Huancayo), 10h. (Tananarive), 13h. (La Paz and near Triest), 15h. (Tinemaha, Palomar, Riverside, Irkutsk, Tas-kent, Sverdlovsk, Pasadena, Haiwee, and Mount Wilson), 21h. (Rome and near Triest (2)), 22h. (Berkeley), 23h. (near Mizusawa).

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Oct. 20d. 10h. 55m. 32s. Epicentre 14°·0N. 125°·0E. (as on 1940, April 8d.).

A = -·5568, B = +·7952, C = +·2404; $\delta = +16$; $h = +6$;
D = +·819, E = +·574; G = -·138, H = +·197, K = -·971.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Manila	4·0	279	i 0 56k	- 8	1 22	-30	—	—
Phu-Lien	18·8	293	4 28?	+ 5	—	—	—	—
Vladivostok	29·6	10	—	—	e 11 35	+31	—	13·4
Agra	E. 45·6	294	—	—	i 18 43	SS	—	—
Andijan	52·8	311	e 9 17	- 2	—	—	e 12 29	PPP
Tashkent	55·2	311	9 43	+ 6	17 22	+ 2	—	—
Sverdlovsk	64·4	327	10 53	+13	19 25	+ 7	—	e 23·7
Upsala	N. 86·5	331	—	—	e 33 28?	SSS	—	31·5

Long waves were also recorded at Pulkovo, Baku, De Bilt, Uccle, Potsdam, and Rome.

Oct. 20d. Readings also at 0h. (Tucson, Huancayo, and Tinemaha), 1h. (Wellington, Christchurch, Huancayo, near Branner, La Paz, and Mizusawa), 2h. (near Triest and Rome), 3h. (Calcutta, Bombay, and Agra), 4h. (Agra), 6h. (near Mizusawa), 10h. (Tucson and La Paz), 12h. (La Paz), 15h. (La Plata and La Paz), 16h. (La Paz), 17h. (near Branner), 20h. and 23h. (La Paz).

Oct. 21d. 6h. 49m. 30s. Epicentre 33°·1N. 116°·4W. (as on 1940, June 4d.).

A = -·3732, B = -·7519, C = +·5435; $\delta = +2$; $h = +1$;
D = -·896, E = +·445; G = -·242, H = -·487, K = -·839.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Palomar	z. 0·5	303	i 0 12	- 2	—	—	—	—
La Jolla	0·8	252	i 0 18	0	i 0 29	- 2	—	—
Riverside	1·2	318	i 0 24k	0	i 0 40	- 1	—	—
Mount Wilson	1·8	309	i 0 34a	+ 2	i 0 57	+ 1	—	—
Pasadena	1·8	306	i 0 34	+ 2	i 0 56	0	—	—
Halwee	3·3	337	e 0 52	- 1	i 1 43	S*	—	—
Fresno	N. 4·6	324	e 1 35	P _r	e 2 22	S*	—	—
Tucson	4·8	98	i 1 13	- 2	i 2 20	+ 8	i 1 36	P _r e 2·7

Tucson also gives $i = +1m.47s.$ and $+1m.54s.$

Oct. 21d. 20h. 15m. 22s. Epicentre 5°·1S. 153°·1E. (as on 1938, March 8d.).

A = -·8883, B = +·4507, C = -·0883; $\delta = 0$; $h = +7$;
D = +·452, E = +·892; G = +·079, H = -·040, K = -·996.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	N. 22·3	182	i 5 2	+ 1	i 8 56	- 6	—	—
Sydney	28·6	184	6 56	PP	—	—	—	—
Vladivostok	51·7	340	i 9 0	-11	i 17 3	+31	—	—
Andijan	86·3	311	e 12 46	+ 1	—	—	—	—
Tashkent	88·7	312	i 12 47	-10	(e 23 2) [-23]	—	—	e 23·0
Pasadena	91·8	57	i 13 13k	+ 2	—	—	—	—
Mount Wilson	91·9	57	i 13 13k	+ 2	—	—	—	—
Tinemaha	92·0	54	i 13 13	+ 1	—	—	—	—
Riverside	z. 92·4	57	i 13 15k	+ 1	—	—	—	—
Palomar	z. 92·8	58	i 13 15	- 1	—	—	—	—
Sverdlovsk	95·6	327	i 13 20	- 8	23 42 [-22]	—	17 12	PP
Tucson	97·8	58	e 13 40	+ 2	i 30 33	?	e 30 55	SS
La Paz	z. 133·9	120	22 33	PP	—	—	—	—

Additional readings:—

Brisbane iSE = +9m.2s.

Pasadena i = +13m.45s.

Mount Wilson iZ = +13m.45s.

Tinemaha eZ = +13m.46s.

Riverside eZ = +13m.48s.

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Oct. 21d. 22h. 14m. 2s. Epicentre 45°·7N. 26°·8E.

(As on 1940, June 24d., and foreshock of October 22d. 6h.).

$$A = +\cdot6255, B = +\cdot3160, C = +\cdot7133; \quad \delta = -10; \quad h = -4;$$

$$D = +\cdot451, E = -\cdot893; \quad G = +\cdot637, H = +\cdot322, K = -\cdot701.$$

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bucharest	1·4	198	—	—	e 2 28	?	—	—	—
Sofia	3·9	221	e 0 59	0	—	—	—	—	—
Istanbul	4·9	160	—	—	e 2 58?	+49	—	—	—
Triest	9·1	275	—	—	i 4 3	+11	—	—	i 5·9
Rome	11·0	255	e 2 54	pP	e 4 33	- 4	—	—	e 5·5
Chur	12·0	282	e 2 49	0	e 5 16	sS	—	—	—
Stuttgart	12·4	291	e 3 19	pP	—	—	i 3 23	PPP	—
Zurich	12·7	284	e 3 1	+ 3	e 5 41	SS	—	—	—
Basle	13·4	285	e 3 8	+ 1	e·5 28	- 6	—	—	—
Copenhagen	13·5	323	i 4 2	+53	—	—	—	—	—
Neuchatel	13·8	283	e 3 7	- 5	e 5 45	+ 1	—	—	—
Helwan	16·2	166	e 1 46	?	—	—	—	—	—

Additional readings:—

Bucharest iE = +3m.4s.

Stuttgart ePZ = +3m.28s.

Helwan iEN = +3m.28s.

Oct. 21d. Readings also at 2h. (Bermuda and near Manila), 3h. (near Mizusawa), 4h. (College and near Lick), 5h. (Huancayo, La Paz, and near Mizusawa), 9h. (Mizusawa), 13h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, and Tucson), 14h. (Balboa Heights and near Tananarive), 18h. (La Paz, near Christchurch, New Plymouth, and Wellington), 19h. (Bucharest, Istanbul, and Sofia), 20h. (Rome), 23h. (Rome and near Triest).

Oct. 22d. 6h. 36m. 57s. Epicentre 45°·7N. 26°·8E. (as on 1940 Oct. 21d.).

Intensity VII-VIII over a wide area.

G. Petrescu.

Determination de l'Epicentre du Treblement de terre de Roumanie du 22 Octobre, 1940. Academie Roumanie, Bulletin de la Section Scientifique, Vol. 24, Bucharest, 1942.

Epicentre Vrancea 45°·8N. 26°·6E. Deep (Bucharest).
45°·9N. 26°·6E. (Strasbourg).

G. Demetrescu et G. Petrescu.

La carte macroseismique du tremblement de terre du 22 Octobre, 1940.

Annexe au Bulletin seismique année 1940, Observatoire de Bucharest, 1941, page 43.

$$A = +\cdot6255, B = +\cdot3160, C = +\cdot7133; \quad \delta = -10; \quad h = -4;$$

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bucharest	1·4	198	i 0 29k	+ 4	—	—	—	—	—
Sofia	3·9	221	i 1 0k	+ 1	i 1 36	- 8	—	—	—
Istanbul	4·9	160	1 18	+ 5	2 13	+ 4	1 24	pP	—
Kecskemet	5·1	286	1 1 14	- 2	i 2 11	- 3	i 1 44	pP	2·8
Simferopol	5·2	96	1 23	+ 6	e 2 41	sS	—	—	—
Yalta	5·3	101	1 26	+ 8	e 2 45	sS	—	—	—
Budapest	5·6	291	1 1 21	- 1	2 23	- 3	1 41	pP	e 2·4
Theodosia	6·1	93	1 31	+ 2	e 2 53	sS	—	—	—
Warsaw	7·5	332	1 1 51k	+ 3	i 3 16	+ 4	—	—	—
Triest	9·1	275	i 2 10	0	i 3 53	+ 1	—	—	—

Continued on next page.

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	Δ °	Az. °	P.		O-C. s.	S.		O-C. s.	Supp.		L. m.	
			m.	s.		m.	s.		m.	s.		
Prague	9.4	303	i 2	14	0	4	1	+ 2	—	—	e 4.3	
Rome	11.0	255	i 2	33k	- 3	i 4	32	- 5	i 3	1	sP	i 6.0
Potsdam	11.2	312	i 2	37k	- 1	i 4	46	+ 4	i 5	7	SS	—
Jena	11.4	303	i 2	40	- 1	i 4	50	+ 3	—	—	—	e 5.3
Platigorsk	11.7	91	2	54	+ 9	e 5	13	SS	—	—	—	—
Ravensburg	12.0	286	i 2	49k	0	i 5	7	+ 6	e 5	34	SS	e 7.8
Chur	12.0	282	e 2	47	- 2	i 5	17	sS	—	—	—	—
Moscow	12.1	30	2	53	+ 3	4	59	- 5	—	—	—	—
Ebingen	12.4	288	i 2	54	0	e 5	6	- 5	—	—	—	—
Stuttgart	12.4	291	i 2	53k	- 1	e 5	10	- 1	i 3	37	PPP	e 7.2
Zurich	12.7	284	e 2	56k	- 2	e 5	22	+ 4	—	—	—	—
Basle	13.4	285	e 3	4	- 3	e 5	17	-17	—	—	—	—
Hamburg	13.4	312	i 3	4k	- 3	5	51	sS	—	—	—	e 7.5
Copenhagen	13.5	323	i 3	6	- 3	5	36	- 1	5	53	sS	—
Ksara	13.8	146	e 3	16	+ 4	i 5	59	sS	—	—	—	—
Neuchatel	13.8	283	e 3	9	- 3	e 5	54	+10	—	—	—	—
Heligoland	14.8	312	e 3	21a	- 4	6	18	sS	—	—	—	e 8.2
Upsala	15.2	342	i 3	29	- 1	i 6	13	- 3	—	—	—	—
De Bilt	15.6	304	i 3	34k	- 2	i 6	41	sS	—	—	—	—
Uccle	15.8	297	i 3	38k	0	i 6	31	+ 1	i 6	45	sS	8.0
Helwan	16.2	166	i 3	43a	0	6	39	0	3	57	PP	—
Clermont-Ferrand	16.6	279	i 3	44	- 4	i 6	52	+ 4	—	—	—	—
Paris	16.8	289	i 3	47	- 3	i 6	50	- 3	3	58	PP	—
Baku	17.7	100	4	6	+ 4	7	27	sS	—	—	—	—
Kew	18.8	298	i 4	12	- 2	i 7	39	+ 2	i 4	17	PP	—
Bergen	19.4	329	i 4	20	- 1	e 7	53	+ 3	—	—	—	—
Algiers	19.9	251	i 4	22	- 4	i 7	54	- 6	i 4	40	pP	9.3
Stonyhurst	19.9	305	i 4	33	+ 7	i 8	8	+ 8	i 5	13	PPP	13.0
Aberdeen	21.2	315	i 4	34	- 5	i 8	19	- 5	i 5	2	PP	10.7
Edinburgh	21.4	310	4	38	- 3	i 8	27	- 1	5	3	pP	i 11.3
Toledo	23.3	267	i 4	58	- 2	i 9	7	+ 5	5	23	PP	10.5
Almeria	23.6	258	i 5	0	- 3	i 9	9	+ 2	5	27	PP	11.0
Sverdlovsk	23.7	50	5	7	+ 3	i 9	13	+ 5	i 5	30	PP	12.0
Granada	24.2	261	i 5	6k	- 2	i 9	23	+ 6	5	34	pP	12.4
San Fernando	26.4	261	e 5	12	-17	i 9	46	- 8	i 5	44	PP	13.0
Lisbon	27.4	268	e 5	35	- 3	9	58	-12	6	2	pP	12.2
Samarkand	29.9	88	i 6	5	+ 4	—	—	—	i 6	24	pP	—
Tchinkent	30.7	81	i 6	11	+ 3	—	—	—	—	—	—	—
Tashkent	30.9	82	i 6	12	+ 2	i 11	8	+ 3	e 6	35	pP	i 17.3
Andijan	33.2	83	i 6	35	+ 5	—	—	—	7	54	PP	—
Frunse	33.9	77	6	39	+ 3	—	—	—	6	58	pP	—
Scoresby Sund	34.2	333	i 5	41	-57	i 11	0	-57	6	41	pP	i 12.6
Almata	35.4	75	6	49	+ 1	12	16	+ 1	—	—	—	—
Semipalatinsk	35.4	62	6	52	+ 4	12	17	+ 2	13	7	sS	—
Agra	E. 44.4	96	8	2	- 1	14	32	+ 3	10	22	PPP	—
Bombay	46.3	109	i 8	18	0	i 15	2	+ 6	i 8	49	pP	—
Irkutsk	49.0	53	8	41	+ 2	15	36	+ 2	9	12	pP	27.0
Hyderabad	51.1	106	8	54	- 1	15	59	- 5	10	57	PcP	24.1
Calcutta	54.5	93	i 9	28k	+ 8	i 16	53	+ 3	e 9	49	pP	—
Kodalkanal	E. 55.8	113	i 9	26a	- 3	i 17	6	- 1	—	—	—	—
Colombo	E. 59.8	114	9	56	- 1	18	0	+ 1	—	—	—	—
East Machias	62.3	306	—	—	—	i 18	27	- 4	—	—	—	e 25.3
Weston	66.1	306	i 10	36	- 3	e 19	15	- 3	—	—	—	—
Ottawa	66.5	311	10	39	- 2	19	19	- 4	23	51	SS	30.0
Fordham	68.5	307	i 10	50	- 4	i 19	43	- 4	i 11	24	pP	—
Vladivostok	69.4	49	i 10	56	- 4	i 19	55	- 2	i 11	29	pP	33.3
Toronto	69.6	312	—	—	—	e 19	58	- 2	e 27	49	SSS	33.0
College	69.7	358	—	—	—	e 20	3	+ 2	—	—	—	—
Philadelphia	69.8	306	—	—	—	e 19	57	- 5	—	—	—	—
Pittsburgh	72.1	310	i 11	12	- 4	e 20	22	- 7	i 11	46	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.
Mizusawa	E.	77.1	47	—	—	12 4	pP	—	—
Columbia		77.4	306	—	—	i 21 22	— 5	—	—
Florissant		78.7	315	e 11 51	- 2	e 21 34	- 7	i 12 23	pP
San Juan		79.1	285	e 11 54	- 1	21 36	- 9	e 12 24	pP
Cape Girardeau		79.5	312	e 11 55	- 3	e 22 43	sS	e 12 30	pP
Lincoln		80.1	319	e 12 33	pP	—	—	—	—
Bozeman		81.7	331	e 12 41	pP	e 22 10	- 2	e 15 29	PP
Manila		82.6	77	i 12 18	+ 4	i 22 24	+ 3	—	—
Victoria		82.6	340	e 12 47	pP	i 22 19	- 2	e 23 19	sS
Seattle		83.2	339	e 14 15	PP	—	—	—	—
Salt Lake City		86.3	330	e 15 30	PP	i 22 44	[- 2]	e 24 13	PS
Tinemaha		91.8	332	i 12 58	0	—	—	e 30 15	PKKP
Berkeley		92.3	335	e 13 0	0	e 23 22	[- 1]	—	—
Fresno	N.	92.6	334	e 13 5	+ 3	e 23 26	[+ 2]	—	—
Haiwee		92.6	332	e 13 2	0	—	—	e 13 36	pP
Tucson		93.4	325	i 13 5	- 1	i 23 53	- 9	e 13 24	pP
Mount Wilson		94.3	331	i 13 9 _a	- 1	e 34 57	SKKP	i 13 44	pP
Riverside	Z.	94.3	331	e 13 8	- 2	—	—	i 30 8	PKKP
Pasadena		94.4	331	i 13 10 _a	0	e 23 32	[- 1]	i 13 43	pP
Palomar	Z.	94.7	329	i 13 11 _a	0	—	—	i 13 46	pP
La Paz	Z.	105.0	261	i 18 11	PP	—	—	—	e 63.0
Huancayo		107.0	270	—	—	e 24 34	[- 2]	i 27 14	PS

Additional readings :—

Sofia iN = +1m.31s. and +1m.40s.
 Kecskemet P_gP_gS_gZ = +1m.59s., S_gZ = +2m.36s.
 Budapest iE = +2m.3s.
 Rome iSS = +4m.50s.
 Potsdam iE = +4m.14s., iN = +4m.24s., iSSSN = +5m.23s.
 Jena e = +4m.33s., iSN = +4m.53s.
 Ravensburg iE = +3m.0s., eSSN = +5m.44s., iSSN = +5m.53s.
 Ebingen eSZ = +5m.10s.
 Stuttgart iZ = +4m.19s., eSEN = +5m.13s. and +5m.26s., eSSE = +6m.3s., eSSN = +6m.13s., eSSE = +6m.26s., e = +6m.58s.
 Uccle i = +4m.28s.
 Paris PPP = +4m.2s., SS = +7m.18s.
 Kew iN = +4m.29s., iE = +4m.35s., iZ = +4m.44s., iEN = +4m.51s., eZ = +7m.33s., iZ = +7m.47s., iSSN = +7m.56s., iE = +8m.23s., e = +10m.35s.
 Algiers iPPP = +4m.46s., eSS = +8m.37s.
 Stonyhurst i = +5m.23s. and +9m.9s.
 Aberdeen iN = +8m.6s. and +8m.23s., iSSN = +9m.1s., iE = +9m.15s., iN = +9m.31s.
 Edinburgh PPP = +5m.16s., e = +8m.21s., i = +9m.22s.
 Almeria PPP = +5m.39s., P_cP = +8m.57s., SS = +9m.44s., SSS = +10m.5s., S_cS = +16m.22s.
 Granada PP = +5m.47s., pPP = +5m.54s., sS = +10m.23s., sSS = +10m.57s.
 San Fernando SSE = +10m.16s.
 Lisbon SN = +10m.3s., SE = +10m.7s., Z = +11m.40s.
 Samarkand sP = +6m.38s.
 Frunse ePP = +7m.58s.
 Agra SSE = +17m.42s.
 Bombay iEN = +10m.18s., isSEN = +15m.51s.
 Hyderabad S_cSE = +18m.32s., SSE = +19m.37s.
 Calcutta isSN = +17m.34s.
 Fordham i = +11m.35s., iSSS = +27m.29s.
 Pittsburgh isS = +21m.24s.
 Florissant iSPEN = +22m.21s., isSN = +22m.36s.
 San Juan i = +22m.38s.
 Bozeman e = +23m.10s.
 Manila SEN = +22m.33s.
 Haiwee ePKKP = +30m.15s.,
 Tucson esP = +13m.43s., ePP = +17m.21s., e = +18m.52s., i = +24m.19s. and +25m.56s., eSS = +30m.8s.
 Mount Wilson ePPZ = +16m.55s., iPKKPZ = +30m.7s., ipPKKPZ = +30m.44s., ePKP,PKPZ = +38m.5s.
 Pasadena ePPZ = +16m.56s., eSPZ = +25m.27s., iZ = +26m.27s., iPKKPZ = +30m.7s., ipPKKPZ = +30m.43s.
 Palomar iPKKPZ = +30m.7s.
 La Paz iPZ = +18m.17s.
 Huancayo e = +25m.59s., i = +28m.32s.
 Long waves were also recorded at Butte.

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Oct. 22d. 11h. 0m. 13s. Epicentre 43°·5N. 122°·0W.

A = -·3856, B = -·6171, C = +·6859; $\delta = -4$; $h = -3$;
D = -·848, E = +·530; G = -·363, H = -·582, K = -·728.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Ferndale		3·4	210	e 0 37	-18	—	—	—	—
Ukiah		4·4	192	e 1 5	-5	—	—	i 1 27	P _s
Berkeley		5·6	182	e 1 23	-4	i 2 17	-16	e 1 56	P _s
San Francisco		5·8	183	e 1 34	+5	e 2 21	-17	—	—
Branner		6·1	181	e 1 31	-3	i 2 35	-10	—	—
Lick		6·2	177	e 1 31	-4	e 2 53	+5	—	—
Santa Clara	E.	6·2	180	—	—	i 2 45	-3	i 2 57	S*
Fresno	N.	6·9	165	e 1 52	+7	i 3 26	S*	—	—
Tinemaha		7·0	155	e 2 4	P*	e 3 38	S*	—	—
Haiwee		8·0	156	e 2 11	+11	i 3 57	S*	—	—
Mount Wilson	z.	9·7	160	i 2 29k	+7	—	—	—	—
Pasadena		9·8	161	i 2 29k	+5	e 4 47	S*	—	—
Riverside	z.	10·2	158	e 2 33	+2	—	—	—	—
Palomar	z.	10·9	157	i 2 46	+6	—	—	—	—
Tucson		14·3	138	e 3 20	-6	i 3 50	?	—	e 8·2

Additional readings:—

Ferndale iS_sE = +40s., iE = +46s.

Berkeley iSEZ = +2m.23s., iEZ = +2m.44s.

Oct. 22d. Readings also at 10h. (near Mizusawa), 11h. (Tucson), 12h. and 14h. (Ferndale), 16h. (Almata, Frunse, Tashkent, Tchimkent, and near Andijan), 17h. (near Branner), 19h. (Huancayo), 20h. (near Apia and near Branner), 23h. (Ksara).

Oct. 23d. 2h. 23m. 5s.* Epicentre 1°·8S. 77°·7W.

Mapa sismico y tectonico de Colombia (Banco de la Republica, Bol. grafico 7, febrero de 1947).

Epicentre 2°·0S. 76°·0W. (Elias, Huila).

A = +·2129, B = -·9766, C = -·0312; $\delta = +5$; $h = +7$;
D = -·977, E = -·213; G = -·007, H = +·030, K = -1·000.

Pasadena suggests depth 140km.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Huancayo		10·5	167	i 2 35 _a	0	i 4 24	-11	i 5 4	SSS
La Paz	z.	17·4	148	i 4 5 _k	-1	i 7 21	+2	—	—
San Juan		23·1	29	e 5 9	+1	e 9 38	+22	e 5 39	PP
Cape Girardeau		40·4	346	e 7 42	+1	—	—	e 8 12	pP
Tucson		46·1	320	i 8 29	+1	e 15 15	+1	i 8 46	pP
La Jolla	z.	50·8	317	e 9 4	0	—	—	—	—
Palomar		50·8	318	i 9 6 _k	+2	—	—	i 9 36	pP
Riverside		51·5	318	i 9 11 _k	+2	—	—	i 9 42	pP
Mount Wilson		52·1	318	i 9 15 _k	+1	—	—	i 9 45	pP
Pasadena		52·2	318	i 9 15 _k	0	—	—	i 9 46	pP
Tinemaha	z.	53·9	320	i 9 27	0	—	—	i 9 58	pP
Clermont-Ferrand		84·9	44	i 12 37	-1	—	—	—	—

Additional readings:—

San Juan e = +10m.10s.

Cape Girardeau ePPP = +10m.18s.

Tucson iSP = +9m.0s.

Oct. 23d. Readings also at 7h. (near Tananarive), 8h. (near Ksara), 10h. (near Ferndale and near Mizusawa), 11h. (La Paz), 14h. (Huancayo, Warsaw, and Ferndale), 15h. (near Berkeley), 17h. (Tashkent, Sverdlovsk, Bombay, Calcutta, and near Tananarive), 18h. (near Fresno), 19h. (near Stuttgart), 20h. (near Trieste and near Mizusawa), 21h. (Rome).

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Oct. 24d. 20h. 6m. 43s. Epicentre 35°·58. 71°·0W.

A = +·2657, B = -·7715, C = -·5781; $\delta = +1$; $h = 0$;
D = -·946, E = -·326; G = -·188, H = +·547, K = -·816.

Tables for depth of focus 0·010 have been used.

		Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.
				m.	s.		m.	s.		m.	s.	
La Plata	E.	10·7	90	i 2 41 _a	+ 9	4 53	SS	—	—	—	6·1	
	N.	10·7	90	2 35	+ 3	4 59	SS	—	—	—	6·0	
La Paz		19·1	10	i 4 13 _k	- 5	17 33	-10	17 59	SS	—	9·1	
Huancayo		23·7	350	i 5 5 _k	+ 1	19 2	- 6	15 30	PP	—	i 12·5	
Rio de Janeiro		27·2	70	i 5 38	+ 2	1 10 9	+ 3	—	—	—	i 13·2	
Balboa Heights		45·0	348	e 5 15	?	—	—	—	—	—	—	
San Juan		53·8	6	e 11 33	PP	i 16 26	-14	e 19 24	SS	—	e 21·3	
Columbia		69·8	351	—	—	e 19 52	-10	—	—	—	e 28·4	
Cape Town		70·9	118	—	—	e 20 57	PS	—	—	—	—	
Cape Girardeau		74·5	345	e 11 27	- 3	—	—	e 11 47	pP	—	—	
Philadelphia		75·2	358	e 11 32	- 2	20 56	- 7	e 15 55	PPP	—	e 30·4	
Fordham		76·0	359	i 11 49	+11	i 21 11	- 1	i 11 56	pP	—	—	
Florissant		76·1	345	i 11 42	+ 3	e 21 12	- 1	e 12 0	pP	—	—	
Tucson		77·1	326	i 11 44 _k	0	i 29 49	SSS	i 12 6	pP	—	i 32·6	
Weston		77·5	0	i 11 46	- 1	e 21 24	- 4	—	—	—	—	
Harvard		77·6	0	i 11 47	0	e 21 24	- 5	i 12 7	pP	—	—	
Buffalo		78·4	354	i 11 50	- 2	—	—	i 12 7	pP	—	—	
Lincoln		79·5	341	e 11 55	- 3	e 21 39	-11	—	—	—	—	
La Jolla		80·6	322	e 12 4	+ 1	—	—	—	—	—	—	
Ottawa		80·6	357	12 2	- 1	21 57	- 4	—	—	—	e 33·3	
Palomar	Z.	80·8	323	e 12 6	+ 2	—	—	—	—	—	—	
Riverside		81·6	322	i 12 10 _k	+ 1	—	—	i 12 33	pP	—	—	
Mount Wilson		82·1	322	i 12 13 _k	+ 2	e 22 17	+ 1	—	—	—	—	
Pasadena		82·1	322	i 12 12 _k	+ 1	i 22 18	+ 2	i 12 32	pP	—	e 39·1	
Seven Falls		82·2	0	12 13	+ 1	i 22 16	- 1	—	—	—	37·3	
Santa Barbara		83·1	321	i 12 18	+ 2	—	—	—	—	—	—	
Haiwee		83·6	323	i 12 21	+ 2	—	—	—	—	—	—	
Tinemaha	Z.	84·5	323	i 12 25	+ 2	—	—	i 12 49	pP	—	—	
Salt Lake City		84·7	330	—	—	e 22 36	- 6	e 29 2	SS	—	e 35·7	
Fresno	N.	85·0	323	e 12 41	+15	—	—	—	—	—	—	
Lick	N.	86·4	322	e 12 37	+ 4	—	—	—	—	—	—	
Berkeley	Z.	87·1	322	i 12 37	+ 1	—	—	—	—	—	—	
Butte		89·4	332	e 12 45	- 2	e 23 25	- 2	—	—	—	—	
San Fernando		93·6	47	—	—	i 23 42	[+14]	—	—	—	52·3	
Granada		95·5	47	—	—	i 26 7	PS	—	—	—	51·5	
Almeria		96·1	49	—	—	e 23 51	[+ 7]	—	—	—	48·3	
Toledo		97·1	46	e 12 28	-54	i 23 59	[+10]	25 57	PPS	—	40·5	
Oxford		105·4	37	—	—	i 24 39	[+10]	—	—	—	e 53·3	
Paris		106·3	41	e 14 42	sP	e 24 39	[+ 6]	i 27 34	PS	—	50·3	
Kew		106·4	38	—	—	e 24 41	[+ 8]	—	—	—	e 43·3	
Rome		108·4	52	e 19 21	PP	i 24 49	[+ 7]	e 27 51	PS	—	e 48·0	
Uccle		108·4	40	—	—	e 24 11	[-31]	—	—	—	—	
De Bilt		109·6	39	—	—	e 28 9	PS	—	—	—	e 53·3	
Triest		111·1	49	e 10 52	?	e 23 51	[-62]	—	—	—	e 50·7	
Scoresby Sund		111·4	15	e 18 6	[-16]	e 23 34	†	—	—	—	e 50·6	
Potsdam		113·9	41	e 19 39	PP	e 25 14	[+10]	e 34 43	SS	—	e 46·3	
Sofia		115·9	55	e 20 3	PP	e 29 18	PS	—	—	—	61·3	
Helwan		116·0	71	e 20 5	PP	i 25 23	[+10]	i 29 23	PS	—	—	
Warsaw		118·3	43	e 20 11	PP	i 29 36	PS	e 36 1	SS	—	61·3	
Bucharest		118·4	53	—	—	e 29 43	PS	—	—	—	61·3	
Istanbul		119·1	58	20 7	PP	29 42	PS	—	—	—	e 62·3	
Upsala	E.	119·3	35	—	—	e 25 17 [?]	[- 7]	—	—	—	e 61·3	
Moscow		128·6	43	19 3	[+ 7]	26 3	[+ 7]	21 20	PP	—	—	
Erevan		129·8	64	22 28	PKS	—	—	—	—	—	—	
Piatigorsk		129·8	59	19 9	[+11]	—	—	—	—	—	—	

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.
Grozny	131.6	60	19 25	[+23]	—	—	—	—
Sverdlovsk	141.3	41	—	—	29 12	SKKS	40 41	SS 56.3
Kodaikanal	E. 141.9	123	—	—	e 29 17	SKKS	—	—
Bombay	144.1	108	e 19 36	[+12]	e 29 35	SKKS	e 23 18	PKS 70.7
Samarkand	146.7	70	e 19 38	[+ 9]	—	—	—	—
Tashkent	148.5	87	19 40	[+ 8]	29 55	SKKS	23 31	PP e 42.2
Tchimkent	148.8	85	e 19 44	[+12]	—	—	—	—
Andijan	150.8	68	e 19 46	[+11]	—	—	—	—
Agra	E. 152.3	99	20 0	[+23]	30 21	SKKS	23 30	SKP
Frunse	152.5	64	e 19 50	[+13]	—	—	—	—
Manila	156.5	210	i 19 55 _a	[+12]	—	—	i 20 28	pPKP
Calcutta	N. 157.8	120	e 20 34	pPKP	—	—	i 44 9	SS

Additional readings :—

La Plata Z = +2m.52s.

Huancayo i = +6m.31s., +9m.13s., +9m.31s., +10m.8s., +10m.53s., and +11m.8s.

Rio de Janeiro iSN = +10m.13s.

San Juan e = +14m.26s., i = +16m.54s.

Cape Girardeau eP_cPEN = +11m.37s., ePPN = +14m.33s.

Philadelphia e = +21m.36s., eSS = +25m.45s.

Fordham iS = +21m.41s.

Florissant iPZ = +11m.46s., iP_cPZ = +12m.9s., eE = +21m.41s., iE = +21m.47s.

Tucson i = +12m.17s. and +13m.36s., iPP = +14m.39s., i = +15m.35s.

Buffalo i = +12m.17s. and +12m.34s.

Lick eE = +12m.41s.

Paris esPP = +19m.19s., ePPS = +28m.54s., iPSS = +33m.30s.

Rome eSKKS = +25m.43s., PPS = +29m.16s., SS = +33m.39s., eSSS = +38m.17s. ?

Triest ePP = +15m.53s., eSKS = +20m.59s., eSKKS = +22m.53s., IPS = +26m.1s.,

eSS = +32m.41s.

Potsdam eN = +25m.14s., iSKS = +26m.21s., eE = +28m.39s., iZ = +28m.52s., epSN =

+29m.14s.

Warsaw eE = +29m.40s.

Bucharest eN = +29m.53s.

Upsala eN = +33m.17s. ?

Moscow PS = +30m.47s.

Bombay eN = +23m.37s., eE = +33m.53s. and +35m.41s., eN = +41m.38s., eE =

+43m.2s.

Agra SSE = +43m.32s.

Long waves were also recorded at Stuttgart, Baku, and Hamburg.

Oct. 24d. Readings also at 0h. (near Manila), 2h. (near La Paz (3), Tinemaha, Haiwee, Pasadena, Mount Wilson, Riverside, and Tucson), 4h. (near Triest (2) and near Rome), 10h. (Tucson), 11h. (near Branner, Lick, and Berkeley), 15h. (near Berkeley), 16h. (New Plymouth), 21h. (Ksara, Tashkent, and Helwan), 22h. (Rome, Bombay, Agra, Apia, Sverdlovsk, and Istanbul), 23h. (Tucson).

Oct. 25d. Readings at 0h. (near Triest), 4h. (La Plata and La Paz), 10h. (Riverside, Pasadena, Mount Wilson, Tucson, Tinemaha, and Palomar), 12h. (Berkeley), 15h. (Riverview, Riverside, Pasadena, Mount Wilson, Tucson, Tinemaha, and Palomar), 20h. (Branner and near Harvard), 23h. (near Tananarive).

Oct. 26d. Readings at 1h. (Tinemaha, Tucson, Haiwee, Riverside, Pasadena, and Mount Wilson), 2h. (near Granada), 5h. (Tucson and Seattle), 6h. (Montezuma, Uccle, Copenhagen, Helwan, Stuttgart, Zurich, and Chur), 10h. (near Ferndale), 11h. (near Tucson), 15h. (Christchurch and Riverview), 16h. (Huancayo), 17h. (Lincoln, Haiwee, Riverside, Pasadena, Mount Wilson, and Tucson), 18h. (College, Salt Lake City, and Sitka), 20h. (near Branner, Berkeley, San Francisco, La Paz, and near Lick).

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Oct. 27d. 5h. 35m. 34s. Epicentre 9°·8N. 84°·3W.

A = +·0979, B = -·9807, C = +·1691; δ = -5; h = +7;
D = -·995, E = -·099; G = +·017, H = -·168, K = -·986.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.	
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.	
Balboa Heights	4·2	100	i 1	16	+ 1	e 2	14	+ 2	—	—	2·7	
Port au Prince	14·5	52	i 3	45	PPP	i 6	50	SS	—	—	e 9·6	
San Juan	19·6	62	i 4	31	- 1	i 8	7	- 1	i 4	58	PPP	i 9·6
Fort de France	23·1	77	i 5	10	+ 2	i 9	26	+10	5	38	PP	e 11·9
Huancayo	23·5	158	i 5	14k	+ 2	i 9	11	-12	i 5	56	PPP	—
Columbia	24·3	7	i 5	21	+ 1	i 9	55	+18	e 5	51	PP	11·0
Cape Girardeau	27·8	352	i 5	52	- 1	e 10	52	+17	i 6	44	PPP	—
Florissant	29·4	351	i 6	3	- 4	i 11	6	+ 5	i 6	45	PP	—
La Paz	30·6	148	e 6	16	- 2	i 11	20	0	i 7	14	PP	16·0
Pittsburgh	30·8	8	i 6	19	- 1	e 11	35	+12	i 7	5	pP	—
Philadelphia	31·1	14	i 6	24	+ 2	i 11	28	0	i 7	10	pP	i 15·4
Pennsylvania	31·4	10	e 6	26	+ 1	e 11	40	+ 8	—	—	—	e 16·4
Chicago, U.S.C.G.S.	32·0	354	i 6	29	- 1	e 11	22	-20	i 7	27	PP	i 17·5
Chicago, J.S.A.	32·1	354	i 6	29	- 2	i 11	29	-14	e 7	31	PP	—
Fordham	32·3	15	i 6	32	- 1	i 11	49	+ 3	i 7	32	PP	—
Lincoln	32·8	344	e 7	1	+24	e 12	5	+11	—	—	—	—
Tucson	33·2	317	i 6	40 _a	0	i 11	48	-12	i 7	44	PP	i 13·1
Buffalo	33·3	8	i 6	42	+ 1	e 12	19	+17	i 8	1	PP	e 17·6
Toronto	34·0	6	i 6	47	- 1	e 12	5	- 8	7	55	PP	17·4
Harvard	34·4	17	i 6	52	+ 1	e 12	28	+ 9	i 8	11	P _c P	e 16·4
Weston	34·4	17	i 6	53	+ 2	i 12	22	+ 3	8	10	PPP	e 16·8
Denver	35·1	332	e 8	46	PPP	e 11	50	-40	e 14	2	SS	e 16·6
Vermont	35·9	14	e 7	5	+ 1	i 12	37	- 5	i 8	28	PP	i 15·2
Ottawa	36·2	10	7	7	+ 1	12	51	+ 4	8	26	PP	e 17·4
East Machias	37·8	20	i 7	22	+ 2	e 13	15	+ 4	i 8	45	PP	—
Shawinigan Falls	37·9	13	7	21	+ 1	13	23	+10	8	55	PP	21·4
Palomar	38·0	313	i 7	23	+ 2	—	—	—	—	—	—	—
La Jolla	38·1	312	e 7	22	0	—	—	—	—	—	—	—
Riverside	38·7	314	e 7	28	+ 1	—	—	—	—	—	—	—
Seven Falls	38·9	14	7	32	+ 3	13	42	+14	i 9	30	PPP	18·4
Halifax	39·0	24	7	30	0	13	20	- 9	9	7	PP	17·4
Mount Wilson	39·3	314	i 7	34 _a	+ 2	—	—	—	i 9	41	P _c P	—
Salt Lake City	39·3	327	i 7	30	- 2	e 13	11	-23	e 9	11	PP	i 16·0
Pasadena	39·4	314	i 7	34 _a	+ 1	e 13	18	-17	i 9	43	P _c P	e 16·4
Logan	40·0	328	i 7	36	- 2	i 13	30	-14	e 8	54	PP	20·3
Haiwee	40·2	317	e 7	40	0	—	—	—	i 9	44	P _c P	—
Santa Barbara	40·6	313	i 7	45	+ 2	—	—	—	—	—	—	—
Tinemaha	40·9	317	e 7	47 _a	+ 1	e 13	38	-20	e 17	48	S _c S	—
Fresno	41·8	316	e 7	58	+ 5	—	—	—	—	—	—	e 24·6
Bozeman	42·5	333	e 7	54	- 5	e 13	45	-37	e 9	52	PP	e 16·9
Butte	43·4	333	e 8	3	- 3	e 12	24	?	e 8	32	?	e 17·7
Lick	43·4	316	e 8	6	0	e 14	51	PS	i 8	36	pP	—
Santa Clara	43·6	316	i 8	10	+ 2	e 14	21	-17	—	—	—	e 20·7
Branner	43·8	315	e 8	11	+ 2	e 14	59	+19	e 18	8	SS	—
Berkeley	44·1	316	i 8	10	- 2	i 14	45	0	i 9	36	PP	i 21·0
San Francisco	44·2	316	e 8	11	- 1	e 18	15	SS	—	—	—	e 25·4
Ukiah	45·4	318	e 8	20	- 2	i 15	14	+10	e 10	29	PP	i 19·1
Saskatoon	46·0	341	e 10	48	PPP	e 18	38	SS	—	—	—	e 24·4
Victoria	50·6	328	9	4	+ 2	16	23	+ 6	11	8	PP	22·4
La Plata	E. 51·0	152	9	8	+ 2	i 16	13	- 9	18	38	S _c S	29·6
	N. 51·0	152	9	14	+ 8	16	15	- 7	16	38	PS	30·0
	Z. 51·0	152	i 9	10 _a	+ 4	—	—	—	—	—	—	32·8
Rio de Janeiro	51·7	130	e 9	9	- 2	i 16	27	- 5	—	—	—	e 25·1
Ivigtut	57·8	21	—	—	—	i 18	17	+23	i 22	26	SS	e 28·5
Sitka	61·5	332	e 10	18	- 3	e 19	35	+53	e 14	20	PPP	e 30·2
College	70·1	337	e 11	13	- 3	e 20	30	+ 3	e 25	3	SS	e 35·1
Honolulu	71·2	290	—	—	—	e 20	51	+11	e 23	55	?	e 33·1
Scoresby Sund	71·8	18	i 9	54	?	e 20	18	-28	e 14	37	PP	e 27·7
Lisbon	72·4	54	11	30	0	21	10	+17	21	26	PS	33·9

Continued on next page.

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	Δ °	Az. °	P.		O-C. s.	S.		O-C. s.	Supp.		L. m.	
			m.	s.		m.	s.		m.	s.		
San Fernando	74.7	56	e 11	44	+ 1	i 21	30	+11	—	—	35.9	
Toledo	76.3	52	i 11	53	+ 1	i 21	55	+18	22	27	PS	32.1
Granada	76.8	54	i 11	54 ^k	- 1	21	42	0	12	20	P _c P	e 34.7
Edinburgh	77.0	35	i 11	56	0	—	—	—	—	—	—	—
Stonyhurst	77.3	37	i 11	56	- 2	i 21	59	+11	14	54	PP	36.4
Aberdeen	77.6	33	i 11	55	- 5	i 22	4	+13	i 22	52	PS	e 33.8
Almeria	77.7	55	i 11	57	- 3	i 22	5	+13	12	23	P _c P	e 38.6
Kew	78.7	40	i 12	5 ^a	- 1	22	1	- 2	i 12	18	P _c P	e 35.4
Paris	80.6	42	i 10	34	?	e 21	0	?	—	—	—	35.4
Clermont-Ferrand	81.3	46	i 12	19	- 1	—	—	—	—	—	—	e 37.4
Bergen	81.4	30	i 12	21	+ 1	—	—	—	—	—	—	e 38.4
Uccle	81.6	41	i 12	21 ^a	0	i 22	34	+ 1	15	24	PP	38.4
De Bilt	82.0	39	i 12	24 ^a	+ 1	e 22	46	+ 9	e 15	31	PP	e 39.4
Algiers	82.1	55	e 12	26	+ 2	e 22	40	+ 2	—	—	—	35.4
Neuchatel	83.8	43	e 12	32	0	e 22	55	0	—	—	—	—
Basle	84.1	43	e 12	34	0	e 22	51	- 7	—	—	—	—
Hamburg	84.7	37	i 12	37 ^a	0	e 23	5	+ 1	e 28	56	SS	—
Zurich	84.8	43	e 12	38 ^a	+ 1	e 23	9	+ 4	—	—	—	—
Stuttgart	85.0	42	i 12	38 ^a	0	e 22	59	[- 2]	e 24	9	PS	—
Chur	85.5	43	e 12	40	- 1	e 23	13	+ 1	—	—	—	—
Copenhagen	85.8	35	i 12	42 ^a	0	23	1	[- 5]	15	59	PP	—
Jena	86.2	40	i 12	44	0	e 23	9	[0]	e 24	22	PS	e 34.4
Potsdam	86.8	38	i 12	47 ^a	0	i 23	11	[- 2]	i 16	6	PP	38.4
Upsala	87.5	30	i 12	50	- 1	e 23	14	[- 3]	e 16	10	PP	e 39.4
Prague	88.1	40	12	52	- 2	e 23	23	[+ 2]	e 23	53	PS	e 40.4
Rome	88.5	48	i 12	56 ^a	0	e 22	51	[- 32]	e 16	33	PP	e 41.3
Triest	88.6	44	i 12	56	0	i 23	25	[+ 1]	i 13	15	pP	e 41.7
Warsaw	91.5	37	i 13	9 ^a	- 1	23	56	[+ 14]	16	52	PP	e 41.4
Pulkovo	93.5	27	e 13	17	- 2	e 23	49	[- 4]	e 17	0	PP	42.7
Sofia	96.1	45	e 13	26 [?]	- 5	e 23	56	[- 11]	e 16	32	PP	41.4
Bucharest	97.4	43	e 17	32	PP	24	6	[- 8]	—	—	—	—
Moscow	98.9	29	13	42	- 1	24	21	[0]	17	45	PP	—
Istanbul	100.7	45	13	58	+ 6	22	35	?	18	0	PP	—
Arapuni	103.9	233	—	—	—	24	26 [?]	[- 19]	33	56	SSP	49.4
Wellington	104.6	230	21	6	PPP	24	49	[0]	29	11	PPS	48.9
Cape Town	106.0	123	—	—	—	25	22	[+ 27]	33	42	SS	51.5
Christchurch	106.2	228	14	38	P	25	3	[+ 7]	18	46	PP	49.8
Helwan	106.7	55	e 14	18	P	e 26	26	+10	e 34	11	SSP	—
Sverdlovsk	107.6	19	e 14	21	P	i 25	2	[0]	18	47	PP	50.4
Ksara	108.6	51	19	26 [?]	PP	e 25	21	[+ 15]	e 27	41	PS	—
Baku	114.5	37	19	39	PP	25	52	[+ 22]	29	28	PS	52.5
Irkutsk	117.7	353	19	55	PP	25	36	[- 6]	29	33	PS	58.4
Vladivostok	117.9	330	20	4	PP	25	59	[+ 16]	29	58	PS	e 40.0
Brisbane	N. 123.4	244	—	—	—	e 37	32	SS	—	—	—	—
Tashkent	123.6	23	19	0	[0]	26	13	[+ 11]	20	46	PP	—
Riverview	E. 124.0	236	—	—	—	e 27	47	[+ 6]	—	—	—	e 58.7
Almata	124.5	16	e 19	10	[+ 9]	—	—	—	—	—	—	—
Andijan	125.3	22	e 19	5	[+ 2]	26	27	[+ 20]	—	—	—	56.4
Tananarive	132.6	107	—	—	—	34	9	PPS	39	22	SS	e 69.9
Agra	E. 139.5	24	e 19	41	[+ 11]	42	2	SSP	23	0	PP	—
Bombay	143.6	39	i 19	33	[- 3]	i 27	9	[+ 24]	i 22	50	PP	—
Manila	145.1	313	i 19	41 ^a	[+ 2]	—	—	—	23	4	PP	69.4
Calcutta	N. 147.1	12	i 19	46	[+ 3]	e 42	13	SS	e 23	9	PP	e 69.9
Phu-Lien	147.7	340	e 19	49	[+ 5]	—	—	—	—	—	—	—
Hyderabad	N. 148.0	32	19	50	[+ 6]	—	—	—	—	—	—	—
Perth	151.1	217	i 19	46	[- 3]	i 43	1	SS	—	—	—	i 59.2
Kodaikanal	E. 153.1	43	e 19	57	[+ 5]	—	—	—	—	—	—	—
Colombo	E. 157.1	44	e 19	56	[- 1]	—	—	—	—	—	—	—

Additional readings:—

Port au Prince PP = +3m.58s., PPP = +4m.14s.

San Juan i = +5m.7s., +6m.49s., and +8m.24s.

Fort de France SS = +10m.3s.

Huancayo i = +6m.22s., +8m.4s., +8m.32s., and +9m.34s.

Columbia i = +10m.10s.

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Cape Girardeau iN = +5m.59s., iEN = +6m.23s., iN = +7m.0s. and +7m.17s., eE = +9m.2s., and +10m.2s., eSSE = +12m.19s.
 Florissant iPPPZ = +7m.7s., iPPPPZ = +7m.21s., iZ = +7m.25s., iN = +11m.16s., iE = +12m.12s., +12m.43s., and +13m.11s.
 La Paz iPZ = +6m.21s.k.
 Pittsburgh iPPP = +7m.41s., i = +12m.10s., iSS = +13m.23s.
 Philadelphia i = +9m.20s., e = +10m.33s., i = +13m.39s. and +14m.50s.
 Pennsylvania e = +6m.48s., +6m.54s., and +13m.58s.
 Chicago U.S.C.G.S. iPPP = +7m.49s., iS = +11m.48s., iSS = +13m.41s., i = +14m.33s. and +16m.27s.
 Fordham iPPP = +7m.52s.
 Tucson i = +6m.47s. and +7m.20s., iP_cP = +8m.58s., i = +11m.36s.
 Buffalo iSS = +14m.34s.
 Toronto eN = +14m.26s.
 Harvard eN = +11m.37s., eSSE = +14m.31s.
 Denver eN = +11m.0s.
 Vermont e = +7m.53s., i = +8m.41s. and +13m.8s.
 Ottawa PPP = +8m.45s., iN = +13m.10s., SS = +15m.16s.
 East Machias i = +7m.33s., e = +12m.36s., i = +13m.55s.
 Shawinigan Falls SSS = +19m.20s.
 Seven Falls SS = +16m.23s.
 Salt Lake City i = +9m.19s., +13m.31s., and +14m.25s.
 Pasadena iZ = +7m.43s., iS_cSE = +17m.43s.
 Logan eSS = +16m.20s.
 Bozeman e = +11m.15s. and +15m.4s.
 Lick eN = +18m.10s.
 Branner eN = +8m.17s., iN = +8m.30s.
 Berkeley iZ = +9m.57s. and +11m.10s., eSZ = +14m.18s., iS_cSZ = +17m.59s., iS_cSN = +18m.13s.
 Ukiah e = +8m.36s., i = +16m.6s.
 Saskatoon eN = +13m.2s.
 Victoria eE = +16m.34s., eN = +18m.42s.
 La Plata E. +17m.20s., S_cS = +18m.38s., SS = +20m.10s., L_q = +25m.26s.
 La Plata N. SS = +20m.16s., L_q = +22m.26s.
 Ivigtut e = +19m.56s.
 Sitka i = +14m.54s. and +20m.30s., iSS = +23m.39s.
 College e = +21m.31s.
 Honolulu e = +19m.53s.
 Scoresby Sund i = +10m.5s., ePPP = +12m.57s., eS = +19m.18s.
 Lisbon Z = +12m.17s., N = +13m.29s. and +13m.48s., E = +16m.28s., N = +31m.2s., eN = +33m.8s.
 San Fernando eN = +11m.57s.
 Granada sP = +12m.32s., iPP = +14m.48s., iS = +21m.51s., S_cS = +22m.3s., sS = +22m.36s., sPS = +23m.4s., SS = +27m.3s.
 Stonyhurst PS = +22m.34s., eSS = +27m.26s., eSSS = +30m.26s.
 Aberdeen iE = +21m.54s., eSSE = +27m.6s., eSSSN = +30m.37s., eE = +32m.28s.
 Almeria PP = +15m.22s., PPP = +17m.9s., PS = +22m.39s., SS = +27m.26s.
 Kew PPZ = +15m.5s., iPPPZ = +17m.1s., ePPSE = +22m.0s., eSSEZ = +27m.26s.?, eN = +29m.26s.?, eSSSEZ = +30m.26s.?, eL_qN = +32.4m.
 Uccle eE = +21m.44s., i = +22m.49s., iPSE = +23m.33s., iPSN = +23m.36s., iSSE = +28m.14s., iSSSE = +31m.33s.
 De Bilt iZ = +12m.34s., eE = +22m.6s., iPS = +23m.36s., eSS = +28m.16s., eSSS = +31m.38s.
 Hamburg iE = +23m.19s., eSSSEZ = +32m.26s.?
 Stuttgart eSSNW = +28m.56s., eSSE = +29m.6s., eSSSEN = +32m.26s.
 Copenhagen +23m.16s. and +24m.22s., SS = +29m.17s.
 Jena eSE = +23m.26s., e = +23m.38s., i = +29m.26s.?
 Potsdam iPN = +12m.51s., iN = +13m.32s., iZ = +14m.1s., iE = +15m.55s., iPPZ = +16m.14s., iSEN = +23m.25s., iS_cSZ = +23m.38s., iS_cSN = +23m.41s., iPSE = +24m.26s., iPSZ = +24m.33s.
 Upsala ePPE = +16m.13s., ePPPE = +18m.0s., iSE = +23m.18s., eE = +24m.42s., eSSN = +28m.26s.?, eSSE = +28m.44s., eSSSN = +32m.26s.?, eSSSE = +32m.44s.
 Uccle ePPE = +18m.0s., iSE = +23m.18s., eE = +24m.42s., eSSN = +28m.26s., eSSE = +28m.44s., eSSN = +32m.26s., eSSSE = +32m.44s.
 Prague ePPS = +24m.45s., eSS = +29m.56s.
 Rome e = +20m.48s., iS = +23m.33s., iPS = +24m.28s., SS = +28m.31s., SSS = +33m.7s.
 Trieste iP_cP = +13m.6s., iPP = +16m.15s., ePPP = +18m.28s., iSKKS = +23m.43s., iS = +23m.59s., iS_cS = +24m.48s., iPS = +24m.56s., iPPS = +25m.20s., e = +26m.58s., iSS = +30m.0s., iSSS = +34m.0s., e = +36m.59s.
 Warsaw ePE = +13m.12s., iPPSE? = +25m.20s., iPPS?N = +25m.25s., iZ = +25m.31s.
 Pulkovo ePS = +25m.27s.
 Sofia eE = +26m.14s.
 Bucharest eS?E = +24m.11s.
 Moscow SS = +32m.2s.
 Wellington SS = +33m.45s.
 Christchurch SN = +26m.34s., PSEZ = +28m.2s., PPSE = +28m.56s., SSE = +34m.2s., L_qN = +44m.24s.

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Sverdlovsk PS = +28m.5s., SS = +34m.2s.
 Baku PPP = +22m.59s.
 Irkutsk SS = +36m.14s.
 Vladivostok SS = +36m.50s.
 Tashkent PS = +30m.57s.
 Agra SSSE = +47m.2s.
 Bombay iEN = +23m.23s., eN = +24m.42s., eSKSPEN = +33m.6s., iSSN = +41m.49s.,
 eSSE = +42m.2s.
 Manila iE = +21m.9s.
 Calcutta iSKPN = +23m.18s., iPSKSN = +33m.21s., ePPSN = +36m.6s.
 Long waves were also recorded at Ferndale, Apia, Adelaide, and Sydney.

Oct. 27d. 10h. 36m. 34s. Epicentre 20°·5S. 70°·5W. (as on 1940 Oct. 6d.).

A = +·3129, B = -·8836, C = -·3481; $\delta = -17$; $h = +5$;

Tables for depth of focus 0·020 have been used.

	Δ	Az.	P.	O - C.	S.	O - C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
La Paz	4·6	30	i 0 54 _a	-15	i 1 50	-12	—	2·1
Huancayo	9·6	330	e 2 26	pP	i 4 4	+ 3	i 4 36	i 6·9
La Plata	E. 18·1	144	4 12	+10	7 44	sS	—	9·6
	N. 18·1	144	4 14	+12	7 49	sS	—	9·6
Rio de Janeiro	25·5	102	e 5 26	+11	—	—	—	—
San Juan	38·9	8	—	—	i 12 52	- 5	i 16 9	SS
Tucson	65·1	324	i 10 25	- 1	—	—	e 10 36	pP
Ottawa	65·7	356	e 10 27	- 3	—	—	—	30·4
Palomar	z. 69·5	321	e 10 58	+ 5	—	—	—	—
Mount Wilson	z. 70·8	321	e 11 2	+ 1	—	—	—	—
Pasadena	70·8	321	e 11 1	0	—	—	—	—
Haiwee	z. 72·0	322	e 11 4	- 4	—	—	—	—

Tucson also gives $i = +10m.47s.$ and $+10m.54s.$

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

Oct. 27d. Readings also at 1h. (Almata, Frunse, Andijan, Paris, Bermuda, and Tchinkent), 3h. (near Berkeley, Branner, and Lick), 4h. (La Paz), 7h. (near Mizusawa), 14h. (Tucson and La Paz), 16h. and 18h. (La Paz), 19h. (near Tucson, Palomar, La Jolla, Riverside, Pasadena, and Mount Wilson), 20h. (Sverdlovsk, Calcutta, Agra, Phu-Lien, Hyderabad, Bombay, De Bilt, Tashkent, Vladivostok, and Tucson), 21h. (near Spokane), 22h. (Haiwee, Seattle, Victoria, Tucson, Butte, Bozeman, Riverside, Pasadena, and Mount Wilson).

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Oct. 28d. 1h. 18m. 34s. Epicentre 31°·0S. 68°·0W.

A = +·3217, B = -·7962, C = -·5125; $\delta = +8$; $h = +2$;
D = -·927, E = -·375; G = -·192, H = +·475, K = -·859.

Tables for depth of focus 0·015 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
La Plata	9·3	117	2 8	- 4	3 50	- 5	—	4·9
La Paz	14·4	359	e 3 26	+ 7	i 6 28	sS	i 3 34	7·6
Huancayo	20·0	339	i 4 25	+ 1	i 8 32	sS	i 4 59	i 10·0
San Juan	49·1	3	e 11 46	PPP	e 19 33	SS	—	—
Tucson	74·8	324	i 11 27	- 1	—	—	i 11 53	—
Riverside	z. 79·7	320	e 11 54	- 1	—	—	—	—
Mount Wilson	80·2	320	i 11 57	- 1	—	—	—	—
Pasadena	80·2	320	i 11 57	- 1	—	—	—	—
Santa Barbara	z. 81·3	319	e 12 15	+12	—	—	—	—
Haiwee	81·6	321	e 12 5	0	—	—	—	—
Berkeley	N. 85·2	320	—	—	e 22 50	+ 9	—	—
Granada	90·7	46	i 16 0	PP	i 24 17	sS	i 18 36	e 36·4
Uccle	103·4	38	—	—	e 33 6	SS	—	e 48·4

Additional readings:—

La Plata PZ = +2m.16s.

Huancayo i = +5m.38s., +9m.4s., and +9m.17s.

Cape Girardeau eN = +26m.57s. L given as S.

Tucson i = +12m.7s. and +12m.44s., e = +18m.6s.

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

Oct. 28d. 2h. 34m. 18s. Epicentre 40°·5N. 43°·0E. (as on 1940 July 10d.).

A = +·5577, B = +·5201, C = +·6469; $\delta = +1$; $h = -2$;
D = +·682, E = -·731; G = +·473, H = +·441, K = -·763.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Erevan	1·2	105	i 0 32	P _r	i 0 58	S _r	—	—
Piatigorsk	3·6	1	—	—	1 55	S _r	—	—
Ksara	8·8	223	e 2 11	0	i 4 35	S _r	—	—
Tashkent	19·8	77	i 4 29	- 6	e 8 11	- 2	—	e 11·8
Sverdlovsk	19·9	30	4 48	+12	e 8 48	SS	—	11·2
Andijan	22·2	80	e 4 59	- 1	—	—	5 33	PP
Frunse	23·6	74	e 5 16	+ 3	—	—	—	—

Long waves were also recorded at Helwan.

Oct. 28d. Readings also at 0h. (Apia and near Mizusawa), 1h. (Christchurch, Copenhagen, Collmberg, Potsdam, Tucson, Riverside, Mount Wilson, Pasadena, Haiwee, De Bilt, and Tinemaha), 3h. (near Branner, Ferndale, Haiwee, Pasadena, Mount Wilson, Tucson, Butte, Ukiah, and Berkeley), 7h. (La Paz), 20h. (La Paz and Mizusawa), 21h. (Seattle, Scoresby Sund, Salt Lake City, Columbia, Bozeman, Palomar (2), Fresno, La Jolla, Haiwee, Pasadena (2), Mount Wilson (2), Tucson (2), Butte, Ukiah, near Berkeley, Riverside (2), De Bilt, and Tinemaha (2)), 23h. (near Manila).

Oct. 29d. Readings at 0h. (Palomar, Pasadena, Mount Wilson, near Manila, near La Paz, and Tucson), 1h. (Cape Girardeau, Sitka, Seattle, Salt Lake City, and Tucson), 3h. (Berkeley), 6h. (La Paz), 8h. (Riverview), 9h. (near Branner, Pasadena, and Mount Wilson), 10h. (Manila and La Paz), 15h. (near Tananarive, Huancayo, and near Berkeley), 18h. and 20h. (Tucson), 23h. (Bermuda).

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Oct. 30d. 3h. 10m. 9s. Epicentre 1°·8S. 20°·8W.

A = +·9344, B = -·3549, C = -·0312; $\delta = +3$; $h = +7$;
D = -·355, E = -·935; G = -·029, H = +·011, K = -1·000.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Rio de Janeiro	30·2	224	e 6 22	+ 8	e 11 19	+ 6	—	i 14·3
San Fernando	40·4	18	e 7 44	+ 3	e 13 54	+ 4	—	16·9
Lisbon	41·7	13	7 52	0	14 7	- 3	9 13?	e 16·6
Granada	42·0	20	i 8 1 _a	+ 7	i 13 57	-17	10 4	e 20·6
Almeria	42·1	22	7 55	0	e 14 23	+ 7	9 44	PP
Toledo	44·2	18	e 8 7	- 5	i 14 40	- 6	15 15	PS
Algiers	44·3	28	—	—	e 14 36	-12	—	—
La Plata	E. 47·7	222	—	—	15 33	- 3	—	21·0
Cape Town	48·7	136	—	—	15 23	-27	19 11	SS
La Paz	48·8	249	8 49	0	i 15 47	- 5	10 37	PP
San Juan	48·9	296	e 8 48	- 2	e 15 30	-23	e 19 23	SS
Clermont-Ferrand	51·8	22	e 9 3	- 9	—	—	—	e 24·8
Rome	52·9	32	9 20	0	i 16 46	- 2	—	—
Neuchatel	54·3	23	e 9 25	- 5	—	—	—	—
Paris	54·3	19	e 5 51	?	16 51?	-16	—	—
Huancayo	55·0	256	e 9 36	+ 1	i 17 21	+ 4	e 21 11	SS
Zurich	55·3	24	e 9 37	- 1	—	—	—	—
Kew	55·8	16	—	—	e 17 21	- 7	e 21 51?	L _a
Oxford	55·9	15	—	—	e 17 16	-13	—	e 23·3
Uccle	56·6	18	e 7 18	?	i 17 31	- 7	—	23·9
Stuttgart	56·7	23	e 9 46	- 2	e 17 34	- 6	e 21 31	SS
Stonyhurst	57·5	13	—	—	e 23 51?	SSS	—	i 27·9
De Bilt	58·0	18	—	—	i 17 56	- 1	e 22 11	SS
Helwan	58·8	53	e 10 0	- 2	18 15	+ 8	24 30	SSS
Jena	59·2	24	e 10 41	+36	e 18 15	+ 3	—	e 24·9
Sofia	59·5	37	—	—	e 17 15	-61	—	e 31·9
Prague	59·8	25	e 7 27	?	e 18 15	- 5	—	e 25·9
Heligoland	60·6	18	e 13 51?	PPP	—	—	(e 24 51?)	SSS
Hamburg	60·8	20	e 10 34	+18	—	—	—	e 25·9
Potsdam	61·0	23	e 10 2	-16	i 18 34	- 1	—	e 20·9
Istanbul	62·2	41	10 31	+ 5	18 21	-30	13 57	PP
Harvard	63·5	320	e 15 28	PPP	—	—	—	—
Ksara	63·9	51	e 10 55	+18	—	—	—	—
Warsaw	64·3	27	e 11 51?	?	—	—	—	e 32·9
Columbia	66·7	308	—	—	e 19 39	- 7	—	—
Upsala	68·4	19	—	—	e 19 39	-28	(e 24 3)	SS
Salt Lake City	90·8	311	—	—	e 24 8	+ 6	e 30 9	SS
Tucson	91·0	303	e 13 6	- 1	—	—	—	—
Bombay	94·0	72	e 14 57	?	e 24 5	[+ 9]	e 26 51	PPS
Kodaikanal	E. 98·5	80	e 14 51?	+69	—	—	—	—
Agra	E. 98·7	63	e 14 38	+56	24 41	-29	e 18 9	PP
Victoria	99·7	319	e 21 51?	?	e 26 51	PS	—	e 40·9
Colombo	E. 100·8	84	—	—	e 24 51?	[+20]	—	—
Calcutta	N. 108·3	67	—	—	e 26 36	S	—	—

Additional readings:—

Rio de Janeiro iSE = +11m.23s.
Lisbon PN = +8m.7s.?, N = +12m.40s.
Almeria PPP = +10m.1s., SS = +16m.52s., SSS = +18m.2s.
Cape Town N = +15m.29s. and +20m.9s.
La Paz SSN = +19m.23s.
San Juan e = +11m.59s.
Huancayo i = +22m.15s. and +24m.8s.
Uccle e = +9m.51s.
Stuttgart eE = +19m.27s.
Helwan iZ = +10m.9s. and +10m.15s.
Jena eN = +10m.45s.
Potsdam iZ = +10m.17s. and +18m.43s., iN = +18m.47s.
Istanbul PS = +18m.37s., SS = +22m.46s.
Upsala eE = +19m.51s.?
Tucson i = +13m.37s. and +14m.27s., eL = +27m.0s.
Bombay iN = +15m.25s., eN = +24m.54s. and +31m.1s., iE = +31m.9s.
Agra PSE = +26m.31s., SSE = +32m.3s.
Long waves were also recorded at Ukiiah, Bozeman, Pasadena, Aberdeen, and Phu-Lien.

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Oct. 30d. 11h. 48m. 28s. Epicentre 21°·5S. 179°·0W.

A = -·9311, B = -·0163, C = -·3644; $\delta = 0$; $h = +4$;
D = -·017, E = +1·000; G = +·364, H = +·006, K = -·931.

Tables for depth of focus 0·080 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Arapuni	17·1	195	—	—	6 32	+13	—	—
Tual	17·6	191	3 34	- 1	6 24	- 4	—	—
New Plymouth	18·5	197	3 47	+ 4	6 40	- 3	—	—
Wellington	20·4	194	3 58	- 3	7 3	-12	7 16	P _c P
Brisbane	26·1	252	i 4 44	- 8	i 8 32	-14	e 5 56	pP
Riverview	N. 29·0	238	—	—	i 9 25	- 7	—	—
Sydney	29·0	238	—	—	e 9 14	-18	—	e 12·8
Honolulu	47·3	27	e 6 8	?	—	—	—	—
Manila	68·9	295	i 10 11	- 1	18 29	- 5	—	—
Vladivostok	78·6	325	e 11 7	0	i 20 18	- 1	—	e 28·7
Berkeley	z. 79·5	42	i 11 12	0	—	—	—	—
La Jolla	z. 79·9	48	e 11 15	+ 1	—	—	e 13 23	pP
Pasadena	80·0	47	i 11 14 _a	0	—	—	i 13 21	pP
Mount Wilson	z. 80·2	47	i 11 16 _a	+ 1	—	—	i 13 23	pP
Palomar	z. 80·5	48	i 11 19	+ 2	—	—	i 13 25	pP
Riverside	z. 80·5	47	i 11 18 _a	+ 1	—	—	e 13 23	pP
Haiwee	81·3	45	e 11 17	- 4	—	—	e 13 27	pP
Tucson	84·3	52	i 11 37	+ 1	i 21 23	+ 7	i 13 50	pP
Calcutta	N. 100·3	289	—	—	e 22 30	[- 5]	—	e 34·9
Bombay	E. 113·1	282	e 20 39	PPP	e 23 28	[- 1]	e 28 32	PS
Sverdlovsk	124·3	325	19 49	PP	25 45	?	—	—
Helwan	z. 151·5	293	i 18 44	[- 1]	—	—	—	46·5

Additional readings:—

Wellington S_cS = +14m.10s., s_cS = +18m.22s.

Brisbane iE = +7m.26s.

Tucson iPP = +15m.6s., i = +17m.24s., iSP = +22m.10s., isS = +24m.59s., eSS = +29m.43s.

Bombay eE = +22m.16s., +24m.33s., and +27m.7s.

Helwan iZ = +18m.53s., +21m.8s., and +21m.14s.

Oct. 30d. Readings also at 2h. (Huancayo and near Ferndale), 3h. (Paris and La Paz), 5h. (Agra), 8h. (near Berkeley), 10h. (Port au Prince), 11h. (Berkeley and Pasadena), 13h. (Tucson (2)), 15h. (La Paz and near Berkeley), 18h. (near Wellington and New Plymouth), 19h. (Tucson), 22h. (near Andijan, Frunse, Almata, and Tchimkent), 23h. (near Mizusawa, Santa Barbara, Tinemaha, Branner, Haiwee, Riverside, Mount Wilson, Palomar, Tucson, Pasadena, and Berkeley).

Oct. 31d. 1h. 53m. 12s. Epicentre 6°·7S. 153°·0E. (as on 1937 May 31d.).

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

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	20·7	179	i 4 48	+ 4	1 8 42	+11	—	—
Riverview	27·1	183	e 5 48	+ 2	i 10 46	+22	11 53	SS
Sydney	27·1	183	e 7 48	+122	e 10 48	+24	—	e 14·7
Manila	38·1	304	e 7 19	- 3	14 34	?	—	—
Bombay	82·9	290	e 12 28	0*	i 22 46	0	—	—
Pasadena	92·7	56	i 13 14	- 1	(i 24 43)	+25	—	—
Riverside	z. 93·4	56	i 13 17	- 1	(i 24 39)	+15	—	—
Palomar	z. 93·7	57	i 13 19	- 1	(i 24 35)	+ 8	—	—
La Paz	z. 133·2	118	18 53	[-25]	—	—	—	—

Additional readings:—

Brisbane ePE = +5m.0s.

Riverview iSN = +10m.50s.

The iS for the Californian stations is recorded as P for a subsequent shock.

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Oct. 31d. 5h. 21m. 52s. Epicentre 10°·0N. 57°·5E.

A = +·5292, B = +·8307, C = +·1725; $\delta = -13$; $h = +7$;
D = +·843, E = -·537; G = +·093, H = +·145, K = -·985.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bombay	17·3	57	14 1	- 3	e 7 32	+16	18 20	SSS
Kodaikanal	E. 19·7	87	i 4 38 _a	+ 4	i 8 33	SS	—	i 10·7
Hyderabad	E. 21·6	68	4 56	+ 2	9 4	SS	—	10·8
Colombo	E. 22·3	97	5 10	+ 9	—	—	—	11·9
Agra	E. 25·8	46	15 29 _a	- 5	9 55	- 7	11 26	SS
Dehra Dun	N. 27·9	41	e 6 33?	PP	e 10 27	-10	—	—
Samarkand	30·7	14	6 14	- 5	—	—	—	—
Ksara	30·9	323	e 6 25	+ 5	e 11 25	+ 1	—	—
Baku	31·0	348	e 6 25	+ 4	i 11 23	- 3	—	16·1
Helwan	31·4	313	i 6 20 _k	- 5	11 29	- 3	7 10	PP
Calcutta	N. 32·0	63	e 6 15	-15	i 11 50	+ 8	17 18	PP
Tashkent	32·9	17	e 6 35	- 3	e 11 51	- 5	—	i 17·0
Andijan	33·3	20	e 6 29	-12	11 53	- 9	—	i 18·5
Tchimkent	33·9	16	6 29	-18	—	—	—	—
Frunse	36·0	22	7 12	+ 7	—	—	—	—
Almata	37·2	24	7 25	+10	—	—	—	—
Istanbul	39·8	326	7 41	+ 5	13 44	+ 2	9 8	PP
Simferopol	40·2	333	7 39	- 1	13 32	-16	—	—
Sverdlovsk	46·8	3	i 8 30	- 3	i 15 10	-14	—	20·1
Moscow	48·2	346	e 8 40	- 4	e 15 29	-14	—	—
Phu-Lien	48·4	72	e 8 48	+ 2	—	—	—	—
Rome	50·6	318	e 8 27	-35	e 15 16	-61	e 18 57	SS
Pulkovo	53·7	344	e 9 30	+ 4	e 16 53	- 6	—	e 22·7
Clermont-Ferrand	58·5	318	—	—	e 21 52	SS	—	e 27·1
Toledo	61·9	310	e 10 21	- 3	12 19	PP	—	26·1
Manila	62·0	79	i 10 26 _k	+ 2	18 56	+ 8	—	—
Tucson	136·5	345	e 19 28	[+ 4]	—	—	—	30·6

Additional readings:—

Bombay iN = +6m.10s.

Agra eN = +5m.32s., iN = +10m.4s.

Calcutta eN = +8m.50s., iN = +13m.57s.

Istanbul PPP = +10m.38s., SS = +16m.35s.

Rome e = +10m.2s., eS = +15m.4s., e = +20m.46s.

Tucson i = +20m.10s.

Long waves were also recorded at Huancayo, Upsala, and De Bilt.

Oct. 31d. 10h. 43m. 50s. Epicentre 23°·7N. 69°·9E.

Intensity VII at Bhuj, V at Barmer, IV at Dwarka, III at Sheo (Jodhpur).

Epicentre in N.W. Kathiawar 22°·5N. 70°·4E. (Bombay).

24°·5N. 70°·2E. (Strasbourg).

See Government of India Seismological Bulletin, 1940, p. 93.

A = +·3150, B = +·8609, C = +·3996; $\delta = +5$; $h = +4$;
D = +·939, E = -·344; G = +·137, H = +·375, K = -·917.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bombay	5·5	149	11 25	0	12 16	-14	11 35	P*
Agra	E. 8·1	63	1 57	- 5	i 3 41	+ 6	2 52	P _s
Dehra Dun	9·8	46	e 2 0	-24	e 3 44	-33	—	—
Hyderabad	E. 10·1	126	2 27	- 1	4 10	-14	—	i 4·6
Kodaikanal	E. 15·2	148	e 3 40	+ 2	6 12	-16	—	4·5
Samarkand	16·1	353	13 46	- 3	7 4	SS	3 55	PP
Calcutta	N. 17·0	90	14 10	+ 9	17 12	+ 2	e 4 17	PP
Andijan	17·1	5	3 59	- 3	17 3	- 9	5 8	PP
Tashkent	17·6	356	14 7	- 1	17 15	- 8	—	—
Tchimkent	18·5	359	4 4	-15	7 28	-16	—	i 11·4

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	19.5	10	i 4 32	+ 1	i 8 4	- 2	i 8 58 SS	10.7
Colombo	19.7	150	4 28	- 6	7 57	-13	—	9.5
Almata	20.4	15	4 38	- 3	8 28	+ 3	—	—
Grozny	27.9	321	5 59	+ 5	10 50	+13	—	—
Sempalatinsk	27.9	15	5 52	- 2	—	—	—	—
Piatigorsk	29.9	320	—	—	12 22	SS	—	—
Ksara	31.4	296	e 6 29	+ 4	e 13 9	SS	—	—
Sverdlovsk	33.8	351	i 6 47	+ 1	i 12 10	0	—	16.5
Phu-Lien	34.1	88	e 6 48	0	—	—	—	—
Helwan	34.9	289	i 6 57k	+ 2	12 40	+13	8 15 pP	—
Theodosia	35.2	316	6 58	0	12 46	+15	—	—
Simferopol	36.0	315	7 3	- 2	—	—	—	—
Istanbul	38.2	307	7 27	+ 4	13 33	+16	8 57 PP	—
Irkutsk	38.7	34	7 27	0	e 13 22	- 3	—	20.2
Moscow	39.9	332	7 37	0	13 42	- 1	—	22.2
Pulkovo	45.4	333	e 8 22	0	e 15 3	- 1	—	e 23.3
Warsaw	46.7	321	8 34a	+ 2	—	—	—	32.2
Manila	48.9	92	i 8 49a	- 1	16 6	+13	—	—
Rome	50.6	306	i 8 2a	-60	e 15 8	-69	e 18 47 SS	e 23.0
Upsala	51.1	330	e 10 10?	+64	—	—	—	e 26.2
Potsdam	51.5	320	i 9 7k	- 2	i 16 43	+14	—	e 30.2
Jena	52.1	318	i 9 14	0	e 16 52	+14	e 11 26 PP	—
Copenhagen	52.5	324	i 9 18a	+ 1	16 54	+11	—	—
Chur	53.0	313	e 9 19	- 2	—	—	—	—
Stuttgart	53.4	315	e 9 23a	- 1	—	—	—	—
Hamburg	53.5	321	i 9 24a	0	—	—	—	e 33.5
Zurich	53.7	313	e 9 26	0	—	—	—	—
Basle	54.4	313	e 9 30	- 1	—	—	—	—
Uccle	56.7	317	i 9 48	0	—	—	—	—
Clermont-Ferrand	57.4	310	i 9 52	- 1	—	—	—	—
Toledo	63.2	304	i 10 31	- 1	—	—	—	50.2
Riverview	96.1	124	e 20 4	PPP	—	—	—	e 55.2
Haiwee	120.0	7	e 18 55	[+ 2]	—	—	—	—
Riverside	z. 122.2	7	i 18 59	[+ 2]	—	—	—	—
Palomar	z. 122.9	6	i 19 2	[+ 4]	—	—	—	—
Tucson	124.4	1	i 19 4	[+ 3]	—	—	—	—
La Paz	140.1	272	e 19 29	[- 2]	—	—	—	74.2
Huancayo	145.0	283	e 19 42	[+ 3]	—	—	—	—

Additional readings :—

Bombay $iP_g = +1m.42s.$, $iS^* = +2m.29s.$, $iS_g = +2m.40s.$

Calcutta $iSSN = +7m.25s.$

Helwan $sSN = +14m.58s.$, $SSE = +15m.52s.$

Istanbul $PPP = +9m.26s.$, $SS = +16m.26s.$

Rome $e = +9m.58s.$

Potsdam $iPE = +9m.11s.$

Jena $iPN = +9m.17s.$, $eN = +16m.56s.$

Long waves were also recorded at De Bilt, Kew, Prague, Bozeman, San Fernando, Tananarive, Baku, Aberdeen, and Berkeley.

Oct. 31d. Readings also at 0h. (La Paz), 2h. (Tucson and near San Juan), 4h. (Christchurch, near New Plymouth, and Wellington), 5h. (Riverview and Sydney), 6h. (La Paz), 12h. (Huancayo), 14h. (near Berkeley), 16h. (Lincoln and Philadelphia), 19h. (near Mizusawa and near Algiers), 20h. (New Plymouth, near Tuai, and Wellington), 22h. (Tucson (2)), 23h. (near Manila).

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Nov. 1d. 7h. 25m. 1s. Epicentre 33°·8N. 118°·6W. (as on 1940 Oct. 10d.).

Intensity V in the district of Los Angeles.

F. Newman.

United States Earthquakes, 1940, Washington, 1943, p. 28.

Epicentre 33° 47'N. 118° 35'W. (Santa Monica Bay). Macroseismic area 1200 square miles.

$$A = -.3986, B = -.7311, C = +.5537; \quad \delta = -3; \quad h = +1;$$

$$D = -.878, E = +.479; \quad G = -.265, H = -.486, K = -.833.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.		
	°	°	m. s.	s.	m. s.	s.	m. s.		
Pasadena	0·5	46	i 0 11k	- 3	i 0 17	- 6	—	—	
Mount Wilson	0·6	47	i 0 13k	- 2	i 0 21	- 5	—	—	
Riverside	1·0	79	i 0 20a	- 1	i 0 33	- 3	—	—	
Santa Barbara	1·1	305	i 0 25	+ 3	i 0 41	+ 2	—	—	
La Jolla	1·5	130	e 0 28	0	i 0 48	- 1	—	—	
Fresno	N.	3·1	342	e 0 53	+ 2	e 1 29	0	i 1 1	P _r
Lick		4·4	327	e 1 30	P _r	e 2 20	S*	e 2 23	S _r
Branner		4·6	323	—	—	e 2 9	+ 2	e 2 48	S _r
Tucson		6·7	98	e 1 42	0	e 3 3	+ 3	e 2 17	P _r

Additional readings:—

Fresno iSN = +1m.36s.

Tucson e = +2m.41s., i = +3m.49s., +4m.6s., and +4m.43s.

Long waves were also recorded at Butte.

Nov. 1d. 15h. 52m. 39s. Epicentre 18°·9N. 107°·0W. (as on 1938, July 22d.).

$$A = -.2768, B = -.9054, C = +.3220; \quad \delta = +5; \quad h = +5;$$

$$D = -.956, E = +.292; \quad G = -.094, H = -.308, K = -.947.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.	
	°	°	m. s.	s.	m. s.	s.	m. s.	m.	
Tucson	13·7	346	i 3 17	- 1	i 6 7	+15	i 3 44	pP	i 7·7
La Jolla	16·7	328	e 3 57	0	—	—	—	—	—
Palomar	z.	16·9	330	i 4 1	+ 2	—	—	—	—
Riverside		17·7	331	e 4 12	+ 2	—	—	—	—
Mount Wilson		18·2	331	i 4 19	+ 3	—	—	—	—
Pasadena		18·2	331	e 4 18	+ 2	—	—	i 4 41	PPP
Haiwee		19·7	334	e 4 35	+ 1	—	—	—	e 8·8
Tinemaha		20·6	334	e 4 45	+ 2	—	—	—	—
Florissant		24·5	33	i 5 17	- 5	i 9 37	- 3	—	—
Bozeman		26·9	355	—	—	e 10 32	+12	—	—
Ottawa		37·0	36	e 7 8	- 5	—	—	—	e 14·0 19·3

Additional readings:—

Tucson i = +3m.24s., e = +4m.7s. and +4m.33s.

Pasadena i = +5m.6s.

Long waves were also recorded at Seattle, Berkeley, East Machias, and Columbia.

Nov. 1d. Readings also at 1h. (Haiwee, Pasadena, Mount Wilson, Riverside, and Palomar), 5h. (near Tananarive), 6h. (near Istanbul), 8h. (near Berkeley), 10h. (near Fresno), 11h. (La Paz), 12h. (near Mizusawa), 14h. (Sitka), 17h. (near Tananarive (2)), 20h. (Tucson).

Nov. 2d. Readings at 0h. (near Apia and Lincoln), 2h. (near Fresno), 3h. (Tucson), 4h. (Mount Wilson, Riverside, Pasadena, and Palomar), 6h. (Bucharest, Rome, and Sofia), 13h. (Ksara and La Paz), 14h. (Haiwee, Mount Wilson, Riverside, Pasadena, and Tucson), 16h. (Stuttgart and Jena), 17h. (Bombay, La Paz, and Tucson), 18h. (near Mizusawa), 19h. (near Ferndale), 20h. (Bermuda), 21h. (Sitka), 22h. (Bermuda and near Mizusawa), 23h. (Sitka, Ottawa, Victoria, Seven Falls, Berkeley, Seattle, Ukiah, Bozeman, College, East Machias, Salt-Lake City, Florissant, Tucson, Mount Wilson, Riverside, Pasadena, and Palomar).

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Nov. 3d. Readings at 0h. (Philadelphia, San Juan, and Ivigtut), 1h. (Huancayo, near Manila, and La Paz (2)), 2h. (San Juan, Philadelphia, Ivigtut, Haiwee, Riverside, Palomar, Pasadena, Victoria, Berkeley, Butte, East Machias, Sitka, Ukiah, Seattle, College, Bozeman, and Florissant), 3h. (San Fernando), 4h. (near Manila), 5h. (Bombay, Colombo, Calcutta, and Kodaikanal), 6h. (Haiwee, Riverside, Palomar, Pasadena, La Paz, and near Mizusawa), 8h. (Tucson), 11h. (Apia), 19h. (Kodaikanal), 20h. (near Mizusawa).

Nov. 4d. 8h. 30m. 13s. Epicentre $36^{\circ}3'N$. $71^{\circ}0'E$. (as on 1940, May 27d.).

Intensity V at Srinagar, IV at Peshawar.

Epicentre: Hindou-Kouch $36^{\circ}0'N$. $71^{\circ}0'E$.; depth 200km. (Bombay).
See Government of India Seismological Bulletin, 1940, p. 93.

$$A = +.2630, B = +.7638, C = +.5894; \quad \delta = -5; \quad h = 0;$$

$$D = +.946, E = -.326; \quad G = +.192, H = +.557, K = -.808.$$

Tables for depth of focus 0.025 have been used.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.		
			m.	s.		m.	s.		m.	s.			
Andijan	4.6	14	e 1	7	- 3	—	—	—	—	—	—		
Samarkand	4.6	319	e 1	8	- 2	1 1	58	- 6	—	—	—		
Tashkent	5.2	347	i 1	16	- 2	1 2	11	- 7	—	—	3.8		
Frunse	7.1	22	—	42	0	—	—	—	—	—	—		
Dehra Dun	N. 8.4	133	e 2	18	pP	e 3	38	+ 5	—	—	—		
Agra	10.9	145	i 2	32k	0	4	27	- 4	2	40	pP	—	
Semipalatinsk	15.6	22	3	42	pP	6	27	+ 9	—	—	—	—	
Baku	17.0	290	3	49	+ 1	—	—	—	—	—	8.8		
Bombay	17.4	174	i 3	56	+ 4	7	5	+ 7	i 5	9	sP	—	
Hyderabad	19.9	159	4	20	+ 2	7	54	+ 7	8	13	SS	10.4	
Calcutta	N. 20.4	127	e 4	29	+ 6	i 8	13	sS	e 8	38	SS	—	
Grozny	20.6	299	4	7	-18	7	21	-38	—	—	—	—	
Erevan	21.1	288	4	40	+10	8	7	- 2	—	—	—	—	
Sverdlovsk	21.7	345	i 4	36	0	e 8	15	- 4	1	5	10	pP	—
Sotchi	25.0	298	5	11	+ 3	—	—	—	—	—	—	—	
Kodaikanal	E. 26.6	166	e 2	47f	?	—	—	—	—	—	—	—	
Moscow	29.8	321	i 5	51	0	e 11	5	pS	e 6	29	pP	—	
Colombo	E. 30.4	163	—	—	—	e 12	17	SS	—	—	—	—	
Pulkovo	35.1	325	6	35	- 2	11	45	- 9	7	40	sP	—	
Copenhagen	43.6	315	1	46	- 1	—	—	—	—	—	—	—	
Stuttgart	z. 46.0	306	i 8	5	- 1	e 13	3	?	—	—	—	—	

Additional readings:—

Agra sSEN = +4m.44s.

Bombay iN = +7m.20s., iE = +7m.24s., isSE = +8m.23s.

Calcutta eScSN = +16m.4s.

Sverdlovsk isP = +5m.36s.

Nov. 4d. Readings also at 3h. (Palomar, Haiwee, Mount Wilson, Pasadena, and Riverside), 4h. (Palomar, Mount Wilson, Pasadena, Riverside, and near Balboa Heights), 10h. (near Lick), 13h. (near Balboa Heights), 15h. (near Branner), 18h. (La Paz (4) and near Huancayo (3)), 20h. (La Paz and near Triest), 22h. (near Rome, Potsdam, Zurich, Chur, Stuttgart, and near Triest).

Nov. 5d. Readings at 1h. (Tashkent, Sverdlovsk, Vladivostok, Baku, Uccle, Manila, and De Bilt), 5h. (La Paz), 7h. (La Paz), 9h. (La Paz), 14h. (Sofia), 15h. (Rome), 19h. (Huancayo), 23h. (Mizusawa).

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Nov. 6d. 16h. 11m. 7s. Epicentre 28°·5N. 103°·6E.

A = -·2070, B = +·8555, C = +·4747; $\delta = +7$; $h = +2$;
D = +·972, E = +·235; G = -·112, H = +·461, K = -·880.

		Δ °	Az. °	P.		O-C.	S.		O-C.	Supp.		L.
				m.	s.	s.	m.	s.	m.	s.	m.	m.
Phu-Lien		8·1	160	e 2	4	+ 2	14	31	S _g	—	—	—
Calcutta	N.	15·0	250	e 3	45	+10	16	48	SS	e 4	1	PPP
Zi-ka-wei		15·7	76	e 2	53	-51	—	—	—	—	—	19·6
Sintiku		15·9	98	3	54	+ 7	8	31	L	—	—	18·7
Zinsen		21·2	59	8	42	S	(8 42)	+ 1	—	—	—	(8·5)
Dehra Dun	N.	22·3	282	e 5	17	PP	e 9	14	+12	—	—	e 12·7
Agra	E.	22·7	273	i 5	0 _a	- 4	9	9	0	—	—	—
Irkutsk		23·7	2	5	15	+ 1	9	30	+ 3	—	—	12·4
Kumamoto		23·7	73	5	16	+ 2	—	—	—	—	—	—
Hyderabad		25·6	251	5	34	+ 2	10	4	+ 5	—	—	13·4
Almata		26·0	313	e 5	37	+ 1	—	—	—	—	—	14·9
Koti		26·1	72	5	35	- 2	10	18	+11	—	—	—
Sumoto		27·2	70	5	50	+ 3	10	37	+12	—	—	—
Frunse		27·4	310	e 5	49	0	—	—	—	—	—	15·9
Sempalatinsk		28·1	330	e 5	52	- 3	—	—	—	—	—	17·2
Andijan		28·3	304	e 5	58	+ 1	—	—	—	—	—	17·1
Nagoya		29·0	69	6	5	+ 1	—	—	—	—	—	—
Bombay		29·7	259	i 6	13	+ 3	1 11	12	+ 6	e 7	6	PP
Kodalkanal		30·5	240	e 5	53 _f	-24	—	—	—	—	—	—
Tashkent		30·7	305	i 6	19	0	e 11	30	+ 9	—	—	18·3
Tchimkent		30·7	307	6	22	+ 3	—	—	—	—	—	16·9
Colombo	E.	31·1	232	6	26	+ 4	11	30	+ 2	—	—	—
Samarkand		32·1	300	e 6	32	+ 1	—	—	—	—	—	18·9
Sverdlovsk		41·4	327	i 7	50	0	14	3	- 2	—	—	17·9
Moscow		53·6	322	9	24	- 1	16	57	- 1	9 44	pP	27·4
Ksara		57·3	294	e 9	53	+ 1	e 18	15	+28	—	—	—
Pulkovo		57·5	326	e 9	50	- 3	e 17	49	- 1	10 11	pP	28·7
Helwan		62·1	291	i 10	24 _k	- 1	i 18	50	+ 1	i 19 13	PS	—
Warsaw		63·6	318	e 10	33	- 2	e 19	10	+ 2	—	—	e 33·9
Upsala	E.	63·8	327	—	—	—	e 17	53 _f	?	—	—	e 34·8
Copenhagen		67·6	324	i 10	59	- 2	19	59	+ 2	—	—	—
Potsdam		68·3	320	i 11	3 _k	- 2	i 20	5	- 1	—	—	34·9
Hamburg		69·6	322	e 11	13	0	e 28	53 _f	SSS	—	—	e 35·9
Jena		69·6	318	i 11	12	- 1	—	—	—	—	—	—
Stuttgart	Z.	71·9	317	i 11	26 _a	- 1	—	—	—	—	—	—
Chur		72·4	316	e 11	28	- 2	—	—	—	—	—	—
Rome		72·4	309	i 11	27 _a	- 3	e 20	53	0	e 12 26	pP	—
Zurich		72·8	316	e 11	31 _a	- 1	—	—	—	—	—	—
Basle		73·3	316	e 11	35	0	—	—	—	—	—	—
Clermont-Ferrand		76·9	315	e 11	54	- 2	—	—	—	—	—	—

Additional readings:—

Calcutta eN = +7m.31s.

Bombay iE = +6m.55s., eP_cPN = +8m.9s., iEN = +11m.27s., iN = +12m.27s., iSSE = +12m.39s., iN = +13m.25s., iE = +15m.52s. and +16m.16s., iS_cSN = +17m.0s., iS_cSE = +17m.5s.

Helwan iZ = +10m.29s., iE = +20m.19s.

Potsdam iE = +18m.16s., eZ = +28m.42s.

Rome eEZ = +11m.34s., ePPZ = +14m.10s., eZ = +17m.0s. and +21m.0s.

Long waves were also recorded at Prague, Kew, De Bilt, Paris, Bergen, Vladivostok, and Baku.

Nov. 6d. Readings also at 1h. (Palomar, Riverside, and Pasadena), 15h. (Ksara), 17h. (near Branner), 20h. (Mizusawa), 21h. (La Paz), 23h. (near Mizusawa).

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Nov. 7d. 13h. 57m. 57s. Epicentre 30°·3N. 138°·5E.

Slight at Titizima and Katuura.

Epicentre 30°·3N. 138°·5E. Macro seismic radius greater than 300km. Depth 480km., approx.

See Seismological Bulletin of the Central Met. Obs., Japan, for the year 1940. Tokyo, 1950, pp. 28-29. Macro seismic chart, p. 28.

$$A = -.6478, B = +.5731, C = +.5020; \quad \delta = +9; \quad \lambda = +2; \\ D = +.663, E = +.749; \quad G = -.376, H = +.333, K = -.865.$$

Tables for depth of focus 0·070 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Hatidyozima	3·0	22	1 14	+ 4	2 11	+ 6	—	—
Siomisaki	3·9	325	1 20	+ 3	2 24	+ 7	—	—
Owase	4·2	333	1 21	+ 2	2 30	+ 8	—	—
Omaesaki	4·3	357	1 26	+ 6	2 34	+10	—	—
Hamamatu	4·4	352	1 51k	+30	2 57	+32	—	—
Osima	4·5	10	1 27	+ 5	2 32	+ 5	—	—
Titizima	4·6	133	1 20	- 3	2 25	- 3	—	—
Mera	4·7	12	1 29	+ 5	2 38	+ 8	—	—
Muroto	4·7	310	1 27	+ 3	2 35	+ 5	—	—
Kameyama	4·8	341	1 30	+ 5	2 41	+ 9	—	—
Wakayama	4·8	326	1 25	0	2 27	- 5	—	—
Misima	4·9	5	1 26	0	2 35	+ 2	—	—
Nagoya	5·0	346	1 32	+ 6	2 44	+ 9	—	—
Osaka	5·0	336	1 29	+ 3	2 43	+ 8	—	—
Sumoto	5·1	325	1 29	+ 2	2 40	+ 3	—	—
Hunatu	5·2	3	1 33	+ 5	2 45	+ 7	—	—
Kobe	5·2	329	1 32 ^a	+ 4	2 45	+ 7	—	—
Kyoto	5·2	335	1 33	+ 5	2 46	+ 8	—	—
Yokohama	5·2	10	1 31	+ 3	2 45	+ 7	—	—
Gihu	5·3	345	1 30k	+ 1	2 45	+ 5	—	—
Hikone	5·3	340	1 35	+ 6	2 48	+ 8	—	—
Kohu	5·3	1	1 34	+ 5	2 56	+16	—	—
Koti	5·3	309	1 31	+ 2	2 45	+ 5	—	—
Simidu	5·3	299	1 29	0	2 44	+ 4	—	—
Tokyo Cen. Met. Ob.	5·5	11	1 34k	+ 3	2 49	+ 5	—	—
Tyosi	5·7	20	1 32	- 1	2 54	+ 7	—	—
Kumagaya	5·9	7	1 39	+ 4	2 56	+ 5	—	—
Matuyama	6·0	307	1 38	+ 2	2 58	+ 6	—	—
Tukubasan	6·0	12	1 37	+ 1	2 52	0	—	—
Kakioka	6·1	12	1 38	+ 1	2 58	+ 4	—	—
Maebasi	6·1	5	1 41	+ 4	3 6	+12	—	—
Toyooka	6·1	331	1 52	+15	3 12	+18	—	—
Miyazaki	6·2	287	1 40	+ 2	3 1	+ 5	—	—
Mito	6·3	15	1 41k	+ 2	3 2	+ 4	—	—
Nagano	6·3	358	1 41	+ 2	3 5	+ 7	—	—
Hirosima	6·5	310	1 42	+ 1	3 5	+ 3	—	—
Toyama	6·5	351	1 48	+ 7	3 11	+ 9	—	—
Kagosima	6·9	282	1 36	-10	—	—	—	—
Onahama	6·9	17	1 50	+ 4	3 15	+ 6	—	—
Yakusima	6·9	273	1 42	- 4	3 7	- 2	—	—
Hamada	7·0	313	1 51	+ 4	3 16	+ 5	—	—
Kumamoto	7·1	292	1 44k	- 4	3 12	- 1	—	—
Wazima	7·2	350	1 50	+ 1	3 15	0	—	—
Izuka	7·4	299	1 49	- 2	3 20	+ 2	—	—
Unzendake	7·4	291	1 45	- 6	2 52	-26	—	—
Hokusima	7·6	12	1 55	+ 2	3 27	+ 5	—	—
Aikawa	7·7	368	1 55 ^a	+ 1	3 28	+ 4	—	—
Nagasaki	7·7	291	1 53	- 1	3 26	+ 2	—	—
Nake	8·1	259	1 53	- 5	3 30	- 2	—	—
Sendai	8·2	14	2 2k	+ 3	3 41	+ 7	—	—
Tomie	8·6	288	2 3	- 1	3 42	0	—	—
Mizusawa	9·1	14	2 12	+ 3	3 56	+ 5	—	—
Husan	9·3	303	2 7	- 4	3 41	-14	—	—
Akita	9·5	8	2 22 ^a	+ 9	4 11	+12	—	—
Miyako	9·7	16	2 17	+ 2	4 8	+ 5	—	—

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.	
Naha	10.4	250	2	16	-7	4	13	-4	—	—	—	
Hatinohe	10.5	13	2	25	+1	4	23	+4	—	—	—	
Aomori	10.6	10	2	29 _a	+4	4	32	+11	—	—	—	
Mori	11.9	8	2	43	+4	3	55	-51	—	—	—	
Keizyo	12.0	310	2	44	+4	4	56	+8	—	—	—	
Zinsen	12.2	309	4	50	S	(4	50)	-2	—	—	—	
Sapporo	12.9	9	2	55 _k	+6	5	15	+9	—	—	—	
Miyakosima	13.0	248	2	41	-9	5	0	-8	—	—	—	
Isigakizima	14.0	249	2	22	-39	—	—	—	—	—	—	
Nemuro	14.2	22	3	9 _a	+6	5	41	+11	—	—	—	
Zi-ka-wei	14.7	278	e 2	1	-67	5	35	-5	—	—	—	
Taihoku	15.9	255	3	1	-19	—	—	—	—	—	—	
Dairen	16.3	306	3	27	+3	6	11	+2	—	—	—	
Sintiku	16.5	255	3	39	+13	—	—	—	—	—	—	
Arisan	17.2	251	4	21	+48	—	—	—	—	—	—	
Taito	17.2	248	4	31	+58	—	—	—	—	—	—	
Kosyun	18.0	247	3	39	-2	—	—	—	—	—	—	
Manila	22.5	229	i 4	17 _k	-7	1	6	48	-68	—	—	
Phu-Lien	30.2	259	e 5	28	-4	1	9	54	-3	—	—	
Irkutsk	33.3	321	5	57	-1	10	45	0	—	—	14.1	
Calcutta	N. 45.3	273	e 7	32	-3	i 13	26	-14	e 15	53	SS	—
Semipalatinsk	47.4	313	e 7	50	-2	e 14	3	-7	—	—	—	—
Almata	49.9	303	e 8	8	-2	14	47	+3	—	—	—	—
Dehra Dun	N. 51.6	286	e 9	1	pP	e 14	55	-12	e 12	39 _f	?	—
Frunse	51.7	303	e 8	22	-2	i 15	10	+2	—	—	—	20.1
Agra	E. 52.6	282	e 8	25	-5	i 15	6	-14	10	28	PP	—
Tchimkent	55.4	303	8	43	-7	i 15	48	-9	—	—	—	—
Tashkent	55.6	302	i 8	52	+1	i 16	1	+1	—	—	—	—
Hyderabad	55.8	272	e 10	56	sP	15	59	-3	i 17	39	PS	—
College	56.1	30	e 8	59	+4	e 16	20	+14	e 21	20	SS	—
Honolulu	57.4	83	e 12	41	PPP	e 16	32	+9	e 19	15	sS	—
Samarkand	57.9	300	e 9	10	+3	e 16	27	-2	—	—	—	—
Sverdlovsk	58.7	321	e 9	10	-2	i 16	38	-2	—	—	—	29.1
Brisbane	59.1	165	i 9	9	-6	i 16	33	-12	i 10	45	pP	—
Colombo	59.5	259	9	15	-3	16	40	-10	—	—	—	—
Kodaikanal	E. 59.9	265	e 9	3 _f	-17	—	—	—	—	—	—	—
Bombay	60.1	275	i 9	18	-4	i 16	49	-8	i 11	37	sP	—
Sitka	63.1	38	e 9	48	+6	e 17	44	+10	e 12	16	PP	e 32.1
Adelaide	64.9	180	—	—	—	i 17	51	-5	i 18	54	PS	—
Riverview	64.9	168	e 8	31	?	i 17	51	-5	i 19	1	PS	e 21.0
Sydney	64.9	168	—	—	—	e 17	45	-11	e 20	51	sS	—
Baku	70.1	306	10	34	+9	—	—	—	—	—	—	35.0
Moscow	71.3	325	i 10	30	-2	19	7	-3	—	—	—	—
Pulkovo	72.8	330	e 10	40	0	i 19	24	-3	—	—	—	30.6
Arapuni	76.4	151	—	—	—	i 23	15	?	—	—	—	—
Spokane	76.9	43	i 11	6	+3	—	—	—	—	—	—	—
Ukiah	77.4	52	e 11	15	+9	e 20	24	+7	e 21	35	pS	e 31.5
Upsala	77.9	334	i 11	10	+1	i 20	21	-1	e 23	15 _f	sS	e 42.1
Scoresby Sund	78.5	354	i 9	37	?	e 18	55	?	e 12	36	?	e 38.9
Berkeley	78.6	54	e 11	10	-2	e 20	38	+9	e 26	3 _f	sS	e 32.3
San Francisco	N. 78.6	54	e 11	15	+3	—	—	—	—	—	—	—
Wellington	78.7	153	—	—	—	i 20	21	-9	—	—	—	—
Branner	78.9	54	e 11	15	+1	—	—	—	—	—	—	—
Lick	79.3	54	e 11	16	0	—	—	—	—	—	—	—
Christchurch	79.8	156	—	—	—	i 20	38	-4	23	47	sS	—
Butte	80.5	42	—	—	—	i 20	56	+7	e 24	14	sS	—
Fresno	N. 80.9	53	e 11	28	+4	e 21	1	+8	—	—	—	—
Warsaw	81.4	327	11	28 _a	+1	i 20	57	-1	i 24	11	sS	e 44.1
Bozeman	81.6	42	e 11	30	+2	e 21	5	+5	e 14	13	sP	e 31.8
Bergen	81.8	339	—	—	—	e 21	4	+2	—	—	—	—
Tinemaha	81.8	52	e 11	29	0	e 21	5	+3	—	—	—	—
Haiwee	N. 82.5	53	e 11	34	+1	e 21	12	+3	—	—	—	—
Copenhagen	82.8	333	e 11	30	-4	21	9	-3	—	—	—	—
Ksara	83.1	305	e 11	36	0	e 21	12	-3	e 13	17	pP	—
Mount Wilson	83.4	54	i 11	37 _a	0	e 21	22	+4	e 13	29	pP	—

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Pasadena	83.4	54	e 11 36 _a	- 1	e 21 18	0	e 13 23	pP e 34.2
Bucharest	83.5	318	—	—	e 21 11	- 8	—	—
Istanbul	83.6	314	11 42	+ 4	21 24	+ 4	14 30	PKS
Salt Lake City	83.9	46	e 11 44	+ 4	i 21 21	- 1	e 13 30	pP e 34.1
Riverside	84.0	54	i 11 39 _a	- 1	e 21 19	- 4	i 13 35	pP
La Jolla	84.7	55	e 11 45	+ 1	—	—	—	—
Palomar	z. 84.7	54	i 11 44	0	—	—	i 40 27	SKP,PKP
Potsdam	84.9	330	i 11 46 _k	+ 2	i 21 20	-12	i 13 32	pP e 45.8
Hamburg	85.3	332	e 13 35	pP	e 21 26	-10	—	—
Prague	85.9	328	21 42	S	(21 42)	0	e 24 58	sS
Sofia	86.1	318	e 11 54	+ 4	i 21 47	+ 4	e 22 33	PS 34.6
Jena	86.6	329	e 10 53	-60	i 21 50	+ 2	e 15 16	PP
De Bilt	88.3	334	i 12 4 _k	+ 3	i 21 45	-19	—	— 57.1
Helwan	88.5	303	i 12 0 _k	- 2	21 42	-23	13 51	pP
Stuttgart	89.2	329	e 12 3	- 2	i 21 48	-24	—	—
Triest	89.3	325	—	—	e 23 19	PS	—	—
Tucson	89.5	53	e 12 6	0	i 21 57	-17	e 14 5	pP 37.6
Uccle	89.6	333	e 12 8	+ 1	—	—	—	e 47.1
Chur	90.5	329	e 12 6	- 5	—	—	—	—
Basle	90.8	329	e 12 12	0	—	—	—	—
Oxford	91.0	337	—	—	i 21 56	-32	i 25 2	sS
Rome	92.6	323	12 21 _a	0	22 40	- 1	i 16 13	PP
Clermont-Ferrand	94.2	330	i 12 29	+ 1	—	—	—	—
Ottawa	98.5	24	—	—	e 22 37	[- 1]	e 26 3	sS e 45.1
Seven Falls	98.5	20	—	—	e 22 32	[- 6]	—	48.1
Fordham	103.1	25	i 17 38	PP	i 23 2	[+ 1]	e 26 30	PS
San Fernando	E. 105.8	331	—	—	e 22 39	[- 33]	—	50.1
Huancayo	143.8	67	e 18 44	[+ 4]	e 24 49	[- 12]	e 21 38	pPKP
La Paz	152.1	66	i 18 57 _a	[+ 5]	i 25 27	[+ 14]	i 22 51	pPKP

Additional readings:—

Zi-ka-wei iN = +5m.43s. and +7m.33s.
 Manila iPN = +4m.21s.
 Agra S_cS?E = +17m.20s.
 Hyderabad eE = +19m.51s.
 College e = +23m.19s.
 Honolulu e = +20m.5s.
 Brisbane eN = +14m.51s., iE = +18m.9s., iN = +18m.15s.
 Bombay iE = +10m.57s., iS_cSEN = +18m.24s.
 Sitka eS_cS = +18m.50s., eSS = +22m.9s.
 Adelaide e = +21m.3s. and +21m.56s., i = +25m.35s.
 Riverview eN = +11m.27s., eZ = +11m.32s.
 Spokane iE = +11m.11s.
 Ukiah e = +22m.23s., eSS = +25m.47s.
 Scoresby Sund i = +20m.59s., eSS = +22m.17s.
 Berkeley ePZ = +11m.15s., iPZ = +12m.19s., eZ = +13m.46s., eN = +16m.9s.
 Bozeman e = +20m.2s., eSS = +24m.25s.
 Mount Wilson IPPZ = +15m.3s., eSKP,PKPZ = +40m.31s.
 Pasadena i = +11m.39s., eSPZ? = +14m.13s., ePPZ = +15m.1s., iSPZ = +22m.24s.,
 ePSNZ = +23m.25s., eSSN = +27m.10s., eSKP,PKPZ = +40m.31s.
 Bucharest iS?N = +21m.22s.
 Istanbul PPP = +16m.6s.
 Salt Lake City ePP = +14m.11s., e = +23m.38s.
 Riverside eSKP,PKPZ = +40m.29s.
 Potsdam ePEN = +12m.3s., IPPZ = +15m.14s., eN = +20m.3s., iSEN = eZ =
 +21m.32s., iN = +24m.44s., +27m.17s., and +34m.9s.
 Hamburg iN = +21m.37s., eE = +34m.3s.?
 Sofia eEN = +21m.30s., eN = +22m.57s., eE = +24m.57s.
 Jena e = +13m.33s.
 De Bilt eS = +25m.20s., ePS = +28m.13s.
 Helwan iEN = +22m.0s., eN = +28m.9s.
 Stuttgart iPZ = +12m.7s., eZ = +12m.38s., eN = +25m.23s., eE = +25m.28s.
 Tucson i = +12m.9s., +12m.16s., and +13m.2s., sP = +14m.47s., IPP = +15m.48s.,
 i = +23m.40s., e = +35m.55s.
 Rome eSKS = +22m.5s., eZ = +23m.57s., isSE = +25m.59s., isSN = +26m.3s., eE =
 +34m.40s. and +39m.27s.
 Ottawa e = +28m.9s.
 Fordham eNZ = +20m.5s.
 Huancayo i = +18m.56s., ePKP₁ = +19m.22s., eSS = +40m.12s.
 La Paz iSKKS = +29m.37s., SSN = +41m.35s.
 Long waves were also recorded at Kew.

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Nov. 7d. Readings also at 3h. (Palomar, Riverside, and Mount Wilson), 6h. (Vladivostok and near Triest), 16h. (Andijan, Zurich, Neuchatel, Ebingen, Ravensburg, Chur, Basle, and near Stuttgart), 21h. (Balboa Heights and Tucson).

Nov. 8d. 10h. 34m. 8s. Epicentre 18°·0S. 167°·7E. (as on 1940 March 3d.).

A = -·9299, B = +·2027, C = -·3071; $\delta = +11$; $h = +5$;
D = +·213, E = +·977; G = +·300, H = -·065, K = -·952.

	Δ	Az.	P.		O-C.		S.		O-C.		Supp.		L. m.
			c	c	m.	s.	s.	m.	s.	m.	s.		
Brisbane	16·5	232	i 3	52	- 2	i 7	10	+12	—	—	—	—	
Apia	20·2	82	e 4	40	+ 1	e 8	47	SS	i 5	3	PP	e 11·7	
Arapuni	21·2	164	5	28	PPP	9	28	SSS	—	—	—	—	
Riverview	21·6	219	e 4	58	+ 4	i 9	2	+13	—	—	—	e 10·7	
Sydney	21·6	219	e 5	1	+ 7	e 9	10	+21	—	—	—	e 11·5	
Wellington	24·0	167	5	17	0	9	42	+10	5	30	pP	12·4	
Christchurch	25·8	171	(5 32)		- 2	5	32	P	—	—	—	10·5	
Adelaide	30·9	230	i 2	50	?	i 7	2	?	—	—	—	15·8	
Perth	48·6	242	16	47	PPS	—	—	—	i 19	34	SSS	25·2	
Vladivostok	69·2	332	e 11	11	+ 1	e 20	18	+ 2	—	—	—	e 31·8	
Ukiah	85·9	47	—	—	—	e 22	8	[-59]	e 24	28	PS	39·4	
Berkeley	86·0	48	—	—	—	e 23	21	+ 4	e 24	23	PS	e 39·1	
Calcutta	N. 87·4	294	e 17	7	?	i 23	37	+ 7	—	—	—	—	
Pasadena	87·5	53	e 12	49	- 2	e 23	22	[+ 5]	—	—	—	e 39·9	
Mount Wilson	Z. 87·6	53	e 12	50	- 1	—	—	—	—	—	—	—	
Riverside	Z. 88·0	53	e 12	53	0	—	—	—	—	—	—	—	
Palomar	Z. 88·1	54	i 12	54	0	—	—	—	—	—	—	—	
Tinemaha	88·6	50	e 12	54	- 2	—	—	—	—	—	—	—	
Sitka	88·8	27	e 23	24	SKS	(e 23 24)	[- 2]	—	e 29	24	SS	e 36·4	
Victoria	90·1	38	—	—	—	e 23	46	- 8	—	—	—	e 41·9	
Colombo	E. 90·1	277	23	34	S	(23 34)	[+ 1]	—	—	—	—	—	
Tucson	92·5	56	e 13	14	0	e 25	44	PS	e 17	4	PP	i 37·1	
Kodaikanal	E. 93·3	279	—	—	—	e 23	52?	[0]	—	—	—	—	
Bozeman	96·8	44	—	—	—	e 24	12	[+ 1]	e 26	18	PS	45·4	
Agra	E. 97·7	296	e 17	48	PP	i 24	17	[+ 2]	31	3	SS	58·6	
Bombay	100·1	286	e 16	59	PP	i 24	29	[+ 2]	—	—	—	—	
Huancayo	111·0	110	e 19	33	PP	e 25	30	[+14]	e 28	44	PS	e 51·9	
La Paz	Z. 115·2	119	—	—	—	e 28	52	PS	—	—	—	53·9	
Ottawa	121·2	46	—	—	—	e 30	12	PS	—	—	—	52·9	
Seven Falls	124·3	45	—	—	—	e 27	53	{+10}	—	—	—	e 49·9	
San Juan	129·0	80	e 22	39	PP	e 29	44	?	e 37	42	SS	—	
Istanbul	137·8	312	19	30	[+ 4]	—	—	—	23	20	PP	—	
Helwan	Z. 138·6	295	i 19	31	[+ 3]	—	—	—	i 23	7	PPS	—	
Potsdam	140·3	336	e 22	34	PP	—	—	—	e 23	10	PKS	e 65·4	
De Bilt	143·3	342	e 19	42	[+ 6]	—	—	—	e 41	42	SS	e 66·9	
Uccle	144·7	343	e 19	40	[+ 1]	—	—	—	—	—	—	e 68·9	
Stuttgart	Z. 145·7	335	e 19	40 _a	[0]	—	—	—	—	—	—	—	
Zurich	146·0	335	e 19	43	[+ 2]	—	—	—	—	—	—	—	
Chur	146·1	334	e 19	42	[+ 1]	—	—	—	—	—	—	—	
Rome	148·2	323	19	49 _a	[+ 5]	e 42	23	SS	23	31	SKP	e 72·4	
Clermont-Ferrand	149·5	338	i 19	54	[+ 7]	—	—	—	—	—	—	—	
San Fernando	E. 160·8	345	e 21	31	?	—	—	—	—	—	—	87·9	

Additional readings :—

Apia e = +5m.57s., P_cP = +8m.28s.

Riverview iPN = +5m.3s.

Wellington PPZ = +6m.2s.

Christchurch P = 10h.33m.33s._a

Adelaide i = +3m.2s. and +4m.58s., iSS = +9m.4s.

Perth PP = +17m.35s., PPP = +18m.2s., S = +21m.49s., SS = +23m.17s.

Berkeley ePSE = +24m.26s., eSSN = +29m.27s., eL_qN = +35m.49s.

Calcutta iN = +23m.50s.

Sitka e = +31m.27s.

Tucson eSS = +31m.2s.

Bozeman eSS = +31m.26s.

Agra SE = +27m.19s., PPS?E = +29m.3s., SSE = +35m.47s.

Huancayo e = +31m.35s., eSS = +35m.3s., e = +48m.13s.

Helwan iZ = +19m.42s. and +22m.28s.

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Potsdam eE = +23m.52s.
 Stuttgart eZ = +19m.50s. and +20m.42s.
 Rome iZ = +19m.56s., PKP₂EZ = +20m.40s., ePSKSZ = +33m.46s., eSSEN = +43m.42s.

Long waves were also recorded at Upsala, Kew, Harvard, Tananarive, Salt Lake City, East Machias, Honolulu, College, Prague, Baku, Warsaw, Sverdlovsk, and Tashkent.

Nov. 8d. 12h. 0m. 42s. Epicentre 45°·7N. 26°·8E. (as on 1940 Oct. 22d.).

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

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bucharest	1·4	198	i 0 26	+ 1	i 0 45	+ 1	—	—
Sofia	3·9	221	i 0 56	- 3	i 1 36	- 8	—	—
Simferopol	5·2	96	—	—	2 20	+ 4	—	—
Kalossa	E. 5·5	281	e 1 18	- 3	e 2 18	- 5	i 2 48	SS
Budapest	5·6	291	1 20	- 2	i 2 25	- 1	1 38	pP
Warsaw	7·5	332	e 1 48	0	e 3 22	sS	e 1 58	pP
Sotchi	9·4	97	—	—	4 23	sS	—	—
Potsdam	11·2	312	—	—	e 4 42	0	e 5 21	SSS
Piatigorsk	11·7	91	—	—	5 8	SS	—	—
Chur	12·0	282	e 3 7	PP	—	—	—	—
Moscow	12·1	30	e 2 58	+ 8	e 4 55	- 9	—	—
Stuttgart	12·4	291	e 2 47	- 7	—	—	—	—
Zurich	12·7	284	e 2 55	- 3	—	—	—	—
Copenhagen	13·5	323	e 3 1	- 8	—	—	—	—
Ksara	13·8	146	e 3 15	+ 3	e 5 54	+10	—	—
Pulkovo	14·3	7	e 3 21	+ 2	e 5 38	-17	—	—
Upsala	15·2	342	e 3 18	-12	i 6 20	+ 4	—	e 8·1
Uccle	E. 15·8	297	i 3 37	- 1	—	—	—	—
Helwan	16·2	166	i 3 39	- 4	—	—	—	—
Tucson	93·4	325	i 12 59	- 7	e 23 42	[+14]	e 18 53	PP
Adelaide	128·4	105	i 21 3	PP	—	—	i 23 11	PPP

Additional readings :—

Sofia iEN = +1m.30s.

Kalossa iE = +2m.59s., eE = +4m.6s.

Budapest eN = +1m.58s., eE = +2m.1s., PSN = +2m.15s., eE = +2m.50s., iE = +3m.15s.

Warsaw eE = +1m.52s. and +3m.32s., eN = +3m.57s. and +4m.31s., eE = +4m.58s., eZ = +5m.55s.

Stuttgart eZ = +2m.51s.

Tucson e = +16m.44s.

Adelaide i = +21m.25s. and +21m.38s.

Long waves were also recorded at Bozeman.

Nov. 8d. 22h. 20m. 42s. Epicentre 35°·3N. 124°·7W.

A = -·4656, B = -·6725, C = +·5752; δ = -11; h = 0;
 D = -·822, E = +·569; G = -·327, H = -·473, K = -·818.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.
	°	°	m. s.	s.	m. s.	s.	m. s.
Branner	2·9	44	i 0 50	+ 2	i 1 27	+ 3	i 1 30
San Francisco	N. 3·1	36	i 0 51	0	i 1 26	- 3	—
Berkeley	3·2	37	i 0 53	+ 1	i 1 30	- 2	—
Lick	3·2	50	i 0 54	+ 2	i 1 34	+ 2	i 1 6
Santa Barbara	Z. 4·2	100	e 1 5	- 2	i 1 54	- 3	—
Fresno	N. 4·3	68	e 1 8	0	i 1 58	- 2	—
Haiwee	5·5	79	i 1 27	+ 2	i 2 34	+ 4	—
Pasadena	5·5	100	i 1 24	- 1	i 2 26	- 4	—
Tinemaha	5·5	68	e 1 26 _k	+ 1	i 2 32	+ 2	—
Mount Wilson	5·6	99	i 1 24 _a	- 3	i 2 30	- 3	—
Riverside	6·2	100	i 1 34	- 1	i 2 42	- 6	—
Palomar	Z. 6·7	105	i 1 42	0	i 2 49	-11	—

Additional readings :—

Branner iE = +1m.44s.

Lick iN = +1m.10s. and +1m.14s.

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Nov. 8d. Readings also at 2h. and 3h. (Adelaide), 4h. (Adelaide and near Mizusawa), 6h. (La Paz), 8h. (Adelaide, Riverview, Sydney, Wellington, and Christchurch), 10h. (New Plymouth), 11h. (near Apia), 12h. (near Tananarive), 14h. (near New Plymouth and Wellington), 16h. (near Balboa Heights), 20h. (Mount Wilson, Pasadena, Palomar, and Riverside), 21h. (Rome).

Nov. 9d. 10h. 58m. 56s. Epicentre $11^{\circ}2'S$. $163^{\circ}9'E$. (as on 1939 May 17d.).

$$A = -0.9427, B = +0.2721, C = -0.1930; \quad \delta = -3; \quad h = +6; \\ D = +0.277, E = +0.961; \quad G = +0.185, H = -0.054, K = -0.981.$$

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	E.	19.2	211	i 4 58	+30	i 8 34	+35	—	—
Riverview	N.	25.4	204	—	—	e 10 16	+20	—	e 13.0
Sydney		25.4	204	—	—	e 10 4	+8	—	e 13.1
Wellington		31.5	163	6 34	+8	11 47	+13	7 41	PP 16.1
Christchurch		33.1	168	6 44a	+4	12 41	SS	8 4	PP 18.4
Perth		48.8	237	16 14	PS	—	—	—	— 25.1
Vladivostok		61.5	334	i 10 23	+2	i 18 45	+3	—	— 30.7
Calcutta	N.	81.2	294	—	—	i 22 40	+11	—	—
Pasadena	Z.	86.4	54	e 12 43	-2	—	—	—	e 38.7
Mount Wilson	Z.	86.5	54	i 12 44	-2	—	—	—	—
Riverside	Z.	87.0	54	i 12 46	-2	—	—	—	—
Haiwee	Z.	87.1	52	e 12 48	-1	—	—	—	—
Victoria		87.2	39	—	—	e 23 28	0	—	— 36.1
Tinemaha	Z.	87.2	51	e 12 48	-1	—	—	—	—
Palomar	Z.	87.3	53	i 12 47	-3	—	—	—	—
Agra	E.	91.4	297	e 17 14	PP	i 23 40	[-1]	i 25 35	PS —
Tucson		91.9	57	e 13 11	0	e 24 36	+25	e 16 29	PP 41.4
Tashkent		100.7	310	—	—	e 24 34	[+4]	—	e 41.6
Lincoln		104.4	50	e 17 51	?	e 22 35	PKS	—	—
Huancayo		116.8	110	—	—	e 29 50	PS	—	e 37.1
San Juan		132.0	275	e 22 33	PKS	—	—	—	e 61.1
Rome		140.5	323	e 22 14	PKS	e 26 36	[-4]	e 50 20	? e 80.5

Additional readings:—

Wellington $P_cPZ = +9m.4s.$, $P_cS = +12m.57s.$, $L_c = +14m.9s.$

Christchurch $L_cE = +14m.40s.$

Perth $i = +20m.57s.$ and $+22m.9s.$

Tucson $e = +13m.47s.$ and $+14m.18s.$

Long waves were also recorded at Arapuni, Sitka, Berkeley, La Paz, Baku, and Sverdlovsk.

Nov. 9d. Readings also at 5h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, and Tinemaha), 6h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Santa Barbara, Tinemaha, Christchurch, and Wellington), 9h. (Mount Wilson, Pasadena, Palomar, Riverside, and Tinemaha), 10h. (Adelaide), 15h. (La Paz, Haiwee, Mount Wilson, Pasadena, Palomar, and Tinemaha), 17h. (Huancayo and near La Paz), 19h. (near Mizusawa), 21h. (Bermuda).

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Nov. 10d. 1h. 39m. 5s. Epicentre 45°·7N. 26°·8E. (as on 1940 Nov. 8d.).

Intensity X at Lopatari, Leculele, Panciu, Petresti, Tg. Bujor; IX at Bucharest and at several other places. Damage in Rumania; epicentral region at 30km. W. of Focsari in the Vrancea Mountains. The area included in the isoseist of intensity VIII extends from l'Olt as far as Jassy, 350-400kms. in length, 200kms. in width. Much damage at Panciu, Braila, Focsari, Bucharest, Ploesti; damage in 67 Hungarian districts.

Epicentre 45°·9N. 26°·6E. (Bucharest).
45°·7N. 26°·5E. depth 150kms. (Gutenberg).

I. Atanasiu et Th. Krautner.

Das Erdbeben Vom 10 November, 1940, in Rumanien Veroffentlichungen der Reichsanstalt fur die Erdbebenforschung in Jena. Heft 40. Berlin, 1941, pp. 7-30, 20 figures et 1 coloured chart. One isoseist chart in colour. Epicentre 45°·8N. 26°·6E.

A. A. Beles.

Le Tremblement de terre du 10 Novembre, 1940, et les batiments, Comptes Rendus, Academie de Sciences de Roumanie, Vol. 5, 270-287. Bucharest, 1941.

G. Demetrescu.

Remarques sur le Tremblement de terre de Roumanie du 10 Novembre, 1940, Comptes Rendus Academie de Roumanie, Vol. 5, 224-242. Bucharest, 1941.

Le Tremblement de terre de Roumanie du 10 Novembre, 1940, note preliminaire. Bulletin seismique Observatoire de Bucarest, annee, 1940, p. 39. Tremblement de terre de Roumanie du 10 Novembre, 1940, carte macroseismique. Annexe au Bulletin seismique annee 1940, Observatoire de Bucarest, p. 42, et une planche hors. texte.

G. Demetrescu and G. Petrescu.

Sur les phénomènes lumineux qui ont accompagne le tremblement de Terre de Roumanie du 10 Novembre, 1940, Academie Roumanie, Bulletin de la Section Scientifique, Tome 23, No. 6, 5 pp. 1 chart, Jan. 1941.

H. J. Fabian.

Bilder vom Erdbeben in Rumänien am 10 November, 1940. Natur und Volk, Vol. 71, No. 1, pp. 35-38, 5 fig., Frankfurt a. M., Jan., 1941.

Ioan A., Bucharest.

Le Tremblement de Terre de Roumanie du 10 Novembre, 1940.

Onde S. Heure d'Origine. C. R. Acad. Sci. Roumanie, 1942, 6 No. 1-4, pp. 104-108.

G. Muller-Deile.

Einige Notizen über das Rumanische Erdbeben, Vom 10, Nov., 1940.

Z. Geophys. Vol. 17, pp. 33-39, 1941.

Observations macroseismiques, impressions personnelles reactions des animaux et oiseaux, éclairs, dégâts, victimes, photos.

J. P. Rothé.

Chronique Seismologique. Revue pour l'Etude des Calamites, Tome V, Geneve, 1942, pp. 55-57.

B. Simon.

Die Erdbebentatigkeit des Ungarischen Beckens. Veroffentlichungen der Reichsanstalt für Erdbebenforschung in Jena, Heft. 40, Berlin, 1941, pp. 82.

E. Tillotson.

The Rumanian Earthquake of Nov. 10. Nature No. 3708, Vol. 146, 675-677, 1 map. London, Nov. 23, 1940.

I. P. Voltesti.

Considerations Geologiques sur la region epicentrale du Tremblement de terre de Roumanie, du 10 Novembre, 1940. Comptes Rendus, Academie des Sciences de Roumanie, Vol. 5, pp. 179-203, Bucharest, 1941.

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

$$D = +.451, E = -.893; \quad G = +.637, H = +.322, K = -.701.$$

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bucharest	1·4	198	i 0 31	+ 6	—	—	—	—
Sofia	3·9	221	i 1 3k	+ 4	i 1 43	- 1	i 1 15	pP
Istanbul	4·9	160	1 16	+ 3	2 12	+ 3	1 25	pP
Simferopol	5·2	96	i 1 19	+ 2	—	—	—	—
Yalta	5·3	101	i 0 53	-25	—	—	—	—

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	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.
Kalossa	5.5	281	i 1	21	0	—	—	—	—	—	2.0
Budapest	5.6	291	i 1	24	+ 2	—	—	—	—	—	—
Ogyalla	6.3	293	i 1	34	+ 2	—	—	—	i 1	40	pP
Warsaw	7.5	332	i 1	50k	+ 2	i 3	8	- 4	—	—	—
Triest	9.1	275	i 2	10	0	i 3	55	+ 3	—	—	—
Prague	9.4	303	i 2	13k	- 1	e 4	0	+ 1	—	—	—
Sochi	9.4	97	i 2	14	0	4	6	+ 7	—	—	—
Rome	11.0	255	i 2	34k	- 2	i 4	39	+ 2	i 2	48	pP
Potsdam	11.2	312	i 2	37	- 1	—	—	—	—	—	—
Jena	11.4	303	i 2	41	0	i 4	47	0	—	—	i 5.9
Piatigorsk	11.7	91	2	45	0	4	46	- 8	—	—	—
Chur	12.0	282	i 2	49	0	i 5	22	sS	—	—	—
Ravensburg	12.0	286	i 2	49k	0	i 5	6	+ 5	—	—	—
Moscow	12.1	30	i 2	54	+ 4	i 5	7	+ 3	—	—	—
Ebingen	12.4	288	i 2	55k	+ 1	e 5	23	sS	i 5	36	SS
Stuttgart	12.4	291	i 2	53k	- 1	i 5	23	sS	i 3	7	pP
Zurich	12.7	284	i 2	57k	- 1	i 5	24	+ 6	—	—	e 5.9
Basle	13.4	285	i 3	4	- 3	e 5	41	+ 7	—	—	—
Hamburg	13.4	312	i 3	3k	- 4	i 5	53	sS	i 5	58	SS
Copenhagen	13.5	323	i 3	5k	- 4	5	38	+ 1	—	—	—
Grozny	13.7	93	3	16	+ 5	—	—	—	3	24	pP
Neuchatel	13.8	283	i 3	9	- 3	e 5	45	+ 1	—	—	—
Ksara	13.8	146	e 3	17	+ 5	5	57	sS	—	—	—
Pulkovo	14.3	7	i 3	15	- 4	i 5	48	- 7	—	—	—
Heligoland	14.8	312	i 3	23k	- 2	i 6	23	sS	—	—	e 7.1
Upsala	15.2	342	i 3	27	- 3	i 6	13	- 3	—	—	—
Marseilles	15.5	269	i 3	38	+ 4	i 6	32	+ 9	—	—	i 7.9
De Bilt	15.6	304	i 3	34k	- 2	i 6	38	sS	—	—	—
Uccle	15.8	297	i 3	38k	0	i 6	33	+ 3	—	—	7.9
Helwan	16.2	166	i 3	43k	0	6	37	- 2	—	—	—
Clermont-Ferrand	16.6	279	i 3	45	- 3	i 6	56	+ 8	—	—	e 15.3
Paris	16.8	289	i 3	49	- 1	e 6	54	+ 1	4	1	PP
Baku	17.7	100	i 4	5	+ 3	—	—	—	—	—	—
Kew	18.8	298	i 4	13k	- 1	i 7	44	+ 7	i 4	21	pP
Bergen	19.4	329	i 4	21	0	i 7	54	+ 4	—	—	—
Oxford	19.4	300	i 4	14	- 7	—	—	—	—	—	—
Algiers	19.9	251	i 4	25	- 1	i 7	59	- 1	4	44	pP
Stonyhurst	19.9	305	i 4	30	+ 4	i 8	13	+ 13	—	—	—
Aberdeen	21.2	315	i 4	38	- 1	i 8	27	+ 3	i 9	2	SS
Edinburgh	21.4	310	4	38	- 3	i 8	23	- 5	—	—	—
Toledo	23.3	267	i 4	57	- 3	i 8	56	- 6	i 5	17	PP
Almeria	23.6	258	i 5	1	- 2	i 8	53	- 14	5	23	PP
Sverdlovsk	23.7	50	i 5	5	+ 1	i 9	10	+ 2	i 5	25	pP
Granada	24.2	261	i 5	7k	- 1	i 9	11	- 6	5	29	pP
San Fernando	26.4	261	i 5	23	- 6	i 9	47	- 7	i 5	59	pP
Lisbon	27.4	268	5	35	- 3	i 10	4	- 6	6	8	pP
Samarkand	29.9	88	i 6	1	0	—	—	—	7	12	PP
Tchimkent	30.7	81	i 6	5	- 3	—	—	—	—	—	—
Tashkent	30.9	82	i 6	10	0	e 11	5	0	e 6	31	pP
Andijan	33.2	83	i 6	31	+ 1	i 14	2	SSS	7	9	sP
Frunse	33.9	77	i 6	37	+ 1	—	—	—	6	59	pP
Scoresby Sund	34.2	333	i 4	56	?	i 10	18	?	17	30	PP
Almata	35.4	75	6	50	+ 2	—	—	—	8	13	PP
Semipalatinsk	35.4	62	i 6	48	0	—	—	—	7	11	pP
Dehra Dun	42.5	93	e 7	48	+ 1	e 14	5	+ 3	e 17	26	SSS
Agra	44.4	96	i 8	0	- 3	14	34	+ 5	8	32	pP
Ivigtut	44.6	318	e 7	58	- 6	i 14	20	- 12	18	38	pP
Bombay	46.3	109	i 8	19	+ 1	i 14	55	- 1	e 8	55	pP
Irkutsk	49.0	53	i 8	55	pP	15	46	+ 12	9	26	sP
Hyderabad	51.1	106	8	53	- 2	16	4	0	9	53	PcP

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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.	
Calcutta	54.5	93	i 9	25 _a	+ 5	i 16	57	+ 7	e 9	56	pP	—
Kodaikanal	55.8	113	i 9	30 _a	+ 1	i 17	10	+ 3	i 20	14	SS	i 25.1
Colombo	59.8	114	9	55	- 2	17	59	0	—	—	—	35.7
Halifax	60.3	305	9	53	- 8	i 17	55	-11	e 22	49	SS	25.9
East Machias	62.3	306	i 10	11	- 3	i 18	18	-13	i 10	42	pP	i 26.6
Seven Falls	62.8	311	10	14	- 4	i 18	32	- 5	12	49	PP	27.9
Shawinigan Falls	64.2	311	10	23	- 4	18	43	-12	i 11	5	pP	30.9
Harvard	66.1	307	i 10	41	+ 2	i 19	17	- 1	i 20	37	sS	e 25.4
Weston	66.1	306	i 10	36	- 3	i 19	14	- 4	11	20	pP	i 21.1
Dairen	66.4	59	10	39	- 2	19	19	- 3	—	—	—	—
Ottawa	66.5	311	i 10	39	- 2	i 19	19	- 4	11	15	pP	e 30.9
Tananarive	67.0	159	i 10	42 _k	- 3	19	33	+ 4	11	18	pP	e 32.7
Phu-Lien	68.4	83	10	55	+ 2	i 19	51	+ 5	—	—	—	—
Fordham	68.5	307	i 10	51	- 3	i 19	45	- 2	i 11	22	P _c P	i 31.0
Vladivostok	69.4	49	11	37	pP	i 19	57	0	i 13	43	PP	33.4
Toronto	69.6	312	i 11	1	0	i 19	55	- 5	i 13	13	PP	32.9
College	69.7	358	e 11	9	+ 8	i 20	5	+ 4	e 11	49	sP	e 29.8
Buffalo	69.8	311	i 11	6	+ 4	e 19	59	- 3	i 11	41	pP	e 32.8
Zinsen	70.3	57	11	4	- 1	20	18	+10	—	—	—	—
Pennsylvania	70.8	310	e 11	7	- 1	e 20	7	- 7	i 11	46	pP	e 33.9
Zi-ka-wei	71.4	65	e 11	9	- 3	20	19	- 1	i 21	25	sS	36.6
Johannesburg	71.5	179	i 11	13	+ 1	e 20	19	- 3	e 14	55	PP	—
Georgetown	71.6	307	e 11	12	- 1	i 20	19	- 4	i 11	44	pP	—
Pittsburgh	72.1	310	i 11	13	- 3	20	25	- 4	i 11	49	pP	—
Sapporo	74.2	44	11	28	0	20	55	+ 3	—	—	—	30.4
Mori	74.5	45	10	29	-61	21	55	sS	i 14	4	PP	39.6
Saskatoon	74.7	333	11	43	+12	23	17	?	14	9	PP	33.9
Chicago J.S.A.	75.1	316	i 11	22	-11	i 20	58	- 4	i 12	12	sP	—
Chicago U.S.C.G.S.	75.1	316	e 11	30	- 3	e 20	52	-10	i 12	6	sP	31.2
Hukuoka	75.2	58	e 11	35	+ 1	21	3	0	—	—	—	—
Taihoku	75.6	69	11	38	+ 2	21	12	+ 4	—	—	—	—
Sitka	76.0	351	i 11	40	+ 2	i 21	17	+ 5	i 12	10	pP	31.2
Miyazaki	77.0	59	11	39	- 5	21	23	0	12	13	pP	30.1
Mizusawa	77.1	47	11	44	0	21	20	- 4	—	—	—	—
Columbia	77.4	306	e 11	43	- 3	i 21	24	- 3	e 12	20	pP	i 31.2
Osaka	77.4	53	11	11	-35	20	52	-35	—	—	—	—
Nagoya	77.8	52	11	48	0	21	28	- 3	—	—	—	—
Fort de France	78.2	278	i 11	47	- 3	i 21	31	- 5	14	39	PP	36.2
Tokyo Cen. Met. Ob.	78.9	50	11	55	+ 1	21	40	- 3	12	26	P _c P	e 43.9
San Juan	79.1	285	e 11	56	+ 1	i 21	39	- 6	i 15	44	PP	32.8
Yokohama	79.1	51	11	54	- 1	e 22	0	+15	i 12	36	pP	e 42.5
Cape Girardeau	79.5	312	e 11	54	- 4	e 21	38	-12	i 12	23	pP	—
Cape Town	79.6	187	12	1	+ 3	21	54	+ 3	15	1	PP	37.7
Bozeman	81.7	331	e 12	15	+ 6	i 22	6	- 6	i 15	19	PP	37.8
Spokane	81.8	337	i 12	9	- 1	e 22	12	- 1	i 12	48	pP	—
Butte	81.9	332	e 12	15	+ 5	i 22	8	- 6	i 12	43	pP	i 38.6
Manila	82.6	77	i 12	15	+ 1	i 22	29	+ 8	—	—	—	—
Victoria	82.6	340	e 12	18	+ 4	i 22	29	+ 8	15	32	PP	e 34.9
Seattle	83.2	339	e 13	38	pP	i 23	10	sS	e 16	51	PPP	e 34.6
Mobile	83.8	309	i 12	25	+ 5	i 22	37	+ 4	i 13	2	pP	—
Denver	84.6	324	e 12	28	+ 4	e 22	19	-22	i 12	56	pP	—
Logan	85.4	331	i 12	28	0	e 22	11	[-30]	e 16	3	PP	e 38.7
Salt Lake City	86.3	330	e 12	44	+12	i 22	36	[-10]	i 13	10	pP	e 34.5
Ferndale	90.3	339	e 12	7	-44	i 23	15	[+ 3]	—	—	—	e 42.9
Ukiah	91.4	337	e 13	26	pP	i 23	15	[- 3]	e 16	39	PP	e 43.5
Tinemaha	91.8	332	e 12	59	+ 1	e 23	16	[- 4]	i 30	17	PKKP	—
Berkeley	92.3	335	e 12	58	- 2	e 23	19	[- 4]	i 13	13	pP	e 44.9
San Francisco	92.4	336	e 13	13	+12	e 23	26	[+ 3]	—	—	—	—
Fresno	92.6	334	e 13	6	+ 4	i 23	25	[+ 1]	e 13	38	pP	e 48.0
Haiwee	92.6	332	e 13	4	+ 2	e 23	21	[- 3]	—	—	—	—
Lick	92.6	335	e 13	4	+ 2	e 23	22	[- 2]	e 17	1	PP	e 43.3
Branner	92.7	335	e 13	7	+ 5	e 24	21	+25	e 16	51	PP	e 45.2
Santa Clara	92.7	335	e 13	1	- 1	i 23	23	[- 2]	e 13	33	pP	e 45.9
Rio de Janeiro	93.2	240	i 13	2	- 3	i 22	55	[-33]	—	—	—	i 36.5
Tucson	93.4	325	i 13	5	- 1	i 23	24	[- 4]	i 13	29	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.	
Mount Wilson	94.3	331	e 13 8	- 2	e 23 30	[- 2]	i 30 8	PKKP	—
Riverside	94.3	331	e 13 7	- 3	e 23 29	[- 3]	i 30 10	PKKP	—
Pasadena	94.4	331	e 13 10	0	i 23 27	[- 6]	i 13 44	pP	e 43.9
Palomar	z. 94.7	329	i 13 10	- 1	—	—	i 30 6	PKKP	—
Santa Barbara	94.7	333	i 13 15	+ 4	e 23 32	[- 3]	—	—	—
La Jolla	95.3	330	e 13 20	+ 6	e 23 38	[- 1]	i 17 44	PP	—
La Paz	105.0	261	i 13 57 _a	P	i 24 23	[- 5]	i 14 57	pP	50.3
Huancayo	107.0	270	e 14 10	P	i 24 35	[- 1]	e 14 45	pP	i 44.5
La Plata	E. 110.7	241	17 43	[- 37]	24 43	[- 6]	18 57	PP	45.2
	N. 110.7	241	17 43	[- 37]	24 37	[- 12]	19 0	PP	45.9
	Z. 110.7	241	18 32	[+ 12]	28 13	SP	19 1	PP	—
Perth	111.4	114	12 45	?	24 42	[- 12]	19 13	PP	51.2
Honolulu	113.2	5	—	—	e 26 16	SKKS	i 35 0	SS	e 46.1
Adelaide	128.3	105	e 10 27	?	19 35	?	32 9	SSP	—
Brisbane	N. 134.1	86	e 19 19	[+ 12]	i 40 25	SS	i 21 37	PP	—
Riverview	136.4	95	i 20 43	pPKP	i 40 5	SS	i 22 3	PP	e 61.3
Sydney	136.5	95	e 20 19	pPKP	e 41 13	sSS	e 22 43	PP	52.9
Apia	144.5	32	19 14	[- 11]	29 28	SKKS	22 26	PP	66.6
Arapuni	155.7	83	19 55?	[+ 12]	31 55	?	24 7	PP	—
Christchurch	155.7	97	19 41 _a	[- 2]	30 43	SKKS	23 52	PP	75.2
Wellington	156.4	90	19 42 _a	[- 1]	43 25	SS	20 51	pPKP	69.9

Additional readings:—

Sofia iEN = +1m.21s.

Istanbul SP_g = +1m.44s.

Ogyalla i = +1m.43s.

Rome iPPZ = +2m.37s., iZ = +2m.41s., iE = +2m.55s., iEN = +3m.20s., eSSEN = +4m.57s.

Jena iP = +2m.45s., eSE = +4m.37s.

Stuttgart iZ = +2m.57s., iPPEN = +3m.43s.

Copenhagen +5m.41s.

Upsala iSE = +6m.6s.?

Marseilles i = +8m.12s., eP_cP = +8m.25s., iP_cS = +11m.59s., iS_cS = +15m.33s.

Uccle iZ = +6m.1s., iSZ = +6m.39s.

Paris SS = +7m.22s.

Kew iPPEN = +4m.27s., SS = +7m.51s., iS_cS = +15m.34s.

Algiers e = +4m.48s., SS = +8m.47s.

Edinburgh i = +8m.4s.

Almeria PPP = +5m.44s., P_cP = +9m.40s., SSS = +9m.56s., S_cS = +17m.21s.

Granada sP = +5m.37s., PP = +5m.49s., pP_cP = +9m.24s., sS = +9m.51s.

Lisbon Z = +5m.43s., pPN = +6m.12s.?, sP_e? = +6m.24s.?, sP_iN = +6m.32s.?

Andijan sPP = +8m.5s.

Scoresby Sund i = +5m.59s., iPP = +6m.18s., i = +8m.36s., and +11m.47s.

Almata pP_cP = +9m.44s.

Semipalatinsk sP = +7m.25s., SP_cP = +10m.0s.

Agra iEN = +8m.6s., sPEN = +9m.1s., PPE = +9m.58s., PPPN = +10m.29s., PPPE = +10m.37s., sSN = +15m.30s., sSE = +15m.34s., SSEN = +17m.47s., S_cSE = +18m.8s., sSS? = +18m.34s.

Ivigtut i = +8m.15s. and +8m.58s., iPP = +9m.38s., i = +11m.45s. and +12m.30s., e = +13m.50s.

Bombay isP = +9m.15s., iP_cPE = +9m.55s., iPPEN = +10m.14s., iEN = +10m.45s., iN = +11m.0s., iEN = +13m.36s. and +15m.37s., isSEN = +15m.58s., iS_cSE = +18m.1s., iSSEN = +18m.18s., iE = +18m.42s., iS_cSE = +18m.59s.

Hyderabad PPN = +11m.1s., S_cSN = +18m.29s., SSN = +19m.33s.

Calcutta isS = +17m.56s.

Halifax SSS = +23m.55s.?

East Machias iPP = +12m.30s., i = +12m.58s., iPPP = +14m.1s., i = +19m.25s. and +20m.10s., iSS = +22m.20s., i = +23m.25s.

Seven Falls SSN = +22m.37s.

Shawinigan Falls e = +19m.59s.

Ottawa e = +14m.49s., PSN = +20m.7s., iE = +21m.27s., e = +23m.1s., SS = +23m.43s., iN = +25m.3s.

Tananarive iN = +10m.45s., sPEN = +11m.42s., PP = +13m.10s., sSN = +20m.18s., eN = +20m.39s., SSN = +24m.3s., SSSN = +24m.49s.

Fordham e = +19m.34s.

College e = +13m.18s., ePP = +13m.47s., i = +20m.15s., isS = +20m.53s., i = +21m.38s.

Toronto eN = +15m.15s., SS = +24m.7s., e = +27m.55s.

Buffalo iP_cP = +11m.15s., i = +11m.31s. and +13m.51s., e = +15m.17s., eSP = +20m.50s., e = +25m.41s. and +28m.5s., i = +28m.11s.

Pennsylvania i = +11m.20s., e = +12m.12s., +24m.39s., and +28m.9s.

Zi-ka-wei iN = +22m.13s.

Johannesburg i?N = +15m.43s., eSKSEN = +21m.19s.

Continued on next page.

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Georgetown $iP = +11m.16s.$, $iPP = +13m.56s.$, $+20m.49s.$
 Pittsburgh $iSPZ = +11m.58s.$, $iSEN = +21m.31s.$
 Saskatoon $i = +12m.11s.$, $PPN = +16m.25s.$, $SS = +26m.7s.$, $SSS = +28m.55s.$?
 Chicago J.S.A. $i = +15m.43s.$ and $+21m.8s.$
 Chicago U.S.C.G.S. $e = +11m.39s.$, $iPP = +14m.19s.$, $ePPP = +16m.25s.$, $iS = +20m.57s.$, $e = +21m.34s.$, $iPS = +21m.59s.$, $i = +22m.30s.$ and $+24m.59s.$, $iSSZ = +25m.49s.$
 Sitka $iPP = +14m.20s.$, $i = +17m.5s.$, $iScS = +21m.23s.$, $i = +22m.25s.$ and $+24m.0s.$, $eSS = +26m.4s.$, $i = +29m.16s.$
 Columbia $e = +16m.44s.$, $iS = +21m.57s.$
 Mizusawa $ePN = +11m.49s.$, $SE = +21m.24s.$
 Fort de France $SS = +26m.35s.$, $SSS = +29m.27s.$
 Tokyo Cen. Met. Ob. $PPPZ = +16m.23s.$, $PS = +22m.42s.$
 San Juan $i = +12m.46s.$, $+13m.39s.$, $+16m.39s.$, and $+21m.56s.$, $iPS = +22m.55s.$, $iSS = +27m.22s.$, $i = +29m.56s.$
 Yokohama $S? = +22m.45s.$
 Cape Girardeau $iPcPEN = +12m.34s.$, $ePPN = +16m.57s.$, $iSKSEN = +21m.55s.$
 Cape Town $PE = +12m.4s.$, $PPN = +16m.54s.$, $PSE = +22m.46s.$, $PSN = +22m.54s.$, $SSE = +26m.54s.$
 Bozeman $i = +12m.48s.$, $e = +13m.21s.$, $i = +15m.32s.$, $iPS = +22m.46s.$, $i = +23m.3s.$, $iS = +23m.17s.$, $iSS = +27m.20s.$, $i = +27m.41s.$ and $+28m.9s.$, $iSSS = +34m.22s.$
 Spokane $iPPEN = +15m.54s.$, $iSEN = +23m.16s.$, $iSSE = +27m.36s.$, $iSSSE = +28m.30s.$, $eE = +36m.16s.$
 Butte $i = +14m.37s.$, $ePP = +15m.43s.$, $i = +18m.59s.$ and $+22m.25s.$, $iSS = +27m.23s.$, $e = +33m.16s.$
 Victoria $SSSN = +32m.1s.$
 Seattle $e = +14m.33s.$ and $+21m.44s.$, $iPS = +23m.37s.$, $iS = +24m.15s.$, $i = +25m.2s.$, $e = +25m.47s.$, $eSS = +29m.28s.$
 Mobile $iPP = +15m.35s.$
 Denver $eSKSE = +22m.23s.$, $iN = +22m.27s.$, $iE = +22m.31s.$, $iSE = +22m.41s.$, $iSN = +22m.47s.$, $eN = +23m.27s.$, $iN = +23m.33s.$, $iSN = +23m.44s.$, $eSSN = +28m.5s.$
 Logan $i = +12m.42s.$ and $+12m.47s.$, $ePPP = +17m.55s.$, $iS = +22m.39s.$, $iPS = +23m.56s.$, $e = +30m.26s.$
 Salt Lake City $i = +13m.24s.$, $e = +16m.7s.$ and $+19m.3s.$, $iPS = +24m.2s.$, $e = +25m.45s.$, $iSS = +28m.9s.$, $i = +31m.3s.$
 Ferndale $eN = +12m.11s.$, $eSKSE = +23m.25s.$
 Ukiah $e = +13m.56s.$, $ePPP = +18m.40s.$, $iS = +23m.46s.$, $i = +24m.27s.$ and $+25m.1s.$, $eSS = +29m.55s.$
 Tinemaha $iZ = +30m.29s.$, $iPKP,PKPZ = +37m.28s.$
 Berkeley $ePN = +13m.2s.$, $ePE = +13m.10s.$, $iN = +13m.37s.$, $eZ = +15m.36s.$, $iPPN = +16m.22s.$, $iPPZ = +16m.47s.$ and $+16m.52s.$, $iZ = +17m.5s.$ and $+20m.43s.$, $iSKSN = +23m.23s.$, $eSKSZ = +23m.40s.$, $iZ = +24m.13s.$
 Fresno $eN = +23m.14s.$
 Branner $eLqN = +38m.13s.$
 Santa Clara $iZ = +16m.34s.$
 Tucson $i = +13m.42s.$, $+15m.10s.$, $+16m.24s.$, $+17m.26s.$, and $+19m.13s.$, $iS = +24m.3s.$, $iPS = +25m.21s.$
 Mount Wilson $iZ = +30m.24s.$
 Riverside $iZ = +30m.21s.$, $ePKP,PKPZ = +37m.55s.$
 Pasadena $iPPZ = +16m.58s.$, $iPPZ = +17m.29s.$, $iSPZ = +17m.57s.$, $iPPPZ = +19m.11s.$, $iZ = +20m.52s.$, $iN = +24m.43s.$, $iSPEZ = +25m.14s.$, $eSSN = +29m.37s.$, $ePKPZ = +29m.59s.$, $ePKP,PKPZ = +38m.4s.$, $eSKP,PKPZ = +41m.24s.$
 La Paz $iSP = +15m.5s.$, $iPPZ = +17m.35s.$, $iPPPZ = +19m.39s.$, $iSKSZ = +24m.16s.$, $iSKKS = +25m.11s.$, $iSN = +25m.44s.$, $iPS = +27m.17s.$, $iPPS = +28m.7s.$, $iSSN = +33m.49s.$, $iSSSZ = +38m.7s.$, $iZ = +39m.39s.$
 Huancayo $ePP = +18m.22s.$, $i = +19m.58s.$ and $+20m.21s.$, $ePPP = +21m.8s.$, $i = +25m.45s.$, $iS = +26m.7s.$, $i = +27m.10s.$, $+28m.33s.$, and $+31m.5s.$
 La Plata E. $sPP = +19m.37s.$, $S = +26m.25s.$, $sS = +27m.25s.$, $SP = +28m.19s.$, $SPP = +29m.13s.$, $+30m.25s.$, and $+32m.7s.$, $SS = +34m.13s.$, $sSS = +35m.7s.$, $+37m.43s.$, $SSS = +39m.7s.$
 La Plata N. $sPP = +19m.31s.$, $S = +26m.25s.$, $sS = +27m.37s.$, $SP = +28m.19s.$, $SPP = +29m.25s.$, $SS = +34m.8s.$, $sSS? = +35m.19s.$, $SSS = +38m.13s.$
 Perth $i = +22m.13s.$ and $+23m.33s.$, $PS = +26m.5s.$, $PPS = +27m.45s.$, $i = +28m.55s.$, $SS = +32m.43s.$, $i = +34m.43s.$, $SSS = +36m.55s.$, $i = +43m.25s.$
 Honolulu $i = +28m.50s.$, $e = +29m.35s.$
 Adelaide $ePKP = +13m.29s.$, $SKKS = +22m.18s.$, $SKSP = +24m.55s.$, $i = +41m.59s.$ and $+44m.23s.$
 Brisbane $iPKSN = +22m.43s.$, $iSSSN = +45m.1s.$
 Riverview $i?N = +20m.46s.$, $iE = +22m.49s.$, $eN = +40m.55s.$ and $+45m.55s.$
 Apia $P = +16m.58s.$, $i? = +19m.38s.$ and $+19m.50s.$, $PKS = +23m.2s.$, $PPP = +25m.35s.$, $SKSP = +32m.35s.$, $SSS = +46m.25s.$, $e = +63m.19s.$
 Arapuni $i = +25m.7s.$, $+38m.37s.$, and $+45m.7s.$
 Christchurch $i = +19m.53s.$, $PPP = +27m.36s.$, $iE = +31m.41s.$ and $+35m.1s.$, $PPS = +37m.51s.$, $iE = +39m.41s.$, $SS = +44m.29s.$, $SSSE = +50m.7s.$, $SSSN = +50m.37s.$, $LqN = +65m.25s.$
 Wellington $PKP = +20m.13s.$, $PPZ = +23m.55s.$, $pPPZ = +24m.31s.$, $sPPZ = +24m.47s.$, $PPP?Z = +28m.15s.$, $SKKS = +31m.35s.$, $SKSP = +35m.10s.$, $PPS = +38m.0s.$, $sSS = +44m.35s.$, $SSS = +49m.55s.$, $Lq = +59.9m.$

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Nov. 10d. 20h. 40m. 25s. Epicentre 17°·4N. 83°·3W.

A = +·1114, B = -·9483, C = +·2972; $\delta = +1$; $h = +5$;
D = -·993, E = -·117; G = +·035, H = -·295, K = -·955.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Balboa Heights	9·1	156	e 2 15	+ 1	—	—	—	3·9
San Juan	16·4	83	e 3 52	- 1	e 6 57	+ 1	i 4 3	i 9·1
Cape Girardeau N.	20·6	347	e 4 43	0	e 8 34	+ 5	i 4 55	—
Florissant	22·2	346	i 5 20	PP	i 9 17	+17	i 5 40	PPP
Pittsburgh	23·1	8	e 5 8	0	e 9 20	+ 4	i 5 28	PP
Pennsylvania	23·8	10	i 5 16	+ 1	—	—	e 5 39	PP
Chicago U.S.C.G.S.	24·6	351	e 5 38	+15	e 9 41	- 1	e 11 23	SSS
Toronto	26·4	7	—	—	e 10 13	+ 1	—	—
Harvard	26·9	19	i 5 45	0	i 10 55	+35	—	—
Vermont	28·3	15	—	—	e 10 45	+ 2	—	—
Ottawa	28·6	11	e 6 0	0	e 10 49	+ 1	—	—
Tucson	28·9	307	e 6 2	- 1	—	—	e 6 39	PP
Huancayo	30·3	165	e 6 35	+20	e 11 20	+ 5	e 7 45	PP
East Machias	30·4	23	—	—	e 11 19	+ 3	—	—
Seven Falls	31·4	16	6 17	- 8	11 36	+ 4	—	—
Salt Lake City	33·9	320	e 7 53	PP	—	—	—	—
Riverside z.	34·7	306	e 6 52	- 2	—	—	—	—
Mount Wilson z.	35·3	306	e 6 59	0	—	—	—	—
Pasadena	35·3	306	e 6 59	0	e 11 59	-34	i 8 26	PP
Haiwee	35·9	309	e 7 4	0	—	—	—	—
Bozeman	36·4	328	—	—	e 12 48	- 2	—	—
Tinemaha	36·5	310	e 7 8	- 1	—	—	—	—
Santa Barbara z.	36·6	305	e 7 8	- 2	—	—	—	—
La Paz	36·8	155	i 7 13 _a	+ 2	i 13 2	+ 6	i 16 1	SSS
Butte	37·5	328	—	—	e 13 9	+ 2	—	—
Berkeley E.	39·7	50	i 7 37	+ 1	e 13 25	-15	i 9 17	PP
Ukiah	40·9	51	—	—	e 13 58	0	—	—
Victoria	45·2	323	e 8 31	+11	e 14 55	- 6	e 18 27	SS
Sitka	55·5	329	—	—	e 17 23	- 1	—	—
Scoresby Sund	64·3	19	—	—	e 23 14	SS	—	—
Rome	82·8	48	e 12 30	+ 3	e 23 39	PS	—	—

Additional readings :—

San Juan e = +6m.5s., i = +7m.45s.
Cape Girardeau iPPN = +5m.13s., iN = +5m.20s.
Florissant iZ = +5m.31s., iSN = +9m.24s.
Pittsburgh iS = +9m.23s. .
Pennsylvania e = +5m.49s.
Chicago U.S.C.G.S. e = +11m.58s. and +12m.31s.
Tucson i = +6m.16s., +6m.24s., +6m.47s., and +6m.57s., e = +7m.27s. and +8m.29s.
Huancayo e = +7m.35s.
Berkeley ePN = +8m.34s., eSN = +13m.47s.
Rome eZ = +12m.42s., eE = +12m.59s., eZ = +23m.46s., eE = +28m.28s.
Long waves were also recorded at La Plata, Warsaw, Potsdam, Uccle, De Bilt, College, Seattle, Wellington, Arapuni, Christchurch, and Honolulu.

Nov. 10d. Readings also at 6h. (Agra), 8h. (New Plymouth, Tuai, and Wellington), 9h. (Bucharest), 10h. (Bucharest, near Branner, Lick (2), Fresno, and Berkeley), 13h. (near Bucharest), 16h. (near Bucharest and Bermuda), 19h. (near Bucharest), 21h. (near Bucharest, Johannesburg, Riverview, Sydney, Adelaide, Helwan, Rome, Tucson, Riverside, Mount Wilson, Pasadena, Haiwee, Tinemaha, and Apia), 22h. (Bozeman, Ukiah, Sitka, and Berkeley).

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1940

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Nov. 11d. 6h. 34m. 17s. Epicentre 45°·7N, 26°·8E. (as on 1940 Nov. 10d.).

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

Tables for depth of focus 0·010 have been used.

		Δ °	Az. °	P.		O-C.		S.		O-C.		Supp.		L. m.
				m.	s.	s.		m.	s.	s.		m.	s.	
Bucharest		1·4	198	i 0	30 _a	+ 5		i 0	49	+ 5				
Sofia	E.	3·9	221	e 1	1	+ 2		i 1	47	+ 3				
Istanbul		4·9	160					e 2	5	- 4				
Sebastopol		4·9	100	1	35	pP								
Kecskemet	Z.	5·1	286	1	13	- 3		i 2	8	- 6	e 1	56	PP	2·9
Simferopol		5·2	96	i 1	11	- 6								
Yalta		5·3	101	1	29	pP								
Budapest	E.	5·6	291	e 1	16	- 6		i 2	6	- 20	1	36	pP	
	N.	5·6	291	1	26	+ 4		2	8	- 18	2	43	sS	
Ogyalla		6·3	293	e 1	33	+ 1		i 2	55	+ 12	e 1	57	pP	e 3·5
Warsaw		7·5	332	e 2	2	pP		i 3	31	sS				
Triest		9·1	275	i 2	12	+ 2		i 3	55	+ 3				
Sotchi		9·4	97	i 2	13	- 1								
Rome		11·0	255	2	32 _k	- 4		4	41	+ 4	e 3	3	sP	
Potsdam		11·2	312	e 3	58	?		e 4	43	+ 1	e 5	25	sS	
Jena		11·4	303	e 3	13	pP								e 7·1
Chur		12·0	282	e 2	50	+ 1								
Moscow		12·1	30	e 2	47	- 3		i 4	51	- 13				
Stuttgart		12·4	291	e 2	50	- 4		e 5	17	+ 6				
Zurich		12·7	284	e 2	54	- 4								
Basle		13·4	285	e 3	6	- 1								
Hamburg		13·4	312	e 2	9	- 58		e 5	22	- 12				
Copenhagen		13·5	323	e 3	3	- 6								
Ksara		13·8	146	e 3	18	+ 6		e 5	59	+ 15				
Pulkovo		14·3	7	e 3	14	- 5		e 5	38	- 17				6·2
Upsala		15·2	342	3	30	0		6	4	- 12				e 7·6
Helwan		16·2	166	3	43	0		i 6	47	+ 8	i 4	16	pP	
Baku		17·7	100	4	23	pP								8·8
Toledo		23·3	267	e 4	56	- 4		9	6	+ 4	5	26	pP	11·1
Sverdlovsk		23·7	50	i 5	5	+ 1		e 9	7	- 1				
Granada		24·2	261					10	23	+ 66				14·6
Samarkand		29·9	88	e 6	44	pP								
Tchimkent		30·7	81	6	41	pP								
Tashkent		30·9	82	i 6	49	pP		e 11	56	sS				12·3
Andijan		33·2	83	6	37	+ 7		13	57	SS				
Frunse		33·9	77	6	40	+ 4								

Additional readings:—

Budapest eE = +1m.56s., eN = +2m.31s.

Ogyalla iN = +2m.29s.

Warsaw eE = +2m.53s., iZ = +3m.43s.

Rome iN = +3m.14s., eEN = +3m.27s., iEN = +3m.33s. and +3m.46s., iE = +5m.1s.,

sSN = +5m.32s., iE = +5m.47s., iN = +6m.24s. and +6m.58s.

Potsdam eN = +4m.1s., iE = +5m.50s.

Nov. 11d. Readings also at 0h. (Scoresby Sund), 5h. (Andijan, Samarkand, Tchimkent, and Tashkent), 6h. (Fresno and near Tananarive), 7h. (Huancayo), 9h. (near Mizusawa), 10h. (near Rome), 11h. (near Tananarive), 12h. (near Ksara), 14h. (Almata, Frunse, Samarkand, and Tchimkent), 17h. (Calcutta, Colombo, Bombay, Vladivostok, Sverdlovsk, and Tashkent), 21h. (Granada), 22h. (near Lick, San Francisco, Branner, and Berkeley), 23h. (Salt Lake City and Tucson).

Nov. 12d. Readings at 3h. (La Paz, Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Berkeley (2), Fresno, near Branner and Lick), 4h. (Balboa Heights (2), Huancayo, Columbia, St. Louis, La Paz, Mount Wilson (2), Pasadena (2), Palomar (2), Riverside, and Tinemaha (2)), 6h. (Balboa Heights), 12h. (near Lick), 14h. (near Bucharest), 15h. (near Apia), 16h. (Wellington), 17h. and 18h. (near Branner), 20h. (near Bucharest and Sofia), 21h. (Tucson), 23h. (near Balboa Heights and near Branner).

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Nov. 13d. 11h. 35m. 44s. Epicentre 6°·5N. 93°·5E. (as on 1939 July 18d.).

A = -·0607, B = +·9918, C = +·1125; δ = +1; h = +7;
D = +·998, E = +·061; G = -·007, H = +·112, K = -·994.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Kodaikanal	E.	16·3	284	e 3 59	+ 7	e 7 52	- 1	—	9·0
Calcutta	N.	16·7	343	e 4 1	+ 4	i 7 1	- 2	—	e 11·3
Hyderabad		18·3	308	4 19	+ 2	—	—	—	9·4
Phu-Lien		19·1	41	e 4 23	- 4	—	—	—	—
Bombay		23·6	303	i 5 21	+ 8	i 9 41	+16	—	—
Agra	E.	25·3	328	e 5 32	+ 2	10 0	+ 6	—	12·7
Manila		28·1	72	e 6 56	+61	11 32	+52	—	14·8
Samarkand		40·8	327	e 7 46	+ 1	—	—	—	—
Tashkent		40·8	332	e 7 41	- 4	13 52	- 4	—	21·1
Tchimkent		41·5	333	10 6	PPP	—	—	—	—
Sverdlovsk		56·4	339	9 42	- 3	17 30	- 6	—	26·3
Ksara		59·6	305	e 12 52	PP	e 14 19	PPP	—	—

Long waves were also recorded at Baku and Colombo.

Nov. 13d. Readings also at 5h. (Sofia, near Bucharest, and near Tananarive), 9h. (near Berkeley, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Butte, Ukiah, and Seattle), 11h. (Hyderabad and Trieste), 16h. (near Bucharest and Sofia), 17h. (near Bucharest).

Nov. 14d. 10h. 33m. 55s. Epicentre 36°·3N. 141°·5E. (as on 1938 July 6d.).

Moderate at Tukubasan, Tyosi, Mito, Kakioka, slight at Tokyo, Utunomiya, Yokohama, Sendai, Onahama, Takeyama, and Katunura.
Epicentre 36°·2N. 141°·5E. Radius 200-300km. Shallow.

See Seismological Bulletin of the Central Met. Obs., Japan, for the year 1940. Tokyo, 1950, pp. 30-31, macroseismic chart p. 30.

A = -·6322, B = +·5029, C = +·5894; δ = -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.	s.	m. s.	s.	m. s.	m.
Tyosi		0·8	222	0 14k	- 4	0 23	- 8	—	—
Mito		0·9	276	0 21k	+ 1	0 35	+ 1	—	—
Kakioka		1·1	266	0 22k	0	0 37	- 2	—	—
Tukubasan		1·1	266	0 24k	+ 2	0 39	0	—	—
Togane		1·2	231	0 33	+ 9	0 49	+ 8	—	—
Utunomiya		1·4	281	0 29k	+ 2	1 4	+18	—	—
Tokyo Cen. Met. Ob.		1·5	247	0 29	+ 1	0 45	- 4	—	—
Tokyo Imp. Univ.		1·5	247	0 31	+ 3	0 47	- 2	—	—
Kiyosumi		1·6	223	0 33	+ 3	0 53	+ 2	—	—
Komaba		1·6	246	0 32	+ 2	0 49	- 2	—	—
Hokusima		1·7	330	0 34a	+ 3	0 59	+ 5	—	—
Kumagaya		1·7	265	0 32a	+ 1	1 4	+10	—	—
Mitaka		1·7	248	0 33	+ 2	0 53	- 1	—	—
Yokohama		1·7	240	0 32a	+ 1	0 57	+ 3	—	—
Kamakura		1·9	238	0 33	- 1	0 53	- 6	—	—
Mera		1·9	224	0 32a	- 2	1 4	+ 5	—	—
Maebasi		2·0	273	0 36	+ 1	1 3	+ 1	—	—
Sendai		2·0	346	0 38a	+ 3	1 6	+ 4	—	—
Titibu		2·0	261	0 33	- 2	0 59	- 3	—	—
Osima		2·3	228	0 36a	- 4	1 15	+ 6	—	—
Hunatu		2·4	250	0 41	0	1 17	+ 5	—	—
Misima		2·4	240	0 41a	0	1 7	- 5	—	—
Kohu		2·5	254	0 43	0	1 33	+19	—	—
Susaki		2·6	231	0 44	0	1 17	0	—	—
Nagano		2·7	278	0 48a	+ 3	1 22	+ 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.	
Mizusawa	2.8	354	e 0	53	P*	1	39	S _s	—	—	—	
Aikawa	3.1	304	0	55	P*	1	43	S _s	—	—	—	
Omaesaki	3.2	238	0	45	- 7	1	29	- S _s ³	—	—	—	
Hamamatu	3.5	243	1	6k	P _s	2	6	S _s	—	—	—	
Hatidyozima	3.5	204	0	55	- 2	1	22	- 18	—	—	—	
Toyama	3.5	279	0	59	+ 2	1	54	S _s	—	—	—	
Akita	3.6	343	1	12k	P _s	2	15	S _s	—	—	—	
Nagoya	3.8	254	1	7	P*	2	14	S _s	—	—	—	
Wazima	3.8	289	1	4	+ 3	2	14	S _s	—	—	—	
Gihu	3.9	258	1	4	+ 2	1	57	S _s *	—	—	—	
Hikone	4.4	258	1	8	- 2	2	19	S*	—	—	—	
Kameyama	4.4	251	1	10	0	2	21	S _s *	—	—	—	
Aomori	4.6	354	1	16k	+ 4	2	18	S _s *	—	—	—	
Kyoto	4.9	256	1	43	P _s	2	58	S _s	—	—	—	
Owase	4.9	245	1	13	- 4	2	51	S _s	—	—	—	
Osaka	5.2	251	1	29	P*	2	33	S*	—	—	—	
Kobe	5.4	254	1	26	+ 2	2	35	+ 7	—	—	—	
Siomisaki	5.5	241	1	24	- 1	3	14	S _s	—	—	—	
Toyooka	5.5	265	1	27	+ 2	2	55	S _s	—	—	—	
Wakayama	5.6	250	1	24	- 2	2	43	+ 10	—	—	—	
Sumoto	5.7	252	1	21	- 7	3	4	S _s	—	—	—	
Mori	5.9	351	1	33	+ 2	2	50	+ 10	—	—	—	
Tohusima	6.1	250	1	17	- 17	2	32	- 13	—	—	—	
Sapporo	6.8	359	2	0	P*	3	18	S*	—	—	—	
Kotl	7.1	250	1	44	- 4	3	18	+ 8	—	—	—	
Matuyama	7.6	253	1	56	+ 1	3	49	S*	—	—	—	
Nemuro	7.6	21	2	1	+ 6	3	16	- 7	—	—	—	
Hirosima	7.7	257	1	54	- 2	4	5	S _s *	—	—	—	
Hamada	7.8	262	2	15	P*	3	50	S _s *	—	—	—	
Simidu	7.8	246	1	55	- 3	4	26	S _s	—	—	—	
Izuka	9.2	256	2	17	+ 1	4	49	SS	—	—	—	
Titizima	9.2	176	2	8	- 8	—	—	—	—	—	—	
Miyazaki	9.4	245	2	14	- 4	5	16	S _s	—	—	—	
Hukuoka	9.5	257	2	22	+ 2	5	14	S _s *	—	—	—	
Kumamoto	9.5	252	2	20 _a	0	4	40	S _s *	—	—	—	
Unzendake	9.9	252	3	17	+ 52	5	43	S _s *	—	—	—	
Husan	10.2	267	2	33	+ 2	5	20	S _s *	—	—	—	
Kagosima	10.2	246	2	39	+ 8	—	—	—	—	—	—	
Taikyu	10.4	271	2	35	+ 1	5	59	S _s	—	—	—	
Tomie	11.1	254	2	9	- 34	—	—	—	—	—	—	
Keizyo	11.7	281	2	55	+ 4	—	—	—	—	—	—	
Manila	28.4	226	i 6	41	PP	12	23	SSS	—	—	—	
Irkutek	30.6	314	6	16	- 2	e 11	23	+ 3	—	—	16.1	
Semipalatinsk	45.4	308	e 8	21	- 1	e 15	0	- 4	—	—	—	
Calcutta	N. 47.8	269	e 7	56	- 45	—	—	—	—	—	—	
Almata	49.0	300	8	48	- 2	—	—	—	—	—	29.1	
College	49.7	32	—	—	—	e 16	5	PS	—	—	e 28.6	
Frunse	50.8	300	e 9	1	- 3	—	—	—	—	—	29.1	
Andijan	53.0	297	e 9	19	- 2	17	15	PPS	—	—	—	
Agra	E. 53.9	280	i 9	25 _a	- 2	e 17	2	0	20	56	SS	—
Tchimkent	54.4	299	9	29	- 2	17	32	PS	—	—	—	
Tashkent	55.0	298	e 9	34	- 1	e 17	18	+ 1	e 9	44	pP	29.4
Sverdlovsk	55.7	319	i 9	40	0	i 17	26	0	i 9	50	pP	26.1
Samarkand	57.2	298	10	24	sP	17	50	+ 4	—	—	—	
Bombay	62.1	274	i 10	23	- 2	e 18	48	- 1	—	—	—	
Colombo	E. 63.2	259	e 10	35	+ 3	—	—	—	—	—	—	
Moscow	67.9	323	11	0	- 2	19	49	- 12	11	10	pP	—
Baku	68.7	306	e 11	11	+ 4	20	11	+ 1	—	—	—	35.5
Pulkovo	68.9	330	e 11	6	- 3	e 19	59	- 14	11	16	pP	32.5
Tinemaha	Z. 76.2	55	e 11	55	+ 3	—	—	—	—	—	—	—
Haiwee	Z. 76.9	54	i 12	5	+ 9	—	—	—	—	—	—	—
Pasadena	77.7	56	e 11	59	- 1	—	—	—	—	—	—	e 36.2
Riverside	Z. 78.6	56	e 12	0	- 5	—	—	—	—	—	—	—
Palomar	Z. 79.3	57	i 12	20	+ 11	—	—	—	—	—	—	—
Istanbul	81.2	316	i 11	59	?	—	—	—	—	—	—	—

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.
Stuttgart	85.3	331	e 12 39	- 1	—	—	—	e 47.1
Triest	85.8	327	e 12 40	- 2	e 23 11	[+ 5]	—	e 46.2
Helwan	87.1	305	12 47	- 2	i 24 11	PS	i 16 13	PP
Rome	89.3	325	e 16 32	PP	e 27 9	?	—	e 41.2

Additional readings :—

Mizusawa SN = +1m.42s.

Gihu S = +1m.42s.

Tinemaha eZ = +12m.0s.

Pasadena I = +12m.7s.

Stuttgart ePZ = +12m.49s.

Triest eS = +24m.7s.

Helwan iZ = +12m.59s.

Rome eNZ = +16m.49s., ePPPZ = +21m.4s.

Long waves were also recorded at Huancayo, Kew, Sofia, Uccle, Upsala, Potsdam, Bucharest, San Fernando, De Bilt, Warsaw, Paris, and Prague.

Nov. 14d. Readings also at 1h. (near Mizusawa), 2h. (near Mizusawa), 4h. (Pasadena, Tinemaha, Riverside, and Haiwee), 6h. (Hamburg), 7h. (Hamburg), 9h. (La Paz), 10h. (Hamburg), 14h. (near Bucharest and Sofia), 15h. (Pennsylvania), 16h. (Bucharest), 18h. (near Lick and Branner), 22h. (near Bucharest and Sofia).

Nov. 15d. 4h. 46m. 7s. Epicentre 36°·2N. 139°·9E. (as on 1940 June 21d.).

A = -·6187, B = +·5210, C = +·5880; δ = -3; h = 0;
D = +·644, E = +·765; G = -·450, H = +·379, K = -·809.

	Δ	Az.	P.	O-C.	S.	O-C.
	°	°	m. s.	s.	m. s.	s.
Tukubasan	0.2	84	0 14	+ 4	0 21	+ 5
Tokyo Imp. Univ.	0.5	192	0 16	+ 2	0 24	+ 1
Komaba	0.6	198	0 17	+ 2	0 25	- 1
Mitaka	0.6	208	0 14	- 1	0 23	- 3
Titibu	0.7	252	0 14	- 3	0 23	- 5
Togane	0.7	149	0 14	- 3	0 28	0
Kamakura	0.9	198	0 14	- 6	0 27	- 7
Kiyosumi	1.1	168	0 14	- 8	0 31	- 8
Susaki	1.7	206	0 28	- 3	0 46	- 8
Mizusawa	E.	3.1	18 e 0 56	+ 5	1 31	+ 2
Pasadena	Z.	79.1	55 e 12 16	+ 8	—	—
Riverside	Z.	79.7	55 e 12 17	+ 6	—	—

Nov. 15d. Readings also at 0h. (Mizusawa), 4h. (Christchurch), 8h. (Balboa Heights, near Tananarive, Pasadena (2), Palomar (2), Riverside (2), Tinemaha (2), Tuai, Christchurch, and Wellington), 10h. (Simferopol and near Bucharest), 11h. (Riverview and Sydney), 13h. (Arapuni, Christchurch, Wellington, Riverview (3), Sydney, Brisbane, Helwan, and Ksara), 14h. (Berkeley, Santa Clara, Bozeman, Ukiah, Pasadena, Palomar, Riverside, Tinemaha, La Paz, Adelaide, and near Tananarive), 16h. (near Balboa Heights and near Mizusawa).

Nov. 16d. 2h. 26m. 54s. Epicentre 51°·0N. 173°·5E. (as on 1940 Sept. 15d.).

A = -·6278, B = +·0715, C = +·7751; δ = +3; h = -6;
D = +·113, E = +·994; G = -·770, H = +·088, K = -·632.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
College	24.3	40	e 5 16	- 4	e 9 43	+ 6	e 5 41	PP
Branner	46.8	82	e 8 30	- 2	—	—	—	—
Fresno	N. 48.5	81	e 8 54	+ 8	—	—	—	—
Tinemaha	49.2	79	1 8 53 _a	+ 1	1 10 18	PP	—	—
Haiwee	50.0	80	1 8 59	+ 1	1 10 20	PP	—	—
Santa Barbara	50.0	83	1 9 1	+ 3	—	—	—	—
Mount Wilson	51.2	82	1 9 6 _a	- 1	—	—	—	—
Pasadena	51.2	82	1 9 7 _a	0	—	—	1 9 20	pP
Riverside	51.8	82	1 9 11	- 1	—	—	1 9 31	pP
Palomar	Z. 52.5	82	1 9 18 _a	+ 1	—	—	—	e 23.5

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Manila	55.5	249	e 8 50	-49	(17 41)	+17	—	17.7
Tucson	57.0	78	i 9 51	+1	17 40	-3	e 11 47	27.4
Almata	61.5	305	e 10 29	+8	—	—	—	—
Frunse	63.0	306	e 10 34	+3	—	—	—	—
Florissant	64.5	59	i 10 38	-3	e 19 16	-3	e 19 46	—
St. Louis	64.7	59	i 10 39	-3	i 19 13	-9	—	e 29.4
Pulkovo	65.6	341	10 46	-2	19 25	-8	e 14 50	40.6
Andijan	65.7	306	e 10 50	+2	—	—	—	—
Tashkent	66.7	307	—	—	e 19 44	-2	—	33.7
Moscow	67.5	335	e 10 58	-2	19 50	-6	—	33.6
Philadelphia	71.4	49	—	—	e 28 41	SSS	—	e 35.5
Warsaw	74.5	344	11 41 _a	-1	—	—	—	e 43.1
Grozny	75.7	323	e 11 51	+2	—	—	—	—
Clermont-Ferrand	83.3	354	e 12 30	0	—	—	—	—
Rome	86.0	346	e 12 40	-3	—	—	—	—

Additional readings :—

Pasadena esP?Z = +9m.28s.

Manila S?E = +13m.36s.

Tucson i = +9m.55s., iSS = +19m.51s.

St. Louis eN = +10m.11s., eSN = +19m.24s.

Rome eN = +22m.13s. and +26m.51s.

Long waves were also recorded at Irkutsk, Scoresby Sund, and other American and European stations.

Nov. 16d. Readings also at 0h. (Ksara), 7h. (Riverview, Mount Wilson, Pasadena, Palomar, and Riverside), 13h. (near Mizusawa), 20h. (Mount Wilson, Tinemaha, and Ksara), 21h. (near Sofia), 22h. (near Bucharest), 23h. (Stuttgart, near Zurich and Chur).

Nov. 17d. 3h. 56m. 24s. Epicentre 44°·0N. 130°·8W.

A = -·4716, B = -·5463, C = +·6922; δ = -1; h = -3;
D = -·757, E = +·653; G = -·452, H = -·524, K = -·722.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Ferndale	E. 5.9	123	e 1 48	P*	i 4 8	?	e 2 48	—
	N. 5.9	123	e 2 8	P _g	i 4 28	?	—	—
Branner	9.3	133	e 2 20	+3	e 6 0	?	—	—
Fresno	N. 11.1	127	e 2 48	+5	—	—	—	e 6.6
Tinemaha	11.8	122	e 2 54	+1	—	—	—	—
Haiwee	z. 12.6	124	e 3 4	+1	—	—	—	—
Mount Wilson	z. 13.9	131	e 3 20	-1	—	—	—	—
Pasadena	13.9	131	e 3 22	+1	e 5 54	-3	—	e 6.6
Bozeman	14.1	76	e 3 20	-3	—	—	—	e 7.2
Riverside	14.4	129	e 3 27	0	—	—	—	—
Salt Lake City	14.4	99	e 3 35	PP	—	—	—	e 7.6
Palomar	15.2	130	e 3 38	0	—	—	—	—
Tucson	19.5	120	e 4 33	+2	i 7 18	-48	i 5 16	18.3
St. Louis	30.7	86	e 6 20	+1	e 11 17	-4	—	e 15.2
Ottawa	38.5	68	—	—	e 12 12	-70	—	19.6
Seven Falls	41.2	64	—	—	14 6	+4	—	21.6

Additional readings :—

Branner eN = +2m.24s.

Tucson i = +5m.42s., e = +7m.6s.

St. Louis ePN = +6m.24s., eSN = +11m.29s.

Long waves were also recorded at San Francisco, College, Seattle, Berkeley, San Juan, Harvard, Scoresby Sund, Ukiah, Sitka, Santa Clara, Philadelphia, Butte, and Honolulu.

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Nov. 17d. 5h. 56m. 2s. Epicentre 58°·0S. 147°·0E. (as on 1940 Aug. 8d.).

A = -·4466, B = +·2900, C = -·8464; $\delta = -6$; $h = -8$;
D = +·545, E = +·839; G = +·710, H = -·460, K = -·533.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.	
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.	
Christchurch	21·5	59	4	55 _a	+ 3	8	49	+ 2	19	4	SS	10·4
Adelaide	23·7	343	e 4	10	-64	9	46	SS	15	38	PP	17·1
Riverview	24·3	10	1	5 24 _a	+ 4	1	9 56	+19	1	5 37	PP	e 11·3
Sydney	24·3	10	e 5	40	PP	1	9 52	+15	—	—	—	e 11·5
Wellington	24·3	58	5	23	+ 3	9	48	+11	10	48	L _a	11·5
Rockefeller Mt.	27·5	157	e 9	0	?	e 13	27	L	—	—	—	(e 13·4)
Brisbane	30·8	10	e 6	22	+ 2	e 10	58	-25	—	—	—	—
Perth	33·6	308	7	51	PP	12	23	+17	13	40	SS	15·1
Manila	75·4	335	e 12	40	- 7	1	21 38	+11	—	—	—	—
Colombo	84·0	294	—	—	—	1	23 28	+31	—	—	—	—
La Plata	85·1	160	—	—	—	23	10	+ 2	—	—	—	35·1
Kodaikanal	88·1	293	—	—	—	e 23	58?	+21	—	—	—	—
Bombay	97·8	293	—	—	—	e 24	26	[+10]	—	—	—	—
La Paz	100·3	147	e 18	58	PP	—	—	—	—	—	—	47·4
Huancayo	102·1	138	—	—	—	e 27	26	PS	e 33	14	SS	e 42·9
Ottawa	151·2	96	e 20	4	[+15]	—	—	—	—	—	—	78·0

Additional readings:—

Christchurch iZ = +6m.22s., iNZ = +7m.13s.

Adelaide iPP = +5m.20s., i = +5m.56s., P_cP = +6m.22s., i = +10m.36s., SS = +11m.26s., i = +11m.42s., +11m.52s., +12m.2s., +12m.12s., +12m.20s., +12m.28s., +12m.36s., and +12m.43s.

Riverview iE = +6m.18s.

Rockefeller Mt. e = +9m.41s.

Huancayo e = +29m.4s.

Long waves were also recorded at De Bilt, San Fernando, Uccle, Scoresby Sund, Bozeman, Sitka, Chur, Pasadena, Tucson, Arapuni, and Agra.

Nov. 17d. 5h. 56m. 15s. Epicentre 39°·2N. 70°·7E. (as on 1939 May 30d.).

A = +·2568, B = +·7334, C = +·6295; $\delta = +9$; $h = -2$;
D = +·944, E = -·331; G = +·208, H = +·594, K = -·777.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	
Andijan	2·0	39	e 0	30	- 5	1	1	- 1	e 0	57	S*
Tashkent	2·4	333	1	0 42	+ 1	1	1 18	S _e	—	—	—
Samarkand	2·9	279	0	55	P _e	1	25	+ 1	1	39	S*
Tchimkent	3·1	345	e 1	4	P _e	e 1	27	- 2	1	37	S*
Frunse	4·7	38	e 1	13	- 1	e 2	11	+ 1	1	25	P*
Almata	6·2	47	e 1	43	+ 8	e 2	57	+ 9	—	—	—

Samarkand gives PP = +1m.3s.

Nov. 17d. 7h. 23m. 0s. Epicentre 40°·4N. 125°·1W. (as on 1940 Sept. 27d.).

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.		
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	
Ferndale	0·6	75	1	0 9	- 6	1	0 16	-10	—	—	—
Berkeley	3·4	138	e 0	54	- 1	1	1 31	- 6	—	—	—
San Francisco	3·4	140	e 0	56	+ 1	e 1	35	- 2	e 1	2	P*
Branner	3·8	141	e 1	3	+ 2	e 1	47	0	—	—	—
Lick	4·1	137	e 1	5	0	1	1 50	- 5	1	2 2	S*
Fresno	5·5	129	e 1	29	+ 4	e 3	2	S _e	—	—	—
Tinemaha	6·3	120	1	1 33	- 3	—	—	—	—	—	—
Mount Wilson	8·4	134	1	2 4 _k	- 2	—	—	—	—	—	—
Pasadena	8·4	136	1	2 3 _k	- 3	1	3 40	- 3	—	—	—
Riverside	8·9	133	1	2 11	- 1	—	—	—	—	—	—
Palomar	9·6	134	e 2	13	- 8	—	—	—	—	—	—
Tucson	14·1	121	1	3 30	+ 7	—	—	—	—	—	—

Pasadena also gives iZ = +2m.11s.
Long waves were also recorded at College.

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Nov. 17d. 19h. 42m. 24s. Epicentre 6°·18. 150°·5E. (as on 1939 Dec. 25d.).

A = -·8655, B = +·4897, C = -·1055; $\delta = +3$; $h = +7$;
D = +·492, E = +·870; G = +·092, H = -·052, K = -·994.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	21·4	174	i 4 48	- 3	i 8 48	+ 3	—	—
Riverview	27·6	178	e 6 2	+11	e 10 57	+25	6 57	PP e14·1
Sydney	27·6	178	—	—	e 12 30	SSS	—	e 14·1
Manila	35·8	306	i 7 1	- 2	12 27	-14	—	16·1
Perth	41·3	227	14 1	S	(14 1)	- 3	i 16 51	SS (22·2)
Christchurch	42·1	156	14 16	S	(14 16)	0	(18 15)	SSS 20·2
Pasadena	94·5	56	i 13 23	0	—	—	—	e 43·7
Mount Wilson	z. 94·6	56	i 13 25	+ 1	—	—	—	—
Tinemaha	z. 94·6	54	e 13 23	- 1	—	—	—	—
Riverside	z. 95·1	56	e 13 28	0	—	—	—	—
Bozeman	100·2	45	—	—	e 40 38	!	—	e 46·7
Huancayo	131·0	111	e 22 48	?	e 28 12	(-14)	—	e 35·1
La Paz	135·7	121	e 19 24	[+ 2]	—	—	—	73·6

Additional readings:—

Riverview ISSE = +12m.19s.

Perth 1 = +17m.31s., S = +20m.4s.. L given as SS.

Christchurch SSS given as S.

Pasadena iZ = +13m.38s.

Mount Wilson iZ = +13m.40s.

Riverside eZ = +13m.37s.

Long waves were also recorded at Ukiah, De Bilt, and Uccle.

Nov. 17d. Readings also at 6h. (near Bucharest and Sofia), 7h. (Rome, Paris, Kew, Tinemaha (2), Mount Wilson, Pasadena, Riverside, Palomar, Tucson, and Haiwee), 8h. (New Plymouth and Wellington), 10h. (near Mizusawa), 11h. (near Algiers), 12h. (De Bilt, Phu-Lien, and Manila), 13h. (near Trieste), 15h. (Sofia), 16h. (Haiwee, Tucson, Riverside, Pasadena, and Tinemaha), 18h. (Pasadena, Riverside, and Mount Wilson), 19h. (near Granada), 20h. (Tucson).

Nov. 18d. 12h. 47m. 24s. Epicentre 34°·0N. 135°·5E.

Strong at Wakayama, Kashiwara, Kyoto; rather strong at Tsuniga, Owase, Sumoto, Osaka, Kobe, Tu, etc.; moderate at Okayama, Hamamatu, Sakai, Oita, etc.; slight at Kohu, Simidu, Hiroshima, Hamada, etc.

Epicentre 34°·0N. 135°·5E. Macroseismic radius greater than 300km. Depth 50km., approx.

See Seismological Bulletin of the Central Met. Obs. Japan, for the year 1940. Tokyo, 1950, pp. 31-33, macroseismic chart p. 31.

A = -·5926, B = +·5823, C = +·5566; $\delta = +5$; $h = 0$;
D = +·701, E = +·713; G = -·397, H = +·390, K = -·831.

Tables for depth of focus 0·005 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Wakayama	0·4	310	0 12k	0	0 21	- 1	—	—
Osaka	0·6	356	0 14k	0	0 24	- 1	—	—
Owase	0·6	83	0 13	- 1	0 23	- 2	—	—
Siomisaki	0·6	158	0 12k	- 2	0 21	- 4	—	—
Sumoto	0·6	304	0 13	- 1	0 23	- 2	—	—
Kobe	0·7	339	0 15a	0	0 27	0	—	—
Kyoto	1·0	11	0 20a	+ 1	0 35	+ 2	—	—
Kameyama	1·2	43	0 23a	+ 1	0 39	+ 1	—	—
Muroto	1·3	236	0 20a	- 3	0 37	- 3	—	—
Hikone	1·4	26	0 25a	+ 1	0 43	0	—	—
Toyooka	1·6	340	0 27a	0	0 47	0	—	—
Koti	1·7	255	0 26a	- 2	0 44	- 6	—	—
Nagoya	1·7	46	0 29a	+ 1	0 54	+ 4	—	—
Gihu	1·9	37	0 28a	- 3	0 53	- 1	—	—
Hamamatu	2·0	69	0 32a	0	0 52	- 5	—	—

Continued on next page.

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	Δ °	Az. °	P.		O-C.	S.		O-C.	Supp.		L. m.
			m.	s.	s.	m.	s.	m.	s.	m.	
Matuyama	2.3	266	0	31 _a	- 6	0	58	- 6	—	—	—
Omaesaki	2.3	75	0	39 _k	+ 2	1	5	+ 1	—	—	—
Simidu	2.5	240	0	36 _a	- 3	1	1	- 8	—	—	—
Hirosima	2.6	279	0	39 _a	- 2	1	8	- 4	—	—	—
Hamada	3.0	288	0	45 _a	- 2	1	20	- 2	—	—	—
Toyama	3.0	27	0	41	- 6	1	21	- 1	—	—	—
Hunatu	3.1	61	0	49	+ 1	1	33	+ 9	—	—	—
Misima	3.1	69	0	43	- 5	1	16	- 8	—	—	—
Osima	3.3	75	0	51 _a	0	1	27	- 2	—	—	—
Nagano	3.4	38	0	56 _a	+ 4	1	40	+ 8	—	—	—
Wazima	3.6	19	0	56 _a	+ 1	1	38	+ 1	—	—	—
Hatidyozima	3.7	103	0	55	- 1	1	35	- 4	—	—	—
Mera	3.7	74	0	58 _a	+ 2	1	55	sS	—	—	—
Yokohama	3.7	66	0	58 _a	+ 2	1	48	+ 9	—	—	—
Kumagaya	3.8	55	1	1 _a	+ 3	2	3	sS	—	—	—
Maebasi	3.8	49	0	50	- 8	1	49	+ 7	—	—	—
Tokyo Cen. Met. Ob.	3.9	63	1	2	+ 3	1	46	+ 2	—	—	—
Izuka	4.0	267	0	59 _a	- 2	1	41	- 6	—	—	—
Miyazaki	4.0	240	1	0 _a	- 1	1	42	- 5	—	—	—
Kumamoto	4.2	255	1	0 _a	- 3	2	2	sS	—	—	—
Hukuoka	4.2	266	1	2 _a	- 1	1	50	- 2	—	—	—
Kakioka	4.4	60	1	6 _a	0	2	14	sS	—	—	—
Tukubasan	4.4	58	1	6	0	2	4	+ 7	—	—	—
Utunomiya	4.4	53	1	9	+ 3	2	13	sS	—	—	—
Aikawa	4.6	28	1	10	+ 1	—	—	—	—	—	—
Unzendake	4.6	255	1	23	pP	2	18	sS	—	—	—
Mito	4.7	58	1	12 _a	+ 2	2	19	sS	—	—	—
Tyosi	4.7	67	1	12	+ 2	2	17	sS	—	—	—
Kagosima	4.8	242	1	6	- 6	—	—	—	—	—	—
Nagasaki	4.9	257	1	6	- 7	2	23	sS	—	—	—
Onahama	5.2	55	1	25	+ 8	2	48	sS	—	—	—
Husan	5.5	283	1	17	- 4	2	29	+ 5	—	—	—
Yakusima	5.5	231	1	19	- 2	2	16	- 8	—	—	—
Hukusima	5.5	45	1	24 _a	+ 3	2	34	+10	—	—	—
Tomie	5.8	258	1	24	- 1	2	25	- 7	—	—	—
Taiyu	5.9	290	1	23	- 4	2	35	+ 1	—	—	—
Sendai	6.1	44	1	32 _a	+ 2	2	39	0	2 47	sS	—
Akita	6.8	32	1	43 _k	+ 4	3	32	?	—	—	—
Mizusawa	6.8	39	1	43	+ 4	3	5	+ 9	—	—	—
Nake	7.5	224	1	47 _k	- 2	3	9	- 5	—	—	—
Miyako	7.7	41	2	12 _a	pP	4	12	?	—	—	—
Keizyo	7.8	300	1	57	+ 4	3	27	+ 6	—	—	—
Aomori	8.0	30	1	59	+ 3	—	—	—	—	—	—
Zinsen	8.0	299	1	56	0	3	21	- 5	—	—	—
Hatinohe	8.1	35	1	58	+ 1	3	37	+ 9	—	—	—
Mori	9.0	25	2	11	+ 1	4	4	sS	—	—	—
Titizima	9.0	138	2	11	+ 1	—	—	—	—	—	—
Sapporo	10.1	25	2	26	+ 1	4	26	+ 9	—	—	—
Naha	10.3	223	2	26	- 1	—	—	—	—	—	—
Zi-ka-wei	12.2	260	e 2	52	- 1	—	—	—	—	—	16.8
Arisan	16.6	235	3	32	-18	—	—	—	—	—	—
Manila	23.4	217	i 5	4 _k	0	i 9	16	+ 7	—	—	—
Phu-Lien	28.7	251	—	—	—	e 10	54	sS	—	—	—
Irkutsk	28.8	320	5	56	+ 2	—	—	—	—	—	—
Almata	45.8	301	e 8	19	+ 2	e 15	0	+ 5	—	—	—
Frunse	47.6	300	e 8	32	+ 1	15	50	sS	—	—	—
Agra	49.4	279	i 8	41 _k	- 4	i 16	2	sS	1 10 41	PP	24.7
Tchimkent	51.3	300	1	9 2	+ 2	e 16	14	+ 2	—	—	—
Tashkent	51.8	299	1	9 2	- 1	e 16	18	- 1	—	—	27.9
Hyderabad	53.3	267	9	15	0	17	1	sS	11 33	PP	27.7

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.
Samarkand	53.9	297	9 20	+ 1	—	—	—	—
College	54.2	31	—	—	e 16 49	- 3	e 20 1	SS
Sverdlovsk	54.3	320	i 9 20	- 2	i 16 54	+ 1	—	—
Bombay	57.3	272	i 9 43	- 1	e 17 37	+ 4	i 17 53	sS
Kodaikanal	E. 57.9	261	e 9 36?	-12	—	—	—	—
Baku	65.9	304	10 44	+ 3	19 27	+ 5	—	—
Moscow	66.8	323	10 46	- 1	19 33	0	—	—
Grozny	67.5	308	e 10 52	+ 1	—	—	—	—
Pulkovo	68.3	329	—	—	19 53	+ 2	—	—
Copenhagen	78.3	332	e 11 55	0	21 42	- 1	—	—
Ksara	78.9	303	e 12 2	+ 4	i 17 56	?	—	—
Tinemaha	81.5	52	e 12 14	+ 2	—	—	i 12 31	pP
Santa Barbara	Z. 82.1	54	i 12 34	pP	—	—	—	—
Haiwee	Z. 82.2	52	e 12 34	pP	—	—	—	—
Mount Wilson	83.3	53	i 12 39	pP	—	—	—	—
Pasadena	83.3	53	i 12 39k	pP	—	—	—	e 38.7
Riverside	Z. 83.9	53	e 12 26	+ 2	—	—	i 12 43	pP
Helwan	84.3	302	i 12 42	pP	i 22 45	0	e 23 12	sS
Palomar	Z. 84.6	53	e 12 44	pP	—	—	—	—
La Jolla	Z. 84.7	54	e 12 45	pP	—	—	—	—
Stuttgart	84.7	328	i 12 29	+ 1	—	—	i 12 46	pP
Rome	88.2	321	—	—	i 23 26	+ 4	e 29 24	SS
Tucson	89.3	51	i 13 9	pP	e 23 22	[+ 9]	e 18 8	PPP
La Paz	Z. 152.5	56	e 19 51	[+ 9]	—	—	24 2	PP

Additional readings:—

Gihu +0m.46s.

Agra SSE = +19m.33s.

Hyderabad S_cSE = +18m.53s., SSE = +20m.37s.

Helwan 1Z = +12m.48s.

Tucson e = +13m.24s. and +15m.0s.

Long waves were also recorded at De Bilt and Warsaw.

Nov. 18d. Readings also at 2h. (Mount Wilson, Pasadena, Tucson, and near Tananarive).
4h. (Manila, Zi-ka-wei, and Calcutta), 5h. (Bombay, Agra (2), and near Calcutta),
12h. (Sydney and Riverview), 13h. (Agra), 21h. (Ksara), 22h. (Palomar, Riverside,
Haiwee, Pasadena, and Mount Wilson), 23h. (near La Paz).

Nov. 19d. 0h. 16m. 12s. Epicentre 39°·0N. 71°·8E. (as on 1937 Sept. 19d.).

A = +·2434, B = +·7402, C = +·6268; δ = +2; h = -1;

D = +·950, E = -·312; G = +·196, H = +·595, K = -·779.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Andijan	1.8	14	0 34	+ 2	e 1 0	+ 4	e 0 39	P _r
Tashkent	3.0	320	1 0 47	- 3	i 1 21	- 6	—	—
Tchinkent	3.7	333	—	—	i 1 38	- 7	—	—
Samarkand	3.8	281	i 0 55	- 6	1 54	S*	—	—
Frunse	4.4	28	1 18	P*	2 13	S*	—	—
Almata	5.7	41	2 4	P _r	3 14	S _r	—	—

Additional reading:—

Andijan S = +1m.4s.

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Nov. 19d. 15h. 1m. 36s. Epicentre 39°·2N. 141°·9E. (as on 1937 June 8d.).

Strong at Miyako and Isinomaki; rather strong at Mizusawa, Sendai, Hatinohe; moderate at Yamagata, Sakata, Aomori, and Mito; slight at Akita, Takada, Oiwake, and Kohu, etc.

Epicentre 39°·0N. 142°·0E. Shallow. Macro seismic radius greater than 300km.

See Seismological Bulletin of the Central Met. Obs. Japan for the year 1940. Tokyo, 1950, pp. 33-34. Macro seismic chart p. 33.

$$A = -.6115, B = +.4795, C = +.6295; \quad \delta = +12; \quad h = -1; \\ D = +.617, E = +.787; \quad G = -.495, H = +.388, K = -.777.$$

	Δ °	Az. °	P.		O-C.		S.		O-C.		Supp.		L. m.
			m.	s.	s.	m.	s.	m.	s.	m.	s.		
Miyako	0·4	8	0	20k	+ 7	0	30	+ 9	—	—	—	—	
Mizusawa	0·6	264	0	20	+ 5	0	33	+ 7	—	—	—	—	
Sendai	1·1	220	0	25k	+ 3	0	39	0	—	—	—	—	
Hatinohe	1·4	348	0	33k	+ 6	0	53	+ 7	—	—	—	—	
Akita	1·5	289	0	36k	+ 8	0	52	+ 3	—	—	—	—	
Hokusima	1·8	218	0	33k	+ 1	0	53	- 3	—	—	—	—	
Aomori	1·9	332	0	42k	+ 8	0	57	- 2	—	—	—	—	
Onahama	2·4	199	0	37k	- 4	1	0	-12	—	—	—	—	
Aikawa	3·0	247	0	54	P*	1	39	S _s	—	—	—	—	
Mito	3·0	202	0	50a	0	1	39	S _s	—	—	—	—	
Mori	3·1	341	0	59a	P _s	1	45	S _s	—	—	—	—	
Utunomiya	3·1	211	0	51	0	1	31	+ 2	—	—	—	—	
Kakioka	3·3	205	0	51k	- 2	1	31	- 4	—	—	—	—	
Tukubasan	3·3	205	0	52	- 1	1	29	- 6	—	—	—	—	
Kumagaya	3·6	214	0	59	+ 1	1	48	+ 6	—	—	—	—	
Maebasi	3·6	220	0	59k	+ 1	1	51	S*	—	—	—	—	
Tyosi	3·6	195	0	58	0	1	38	- 4	—	—	—	—	
Nagano	3·8	234	1	4k	+ 3	1	49	+ 2	—	—	—	—	
Togane	3·8	199	1	7	P*	1	54	S*	—	—	—	—	
Komaba	3·9	207	1	3	+ 1	1	54	+ 4	—	—	—	—	
Mitaka	3·9	209	1	7	+ 5	1	59	S*	—	—	—	—	
Sapporo	3·9	352	1	11k	P*	2	7	S _s	—	—	—	—	
Titibu	3·9	215	1	7	P*	—	—	—	—	—	—	—	
Tokyo Imp Univ.	3·9	207	1	3	+ 1	1	53	+ 3	—	—	—	—	
Yokohama	4·2	207	1	8a	+ 1	1	59	+ 2	—	—	—	—	
Wazima	4·3	247	1	9k	+ 1	2	5	+ 5	—	—	—	—	
Kamakura	4·3	206	1	7	- 1	1	57	- 3	—	—	—	—	
Kiyosumi	4·3	200	1	7	- 1	2	0	0	—	—	—	—	
Hunatu	4·4	208	1	12	+ 2	2	4	+ 2	—	—	—	—	
Kohu	4·4	218	1	13	+ 3	2	18	S*	—	—	—	—	
Koyama	4·4	212	1	7	- 3	1	57	- 5	—	—	—	—	
Toyama	4·4	238	1	14	+ 4	2	27	S _s	—	—	—	—	
Mera	4·6	203	1	12	0	2	8	+ 1	—	—	—	—	
Misima	4·7	211	1	15	+ 1	2	9	- 1	—	—	—	—	
Osima	4·8	205	1	15	0	2	9	- 3	—	—	—	—	
Nemuro	5·0	33	1	18k	0	2	13	- 5	—	—	—	—	
Susaki	5·1	208	1	17	- 3	2	14	- 6	—	—	—	—	
Omaesaki	5·5	214	1	32	P*	2	34	+ 4	—	—	—	—	
Gihu	5·6	229	1	28k	+ 1	2	34	+ 1	—	—	—	—	
Hamamatu	5·6	218	1	30a	+ 3	2	38	+ 5	—	—	—	—	
Nagoya	5·6	226	1	29k	+ 2	2	46	S*	—	—	—	—	
Hikone	5·9	231	1	35a	+ 4	2	38	- 2	—	—	—	—	
Kameyama	6·1	227	1	36k	+ 2	3	6	S*	—	—	—	—	
Hatidyozima	6·3	196	1	38	0	2	42	- 8	—	—	—	—	
Kyoto	6·4	232	1	40k	+ 2	3	2	+ 9	—	—	—	—	
Toyooka	6·7	239	1	50k	+ 8	3	9	+ 9	—	—	—	—	
Osaka	6·8	230	1	44	0	3	7	+ 4	—	—	—	—	
Owase	6·9	223	1	44	- 1	3	24	S*	—	—	—	—	
Kobe	7·0	232	1	47	+ 1	3	13	+ 5	—	—	—	—	
Wakayama	7·3	230	1	51	+ 1	3	24	+ 9	—	—	—	—	

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.
Sumoto	7.4	232	1 35 _a	-17	3 27	+ 9	—	—	—
Siomisaki	7.5	223	1 55	+ 2	3 45	S*	—	—	—
Muroto	8.6	229	2 11	+ 2	3 58	+10	—	—	—
Koti	8.8	233	2 11	0	4 3	+10	—	—	—
Hamada	8.9	245	2 18 _a	+ 6	4 2	+ 7	—	—	—
Hirosima	9.0	240	2 18 _a	+ 5	4 6	+ 8	—	—	—
Matuyama	9.1	237	2 15	+ 1	3 56	- 4	—	—	—
Simidu	9.7	231	2 24 _a	+ 2	4 30	+15	—	—	—
Izuka	10.5	242	2 41	+ 6	5 1	S*	—	—	—
Hukuoka	10.8	243	2 45 _k	+ 6	5 7	SS	—	—	—
Husan	11.0	252	2 47	+ 5	4 50	+ 3	—	—	—
Kumamoto	11.1	238	2 45	+ 2	5 13	SSS	—	—	—
Taikyu	11.1	257	3 7	PPP	4 25	-24	—	—	—
Miyazaki	11.2	232	2 44	0	—	—	—	—	—
Nagasaki	11.6	240	3 4	PP	6 15	L	—	—	(6.2)
Keizyo	11.8	267	3 2	+ 9	—	—	—	—	—
Kagosima	12.0	234	2 59	+ 4	—	—	—	—	—
Titizima	12.1	179	3 5	+ 8	4 50	-24	—	—	—
Zinsen	12.1	267	2 57	0	5 11	- 3	—	—	—
Tomie	12.5	242	3 8	+ 6	6 13	SSS	—	—	—
Yakusima	12.8	230	3 7	+ 1	6 7	SS	—	—	—
Nake	14.9	228	3 33	- 1	—	—	—	—	—
Dairen	15.7	275	3 48	+ 4	6 53	SS	—	—	—
Naha	17.6	227	4 9	+ 1	—	—	—	—	—
Zi-ka-wei	18.5	252	e 4 16	- 3	i 8 6	SS	i 4 36	PP	i 10.4
Miyakozima	20.1	231	4 46	+ 8	8 31	+12	—	—	—
Isigakizima	21.1	232	4 43	- 5	—	—	—	—	—
Taihoku	22.2	239	5 1	+ 1	—	—	—	—	—
Sintiku	22.8	239	5 16	+11	—	—	—	—	—
Taito	24.1	234	5 18	0	6 20	PPP	—	—	—
Irkutsk	29.0	311	6 3	- 1	11 3	+ 9	—	—	14.4
Manila	30.7	223	e 6 15 _a	- 4	i 11 21	0	—	—	—
Phu-Lien	35.2	250	e 6 59	+ 1	e 12 29	- 2	—	—	—
Semipalatinsk	44.0	307	8 10	- 1	—	—	—	—	—
College	47.1	34	e 8 34	- 1	i 15 27	- 1	e 10 29	PP	e 21.7
Almata	47.9	298	e 8 42	0	—	—	—	—	28.4
Calcutta	N. 48.2	267	i 8 47 _a	+ 3	i 15 45	+ 2	e 10 32	P _c P	e 23.1
Frunse	49.7	298	e 8 56	0	—	—	—	—	24.4
Andijan	52.0	296	e 9 14	+ 1	—	—	—	—	29.8
Tchimkent	53.3	299	i 9 22	- 1	—	—	—	—	—
Agra	E. 53.8	278	i 9 23 _a	- 3	i 16 50	-11	11 25	PP	—
Sverdlovsk	53.8	318	i 9 28	+ 2	i 17 0	- 1	—	—	25.7
Tashkent	53.9	298	i 9 27	0	16 55	- 7	—	—	28.4
Honolulu	54.1	91	e 9 42	+13	e 17 4	- 1	e 11 35	PP	e 22.3
Sitka	54.3	42	e 7 54	?	(i 17 12)	+ 5	e 11 8	PP	i 17.2
Samarkand	56.2	297	e 9 43	- 1	—	—	—	—	30.4
Hyderabad	58.7	268	10 0	- 2	18 7	+ 1	12 6	PP	28.3
Bombay	62.3	274	i 10 23	- 3	18 48	- 4	e 12 47	PP	30.6
Kodaikanal	E. 63.8	263	i 10 34 _k	- 2	i 19 12	+ 1	i 19 24	PS	30.3
Colombo	E. 64.1	257	—	—	e 19 24	+10	—	—	—
Victoria	64.7	48	e 10 56	+14	19 15	- 7	e 23 29	SS	30.4
Seattle	65.7	48	e 13 22	PP	e 18 41	-53	—	—	e 21.5
Moscow	65.8	324	10 47	- 2	19 31	- 4	—	—	33.5
Pulkovo	66.5	330	e 10 52	- 2	e 19 44	0	—	—	33.5
Brisbane	67.1	170	i 11 0	+ 3	i 19 42	- 9	—	—	—
Baku	67.3	305	e 11 1	+ 2	i 20 41	PS	—	—	—
Ukish	69.9	57	e 11 28	+13	e 20 26	+ 2	e 15 9	PPP	e 28.2
Scoresby Sund	70.0	355	—	—	i 18 35	?	—	—	33.1
Berkeley	71.2	58	e 11 23	0	i 20 38	- 2	—	—	i 29.9
Upsala	71.2	334	11 20	- 3	e 20 33	- 7	e 21 0	PS	e 33.4

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.
Santa Clara	71.7	58	i 11	39	+13	e 20	45	0	—	—	—
Sotchi	71.7	313	e 11	28	+2	20	47	+2	—	—	—
Butte	72.2	45	e 11	43	+14	e 21	17	PS	e 21	34	PPS e 32.0
Bozeman	73.2	45	e 11	48	+13	i 20	59	-3	e 21	45	PPS e 28.9
Riverview	73.2	173	i 11	45	+10	i 20	55	-7	e 21	17	PS e 37.2
Sydney	73.2	173	—	—	—	i 20	54	-8	—	—	—
Theodosia	73.3	315	11	32	-3	—	—	—	—	—	—
Simferopol	74.1	316	11	41	+1	—	—	—	—	—	—
Tinemaha	74.2	55	i 11	42	+2	—	—	—	—	—	—
Bergen	74.6	340	e 11	41	-2	e 21	19	+1	—	—	e 35.4
Santa Barbara	74.9	58	i 11	58	+14	—	—	—	—	—	—
Haiwee	75.0	56	i 11	57	+12	—	—	—	—	—	—
Warsaw	75.5	327	11	48 _a	0	21	44	+16	14	48	PP e 38.4
Pasadena	75.9	57	e 11	49	-1	i 21	29	-3	i 14	46	PP e 31.4
Salt Lake City	75.9	49	e 12	3	+13	i 21	32	0	e 26	48	SS
Mount Wilson	76.0	57	e 11	50	-1	—	—	—	—	—	—
Copenhagen	76.2	334	i 11	51 _a	-1	21	33	-3	14	45	PP
Riverside	76.7	57	e 11	53	-2	—	—	—	—	—	—
Palomar	z. 77.4	58	i 12	11	+13	—	—	—	—	—	—
La Jolla	77.5	59	e 12	10	+11	—	—	—	—	—	—
Potsdam	78.5	332	i 12	3 _a	-1	i 22	2	+1	i 12	18	P _c P e 35.1
Bucharest	78.7	320	e 12	4	-2	22	21	+18	e 15	5	PP 38.4
Hamburg	78.7	335	i 12	5 _a	-1	e 21	48	-15	e 14	7	? e 38.4
Heligoland	78.9	335	e 12	8	+1	e 21	56	-9	—	—	e 38.4
Aberdeen	79.3	342	i 17	9	PPP	e 21	55	-14	i 26	44	SS e 36.8
Istanbul	79.4	316	12	13	+4	22	28	+18	15	8	PP 46.4
Budapest	E. 79.8	325	12	12	0	e 22	36	+22	—	—	42.4
	N. 79.8	325	12	13	+1	22	19	+5	i 22	31	PS e 41.9
Prague	79.8	330	e 11	58	-14	e 22	33	+19	—	—	e 37.4
Ogyalla	79.9	326	12	13	+1	22	31	+15	12	17	P _c P e 45.9
Kecskemet	z. 80.0	324	e 11	12	-61	—	—	—	—	—	—
Ksara	80.2	306	e 12	8	-6	e 22	24	+5	—	—	—
Jena	80.3	331	e 12	11	-3	e 22	24	+4	—	—	e 38.4
Sofia	81.3	320	e 12	0	-20	e 22	36	+6	—	—	38.9
De Bilt	81.6	335	i 12	21 _a	0	i 22	37	+4	i 15	27	PP e 38.4
Tucson	82.0	55	i 12	22	-1	i 22	36	-1	i 23	34	PS e 31.6
Stonyhurst	82.4	340	e 12	19	-6	e 22	44	+3	—	—	41.4
Arapuni	82.9	154	—	—	—	22	30	-16	34	54	L _g 39.4
Stuttgart	82.9	331	e 12	28 _a	0	e 22	50	+4	e 12	50	pP e 42.4
Uccle	83.0	336	i 12	27 _a	-1	i 22	41	-6	i 15	42	PP e 38.4
Triest	83.6	327	i 16	9	PP	e 23	36	PS	e 24	19	PPS
Kew	83.9	338	i 12	32	-1	i 22	51	-5	12	35	P _c P e 39.4
Oxford	83.9	338	—	—	—	22	54	-2	—	—	e 39.4
Lincoln	84.1	41	e 15	38	PP	e 23	52	PS	—	—	e 26.7
Zurich	84.3	331	e 12	34 _a	-1	e 23	14	+14	—	—	—
Chur	84.4	330	e 12	34	-2	e 22	58	-3	—	—	e 44.6
Basle	84.5	331	e 12	35	-1	e 23	3	+1	—	—	—
Neuchatel	85.2	331	e 12	39	0	—	—	—	—	—	—
Paris	85.3	335	i 12	41	+1	23	4	[+1]	e 16	2	PP 46.4
Wellington	85.5	157	12	49	+8	23	4	[0]	13	2	pP 39.4
Helwan	85.7	306	i 12	41 _k	-1	23	4	[-2]	16	3	PP
Christchurch	86.9	159	13	0 _a	+12	23	11	[-2]	29	4	SS 41.1
Rome	87.1	326	i 12	48	-1	i 23	1	[-14]	i 13	1	pP
Clermont-Ferrand	87.7	333	i 12	53	+1	—	—	—	—	—	—
Florissant	88.8	39	—	—	—	e 23	40	-4	e 23	58	sS
St. Louis	89.0	39	e 12	53	-5	i 23	39	-6	e 13	11	pP e 39.9
Seven Falls	89.2	23	—	—	—	23	49	+2	e 29	36	SS 44.4
Ottawa	89.3	27	12	58	-1	23	40	-8	29	48	SS e 40.4
Toronto	89.5	29	—	—	—	e 23	44	-6	—	—	42.4
Vermont	90.9	26	—	—	—	e 23	51	-12	—	—	e 48.9

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	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Bagneres	91.1	332	—	—	e 23 42 [+ 3]	—	—	42.4
Pittsburgh	92.0	31	—	—	i 24 10 - 2	i 24 36	PS	—
Harvard	93.2	24	e 13 16	- 1	—	—	e 13 32	e 50.4
Fordham	93.9	26	e 13 21	0	i 24 26 - 3	—	—	—
Philadelphia	94.2	28	—	—	e 23 53 [- 4]	e 31 42	SSP	e 42.4
Toledo	95.4	334	e 13 25	- 3	26 25	PS	17 37	PP 42.4
Almeria	97.5	331	—	—	23 46 [- 28]	—	—	55.4
Lisbon	98.0	337	—	—	24 41 - 23	27 23	PPS	e 49.4
San Fernando	99.2	334	—	—	(e 24 13) [- 10]	e 32 39	SSP	47.4
San Juan	117.0	30	e 14 11	P	e 27 37 {+ 43}	e 21 5	?	e 51.9
Huancayo	137.4	61	e 19 55	[+ 29]	e 27 17 [+ 42]	e 23 15	PP	e 57.0
La Paz	145.4	58	i 19 40 _a	[0]	i 41 40	SS	i 23 32	PP 69.4

Additional readings :—

Zi-ka-wei iE = +4m.56s.
 College e = +11m.44s., +15m.47s., and +18m.56s.
 Calcutta iSSN = +19m.0s.
 Agra iE = +9m.28s., SSE = +20m.43s., iE = +21m.22s.
 Honolulu e = +10m.36s., +14m.29s., and +16m.2s., i = +19m.16s.
 Hyderabad PSN = +18m.14s., S_cSE = +20m.6s., SSN = +22m.0s.
 Bombay iPSEN = +19m.6s., iS_cSEN = +20m.33s., iSSEN = +22m.48s., L_qE = +28m.7s.
 Kodaikanal SSE = +23m.20s.
 Victoria eN = +20m.36s., e = +26m.50s.
 Ukiah e = +24m.39s.
 Berkeley iPE = +11m.35s., iZ = +11m.38s.
 Upsala eSSE = +25m.30s., eSSSN = +28m.24s.
 Tinemaha i = +11m.54s.
 Warsaw eN = +21m.28s., SE = +21m.50s., PSN = +22m.22s., iEN = +24m.34s.
 Pasadena i = +12m.3s.
 Salt Lake City e = +13m.7s., +13m.54s., and +25m.36s.
 Mount Wilson iZ = +12m.3s.
 Copenhagen +16m.32s., +21m.51s., +22m.24s., and +22m.51s.
 Riverside i = +12m.7s.
 Potsdam iPZ = +12m.6s.k, iPN = +12m.9s., iPPNZ = +15m.4s., iPPPN = +16m.49s., iPPPZ = +16m.56s., iSKSEN = +22m.18s., iSKSZ = +22m.26s.
 Bucharest SSN = +27m.27s., SSE = +27m.30s.
 Hamburg ePS = +22m.18s.
 Aberdeen eE = +22m.32s.
 Budapest iN = +13m.8s.
 Ogyalla S_cSE = +22m.53s., eS_cSN = +22m.57s., ePSN = +23m.14s., ePSE = +23m.21s.
 Jena eP = +12m.18s.
 Sofia ePE = +12m.16s.
 De Bilt ePPP = +17m.19s., ePPPP = +19m.19s., eSS = +27m.39s.
 Tucson i = +12m.38s., +13m.15s., and +14m.11s., e = +21m.49s., eS = +22m.41s.
 Stonyhurst iS = +22m.59s.
 Stuttgart ePPZ = +15m.54s., iPS = +23m.40s., eSS = +28m.53s.
 Uccle iZ = +12m.31s. and +12m.43s., e = +23m.3s., i = +23m.54s., SS = +28m.18s.
 Kew eZ = +13m.55s., ePP = +15m.45s., ePPPZ = +17m.54s., eSEN = +23m.13s., eSSEZ = +28m.24s., eSSS = +33m.24s., eL_qEN = +37m.24s.
 Paris e = +18m.24s.?, SKKS = +23m.31s., i = +24m.20s., e = +27m.24s. and +35m.24s.?, L_q = +42.4m.
 Wellington sPZ = +13m.13s., PPZ = +16m.8s., pPP = +16m.19s., sS = +23m.20s., SP = +23m.59s., SS = +28m.44s.
 Helwan PPPE = +17m.59s., PSE = +23m.58s.
 Christchurch +23m.38s., L_qEN = +36m.11s.
 Rome iN = +14m.22s., iPPN = +16m.23s., iZ = +18m.6s., iPPPN = +18m.12s., iN = +23m.11s., iSN = +23m.18s., iSKKSN = +23m.33s., iN = +23m.40s. and +24m.11s., iPSN = +24m.54s., iN = +28m.45s., iSSE = +29m.20s., iSSSE = +33m.0s.
 Florissant iSE = +23m.43s., esSE = +24m.1s.
 St. Louis iPEN = +12m.56s., eE = +23m.10s., eN = +23m.20s., eSE = +23m.45s., isSE = +24m.5s.
 Fordham i = +24m.47s. and +26m.22s.
 Philadelphia e = +39m.42s., iS = +24m.24s.
 Toledo SS = +31m.57s.
 Lisbon SE = +25m.21s., N = +27m.30s., Z = +34m.25s.
 San Fernando eSSN = +36m.19s. SKS is given as PP.
 Huancayo e = +23m.35s., +40m.19s., and +45m.32s.
 La Paz SSSN = +46m.28s.
 Long waves were also recorded at Algiers and Granada.

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

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Nov. 19d. 18h. 34m. 34s. Epicentre 40°·4N. 124°·2W.

Intensity VI at Westport and in the region of Humboldt. Macroseismic area 8000 sq. miles.

F. Neuman.

United States Earthquakes, 1940. Washington, 1943, p. 29.

A = -·4293, B = -·6316, C = +·6456; $\delta = +2$; $h = -2$;
D = -·827, E = +·562; G = -·363, H = -·534, K = -·764.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Ferndale	0·2	343	i 0 10	0	i 0 16	0	—	—
Ukiah	1·5	149	e 0 28	0	e 0 46	- 3	—	0·8
Berkeley	2·9	149	i 0 48	0	i 1 21	- 3	e 0 52	P* 1 2·6
San Francisco	3·0	153	e 0 49	- 1	i 1 19	- 8	—	—
Branner	3·4	152	i 0 54	- 1	i 1 28	- 9	i 1 3	P* —
Santa Clara	3·5	150	e 0 57	0	e 1 52	S _g	—	—
Lick	3·6	146	i 0 58	0	i 1 40	- 2	i 1 14	P _g —
Fresno	N. 5·0	135	e 1 20	+ 2	i 2 50	S _g	i 1 24	P* —
Tinemaha	5·7	124	i 1 32	+ 4	i 2 48	S _g *	—	—
Haiwee	6·5	129	i 1 43	+ 4	i 3 11	S*	—	—
Santa Barbara	z. 6·9	148	i 1 44	- 1	—	—	—	—
Mount Wilson	7·9	140	i 1 59 _a	0	—	—	—	—
Pasadena	7·9	140	i 1 58 _a	- 1	i 3 22	- 8	—	—
Riverside	8·4	137	i 2 5 _a	- 1	—	—	—	—
Palomar	z. 9·2	138	i 2 15 _a	- 1	—	—	—	—
Tucson	13·5	123	e 3 20	+ 5	—	—	i 3 26	PP e 7·0

Additional readings:—

Berkeley eE = +1m.16s., iSZ = +1m.32s., iSN = +1m.43s.

Branner iN = +58s., iSE = +1m.31s.

Lick iN = +1m.53s., eE = +2m.37s.

Fresno iN = +3m.29s.

Pasadena iE = +3m.30s.

Tucson i = +3m.35s. and +3m.43s.

Long waves were also recorded at Spokane, Butte, Bozeman, and Jena.

Nov. 19d. 20h. 27m. 14s. Epicentre 45°·7N. 26°·8E. (as on 1940 Nov. 11d.).

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

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bucharest	1·4	198	i 0 27	+ 2	i 0 44	0	i 0 48	sS —
Sofia	3·9	221	e 0 59	0	e 1 40	- 4	—	—
Sebastopol	4·9	100	1 2	- 11	—	—	—	—
Kecskemet	z. 5·1	286	e 1 21	+ 5	—	—	—	e 3·0
Simferopol	5·2	96	1 13	- 4	—	—	—	—
Budapest	5·6	291	1 21	- 1	—	—	i 2 9	? 2·6
Ogyalla	6·3	293	1 39	+ 7	e 2 46?	+ 3	e 1 45	pP —
Warsaw	7·5	332	e 1 46	- 2	e 3 10	- 2	—	e 3·3
Potsdam	11·2	312	—	—	e 5 28	SSS	—	i 5·6
Chur	12·0	282	e 2 47	- 2	e 5 11	+ 10	—	—
Moscow	12·1	30	e 2 49	- 1	e 4 58	- 6	—	—
Stuttgart	12·4	291	e 3 21	pP	—	—	—	—
Copenhagen	13·5	323	i 3 2	- 7	—	—	—	—
Pulkovo	14·3	7	e 3 13	- 6	e 5 44	- 11	—	—
Clermont-Ferrand	16·6	279	i 3 43	- 5	—	—	—	—
Sverdlovsk	23·7	50	5 31	pP	—	—	—	—

Additional readings:—

Ogyalla eN = +2m.49s., eE = +3m.59s., iN = +4m.57s.

Chur i = +2m.52s.

Nov. 19d. Readings also at 8h. (near Mizusawa, Huancayo, and La Paz), 16h. (Agra, Tucson, and near Branner), 17h. (Uccle).

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Nov. 20d. 17h. 59m. 57s. Epicentre 36°·3N. 71°·0E. (as on 1940 Nov. 4d.).

Intensity VI at Srinager, V at Cherat, IV at Kabul, III at Peshawar Cantt.

Epicentre Hindou-Kouch 36°N. 71°E. (Bombay). Depth 180km.
See Government of India Seismological Bulletin, 1940, p. 93.

$$A = +.2630, B = +.7638, C = +.5894; \quad \delta = -5; \quad h = 0.$$

Tables for depth of focus 0·025 have been used.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Andijan		4·6	14	i 1 10	0	—	—	—	—
Samarkand		4·6	319	i 1 5	- 5	1 54	-10	—	—
Tashkent		5·2	347	i 0 16	-62	—	—	—	1·0
Tchimkent		6·1	351	i 1 28	- 1	—	—	—	—
Frunse		7·1	22	i 0 45	-57	—	—	—	—
Almata		8·3	32	i 2 0	+ 2	—	—	—	—
Dehra Dun	N.	8·4	133	e 2 14 ⁷	pP	e 3 52	sS	—	—
Agra	E.	10·9	145	i 2 35 ^k	+ 3	4 31	0	3 15	sP
Semipalatinsk		15·6	22	e 3 28	- 3	6 17	- 1	—	—
Baku		17·0	290	3 49	+ 1	—	—	—	8·2
Bombay		17·4	174	i 3 56	+ 4	i 7 8	+10	i 4 49	sP
Hyderabad	N.	19·9	159	4 23	+ 5	7 59	+12	5 20	PP
Calcutta	N.	20·4	127	e 4 33	+10	i 8 11	sS	i 5 29	sP
Erevan		21·1	288	4 33	+ 3	8 4	- 5	—	—
Sverdlovsk		21·7	345	i 4 37	+ 1	i 8 23	+ 4	i 5 10	PP
Piatigorsk		22·6	300	e 4 45	0	e 8 35	0	—	—
Kodaikanal	E.	26·6	166	—	—	e 8 17	?	i 11 18	SS
Ksara		28·8	275	e 5 57	pP	e 11 19	sS	—	i 12·8
Moscow		29·8	321	5 49	- 2	10 27	- 5	6 29	pP
Colombo	E.	30·4	163	—	—	e 12 31	SS	—	—
Helwan		33·7	270	e 6 24	- 1	i 11 28	- 5	e 7 3	pP
Pulkovo		35·1	325	i 6 34	- 3	e 11 48	- 6	7 15	pP
Warsaw		38·3	311	e 7 50	pP	e 15 21	SS	e 16 12	SSS
Upsala		41·2	322	i 7 27	0	e 13 3	-23	i 8 55	PP
Potsdam		43·2	311	i 7 41 _a	- 3	e 17 3	SS	i 8 46	pP
Copenhagen		43·6	315	i 7 46	- 1	—	—	—	—
Rome		45·0	296	e 7 36	-22	e 14 19	- 2	—	—
Stuttgart		46·0	306	e 8 4	- 2	—	—	—	—
Mount Wilson	z.	109·3	7	e 18 12	[+ 5]	—	—	—	—

Additional readings :—

Agra iE = +4m.48s.

Bombay iN = +7m.11s., eEN = +8m.15s., iN = +9m.21s.

Calcutta esSN = +9m.5s.

Helwan eZ = +7m.27s.

Warsaw eE = +15m.25s., eN = +15m.31s., eE = +15m.59s., eZ = +17m.32s.

Upsala eE = +10m.3s.

Potsdam iE = +7m.45s., iZ = +10m.27s., iN = +10m.33s., iE = +17m.18s., iN = +18m.51s.

Stuttgart eZ = +8m.21s. and +8m.38s., iZ = +8m.45s., eZ = +11m.58s.

Nov. 20d. Readings also at 2h. (Cape Town and Tananarive), 5h. (near Tananarive), 8h. (near Bucharest), 9h. (near Mizusawa and near Bucharest), 12h. (Bucharest), 17h. (near Branner, Fresno, San Francisco, Berkeley, Lick, and Rome), 18h. (near Almeria and Granada), 19h. (near Apia), 20h. (Tinemaha, Pasadena, Riverside, and Mount Wilson).

Nov. 21d. Readings at 1h. (near Bucharest), 3h. (San Juan), 12h. (near Bucharest), 22h. (near Mizusawa).

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Nov. 22d. 2h. Local Japanese shock. Tokyo Imperial University gives Epicentre 35°·84N. 140°·22E.

Tokyo Imp. Univ. P = 36m.6s., S = 36m.16s.
 Komaba P = 36m.7s., S = 36m.16s.
 Kamakura P = 36m.8s., S = 36m.18s.
 Koyama P = 36m.8s., S = 36m.22s.
 Mitaka P = 36m.8s., S = 36m.18s.
 Titibu P = 36m.8s., S = 36m.20s.
 Togane P = 36m.8s., S = 36m.18s.
 Tukubasan P = 36m.8s., S = 36m.15s.
 Susaki P = 36m.35s.

Nov. 22d. 9h. 0m. 10s. Epicentre 6°·1S. 150°·5E. (as on 1940 Nov. 17d.).

A = -·8655, B = +·4897, C = -·1055; $\delta = +3$; $h = +7$.

	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Brisbane	21·4	174	i 4 56	+ 5	i 8 56	+11	—	—
Riverview	N. 27·6	178	e 5 48	- 3	e 11 10	SS	—	e 14·6
Sydney	27·6	178	e 5 29	-22	e 11 14	SS	—	e 15·2
Manila	35·8	306	i 7 13 _a	+10	13 7	+26	—	—
Wellington	41·2	152	—	—	13 55	- 7	i 17 27	SSS 20·8
Christchurch	42·1	156	7 6	-49	14 26	+10	19 2	L _g 22·2
Pasadena	94·5	56	e 13 17	- 6	—	—	—	e 43·5
Mount Wilson	94·6	56	i 13 19	- 5	—	—	—	—
Tinemaha	94·6	54	i 13 29	+ 5	—	—	—	—
Riverside	95·1	56	i 13 22	- 4	—	—	—	—

Additional readings :—

Brisbane iSE = +9m.2s.

Long waves were also recorded at Tucson, Sitka, Ukiah, Bozeman, St. Louis, and Berkeley.

Nov. 22d. 13h. 6m. 37s. Epicentre 43°·7N. 131°·5E. (as on 1938 Oct. 21d.).

A = -·4806, B = +·5432, C = +·6884; $\delta = -6$; $h = -3$;
 D = +·749, E = +·663; G = -·456, H = +·516, K = -·725.

Tables for depth of focus 0·080 have been used.

	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Mizusawa	8·6	118	e 2 4	0	3 39	- 4	—	—
Tashkent	45·0	290	i 7 24	- 5	e 13 18	-10	—	16·3
Berkeley	z. 74·9	53	i 10 45	- 2	—	—	i 12 43	pP
Tinemaha	77·7	51	i 11 3	+ 1	—	—	e 13 2	pP
Haiwee	78·6	51	i 11 7	0	—	—	—	—
Santa Barbara	z. 78·8	53	i 11 8	0	—	—	—	—
Mount Wilson	79·9	53	i 11 12 _a	- 2	—	—	—	—
Pasadena	79·9	53	i 11 13	- 1	—	—	i 13 12	pP
Riverside	z. 80·5	53	i 11 15	- 2	—	—	—	—
La Jolla	81·3	53	e 11 21	0	—	—	—	—
Tucson	85·4	49	i 11 41	0	—	—	i 13 43	pP

Additional readings :—

Tucson e = +12m.35s. and +15m.12s.

Long waves were also recorded at Sverdlovsk.

Nov. 22d. 14h. Local Japanese shock. Tokyo Imperial University gives Epicentre 35°·78N. 140°·26E.

Tokyo Imp. Univ. P = 12m.44s., S = 12m.55s.
 Kamakura P = 12m.46s., S = 12m.58s.
 Komaba P = 12m.46s., S = 12m.56s.
 Koyama P = 12m.46s., S = 13m.1s.
 Mitaka P = 12m.46s., S = 12m.57s.
 Titibu P = 12m.46s., S = 13m.0s.
 Togane P = 12m.46s., S = 12m.57s.
 Tukubasan P = 12m.46s., S = 12m.56s.
 Susaki P = 12m.54s., S = 13m.14s.

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Nov. 22d. Readings also at 2h. (Sofia and near Bucharest), 3h. (La Paz), 9h. (near Bucharest), 12h. (Tucson), 14h. (near Sofia), 19h. (near Mizusawa), 23h. (Bermuda).

Nov. 23d. 3h. 48m. 51s. Epicentre 9°·2N. 84°·2W.

A = +·0998, B = -·9822, C = +·1589; $\delta = -7$; $h = +7$;
D = -·995, E = -·101; G = +·016, H = -·158, K = -·987.

	Δ	Az.	P.		O-C.		S.		O-C.		Supp.		L.
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.	s.	m.
Balboa Heights	4·6	93	i 1	11	- 1	e 2	9	+ 2	—	—	—	—	2·4
Tacubaya	17·7	307	e 4	12	+ 2	i 7	54	+28	—	—	—	—	—
San Juan	19·8	60	i 4	33	- 2	i 8	28	+15	—	—	—	—	i 9·9
Huancayo	22·9	158	i 5	3k	- 3	e 9	4	- 9	i 5	20	PP	—	—
Columbia	24·9	7	i 5	26	0	i 10	12	+25	—	—	—	—	i 13·7
Cape Girardeau	28·4	352	e 5	47	-11	e 11	31	SS	e 6	51	PP	—	—
St. Louis	29·8	351	e 6	9	- 2	e 11	32	SS	e 7	6	PP	—	—
Florissant	30·0	351	e 6	11	- 1	e 11	14	+ 4	—	—	—	—	—
La Paz	30·1	148	e 6	13a	0	i 11	33	+21	i 8	19	PP	—	16·3
Pittsburgh	31·3	8	e 7	19	PP	e 11	45	+14	e 7	38	PPP	—	—
Philadelphia	31·7	13	6	27	0	e 11	42	+ 5	e 7	28	PP	—	e 14·0
Pennsylvania	32·0	9	e 6	25	- 5	—	—	—	—	—	—	—	—
Chicago U.S.C.G.S.	32·6	354	e 6	34	- 1	e 11	30	-21	e 7	33	PP	—	e 18·2
Fordham	32·8	15	e 6	37	0	e 12	2	+ 8	e 7	38	PP	—	—
Tucson	33·7	318	e 6	45a	0	—	—	—	i 7	53	PP	—	i 16·5
Buffalo	33·9	7	e 6	47	0	e 12	24	+13	i 6	44	pP	—	e 16·7
Toronto	34·6	6	6	53	0	12	27	+ 5	8	24	PPP	—	19·1
Harvard	35·0	16	e 6	58	+ 2	e 12	34	+ 6	e 8	12	PP	—	e 15·1
Vermont	36·4	13	e 8	37	PP	e 12	55	+ 5	e 15	21	SS	—	e 20·1
Ottawa	36·8	9	7	11	0	12	59	+ 3	8	35	PPP	—	e 19·1
East Machias	38·3	19	e 7	27	+ 3	i 13	29	+10	e 8	42	PP	—	e 17·9
La Jolla	38·5	313	e 7	27	+ 1	—	—	—	—	—	—	—	—
Palomar	38·5	314	i 7	25	- 1	—	—	—	—	—	—	—	—
Shawinigan Falls	38·5	13	e 7	25	- 1	—	—	—	—	—	—	—	23·1
Riverside	39·2	315	i 7	32a	+ 1	—	—	—	—	—	—	—	—
Seven Falls	39·5	14	e 9	9	PP	13	42	+ 5	e 16	51	SSS	—	e 19·1
Mount Wilson	39·8	315	i 7	37a	+ 1	—	—	—	—	—	—	—	—
Pasadena	39·8	315	i 7	37a	+ 1	e 13	50	+ 8	i 8	51	PP	—	e 18·9
Salt Lake City	39·9	326	e 7	39	+ 2	e 13	30	-13	—	—	—	—	e 17·9
Haiwee	40·7	317	i 7	46a	+ 2	—	—	—	—	—	—	—	—
Santa Barbara	41·1	313	i 7	47	0	—	—	—	—	—	—	—	—
Tinemaha	41·5	318	i 7	51a	+ 1	—	—	—	—	—	—	—	—
Fresno	42·3	317	e 7	59	+ 2	—	—	—	—	—	—	—	—
Lick	43·9	317	e 8	12	+ 2	—	—	—	—	—	—	—	—
Butte	44·0	333	e 10	45	PPP	—	—	—	—	—	—	—	e 27·9
Branner	44·3	317	e 8	16	+ 3	—	—	—	—	—	—	—	—
Berkeley	44·6	317	e 8	2	-14	i 15	0	+ 8	e 9	8	PP	—	e 23·9
Ukiah	45·9	318	e 8	23	- 3	e 15	22	+11	—	—	—	—	e 18·6
Seattle	50·0	327	e 14	40	?	e 17	51	?	—	—	—	—	e 29·6
La Plata	50·4	153	—	—	—	16	21	+ 7	20	21	SSS	—	29·2
Victoria	51·1	328	e 9	3	- 3	e 16	38	+14	e 19	6	SS	—	28·2
Rio de Janeiro	51·2	129	i 16	26	S	(i 16	26)	+ 1	—	—	—	—	e 26·0
Sitka	62·1	332	—	—	—	e 18	59	+10	—	—	—	—	e 22·4
Toledo	76·6	52	i 11	54	0	—	—	—	—	—	—	—	—
Granada	77·0	55	i 12	1	+ 5	—	—	—	e 15	12	PP	—	—
Paris	81·0	43	—	—	—	e 23	9	PS	—	—	—	—	40·1
Uccle	82·0	40	—	—	—	e 22	36	- 1	e 23	33	PS	—	e 35·1
Potsdam	87·2	38	i 12	50k	+ 1	i 23	26	- 2	i 28	27	SS	—	e 35·1
Upsala	88·0	30	—	—	—	e 23	35	- 1	—	—	—	—	—
Rome	88·9	48	i 12	57	- 1	e 23	39	- 5	e 16	19	PP	—	e 37·8
Warsaw	92·0	37	—	—	—	e 24	9?	- 3	e 25	9?	PS	—	e 50·1
Manila	145·6	314	i 19	45a	[+ 5]	—	—	—	—	—	—	—	—
Calcutta	N. 147·6	13	e 19	49	[+ 6]	—	—	—	—	—	—	—	—

For Notes see next page.

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NOTES TO NOVEMBER 23d. 3h. 48m. 51s.

Additional readings :—

San Juan *i* = +7m.33s.
 Huancayo *i* = +5m.50s., +6m.45s., and +6m.56s.
 Cape Girardeau *eE* = +10m.3s.
 St. Louis *eE* = +6m.22s., +11m.0s., and +11m.38s., *iN* = +11m.55s., *eE* = +12m.58s.
 Florissant *eSN* = +11m.19s.
 La Paz *iPN* = +7m.1s., *iN* = +10m.13s., *iNZ* = +12m.49s.
 Philadelphia *e* = +7m.9s. and +9m.15s.
 Chicago U.S.C.G.S. *e* = +9m.5s., *i* = +13m.49s., *e* = +15m.15s.
 Fordham *iP* = +6m.40s.
 Tucson *i* = +7m.15s., +7m.34s., and +7m.59s., *iPPP* = +8m.4s., *i* = +8m.39s. and +9m.54s.
 Buffalo *ePP* = +7m.58s., *eSS* = +14m.5s.
 Toronto *e* = +15m.51s.
 Vermont *e* = +17m.2s.
 Ottawa *SSS* = +16m.9s.?
 East Machias *e* = +8m.9s.
 Tinemaha *eZ* = +8m.48s.
 Fresno *eN* = +8m.21s.
 Berkeley *iPZ* = +8m.16s., *ePPE* = +9m.30s., *iSN* = +15m.9s., *eSSN* = +18m.18s., *eE* = +19m.2s.
 Potsdam *iSKSN* = +23m.32s., *iSE* = +23m.38s., *eZ* = +23m.45s., *iN* = +24m.12s.
 Upsala *eE* = +23m.43s.?
 Rome *iEN* = +23m.50s., *eE* = +24m.40s. and +25m.5s., *iE* = +26m.16s., *eSS* = +29m.56s.
 Warsaw *eE* = +23m.9s.
 Long waves were also recorded at Bozeman, College, Lincoln, Scoresby Sund, Bucharest, and De Bilt.

Nov. 23d. 14h. 49m. 53s. Epicentre 45°·7N. 26°·8E. (as on 1940 Nov. 19d.).

A = +·6255, B = +·3160, C = +·7133; δ = -10; h = -4;

Tables for depth of focus 0·010 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bucharest	1·4	198	i 0 26	+ 1	0 42	- 2	—	—
Sofia	3·9	221	e 0 56	- 3	e 1 29	-15	—	—
Kalossa	5·5	281	e 1 24	+ 3	e 2 18	- 5	e 1 34	P*
Budapest	5·6	291	1 19	- 3	i 2 24	- 2	1 32	P*
Chur	12·0	282	e 2 49	0	—	—	—	—
Moscow	12·1	30	e 2 54	+ 4	e 5 0	- 4	—	—
Stuttgart	12·4	291	e 2 49	- 5	—	—	e 3 38	PPP
Zurich	12·7	284	e 2 55	- 3	—	—	—	—
Pulkovo	14·3	7	e 3 21	+ 2	e 5 48	- 7	—	—

Additional readings :—

Bucharest *iSN* = +0m.46s.
 Sofia *iEN* = +1m.33s.
 Budapest *PSSE* = +2m.35s.
 Long waves were also recorded at Baku.

Nov. 23d. Readings also at 2h. (near Lick and Branner), 5h. (Tucson), 15h. (Helwan), 18h. (Helwan), 21h. (near Cape Girardeau), 23h. (near St. Louis).

Nov. 24d. Readings at 2h. (near Lick and Berkeley), 3h. (Ksara), 5h. (Istanbul and near Tananarive), 13h. (Tucson and near La Paz), 14h. (Rome), 14h. (near Rome), 16h. (Riverside, Mount Wilson, Tinemaha, and Pasadena), 19h. (near Branner, Lick, and Berkeley), 20h. (near La Paz and Bucharest), 21h. (near Bucharest).

Nov. 25d. Readings at 1h. (Manila), 2h. (near Bagneres), 4h. (Sofia and Ksara), 6h. (Sverdlovsk, Tashkent, Vladivostok, Calcutta, Phu-Lien, Agra, and near Manila), 7h. (Baku, Potsdam, and De Bilt), 8h. (Ksara), 11h. (near San Francisco, Berkeley, and Branner), 12h. (near Bucharest and Copenhagen), 13h. (near Bucharest), 14h. (near Berkeley and Branner), 15h. (near Branner), 20h. (near Trieste).

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Nov. 26d. 22h. 24m. 58s. Epicentre 36°·5N. 139°·5E.

Rather strong at Kumagaya, Kakioka, and Yokohama; moderate at Maebasi, Tokyo, Mito, Hunatu, Ito, etc.; slight at Kohu, Takada, Mera, Osima, and Shirakawa.

Epicentre 36°·5N. 139°·5E. Macro seismic radius 200-300kms. Depth 120kms. See Seismological Bulletin of the Central Met. Obs. Japan for the year 1940. Tokyo, 1950, pp. 35-36. Macro seismic chart p. 35.

$$A = -.6127, B = +.5233, C = +.5922; \quad \delta = -5; \quad h = 0; \\ D = +.649, E = +.760; \quad G = -.450, H = +.385, K = -.806.$$

Tables for depth of focus 0·015 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Utunomiya	0·3	80	0 20 _a	+ 2	0 34	+ 2	—	—
Kumagaya	0·4	195	0 19	0	0 34	+ 1	—	—
Maebasi	0·4	254	0 19	0	0 33	0	—	—
Kakioka	0·6	116	0 21	+ 1	0 34	- 1	—	—
Titibu	0·6	213	0 22	+ 2	0 35	0	—	—
Tukubasan	0·6	120	0 21 _a	+ 1	0 35	0	—	—
Mitaka	0·8	177	0 22	0	0 38	0	—	—
Mito	0·8	99	0 22 _a	0	0 38	0	—	—
Tokyo Cen. Met. Ob.	0·8	165	0 21 _a	- 1	0 39	+ 1	—	—
Tokyo Imp. Univ.	0·8	165	0 22	0	0 39	+ 1	—	—
Komaba	0·9	170	0 21	- 1	0 38	- 1	—	—
Nagano	1·0	279	0 24 _a	+ 1	0 42	+ 1	—	—
Yokohama	1·1	174	0 25 _a	+ 1	0 42	- 1	—	—
Hunatu	1·2	211	0 24 _k	- 1	0 41	- 4	—	—
Kamakura	1·2	178	0 22	- 3	0 40	- 5	—	—
Kohu	1·2	221	0 25	0	0 42	- 3	—	—
Koyama	1·2	200	0 22	- 3	0 40	- 5	—	—
Onahama	1·2	69	0 29	+ 4	0 45	0	—	—
Togane	1·2	143	0 22	- 3	0 42	- 3	—	—
Tyosi	1·3	125	0 28 _a	+ 2	0 48	+ 2	—	—
Hokusima	1·5	32	0 31 _k	+ 2	0 52	+ 2	—	—
Kiyosumi	1·5	158	0 22	- 7	0 42	- 8	—	—
Misima	1·5	198	0 27 _k	- 2	0 47	- 3	—	—
Mera	1·6	170	0 29 _k	- 1	0 51	- 1	—	—
Osima	1·7	183	0 31 _k	0	0 53	- 1	—	—
Aikawa	1·8	327	0 32	0	0 56	0	—	—
Toyama	1·8	276	0 34	+ 2	1 0	+ 4	—	—
Susaki	1·9	193	0 32	- 1	0 55	- 3	—	—
Sendai	2·1	32	0 38 _k	+ 2	1 3	0	—	—
Hamamatu	2·3	219	0 39	+ 1	1 6	- 1	—	—
Nagoya	2·3	237	0 40	+ 2	1 8	+ 1	—	—
Wazima	2·3	293	0 37 _a	- 1	1 7	0	—	—
Gihu	2·5	244	0 40 _k	- 1	1 7	- 5	—	—
Hikone	2·9	245	0 46 _k	0	1 19	- 2	—	—
Mizusawa	2·9	26	0 48	+ 2	1 25	+ 4	—	—
Kameyama	3·0	236	0 46 _k	- 2	1 21	- 3	—	—
Akita	3·2	8	0 52 _a	+ 2	1 33	+ 5	—	—
Hatidyojima	3·4	175	0 51 _k	- 2	1 29	- 4	—	—
Kyoto	3·4	245	0 52 _k	- 1	1 27	- 6	—	—
Osaka	3·4	238	0 53	0	1 35	+ 2	—	—
Owase	3·6	229	0 54	- 2	1 28	-10	—	—
Miyako	3·7	31	0 54	- 3	1 36	- 4	—	—
Toyooka	3·9	258	0 59	0	1 42	- 3	—	—
Kobe	4·0	244	0 58	- 3	1 36	-11	—	—
Wakayama	4·2	239	1 3 _k	0	1 41	-11	—	—
Siomisaki	4·3	227	1 12 _k	+ 7	1 42	-13	—	—
Sumoto	4·3	242	1 4	- 1	1 51	- 4	—	—
Aomori	4·4	13	1 11	+ 5	1 38	-19	—	—
Hatinohe	4·4	21	1 4	- 2	—	—	—	—
Kotl	5·7	241	1 23	- 1	2 26	- 2	—	—

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Mori	5.7	8	1 24	0	2 33	+ 5	—	—
Hamada	6.3	258	1 48	pP	—	—	—	—
Sapporo	6.7	12	1 51	pP	—	—	—	—
Kumamoto	8.1	246	1 57	+ 1	—	—	—	—
Miyazaki	8.1	238	1 0	-56	—	—	—	—
Nemuro	8.3	33	1 58	- 1	3 20	-11	—	—
Vladivostok	8.9	321	e 2 6	- 1	e 3 39	- 7	—	4.8
Titizima	9.7	166	2 11	- 6	3 49	-16	—	—

Long waves were also recorded at Sverdlovsk.

Nov. 26d. Readings also at 1h. (Palomar, La Jolla, near Mizusawa, Mount Wilson (2), Pasadena (2), Bozeman, Sitka, College, Tinemaha, Haiwee (2), and Riverside (2)), 2h. (Butte), 6h. (Wellington and New Plymouth), 9h. (near Branner, Lick, Berkeley, Ferndale, Phu-Lien, and Zi-ka-wei), 10h. (Potsdam, Rome, De Bilt, Bombay, Agra, and Calcutta), 16h. (near Tananarive).

Nov. 27d. 14h. 41m. 25s. Epicentre $3^{\circ}2S$. $151^{\circ}0E$.

Intensity VI at Baining, IV-V at Rabaul.

Epicentre $3^{\circ}2S$. $151^{\circ}0E$. (Gutenberg).

$3^{\circ}3S$. $151^{\circ}0E$. (U.S.C.G.S.).

See Annales de l'Institut de Physique du Globe de Strasbourg, Tome V, 2eme partie, Seismologie, 1940. Strasbourg, 1948, p. 16.

$$A = -.8733, B = +.4841, C = -.0555; \quad \delta = +9; \quad h = +7; \\ D = +.485, E = +.875; \quad G = +.048, H = -.027, K = -.999.$$

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	E.	24.2	175	i 5 11	- 8	i 9 29	- 6	—	—
	N.	24.2	175	i 5 5	-14	i 9 23	-12	—	—
Riverview		30.5	180	e 6 12	- 5	i 11 8	-10	i 7 12	PPP e 14.4
Sydney		30.5	180	e 6 17	0	e 10 53	-25	e 7 17	PPP e 14.8
Adelaide		33.6	199	i 12 5	S	(i 12 5)	- 1	13 41	SS (i 19.0)
Manila		34.6	302	i 6 54 _a	+ 1	12 24	+ 2	—	—
Apia		38.2	108	e 7 22	- 1	e 13 16	- 1	i 8 51	PP e 19.3
Miyazaki		39.6	334	e 7 34	- 1	13 17	-21	—	—
Yokohama		39.9	345	e 7 40	+ 3	e 17 23	SSS	—	e 23.3
Tokyo Cen. Met. Ob.		40.1	346	e 7 58	+19	—	—	—	—
Osaka		40.3	340	7 21	-19	12 16	?	—	—
Nagoya		40.4	343	7 34	- 7	—	—	—	—
Matuyama		40.7	336	7 41	- 3	14 15	+20	—	—
Arapuni		41.4	150	—	—	14 17	+12	17 35	SS
Hukuoka		41.4	334	7 50	0	14 9	+ 4	e 17 18	SS 19.9
Hamada		41.9	336	7 59	+ 5	14 15	+ 2	9 33	PP 18.0
Sendai		42.3	349	7 54	- 3	14 6	-13	9 36	PP 21.0
Mizusawa		43.1	349	8 3	- 1	14 57	+27	—	—
Wellington		43.5	154	8 5 _a	- 2	14 30	- 6	8 25	pP 21.1
Perth		43.7	225	8 22	+14	14 27	-12	9 52	PP 21.9
Christchurch		44.5	158	8 9 _a	- 6	14 43	- 8	i 10 21	PPP 21.3
Mori		46.1	350	8 28	0	—	—	—	—
Zinsen		46.4	333	8 30	0	15 22	+ 4	10 4	P _c P 18.9
Phu-Lien		49.6	301	e 8 54	- 1	16 8	+ 5	—	—
Honolulu		55.7	62	i 10 2	+22	i 17 27	+ 1	e 11 17	PP e 21.4
Calcutta	N.	66.2	297	e 10 53	+ 1	i 19 38	- 2	e 20 49	S _c S i 30.6
Irkutsk		67.8	301	11 0	- 2	19 52	- 8	—	— 34.6
Colombo	E.	71.7	278	11 26	0	—	—	—	—
Hyderabad	E.	74.4	289	11 41	- 1	21 41	PS	14 38	PP 37.2
Kodaikanal	E.	74.4	282	i 11 53 _a	+11	i 21 33	+17	i 21 59	PS 35.9

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.
Rockefeller Mt.	79.8	170	e 12	3	- 9	22	5	- 9	—	—	e 32.6
Bombay	79.9	290	i 12	11	- 1	27	35	SS	e 14	55	PP e 40.0
Semipalatinsk	80.3	322	—	16	+ 2	—	—	—	—	—	—
Almata	80.7	315	e 12	20	+ 4	—	—	—	—	—	—
College	81.0	22	—	—	—	e 22	25	- 2	e 28	0	SS e 33.6
Frunse	82.2	313	e 12	31	+ 7	—	—	—	—	—	—
Sitka	84.0	32	e 13	2	+29	e 22	57	0	e 15	48	PP e 37.8
Tchimkent	85.8	312	i 12	39	- 3	—	—	—	—	—	—
Tashkent	85.9	311	e 12	40	- 3	e 23	9	[+ 2]	—	—	—
Samarkand	87.4	309	e 12	49	- 1	—	—	—	—	—	36.3
Ukiah	88.7	51	—	—	—	e 23	44	+ 1	e 29	41	SS e 36.1
Berkeley	89.4	53	—	—	—	e 23	33	[+ 4]	i 29	44	SS e 40.9
Victoria	89.4	42	—	—	—	i 23	58	+ 9	—	—	37.6
Santa Clara	89.6	53	i 13	3	+ 2	e 25	13	PS	—	—	e 38.9
Santa Barbara	z. 91.2	56	e 13	11	+ 3	—	—	—	—	—	—
Pasadena	92.5	56	e 13	10	- 4	e 24	24	+ 7	e 16	56	PP e 38.3
Tinemaha	92.5	56	i 13	13	- 1	—	—	—	—	—	—
Mount Wilson	z. 92.6	56	e 13	11	- 4	—	—	—	e 16	57	PP
Haiwee	z. 92.7	54	i 13	17	+ 2	—	—	—	—	—	—
Sverdlovsk	92.9	326	—	—	—	24	19	- 1	24	45	S _c S 37.9
Riverside	93.1	56	i 13	12k	- 5	—	—	—	e 16	55	PP
La Jolla	z. 93.2	57	i 13	17	0	—	—	—	—	—	—
Palomar	z. 93.5	56	e 13	18	- 1	—	—	—	—	—	—
Tucson	98.6	58	i 13	46	+ 4	—	—	—	—	—	e 40.9
Baku	100.6	310	14	0	+ 9	e 24	0	[-29]	e 18	1	PP 45.6
Tananarive	E. 101.7	250	e 21	40	?	27	7	PS	32	46	SS e 41.6
Moscow	105.7	327	e 18	30	PP	e 25	58	{+23}	27	43	PS
Pulkovo	107.8	332	e 18	49	PP	e 25	1	[-2]	e 28	6	PS 45.1
Ksara	112.6	304	e 19	21	PP	e 29	4	PS	e 21	53	PPP
Upsala	113.2	336	—	—	—	e 39	35	SSS	—	—	e 48.6
Warsaw	116.0	328	—	—	—	e 34	35?	SS	—	—	e 56.6
Helwan	117.2	301	i 19	59 _a	PP	e 29	29	PS	e 22	50	PPP
Sofia	119.2	317	e 18	35	[-16]	—	—	—	e 20	11	PP 61.6
Potsdam	119.8	332	i 20	18	PP	e 29	53	PS	i 22	54	PPP e 48.6
Prague	120.7	329	—	—	—	32	35	PPS	e 40	59	SSS e 59.6
De Bilt	123.6	335	—	—	—	e 37	35	SS	—	—	e 54.6
Stuttgart	124.1	330	e 20	49	PP	e 37	23	SS	e 32	47	PPS e 61.6
Uccle	124.9	335	—	—	—	e 37	59	SS	e 41	23	SSS e 56.6
Rome	126.5	322	e 19	1	[-4]	e 27	59	{+2}	e 21	1	PP e 55.4
Paris	127.2	334	—	—	—	e 24	35?	?	e 33	40	PPS 60.6
Clermont-Ferrand	129.2	331	19	11	[+1]	—	—	—	—	—	—
Huancayo	131.5	109	i 22	47	PP	e 33	41	PPS	e 39	32	SS e 54.2
Bermuda	135.6	45	e 21	57	PP	e 39	27	SS	—	—	e 55.7
La Paz	136.7	118	e 19	38	[+14]	26	19	[-14]	22	55	PP 67.6
Toledo	137.1	331	e 19	58	[+33]	25	15	?	23	46	PP
Almeria	138.6	327	19	30	[+2]	26	35	[-2]	22	55	PKS
Granada	138.9	328	i 19	27	[-2]	—	—	—	i 22	13	SKP e 82.7
Lisbon	140.3	335	19	34	[+3]	—	—	—	22	30	PP 71.9
San Juan	140.7	65	e 22	39	PP	—	—	—	—	—	e 65.7

Additional readings:—

Sydney e = +12m.47s.

Adelaide PP = +13m.47s. L given as S.

Apia eP_cPN = +9m.41s., SSN = +15m.49s.

Mizusawa S = +15m.1s.

Wellington sPZ = +8m.40s., P_cPZ = +9m.40s., pP_cPZ = +10m.11s., i = +10m.51s.,

sS = +15m.2s., i = +16m.55s., SS = +17m.45s., sSS? = +18m.40s., L_q = +19m.5s.

Perth SS = +17m.48s., SSS = +19m.37s., i = +20m.58s.

Christchurch L_q = +17m.53s.

Zinsen PP = +10m.26s., PS = +15m.42s.

Honolulu e = +18m.15s. and +20m.4s.

Calcutta eSSN = +23m.45s.

Hyderabad PSE = +22m.6s., SSE = +26m.19s.

Kodaikanal SSE = +26m.20s.

Bombay eP = +12m.15s., iE = +12m.35s., L_qE = +33m.56s.

Ukiah e = +24m.45s.

Berkeley iSN = +23m.51s., iE = +25m.51s., eSSE = +29m.49s., eN = +36m.23s.

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Mount Wilson iZ = +13m.14s.
Sverdlovsk SS = +30m.41s.
Tucson i = +14m.4s., e = +18m.47s. and +22m.10s.
Pulkovo ePPS = +29m.1s., eSS = +34m.5s.
Warsaw eN = +34m.52s.
Helwan PKKPZ = +20m.22s., eE = +20m.35s., +23m.41s., and +31m.17s.
Potsdam ePSN = +30m.17s., iPPSE = +31m.20s., iSSN = +37m.12s., iSSE = +37m.15s., iN = +44m.8s.
Prague e = +34m.29s.
Stuttgart eSSSE = +42m.11s.
Rome eE = +20m.0s. and +20m.43s., eN = +21m.23s., iE = +24m.54s., eSIN = +29m.29s., iPSN = +30m.57s., eSSE = +37m.36s., iSS = +38m.0s., iE = +40m.1s.
Huancayo e = +29m.36s., eSSS = +39m.53s., e = +45m.21s. and +48m.24s.
Bermuda e = +23m.33s., +30m.17s., +36m.9s., +42m.57s., and +48m.17s.
La Paz SSN = +42m.9s.
Almeria PKP₁ = +21m.7s., PP = +24m.55s., PPP = +29m.9s., SKKS = +31m.36s., PPS = +38m.36s., SS = +45m.57s., SSS = +52m.59s.
Granada iPP = +24m.32s.
Long waves were also recorded at Jena, Hamburg, Bozeman, Scoresby Sund, Bucharest, Seattle, Ferndale, Bergen, Salt Lake City, and San Fernando.

Nov. 27d. Readings also at 0h. (College), 4h. (Helwan), 7h. (La Paz), 8h. (near Bucharest, Sofia, near Andijan, Samarkand, Frunse, Tchimkent, and Almata), 17h. (near Lick), 19h. (Balboa Heights), 20h. (Huancayo), 21h. (San Juan and Huancayo), 22h. (near Granada and Almeria (2)).

Nov. 28d. Readings at 8h. (near Berkeley), 11h. (near Manila), 14h. (New Plymouth, Arapuni, Riverside, Tuai, Mount Wilson, Pasadena, Wellington, Riverview, Christchurch, and Sydney), 16h. (Copenhagen), 17h. (Huancayo), 18h. (near Lick (2) and Branner (2)), 20h. (Branner, La Paz, and near Mizusawa), 21h. (Calcutta, Agra, Dehra Dun, Kodaikanal, and Bombay), 22h. (Potsdam, near Samarkand, Almata, Andijan, and Tchimkent).

Nov. 29d. 2h. Local Japanese shock. Tokyo Imperial University gives Epicentre 36°·10N. 140°·23E.

Komaba P = 45m.16s., S = 45m.26s.
Tokyo Imp. Univ. P = 45m.16s., S = 45m.34s.
Kamakura P = 45m.18s., S = 45m.29s.
Kiyosumi P = 45m.18s., S = 45m.32s.
Koyama P = 45m.18s., S = 45m.35s.
Mitaka P = 45m.18s., S = 45m.28s.
Titibu P = 45m.18s., S = 45m.28s.
Tukubasan P = 45m.18s., S = 45m.24s.
Suzaki P = 45m.32s., S = 45m.49s.
Mizusawa eP = 45m.59s., S = 46m.34s.

Nov. 29d. Readings also at 0h. (Tinemaha, Mizusawa, Riverside, Mount Wilson, and Pasadena), 3h. (near Mizusawa), 4h. (near Mizusawa, La Paz (2), Balboa Heights (2), San Juan, and Huancayo), 5h. (La Paz), 9h. (near Branner), 12h. (near Tananarive, and near Mizusawa), 13h. (Colombo, Calcutta, Riverside, Mount Wilson (2), Pasadena (2), and Tinemaha (2)), 14h. (Sydney), 19h. (La Paz), 22h. (Riverview and Wellington), 23h. (Wellington, Arapuni, Tuai, New Plymouth, and Christchurch).

Nov. 30d. Readings at 0h. (near Almeria and Granada), 2h. (Mizusawa, Mount Wilson, Pasadena, Huancayo, Tinemaha, and Riverside), 3h. (Andijan, Tashkent, and Sverdlovsk), 4h. (near Apia, Mizusawa, and La Paz), 8h. (Arapuni), 10h. (La Paz, Christchurch, Wellington (2), near Huancayo, Riverview, New Plymouth (2), Arapuni (2), Tuai (2), and Tucson), 11h. (Pasadena), 12h. (Branner), 16h. (San Francisco, Christchurch, Riverview, New Plymouth, Wellington, Arapuni, and Tuai), 20h. (near Lick), 21h. (Haiwee, Christchurch, Tinemaha, Riverside, Pasadena, Tucson, Huancayo, and La Paz), 22h. (New Plymouth, Wellington, Tuai, Christchurch, Riverview, and Arapuni).

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Dec. 1d. 17h. Local European shock.

Bucharest iPZ = 13m.26s., iSEN = 13m.45s.
 Sofia ePEN = 14m.6s., eSEN = 14m.34s.
 Zurich eP = 15m.46s.
 Stuttgart ePZ = 15m.51s.
 Basle eP = 15m.56s.
 Clermont-Ferrand iP = 16m.27s.

Dec. 1d. 21h. 10m. 28s. Epicentre 7°·0N. 82°·7W. (as on 1938 Sept. 20d.).

A = +·1261, B = -·9846, C = +·1211; $\delta = 0$; $h = +7$;
 D = -·992, E = -·127; 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 0 55	- 5	e 1 17	-28	—	1·7
San Juan	19·7	54	e 4 30	- 4	i 8 18	+ 8	e 4 58 PP	e 9·4
Huancayo	20·3	158	i 4 41	+ 1	e 8 23	0	i 9 8 SSS	i 10·2
La Paz	27·4	147	i 5 50 _a	+ 1	i 11 25	SS	6 37 PP	15·4
St. Louis	32·2	348	e 6 31	- 1	e 11 47	+ 2	e 7 27 PP	—
Philadelphia	33·5	11	—	—	e 12 5	0	e 14 14 SS	e 15·0
Tucson	36·3	319	i 7 8	+ 1	e 12 41	- 7	i 8 32 PP	e 15·5
Ottawa	38·7	8	e 7 27	0	e 13 32	+ 7	—	e 17·5
Seven Falls	41·3	12	—	—	e 14 6	+ 2	—	e 17·5
Riverside	41·8	316	i 7 52	- 1	—	—	—	—
Mount Wilson	42·4	316	i 7 58	0	—	—	—	—
Pasadena	42·4	316	i 7 58	0	e 14 31	+11	—	e 19·3
Salt Lake City	42·5	327	—	—	e 15 7	+45	—	e 19·0
Haiwee	43·3	318	i 8 8	+ 3	—	—	—	—
Santa Barbara	43·7	313	e 8 10	+ 2	—	—	—	—
Tinemaha	44·1	318	e 8 12	0	—	—	—	—
Fresno	44·9	317	e 8 20	+ 2	—	—	—	—
Berkeley	47·2	317	—	—	e 12 44	?	—	—
Victoria	53·8	328	—	—	e 17 13	+12	—	e 24·3
Clermont-Ferrand	82·1	45	e 12 22	- 2	—	—	—	24·5
Uccle	82·8	40	—	—	e 22 3	-42	e 23 51 PS	e 36·5
De Bilt	83·2	38	—	—	e 28 32	SS	—	—
Sverdlovsk	109·7	20	—	—	e 28 28	PS	34 20 SS	44·5
Baku	115·8	39	e 18 47	[+ 3]	e 29 51	PS	—	56·9

Additional readings:—

San Juan i = +6m.53s. and +8m.48s.
 Huancayo e = +8m.10s., iS = +8m.28s.
 St. Louis ePPPE = +7m.42s., eE = +11m.32s., eN = +11m.42s., eE = +14m.14s.,
 iE = +14m.46s., eE = +14m.49s.
 Philadelphia e = +14m.48s.
 Tucson i = +7m.12s., +7m.23s., +7m.27s., +7m.51s., and +9m.10s.
 Berkeley eSE = +12m.54s.
 Uccle e = +28m.17s.

Long waves were also recorded at Tashkent, Bozeman, Chicago U.S.C.G.S., Ukiah, Scoresby Sund, and Potsdam.

Dec. 1d. Readings also at 5h. (near Mizusawa), 9h. (La Paz (2)), 15h. (Tucson, near Pasadena, Mount Wilson, and Riverside), 16h. (near La Paz), 17h. (Bermuda), 18h. (Mount Wilson), 19h. (near Branner, Haiwee, Pasadena, Riverside, Tinemaha, and Mount Wilson), 20h. (Balboa Heights and Toledo), 21h. (Pasadena, Riverside, Tinemaha, Mount Wilson, La Paz, and near Balboa Heights).

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Dec. 2d. 12h. 8m. 4s. Epicentre $40^{\circ}5N$. $76^{\circ}3E$. (as on 1938 Nov. 24d.).

$A = +.1806$, $B = +.7409$, $C = +.6469$; $\delta = +3$; $h = -2$;
 $D = +.972$, $E = -.237$; $G = +.153$, $H = +.628$, $K = -.763$.

		Δ	Az.	P.		O-C.	S.		O-C.	Supp.		
				m.	s.		m.	s.		m.	s.	
Frunse		2.7	332	i 0	44	- 1	i 1	29	S_g	i 0	48	P^*
Almata		2.8	10	e 0	42	- 5	1	10	-12	i 0	49	P^*
Andijan		3.0	275	e 0	55	P^*	e 1	27	0	e 1	3	P_g
Tchimkent		5.3	292	e 1	25	+ 3	2	44	S^*	1	43	P_g
Samarkand		7.2	268	e 1	49	0	e 3	56	S_g	e 2	29	P_g
Agra	E.	13.4	172	—	—	—	e 5	19	-26	—	—	—
Calcutta	N.	20.6	147	—	—	—	e 8	19	-10	—	—	—
Branner		100.6	15	e 21	58	PKS	—	—	—	—	—	—
Lick		100.8	15	e 22	2	PKS	—	—	—	—	—	—
Tinemaha	z.	101.6	11	e 22	31	PKS	—	—	—	—	—	—
Fresno	N.	101.7	13	e 22	31	PKS	—	—	—	—	—	—
Mount Wilson	z.	104.5	12	—	—	—	e 24	31	[-17]	—	—	—
Pasadena	z.	104.5	12	e 22	55	?	—	—	—	—	—	—

Additional readings:—

Frunse $iP_g = +52s$.
 Almata $iS_g = +1m.25s$.
 Andijan $iS^* = +1m.38s.$, $iS_g = +1m.51s$.
 Tchimkent $S_g = +3m.4s$.
 Lick $eE = +22m.30s$.
 Fresno $eN = +23m.13s$.

Dec. 2d. 13h. 58m. 48s. Epicentre $38^{\circ}0S$. $73^{\circ}0W$.

$A = +.2310$, $B = -.7555$, $C = -.6131$; $\delta = +3$; $h = -1$;
 $D = -.956$, $E = -.292$; $G = -.179$, $H = +.586$, $K = -.790$.

		Δ	Az.	P.		O-C.	S.		O-C.	L.
				m.	s.		m.	s.		
La Plata	E.	12.5	80	3	7 _k	+ 5	5	42	SSS	6.9
	N.	12.5	80	3	11 _a	+ 9	5	33	SS	6.8
La Paz	N.	21.8	15	i 4	55 _a	- 1	i 8	52	0	11.0
Huancayo		25.9	356	e 5	33	- 2	i 10	16	+12	i 11.6
Rio de Janeiro		29.6	68	e 6	12	+ 3	e 10	12	-52	e 14.8
Riverside	z.	82.6	323	e 12	25	- 1	—	—	—	—
Pasadena		83.1	323	e 12	26	- 3	—	—	—	e 41.5
Mount Wilson	z.	83.2	323	e 12	26	- 3	—	—	—	—
Tinemaha	z.	85.6	325	e 12	41	0	—	—	—	—

Additional readings:—

La Plata $N = +5m.57s$.
 Huancayo $e = +5m.49s$. and $+9m.44s$.
 Long waves were also recorded at Butte, Bozeman, Potsdam, Uccle, and De Bilt.

Dec. 2d. Readings also at 1h. (La Paz), 3h. (near Manila), 9h. (Tinemaha), 10h. (Riverside, Haiwee, Huancayo, Pasadena, Mount Wilson, Tinemaha, and La Paz (2)), 14h. (Christchurch), 18h. (near New Plymouth, Christchurch, Wellington, and La Plata), 19h. (La Paz).

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Dec. 3d. 6h. 32m. 38s. Epicentre 4°·5N. 125°·5E.

A = -·5790, B = +·8117, C = +·0779; $\delta = +17$; $h = +7$;
D = +·814, E = +·581; G = -·045, H = +·063, K = -·997.

	Δ °	Az. °	P.		O-C.	S.		O-C.	Supp.		L.	
			m.	s.	s.	m.	s.	m.	s.	m.		
Manila	11·0	336	2	44	+ 2	5	1	SS	—	—	—	
Phu-Lien	24·5	313	e 5	27	+ 5	—	—	—	—	—	—	
Calcutta	N. 40·2	301	e 9	0	PP	i 13	58	+10	—	—	—	
Colombo	E. 45·5	275	e 8	52	+29	—	—	—	—	—	—	
Agra	E. 50·5	302	e 9	6	+ 4	16	12	- 4	—	—	25·0	
Almata	57·6	320	e 9	55	+ 1	—	—	—	—	—	—	
Andijan	59·7	315	e 10	10	+ 1	—	—	—	—	—	—	
Tashkent	62·0	315	e 10	24	0	e 18	46	- 2	—	—	31·5	
Tchimkent	62·2	316	10	26	0	18	55	+ 4	—	—	—	
Samarkand	63·2	312	10	33	+ 1	—	—	—	—	—	—	
Sverdlovsk	72·7	328	e 11	31	- 1	e 20	57	0	—	—	32·4	
Huancayo	158·1	112	—	—	—	e 30	1	{ -61}	e 36	56	PPS	—
La Paz	N. 162·1	133	e 20	15	[+12]	—	—	—	—	—	—	

Agra also gives $i = +9m.12s.$

Long waves were also recorded at Vladivostok, Baku, Potsdam, Uccle, and De Bilt.

Nov. 3d. Readings also at 4h. (La Plata), 6h. (San Juan, Tucson, near Balboa Heights, Tinemaha, Mount Wilson, Pasadena, La Paz, and Riverside), 7h. (Riverside, Pasadena and Mount Wilson), 8h. (Huancayo), 9h. (Tinemaha and Mount Wilson), 11h. (near Apia), 13h. (near Mizusawa), 14h. (Salt Lake City, College, Butte, Bozeman, Tinemaha, Mount Wilson, Riverside, and Pasadena), 17h. (near Mizusawa), 20h. (La Paz).

Dec. 4d. 13h. 5m. 42s. Epicentre 3°·5S. 131°·5E.

A = -·6614, B = +·7476, C = -·0606; $\delta = +3$; $h = +7$;
D = +·749, E = +·663; G = +·040, H = -·045, K = -·998.

	Δ °	Az. °	P.		O-C.	S.		O-C.	Supp.		L.	
			m.	s.	s.	m.	s.	m.	s.	m.		
Manila	20·8	330	i 4	44k	- 1	i 8	39	+ 6	—	—	—	
Brisbane	31·5	141	e 6	12	-14	i 11	42	+ 8	—	—	—	
Perth	31·9	205	6	39	+10	11	56	+16	7	53	PPP	16·3
Adelaide	32·0	169	i 11	52	S	(i 11	52)	+10	13	3	SS	(17·4)
Phu-Lien	34·3	316	e 6	48	- 2	e 12	10	- 7	—	—	—	
Riverview	35·3	151	e 7	8	+ 9	e 15	7	SS	i 8	31	PPP	e 18·7
Sydney	35·3	151	e 7	48	PP	e 13	0	+27	—	—	—	e 18·9
Osaka	38·1	6	7	22	0	13	14	- 2	8	51	PP	20·7
Gihu	39·0	9	7	32	+ 2	13	25	- 4	—	—	—	—
Yokohama	39·5	11	7	33	- 1	—	—	—	—	—	—	—
Oiwake	40·2	10	7	56	+16	—	—	—	—	—	—	—
Zinsen	41·0	354	7	42	- 4	13	52	- 7	8	35	pP	17·4
Sendai	42·4	12	7	52	- 6	—	—	—	—	—	—	—
Mizusawa	43·3	12	8	15	+10	14	20	-13	—	—	—	—
Vladivostok	46·4	1	e 8	35	+ 5	i 15	19	+ 1	—	—	—	19·2
Calcutta	N. 49·5	304	e 8	57	+ 3	i 16	2	0	e 9	19	pP	—
Colombo	N. 52·6	281	9	15	- 3	16	38	- 6	—	—	—	20·6
Arapuni	53·0	136	—	—	—	e 17	48	PPS	—	—	—	29·3
Christchurch	53·9	143	8	7	?	17	15	+13	17	34	S _c S	30·1
Wellington	54·0	140	6	45	?	16	48	-15	9	39?	PP	29·3
Kodaikanal	E. 55·5	285	e 9	37	- 2	i 17	30	+ 5	—	—	—	26·0
Hyderabad	56·3	293	9	39	- 6	17	26	- 8	17	40	PS	27·5
Agra	E. 59·9	305	10	4	- 6	i 18	8	-13	e 12	14	PP	28·0
Irkutsk	60·1	341	10	11	0	—	—	—	—	—	—	29·3
Bombay	61·9	293	e 10	18	- 6	e 18	34	-13	i 12	36	PP	30·3

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.
Almata	67.6	320	e 11	2	+ 1	—	—	—	—	—	—
Frunse	68.9	319	e 11	30	+21	20	29	+16	—	—	—
Andijan	69.5	316	e 11	16	+ 4	20	32	+12	—	—	—
Tashkent	71.9	316	e 11	24	- 3	i 20	41	- 7	—	—	35.3
Tchimkent	72.0	317	e 11	24	- 4	—	—	—	14	42	PP
Samarkand	73.0	313	11	33	0	—	—	—	—	—	—
Honolulu	73.4	67	—	—	—	e 21	19	+14	—	—	e 34.6
Sverdlovsk	82.6	329	12	26	0	22	37	- 6	—	—	34.3
Rockefeller Mt.	83.1	168	e 12	39	+10	e 22	44	- 4	—	—	e 40.3
Tananarive	83.2	252	e 12	32	+ 3	e 23	0	+11	e 23	23	PS e 41.2
Baku	85.9	310	12	47	+ 4	23	12	- 4	—	—	43.3
College	89.2	25	—	—	—	e 23	56	+ 9	e 24	53	PS e 34.3
Piatigorsk	91.3	313	13	0	- 9	24	3	- 3	—	—	—
Moscow	95.1	325	e 13	31	+ 5	24	29	-10	e 17	26	PP
Helwan	100.5	298	e 9	30	?	e 24	48	[+19]	—	—	—
Victoria	102.6	41	—	—	—	e 24	54	[+15]	e 33	24	SSP 47.3
Ukiah	104.0	52	—	—	—	e 34	41	?	—	—	e 47.6
Upsala	104.8	331	—	—	—	e 28	18?	PPS	e 32	18?	?
Warsaw	105.2	322	—	—	—	e 33	18?	SS	—	—	e 52.3
Cape Town	106.9	232	—	—	—	25	18?	[+19]	34	18	SSP
Pasadena	108.7	55	e 14	38	P	—	—	—	e 18	24	PP e 49.3
Mount Wilson	z. 108.8	55	e 14	38	P	—	—	—	e 18	30	PP
Riverside	z. 109.4	55	e 14	44	P	—	—	—	e 19	4	PP
Potsdam	109.8	325	e 19	18	PP	e 29	18	PPS	—	—	e 43.3
Prague	109.8	322	—	—	—	e 34	18	SS	—	—	e 55.3
Bozeman	111.5	42	—	—	—	e 28	55	PS	e 39	17	SSS e 52.3
Triest	111.7	317	—	—	—	e 25	47	[+28]	e 29	55	PPS
Stuttgart	n. 113.5	322	—	—	—	e 28	54	PS	—	—	e 57.3
Rome	113.7	313	e 19	17k	PP	e 27	11	{+40}	e 22	26	SKP e 56.4
De Bilt	114.4	327	—	—	—	e 30	18	PPS	e 35	18	SS e 54.3
Tucson	115.1	56	e 18	53	[+10]	e 28	13	?	e 19	51	PP e 52.1
Clermont-Ferrand	118.5	321	e 20	18?	PP	—	—	—	—	—	e 72.3
Toledo	125.9	317	e 19	24	[+20]	31	7	PS	21	9	PP 53.0
Granada	126.9	315	e 20	39	PP	28	18	{+19}	21	37	PP e 72.2
Lisbon	129.9	319	24	44?	PPP	e 41	29?	?	—	—	65.7
Huancayo	149.2	120	e 19	59	[+13]	e 44	4	SSP	e 22	59	PP e 76.6
La Paz	152.2	136	20	10	[+19]	43	46	SS	24	13	PP 76.3

Additional readings:—

Manila iE = +6m.5s., iN = +7m.31s.
 Brisbane ePE = +6m.30s.
 Perth PPP = +8m.13s., i = +9m.58s., SSS = +13m.53s.
 Adelaide P_cP = +14m.9s., i = +14m.49s.; all phases wrongly identified.
 Riverview iEN = +11m.9s., eN = +13m.18s., iN = +16m.44s.
 Zinsen PP = +9m.38s., S_cS = +17m.56s.
 Calcutta esSN = +16m.43s.
 Christchurch L_q = +24m.53s.
 Wellington PPPZ = +11m.28s., i?Z = +16m.3s., SS = +21m.38s., SSS = +24m.18s.,
 L_q = +25.8m.
 Hyderabad S_cSN = +19m.29s., SSE = +21m.35s.
 Agra iE = +14m.47s., S_cS = +20m.4s., SS = +22m.5s., SSS = +23m.35s.
 Bombay iN = +18m.49s., iS_cSE = +20m.38s., eSSEN = +23m.9s., L_qE = +27m.46s.
 Rockefeller Mt. eL = +29m.46s.
 Tananarive eSSE = +27m.37s., eE = +32m.1s.
 College e = +33m.42s.
 Moscow eS = +24m.59s.
 Helwan eZ = +15m.57s., eEN = +25m.54s.
 Bozeman e = +43m.10s.
 Rome SSN = +36m.41s.
 De Bilt e = +39m.18s.
 Tucson e = +20m.42s., iPS = +28m.52s.
 Granada PPP = +24m.35s., S = +30m.8s.
 Huancayo e = +29m.2s. and +35m.55s.
 Long waves were also recorded at San Juan, Santa Clara, Pulkovo, Bergen, Aberdeen, San Fernando, Hamburg, Sitka, Salt Lake City, Chicago (U.S.C.G.S.), Berkeley, and East Machias.

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Dec. 4d. Readings also at 0h. (Riverside, Mount Wilson, Pasadena, and Tucson), 1h. (Mount Wilson, Pasadena, and Tinemaha), 2h. (Almeria), 4h. (Mount Wilson, Pasadena, Tinemaha, and Riverside), 5h. (near Mizusawa), 7h. (Tinemaha and Mount Wilson), 8h. (Almeria), 10h. (Adelaide), 13h. (near Balboa Heights), 19h. (La Paz, near Huancayo, Tinemaha, Mount Wilson, and Pasadena), 21h. (near Balboa Heights), 22h. (College).

Dec. 5d. Readings at 5h. (near Balboa Heights), 11h. (Tinemaha, Mount Wilson, and Pasadena), 12h. (near Balboa Heights), 17h. (near Branner), 22h. (near La Paz).

Dec. 6d. Readings at 0h. (Sofia), 1h. (near La Paz), 2h. (Haiwee, Riverside, Pennsylvania, Tinemaha, Pasadena, and Mount Wilson), 4h. (Pennsylvania), 9h. (near Sotchi, Grozny, and Erevan), 10h. (near Mizusawa), 19h. (near Bucharest and Sofia), 20h. (Rio de Janeiro, Huancayo, La Plata, Riverside, Tinemaha, Pasadena, Mount Wilson, and La Paz), 23h. (near Balboa Heights).

Dec. 7d. 13h. Probably off coast of Nicaragua.

Balboa Heights ePEN = 21m.0s.
 San Juan eP = 24m.28s., eS = 28m.27s., e = 29m.8s., eL = 30m.13s.
 Huancayo eP = 24m.56s., e = 25m.29s., L = 29m.4s.
 La Paz iPZ = 26m.31s., SZ = 31m.39s., LZ = 36m.42s.
 Tucson iP = 26m.37s.
 Riverside ePZ = 27m.23s.
 Pasadena ePZ = 27m.29s.
 Mount Wilson iPZ = 27m.29s.

Dec. 7d. 22h. 16m. 26s. Epicentre 31°·7N. 115°·1W. (as given by Pasadena).

A = -·3616, B = -·7719, C = +·5229; $\delta = +1$; $h = +7$;
 D = -·906, E = +·424; G = -·222, H = -·474, K = -·852.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		c	c	m. s.	s.	m. s.	s.	m. s.	m.
La Jolla	N.Z.	2·2	303	e 0 36 _a	- 2	i 1 7	+ 1	—	—
Riverside		3·0	320	i 0 48 _k	- 2	i 1 33	S*	—	—
Mount Wilson		3·5	316	i 0 56 _k	- 1	i 1 52	S*	—	—
Pasadena		3·5	316	i 0 56 _k	- 1	i 1 49	S*	—	—
Tucson		3·6	83	i 0 58	0	i 1 41	- 1	i 1 4	P* i 2·0
Haiwee		5·0	332	i 1 18	0	i 2 43	S _g	—	—
Tinemaha		6·0	335	i 1 32 _k	0	i 3 19	S _g	i 1 55	P _g —
Fresno	N.	6·3	324	e 1 45	P*	i 3 19	S*	i 2 7	P _g i 5·3
Lick		7·8	318	e 2 3	+ 5	e 4 6	S*	i 4 12	S _g e 5·7
Santa Clara		8·0	317	—	—	i 4 26	S _g	—	—
Branner		8·1	317	e 2 7	+ 5	i 3 40	+ 5	e 4 32	S _g e 6·6
Berkeley		8·5	318	e 2 6	- 1	e 4 36	S _g	e 2 28	P* e 6·8
San Francisco		8·5	317	e 2 47	P _g	e 3 47	+ 2	e 4 45	S _g —
Salt Lake City		9·4	15	e 2 29	+11	e 4 47	S*	—	— 5·4
Ferndale		11·5	323	—	—	e 6 14	?	—	— e 6·6
Bozeman		14·3	13	(e 3 40)	+14	e 3 40	P	—	— e 7·5
Butte		14·4	7	(e 3 44)	PPP	e 3 44	P	—	— e 8·0
Lincoln		17·4	53	e 4 10	+ 4	e 7 20	+ 1	—	— e 9·3
Florissant		21·4	65	i 4 52	+ 1	e 8 59	+14	—	— i 11·4
St. Louis		21·4	65	i 4 48	- 3	i 9 0	+15	i 5 16	PP e 11·4
Cape Girardeau	E.	21·8	69	e 4 53	- 3	—	—	—	— —
Sitka		29·4	23	e 6 36	PP	—	—	—	— e 17·9
Ottawa		33·3	54	e 6 42	+ 1	—	—	—	— 17·6
Fordham		34·2	63	e 6 48	- 1	—	—	—	— e 19·1

Additional readings:—

Tucson i = +1m.14s.
 Fresno iN = +3m.12s. and +3m.40s.
 Branner ePN = +2m.13s.
 Berkeley ePN = +3m.21s., eZ = +3m.41s., eE = +4m.16s., eN = +4m.19s., eSEN = +4m.42s.
 San Francisco eSN = +4m.48s.
 Bozeman e = +4m.40s.

Florissant eE = +5m.0s., eSE = +9m.3s.
 St. Louis eN = +4m.51s., eE = +4m.54s.

Long waves were also recorded at College, Seattle, Philadelphia, Scoresby Sund, and Ukiah.

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Dec. 7d. Readings also at 1h. (near Lick), 5h. (near Tananarive), 8h. (Mount Wilson, Pasadena), Riverside, Santa Barbara, Tinemaha, near Mizusawa, near New Plymouth, and Wellington), 9h. (Christchurch), 10h. (near La Paz), 11h. (near Mizusawa), 12h. (La Paz), 13h. (near Mizusawa), 14h. (Mount Wilson, Pasadena, Riverside, and Tinemaha), 17h. (Christchurch, near New Plymouth, and Wellington), 18h. (near Branner), 20h. (near Almata, Andijan, and Frunse), 23h. (near Branner).

Dec. 8d. 6h. 10m. 55s. Epicentre $9^{\circ}08'$. $108^{\circ}0E$.

A = -0.3053, B = +0.9395, C = -0.1554; $\delta = +2$; $h = +7$;
D = +0.951, E = +0.309; G = +0.048, H = -0.148, K = -0.988.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Phu-Lien		29.7	357	—	—	e 11 11	+ 5	—	—
Colombo	E.	32.2	298	e 6 35	+ 3	—	—	—	—
Kodaikanal	E.	35.9	302	i 7 16k	+12	i 12 59	+17	—	18.2
Calcutta	N.	36.8	329	e 7 12	+ 1	i 12 53	- 3	i 16 32	SS e 22.5
Bombay		44.4	309	i 8 13	- 1	i 14 59	+10	i 9 59	PP —
Agra	E.	46.2	323	8 24	- 4	15 17	+ 2	18 14	SS 23.3
Brisbane		46.2	119	—	—	i 15 17	+ 2	e 18 11	SS —
Riverview		46.7	129	—	—	e 18 35	SS	e 18 53	SSS e 24.1
Sydney		46.7	129	—	—	e 18 47	SS	—	—
Vladivostok		56.2	21	9 43	- 1	—	—	—	35.5
Almata		59.2	334	e 10 8	+ 3	—	—	—	—
Andijan		59.4	329	e 10 4	- 2	i 18 18	+ 3	—	—
Frunse		60.0	332	—	—	e 18 17	- 6	—	—
Tashkent		61.4	328	10 18	- 2	18 38	- 2	—	—
Samarkand		61.5	324	10 21	0	18 41	- 1	—	—
Tchimkent		62.0	329	10 20	- 4	18 43	- 5	—	—
Baku		72.6	317	e 11 32	+ 1	e 20 57	+ 1	—	36.6
Sverdlovsk		76.2	336	i 11 51	- 1	i 21 35	- 1	—	35.1
Piatigorsk		78.8	318	12 10	+ 4	22 15	+11	—	—
Helwan	z.	83.0	302	i 12 26	- 2	—	—	—	—
Santa Barbara	z.	129.5	52	e 19 11	[0]	—	—	—	—
Tinemaha	z.	129.8	48	e 19 10	[- 1]	—	—	—	—
Haiwee	z.	130.3	49	i 19 13	[+ 1]	—	—	—	—
Mount Wilson	z.	130.9	52	i 19 14	[+ 1]	—	—	—	—
Pasadena	z.	130.9	52	i 19 14	[+ 1]	—	—	—	—
Riverside	z.	131.5	52	i 19 14	[- 1]	—	—	—	—
St. Louis		146.2	25	i 19 58	[+17]	—	—	—	—
Harvard		146.6	358	i 21 41	?	—	—	—	—
La Paz		154.4	188	20 5	[+12]	—	—	—	—

Additional readings:—

Bombay SS = +18m.19s.

Helwan iZ = +12m.38s.

Long waves were also recorded at Huancayo and Wellington.

Dec. 8d. Readings also at 1h. (Tinemaha), 3h. (Sydney, Helwan, Wellington (2), Stuttgart (2), Christchurch, Tinemaha, Brisbane, Mount Wilson (2), Riverview (2), and Riverside (2)), 4h. (La Paz), 5h. (Perth), 12h. (Apia), 17h. (Brisbane, Riverview, and near Berkeley), 18h. (Neuchatel, Tinemaha, Clermont-Ferrand, Pasadena, Haiwee, Mount Wilson, and Riverside), 20h. (near Berkeley, Ferndale, San Francisco, Santa Clara, Lick, and Branner), 22h. (near La Paz), 23h. (Apia and Tinemaha).

Dec. 9d. 17h. Local shock. Suggested epicentre $35^{\circ}83'N$. $140^{\circ}12'E$., Tokyo Imperial University.

Tokyo Imp. Univ. P = 52m.42s., S = 52m.50s.

Komaba P = 52m.44s., S = 52m.52s.

Togane P = 52m.44s., S = 52m.52s.

Tukubasan P = 52m.44s., S = 52m.52s.

Kamakura P = 52m.44s., S = 52m.53s.

Kiyosumi P = 52m.44s., S = 52m.53s.

Mitaka P = 52m.44s., S = 52m.53s.

Titibu P = 52m.44s., S = 52m.56s.

Koyama P = 52m.44s., S = 52m.58s.

Susaki P = 52m.56s., S = 53m.9s.

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Dec. 9d. Readings also at 0h. (near Mizusawa and Tucson), 2h. (near Ferndale), 16h. (Haiwee, Mount Wilson, Pasadena, Riverside, and Tinemaha), 18h. (near La Paz), 20h. (near Ksara), 22h. (La Paz and near Branner).

Dec. 10d. Readings at 0h. (Riverside, Mount Wilson, Tinemaha, Huancayo, and La Paz), 1h. (Sofia and near Bucharest), 8h. (near La Paz), 17h. (Pasadena, Colombo, Stuttgart, Kodaikanal, Haiwee, Riverside, Mount Wilson, and Tinemaha), 19h. (Riverside, Mount Wilson, Tinemaha, and Salt Lake City), 21h. (Pittsburgh).

Dec. 11d. Readings at 1h. (La Paz), 3h. (near La Paz), 8h. (Tucson), 11h. (near Mizusawa), 13h. (near Manila), 18h. (near Branner).

Dec. 12d. Readings at 1h. (near Stuttgart, Ravensburg, Ebingen, Basle, Zurich, and Chur), 2h. (near Mizusawa, near Almata, Frunse, and Samarkand, and Andijan), 7h. (near Balboa Heights), 21h. (near Kew, Stonyhurst, Collmberg, and Clermont-Ferrand).

Dec. 13d. Readings at 1h. (La Plata), 4h. (Huancayo), 5h. (San Juan, Pasadena, Mount Wilson, and Riverside), 8h. (Tucson), 10h. (Tucson), 11h. (Tananarive), 12h. (near Fresno), 14h. (La Paz), 15h. (Bucharest, Sofia, Adelaide, Sydney, Perth, Brisbane, Riverview, and near Wellington), 19h. (near Mizusawa), 20h. (Tual, New Plymouth, Christchurch, and Wellington), 21h. (near Lick).

Dec. 14d. 8h. Undetermined shock.

Pasadena suggests depth 600km.

Berkeley iPZ = 36m.41s. a, epPZ = 38m.50s.

Branner iP = 36m.42s.

Santa Barbara iP = 36m.42s. a

La Jolla eP = 36m.46s., epP = 38m.55s.

Pasadena iP = 36m.46s. a, ipPZ = 38m.55s., isP = 39m.50s.

Mount Wilson iP = 36m.47s. a, ipPZ = 38m.55s., isPEZ = 39m.50s.

Riverside iP = 36m.48s. a, ipPZ = 38m.57s., isPZ = 39m.55s.

Tinemaha iP = 36m.54s. a, epPZ = 39m.3s.

Tucson iP = 37m.10s., i = 37m.16s., 37m.29s., 38m.10s., and 39m.20s., eL = 40.1m.

Stuttgart ePZ = 44m.30s. and 44m.36s.

Dec. 14d. Readings also at 1h. (near Mizusawa), 2h. (De Bilt and Potsdam), 3h. (Ksara, Tucson, and La Paz), 4h. (Santa Barbara, La Jolla, Tinemaha, Riverside, Mount Wilson, and Pasadena), 7h. (Riverview and near La Paz), 12h. (Triest), 13h. (Tinemaha, Pasadena, and Mount Wilson), 14h. (Ksara), 15h. (near Mizusawa), 16h. (Riverview, Adelaide, and Perth), 23h. (Mount Wilson).

Dec. 15d. 23h. Readings for a Central America earthquake.

San Juan eP = 58m.16s., e = 60m.30s., eL = 64m.36s.

St. Louis ePZ = 58m.25s., iPE = 58m.28s., eN = 63m.4s., eSN = 63m.25s., eLN = 65m.36s.

Tucson iP = 58m.44s., i = 59m.5s., iPP = 59m.40s., i = 59m.59s. and 60m.43s., iP_cP = 62m.5s., eS = 63m.35s., L = 67m.22s.

Riverside iPZ = 59m.31s.

Mount Wilson iPZ = 59m.37s., iP_cPZ = 62m.20s.

Pasadena iP = 59m.38s., iP_cPZ = 62m.20s.

Tinemaha iPZ = 59m.52s., eP_cPZ = 62m.24s.

Huancayo iS = 63m.58s., e = 64m.12s. and 65m.29s., eL = 66m.14s.

Dec. 15d. Readings also at 1h. (La Paz), 3h. (near Almata, Andijan, Frunse, Samarkand, and Tchimkent), 5h. (near Tananarive), 8h. (near Rome), 10h. (La Paz and near Manila), 13h. (Riverview), 14h. (near Manila), 15h. (Christchurch, La Paz, and Rockefeller Mt.), 16h. (near Mizusawa), 19h. (near Tananarive).

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Dec. 16d. 9h. 51m. 15s. Epicentre 28°·0N. 57°·0E.

$$A = +.4816, B = +.7416, C = +.4670; \quad \delta = 0; \quad h = +2;$$

$$D = +.839, E = -.545; \quad G = +.254, H = +.392, K = -.884.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bombay	17.1	118	i 4 19	PP	i 7 42	SSS	—	—
Tchimkent	17.6	33	e 4 16	+ 8	—	—	—	—
Grozny	17.8	332	4 8	- 3	7 45	SS	—	—
Andijan	17.9	41	e 4 6	- 6	—	—	—	—
Agra	18.7	88	i 4 23	+ 1	7 56	+ 8	—	—
Ksara	19.0	291	e 4 9	-17	e 8 4	+ 9	—	e 10.4
Piatigorsk	19.5	328	4 25	- 6	—	—	—	—
Frunse	20.6	40	e 4 45	+ 2	—	—	—	—
Almata	22.2	41	e 5 1	+ 1	—	—	—	—
Helwan	22.5	281	5 5	+ 3	9 10	+ 5	5 33	PP
Calcutta	N. 28.8	94	e 7 51	?	e 11 42	+51	e 12 11	SS
Colombo	E. 30.2	130	—	—	e 11 15	+ 2	—	—

Additional readings:—

Ksara e = +4m.30s.

Calcutta eN = +8m.9s., eN = +11m.58s.

Long waves were also recorded at Baku, Tashkent, and Sverdlovsk.

Dec. 16d. Readings also at 1h. (near Mizusawa), 3h. (La Paz), 5h. (near Mizusawa), 9h. (near Mizusawa, Bombay, Agra, Tinemaha, Brisbane, Riverside, Kodaikanal, Christchurch, and Andijan), 11h. (Bermuda), 12h. (La Paz), 16h. (La Paz), 17h. (near Mizusawa), 18h. (near Balboa Heights), 20h. (Calcutta, Bombay, and Agra), 21h. (College and Tinemaha), 22h. (Clermont-Ferrand), 23h. (La Paz).

Dec. 17d. 10h. 52m. 42s. Epicentre 45°·4N. 17°·7E.

$$A = +.6712, B = +.2142, C = +.7096; \quad \delta = -8; \quad h = -4;$$

$$D = +.304, E = -.953; \quad G = +.676, H = +.216, K = -.705.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Kalossa	1.4	38	0 27	0	0 49	+ 3	i 0 32	P _g 0.9
Budapest	2.3	24	0 37	- 3	1 14	S*	0 44	P _g —
Ogyalla	E. 2.5	8	e 1 11	S	(e 1 11)	- 3	—	— 1.8
	N. 2.5	8	e 1 5	S	(e 1 5)	- 9	i 1 19	S* 2.0
Sofia	4.9	123	e 1 18	+ 1	1 2 14	- 1	—	—
Prague	5.2	337	e 2 6?	?	e 2 56	S _g	—	—
Rome	5.2	229	e 2 22	S	(e 2 22)	0	i 2 36	S* i 3.1
Chur	5.9	289	e 1 33	+ 2	e 3 14	S _g	—	—
Bucharest	6.0	98	e 2 3	P _g	i 3 8	S*	—	— 4.5
Ravensburg	6.1	297	e 1 50	P*	e 2 52	+ 7	e 2 4	P _g —
Zurich	6.6	290	e 1 42 _a	+ 1	e 3 7	+ 9	e 3 49	S _g —
Ebingen	6.6	298	e 2 11	P _g	e 3 55	S _g	—	—
Stuttgart	6.7	302	e 1 41	- 1	i 3 2	+ 2	i 1 53	P* —
Jena	6.9	326	e 1 48	+ 3	—	—	e 1 54	P* e 3.2
Basle	7.3	291	e 1 50	0	e 4 17	S _g	—	—
Neuchatel	7.6	287	e 1 54	- 1	—	—	—	—
Tucson	89.7	319	e 13 1	0	e 23 33	[+ 2]	e 18 34	PPP e 31.8

Additional readings:—

Budapest iN = +48s., S_g = +1m.24s.

Ogyalla iE = +1m.37s., iN = +1m.49s.

Prague eS = +3m.11s.

Rome eSEN = +2m.52s.

Bucharest eN = +2m.12s.

Ravensburg eS = +2m.57s., eN = +3m.8s., eE = +3m.22s., eS*E = +3m.29s., eE =

+3m.39s., eS_gEN = +3m.49s.

Stuttgart iP_gZ = +2m.18s., iS*EN = +3m.34s., iS_gEN = +3m.58s., iN \dot{W} = +4m.4s.,

iNE = +4m.9s.

Tucson e = +20m.32s. and +24m.27s.

Ebingen eZ = +3m.0s. and +3m.30s., eE = +3m.41s., eZ = +4m.3s.

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Dec. 17d. 14h. 42m. 5s. Epicentre 1°·0S. 138°·2E.

A = -·7453, B = +·6664, C = -·0173; δ = -14; h = +7;
D = +·667, E = +·745; G = +·013, H = -·012, K = -1·000.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Manila	23·0	313	i 5 10	+ 3	9 28	+14	—	—
Karenko	29·6	330	5 59	-10	—	—	—	—
Brisbane	29·9	152	i 6 7	- 5	i 11 1	- 8	i 13 7	SSS
Miyazaki	33·4	351	6 41	- 1	11 52	-11	—	—
Adelaide	33·8	179	i 6 49	+ 3	i 12 5	- 5	8 0	PP i 17·0
Koti	34·7	355	6 53	- 1	12 16	- 8	—	—
Riverview	34·9	161	e 6 57	+ 2	i 12 25	- 2	i 15 50	SSS e 20·7
Sydney	34·9	161	e 7 19	+24	e 12 7	-20	—	e 21·1
Gihu	36·2	0	7 6	0	—	—	—	—
Perth	37·3	212	7 25	+ 9	13 3	- 1	9 8	PPP 17·3
Nagano	37·5	2	7 6	-11	—	—	—	—
Phu-Lien	37·7	308	e 7 21	+ 2	e 13 24	+14	—	—
Sendai	39·2	6	7 30	- 1	13 26	- 6	—	—
Zinsen	39·8	346	12 40	?	—	—	—	—
Mizusawa	E. 40·0	6	(7 39)	+ 1	7 39	P	—	—
Mori	42·9	4	7 59	- 3	—	—	—	—
Vladivostok	44·3	355	e 8 13	0	i 14 44	- 4	—	—
Arapuni	51·1	141	—	—	16 43	+19	—	21·8
Wellington	51·9	145	9 10	- 2	16 25	-10	20 10	SS 25·9
Christchurch	52·3	149	9 17	+ 2	16 37	- 3	i 21 11	SSS 26·4
Calcutta	N. 53·9	300	e 9 27	0	i 17 3	+ 1	e 20 58	SS e 28·0
Colombo	E. 58·7	279	10 2	0	—	—	—	—
Irkutsk	60·2	338	10 12	0	18 26	+ 1	—	30·9
Kodaikanal	E. 61·4	283	i 10 20 _a	0	18 42	+ 2	—	29·8
Hyderabad	61·6	291	10 21	- 1	18 40	- 3	18 52	PS 29·6
Agra	E. 64·2	302	10 37	- 2	19 11	- 5	11 5	PeP
Bombay	67·1	291	i 10 58	+ 1	i 19 50	- 1	i 13 24	PP
Almata	70·2	319	e 11 17	0	—	—	—	—
Andijan	72·6	314	e 11 34	+ 3	—	—	—	—
Tashkent	74·9	314	i 11 43	- 1	e 21 21	- 1	—	—
Tchimkent	75·0	315	11 46	+ 1	21 27	+ 4	—	—
Samarkand	76·3	311	11 54	+ 2	—	—	—	—
Sverdlovsk	84·0	328	i 12 33	0	22 50	- 7	15 48	PP 34·9
College	84·1	25	—	—	e 23 16	+18	e 23 57	PS e 32·3
Rockefeller Mt.	84·3	169	e 12 26	- 9	e 22 55	- 5	—	e 41·9
Sitka	88·9	34	—	—	e 23 33	[+ 7]	e 30 38	SS e 42·3
Baku	89·3	310	16 14	PP	23 51	+ 3	—	46·2
Victoria	96·3	42	—	—	e 24 4	[- 4]	e 31 36	SS e 43·9
Ukiah	97·3	51	—	—	e 26 38	PS	—	e 41·2
Tinemaha	101·4	53	e 13 44	-11	—	—	—	—
Pasadena	101·8	56	e 13 55	- 1	—	—	—	e 44·9
Riverside	z. 102·5	56	i 13 59	- 1	—	—	—	—
Bozeman	105·1	43	—	—	e 25 6	[+15]	e 27 44	PS e 48·0
Tucson	108·2	57	e 13 53	P	e 24 32	[-33]	e 19 3	PP e 40·2
Rome	116·6	317	e 21 22	PPP	e 31 52	PPS	—	—
Uccle	116·9	329	—	—	e 29 55	PS	—	e 54·9
Toronto	125·9	33	—	—	e 30 19	PS	—	56·9
Ottawa	126·7	29	e 19 4	[- 1]	—	—	—	42·9
Seven Falls	127·6	24	—	—	e 32 55	PPS	—	60·9
Toledo	128·3	322	e 19 12	[+ 4]	31 13	PS	24 9	PPP 79·4
Almeria	128·4	318	e 19 23	[+14]	e 31 43	PS	—	—
Granada	129·7	320	e 19 25	[+14]	—	—	—	—
Huancayo	144·3	112	i 19 39	[+ 2]	e 29 8	{-38}	—	e 68·2
La Paz	148·7	125	i 19 48 _a	[+ 3]	i 28 13	?	i 20 55	pPKP 72·9
San Juan	150·5	52	e 19 49	[+ 1]	e 30 8	{-13}	—	e 76·8

For Notes see next page.

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NOTES TO DECEMBER 17d. 14h. 42m. 5s.

Additional readings :—

Brisbane iPE = +6m.13s.
 Adelaide P_cP = +9m.15s., i = +12m.13s., +12m.20s., and +13m.9s., iSS = +13m.54s., S_cS = +16m.51s.
 Riverview iZ = +7m.1s., iN = +7m.5s., iE = +17m.16s., iN = +17m.23s., iE = +18m.37s., iN = +19m.49s.
 Sydney e = +16m.43s.
 Perth iZ = +11m.40s., SS = +15m.7s., i = +16m.50s.
 Mizusawa ePE = +6m.2s.
 Wellington i = +17m.0s., L_q = +22.9m.
 Hyderabad S_cSE = +20m.14s., SSE = +22m.21s.
 Agra E. ePP = +12m.55s., PS = +19m.23s., i = +19m.30s., S_cS = +20m.42s., SS = +23m.29s.
 Bombay iE = +15m.15s., iPSE = +20m.7s., iE = +20m.48s.
 Sitka iSKS = +23m.50s.
 Victoria e = +25m.55s. and +35m.4s.
 Bozeman e = +33m.49s.
 Tucson e = +14m.25s., +17m.39s., +19m.53s., and +20m.11s., ePS = +26m.32s., i = +30m.53s.
 Toledo ePKP₂ = +20m.21s., SS = +45m.8s.
 Huancayo e = +20m.38s., i = +23m.46s., e = +23m.58s.
 La Paz iPKP₂Z = +20m.4s., isPKPZ = +21m.55s., iSKP = +23m.17s., iPPZ = +23m.46s., PSKS = +33m.9s., SSN = +47m.57s., SSSN = +48m.57s.
 Long waves were also recorded at Berkeley, Jena, De Bilt, Hamburg, Warsaw, Prague, Stuttgart, Kew, Paris, Santa Clara, Chicago (U.S.C.G.S.), East Machias, Honolulu, Lincoln, Seattle, San Fernando, Potsdam, Upsala, and Pulkovo.

Dec. 17d. Readings also at 0h. (Bermuda), 1h. (Rockfeller Mt., Christchurch (2), Wellington (2), Sydney, Riverview, Brisbane, Adelaide, and New Plymouth), 2h. (Huancayo), 5h. (Apia), 9h. (Balboa Heights), 14h. (near Sofia and Bucharest), 16h. (Mizusawa).

Dec. 18d. 3h. 39m. 40s. Epicentre 11°·0S. 33°·0E.

A = +·8235, B = +·5348, C = -·1896; δ = +11; h = +6;
 D = +·545, E = -·839; G = -159, H = -·103, K = -·982.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Tananarive	16·1	121	e 3 50	+ 1	i 7 3	SS	i 3 58	PP e 8·9
Cape Town	26·4	208	10 31	S	(10 31)	+19	—	(13·5)
Helwan	40·7	358	i 7 44 _a	0	14 10	+15	9 47	PPP
Ksara	44·7	4	e 8 20	+ 4	e 15 14	+20	—	—
Kodaikanal	E. 49·0	65	e 8 0	-50	—	—	—	—
Bombay	49·2	53	e 8 55	+ 3	e 16 2	+ 4	—	—
Colombo	E. 49·9	72	8 51	- 6	16 11	+ 4	—	—
Rome	55·9	341	i 9 42	0	e 17 50	+21	—	24·7
Agra	E. 57·8	48	e 9 54	- 1	18 6	+12	19 42	e 28·5
Almeria	58·1	327	e 10 20	+22	19 0	?	12 48	S _c S PP 31·3
Granada	59·0	326	10 3	- 1	—	—	—	—
Toledo	61·2	328	e 10 20	+ 1	18 52	+14	—	e 31·6
Clermont-Ferrand	62·6	337	e 10 31	+ 3	—	—	—	—
Calcutta	N. 63·6	58	—	—	i 19 11	+ 3	—	—
Tucson	140·7	309	e 19 28	[- 4]	—	—	e 23 14	PP e 58·0
Tinemaha	Z. 143·7	320	e 19 38	[+ 1]	—	—	—	—
Riverside	144·6	316	i 19 41	[+ 3]	—	—	—	—
Mount Wilson	Z. 144·9	316	i 19 42 _k	[+ 3]	—	—	—	—
Pasadena	Z. 145·0	316	i 19 42 _k	[+ 3]	—	—	—	—
La Jolla	Z. 145·1	314	e 19 42	[+ 3]	—	—	—	—
Santa Barbara	145·9	318	i 19 46 _k	[+ 5]	—	—	—	—

Additional readings :—

Tananarive iSSE = +7m.13s., EN = +17m.27s., iEN = +17m.56s.
 Helwan SSE = +16m.55s.
 Rome iE = +9m.49s., eN = +26m.44s.
 Agra eSS = +22m.2s.
 Almeria PPP = +14m.20s., SS = +23m.4s., SSS = +25m.55s.
 Tucson i = +19m.36s., e = +20m.50s., i = +25m.18s.
 Long waves were also recorded at Huancayo, La Paz, San Juan, De Bilt, Uccle, Kew, Scoresby Sund, Potsdam, Salt Lake City, Bozeman, Paris, San Fernando, Lisbon, and Algiers.

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Dec. 18d. 5h. 31m. 52s. Epicentre 4°·0S. 131°·1E.

A = -·6558, B = +·7518, C = -·0693; $\delta = +8$; $h = +7$;
D = +·754, E = +·657; G = +·046, H = -·052, K = -·998.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Manila	21·0	332	i 4 59 _a	+12	i 9 0	SS	—	—
Perth	31·3	206	i 6 36	+12	11 18	-13	7 8	PP 13·2
Brisbane	31·4	140	i 6 20	-5	i 10 56	-36	—	—
Phu-Lien	34·4	317	i 6 58	+7	e 12 31	+12	—	—
Riverview	35·1	151	e 6 59	+2	i 12 7	-23	i 14 30	SS —
Sydney	35·1	151	—	—	e 11 32	-58	—	e 17·4
Vladivostok	46·9	1	e 8 37	+3	i 15 31	+6	—	26·2
Calcutta	N. 49·4	304	e 8 51	-2	i 16 5	+5	e 9 12	?
Colombo	E. 52·3	281	i 9 17	+2	i 16 42	+2	—	—
Christchurch	53·8	144	9 30	+4	16 33	-28	20 58	L _a 26·5
Wellington	53·9	141	9 27	0	16 31	-31	11 3	P _c P 24·1
Kodaikanal	E. 55·2	285	i 8 38 _k	-59	i 16 26	-54	—	e 26·4
Hyderabad	E. 56·1	294	9 46	+3	17 38	+6	19 33	S _c S —
Agra	E. 59·8	304	i 10 10	+1	18 23	+3	e 12 13	PP 28·8
Bombay	61·7	294	i 10 24	+2	i 18 48	+4	i 12 46	PP 31·1
Almata	67·7	320	e 11 4	+3	—	—	—	—
Frunse	69·0	319	—	—	i 20 22	+8	—	—
Andijan	69·6	316	—	—	e 20 30	+9	—	—
Tashkent	72·0	315	e 11 28	0	i 20 56	+7	—	33·2
Tchimkent	72·1	317	20 58	S	(20 58)	+8	—	—
Sverdlovsk	82·8	328	12 29	+2	i 22 44	-1	23 23	S _c S 34·6
Baku	85·9	311	—	—	i 23 25	+9	—	43·6
Johannesburg	99·9	243	i 14 32	+44	i 15 44	?	—	—
Riverside	109·0	56	e 19 6	PP	—	—	—	—
Mount Wilson	z. 109·4	56	e 18 52	PP	—	—	—	—
Huancayo	149·3	122	e 19 51	[+5]	e 42 58	SS	e 43 48	SSP e 54·1
La Paz	152·1	138	20 14	[+23]	—	—	23 46	SKP 75·1
San Juan	157·1	48	—	—	e 25 37	?	e 29 48	? e 44·4

Additional readings:—

Perth i = +10m.35s., SS = +12m.8s.

Brisbane iN = +12m.8s.

Riverview ePEN = +7m.3s., iN = +7m.26s., iN = +15m.17s., +16m.1s., +16m.39s., and +17m.16s., S_cS?E = +17m.42s.

Calcutta eSSN = +16m.43s.

Wellington PPZ = +11m.31s., iEN = +17m.1s.

Hyderabad SSE = +21m.16s.

Agra E. PPP? = +14m.4s., S_cS = +19m.55s., SS? = +22m.28s.

Bombay i = +23m.8s.

Johannesburg i?N = +15m.26s. Record interpreted as of a local shock.

Huancayo e = +20m.18s., i = +20m.30s., e = +21m.26s.

La Paz iPKPZ = +20m.18s., PPZ = +24m.14s.

Long waves were also recorded at De Bilt, College, Rockefeller Mt., Uccle, and Kew.

Dec. 18d. Readings also at 3h. (Rome), 4h. (Christchurch, Huancayo, and near La Paz), 5h. (San Juan, Pasadena, Tinemaha, Riverside, and Mount Wilson), 6h. (Tinemaha, Riverside, and Mount Wilson), 12h. (Riverview, Zurich, near Sofia, and Bucharest), 17h. (Rome and Tinemaha), 18h. (College), 23h. (near Wellington).

Dec. 19d. 15h. 48m. 37s. Epicentre 10°·5N. 118°·0E.

A = -·4617, B = +·8684, C = +·1811; $\delta = +8$; $h = +6$;
D = +·883, E = +·469; G = -·085, H = +·160, K = -·984.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Manila	5·0	35	e 1 18	0	i 3 52	?	—	—
Phu-Lien	15·0	315	e 3 46	+1	—	—	—	—
Zi-ka-wei	N. 20·8	9	e 4 57	+12	—	—	—	i 9·3
Calcutta	N. 30·8	297	e 6 23	+3	i 11 30	+7	e 8 38	P _c P e 17·3
Colombo	E. 37·9	268	e 7 23?	+3	—	—	—	—

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.
Kodaikanal	E.	39.9	275	e 7 23?	-14	—	—	—	—
Agra	E.	41.1	300	i 7 45	- 2	14 1	0	9 25	PP
Bombay	E.	44.4	287	i 8 13	- 1	i 14 45	- 4	i 18 53	SSS
Tashkent		52.6	315	e 9 22	+ 4	e 16 53	+ 9	—	—
Samarkand		53.6	312	e 9 21	- 4	—	—	—	—
Sverdlovsk		63.7	330	10 37	+ 1	19 21	+11	—	—
Baku		66.6	310	11 10	+16	19 54	+ 9	—	—
Moscow		76.0	325	11 50	- 1	—	—	—	—
Pulkovo		79.8	330	e 12 13	+ 1	—	—	—	—
Helwan		82.0	299	i 12 19	- 4	i 22 38	+ 1	—	—
Rome		94.3	314	e 24 7	S	(e 24 7) [+10]	—	—	e 50.3

Additional readings:—

Calcutta eN = +11m.52s., iSSN = +14m.9s.

Agra E. sSS? = +17m.10s., ScS = +17m.48s.

Rome eSE = +32m.57s.

Long waves were also recorded at De Bilt, Upsala, Vladivostok, Irkutsk, Potsdam, Scoresby Sund, Warsaw, Uccle, and Kew.

Dec. 19d. Readings also at 0h. (New Plymouth), 3h. (Riverside, Zurich, San Fernando, Bermuda, Pasadena, and Mount Wilson), 5h. (San Fernando, Huancayo, and La Paz), 9h. (Bagneres), 12h. (Balboa Heights), 15h. (Rome), 17h. (Huancayo, Tashkent, Samarkand, Agra, Frunse, and near Tchimbkent), 18h. (Branner), 19h. (Bermuda), 20h. (Pasadena, Mount Wilson, and Tinemaha), 22h. (Basle, Zurich, Chur, near Rome, and near La Paz).

Dec. 20d. 7h. 27m. 24s. Epicentre 43°·8N. 71°·3W.

Intensity VII at Tamworth and Wonalancet (New Hampshire). Epicentre 43°50'N. 71°17'W. (near Lake Ossipee). Macroseismic area 150,000 square miles.

F. Neumann.

United States Earthquakes, 1940, Washington, 1943, p. 8-13, chart p. 10.

J. J. Devlin, S.J.; Langguth; C. Lawrence, S. J.; and R. L. Arringdale.

"Macroseismic Study of the New Hampshire Earthquakes of Dec., 1940." Bull. Seismological Society of America, Vol. 32, No. 2, 67-73, 2 fig., Berkeley, April, 1942.

L. Don Leet and D. Linehan, S. J.

Instrumental Study of the New Hampshire Earthquakes of Dec., 1940. Bull. of the Seismological Society of America, Vol. 32, No. 2, April 1942, pp. 75-92, 2 fig.

D. Linehan, S. J., and L. Don Leet.

"Earthquakes of the North Eastern United States and Eastern Canada, 1938, 1939, 1940." Bulletin of the Seismological Society of America, Vol. 32, No. 1, 11-17, 2 fig. 1 tab. bib. Berkeley, Jan. 1942.

"Anon."—Cause of the New Hampshire Earthquake of 1940. "Nature," London, Vol. 150, p. 300, 1942.

A = +.2322, B = -.6859, C = +.6897; δ = +6; h = -3;
D = -.947, E = -.321; G = +.221, H = -.653, K = -.724.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Harvard		1.3	189	i 0 27	+ 2	i 0 47	+ 3	—	—
Weston		1.4	181	i-0 6	-33	i 0 14	-32	—	—
Williamstown		1.8	232	0 34	+ 2	0 55	- 1	—	—
Shawinigan Falls		2.9	339	0 47	- 1	1 28	+ 4	0 54	P*
East Machias		3.0	71	i 0 51	+ 1	—	—	—	i 1.5
Seven Falls		3.3	4	0 52	- 1	1 32	- 3	1 3	P*
Fordham		3.5	214	i 0 55	- 2	i 1 34	- 6	i 1 56	S*
Ottawa		3.5	298	0 56	- 1	1 34	- 6	1 1	P*
Philadelphia		4.8	218	i 1 14	- 1	i 2 9	- 3	e 1 28	P*
Buffalo		5.6	263	i 1 38	P*	i 2 28	- 5	i 2 52	S*
Halifax		5.6	79	e 2 21	+54	e 2 32	- 1	—	—
Pennsylvania		5.7	242	e 1 30	+ 2	i 2 57	S*	i 1 44	P*
Georgetown		6.5	223	i 2 0	P*	—	—	—	—
Pittsburgh		7.2	246	e 1 48	- 1	e 3 12	- 1	i 2 10	P*
Cincinnati		10.9	250	e 3 18	PPP	i 5 5	SS	i 5 22	SSS

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.
Chicago J.S.A.	12.1	268	e 2 50	- 7	e 4 59	-15	—	i 6.2
Chicago U.S.C.G.S.	12.1	268	e 4 52	?	i 5 59	SSS	—	i 6.9
Florissant E.	15.1	258	e 3 32	- 4	i 6 28	+ 3	i 7 17	SSS i 7.8
St. Louis	15.2	256	e 3 33	- 5	e 6 27	- 1	i 3 43	PP e 7.8
Cape Girardeau	15.3	253	e 3 42	+ 3	e 6 16	-14	i 7 13	SS i 7.8
Lincoln	18.9	270	e 4 25	+ 1	e 8 0	+ 7	—	e 9.7
Saskatoon	24.9	302	—	—	e 10 7	+20	—	12.6
Bozeman	28.1	288	—	—	e 12 17	SSS	—	e 14.1
Butte	29.1	290	—	—	e 12 45	SSS	—	e 14.8
Salt Lake City	29.9	280	—	—	e 14 26	?	—	i 15.5
Spokane	32.0	294	—	—	e 15 30	?	—	i 16.8
Tucson	32.9	263	i 6 38	0	i 11 58	+ 2	e 7 46	PP i 14.9
Tinemaha	36.0	275	i 7 4	- 1	—	—	—	—
Haiwee z.	36.2	274	e 7 6	0	—	—	—	—
Riverside z.	36.8	271	i 7 12	+ 1	—	—	—	—
Mount Wilson z.	37.1	271	i 7 15	+ 1	—	—	—	e 19.5
Pasadena z.	37.2	271	i 7 15	0	—	—	—	i 19.6

Additional readings:—

Shawinigan Falls e = +1m.13s.
 Seven Falls e = +1m.20s.
 Ottawa S = +1m.45s.
 Fordham i = +1m.39s. and +1m.46s.
 Philadelphia i = +1m.18s., +1m.51s., and +2m.24s.
 Buffalo i = +2m.41s., e = +3m.3s.
 Pennsylvania ePP = +1m.53s., i = +4m.6s.
 Pittsburgh iZ = +1m.58s.
 Cincinnati e = +4m.9s., i = +5m.36s.
 Florissant iE = +6m.32s. and +7m.27s.
 St. Louis eN = +6m.33s.
 Cape Girardeau eE = +3m.48s. SS was given as iS.
 Lincoln e = +9m.10s.
 Bozeman e = +13m.21s.
 Tucson i = +8m.39s., e = +9m.1s., +10m.46s., and +13m.11s.
 Long waves were also recorded at Mobile, Denver, San Juan, and Scoresby Sund.

Dec. 20d. 23h. 40m. 49s. Epicentre 39°·5N. 125°·0W.

Intensity VI at Ferndale, Garberville, etc. Epicentre in the area of Cap Mendocino.
 Macroseismic area 9000 square miles.

F. Neumann.

United States Earthquakes, 1940. Washington, 1943, p. 29-30.

A = -·4438, B = -·6338, C = +·6335; δ = -2; h = -1;
 D = -·819, E = +·574; G = -·363, H = -·519, K = -·774.

	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Ferndale	1.2	28	i 0 24	0	i 0 38	- 3	—	—
Ukiah	1.4	105	i 0 23	- 4	i 0 45	- 1	—	—
San Francisco	2.6	131	e 0 43	- 1	i 1 28	S _r	i 0 46	P* e 2.2
Berkeley	2.7	127	i 0 43	- 2	—	—	i 0 55	P _r i 3.1
Branner	3.0	133	e 0 50	0	i 1 45	S _r	i 1 10	P _r —
Santa Clara E.	3.2	131	i 0 56	+ 4	i 1 39	S*	—	—
Lick	3.4	127	i 0 54	- 1	i 1 57	S _r	—	—
Fresno N.	4.9	121	e 1 16	- 1	—	—	i 1 43	P _r e 4.8
Tinemaha	5.8	112	e 1 29	0	—	—	—	—
Haiwee	6.5	119	i 1 39	0	i 2 51	- 4	—	—
Santa Barbara z.	6.6	138	e 1 43	+ 2	—	—	—	—
Mount Wilson	7.6	131	e 1 55	0	—	—	—	—
Pasadena	7.6	131	e 1 55	0	i 3 31	+ 8	—	e 3.7
Riverside z.	8.2	129	i 2 2	- 1	—	—	—	—
Seattle	8.4	12	e 2 51	P _r	—	—	—	e 5.4
Victoria	9.1	7	—	—	4 47	S _r	—	7.5
Spokane	9.9	32	i 2 23	- 2	i 5 24	S _r	—	i 6.3
Salt Lake City	10.1	80	e 2 35	+ 7	i 4 23	- 2	—	i 5.2
Butte	11.2	51	e 2 40	- 4	4 41	-11	—	e 5.3
Bozeman	12.0	54	i 2 49	- 6	i 4 56	-15	i 3 50	PPP i 6.3

Continued on next page.

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	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.	
			m.	s.		m.	s.		m.	s.		
Tucson	13.6	118	i 3	15	- 2	i 6	21	SSS	i 3	33	PP	i 7.6
Denver	15.4	85	i 3	52	PP	i 7	28	SSS	e 4	11	PPP	e 8.7
Saskatoon	17.9	39	e 4	4	- 8	—	—	—	—	—	—	e 9.2
Sitka	19.3	344	e 4	28	- 1	—	—	—	—	—	—	e 10.6
Lincoln	21.7	76	e 4	49	- 6	e 8	53	+ 2	e 9	38	SSS	e 11.8
Florissant	26.8	80	e 5	45	+ 1	e 10	9	-10	i 6	37	PP	—
St. Louis	26.9	80	e 5	39	- 6	e 10	8	-12	e 11	9	SS	e 13.3
Cape Girardeau	27.8	84	e 6	16	+23	—	—	—	—	—	—	e 16.2
Chicago U.S.C.G.S.	28.3	72	e 10	5	?	e 10	36	- 7	e 12	50	SSS	e 14.5
Buffalo	34.5	68	e 7	22	+30	e 16	34	?	—	—	—	—
Ottawa	36.4	63	7	3	- 5	12	41	- 9	15	11	SS	e 18.7
Philadelphia	37.9	72	—	—	—	e 16	14	SSS	—	—	—	e 19.0
Shawinigan Falls	38.2	61	e 8	2	+39	12	42	-35	—	—	—	19.2
Seven Falls	39.5	60	e 7	32	- 2	e 17	41	?	—	—	—	21.2
East Machias	42.3	63	e 9	29	PP	e 14	13	- 6	e 9	57	PPP	21.1
Bermuda	48.5	78	—	—	—	e 15	52	+ 4	—	—	—	e 24.4
San Juan	54.7	94	e 12	27	PPP	e 17	10	- 3	—	—	—	e 27.5
Scoresby Sund	57.5	22	—	—	—	e 15	58	?	e 19	49	?	e 27.8
Huancayo	69.0	127	e 11	19	+10	i 20	21	+ 7	e 15	17	PPP	e 28.4
Pulkovo	79.0	12	e 12	9	+ 2	e 22	4	- 2	—	—	—	—
Uccle	79.7	30	e 12	14	+ 3	—	—	—	—	—	—	e 43.2
Stuttgart	z. 83.2	29	e 12	37	+ 8	—	—	—	—	—	—	—
Sverdlovsk	83.9	357	i 12	34	+ 1	22	58	+ 2	i 15	47	PP	42.2
Moscow	84.0	10	e 12	39	+ 6	e 23	3	+ 6	—	—	—	—
Zurich	84.1	30	e 12	36 _a	+ 2	—	—	—	—	—	—	—
Toledo	84.4	42	i 12	38	+ 2	23	12	+11	15	54	PP	—
Chur	84.9	29	e 12	41	+ 3	—	—	—	—	—	—	—
Rome	90.2	30	e 13	9	+ 5	i 24	3	+ 7	e 16	40	PP	—
Tashkent	98.5	349	17	38	PP	26	51	PS	31	35	SS	39.2
Agra	E. 110.3	337	e 16	41	?	—	—	—	—	—	—	—
Calcutta	N. 110.7	326	e 15	40	?	—	—	—	—	—	—	—
Bombay	E. 119.6	340	e 15	19	P	—	—	—	—	—	—	—
Kodaikanal	E. 126.3	333	e 13	11?	?	—	—	—	—	—	—	—
Colombo	E. 128.4	328	e 12	11?	?	—	—	—	—	—	—	—

Additional readings :—

Ukiah i = +58s.
 San Francisco iEN = +54s.
 Lick eEN = +4m.53s.
 Fresno iNE = +2m.44s.
 Spokane iPEN = +2m.45s., iN = +3m.40s.
 Salt Lake City e = +3m.3s.
 Bozeman i = +6m.3s.
 Tucson i = +3m.20s., +4m.7s., +4m.28s., +6m.53s., and +7m.25s.
 Denver eN = +4m.17s., eE = +8m.23s. and +8m.35s.
 Sitka e = +4m.33s. and +6m.45s.
 St. Louis ePE = +5m.42s., eE = +6m.15s., +7m.47s., and +10m.21s., eN = +10m.59s.
 Chicago U.S.C.G.S. e = +11m.16s.
 Philadelphia i = +17m.20s., e = +18m.20s.
 Shawinigan Falls e = +17m.11s.
 East Machias e = +13m.2s. and +19m.4s.
 Huancayo e = +12m.5s.
 Rome eN = +24m.35s., ePSEN = +25m.9s., esSEN = +29m.15s.
 Long waves were also recorded at Pennsylvania, Vladivostok, Baku, College, Honolulu, Harvard, Rockefeller Mt., Prague, Kew, Warsaw, Clermont-Ferrand, Upsala, Bucharest, De Bilt, Potsdam, Stonyhurst, Aberdeen, and Hamburg.

Dec. 20d. Readings also at 5h. (Ksara), 15h. (near Balboa Heights and near Branner), 23h. (Tucson and Tananarive).

Dec. 21d. Readings at 0h. (near Wellington, Christchurch, New Plymouth, and Tuai), 8h. (La Paz and Bermuda), 12h. (San Fernando, near La Paz, Huancayo, San Juan, Tananarive, and Bombay), 13h. (near Stuttgart), 16h. (near Mizusawa), 19h. (Pasadena, Mount Wilson, Riverside, Tinemaha, and Tucson).

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Dec. 22d. 12h. 31m. 57s. Epicentre 15°·5S. 179°·0W.

A = -·9640, B = -·0168, C = -·2656 ; $\delta = +12$; $h = +6$;
D = -·017, E = +1·000 ; G = +·266, H = +·005, K = -·964.

		Δ		Az.		P.		O-C.	S.		O-C.	Supp.		L.
		°	'	°	'	m.	s.	s.	m.	s.	s.	m.	s.	m.
Arapuni		23·0		191		5	51	PPP	9	45	SS	—	—	10·6
New Plymouth		24·2		193		5	5	-14	—	—	—	—	—	—
Wellington		26·2		191		5	40	+ 2	10	18	+ 9	6	38	PPP
Brisbane	N.	28·5		242		e 5	51	- 8	i 10	33	-13	i 6	45	PP
Christchurch		28·8		192		6	8	+ 6	10	43	- 8	—	—	12·8
Riverview		32·5		230		6	5	-29	i 10	49	-60	—	—	e 13·8
Sydney		32·5		230		e 7	39	+65	e 12	0	+11	—	—	e 15·3
Honolulu		42·1		30		e 7	12	-43	e 13	58	-18	—	—	i 17·2
Adelaide		42·6		235		i 11	32	?	i 16	9	?	17	9	SS
Perth		61·1		242		14	33	PPP	21	3	?	i 22	23	SS
Rockefeller Mt.		63·7		174		e 10	36	0	e 19	4	- 6	—	—	e 26·4
Tokyo Cen. Met.	Ob.	64·1		323		10	34	- 4	18	54	-20	—	—	—
Gihu		65·7		322		10	51	+ 3	18	51	-43	—	—	31·0
Kobe		66·2		320		10	29	-23	19	28	-12	—	—	—
Manila		66·4		294		10	44	- 9	i 19	40	- 3	—	—	32·0
Koti		66·5		318		10	54	0	19	28	-16	—	—	—
Hamada		68·3		318		11	10	+ 5	—	—	—	—	—	—
Vladivostok		73·7		325		e 11	14	-24	e 20	54	-14	—	—	32·8
Santa Barbara	z.	75·1		48		e 11	28	-18	—	—	—	—	—	—
Santa Clara		75·1		44		e 11	42	- 4	e 22	14	PS	—	—	e 34·0
Ukiah		75·2		42		e 11	39	- 7	e 20	40	-45	e 26	23	SS
La Jolla	z.	76·1		50		e 11	42	- 9	—	—	—	—	—	e 30·7
Pasadena		76·1		48		e 11	33	-18	e 21	21	-14	—	—	e 33·3
Mount Wilson		76·2		48		i 11	32	-20	—	—	—	—	—	—
Riverside	z.	76·5		48		e 11	32	-22	—	—	—	—	—	—
Haiwee	z.	77·2		47		e 11	39	-18	—	—	—	—	—	—
Tinemaha		77·4		46		e 11	39	-19	—	—	—	—	—	—
Tucson		80·6		53		e 11	55	-21	i 21	18	-65	e 16	45	PPP
Sitka		81·3		23		—	—	—	e 22	25	- 5	i 31	8	SSS
Phu-Lien		81·4		294		e 12	31	+11	—	—	—	—	—	e 33·1
College		83·6		12		e 13	20	+48	e 23	2	+ 9	e 23	43	PS
Bozeman		86·3		41		e 13	48	+63	e 23	5	[- 4]	e 28	47	SS
Irkutsk		94·2		323		e 17	2	PP	24	21	-10	25	46	PS
Lincoln		94·3		48		e 13	42	+19	e 24	17	[+20]	e 31	10	SS
Calcutta	N.	98·2		291		e 17	51	PP	i 25	6	+ 1	—	—	e 41·3
Florissant	z.	98·5		52		e 13	40	- 2	e 24	21	[+ 2]	e 26	10	PS
St. Louis		98·6		52		e 13	30	-12	i 24	3	[-17]	e 26	12	PS
Huancayo		99·7		105		e 17	35	PP	e 24	33	[+ 8]	e 27	3	PPS
Chicago U.S.C.G.S.		101·2		49		—	—	—	e 24	18	[-15]	e 31	50	SS
Colombo	E.	102·5		273		18	22	PP	—	—	—	—	—	e 46·7
La Paz		104·3		—		i 18	12	PP	i 26	7	+11	i 33	16	SS
Kodaikanal	E.	105·6		276		e 18	3?	PKP	—	—	—	—	—	48·0
Agra	E.	108·3		294		e 17	26	?	28	3	PS	38	1	SSS
Ottawa		110·1		46		—	—	—	e 26	33	{+27}	e 34	21	?
Philadelphia		110·3		53		—	—	—	e 26	28	{+21}	e 33	24	SS
Fordham		111·3		51		—	—	—	e 28	15	PS	—	—	—
Bombay		111·7		284		e 18	16	[-20]	i 28	33	PS	e 21	25	PPP
Vermont		111·9		48		—	—	—	e 28	43	PS	e 29	38	PPS
Seven Falls		113·5		44		—	—	—	e 26	57	{+28}	e 34	48	SS
East Machias		116·1		47		e 17	43	?	e 26	19	{+31}	e 29	28	PS
Tashkent		116·3		309		19	39	PP	29	33	PS	—	—	61·0
Sverdlovsk		119·3		327		20	17	PP	36	45	SS	30	5	PS
Rio de Janeiro	E.	122·3		130		—	—	—	e 28	3	{+34}	—	—	—
Tananarive		122·8		234		—	—	—	e 39	40	?	40	46	SSS
Aberdeen		138·4		2		—	—	—	i 26	25	[-11]	i 40	24	SS

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	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.
Potsdam	142.0	348	e 20	3	[+29]	—	—	—	—	—	e 66.6
De Bilt	143.3	355	i 19	36	[0]	e 39	33	?	—	—	e 68.0
Ksara	143.6	306	e 21	23	?	—	—	—	e 24	13	?
Prague	143.9	345	—	—	—	e 48	3	SSS	—	—	e 67.0
Kew	144.1	1	e 20	3?	[+25]	e 46	3?	?	—	—	e 60.0
Uccle	144.7	357	e 19	43	[+ 4]	e 41	45	SS	—	—	e 60.0
Istanbul	144.8	322	i 20	3?	[+24]	—	—	—	—	—	—
Stuttgart	146.2	350	e 19	36 _k	[- 5]	—	—	—	e 20	27	pPKP
Paris	146.8	358	19	37	[- 5]	—	—	—	e 25	5	?
Sofia	146.8	329	e 19	33	[- 9]	—	—	—	—	—	e 74.0
Basle	147.6	351	e 19	29	[-14]	—	—	—	—	—	—
Zurich	147.6	351	e 19	35	[- 8]	—	—	—	—	—	—
Chur	147.9	350	e 19	33	[-11]	—	—	—	—	—	—
Neuchatel	148.2	352	—	—	—	—	—	—	e 22	32	PP
Helwan	z. 148.7	302	19	36	[- 9]	—	—	—	—	—	—
Clermont-Ferrand	149.8	357	e 19	36	[-11]	—	—	—	—	—	e 81.6
Rome	151.9	342	e 19	48 _a	[- 2]	e 25	49	[-66]	i 23	11	PP
Lisbon	155.2	18	—	—	—	26	37	[-23]	49	47	SSS
Toledo	155.3	9	e 20	12	[+17]	31	37	{+50}	24	39	PP
Granada	158.0	10	20	26 _k	[+28]	29	30	?	24	14	PP
Almeria	158.5	8	19	59	[0]	—	—	—	—	—	88.0

Additional readings:—

Wellington iZ = +7m.51s. and +8m.18s.
 Riverview iEZ = +6m.34s., iEN = +7m.45s.
 Honolulu i = +14m.9s.
 Adelaide iPPN = +11m.52s., i = +13m.52s., P_cPN = +14m.45s.
 Perth PP = +15m.53s., PPP = +16m.31s., SS = +23m.53s., SSS = +24m.56s.
 Tokyo Cen. Met. Ob. e = +28m.34s.
 Ukiah e = +21m.18s. and +24m.26s.
 Riverside iZ = +11m.42s.
 Tucson i = +11m.59s., +12m.13s., +12m.27s., +12m.37s., +15m.41s., and +22m.21s.
 Sitka e = +22m.9s.
 College ePP = +13m.34s., e = +19m.42s. and +22m.27s., eSS = +25m.44s.
 Bozeman e = +24m.23s.
 Irkutsk SKS = +23m.51s.
 Florissant eZ = +14m.11s., iZ = +23m.36s., eSSZ = +32m.5s.
 St. Louis eN = +24m.8s., eSEN = +25m.5s., iSSN = +31m.30s., eSSE = +31m.46s.
 Huancayo e = +19m.3s. and +21m.44s., i = +25m.22s., e = +28m.34s.
 Chicago U.S.C.G.S. ePS = +25m.44s., e = +32m.12s.
 La Paz L_c = +43m.43s.
 Agra eE = +19m.51s., SKS?E = +29m.18s.
 Philadelphia i = +28m.14s., e = +29m.0s., +34m.19s., and +49m.15s.
 Bombay eEN = +26m.56s. and +31m.57s.
 Vermont e = +34m.36s.
 East Machias e = +21m.8s., +23m.21s., +30m.41s., +35m.47s., and +40m.7s.
 Tananarive N = +46m.49s., EN = +47m.3s., +52m.2s., and +56m.6s.
 Aberdeen eN = +25m.36s.
 Kew eN = +24m.3s.?
 Stuttgart eN = +21m.18s., eE = +21m.29s.
 Paris i = +21m.54s.
 Helwan iEZ = +20m.22s., iZ = +21m.13s.
 Rome iZ = +20m.6s., iN = +20m.14s., i = +20m.33s., e = +28m.43s., iE = +31m.40s.,
 iN = +32m.39s., eZ = +34m.18s., iE = +34m.46s., ePPSEN = +35m.13s.?, eSSN =
 +42m.47s., eZ = +43m.56s. and +46m.42s., eL_cE = +64m.42s.
 Lisbon N = +26m.42s., +28m.48s., and +52m.43s.
 Toledo iPKP₁ = +21m.3s.
 Granada PKP₁ = +21m.3s.
 Almeria e = +20m.39s.
 Long waves were also recorded at Berkeley, Pulkovo, Upsala, Bucharest, Harvard, Pittsburgh, Seattle, Butte, Scoresby Sund, San Fernando, Stonyhurst, Bergen, and Warsaw.

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Dec. 22d. 18h. 59m. 46s. Epicentre 15°·0S. 69°·5W.

A = +·3384, B = -·9052, C = -·2572; $\delta = +5$; $h = +6$;
D = -·937, E = -·350; G = -·090, H = +·241, K = -·966.

Tables for depth of focus 0·020 have been used.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
La Paz	1·8	139	i 0 39 _k	+ 5	—	—	—	—
Huancayo	6·4	297	i 1 41 _a	pP	i 2 45	0	i 3 11	SSS
La Plata	22·4	155	e 4 33 _a	-13	8 26	-10	5 20	PP
Balboa Heights	25·8	338	e 5 24	+ 6	—	—	—	—
Rio de Janeiro	26·0	110	i 5 14	- 6	i 9 14	-22	—	—
Fort de France	30·7	17	i 6 2	0	i 10 52	+ 1	i 12 0	SS
San Juan	33·3	6	e 6 28	+ 4	i 11 35	+ 3	e 7 45	PP
Bermuda	47·3	5	e 9 11	pP	e 15 1	+ 2	e 11 26	PPP
Philadelphia	54·9	355	i 9 19	+ 3	e 16 31	-12	e 10 6	pP
Fordham	55·7	357	i 9 23	+ 1	i 16 56	+ 2	—	—
Pennsylvania	56·1	352	e 9 40	+15	—	—	12 47	PPP
St. Louis	56·8	340	i 9 31	+ 1	i 17 8	0	i 10 25	pP
Florissant	57·0	340	i 9 32	+ 1	e 17 9	- 2	i 10 23	pP
Harvard	57·2	358	i 9 35	+ 3	—	—	i 10 28	pP
Buffalo	58·3	352	i 9 43	+ 3	—	—	i 10 24	pP
Chicago U.S.C.G.S.	58·9	343	e 13 50	PPP	e 17 17	-19	e 20 31	SS
Vermont	59·3	357	e 10 47	pP	e 17 44	+ 3	e 19 11	sS
East Machias	59·5	2	e 9 53	+ 5	e 17 42	- 1	e 10 42	pP
Ottawa	60·4	355	e 9 56	+ 1	e 17 56	+ 1	e 10 44	pP
Lincoln	61·0	337	e 9 59	0	i 18 4	+ 2	i 19 31	sS
Tucson	61·4	320	i 10 3	+ 2	i 18 12	+ 4	i 10 27	pP
Seven Falls	61·8	359	e 10 7	+ 3	i 18 18	+ 5	i 19 44	sS
La Jolla	65·9	316	i 10 33	+ 2	e 19 8	+ 5	e 11 28	pP
Riverside	66·7	317	i 10 38 _a	+ 2	e 19 17	+ 4	i 11 32	pP
Mount Wilson	67·3	317	i 10 42 _a	+ 2	e 19 28	+ 8	i 11 36	pP
Pasadena	67·3	317	i 10 42	+ 2	i 19 27	+ 7	i 11 34	pP
Haiwee	68·4	319	i 10 48 _a	+ 2	e 19 40	+ 7	e 38 56	P'P'
Santa Barbara	68·5	316	e 10 48	+ 1	—	—	—	—
Tinemaha	69·2	319	i 10 53 _a	+ 2	e 19 49	+ 6	e 38 56	P'P'
Fresno	69·9	318	e 10 56	+ 1	e 19 52	+ 1	e 11 21	pP
Bozeman	71·1	331	e 11 5	+ 2	i 20 6	+ 2	i 21 39	sS
Lick	71·5	318	e 11 10	+ 5	—	—	—	—
Branner	71·9	318	e 11 10	+ 3	—	—	—	—
Butte	72·1	331	e 11 14	+ 5	e 20 22	+ 6	—	—
Berkeley	72·2	318	i 11 12	+ 3	e 20 23	+ 6	—	—
San Francisco	72·3	318	e 12 10	+60	e 20 22	+ 4	—	—
Ukiah	73·5	319	e 16 23	PPP	e 20 37	+ 5	i 22 15	PPS
Rockefeller Mt.	74·6	192	e 11 12	-11	(e 20 27)	-17	—	—
Lisbon	77·7	44	11 42	+ 2	e 21 26	+ 8	12 38	pP
Seattle	78·1	326	—	—	e 21 34	+12	—	—
San Fernando	78·6	47	e 13 14	?	—	—	—	—
Victoria	79·3	326	—	—	i 21 46	+11	i 23 6	PPS
Cape Town	80·1	122	—	—	e 21 54	+11	e 28 6	SSS
Granada	80·8	47	12 29 _k	+32	22 46	sS	13 17	pP
Almeria	81·4	48	i 12 2	+ 2	22 4	+ 8	12 34	pP
Toledo	81·7	45	i 12 3	+ 1	22 1	+ 2	12 57	pP
Clermont-Ferrand	88·9	42	e 12 38	+ 1	—	—	e 13 36	pP
Kew	89·2	36	—	—	(e 21 14?)	?	—	—
Paris	89·3	39	i 13 38	pP	—	—	(e 16 14)	PP
Sitka	90·2	329	e 12 47	+ 4	i 23 22	+ 1	e 29 45	SS
Aberdeen	90·8	30	—	—	e 22 54	[- 6]	i 24 44	PS
Scoresby Sund	91·3	14	e 11 53	-56	e 24 1	+32	i 29 14	SS
Uccle	91·6	37	e 12 49	- 1	i 23 5	[0]	i 13 47	pP
Neuchatel	91·9	42	e 12 51	0	—	—	—	—
Basle	92·5	41	e 12 54	0	e 23 16	[+ 6]	—	—
De Bilt	92·6	36	i 13 52	pP	i 23 14	[+ 3]	e 17 30	PP
Zurich	93·0	42	e 12 57 _a	+ 1	e 23 12	[- 1]	e 13 52	pP
Chur	93·5	42	e 12 59	0	e 23 20	[+ 4]	e 13 54	pP
Honolulu	93·8	291	—	—	(e 24 56)	PS	—	—
Stuttgart	93·9	41	e 13 0 _k	0	e 23 14	[- 3]	e 13 56	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.	
Rome	94.1	48	i 13	57	pP	i 23	23	[+ 5]	i 16	18	PP	e 39.2
Potsdam	97.3	38	e 17	14	PP	i 23	40	[+ 4]	—	—	—	e 39.2
Prague	97.5	40	e 21	44	?	—	—	—	—	—	—	—
Wellington	98.5	223	17	17	PP	(23 32)	—	[-10]	—	—	—	23.5
College	98.6	335	—	—	—	e 23	40	[- 3]	e 26	1	sS	e 48.1
Upsala	101.4	31	—	—	—	e 26	14?	PS	e 34	14?	sSS	—
Sofia	102.1	49	e 18	2	PP	e 24	14	[+14]	—	—	—	—
Bucharest	E. 104.3	47	—	—	—	e 24	10	[0]	—	—	—	—
Helwan	106.6	63	e 14	56	?	i 25	14	?	18	24	PPP	—
Ksara	110.9	60	—	—	—	i 24	43	[+ 5]	e 30	46	?	—
Bombay	143.8	78	i 19	13	[- 2]	—	—	—	e 22	40	PP	—
Mizusawa	144.0	317	e 19	18	[+ 2]	22	42	PP	—	—	—	—
Kodaikanal	E. 147.4	93	e 19	14?	[- 8]	—	—	—	—	—	—	—
Agra	E. 147.5	62	19	24	[+ 2]	29	26	SKKS	41	24	SS	—
Colombo	E. 148.9	102	i 19	18	[- 7]	i 29	23	SKKS	i 20	17	pPKP	47.6
Calcutta	N. 157.7	65	e 19	53	[+16]	e 30	16	SKKS	—	—	—	—
Manila	169.9	269	i 19	51	[+ 3]	i 26	14	[-20]	(24 47)	—	PP	—
Phu-Lien	173.2	33	e 21	37	?	—	—	—	—	—	—	—

Additional readings :—

Huancayo i = +1m.50s.
 La Plata ePZ = +4m.36s., N = +9m.32s.
 San Juan e = +8m.27s., eP_cP = +9m.14s., e = +10m.22s., i = +12m.29s., isS = +13m.1s.
 Bermuda e = +15m.47s., esS = +16m.21s., e = +17m.57s., eSS = +19m.7s., e = +22m.41s.
 Philadelphia e = +13m.11s. and +17m.41s., iS_cS = +18m.26s., i = +18m.44s., e = +20m.11s. and +22m.29s.
 St. Louis eE = +18m.21s., isSN = +18m.36s., isSE = +18m.39s., iE = +18m.59s., iN = +19m.4s. and +20m.31s., iE = +20m.37s.
 Florissant iPSN = +17m.38s., isSE = +18m.30s., isSN = +18m.33s., ipPS = +19m.4s.
 Buffalo i = +10m.30s., +10m.40s., +12m.4s., +12m.37s., and +14m.12s.
 Chicago U.S.C.G.S. e = +14m.31s., +17m.7s., +18m.35s., +23m.31s., and +25m.57s.
 Vermont e = +14m.54s., +20m.54s., +22m.41s., and +25m.48s.
 East Machias e = +14m.45s., esS = +19m.13s., i = +19m.21s., e = +22m.55s.
 Ottawa eN = +14m.43s.
 Lincoln i = +18m.11s., e = +20m.13s.
 Tucson i = +10m.54s., +11m.11s., and +13m.8s., isPP = +13m.37s., i = +18m.20s., isS = +19m.40s., iSS = +22m.12s.
 Seven Falls e = +17m.16s.
 La Jolla eSPE = +20m.5s.
 Riverside iSPEN = +20m.13s., PKP,PKP,Z = +38m.52s., eZ = +39m.52s.
 Mount Wilson isPZ = +12m.9s., ePKP,PKP,Z = +38m.56s., eZ = +39m.58s.
 Pasadena iPPZ = +13m.17s., isPE = +20m.18s., iEN = +21m.2s.
 Haiwee eZ = +39m.53s.
 Bozeman i = +21m.43s., eSS = +26m.33s., e = +27m.47s.
 Butte e = +26m.35s.
 Berkeley iZ = +11m.15s.
 Ukiah iS = +20m.44s., eSS = +25m.36s.
 Lisbon SE = +21m.29s., N = +32m.26s., E = +33m.8s.
 Seattle e = +21m.53s.
 Almeria PP = +15m.18s., PPP = +17m.0s., S_cS = +22m.28s., PPS = +23m.25s., SS = +27m.22s., SSS = +30m.34s.
 Toledo P_cP = +12m.6s., PP = +15m.29s., S = +22m.8s.
 Sitka e = +24m.1s., +24m.44s., +25m.2s., and +33m.25s.
 Aberdeen iN = +36m.4s., eE = +36m.54s.
 Scoresby Sund i = +11m.58s., e = +28m.1s., i = +29m.47s., isSS = +30m.52s., i = +31m.16s.
 Uccle eEN = +24m.52s., eE = +29m.27s.
 De Bilt iZ = +25m.9s., eSS = +30m.4s.
 Stuttgart eSEN = +24m.31s.
 Rome eNZ = +16m.49s., eN = +24m.5s., isSE = +24m.56s., eZ = +26m.40s.?, eN = +30m.29s.?
 Potsdam eZ = +36m.26s.
 Prague e = +22m.45s.
 Wellington S?Z = +20m.11s.
 College eS = +24m.34s., e = +36m.52s.
 Bucharest iEN = +24m.15s.
 Helwan SKS = +24m.20s., PSE = +28m.59s.
 Bombay eEN = +20m.12s., and +23m.57s., eE = +24m.13s., eEN = +29m.5s.
 Agra i = +20m.23s. and +23m.47s.
 Manila iZ = +24m.57s., iE = +26m.0s. PP is given as S.

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Dec. 22d. Readings also at 7h. (near Bucharest), 10h. (Sofia and near Bucharest), 17h. (near Tananarive), 20h. (Zurich, Honolulu, Tinemaha, Pasadena, Mount Wilson, Riverside, Wellington, and Christchurch), 23h. (near La Paz).

Dec. 23d. 21h. Undetermined shock.

Intensity VI at Helena (Montana). Epicentre near Helena.

F. Neumann.

United States Earthquakes, 1940. Washington, 1943, p. 15.

Butte iP = 50m.43s., i = 50m.51s. and 51m.37s., e = 54m.51s.
 Bozeman iP = 50m.53s., i = 51m.19s. and 52m.6s.
 Spokane iPEN = 51m.50s., iN = 52m.4s., iSEN = 52m.20s., iLEN = 52.7m.
 Saskatoon e = 52m.46s., L = 54.0m.
 Tinemaha ePZ = 53m.0s., eS = 56m.0s.
 Tucson eP = 53m.54s., i = 54m.29s., e = 55m.6s. and 55m.34s., eL = 58.1m.
 Haiwee eSN = 56m.30s.
 Cape Girardeau eE = 57m.52s., eN = 59m.24s., iN = 59m.42s.
 Ottawa eZ = 61m.19s., L = 64.0m.
 Shawinigan Falls e = 62m.18s., L = 64.0m.

Dec. 23d. Readings also at 4h. (near Tananarive), 5h. (near Mizusawa and Vladivostok), 6h. (Irkutsk and Sverdlovsk), 9h. (Ksara), 11h. (Stuttgart), 19h. (La Paz), 21h. (Spokane), 22h. (Calcutta).

Dec. 24d. 13h. 43m. 44s. Epicentre 43°·8N. 71°·3W. (as on 1940 Dec. 20d.).

Repetition of the quake of Dec. 20, 1940. Damage in the epicentral zone at Wonalancet and Tamworth. Epicentre 43°50'N. 71°17'W. (W. of Whittier). Macro seismic area 385,000 square miles.

L. Don Leet and D. Linehan, S. J.

Instrumental study of the New Hampshire Earthquakes of Dec., 1940. Bulletin of the Seismological Society of America, Vol. 32, No. 2, April 1942, pp. 75-92. Macro seismic chart, fig. 1, p. 77.

F. Neumann.

United States Earthquakes, 1940, Washington 1943, p. 13.

A = +.2322, B = -.6859, C = +.6897; $\delta = +6$; H = -3;
 D = -.947, E = -.321; G = +.221, H = -.653, K = -.724.

	Δ	Az.	P.	O - C.	S.	O - C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Harvard	1.3	189	i 0 27	+ 2	i 0 44	0	—	—
Weston	1.4	181	0 28	+ 1	—	—	—	—
Shawinigan Falls	2.9	339	0 46	- 2	1 27	+ 3	0 52	P*
Seven Falls	3.3	4	0 52	- 1	0 58	- 37	—	—
Fordham	3.5	214	i 0 55	- 2	i 1 39	- 1	i 1 10	P _s
Ottawa	3.5	298	0 55	- 2	1 34	- 6	1 45	S*
Philadelphia	4.8	218	e 1 16	+ 1	i 2 12	0	i 1 30	P*
Buffalo	5.6	263	i 1 28	+ 1	2 27	- 6	i 1 42	P*
Pennsylvania	5.7	242	e 1 34	+ 6	i 2 48	S*	i 1 43	P*
Pittsburgh	7.2	246	e 1 42	- 7	e 3 17	+ 4	i 2 12	P*
Cincinnati	10.9	250	e 3 23	?	e 4 34	- 10	1 5 23	SSS
Chicago J.S.A.	12.1	268	e 2 53	- 6	i 4 59	- 15	—	—
Chicago U.S.C.G.S.	12.1	268	—	—	e 4 42	- 32	i 5 33	SS
Florissant	15.1	258	e 3 32	- 4	i 6 20	- 5	—	—
Cape Girardeau	15.3	253	e 3 39	0	i 6 47	SS	—	—
Lincoln	18.9	270	e 4 26	+ 2	e 8 0	+ 7	e 5 56	?
Saskatoon	24.9	302	—	—	e 10 3	+ 16	—	—
Denver	25.4	271	—	—	e 11 8	SS	—	—
Bozeman	28.1	288	—	—	e 11 46	SS	—	—
Tucson	32.9	263	e 6 38	0	e 11 34	- 22	i 7 50	PP

Additional readings:—

Shawinigan Falls i = +1m.8s.
 Fordham i = +1m.45s.
 Ottawa P = +1m.0s.
 Philadelphia e = +1m.41s., i = +2m.14s.
 Buffalo i = +2m.15s., +2m.39s., and +2m.45s.

Continued on next page.

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Pennsylvania $i = +2m.0s.$ and $+3m.0s.$
 Pittsburgh $iZ = +1m.51s., i = +3m.34s.$
 Chicago J.S.A. $i = +2m.56s.$
 Chicago U.S.C.G.S. $i = +4m.59s., +5m.6s., +5m.43s.,$ and $+6m.9s.$
 Florissant $iPE = +3m.35s., iE = +6m.12s., iZ = +6m.34s.$
 Denver $eN = +11m.52s.$
 Tucson $i = +8m.2s., e = +12m.0s.$

Long waves were also recorded at Sitka, Tinemaha, Haiwee, Riverside, Mount Wilson, La Jolla, Pasadena, De Bilt, Seattle, Scoresby Sund, San Juan, College, Butte, Bermuda, Spokane, and Mobile.

Dec. 24d. Readings also at 1h. (near Balboa Heights), 3h. (near Mizusawa), 13h. (near Harvard), 14h. (near Harvard), 16h. (Mizusawa), 18h. (near Harvard), 20h. (River-view and La Paz).

Dec. 25d. 4h. 41m. 6s. Epicentre $38^{\circ}6N. 142^{\circ}5E.$ (as on 1939 June 17d.).

Very strong at Miyako, moderate at Sendai, Morioka, and Mito, etc., slight at Yamagata, Hukusima, Onahama, and Shirakawa, etc.

Epicentre $38^{\circ}6N. 142^{\circ}1E.$ Macro seismic radius 200-300kms. Shallow.

See Seismological Bulletin of the Central Met. Obs., Japan, for the year 1940. Tokyo, 1950, pp. 36-37. Macro seismic chart p. 36.

$A = -.6216, B = +.4770, C = +.6213; \delta = -7; h = -1;$
 $D = +.609, E = +.793; G = -.493, H = +.378, K = -.784.$

	Δ		Az.		P.		O-C.		S.		O-C.		Supp.		L. m.
	m.	s.	m.	s.	m.	s.	m.	s.	m.	s.	m.	s.	m.	s.	
Miyako	1.1	339	0	24k	+	2	—	—	—	—	—	—	—	—	—
Mizusawa	1.2	297	0	22	—	2	0	35	—	6	—	—	—	—	—
Sendai	1.3	255	0	20k	—	5	0	35	—	9	—	—	—	—	—
Hukusima	1.8	242	0	28k	—	4	0	49	—	7	—	—	—	—	—
Hatinohe	2.1	339	0	38a	+	1	1	3	—	1	—	—	—	—	—
Onahama	2.1	217	0	36	—	1	0	57	—	7	—	—	—	—	—
Akita	2.2	300	0	39	+	1	1	18	S _s	—	—	—	—	—	—
Aomori	2.6	329	0	47k	+	3	1	19	+	2	—	—	—	—	—
Mito	2.8	216	0	43a	—	4	1	6	—	16	—	—	—	—	—
Utunomiya	2.9	226	0	44	—	4	1	14	—	10	—	—	—	—	—
Tukubasan	3.1	219	0	46	—	5	0	58	—	31	—	—	—	—	—
Tyosi	3.1	204	0	49	—	2	1	32	+	3	—	—	—	—	—
Aikawa	3.4	262	0	54	—	1	1	35	—	2	—	—	—	—	—
Maebasi	3.5	233	0	54	—	3	1	33	—	7	—	—	—	—	—
Tokyo Cen. Met. Ob.	3.6	219	0	58		0	1	38	—	4	1	52	S*	—	—
Mori	3.8	338	1	6k	P*		1	59	S*		—	—	—	—	—
Yokohama	3.9	217	1	4	+	2	1	43	—	7	—	—	—	—	—
Mera	4.3	211	1	5	—	3	—	—	—	—	—	—	—	—	—
Misima	4.5	221	1	7	—	4	2	3	—	2	—	—	—	—	—
Osima	4.6	214	1	8	—	4	1	51	—	16	—	—	—	—	—
Toyama	4.6	248	1	22	P*		2	0	—	7	—	—	—	—	—
Wazima	4.6	257	1	10	—	2	2	1	—	6	—	—	—	—	—
Nemuro	5.3	25	1	29	P*		2	26	+	1	—	—	—	—	—
Hamamatu	5.5	227	1	20k	—	5	2	26	—	4	—	—	—	—	—
Gihu	5.6	238	1	23	—	4	2	24	—	9	—	—	—	—	—
Nagoya	5.6	234	1	25	—	2	2	25	—	8	—	—	—	—	—
Hatidyozima	5.9	202	1	25	—	6	2	23	—	17	—	—	—	—	—
Hikone	6.0	239	1	31a	—	1	2	38	—	5	—	—	—	—	—
Kameyama	6.1	234	1	40	+	6	3	11	+	26	—	—	—	—	—
Kyoto	6.5	239	1	37	—	2	—	—	—	—	—	—	—	—	—
Osaka	6.8	237	2	4	P*		3	8	+	5	—	—	—	—	—
Owase	6.8	231	1	49	+	5	2	50	—	13	—	—	—	—	—
Kobe	7.1	239	1	44	—	4	3	8	—	2	—	—	—	—	—
Siomisaki	7.5	229	3	5	S		(3	5)	—	15	—	—	—	—	—
Sumoto	7.5	237	2	10	P*		3	13	—	7	—	—	—	—	—
Vladivostok	9.2	303	e	2 14	—	2	i	3 57	—	6	—	—	—	—	4.6
Giran	22.4	239	1	8	?		—	—	—	—	—	—	—	—	—
Tashkent	54.4	299	e	9 28	—	3	—	—	—	—	—	—	—	—	30.0
Sverdlovsk	54.6	318	i	9 26	—	6	—	—	—	—	—	—	—	—	25.9

Long waves were also recorded at Rome, Irkutsk, Baku, De Bilt, and Uccle.

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Dec. 25d. 23h. 7m. 34s. Epicentre $36^{\circ}3'N$. $71^{\circ}0'E$. (as on 1940 Nov. 20d.).

Intensity VII at Srinagar, V at Drosh, III at Peshawar. Epicentre Hindou-Kouch. See Government of India Seismological Bulletin, 1940, p. 93.

$$A = +.2630, B = +.7638, C = +.5894; \quad \delta = -5; \quad h = 0; \\ D = +.946, E = -.326; \quad G = +.192, H = +.557, K = -.808.$$

Tables for depth of focus 0.025 have been used.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	s.
Andijan		4.6	14	e 1 11	+ 1	—	—	—	—
Samarkand		4.6	319	1 6	- 4	—	—	—	—
Tashkent		5.2	347	i 1 17	- 1	2 15	- 3	—	—
Tchimkent		6.1	351	e 1 30	+ 1	—	—	—	—
Almata		8.3	32	2 0	+ 2	—	—	—	—
Dehra Dun	N.	8.4	133	e 2 21?	pP	e 3 21	-12	e 3 51	sS
Agra	E.	10.9	145	e 2 35	+ 3	4 30	- 1	—	—
Baku		17.0	290	e 4 8	pP	e 6 54	+ 5	—	—
Bombay		17.4	174	i 3 56	+ 4	i 7 8	+10	—	—
Hyderabad	E.	19.9	159	—	—	8 1	sS	—	—
Calcutta	N.	20.4	127	e 6 24	?	i 8 19	sS	—	—
Sverdlovsk		21.7	345	i 4 36	0	i 8 23	+ 4	i 5 38	sP
Moscow		29.8	321	e 5 50	- 1	e 10 29	- 3	—	—
Pulkovo		35.1	325	e 6 33	- 4	e 11 49	- 5	—	—
Warsaw		38.3	311	—	—	e 14 56?	SS	e 15 26?	SSS
Rome		45.0	296	—	—	e 14 17	- 4	e 13 42	?

Bombay also gives $eE = +4m.3s$.
Long waves were also recorded at De Bilt and Irkutsk.

Dec. 25d. Readings also at 3h. (Riverside, Haiwee, Tinemaha, and La Paz), 5h. (near Ottawa and Harvard), 6h. (near Cape Girardeau, Pennsylvania, near Mizusawa, Harvard, and Pittsburgh), 8h. (near Apia), 12h. (Basle, Tucson, Stuttgart, Haiwee, Pittsburgh, Riverside, Tinemaha, Mount Wilson, and Pasadena), 14h. (Clermont-Ferrand), 18h. (La Plata, Riverside, Haiwee, Tinemaha, Mount Wilson, La Paz, and Pasadena).

Dec. 26d. 23h. 27m. 59s. Epicentre $41^{\circ}4'N$. $140^{\circ}4'E$.

$$A = -.5797, B = +.4795, C = +.6588; \quad \delta = -1; \quad h = -2; \\ D = +.637, E = +.771; \quad G = -.508, H = +.420, K = -.752.$$

Slight at Urakawa, Obihiro, and Hatinohé.

Seismological Bulletin of Central Meteorological Observatory, Tokyo, 1940. Tokyo 1950, pp. 37, 38, with macroseismic chart.

The suggested Epicentre $41^{\circ}4'N$. $141^{\circ}8'E$. was found not in good accord and has been modified. The negative residuals for distant station suggest a deep focus, but this is not supported by the Japanese readings, and the determination must be regarded as hypothetical.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Aomori	0.6	154	0 8 _a	- 7	0 18	- 8	—	—
Mori	0.7	10	0 16 _a	- 1	0 32	+ 4	—	—
Hatinohé	1.2	135	0 19 _a	- 5	0 35	- 6	—	—
Akita	1.7	188	0 33 _a	+ 2	0 58	+ 4	—	—
Sapporo	1.8	23	0 23 _a	- 9	0 43	-13	—	—
Miyako	2.2	146	0 30 _k	- 8	0 41	-25	—	—
Mizusawa	2.3	166	0 39	- 1	1 7	- 2	—	—
Sendai	3.1	173	0 51	0	1 24	- 5	—	—
Hokusima	3.6	180	1 1	+ 3	1 53	S*	—	—
Aikawa	3.8	207	1 4	+ 3	—	—	—	—

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.
Nemuro	4.3	62	0 50	-18	1 27	-33	—	—
Onahama	4.5	175	1 31	P _g	2 18	S*	—	—
Wazima	4.8	215	1 19	+ 4	2 23	S*	—	—
Utunomiya	4.9	185	1 15	- 2	2 13	- 2	—	—
Nagano	5.0	201	1 22	+ 4	2 2	-16	—	—
Mito	5.0	180	1 19	+ 1	2 35	S*	—	—
Kakioka	5.1	183	1 19	- 1	—	—	—	—
Maebasi	5.1	192	1 15	- 5	—	—	—	—
Tukubasan	5.2	183	1 18	- 3	2 15	- 7	—	—
Kumagaya	5.3	190	1 34	P*	2 42	S*	—	—
Tyosi	5.6	176	1 19	- 8	—	—	—	—
Tokyo Cen. Met. Ob.	5.7	186	1 41	P*	3 2	S _g	—	—
Kohu	5.9	195	1 13	-18	—	—	—	—
Hunatu	6.0	193	1 32	0	3 7	S*	—	—
Yokohama	6.0	186	1 41	P*	3 6	S*	—	—
Misima	6.4	191	1 44	+ 6	—	—	—	—
Mera	6.5	184	2 9	P _g	—	—	—	—
Vladivostok	6.5	288	1 42	+ 3	3 17	S*	—	5.0
Gihu	6.6	207	1 43	+ 2	3 6	+ 8	—	—
Nagoya	6.8	205	1 47	+ 3	3 49	S _g	—	—
Kameyama	7.2	206	1 48 _a	- 1	4 25	?	—	—
Andijan	50.0	292	—	—	e 15 56	-13	—	—
Tchimkent	51.3	296	—	—	16 9	-17	—	—
Sverdlovsk	51.4	317	i 8 54	-15	16 6	-22	—	26.0
Samarkand	54.2	294	9 9	-20	16 40	-26	—	—
Tinemaha	z. 73.9	55	i 11 19	-20	—	—	—	—
Haiwee	z. 74.7	55	i 11 23	-20	—	—	—	—
Pasadena	z. 75.8	57	i 11 28	-22	—	—	—	—
Mount Wilson	z. 75.9	57	i 11 31	-19	—	—	—	—
Riverside	z. 76.4	57	i 11 32	-21	—	—	—	—

Long waves were recorded also at Irkutsk.

Dec. 26d. Readings also at 1h. (Rome), 3h. (Tinemaha and Riverside), 6h. (Haiwee, Riverside, Mount Wilson, Pasadena, Tinemaha, College, Sitka, Butte, Bozeman, Tucson, Balboa Heights, Cape Girardeau, Lincoln, Philadelphia, Pennsylvania, Harvard, Buffalo, Ottawa, Cincinnati, Shawinigan Falls, and Seven Falls. Two or perhaps three shocks are represented in the above list, with epicentres near Sitka, Lincoln, Buffalo, and Balboa Heights), 7h. (near Mizusawa), 10h. (Fresno, near Branner, and Lick), 14h. (Mount Wilson, Riverside, and La Paz), 16h. (Rome and near Tananarive), 19h. (near Mizusawa), 20h. (La Paz, Huancayo, and Rome), 21h. (La Paz, Huancayo, Rome, near Bucharest, and Sofia).

Dec. 27d. 16h. 57m. 25s. Epicentre 39°·0N. 74°·0E.

U.S.S.R. gives Epicentre 39°·6N. 72°·6E.

$$A = +.2148, B = +.7490, C = +.6268; \quad \delta = +2; \quad h = -1;$$

$$D = +.961, E = -.276; \quad G = +.173, H = +.603, K = -.779.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Andijan	2.1	324	i 0 27	-10	i 0 44	P _g	—	—
Frunse	3.9	8	1 3	+ 1	1 49	- 1	—	—
Tashkent	4.2	305	e 1 4	- 3	e 1 48	- 9	—	2.0
Tchimkent	4.7	316	e 1 16	+ 2	—	—	—	—
Almata	4.8	27	1 21	+ 6	2 29	S*	—	—
Agra	E. 12.3	163	—	—	e 5 32	SS	—	—
Calcutta	N. 20.5	139	—	—	e 7 35	-52	e 9 47	SSS e 12.2

Long waves were also recorded at Kodaikanal, Semipalatinsk, Uccle, Potsdam, De Bilt, Baku, Vladivostok, and Sverdlovsk.

Dec. 27d. Readings also at 1h. (Sofia), 2h. (Tucson, Riverside, Tinemaha, Pasadena, Palomar, Huancayo, and La Paz), 11h. (near Mizusawa), 17h. (near La Paz), 18h. (College), 19h. (Shawinigan Falls, Ottawa, La Plata, near Harvard, La Paz, Huancayo, Mount Wilson, Riverside, and Tinemaha), 22h. (Bozeman, Irkutsk, Scoresby Sund, Sverdlovsk, Vladivostok, Baku, Tashkent, Mount Wilson, Riverside, Tinemaha, Palomar, and Pasadena).

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Dec. 28d. 16h. 37m. 40s. Epicentre 18°·1N. 147°·5E.

A = -·8022, B = +·5111, C = +·3088; $\delta = +11$; $h = +5$;
D = +·537, E = +·843; G = -·260, H = +·166, K = -·951.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.	
			m.	s.		m.	s.		m.	s.		
Titizima	10·2	332	2	29	- 2							
Yokohama	18·6	339	4	20	- 1	8	7	SS				
Nagoya	19·4	336	4	30	0	8	23	SS				
Sumoto	19·7	331	4	32	- 2	8	12	+ 2				
Matuyama	20·5	325	4	41	- 1	8	25	- 2				
Sendai	20·9	347	4	46	0	8	41	+ 6				
Hukuoka	21·7	319	4	58	+ 3	8	51	0				
Mizusawa	21·7	348	4	54	- 1	8	41	-10				
Taihoku	25·1	291	5	37	+ 9							
Sapporo	25·4	351	5	33	+ 2	11	21	SSS				
Manila	25·7	267	i 5	32 _a	- 1	10	13	+12	i 6	26	PP	
Zinsen	26·6	321	· 5	42	0	10	16	0				
Zi-ka-wei	26·9	305	e 5	40	- 5	10	30	+10	i 6	54	PP	18·0
Vladivostok	28·2	336	i 5	57	+ 1	i 10	46	+ 5				12·9
Phu-Lien	38·6	282	e 7	28	+ 2	13	28	+ 5				
Irkutsk	47·9	326	1	8	42	0	i 15	37	- 2			23·3
Honolulu	50·6	76	e 9	8	+ 6	i 16	42	+25	i 10	24	P _c P	21·7
Riverview	51·8	176	e 9	12	0	i 16	31	- 2	11	10	PP	e 23·6
Sydney	51·8	176	e 8	44	-28	i 16	38	+ 5				e 22·3
Adelaide	53·4	189	i 9	26	+ 2	i 16	56	+ 1	10	40	P _c P	28·2
Calcutta	N. 55·3	285	i 9	45 _a	+ 7	i 17	21	0	e 10	26	PP	
Perth	58·3	212	10	10	+11	18	3	+ 2	12	10	PP	27·4
Arapuni	61·8	155				19	14	+28				26·8
Semipalatinsk	61·8	318	10	20	- 3	18	42	- 4				
Tuai	63·0	154	10	30	- 1							
College	63·1	26	e 10	28	- 4	e 19	10	+ 8	e 11	10	P _c P	i 26·2
Almata	63·8	310	10	38	+ 2	19	10	- 1				
Agra	E. 64·1	292	e 10	34	- 4	19	7	- 7	10	49	pP	
Wellington	64·3	158	10	36 _a	- 3	19	20	+ 3	11	17	P _c P	28·9
Hyderabad	65·4	281	10	45	- 2	19	28	- 2	20	27	S _c S	32·7
Christchurch	65·5	160	10	49 _a	+ 2	19	31	- 1	27	6	L _a	32·2
Frunse	65·5	309	10	51	+ 4	19	39	+ 7				39·5
Colombo	E. 66·7	269	10	56	+ 1	i 19	46	0				32·1
Andijan	67·3	307	10	59	0							39·1
Kodaikanal	E. 68·0	274	i 11	1k	- 2	i 19	51	-11				i 33·1
Sitka	68·1	35	i 11	2	- 2	i 20	12	+ 9	e 13	44	PP	e 27·5
Tchimkent	69·2	309	e 11	10	0							
Tashkent	69·5	308	e 11	12	0	i 20	17	- 3				32·5
Bombay	70·3	284	i 11	21	+ 4	i 20	25	- 4	i 11	33	P _c P	33·6
Samarkand	71·5	306				20	43	0				39·6
Sverdlovsk	73·3	325	i 11	34	- 1	i 21	1	- 3				31·3
Victoria	76·1	43	11	52	+ 1	21	13	-22	14	47	PP	32·3
Seattle	77·0	44	e 11	27	-29	e 21	7	-38	e 14	20	PP	e 27·8
Ferndale	77·2	51				e 32	20	?				e 35·3
Ukiah	78·3	53	e 12	2	- 1	e 22	4	+ 5	e 29	50	SSS	e 31·6
San Francisco	79·2	54	e 12	12	+ 4							e 39·3
Berkeley	79·3	54	e 12	9	0							e 35·4
Branner	79·5	54	e 12	10	0				i 12	16	P _c P	e 41·8
Santa Clara	79·7	54	i 12	16	+ 5	i 22	37	+24				e 35·6
Lick	79·9	54	e 12	12	0	e 22	22	+ 6	e 15	6	PP	e 36·3
Fresno	N. 81·5	54	e 12	22	+ 1							
Tinemaha	82·6	54	i 12	25k	- 1							
Haiwee	83·1	54	i 12	28k	- 1							
Pasadena	83·5	56	i 12	31k	0	e 22	44	- 8	e 39	2	P'P'	e 37·2
Mount Wilson	83·6	56	i 12	31k	- 1				i 42	22	SKP,PKP	
Butte	83·9	43	12	33	0	e 23	0	+ 4	e 15	42	PP	e 34·7
Baku	84·1	311	12	39	+ 5	22	59	+ 1	15	51	PP	39·3
Riverside	84·2	56	i 12	33k	- 1	e 22	55	- 4	e 38	54	P'P'	
Palomar	z. 84·8	57	i 12	37	0							
Bozeman	85·0	44	i 12	40	+ 2	e 23	6	- 1	e 16	4	PP	35·3

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Saskatoon	85.2	37	12 44	+ 5	23 12	+ 3	—	37.3
Logan	85.8	48	12 45	+ 3	e 23 13	- 2	e 16 9	PP e 35.3
Grozny	86.0	314	—	—	e 23 19	+ 2	—	—
Moscow	86.0	328	12 42	- 1	23 5	[- 3]	16 9	PP
Salt Lake City	86.1	49	i 12 44	0	e 23 10	[+ 2]	e 16 12	PP e 35.1
Pulkovo	87.3	333	e 12 47	- 3	e 23 23	- 6	e 16 29	PP 43.0
Erevan	88.0	312	e 12 55	+ 2	—	—	—	—
Tucson	89.9	56	i 13 2	0	i 23 49	- 5	i 13 24	pP i 36.8
Scoresby Sund	91.3	357	(e 13 10)	+ 1	(i 24 3)	- 3	(e 16 56)	PP (40.1)
Upsala	92.4	337	e 13 20?	+ 6	e 23 56	[+ 9]	e 17 2	PP e 44.3
Bergen	96.0	342	e 14 20	+50	—	—	—	e 44.3
Warsaw	96.0	331	e 13 29	- 1	e 24 11	[+ 4]	e 17 39	PP e 51.3
Lincoln	96.5	43	e 13 29	- 3	e 26 29	PS	e 17 27	PP e 39.6
Ksara	96.9	308	e 13 34	0	e 24 15	[+ 4]	—	—
Bucharest	98.0	322	e 13 40	+ 1	e 23 56	[- 21]	e 17 54	PP 46.3
Istanbul	98.1	317	13 44	+ 4	—	—	17 44	PP
Potsdam	99.5	334	e 13 41	- 5	i 24 3	[- 22]	i 13 59	pP e 49.1
Hamburg	99.8	336	e 13 50	+ 3	e 24 32	[+ 6]	e 17 41	PP e 50.3
Budapest	E. 100.0	327	e 17 10	PKP	—	—	e 17 55	PP 51.3
	N. 100.0	327	e 17 3	PKP	e 25 39	+19	e 17 37	PP 51.3
Heligoland	N. 100.2	338	e 18 1	PP	e 24 38	[+10]	—	e 49.3
Prague	100.5	331	(e 13 42)	- 9	(e 24 20)	[- 10]	(e 16 59)	PP (e 47.3)
Sofia	100.7	321	e 15 2	?	e 25 38	+12	e 29 12	PPS 53.6
Aberdeen	100.8	343	i 18 11	PP	i 25 39	+12	i 32 41	SS 58.1
Jena	101.1	333	e 13 50	- 3	e 24 43	[+11]	e 17 57	PP e 47.3
Chicago U.S.C.G.S.	101.3	39	e 18 11	PP	e 24 41	[+ 8]	e 26 48	PS e 42.2
Rockefeller Mt.	101.3	170	e 13 29	-25	e 24 29	[- 4]	e 17 32	PP e 45.9
Florissant	101.7	43	i 13 53	- 3	i 24 48	[+13]	i 18 8	PP
St. Louis	101.9	43	i 13 54	- 3	i 24 33	[- 3]	i 18 2	PP e 31.6
Helwan	102.2	307	13 56	- 2	24 33	[- 5]	17 50	PP
De Bilt	102.8	337	e 14 0	- 1	e 24 50	[+10]	i 18 14	PP e 48.3
Cape Girardeau	103.1	44	e 18 20	PP	e 24 40	[- 1]	e 27 21	PS
Stonyhurst	103.8	342	—	—	i 26 10	+18	i 28 20	PPS e 51.3
Stuttgart	103.8	333	e 14 4	- 1	e 24 40	[- 5]	e 18 17	PP e 52.3
Uccle	104.1	337	e 14 6	- 1	i 24 57	[+11]	i 18 24	PP 49.3
Tananarive	104.8	255	—	—	e 24 57	[+ 7]	27 54	PS e 47.4
Zurich	105.1	333	e 14 9	- 2	25 5	[+14]	e 18 9	PP
Chur	105.1	332	e 14 11	0	—	—	e 18 29	PP
Kew	105.2	340	i 14 14	+ 3	25 1	[+ 9]	i 18 28	PP e 50.3
Oxford	105.3	341	e 18 26	PP	i 26 20	+15	—	e 47.1
Basle	105.4	333	e 14 12	- 1	—	—	e 18 35	PP
Ottawa	105.6	30	e 18 44	PP	e 33 56	SS	—	e 47.3
Shawinigan Falls	106.1	27	e 18 32	PP	e 27 50	PS	—	49.3
Neuchatel	106.1	333	e 18 13	PP	—	—	—	—
Seven Falls	106.2	26	e 17 36	PP	e 25 11	[+15]	e 34 0	SSP 41.3
Paris	106.5	336	e 14 17	P	—	—	i 18 46	PP 54.3
Pittsburgh	107.0	36	e 18 32	PP	i 25 8	[+ 9]	e 20 21	PPP
Rome	107.3	326	14 18	P	i 25 6	[+ 6]	i 18 43	PP
Vermont	107.5	29	e 18 25	PP	e 25 8	[+ 7]	e 28 6	PS e 49.8
Clermont-Ferrand	108.7	335	e 18 39	PP	—	—	i 19 5	PP e 61.3
East Machias	109.8	26	e 16 14	?	e 25 21	[+ 9]	i 19 13	PP i 45.5
Harvard	z. 109.8	29	e 19 8	PP	e 28 50	PS	e 21 39	PPP
Philadelphia	109.9	33	e 19 11	PP	e 26 14	{+10}	i 28 31	PS e 51.1
Halifax	111.4	23	e 19 21	PP	e 28 50	PS	—	50.3
Algiers	115.9	328	i 19 50	PP	e 29 41	PS	e 35 45	SS 69.3
Toledo	116.5	336	e 18 50	[+ 4]	25 40	[+ 3]	19 51	PP 49.3
Almeria	118.4	333	19 53	PP	26 33	[- 29]	23 20	PKS 66.3
Granada	118.6	334	18 46 _a	[- 4]	25 25	[- 20]	20 13	PP 54.3
Lisbon	119.4	339	20 8	PP	30 13	PS	—	74.8
San Fernando	120.2	336	20 33	PP	e 30 23	PS	e 36 53	SS 63.3

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bermuda	121.1	31	i 20 25	PP	e 29 56	PS	20 35	pPP e 47.7
San Juan	130.9	44	e 21 36	PP	e 32 22	PS	i 24 29	PPP e 53.9
Cape Town	E. 132.0	240	e 21 50	PP	—	—	e 22 55	PPS 62.3
Huancayo	138.3	88	e 19 19	[- 9]	i 25 59	[- 38]	e 22 27	PP i 57.3
La Paz	146.0	92	i 19 44	[+ 3]	29 54	[- 2]	i 20 8	pPKP 67.8
La Plata	151.9	131	19 57	[+ 8]	—	—	—	74.9
Rio de Janeiro	168.9	119	e 20 20	[+11]	—	—	—	—

Additional readings:—

Manila iE = +6m.42s. and +8m.4s.

Zi-ka-wei iE = +10m.42s.

Honolulu i = +9m.47s., +12m.31s., +17m.25s., +18m.23s., and +19m.25s., iSS = +19m.52s.

Riverview iPEN = +9m.15s., iN = +10m.12s., iPPE = +11m.14s., iN = +16m.35s., iScSE = +19m.4s., iE = +19m.29s., SSSN = +20m.52s., iEN = +22m.19s.

Adelaide i = +9m.36s., PP = +11m.21s., i = +16m.25s. and +18m.48s., ScS = +19m.18s., i = +19m.39s., SS = +20m.3s.

Calcutta iSN = +18m.38s.

Perth PPP = +13m.5s., i = +15m.10s., PS = +18m.27s. +20m.40s., SS = +22m.0s., SSS = +23m.40s.

College e = +15m.37s., +18m.25s., and +20m.35s., eSS = +23m.21s., e = +24m.26s.

Agra E. iP = +10m.37s., PP = +12m.39s., pPP = +14m.29s., PS = +19m.14s., sS = +19m.37s., ScS = +20m.20s., SS = +23m.22s., sSS? = +23m.51s.

Wellington iZ = +11m.36s. and +12m.10s., PPZ = +12m.57s., iZ = +14m.8s., i = +19m.5s., SP? = +19m.27s., i = +19m.45s., ScS = +20m.35s., i = +22m.27s., SS = +23m.17s., L_a = +26m.17s.

Sitka i = +14m.23s., +15m.39s., +20m.20s., and +20m.32s., iScP = +20m.40s., i = +24m.55s.

Bombay iPPE = +13m.31s., iScSEN = +21m.20s., eEN = +25m.37s.

Victoria SSE = +26m.10s., SSS = +29m.50s.

Seattle e = +17m.16s., +19m.13s., and +24m.5s.

Ukiah e = +18m.12s. and +24m.52s.

Berkeley iZ = +13m.24s., eZ = +20m.18s.

Branner iEN = +12m.46s.

Fresno eN = +14m.38s.

Pasadena iN = +23m.1s., iE = +23m.45s., eSKP,PKPZ = +42m.15s., ePKP,PKP,PKP,Z = +59m.21s.

Butte e = +12m.57s., iS = +23m.20s., e = +24m.19s.

Riverside eSKP,PKPZ = +42m.18s., ePKP,PKP,PKPZ = +59m.20s.

Bozeman i = +12m.52s. and +16m.49s., iS = +23m.13s., i = +24m.32s., iSS = +28m.37s., e = +32m.32s.

Logan e = +13m.53s., +29m.14s., and +32m.31s.

Salt Lake City e = +13m.20s. and +22m.33s., iS = +23m.22s., e = +26m.29s., eSS = +28m.46s.

Tucson i = +13m.6s., +13m.34s., and +14m.32s., iPP = +17m.14s., i = +18m.56s., iSKS = +23m.9s., i = +24m.29s., +25m.4s., and +31m.57s.

Scoresby Sund i = (+17m.38s.), (+18m.17s.), and (+20m.53s.), eSS = (+30m.22s.), all readings have been increased by 2m.

Upsala eE = +28m.20s.

Bergen ePP = +18m.24s.

Warsaw eZ = +19m.36s., eE = +22m.52s., eZ = +24m.43s., eE = +24m.47s., eZ = +27m.42s.

Lincoln e = +15m.59s., eSS = +31m.31s.

Bucharest eN = +14m.2s., eZ = +17m.47s., eN = +19m.20s., eS?E = +24m.12s.

Potsdam iPZ = +13m.44s., iSPE = +14m.11s., eN = +15m.8s., iZ = +17m.45s., iEN = +17m.48s., iPPZ = +17m.54s., iPPE = +18m.7s., iSPPZ = +18m.19s., iSKKS = +24m.39s., iZ = +26m.12s., iPPSZ = +26m.58s., iPPSN = +27m.49s., iPPSZ = +27m.53s., iSSN = +32m.3s., iSSPZ = +32m.14s., iSSPN = +32m.17s., iE = +37m.58s., iZ = +38m.37s., and +41m.38s.

Hamburg eNZ = +17m.46s., eN = +25m.13s. and +47m.51s.

Budapest eE = +23m.3s., SN? = +26m.29s.

Prague 12m. have been added to all readings; eSKS = (+23m.32s.), eSS = (+31m.20s.).

Sofia eE = +22m.38s., eS?N = +26m.38s.

Aberdeen eE = +45m.44s., L_aN = +51m.54s.

Jena ePN = +13m.53s., iE = +18m.1s., e = +32m.32s.

Chicago U.S.C.G.S. e = +25m.39s., eSS = +32m.15s., e = +35m.57s.

Rockefeller Mt. eS = +25m.12s.

Florissant iZ = +14m.35s., eZ = +17m.32s., iPSE = +27m.8s., iE = +27m.17s.

St. Louis eE = +14m.4s., +14m.7s., +17m.36s., +18m.10s., +18m.31s., and +24m.45s., iN = +24m.49s.

Helwan SE = +25m.30s.

De Bilt eSS = +32m.50s.

Stonyhurst i = +33m.10s.

Uccle eZ = +17m.40s., iPSEN = +27m.45s., eSSN = +33m.7s.

Continued on next page.

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Stuttgart eZ = +14m.9s., IPPEN = +18m.20s., iSKSEN = +24m.55s., eSN = +26m.0s., eSE = +26m.5s., ePSE = +27m.40s., ePSN = +27m.47s., iSSN = +33m.12s., iSSE = +33m.20s.
 Tananarive SSE = +33m.27s., SSS = +38m.21s.
 Kew ipPZ = +14m.23s., i = +18m.44s., NZ = +19m.4s., ePPP = +20m.54s., SEN = +26m.18s., ePSE = +27m.47s., eN = +27m.56s., eZ = +28m.0s., eNZ = +28m.7s., eSSE = +33m.20s., eSSSE = +37m.50s., eL_qEN = +43.3m.
 Ottawa e = +24m.50s.
 Seven Falls e = +27m.56s.
 Pittsburgh i = +28m.2s., +28m.44s., +29m.57s., and +31m.38s.
 Rome iPPPN = +21m.25s., iEZ = +22m.12s., iSKSN = +25m.9s., iSN = +26m.27s., iN = +27m.28s., iPSE = +27m.58s., iPSN = +28m.3s., iPPSE = +28m.53s., iN = +31m.0s., iSSN = +33m.55s., iN = +39m.10s., eN = +53m.48s., eE = +54m.58s., iN = +55m.59s.
 Vermont e = +29m.10s. and +32m.52s., eSS = +34m.10s., e = +37m.50s. and +40m.53s.
 East Machias i = +26m.16s., ePS = +28m.23s., eSS = +34m.33s.
 Harvard eZ = +19m.49s.
 Philadelphia e = +33m.15s., eSS = +34m.35s., e = +38m.56s., i = +48m.59s.
 Algiers i = +19m.55s.
 Toledo PS = +29m.50s., SS = +35m.58s.
 Almeria PP = +21m.9s., PPP = +23m.37s., SKKS = +27m.59s., PS = +30m.49s., PPS = +32m.13s., SS = +37m.16s., SSS = +41m.55s.
 Granada SKP = +21m.37s., PPP = +22m.53s., PS = +30m.24s., PPS = +31m.41s.
 Lisbon E = +20m.13s., N = +20m.16s., E = +21m.36s.
 Bermuda eSS = +36m.34s., esSS = +37m.17s.
 San Juan e = +22m.35s., i = +39m.57s.
 Huancayo i = +20m.26s., +23m.18s., and +24m.56s., e = +32m.39s., eSS = +39m.59s., i = +41m.17s.
 La Paz isPKPZ = +20m.27s., iZ = +21m.50s., iPPZ = +23m.21s., iZ = +26m.25s., iPPPZ = +27m.20s., SKKSN = +30m.14s., PSKS = +33m.32s., PPSZ = +37m.2s., iZ = +37m.56s., iSSZ = +42m.52s., iSSSN = +47m.38s.

Dec. 28d. Readings also at 2h. (Calcutta and Agra), 8h. (Christchurch and Wellington), 17h. (Palomar, La Paz, Mount Wilson, Haiwee, Tinemaha, Pasadena, Riverside, and Wellington), 19h. (Agra), 20h. (Balboa Heights), 21h. (Bombay, Manila, Agra, and Calcutta), 22h. (near Tananarive), 23h. (Tinemaha (2), Pasadena, and Riverside (2)).

Dec. 29d. 16h. 38m. 0s. Epicentre 8°·8N. 82°·7W. (as on 1939 Oct. 20d.).

A = +·1256, B = -·9804, C = +·1520; δ = +6; h = +7
 D = -·992, E = -·127; G = +·019, H = -·151, K = -·988.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
San Juan	18·7	58	—	—	e 7 57	+ 9	—	e 10·9
Huancayo	22·0	160	i 4 46	-12	i 8 47	- 9	e 5 8 PP	10·5
La Paz	29·0	149	6 2	- 2	10 47	- 7	—	14·0
St. Louis	30·4	349	e 5 4	-72	e 12 37	SS	—	e 20·6
Florissant	30·7	349	—	—	e 12 8	+47	e 12 56 SS	—
Tucson	35·0	316	i 6 57	+ 1	e 12 44	+16	e 8 23 PP	e 15·4
Palomar	z. 39·9	314	e 7 31	- 6	—	—	—	—
Riverside	z. 40·5	314	e 7 42	0	—	—	—	—
Mount Wilson	z. 41·1	314	i 7 45	- 2	—	—	—	—
Haiwee	z. 42·1	316	e 7 55	0	—	—	—	—
Tinemaha	z. 42·8	317	e 8 2	+ 1	—	—	—	—

Additional readings:—

San Juan e = +7m.5s.
 Huancayo i = +6m.26s., e = +6m.46s., i = +9m.20s.
 Tucson i = +7m.6s., +7m.24s., and +7m.57s., e = +8m.49s.
 Long waves were also recorded at Salt Lake City and Bozeman.

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Dec. 29d. 18h. 5m. 36s. Epicentre $1^{\circ}5'N$. $90^{\circ}3'W$. (as on 1940 Aug. 26d.).

$A = -0.0052$, $B = -0.9997$, $C = +0.0280$; $\delta = +10$; $h = +7$;
 $D = -1.000$, $E = +0.005$; $G = 0.000$, $H = -0.026$, $K = -1.000$.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Huancayo		20.1	134	e 4 43	+ 5	i 8 42	+23	—	i 9.8
La Paz		28.3	130	e 5 58	+ 1	i 10 46	+ 3	—	12.9
San Juan		29.0	53	e 8 5	PP	e 11 2	+ 8	—	e 13.8
Tucson		36.2	330	e 7 2	- 4	e 12 51	+ 4	i 7 43	17.8
St. Louis		37.0	0	e 7 12	- 1	e 13 1	+ 2	—	e 20.0
Florissant	E.	37.1	0	—	—	i 13 3	+ 2	—	—
Bermuda		38.9	36	e 9 5	PP	—	—	—	e 13.0
Palomar	Z.	40.3	325	i 7 39	- 1	—	—	—	—
Philadelphia		40.7	19	—	—	e 13 57	+ 2	e 16 54	SS e 18.5
Riverside	Z.	41.1	325	e 7 45	- 2	—	—	—	—
Mount Wilson	Z.	41.6	325	i 7 50	- 1	—	—	—	—
Pasadena		41.6	325	—	—	e 14 20	+12	—	—
Haiwee		42.9	327	e 8 1	0	—	—	—	—
Salt Lake City		43.7	336	—	—	e 14 39	0	—	e 21.1
Tinemaha	Z.	43.8	327	e 8 6	- 3	—	—	—	—
Berkeley		46.6	325	—	—	e 15 15	- 6	—	e 23.1
La Plata	E.	47.2	143	15 42	S	(15 42)	+13	—	23.9
Bozeman		47.6	341	—	—	e 15 41	+ 6	—	e 21.7
East Machias		47.6	23	—	—	e 15 45	+10	—	e 19.5
Rome	E.	98.5	47	—	—	e 28 55	?	—	—

Additional readings:—

Huancayo iP = +4m.50s., i = +5m.17s., e = +6m.52s., i = +8m.52s.

Tucson i = +7m.5s. and +7m.32s., +8m.1s., and +9m.2s.

St. Louis iZ = +7m.16s., eE = +7m.21s., eEN = +12m.58s.

Bozeman e = +15m.34s.

East Machias e = +14m.27s.

Long waves were also recorded at Ukiah, College, Scoresby Sund, and other European stations.

Dec. 29d. Readings also at 1h. (near Mizusawa), 2h. (Manila), 4h. (Balboa Heights), 5h. (Fresno, Lick, and near Branner), 7h. (Tinemaha and Riverside), 10h. (near Ksara), 17h. (Christchurch), 18h. (Arapuni, Wellington, and Christchurch), 19h. (Bozeman, Tucson, St. Louis, San Juan, and La Paz), 20h. (La Paz).

Dec. 30d. 20h. 51m. 38s. Epicentre $34^{\circ}2'N$. $136^{\circ}8'E$.

Slight at Tokyo, Tukubasan, Utunomiya, and Mito.

Epicentre $34^{\circ}2'N$. $136^{\circ}8'E$. Radius 200-300kms. Depth 360kms. approx.

See Seismological Bulletin of the Central Met. Obs., Japan, for the year 1940. Tokyo, 1950, pp. 38-39. Macroseismic chart p. 38.

$A = -0.6042$, $B = +0.5674$, $C = +0.5595$; $\delta = +4$; $h = 0$;
 $D = +0.685$, $E = +0.729$; $G = -0.408$, $H = +0.383$, $K = -0.829$.

Tables for depth of focus 0.050 have been used.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Owase		0.5	255	0 44	0	1 20	+ 1	—	—
Kameyama		0.7	337	0 46k	+ 1	1 23	+ 3	—	—
Hamamatu		0.9	56	0 47	+ 1	1 26	+ 5	—	—
Nagoya		1.0	8	0 47	+ 1	1 25	+ 3	—	—
Hikone		1.1	337	0 48	+ 2	1 26	+ 3	—	—
Osaka		1.1	292	0 45	- 1	1 23	0	—	—
Siomisaki		1.1	229	0 46k	0	1 24	+ 1	—	—
Gihu		1.2	359	0 46	- 1	1 23	- 1	—	—
Kyoto		1.2	313	0 48	+ 1	1 27	+ 3	—	—
Wakayama		1.4	271	0 48a	0	1 24	- 1	—	—

Continued on next page.

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	Δ	Az.	P.		O - C.	S.		O - C.	Supp.		L. m.	
			m.	s.		m.	s.		m.	s.		
Kobe	1.6	290	0	48 ^a	-	1	1	26	-	1	—	—
Sumoto	1.6	275	0	50 ^a	+	1	1	28	+	1	—	—
Misima	2.0	63	0	51	-	1	1	34	+	2	—	—
Hunatu	2.1	51	0	48	-	4	1	34	+	1	—	—
Koyama	2.1	57	0	57	+	5	1	40	+	7	—	—
Toyooka	2.1	309	0	53	+	1	1	35	+	2	—	—
Muroto	2.4	246	2	28	?		3	13	?		—	—
Kamakura	2.5	64	0	57	+	2	1	40	+	1	—	—
Toyama	2.5	7	0	56	+	1	1	42	+	3	—	—
Mera	2.6	74	0	55	-	1	1	40		0	—	—
Titibu	2.6	46	0	57	+	1	1	44	+	4	—	—
Yokohama	2.6	62	0	57	+	1	1	46	+	6	—	—
Hatidyozima	2.7	114	0	57		0	—	—	—	—	—	—
Mitaka	2.7	57	0	57		0	1	42		0	—	—
Nagano	2.7	25	0	58	+	1	1	44	+	2	—	—
Komaba	2.8	58	0	57	-	1	1	42	-	1	—	—
Koti	2.8	257	0	57	-	1	1	45	+	2	—	—
Kumagaya	2.9	47	0	58	-	1	1	43	-	2	—	—
Maebasi	2.9	40	0	59		0	1	43	-	2	—	—
Tokyo Cen. Met. Ob.	2.9	59	0	58	-	1	1	42	-	3	—	—
Tokyo Imp. Univ.	2.9	59	0	57	-	2	1	41	-	4	—	—
Kiyosumi	3.0	71	0	57	-	3	1	43	-	3	—	—
Matuyama	3.4	263	1	3		0	1	54	+	1	—	—
Tukubasan	3.4	52	0	59	-	4	1	45	-	8	—	—
Utunomiya	3.4	47	1	2	-	1	1	50	-	3	—	—
Kakioka	3.5	52	1	7	+	3	1	59	+	4	—	—
Simidu	3.5	247	1	3	-	1	—	—	—	—	—	—
Mito	3.7	53	1	5	-	1	1	54	-	4	—	—
Tyosi	3.7	64	1	5	-	1	1	56	-	2	—	—
Hamada	4.0	285	1	50	+	41	3	5	+	61	—	—
Onahama	4.3	51	1	56	+	43	2	51	+	41	—	—
Miyazaki	5.0	244	1	21	+	1	2	25	+	2	—	—
Sendai	5.2	40	1	21	-	1	2	24	-	3	—	—
Kumamoto	5.3	255	1	23 ^a	-	1	2	30	+	1	—	—
Kagosima	5.9	246	1	32	+	2	—	—	—	—	—	—
Mizusawa	6.0	33	e 1	30	-	1	2	40	-	3	—	—
Akita	6.1	25	2	40 ^a	+	68	3	59	?		—	—
Husan	6.5	282	2	30	+	53	—	—	—	—	—	—
Miyako	6.8	35	1	6	-	35	2	49	-	11	—	—
Aomori	7.3	24	1	46 ^a	-	1	3	12	+	2	—	—
Hatinohe	7.3	29	1	45	-	2	3	1	-	9	—	—
Mori	8.4	19	1	40	-	20	3	9	-	25	—	—
Titizima	8.5	146	1	59	-	2	3	24	-	12	—	—
Tinemaha	80.5	52	i 11	32 ^a	-	3	—	—	—	—	—	—
Haiwee	81.3	52	i 11	37	-	2	—	—	—	—	—	—
Pasadena	z. 82.3	54	i 11	41 ^a	-	3	—	—	—	—	—	—
Riverside	z. 82.9	54	i 11	44	-	3	—	—	—	—	—	—
Palomar	z. 83.6	54	i 11	48 ^a	-	3	—	—	—	—	—	—

Long waves were also recorded at Tashkent, Vladivostok, Irkutsk, Baku, Moscow, Pulkovo, and Helwan.

Dec. 30d. 23h. Local Japanese shock. Tokyo Imperial University gives Epicentre 36°·0N. 140°·04E.

Tokyo Imp. Univ. P = 53m.46s., S = 53m.56s.
 Komaba P = 53m.48s., S = 53m.58s.
 Kamakura P = 53m.49s., S = 53m.58s.
 Kiyosumi P = 53m.49s., S = 54m.0s.
 Koyama P = 53m.49s., S = 54m.5s.
 Mitaka P = 53m.49s., S = 53m.59s.
 Titibu P = 53m.49s., S = 54m.3s.
 Togane P = 53m.49s., S = 54m.1s.
 Tukubasan P = 53m.49s., S = 53m.58s.

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Dec. 30d. Readings also at 4h. (near Mizusawa), 9h. (Sofia), 11h. (Sofia and La Paz), 12h. (Manila, Vladivostok, Irkutsk, Moscow, La Paz, and Sverdlovsk), 13h. (La Paz, Tashkent, and Pasadena), 15h. (near Apia and Christchurch), 16h. (Riverview, Moscow, Pulkovo, Wellington, Pasadena, Haiwee, and Tinemaha), 17h. (Arapuni, Christchurch, Sverdlovsk, Potsdam, Upsala, Warsaw, Baku, Tashkent, and Tuai), 20h. (Berkeley, Lincoln, Victoria, Tucson, Sitka, College, Seven Falls, Bozeman, Salt Lake City, Sverdlovsk, Haiwee, Riverside, Tinemaha, and Pasadena), 21h. (Scoresby Sund, East Machias, and Philadelphia).

Dec. 31d. 20h. 41m. 10s. Epicentre $18^{\circ}1N$. $147^{\circ}5E$. (as on 1941 Dec. 28d.).

$A = -8022$, $B = +5111$, $C = +3088$; $\delta = +11$; $h = +5$.

	Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.
	$^{\circ}$	$^{\circ}$	m.	s.	s.	m.	s.	s.	m.	s.	m.
Gihu	19.7	336	4	36	+ 2	8	21	+11	—	—	—
Nagano	20.2	338	4	40	+ 1	8	34	+13	—	—	—
Kumamoto	21.1	318	4	49	+ 1	8	45	+ 6	—	—	—
Manila	25.7	267	e 5	29	- 4	9	29	-32	—	—	11.8
Vladivostok	28.2	336	e 5	59	+ 3	e 10	49	+ 8	—	—	12.5
Irkutsk	47.9	326	e 8	42	0	e 15	40	+ 1	—	—	24.8
Tashkent	69.5	308	e 11	11	- 1	e 20	21	+ 1	—	—	36.3
Sverdlovsk	73.3	325	i 11	35	0	e 21	5	+ 1	—	—	34.8
Tinemaha	z. 82.6	54	i 12	25	- 1	—	—	—	—	—	—
Pasadena	z. 83.5	56	i 12	28	- 3	—	—	—	—	—	e 51.8
Mount Wilson	z. 83.6	56	i 12	29	- 3	—	—	—	13	1	?
Riverside	z. 84.2	56	e 12	32	- 2	—	—	—	—	—	—
La Paz	z. 146.0	92	19	33	[- 8]	—	—	—	—	—	—

Dec. 31d. Readings also at 0h. (near Branner and near Mizusawa), 7h. (Tucson (2), Berkeley, Pasadena (2), Tinemaha (2), Mount Wilson, Riverside, Ukiah, Salt Lake City (2), Butte, Bozeman, Santa Clara, and Ferndale), 8h. (Ferndale, Santa Clara, Bozeman, Butte, Salt Lake City, and Ukiah), 9h. (Ukiah and near Mizusawa), 10h. (Riverside, Mount Wilson, Tinemaha, Haiwee, and Potsdam), 16h. (San Juan), 19h. (near Tananarive).

The scanned images of the bulletins of the International Seismological Summary (ISS) have been obtained as part of a global earthquake relocation project (Villaseñor et al., 1997) initiated with funding from the US National Science Foundation through grant EAR-9725140 and collected by SGA [Storia Geofisica Ambiente](#) (Bologna) on behalf of the [Istituto Nazionale di Geofisica e Vulcanologia](#) (Rome), in the frame of [Euroseismos](#) project.

A digital hypocenter file of the ISS (Villaseñor and Engdahl, 2005) can be obtained from the USGS web site: <http://earthquake.usgs.gov/scitech/iss/>

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