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The International Seismological Summary.

1951 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. and H.M. Treasury for financial support, which has covered the cost and preparation of this volume.

The last quarter of 1951 contains 282 epicentres, 226 of which are repetitions from previous determinations.

Cases of abnormal focal depth are noted below :—

Oct.	2d. 2h.	38·4°N.	73·6°E.	0·015
	2d. 21h.	35·8N.	140·8E.	Base of Superficial Layers.
	3d. 2h.	17·0N.	62·5W.	0·010
	3d. 11h.	18·8S.	70·5W.	0·005
	4d. 5h.	36·7N.	70·5E.	0·030
	4d. 6h.	43·8N.	147·0E.	0·010
	6d. 5h.	53·3N.	178·4W.	0·010
	7d. 6h.	7·2N.	75·0W.	0·010
	7d. 12h.	24·7S.	70·2W.	0·010
	9d. 3h.	36·2N.	140·0E.	0·005
	9d. 15h.	21·0S.	169·5E.	Suggested Deep.
	13d. 1h.	19·0S.	175·5W.	0·030
	14d. 18h.	Undetermined shock		Very Deep.
	15d. 10h.	36·0N.	140·1E.	Suggested Deep.
	15d. 14h.	36·7N.	70·5E.	0·030
	15d. 21h.	32·6N.	134·5E.	Suggested Deep.
	18d. 8h.	41·6N.	142·0E.	Base of Superficial Layers.
	19d. 14h.	41·6N.	142·0E.	0·005
	20d. 8h.	36·1N.	141·2E.	Suggested Deep.
	21d. 18h.	37·7N.	141·8E.	0·005
	22d. 10h.	3·0S.	76·9W.	0·020
	23d. 6h.	17·8S.	178·8W.	0·070
	24d. 1h.	41·9N.	143·6E.	0·010
	24d. 23h.	36·7N.	141·2E.	Suggested Deep.
	25d. 4h.	16·6N.	92·6W.	0·010
	29d. 21h.	30·3N.	68·3E.	0·010

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Nov.	1d. 11h.	24·9°S.	179·6°E.	0·090
	3d. 8h.	Undetermined shock		Deep.
	3d. 13h.	35·8N.	140·8E.	0·005
	4d. 8h.	5·2S.	147·5E.	0·020
	6d. 21h.	42·5N.	144·4E.	0·005
	6d. 22h.	26·0S.	70·2W.	0·010
	7d. 4h.	21·0S.	178·0W.	0·080
	8d. 0h.	41·6N.	142·0E.	Base of Superficial Layers.
	9d. 22h.	22·1S.	68·7W.	0·015
	10d. 7h.	3·0S.	139·5E.	0·015
	10d. 22h.	41·2N.	142·5E.	0·005
	12d. 9h. (13m.)	24·4S.	178·5W.	0·050
	12d. 9h. (36m.)	17·0N.	61·0W.	0·010
	14d. 10h.	35·3N.	135·6E.	Suggested Deep.
	15d. 8h. (25m.)	52·6N.	160·3E.	0·005
	15d. 8h. (39m.)	52·6N.	160·3E.	0·005
	15d. 9h.	52·6N.	160·3E.	0·005
	15d. 10h. (2m.)	52·6N.	160·3E.	0·005
	15d. 10h. (31m.)	52·6N.	160·3E.	0·005
	15d. 11h.	52·6N.	160·3E.	0·005
	15d. 15h.	52·6N.	160·3E.	0·005
	15d. 16h.	52·6N.	160·3E.	0·005
	15d. 17h.	52·6N.	160·3E.	0·005
	15d. 19h.	52·6N.	160·3E.	0·005
	15d. 20h. (20m.)	52·6N.	160·3E.	0·005
	15d. 20h. (38m.)	33·5N.	138·2E.	0·040
	15d. 21h.	52·6N.	160·3E.	0·005
	16d. 15h. (3m.)	52·6N.	160·3E.	0·005
	16d. 15h. (20m.)	52·6N.	160·3E.	0·005
	16d. 15h. (29m.)	52·6N.	160·3E.	0·005
	16d. 17h.	29·3S.	178·2W.	Base of Superficial Layers.
	16d. 19h.	52·6N.	160·3E.	0·005
	17d. 13h.	52·6N.	160·3E.	0·005
	17d. 17h.	36·8N.	69·4E.	0·020
	17d. 20h.	52·6N.	160·3E.	0·005
	18d. 4h.	52·6N.	160·3E.	0·005
	18d. 5h.	37·3N.	141·3E.	Base of Superficial Layers.
	18d. 23h.	37·3N.	141·3E.	Base of Superficial Layers.
	21d. 19h.	50·8N.	154·2E.	0·050
	25d. 9h.	21·5N.	146·0E.	0·020
	27d. 4h.	36·4N.	140·6E.	0·005
	27d. 16h.	35·0S.	179·9W.	0·020
	28d. 5h.	34·1N.	134·0E.	Suggested Deep.
	29d. 4h.	0·5N.	120·7E.	0·010

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Dec.	3d. 20h.	36°·7N.	139°·7E.	0·010
	6d. 19h.	36·0N.	137·6E.	0·040
	8d. 3h.	43·9N.	146·2E.	0·005
	8d. 4h.	33·7S.	57·7E.	Base of Superficial Layers.
	8d. 13h.	6·2S.	154·8E.	0·020
	9d. 12h.	35·5N.	140·4E.	Base of Superficial Layers.
	12d. 1h. (37m.)	16·5N.	96·9W.	0·020
	12d. 21h.	35·5N.	140·4E.	Base of Superficial Layers.
	14d. 2h.	8·0S.	111·5E.	0·100
	15d. 4h.	38·4N.	73·6E.	0·015
	15d. 14h.	36·0N.	138·8E.	0·030
	15d. 18h.	37·6N.	71·6E.	0·010
	16d. 12h.	29·1S.	177·7W.	0·010
	17d. 17h.	11·5N.	86·3W.	0·010
	18d. 14h.	19·3S.	174·5W.	0·005
	18d. 16h.	52·2N.	179·3W.	0·005
	19d. 18h.	35·5N.	140·4E.	Base of Superficial Layers.
	22d. 6h.	35·7N.	69·2E.	0·020
	23d. 0h.	24·7S.	177·4W.	0·010
	23d. 6h. (57m.)	15·1N.	61·3W.	0·020
	25d. 14h.	28·5S.	67·2W.	0·025
	25d. 15h.	Undetermined shock.		Very Deep.
	28d. 9h.	16·9N.	98·7W.	Base of Superficial Layers.
	28d. 15h.	9·0S.	71·0W.	0·100
	29d. 12h.	18·8N.	100·7W.	Base of Superficial Layers.
	31d. 20h.	15·0N.	90·0W.	Base of Superficial Layers.

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

KEW OBSERVATORY,
Richmond,
SURREY.

October, 1959.

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NOTE ON FUTURE POLICY OF THE I.S.S.

In view of the greatly increased size of the International Seismological Summary and the large number of stations now reporting, it has become necessary to reduce the volume in some way to cause a minimum interference with utility. The Summary for 1952 will consist only of such matter as can be accommodated in the tabular part. Other things, additional readings, and notes, will be omitted. No other change in the presentation of earthquake data will be made, and a similar number of shocks will be dealt with as in previous years.

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1951 OCTOBER, NOVEMBER, DECEMBER.

Oct. 1d. 1h. 26m. 33s. Epicentre 34°·5N. 26°·5E. (as on 1949, February 23d.).

A = +·7391, B = +·3685, C = +·5638 ; δ = −7 ; h = 0 ;
D = +·446, E = −·895 ; G = +·505, H = +·252, K = −·826.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		4·1	328	i 1 9k	+ 4	i 1 48	− 7	e 1 15	P_g	i 2·3
Helwan	Z.	6·2	137	e 1 33	− 2	—	—	i 1 51	P*	—
Ksara		7·8	93	e 1 54	− 4	i 3 30	+ 2	—	—	—
Sofia		8·5	344	e 2 12	+ 5	3 56	+11	2 30	PP	—
Taranto		9·5	312	2 32	+12	e 3 52	−18	—	—	e 5·7
Messina	Z.	9·6	296	e 2 21	0	i 4 4	− 8	—	—	—
Bucharest		9·9	358	e 2 29	+ 4	e 4 34	+14	—	—	—
Belgrade		11·3	338	e 2 47a	+ 1	e 6 20	L	—	—	(e 6·3)
Yalta		11·6	28	e 3 8	+18	e 5 20	+19	—	—	—
Timisoara	E.	11·9	342	e 3 16	+22	e 5 18	+ 9	—	—	—
Kishinev		12·6	7	3 3	0	5 30	+ 4	—	—	—
Rome		13·3	308	e 4 11	+58	e 6 8	?	e 6 47	Q	e 7·2
Budapest		14·1	339	3 24	+ 1	—	—	—	—	e 7·6
Ogyalla		14·7	338	e 3 38	+ 7	e 6 4	−12	e 3 55	PPP	e 7·3
Triest		14·8	323	e 3 34	+ 2	i 6 21	+ 3	e 4 53	PPP	e 8·7
Leninakan		15·1	60	e 3 30	− 6	—	—	—	—	—
Tsikhlis-Dzhvari		15·1	57	3 27	− 9	—	—	—	—	—
Prato		15·2	313	e 3 57	+19	e 6 43	+15	—	—	—
Lwow		15·4	354	e 3 40	0	—	—	—	—	—
Skalnate Pleso		15·4	344	e 3 41	+ 1	e 7 38	Q	e 3 56	PP	e 8·8
Gori		15·7	56	e 3 47	+ 3	—	—	—	—	—
Tiflis		16·1	58	3 49	0	e 6 49	0	—	—	—
Salo	N.	16·5	317	e 4 0	+ 6	e 7 5	+ 7	e 4 20	PPP	—
Raciborzu		16·7	341	3 57	0	(e 7 13)	+10	e 4 8	PP	e 9·1
Kirovobad		16·9	63	4 0	+ 1	—	—	—	—	—
Pavia		17·0	315	e 4 3	+ 2	—	—	—	—	e 8·6
Prague		17·9	336	i 4 10a	− 2	e 7 32	+ 2	e 4 25	PP	e 10·0
Lenkoran		18·4	68	—	—	7 46	+ 5	—	—	—
Shemakla		18·6	62	4 26	+ 5	7 48	+ 2	—	—	—
Zürich		18·6	320	e 4 20	− 1	e 7 51	+ 5	—	—	—
Cheb		18·7	331	e 4 21	− 1	e 7 54	+ 6	e 8 23	SS	—
Algiers Univ.	Z.	19·2	283	e 4 27	− 1	e 8 18	+19	e 4 41	PP	—
Stuttgart		19·2	325	e 4 26	− 2	e 8 17	+18	e 8 36	SS	e 10·0
Basle		19·3	320	e 4 26	− 3	e 7 47	−15	e 4 47	PP	—
Neuchatel		19·3	318	e 4 27	− 2	—	—	—	—	—
Baku		19·5	63	e 4 32	+ 1	e 8 10	+ 4	—	—	—
Jena		19·7	333	e 4 31	− 3	e 8 22	+12	—	—	e 9·6
Karlsruhe	Z.	19·7	325	4 27	− 7	e 5 40	?	—	—	—
Strasbourg		19·8	323	i 4 34	− 1	e 8 17	+ 4	e 4 57	PP	e 10·4
Potsdam		20·3	336	e 4 38	− 2	e 8 31	SS	—	—	e 11·4
Clermont-Ferrand		21·1	310	e 4 43	− 5	i 8 47	+ 8	i 4 54	PP	e 11·2
Tortosa		21·5	295	e 5 0	+ 8	8 42	− 5	—	—	—
Tamanrasset	Z.	21·8	244	i 4 57	+ 1	i 8 52	0	i 9 46	SSS	—
Alicante		22·0	288	4 44	−14	e 8 30	−26	12 16	PcS	e 10·2
Moscow		22·6	16	e 5 2	− 1	9 6	− 1	—	—	—
Paris		22·8	317	e 5 5	0	i 9 18	+ 7	i 5 12?	pP	e 12·4
Witteveen	Z.	23·1	330	e 5 7	− 1	—	—	—	—	—
Copenhagen		23·3	340	e 5 7	− 3	e 9 21	+ 1	—	—	12·4
De Bilt		23·3	327	—	—	e 9 27?	+ 7	—	—	e 12·4
Almeria		23·6	284	i 5 27	+14	9 47	+22	6 3	PP	14·8
Granada		24·5	286	5 22	0	9 52	+12	6 1	PP	14·8
Toledo		24·8	292	e 5 14	−11	e 9 34	−12	e 5 40	PP	—
Malaga		25·2	285	i 5 30	+ 1	i 10 43	+51	i 8 18	PcP	—
Pulkovo		25·4	4	5 28	− 3	—	—	—	—	—
Helsinki		25·7	358	—	—	e 10 5	+ 4	—	—	e 13·4

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.
Kew		25·7	321	i 5 33	0	e 10 12	+11	—	—	e 13·4
Ashkabad		25·9	72	e 5 34	− 1	—	—	—	—	—
Upsala		26·0	350	e 5 47	+11	e 10 0	− 6	e 11 8	SS	e 13·8
Mary		28·7	71	—	—	e 10 59	+ 9	—	—	—
Rathfarnham Castle		29·8	320	i 6 6	− 5	e 11 10	+ 3	e 6 51	PP	e 16·3
Sverdlovsk		32·1	35	e 6 34	+ 3	—	—	—	—	—
Kiruna		33·6	357	i 6 40a	− 4	e 11 58	− 8	e 13 56	SS	e 15·8
Tashkent		34·2	65	e 6 59?	+10	e 12 23?	+ 7	—	—	—
Tchimkent		34·4	63	e 6 53	+ 2	—	—	—	—	—
Fergana	z.	36·1	67	e 7 2?	− 3	—	—	—	—	—
Khorog		36·4	72	e 7 8	0	—	—	—	—	—
Andijan		36·5	66	e 7 9	0	—	—	—	—	—
Frunse		38·0	62	7 21	0	—	—	—	—	—
Krasnogorka		38·4	61	e 7 24	− 1	—	—	—	—	—
Ili		39·8	59	7 34	− 2	—	—	—	—	—
Scoresby Sund		44·4	340	i 8 13a	− 1	—	—	—	—	26·4
Pretoria	z.	59·9	177	i 9 41	−29	—	—	—	—	—
Kimberley	z.	62·9	181	i 10 29	− 1	—	—	—	—	—
Weston		72·8	309	i 11 33	+ 1	—	—	—	—	—
Harvard		72·9	309	i 11 33	0	—	—	—	—	—
Morgantown		79·8	310	e 12 11	− 1	—	—	—	—	—
College		80·9	357	12 16	− 1	—	—	—	—	—
Hungry Horse		90·3	335	i 13 4	0	—	—	—	—	—
Mineral	z.	99·9	335	e 17 50a	PP	—	—	—	—	—

Additional readings and notes :—
Athens i = 1m.21s. and 1m.27s.
Sofia eEN = 2m.45s., 2m.57s., and 3m.19s.
Messina iZ = 2m.26s., 2m.41s., and 4m.19s.
Bucharest eN = 2m.36s. and 5m.1s.
Belgrade eZ = 3m.1s., eNE = 5m.57s.
Budapest PE = 3m.36s.
Ogyalla e? = 3m.47s., 4m.12s., and 5m.0s.
Triest iSSS = 8m.10s.
Raciborzu ePN = 4m.3s., eE = 6m.13s., ePcPZ = 8m.50s., ePcP?N = 8m.58s. ; true S is given as SSN.
Pavia e = 6m.11s. and 7m.51s.
Prague i = 4m.14s., e = 4m.54s., 5m.21s., 5m.54s., and 6m.30s., eSS = 7m.51s., e = 8m.33s. and 9m.11s.
Skalnate Pleso e = 4m.1s., eN = 4m.33s., 4m.55s., and 6m.14s., eSN = 6m.37s., e = 7m.6s., 8m.7s., and 8m.37s.
Algiers Univ. ePPPZ = 4m.47s., eZ = 4m.56s., 5m.9s., and 7m.4s.
Stuttgart e = 5m.35s., eZ = 7m.57s.
Jena eN = 4m.37s., eZ = 5m.42s., eS?N = 8m.3s.?
Strasbourg eP = 4m.40s., ePPP = 5m.3s., iPPP = 5m.8s., e = 5m.32s., i = 6m.31s.
Potsdam ePEN = 4m.41s., eSS?E = 8m.34s.
Clermont-Ferrand iPPP = 5m.20s., i = 6m.3s.
Tamanrasset eZ = 7m.30s.
Paris i = 5m.30s. and 5m.39s., iPPP = 5m.43s., e = 7m.23s., i = 9m.2s., eSS? = 9m.59s., iSSS = 10m.26s.
Granada SS = 12m.16s.
Toledo PPP = 6m.0s., e = 10m.50s.
College i = 12m.27s.
Hungry Horse i = 13m.31s.
Long waves were also recorded at Kalossa and Durham.

Oct. 1d. 10h. 11m. 50s. Epicentre 55°·0N. 164°·0W.

A = −·5539, B = −·1588, C = +·8173 ; δ = 0 ; h = −7 ;
D = −·276, E = +·961 ; G = −·786, H = −·225, K = −·576.

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
College	12·8	33	i 3 6	0	i 6 36	L	—	—	(i 6·6)
Sitka	16·1	69	e 3 34	−15	e 6 50	+ 1	—	—	—
Seattle	26·7	87	e 5 50?	+ 7	e 11 32	+75	—	—	e 13·2
Shasta Dam	30·9	99	i 6 20	0	—	—	—	—	—
Hungry Horse	31·1	81	i 6 22	0	i 13 5	PcS	—	—	—

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.
Mineral	Z.	31·6	99	e 6 26k	0	i 13 4	PcS	—	—	—
Berkeley		32·9	103	i 6 37k	– 1	e 14 56	Q	—	—	—
Reno		33·1	98	e 6 40k	0	—	—	e 8 34	PPP	—
Butte		33·2	82	e 6 40	0	—	—	e 7 51	PP	—
Lick	Z.	33·6	103	i 6 44a	0	—	—	e 8 10	PP	—
Fresno	Z.	35·1	102	e 6 56	– 1	—	—	—	—	—
Tinemaha	Z.	35·7	100	i 7 2	0	—	—	i 13 20	ScP	—
China Lake		36·9	100	i 7 11	– 1	—	—	—	—	—
Pasadena		37·9	103	e 7 20	0	e 13 29	ScP	e 8 40	PP	e 17·4
Boulder City		38·4	98	i 7 25	0	e 13 27	+ 7	—	—	—
Riverside	Z.	38·4	103	e 7 25	0	—	—	e 8 55	PP	—
Palomar	Z.	39·2	103	i 7 31k	0	e 13 33	ScP	—	—	—
Tucson		43·4	98	e 8 6	0	e 18 0	SS	—	—	—
Lubbock		47·6	89	7 40	–59	13 38	?	—	—	—
Kirkland Lake	Z.	49·6	60	e 8 54a	– 1	—	—	—	—	—
Cleveland		53·4	68	e 9 24	0	i 20 4	SS	—	—	e 25·4
Ottawa		53·7	60	e 9 23	– 3	—	—	e 21 16	SS	26·3
Seven Falls	E.	54·9	56	—	—	e 17 23	+ 7	21 37	SS	26·0
Morgantown		55·6	69	e 9 38	– 2	—	—	—	—	—
Kiruna		57·4	358	i 9 54k	+ 1	e 17 46	– 3	e 10 36	PcP	e 26·0
Palisades		57·8	63	i 9 54a	– 1	e 17 48	– 6	—	—	i 30·9
City College, N.Y.		57·9	63	i 9 37	–19	—	—	—	—	—
Fordham		57·9	63	e 9 56	0	e 18 1	+ 6	—	—	—
Harvard		57·9	60	i 9 54	– 2	—	—	—	—	e 29·7
Weston		58·1	60	i 9 50	– 8	—	—	—	—	e 41·8
Tacubaya		59·9	99	e 10 10	0	e 18 30	+ 9	e 10 24	?	—
Upsala		65·5	359	—	—	e 19 49	+17	e 22 42	?	e 32·2
Bermuda		69·1	63	e 11 12	+ 2	—	—	—	—	e 33·6
Rathfarnham Castle		70·5	14	e 14 53	PP	—	—	—	—	e 36·8
Kew		73·0	9	—	—	e 20 16	–44	—	—	e 36·2
Collmberg	Z.	74·0	2	e 11 42	+ 3	—	—	—	—	—
Cheb		75·3	3	—	—	e 27 22	SS	e 30 34	SSS	—
Prague		75·3	1	—	—	e 21 57	+31	—	—	e 42·7
Paris		75·9	9	e 13 34	?	—	—	—	—	e 37·2
Skalnate Pleso		76·1	357	e 11 42	– 9	e 22 45	PS	e 15 19	PP	e 36·9
Stuttgart		76·4	4	e 16 53?	PPP	e 17 39	?	—	—	e 40·2
Strasbourg		76·6	5	—	—	e 22 12	PS	—	—	e 36·2
San Juan		79·6	73	i 12 10	0	—	—	—	—	—
Triest		79·7	2	e 12 5	– 6	—	—	i 12 28	PcP	e 46·2
Rome	N.	83·4	3	e 14 31	?	e 22 30?	–21	—	—	—
Istanbul	E.	83·7	350	e 12 31	– 1	e 23 1	+ 7	e 15 43	PP	e 41·2
Fort de France		85·3	72	—	—	e 23 10	0	—	—	—
Alicante		86·0	3	12 31	–12	23 21	+ 4	15 55	PP	e 43·4
Granada		86·7	6	—	—	22 53	[–19]	—	—	46·5
Ksara		89·9	344	e 12 39	–23	e 24 3	+ 9	—	—	—
Pretoria	Z.	149·5	337	i 20 26	[+39]	—	—	—	—	—

Additional readings :—
Mineral iZ = 7m.7s.
Berkeley iZ = 6m.48s.
Reno eZ = 7m.0s.
Lick iZ = 7m.10s.
Fresno eZ = 6m.59s.
Kirkland Lake iPZ = 8m.57s.
Cleveland iZ = 10m.57s., eE = 23m.18s.
Kiruna iZ = 10m.14s., ePcPE = 10m.41s., ePPPN = 13m.22s., eE = 20m.31s., eN = 20m.37s., eSS?N = 21m.35s., eZ = 22m.19s., eSSS?N = 23m.41s.
Skalnate Pleso eE = 13m.51s., eN = 19m.45s. and 23m.26s., eE = 28m.27s., e = 31m.53s.
Strasbourg e = 31m.56s., 32m.57s., and 34m.10s.
Istanbul ePSE = 23m.56s.
Alicante PPP = 17m.49s., PS = 24m.16s., PPS = 24m.35s., SS = 28m.45s., SSS = 32m.19s., Q = 35m.25s.
Long waves were also recorded at Santa Clara, Scoresby Sund, Aberdeen, Durham, Almeria, De Bilt, Pavia, Christchurch, and Wellington.

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Oct. 1d. 23h. 59m. 37s. Epicentre 22°·3N. 94°·1E. (as on 1948, Sept. 28d.).

A = −·0662, B = +·9237, C = +·3773 ; δ = −4 ; h = +4 ;
D = +·997, E = +·071 ; G = −·027, H = +·376, K = −·926.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	5·3	274	i 1 25a	+ 3	i 2 31	+ 6	3 6	S_g	—
Hyderabad		15·5	254	i 3 43	+ 1	8 21	L	—	—	(8·4)
Dehra Dun	N.	16·4	303	—	—	e 7 5	+ 9	—	—	—
New Delhi		16·5	296	e 3 51	− 3	e 6 41	−17	4 2	PP	7·3
Poona		19·3	262	i 4 29	0	i 8 10	+ 8	4 50	PP	9·3
Bombay		20·2	264	i 4 45	+ 6	8 36	+15	8 48	Q i	10·9
Nanking		24·0	60	i 5 14k	− 3	e 9 23	− 9	—	—	—
Przhevalsk		24·0	332	i 5 17	0	i 9 30	− 2	—	—	—
Naryn		24·4	326	i 5 20	− 1	i 9 34	− 5	—	—	—
Almata II		25·1	330	e 5 28	0	—	—	—	—	—
Almata		25·3	330	i 5 29	− 1	i 9 53	− 1	—	—	—
Ili		25·8	331	i 5 31	− 3	—	—	—	—	—
Zi-ka-wei	Z.	25·9	63	e 5 30	− 5	—	—	—	—	e 10·5
Andijan		26·0	320	i 5 35	− 1	10 1	− 5	—	—	—
Fergana		26·1	320	e 5 36	− 1	—	—	—	—	—
Frunse		26·2	325	i 5 36	− 2	i 10 5	− 4	—	—	—
Krasnogorka		26·2	328	e 5 41	+ 3	—	—	—	—	—
Obi-garm		26·5	314	i 5 40?	− 1	e 10 14?	0	—	—	—
Manila		26·6	101	i 5 45	+ 3	e 6 36	?	—	—	—
Stalinabad		27·1	313	i 5 44	− 2	e 10 20	− 4	—	—	—
Tashkent		28·2	318	e 5 54?	− 2	i 10 31?	−10	—	—	—
Tchimkent		28·6	320	5 55?	− 5	i 10 41	− 7	—	—	—
Irkutsk		30·9	12	e 6 18	− 2	e 11 16?	− 8	—	—	—
Kabansk		31·3	15	6 21	− 3	e 11 23?	− 8	—	—	—
Mary		31·6	308	6 23	− 3	—	—	—	—	—
Kizyl-Arvat		36·3	306	7 7	0	—	—	—	—	—
Shemakla		42·3	306	8 7?	+10	14 21?	+ 2	—	—	—
Sverdlovsk		42·3	333	i 7 53	− 4	e 14 9	−10	—	—	—
Goris		43·9	304	e 8 10	0	—	—	—	—	—
Erevan		45·4	305	e 8 19	− 3	—	—	—	—	—
Tiflis		45·4	307	e 8 22	0	—	—	—	—	—
Leninakan		46·0	306	e 8 29?	+ 2	—	—	—	—	—
Tsikhlis-Dzhvari		46·4	307	e 8 22	− 8	—	—	—	—	—
Ksara		52·0	296	i 9 14	+ 1	e 18 16	?	—	—	—
Moscow		53·1	324	e 9 19	− 2	i 16 42	− 9	—	—	—
Yalta		53·4	309	e 9 23	− 1	e 16 50	− 5	—	—	—
Istanbul		57·1	305	e 9 49	− 1	e 17 40	− 5	—	—	—
Kishinev		57·3	313	e 9 49	− 3	—	—	—	—	—
Pulkovo		57·8	328	9 53	− 2	e 17 45	− 9	—	—	—
Lwow		60·5	316	e 10 12	− 2	i 18 21	− 8	—	—	—
Uzhgorod		61·7	315	e 10 21	− 1	—	—	—	—	—
Skalnate Pleso		63·0	315	e 10 36	+ 5	e 19 59	+58	—	—	—
Belgrade	Z.	63·2	310	e 10 36k	+ 4	—	—	e 13 9	PP	—
Kiruna		63·4	336	i 10 30a	− 4	i 18 57	− 9	i 10 44	PcP	e 31·2
Prague		66·7	317	e 10 50	− 5	e 13 12	PP	e 11 19	PcP	—
Copenhagen		67·2	323	e 11 2	+ 4	e 19 46	− 6	—	—	32·4
Potsdam		67·3	320	e 11 4	+ 5	i 19 49	− 5	—	—	e 34·4
Collmberg	Z.	67·4	318	e 10 58	− 1	e 19 59	+ 4	e 13 41	PP	—
Messina		67·8	304	e 10 59	− 3	e 19 55	− 5	i 11 21	PcP	—
Triest		67·8	312	e 11 14	+12	e 19 53	− 7	—	—	—
Jena		68·4	317	e 11 3?	− 3	e 20 10?	+ 3	e 11 12	pP	—
Rome	N.	69·4	308	e 10 27	−45	—	—	e 33 41	Q	e 40·0
Stuttgart		70·3	316	e 11 17	0	e 20 23	− 6	e 11 29	PcP	e 37·4
Karlsruhe	Z.	70·7	317	e 11 20	0	—	—	e 12 0	PcP	—
Witteveen	Z.	71·0	321	i 10 28	−54	—	—	—	—	—
Zürich		71·0	315	e 11 17	− 5	—	—	e 11 31	PcP	—
Pavia		71·1	312	—	—	e 20 20	−18	—	—	—
Strasbourg		71·3	316	e 11 23	0	e 20 23?	−18	e 11 51	PcP	37·4
Basle		71·6	315	e 11 23	− 2	—	—	—	—	—
Paris		74·6	317	i 11 42	− 1	—	—	i 11 56	PcP	e 40·4

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.
Brisbane	Z.	75·4	128	i 11 51 a	+ 4	i 22 4	PS	—	—	—
Kew		75·5	320	—	—	e 31 49	Q	—	—	e 40·4
Algiers Univ.	Z.	77·8	305	e 11 59	− 2	i 12 13	PcP	i 12 8	pP	—
Rathfarnham Castle		78·4	323	—	—	e 19 59	?	e 30 56	?	—
Pretoria	Z.	79·8	237	i 12 16	+ 4	—	—	—	—	—
Pietermaritzburg	Z.	80·1	232	i 12 18	+ 5	—	—	—	—	—
Tamanrasset	Z.	80·4	291	i 12 17 k	+ 2	—	—	i 12 27	pP	—
Resolute Bay		83·1	3	i 12 27 k	− 2	—	—	i 12 38	PcP	—
Kimberley	Z.	83·9	236	i 12 6	−27	—	—	—	—	—
Grahamstown	Z.	84·8	231	i 13 12	+35	—	—	—	—	—
Huancayo		165·6	314	e 20 24	[+18]	—	—	—	—	—

Additional readings :—
Calcutta S*E = 2m.52s.
New Delhi PPPN = 4m.12s., SSEN = 6m.57s.
Poona PPPE = 4m.58s., QE = 8m.22s., SSEN = 8m.32s., SSSE = 8m.59s.
Belgrade eNE = 14m.48s. and 16m.43s.
Kiruna iZ = 11m.30s., eSE = 19m.0s., ePPS?Z = 19m.35s., eScSN = 20m.15s., eE = 22m.7s., eN = 22m.43s., eE = 24m.10s., eSSS?N = 26m.11s., eQE = 27m.29s.
Prague e = 10m.59s., 11m.8s., 11m.56s., and 14m.58s.
Collmberg eZ = 11m.11s.
Jena eN = 11m.48s., eE = 11m.57s., eN = 13m.41s., eS?N = 19m.54s.
Stuttgart eZ = 12m.11s.
Strasbourg i = 11m.31s. and 11m.36s., e = 11m.44s. and 12m.11s.
Paris i = 11m.51s. and 12m.4s.
Tamanrasset eZ = 12m.50s. and 13m.20s., iZ = 14m.23s.
Resolute Bay i = 12m.59s.
Long waves were also recorded at De Bilt and Alicante.

Oct. 1d. Readings also at 0h. (Almata, Przhevalsk, Rybach'e, and near Huancayo), 1h. (Resolute Bay and Potsdam), 2h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Victoria, Kiruna, Clermont-Ferrand, Paris, Tamanrasset, and near Almata II), 4h. (Wellington), 5h. (Murgab, near Dzhergetal, Khorog, Obi-garm, Stalinabad, and near Manila), 6h. (Kiruna), 7h. (Mount Wilson, Palomar, and Mizusawa), 9h. (Palomar, Riverside, Tinemaha, Tucson, Boulder City, Shasta Dam, Hungry Horse, Victoria, College, Weston, Huancayo, La Paz, Kiruna, Collmberg, Prague, Tamanrasset, near Prato, Rocca di Papa, and Rome (2)), 10h. (Mount Wilson, Palomar, Riverside, Seattle, Andijan, Dzhergetal, Ili, Tchimkent, near Fergana, Frunse, and Krasnogorka), 11h. (Galerazamba, Victoria (2), Almata II, Andijan, Krasnogorka, Naryn, Przhevalsk, Samarkand, Stalinabad, near Dzhergetal, Fergana, Khorog, Murgab, Obi-garm, near Apia, and near Bogota), 13h. (Fergana, Samarkand, Stalinabad, near Dzhergetal, Khorog, and Obi-garm), 15h. (Grahamstown, Kimberley, Pietermaritzburg, Pretoria, and near Athens), 16h. (Alicante, near Granada, and Malaga), 17h. (Kiruna, Auckland, Christchurch, Cobb River, Kaimata, Tuai, Wellington, Fergana, Obi-garm, Stalinabad, near Dzhergetal, Garm, and Khorog), 19h. (Simferopol and near Yalta), 20h. (Copiapo, Rome, and near Mizusawa), 21h. (Apia and near Garm), 22h. (Apia).

Oct. 2d. 2h. 56m. 35s. Epicentre 38°·4N. 73°·6E. Depth of focus 0·015.
(as on 1951, Jan. 4d.).

A = + ·2218, B = + ·7537, C = + ·6186 ; δ = − 8 ; h = − 1 ;
D = + ·959, E = − ·282 ; G = + ·175, H = + ·593, K = − ·786.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Murgab	0·3	97	i 0 14?	− 4	i 0 31?	− 1
Khorog	1·8	239	e 0 36	+ 4	i 1 4	+ 8
Dzhergetal	2·0	294	i 0 38	+ 4	i 1 9	+ 9
Fergana	2·4	325	e 0 42	+ 2	1 16	+ 6
Andijan	2·5	338	0 43	+ 2	i 1 18	+ 6
Garm	2·7	283	i 0 44	0	i 1 19	+ 2
Obi-garm	3·1	276	e 0 50	+ 1	i 1 30	+ 4
Naryn	3·5	29	e 0 50	− 4	i 1 31	− 5
Stalinabad	3·8	274	—	—	i 1 45	+ 2
Frunse	4·5	9	e 1 7	− 1	i 2 2	+ 3
Krasnogorka	5·0	13	i 1 12	− 2	i 2 10	− 2
Tchimkent	5·0	323	e 1 14	0	i 2 10	− 2
Almata	5·5	26	i 1 17	− 4	e 2 19	− 5
Almata II	5·6	29	e 1 19	− 3	—	—
Ili	6·1	24	i 1 25	− 4	—	—

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Oct. 2d. 21h. 2m. 11s. Epicentre 35°·8N. 140°·8E. Focus at base of Superficial Layers. (as on 1951, Aug. 30d.).

Intensity V at Tyosi ; IV at Nikko, Hokota, Yokaichiba ; II-III at Shirakawa, Tukubasan, Tomioka, Minato, and Koriyama. Epicentre near that adopted. Depth of focus 40km.

Seismo. Bull. Cent. Met. Obs., Japan, 1951. Tokyo, 1951, pp.244-245, with macroseismic chart.

A = −·6300, B = +·5138, C = +·5823 ; δ = −4 ; h = 0 ;
D = +·632, E = +·775 ; G = −·451, H = +·368, K = −·813.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Mito		0·7	335	0 9	− 4	0 23	0
Tukubasan		0·7	306	0 13	0	0 21	− 2
Tokyo		0·8	263	0 15k	0	0 33	+ 7
Yokohama		1·0	249	0 21	+ 3	0 38	+ 7
Onahama		1·1	4	0 18	− 1	0 31	− 2
Utunomiya		1·1	315	0 16	− 3	0 30	− 3
Kumagaya		1·2	287	0 20k	0	0 35	− 1
Mera		1·2	222	0 31	+11	0 51	+15
Shirakawa		1·4	340	0 21	− 2	0 38	− 3
Titibu		1·4	278	0 25	+ 2	—	—
Maebasi		1·5	293	0 24k	0	0 42	− 2
Osima		1·5	228	0 26	+ 2	0 52	+ 8
Ajiro		1·6	242	0 29	+ 3	—	—
Misima		1·7	246	0 26	− 2	—	—
Hunatu		1·7	260	0 29	+ 1	0 54	+ 5
Oiwake		1·9	286	0 33	+ 2	—	—
Hukusima		2·0	352	0 30a	− 2	0 57	+ 1
Matusiro		2·2	291	0 35	0	1 11	+10
Matumoto		2·3	281	0 42	+ 6	1 13	+ 9
Nagano		2·3	292	0 35	− 1	1 16	+12
Takada		2·4	302	0 43	+ 5	1 25	+19
Sendai		2·5	2	0 37	− 2	—	—
Hamamatu		2·7	247	0 32	−10	—	—
Isinomaki		2·7	9	0 27	−15	—	—
Aikawa		3·0	317	0 51	+ 5	—	—
Toyama		3·0	287	0 53	+ 7	1 31	+ 9
Nagoya		3·2	259	0 55	+ 6	—	—
Gihu		3·3	263	0 53	+ 2	—	—
Mizusawa	E.	3·3	5	0 55	+ 4	1 26	− 3
Kameyama		3·7	257	1 12	+16	2 6	+27
Akita		3·9	252	1 12	+13	—	—
Miyako		3·9	13	0 56?	− 3	1 38?	− 6
Morioka		3·9	4	0 56	− 3	1 39	− 5
Tsuruga		3·9	269	1 9	+10	—	—
Kyoto		4·2	262	1 11	+ 8	2 17	+25
Osaka		4·5	257	1 24	+16	—	—
Hatinohe		4·8	8	0 44	−28	—	—

Oct. 2d. Readings also at 0h. (near Garm (2)), 1h. (Manila), 2h. (Bogota, Victoria, Kimberley, Tamanrasset (2), Collmberg (2), Kiruna (2), and Calcutta (2)), 3h. (near Apia (3)), 4h. (Auckland, Kaimata, Tuai, Wellington, China Lake, Grahamstown, Kimberley (2), Pretoria (3), and Pietermaritzburg (3)), 5h. (Bandong and Djakarta), 6h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Cleveland, Bermuda, Puebla, Tacubaya, Vera Cruz, Huancayo, near Apia, and near Manila), 7h. (Stalinabad, Palomar, China Lake, Bermuda, Puebla, Tacubaya (2), Vera Cruz, and Huancayo), 8h. (Pasadena), 9h. (Copiapo, Santa Lucia, Puebla, Tacubaya, Vera Cruz, Rathfarnham Castle, Strasbourg, and Messina), 10h. (Puebla (2), Tacubaya (2), Vera Cruz, and Strasbourg), 11h. (Fergana, near Almata II, Frunse, Ili, and Naryn), 12h. (near Alicante), 13h. (Palomar, Pasadena, China Lake, Tacubaya, Vera Cruz, and Huancayo), 14h. (Scoresby Sund, Kew, Messina, Fergana, Murgab, near Dzhergetal, Khorog, and Obi-garm), 16h. and 17h. (near Garm), 21h. (Huancayo), 23h. (La Paz).

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Oct. 3d. 2h. 0m. 53s. Epicentre 17°·0N. 62°·5W. Depth of focus 0·010.
(as on 1950, December 29d.).

A = +·4418, B = −·8488, C = +·2906 ; δ = +10 ; h = +5 ;
D = −·887, E = −·462 ; G = +·134, H = −·258, K = −·957.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		2·6	150	i 0 44	+ 3	i 1 19	+ 7	—	—	—
Roosevelt Roads		3·2	293	i 0 46	− 4	—	—	—	—	—
San Juan		3·7	292	i 0 55	− 1	i 1 40	+ 1	—	—	—
Guantanamo Bay		12·2	285	i 5 29	SS	i 6 17	L	—	—	(i 6·3)
Bermuda		15·4	353	i 3 21	−12	i 5 46	−35	—	—	e 6·3
Chinchina		17·5	228	i 4 21	PP	i 6 50	−18	—	—	—
Fordham		25·7	341	e 5 21	− 2	—	—	e 10 2	?	—
Palisades		25·9	341	i 5 22k	− 3	e 10 7	?	i 10 15	?	—
Weston		26·4	346	e 5 26	− 3	e 10 12	+18	i 5 41	pP	—
Harvard		26·6	346	e 5 27	− 4	e 10 15	+18	—	—	—
Morgantown		27·2	329	e 5 36	0	e 10 55	?	—	—	—
Huancayo		31·5	204	i 6 22	+ 7	e 13 14	SS	—	—	e 19·3
La Paz		33·8	189	e 5 53	−42	—	—	—	—	15·6
Fayetteville		33·9	311	i 6 38	+ 2	—	—	—	—	—
Tucson		46·1	299	i 8 18	+ 2	—	—	i 8 36	pP	—
Boulder City		49·9	303	i 8 48	+ 2	—	—	—	—	—
Butte		50·5	317	e 8 50	0	—	—	—	—	—
Riverside	Z.	51·7	301	i 9 1	+ 2	i 10 14	PcP	e 9 15	pP	—
China Lake	Z.	52·1	303	i 9 3	+ 1	i 10 15	PcP	e 9 15	pP	—
Hungry Horse		52·1	319	i 9 3	+ 1	—	—	—	—	—
Pasadena	Z.	52·4	301	i 9 6	+ 2	—	—	i 10 16	PcP	—
Tinemaha	Z.	52·8	305	i 9 10	+ 2	—	—	—	—	—
Fresno	Z.	53·9	304	e 9 17k	+ 1	—	—	—	—	—
Reno	Z.	54·3	307	e 9 21a	+ 3	—	—	—	—	—
Lick	Z.	55·1	305	i 9 28a	+ 4	i 9 57	sP	i 9 32	?	—
Shasta Dam		56·4	308	i 9 33	− 1	—	—	e 12 49	PPP	—
Alicante		57·8	55	e 8 55	−49	—	—	23 15	Q	e 27·6
Tamanrasset	Z.	63·7	72	i 10 24a	+ 1	—	—	i 10 37	pP	—
Collmberg	Z.	67·9	42	e 10 48	− 2	—	—	—	—	—
Kiruna	Z.	71·7	23	i 11 11a	− 2	—	—	i 11 34	pP	—
College		72·8	334	11 19	− 1	—	—	—	—	—

Fort de France gives also P^* = 50s., P_g = 57s., S^* = 1m.26s., S_g = 1m.35s.
Long waves were also recorded at Auckland.

Oct. 3d. 11h. 7m. 9s. Epicentre 18°·8S. 70°·5W. Depth of focus 0·005.
(as on 1942, June 18d.).

Intensity V between 18° and 19°S. in Chile. Epicentre 18°·5S. 70°·5W. (Strasbourg).

F. Greve.
Boletin del año 1951, Instituto Sismológico, Universidad de Chile, Santiago, p. 37.

E. Silgado.
Datos Sismológicos del Perú, 1951, Boletin No. 8, Lima, Peru, 1953. p. 18.

A = +·3162, B = −·8929, C = −·3203 ; δ = −16 ; h = +5 ;
D = −·943, E = −·334 ; G = −·107, H = +·302, K = −·947.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		3·2	44	i 0 52a	+ 3	i 1 33	+ 6	—	—	—
Antofagasta	E.	4·9	179	e 1 24	PP	2 17	+ 8	e 2 38	SSS	—
Huancayo		8·2	325	e 1 55	− 4	e 3 9	−22	i 2 2	PP	e 3·4
Bogota		23·6	352	e 5 23	PP	e 9 14	+ 2	i 12 20	ScP	—
Galerazamba		29·8	352	—	—	e 16 19	ScS	—	—	—
Bermuda		51·2	7	i 8 55	− 4	—	—	—	—	—
Morgantown		58·8	352	i 9 52	− 2	—	—	i 10 10	pP	—
Weston		60·9	0	i 10 5	− 3	—	—	—	—	—
Harvard		61·0	0	i 10 5	− 4	—	—	—	—	—
Tucson		63·8	323	e 10 26	− 2	—	—	i 10 40	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.
Ottawa		64·1	356	i 10 27	– 3	—	—	—	—	—
Kirkland Lake	Z.	67·2	354	e 10 49	0	—	—	e 11 7	PcP	—
Palomar	Z.	68·2	320	e 10 56	0	e 11 14	sP	—	—	—
Boulder City		68·8	323	e 10 59	0	i 11 18	sP	—	—	—
Riverside	Z.	68·9	319	e 11 0	0	i 11 19	sP	e 11 13	pP	—
Mount Wilson	Z.	69·5	319	11 5	+ 1	—	—	e 11 17	pP	—
China Lake	Z.	70·3	322	e 11 8	– 1	i 11 27	sP	i 11 21	pP	—
Tinemaha	Z.	71·5	321	e 11 18	+ 2	i 11 36	sP	e 11 31	pP	—
Lick	Z.	73·7	320	e 11 31	+ 2	i 11 49	sP	i 11 43	pP	—
Reno	Z.	74·1	323	e 11 33	+ 2	—	—	—	—	—
Butte		74·9	332	e 11 36	0	e 11 55	sP	—	—	—
Shasta Dam		76·3	322	i 11 44	0	—	—	—	—	—
Hungry Horse		77·3	332	i 11 50	+ 1	i 12 8	sP	—	—	—
Tamanrasset	Z.	85·0	64	i 12 32	+ 2	e 12 58	sP	i 12 45	pP	—
College		101·5	335	—	—	e 14 1	sP	—	—	—

Additional readings :—
La Paz iP_g = 1m.2s., iS_g = 1m.47s.
Bogota eSSEN = 10m.50s.

Oct. 3d. 17h. 38m. 46s. Epicentre 41°·0S. 172°·6E.

Intensity V-VI from Taumarunui to Hokitika ; III at Wellington.
Epicentre as adopted.

R. C. Hayes.
Earthquake origins in New Zealand during the year 1951, New Zealand Journal of Science and Technology, Sec. B, Vol. 34, No. 4, January, 1953, p. 256.

A = – ·7506, B = + ·0975, C = – ·6535 ; δ = – 3 ; h = – 2 ;
D = + ·129, E = + ·992 ; G = + ·648, H = – ·084, K = – ·757.

		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Cobb River	E.	0·1	130	i 0 1	– 7	i 0 6	– 7
Wellington		1·7	100	i 0 30	– 1	i 0 51	– 3
Kaimata	N.E.	1·8	210	e 0 32	0	0 55	– 1
New Plymouth	E.	2·2	31	e 0 38	0	1 2	– 4
Christchurch		2·5	180	e 0 44	+ 1	e 1 19	+ 5
Karapiro	N.	3·8	37	i 1 4?	+ 3	i 1 45?	– 2
Tuai	N.	4·1	59	e 1 8	+ 3	i 1 56	+ 1
Auckland	N.	4·5	23	e 1 14?	+ 3	2 29?	+24
Kiruna	Z.	149·2	340	i 19 44a	[– 2]	—	—
Tamanrasset	Z.	158·8	215	e 20 22	[+22]	—	—

Oct. 3d. 20h. South Pacific.

Wellington eP? = 37m.15s., S = 40m.54s., eL = 43·0m., eScS? = 47m.32s.
Cobb River iP?E = 37m.41s., eSE = 41m.9s.
Kaimata ePNE = 38m.16s., eSNE = 41m.50s.
Tuai eSN = 39m.48s.
Apia e = 40m. ca.
Christchurch eS? = 42m.3s., eL = 44m.
Pasadena iPZ = 46m.34s.
Lick iPZ = 46m.36s.a, iZ = 46m.43s.
Palomar iPZ = 46m.37s.k.
Riverside iPZ = 46m.37s.
Fresno ePZ = 46m.39s.a, eZ = 46m.52s.
China Lake iPZ = 46m.42s.k, iZ = 46m.55s.
Tinemaha iPZ = 46m.45s.k.
Shasta Dam eP = 46m.46s.
Reno ePZ = 46m.48s.k.
Vladivostok eP = 46m.50s., eS = 57m.32s.
Tucson iP = 46m.55s.
Hungry Horse i = 47m.30s.
College P = 47m.34s.
Kimberley iPKPZ = 53m.12s.
Samarkand ePKP = 53m.26s.
Sverdlovsk iPKP = 53m.30s., PKS = 56m.51s.
Kizyl-Arvat ePKP = 53m.44s.

Continued on next page.

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Moscow ePKP = 53m.50s.
Tiflis ePKP = 53m.51s.
Tsikhlis-Dzhvari ePKP = 53m.56s.
Goris ePKP = 53m.57s.
Lwow ePKP = 54m.6s.
Copenhagen iPKP = 54m.9s.k.
Yalta ePKP = 54m.10s.
Collmberg eZ = 54m.10s., 54m.33s., and 58m.14s.
Uzhgorod ePKP = 54m.14s.
Stuttgart ePKPZ = 54m.14s., eZ = 54m.46s.
Ksara iPKP = 54m.14s., PP = 57m.57s.
Tamanrasset iPKPZ = 54m.28s.a, iZ = 54m.41s., iPKP$_2$Z = 56m.7s., eZ = 56m.34s., ePPZ = 59m.59s., ePcP,PKPZ = 63m.10s.
Triest ePKPZ = 54m.36s., ePKP$_2$?Z = 55m.31s.
Prague ePKP?E = 54m.38s., e = 54m.44s. and 55m.13s., eN = 55m.38s., e = 56m.5s.
Paris ePKP$_2$ = 54m.48s., eL = 125m.
Strasbourg iPKP$_2$ = 54m.49s., e = 55m.13s.
Algiers Univ. ePKP$_2$Z = 55m.40s.
Kiruna iPPEN = 57m.15s.
Long waves were also recorded at Auckland and Palisades.

Oct. 3d. Readings at 0h. (Mount Wilson, China Lake, Tinemaha, Collmberg, near Apia, and near Manila), 1h. (Huancayo, Riverside, China Lake, Tinemaha, and near Manila), 2h. (Brisbane), 3h. (Christchurch and Wellington), 5h. (Antofagasta), 6h. (near Yalta), 8h. (Pretoria (3), La Plata, and Athens), 9h. (Huancayo, Kimberley, Rome, Fergana, Samarkand, Lunacharskoe, near Khorog, Garm, Dzhergetal, Stalinabad, Murgab, and Andijan), 10h. (Rome and near Istanbul), 11h. (Messina and near Yalta), 12h. (Apia, near Athens, near Yalta, and near Reykjavik), 13h. (Brisbane, Manila, Tamanrasset, Rome, Messina, Mount Wilson, Riverside, Palomar, China Lake, Tinemaha, Lick, Fresno, Reno, Boulder City, Hungry Horse, Shasta Dam, Tucson, College, Puebla, Vera Cruz, near Tacubaya, near Santa Clara, and near Yalta (2)), 14h. (Zürich, near Ashkabad, near Mary, Kizyl-Arvat, near Yalta, and near Santa Clara), 15h. (Manila, Kirkland Lake, Strasbourg, near Naryn, Almata II, and Ili), 16h. (Messina, Paris, and Tamanrasset), 17h. (Tananarive, near Almeria, Malaga, and near Garm), 18h. (near Mizusawa), 19h. (Stalinabad, near Dzhergetal (2), Garm, Khorog, and near Chilisk), 20h. (Manila, Tacubaya, Puebla, Vera Cruz, and near Ottawa), 21h. (Palisades, Pasadena, Palomar, China Lake, Tinemaha, Khorog, Fergana, Naryn, near Andijan, Dzhergetal, and Garm), 22h. (Riverside, China Lake, Palomar, Fort de France, Bogota, Galerazamba, Chinchina, Huancayo, Puebla, Vera Cruz, and Tacubaya), 23h. (Bermuda, Mount Wilson, Palomar, Riverside, China Lake, La Paz, Palisades, Weston, Resolute Bay, Scoresby Sund, Paris, Messina, Kiruna, Potsdam, De Bilt, Kew, Christchurch, and near Almata II).

Oct. 4d. 5h. 43m. 8s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030.
(as on 1951, Aug. 29d.).

A = +·2683, B = +·7576, C = +·5951 ; δ = +9 ; h = 0 ;
D = +·943, E = −·334 ; G = +·199, H = +·561, K = −·804.

	Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Khorog	1·2	48	i 0 32	− 2	—	—	—	—	—
Stalinabad	2·3	323	i 0 43	− 1	i 1 16	− 1	—	—	—
Garm	2·3	356	e 0 44	0	i 1 17	0	—	—	—
Dzhergetal	2·6	12	i 0 47	0	1 23	0	—	—	—
Murgab	3·2	59	i 0 51?	− 3	1 31?	− 4	—	—	—
Fergana	3·8	15	i 1 1	0	i 1 47	− 1	—	—	—
Samarkand	4·1	319	i 1 5	+ 1	1 53	− 1	—	—	—
Andijan	4·3	20	i 1 7	0	i 1 58	− 1	—	—	—
Tashkent	4·7	349	i 1 14	+ 2	—	—	—	—	—
Tchimkent	5·6	354	i 1 25	+ 2	2 31	+ 3	—	—	—
Naryn	6·4	41	i 1 30	− 3	i 2 41	− 5	—	—	—
Mary	6·9	280	e 1 40	0	i 2 58	0	—	—	—
Frunse	6·9	26	i 1 41	+ 1	i 2 59	+ 1	—	—	—
Rybach'e	7·2	35	i 1 43	− 1	i 3 3	− 2	—	—	—
Krasnogorka	7·5	27	i 1 46	− 1	—	—	—	—	—
Almata	8·2	35	i 1 56	− 1	i 3 27	− 1	—	—	—
Przhevalsk	8·4	44	i 1 58	− 1	i 3 32	0	—	—	—
Almata II	8·4	37	i 1 59	0	—	—	—	—	—
Chilisk	9·1	39	i 2 9	+ 1	—	—	—	—	—
Ashkabad	9·8	281	e 2 17	0	e 4 3	− 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.
New Delhi		9·8	143	i 2 9a	– 8	i 3 51	–14	2 24	PP	—
Kizyl-Arvat		11·5	286	—	—	e 4 21	–23	—	—	—
Baku		16·5	289	e 3 45	+ 5	—	—	—	—	—
Poona		18·3	170	i 3 56	– 4	7 19	+ 7	8 17	PcP	7·7
Kirovobad		19·2	291	i 4 10?	+ 1	—	—	—	—	—
Goris		19·2	286	e 4 11	+ 2	—	—	—	—	—
Hyderabad		20·4	158	e 4 12	– 9	7 53	+ 1	—	—	—
Tiflis		20·5	293	e 4 24	+ 2	—	—	—	—	—
Erevan		20·6	288	e 4 24	+ 1	—	—	—	—	—
Gori		21·0	295	e 4 25	– 2	—	—	—	—	—
Sverdlovsk		21·2	345	i 4 33	+ 4	i 8 19	+13	i 5 9	pP	—
Ksara		28·3	275	—	—	e 9 22	–41	e 15 42	?	—
Moscow		29·2	322	e 5 44	+ 1	—	—	—	—	—
Lwow		35·7	307	i 6 39	0	—	—	—	—	—
Kiruna		41·7	334	i 7 30k	+ 2	i 16 29	SS	i 8 15	pP	e 19·9
Prague		41·9	308	e 7 32	+ 2	—	—	e 9 13	PP	—
Potsdam		42·7	311	e 7 41	+ 5	e 17 0	SS	i 10 30	?	—
Collmberg	Z.	42·8	309	e 7 37	0	—	—	—	—	—
Copenhagen		43·0	316	i 7 40a	+ 1	—	—	—	—	—
Jena	E.	43·7	308	e 7 45	0	—	—	e 8 31	pP	—
Stuttgart	Z.	45·5	306	e 7 59	0	—	—	e 9 11	sP	—
Strasbourg		46·4	306	e 8 6	0	—	—	e 8 49	pP	—
Paris		49·8	307	i 8 32	0	e 11 14	PPP	i 8 1	?	—
Manila		49·9	103	e 8 22?	–11	—	—	—	—	—
Algiers Univ.	Z.	53·0	292	e 8 54	– 2	—	—	—	—	—
Rathfarnham C.	Z.	54·1	315	e 8 55	– 9	e 13 40	ScP	—	—	—
Tamanrasset	Z.	57·1	277	i 9 24k	– 1	e 10 37	sP	e 10 15	pP	—
Resolute Bay	Z.	68·5	356	i 10 40a	0	—	—	—	—	—
Pretoria	Z.	73·8	220	i 11 10	– 2	—	—	—	—	—
Pietermaritzburg	Z.	76·0	216	i 11 23	– 1	—	—	—	—	—
Kimberley	Z.	78·0	220	i 11 32	– 3	—	—	—	—	—
Grahamstown	Z.	80·8	217	i 11 48	– 2	—	—	—	—	—

Additional readings :—
New Delhi PPE = 2m.17s., QN = 3m.41s., SSN = 4m.2s., S*N = 4m.25s., S_gN = 4m.51s.
Poona PPE = 4m.8s., PPPE = 4m.18s., iSE = QE = 6m.59s., SSS = 7m.33s.
Sverdlovsk i = 8m.23s.
Kiruna iZ = 7m.39s., iPPZ = 9m.11s., ePPP?N = 10m.2s., isPPEZ = 10m.11s., eN = 14m.17s., eE = 15m.1s., eEZ = 16m.52s.?, esSS?N = 17m.21s.
Prague e = 9m.58s. and 10m.38s.
Jena ePPE = 9m.30s., eE = 10m.2s.
Strasbourg ePP = 9m.45s., e = 10m.24s.
Tamanrasset eZ = 9m.50s., ePPPZ = 13m.2s.
Long waves were also recorded at Bombay.

Oct. 4d. 6h. 12m. 24s. Epicentre 43°·8N. 147°·0E. Depth of focus 0·010.
(as on 1945, Oct. 9d.).

Intensity II-III at Nemuro, Noshappu, and Kenebetsu. Suggested Epicentre 44°·1N. 147°·0E. Depth 100km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for Oct., 1951, Tokyo, 1951, pp.245-246, with macroseismic chart on p.245.

A = –·6073, B = +·3944, C = +·6897 ; δ = +5 ; h = –3 ;
D = +·545, E = +·839 ; G = –·578, H = +·376, K = –·724.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Nemuro	1·1	246	0 19a	– 3	1 10	+32
Abashiri	2·0	276	0 38	+ 5	—	—
Kusiro	2·0	247	0 32	– 1	—	—
Urakawa	3·5	243	0 53	– 1	1 36	+ 2
Sapporo	4·2	261	1 3	0	1 53	+ 2
Mori	5·0	252	1 18	+ 4	2 16	+ 5
Aomori	5·5	239	2 20	S	(2 20)	– 3
Morioka	6·0	229	1 24	– 4	2 27	– 9
Sendai	7·2	222	2 57	S	(2 57)	– 8

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Oct. 4d. 8h. 3m. 40s. I
8h. 17m. 40s. II } Epicentre 40°·2N. 75°·0E.

A = +·1982, B = +·7398, C = +·6429 ; δ = −9 ; h = −3 ;
D = +·966, E = −·259 ; G = +·166, H = +·621, K = −·766.

	Δ	Az.	P.	O − C.	S.	O − C.
	°	°	m. s.	s.	m. s.	s.
I Naryn	1·5	32	e 0 22	− 6	e 0 44	− 5
II	1·5	32	i 0 23	− 5	i 0 44	− 5
I Murgab	2·0	204	e 0 32	− 3	e 0 54	− 8
II	2·0	204	0 35	0	1 2	0
I Andijan	2·1	285	0 38	+ 1	1 11	S_g
II	2·1	285	0 39	+ 2	1 12	S_g
II Rybach'e	2·4	20	e 0 41	0	1 17	S_g
I Fergana	2·5	274	e 0 43	0	e 1 18	S*
II	2·5	274	e 0 40?	− 3	e 1 20	S_g
I Frunse	2·7	353	—	—	e 1 29	S_g
II	2·7	353	—	—	e 1 29	S_g
I Dzhergetal	3·1	251	0 53?	+ 2	1 36?	S*
II	3·1	251	0 54	+ 3	1 38	S*
I Krasnogorka	3·1	3	i 0 53	+ 2	i 1 43	S_g
II	3·1	3	e 0 49	− 2	i 1 39	S_g
I Almata	3·4	25	e 0 57	+ 2	i 1 47	S*
II	3·4	25	i 0 58	+ 3	i 1 [illegible]	S*
I Przhevalsk	3·4	47	e 0 57	+ 2	e 1 41	S*
II	3·4	47	e 0 53	− 2	—	—
I Almata II	3·5	29	e 0 55	− 2	i 1 49	S*
II	3·5	29	e 0 56	− 1	i 1 49	S*
I Khorog	3·8	225	e 0 52?	− 9	e 1 48?	+ 1
II	3·8	225	e 1 2	+ 1	e 1 58	S*
I Ili	4·1	22	i 1 7	+ 2	i 2 5	S*
II	4·1	22	i 1 8	+ 3	i 2 5	S*
I Chilisk	4·2	36	e 1 32?	+25	i 2 34?	+37
II Tashkent	4·5	287	e 1 26	P_g	e 2 27?	S_g
II Tchimkent	4·6	299	1 27	P_g	e 2 34	S_g
I Stalinabad	5·1	253	—	—	e 2 13	− 7
II	5·1	253	—	—	e 2 53	S*
II Samarkand	6·2	268	1 50	P*	—	—

Oct. 4d. 14h. Undetermined shock.

Apia eP? = 9m.24s., e = 12m.?.
Auckland iN = 10m.0s.?, LN = 11m.0s.?.
Wellington P? = 10m.45s., L? = 12m.40s.
Tuai eP?N = 10m.52s.
Riverview iPZ = 11m.48s.k, iPPE = 12m.34s., eSE = 16m.21s., eLN = 18·5m.
Palomar ePZ = 17m.54s.
China Lake ePZ = 17m.59s.
Manila e = 18m.
Ksara iPKP? = 25m.25s., e = 29m.10s.
Collmberg eZ = 25m.45s.
Kiruna ePPZ = 28m.23s., ePKSN = 29m.7s., ePS?N = 38m.28s., eLN = 84m.
Long waves were recorded at Palisades, Weston, Christchurch, and several European stations.

Oct. 4d. Readings also at 2h. (China Lake, Palomar, Riverside, and Mount Wilson), 5h. (Vera Cruz, Tacubaya, China Lake, Christchurch, and Auckland), 7h. (Tamanrasset, La Paz, and near Yalta), 8h. (Wellington, Auckland, Christchurch, Santa Lucia, Vera Cruz, and Tacubaya), 11h. (Pretoria, Kimberley, and near Athens), 13h. (Timisoara, Triest, Stuttgart, Collmberg, and Strasbourg), 14h. (near Ashkabad), 15h. (near Garm (3)), 16h. (Tuai, Wellington, and Alicante (3)), 17h. (Palomar (2), China Lake (2), Christchurch, and Ashkabad), 18h. (Kimberley and Grahamstown), 19h. (Wellington, Zürich, Basle, Stuttgart (2), Strasbourg, Paris, Tchimkent, Tashkent, Murgab, near Samarkand, Stalinabad, Khorog, Dzhergetal, Fergana, and Garm (2)), 21h. (near Garm), 23h. (Ksara, near Horseshoe Bay, Victoria, Seattle, Goris, Shemakla, Tsikhlis-Dzhvari, Leninakan, near Erevan, Tiflis, and Kirovobad),

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Oct. 5d. 1h. 20m. 37s. Epicentre 34°·9N. 134°·6E. (as on 1947, March 17d.).

Intensity V at Akashi Sanda; IV at Kobe, Okayama, Kaibara; II-III at Toyooka, Takamatu, Tottori, and Kyoto. Epicentre 34°·7N. 135°·0E.

Seismo. Bull. Cent. Met. Obs., Japan, for 1951, Tokyo, 1951, pp.246-247, with macroseismic chart.

A = −·5771, B = +·5853, C = +·5696; δ = +6; h = 0;
D = +·712, E = +·702; G = −·400, H = +·406, K = −·822.

	Δ	Az.	P.	O − C.	S.	O − C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Himeji	0·4	202	0 15	+ 2	0 19	− 2	—	—
Kobe	0·5	114	0 12k	− 2	0 16	− 7	—	—
Okayama	0·6	247	0 26	S	(0 26)	0	0 42	?
Sumoto	0·6	157	0 14a	− 1	0 19	− 7	—	—
Takamatu	0·7	218	0 22k	+ 5	0 34	+ 6	—	—
Tottori	0·7	333	0 33	S	(0 33)	+ 5	0 47	?
Osaka	0·8	108	0 12	− 6	0 19	−12	—	—
Wakayama	0·8	145	0 44	S	(0 44)	+13	0 50	?
Kyoto	0·9	83	0 23	+ 3	0 32	− 2	—	—
Yonago	1·1	298	0 36	S	(0 36)	− 3	0 58	?
Hikone	1·4	75	0 31	+ 4	0 47	+ 1	—	—
Tsuruga	1·4	58	0 33a	+ 6	0 50	+ 4	—	—
Kameyama	1·5	92	0 31	+ 3	0 52	+ 3	—	—
Owase	1·6	122	0 31	+ 1	0 46	− 5	—	—
Muroto	1·7	192	0 37	+ 6	0 56	+ 2	—	—
Siomisaki	1·7	146	0 33	+ 2	0 51	− 3	—	—
Hukui	1·8	50	0 43a	+11	1 3	+ 7	—	—
Matuyama	1·9	235	0 42	+ 8	1 8	+ 9	—	—
Nagoya	2·0	82	0 38	+ 3	1 3	+ 1	—	—
Kanazawa	2·3	46	0 55	P_g	1 21	S_g	—	—
Simidu	2·5	213	0 59	P_g	1 25	S_g	—	—
Hamamatu	2·6	90	0 41	− 3	1 13	− 4	—	—
Iida	2·7	77	1 12	S	(1 12)	− 7	—	—
Toyama	2·8	50	1 9	P_g	—	—	—	—
Omaesaki	3·0	69	1 2	P_g	—	—	—	—
Ooita	3·0	236	0 43	− 7	—	—	—	—
Matumoto	3·1	64	1 8	P_g	1 45	S_g	—	—
Wazima	3·1	37	1 11	P_g	1 56	S_g	—	—
Kohu	3·3	77	1 8	P_g	1 46	S*	—	—
Nagano	3·4	58	1 17	P_g	1 55	S_g	—	—
Hunatu	3·5	79	1 5	P*	—	—	—	—
Oiwake	3·5	65	1 12	P_g	—	—	—	—
Misima	3·6	86	0 37	−21	—	—	—	—
Hukuoka	3·7	250	1 22	P_g	2 11	S_g	—	—
Kumamoto	3·8	239	2 12	S_g	—	—	—	—
Maebasi	3·9	66	1 57	S*	—	—	—	—
Saga	3·9	246	2 15	S_g	—	—	—	—
Kumagaya	4·1	71	1 25	P_g	2 15	S_g	—	—
Ksara	77·8	303	e 11 42	−19	e 13 24	?	—	—

When P reading has been referred to the S phase the corresponding recorded S has been entered in the Supplementary Column.

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Oct. 5d. 6h. 30m. 43s. Epicentre 32°·8S. 178°·1W. (as on 1950, Oct. 28d.).

A = −·8418, B = −·0279, C = −·5391 ; δ = +3 ; h = +1 ;
D = −·033, E = +·999 ; G = +·539, H = +·018, K = −·842.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tuai	N.	7·1	211	1 51	+ 3	3 9	− 1	—	—	—
Karapiro	N.	7·3	224	2 17?	+27	3 36?	+21	—	—	—
Wellington		10·2	212	e 2 52	+21	i 4 19	− 8	—	—	—
Cobb River	E.	11·0	219	—	—	e 4 38	− 9	—	—	—
Kaimata	N.E.	12·8	217	e 3 16	+10	e 5 18	−12	—	—	—
Christchurch		13·0	212	—	—	e 5 25	−10	—	—	—
Apia		19·8	20	e 4 26	− 9	e 7 41	−32	e 4 47	PP	9·6
Brisbane	Z.	25·5	274	i 5 32a	0	—	—	—	—	—
Riverview		25·7	258	i 5 41	+ 8	e 10 14	+13	e 11 17	Q	e 12·6
Terre Adélie		41·5	203	i 7 54	+ 4	—	—	—	—	—
Manila		74·8	299	(i 11 39)	− 5	i 11 39	P	—	—	—
Pasadena	Z.	87·2	46	e 12 51	+ 2	—	—	—	—	—
Lick	Z.	87·4	41	i 12 49	− 1	—	—	—	—	—
Palomar	Z.	87·5	47	e 12 51	0	—	—	—	—	—
Riverside	Z.	87·6	46	e 12 50	− 1	—	—	—	—	—
Fresno	Z.	88·0	43	e 12 53	0	—	—	—	—	—
Vladivostok		88·3	326	e 12 52	− 3	e 23 35	− 4	—	—	—
China Lake	Z.	88·7	45	i 12 56	− 1	—	—	—	—	—
Reno	Z.	90·0	41	e 13 2	− 1	—	—	—	—	—
Boulder City		90·5	47	e 12 31	−34	—	—	—	—	—
Tucson		90·6	51	e 13 6	+ 1	—	—	—	—	—
La Paz		97·1	115	e 13 33	− 2	—	—	—	—	—
College		100·2	12	e 13 49	0	—	—	—	—	—
Sverdlovsk		133·7	319	e 19 18	[− 1]	i 22 46	PKS	—	—	—
Kiruna		143·3	348	e 19 30	[− 6]	e 29 39	{− 1}	e 22 40	PP	e 77·5
Goris		143·8	294	e 19 34	[− 3]	—	—	—	—	—
Tiflis		145·0	297	e 19 35	[− 4]	—	—	—	—	—
Erevan		145·2	294	e 19 37	[− 3]	—	—	—	—	—
Tsikhlis-Dzhvari		146·0	299	e 19 39	[− 2]	—	—	—	—	—
Moscow		146·2	323	e 19 40	[− 1]	—	—	—	—	—
Ksara		151·7	281	i 19 50	[0]	—	—	—	—	—
Potsdam		158·8	342	e 20 0	[+ 1]	—	—	—	—	e 77·3
Witteveen	Z.	159·7	353	20 39	PKP_2	—	—	—	—	—
Collmberg	Z.	159·8	339	e 20 1	[0]	—	—	—	—	—
Jena	Z.	160·5	340	e 19 58	[− 3]	—	—	—	—	—
Kew		161·3	4	—	—	e 32 13	{+53}	—	—	e 84·3
Stuttgart		163·1	344	e 20 3	[− 1]	e 32 47	{+78}	e 20 52	PKP_2	e 49·3
Strasbourg		163·6	346	e 20 55	PKP_2	—	—	e 24 37	PP	—
Paris		164·0	359	e 20 6	[+ 1]	e 24 39	PP	e 20 49	PKP_2	e 84·3
Triest		164·2	329	e 30 30	?	e 31 8	{−26}	e 34 32	PSKS	e 87·8
Pavia		166·4	338	—	—	e 32 43	{+58}	e 45 30	SS	e 88·6
Tamanrasset	Z.	169·5	194	i 20 11k	[+ 2]	e 21 25	PKP_2	e 25 15	PP	—
Granada		173·7	—	24 13k	?	29 22	?	25 41	PP	93·2
Alicante		174·1	—	20 11	[0]	27 22	[+ 9]	25 37	PP	e 74·5
Almeria		174·6	—	i 20 9	[− 2]	32 11	{−14}	25 29	PP	—

Additional readings :—
Riverview iE = 6m.10s.
Kiruna ePKSN = 23m.17s.?, eN = 31m.39s., 37m.41s., and 50m.17s.?.
Collmberg eZ = 20m.37s. and 20m.51s.
Jena eZ = 20m.7s., 20m.12s., 20m.36s., and 20m.55s.
Stuttgart ePP = 24m.35s. and 24m.49s., ePPS? = 37m.47s.
Strasbourg e = 21m.8s.
Paris e = 25m.23s.
Triest eSS = 44m.59s.
Granada SS = 51m.13s.
Alicante PPP = 29m.35s., PPS = 39m.43s., SS = 47m.5s.
Long waves were also recorded at Huancayo, Berkeley, Palisades, Scoresby Sund, and Messina,

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Oct. 5d. 11h. 37m. 26s. Epicentre 29°·5S. 176°·5W.

A = −·8702, B = −·0532, C = −·4899 ; δ = +8 ; h = +2 ;
D = −·061, E = +·998 ; G = +·489, H = +·030, K = −·872.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland		10·3	222	(e 2 34)	+ 2	(e 4 34)	+ 4	—	—	e 4·6
Tuai	N.	10·7	208	—	—	4 20	−19	—	—	e 5·6
Wellington		13·7	209	e 3 17	− 1	5 27	−25	i 5 35	SS	6·2
Cobb River	E.	14·5	214	—	—	e 5 49	−22	—	—	—
Apia		16·2	17	e 3 45	− 5	e 6 39	−12	—	—	e 6·8
Kaimata	N.E.	16·2	214	e 3 51	+ 1	e 6 37	−14	—	—	—
Christchurch		16·5	209	e 6 3	?	7 7	+ 9	—	—	e 8·2
Brisbane		26·8	268	i 5 44k	0	i 10 23	+ 4	i 6 17	PP	i 13·0
Riverview		27·8	253	i 5 53a	0	i 10 34	− 1	i 11 56	SS	e 13·3
Terre Adélie		45·1	203	e 8 19	− 1	e 14 57	− 2	—	—	—
Manila		74·5	297	e 11 37	PcP	—	—	—	—	—
Pasadena		83·9	46	e 12 34	+ 1	—	—	—	—	e 40·6
Santa Clara	E.	83·9	41	—	—	e 38 16	Q	—	—	e 51·2
Berkeley		84·0	41	—	—	e 23 8	+11	e 28 44	SS	e 41·0
Palomar	Z.	84·2	47	e 12 36	+ 2	—	—	—	—	—
Zi-ka-wei	Z.	84·4	311	e 12 37	+ 1	e 23 3	+ 2	—	—	—
Fresno	Z.	84·7	43	e 12 35	− 2	—	—	—	—	—
China Lake	Z.	85·4	45	e 12 42	+ 2	—	—	—	—	—
Shasta Dam		86·0	39	e 12 40	− 3	—	—	—	—	—
Vladivostok		86·4	325	e 12 41	− 4	i 23 31	+10	e 23 8	SKS	—
Reno	Z.	86·6	41	e 13 1a	+15	—	—	—	—	—
Nanking		86·7	310	e 12 49	+ 2	23 19	− 5	—	—	—
Boulder City		87·2	46	e 13 10	+21	—	—	—	—	—
Tucson		87·5	51	e 12 52	+ 1	—	—	—	—	—
Seattle		90·9	326	—	—	e 24 20	+17	e 25 26	PS	e 45·6
Victoria		91·0	327	—	—	e 23 46	[+ 7]	—	—	—
Huancayo		93·6	106	—	—	e 23 58	[+ 5]	e 24 39	S	e 44·0
La Plata		93·6	134	—	—	38 46	Q	—	—	49·1
College		96·7	12	e 13 31	− 2	—	—	—	—	—
La Paz		97·2	114	i 13 42	+ 6	i 24 18	[+ 5]	e 17 50	PP	47·2
Chinchina		101·9	92	—	—	e 28 19	PPS	—	—	47·5
Bogota		103·1	92	—	—	e 24 37	[− 5]	e 26 48	PS	51·2
Kabansk		105·2	321	—	—	e 24 34	[−17]	—	—	—
Irkutsk		106·6	321	—	—	e 25 4	[+ 6]	e 28 4	PS	—
Resolute Bay		116·0	17	—	—	e 27 46	{+59}	e 29 46	PS	e 51·8
Rybach'e		121·5	304	e 19 17	[+21]	e 26 1	[+ 6]	e 20 49	PP	—
Andijan		123·9	301	e 19 2?	[+ 2]	e 27 44	{+ 4}	—	—	—
Fergana		124·2	301	e 19 16	[+15]	26 8	[+ 4]	e 27 47	SKKS	—
Tchimkent		126·2	303	—	—	e 26 14	[+ 4]	—	—	—
Tashkent		126·3	302	e 19 21	[+16]	i 26 16	[+ 6]	e 20 53	PP	—
Mary		131·4	297	i 22 44	PKS	—	—	—	—	—
Sverdlovsk		132·0	322	e 19 19	[+ 3]	e 28 33	{+ 1}	i 22 48	PKS	—
Ashkabad		134·2	296	e 22 41	PKS	—	—	—	—	—
Kizyl-Arvat		135·9	298	e 21 25	PP	i 22 51	PKS	—	—	—
Scoresby Sund		136·5	12	22 52	PKS	34 52	PPS	—	—	76·6
Kiruna		140·3	350	e 28 1	?	e 29 15	{− 8}	i 32 48	PS	e 63·9
Moscow		144·3	328	e 19 35	[− 3]	—	—	e 22 51	PKS	—
Tiflis		144·6	302	e 19 45?	[+ 7]	—	—	—	—	—
Pulkovo		144·7	338	e 19 37	[− 2]	—	—	—	—	—
Erevan		145·0	300	e 19 26	[−13]	—	—	—	—	—
Tsikhlis-Dzhvari		145·6	303	e 19 47?	[+ 7]	—	—	—	—	—
Yalta		151·5	310	e 19 52	[+ 2]	—	—	—	—	—
Ksara		152·2	288	e 19 57	[+ 6]	—	—	e 23 21	PKS	—
Copenhagen		153·1	350	e 20 4	[+12]	—	—	43 28	SS	76·6
Kishinev		153·7	320	e 20 5	[+12]	—	—	—	—	—
Lwow		154·4	329	e 19 57	[+ 3]	e 26 49	[−10]	e 23 1?	PKS	—
Durham		154·5	7	—	—	e 29 21	?	i 33 36	PS	—
Rathfarnham Castle		155·2	14	e 19 57	[+ 2]	e 39 1	P'P'	e 24 59	PP	e 90·1
Helwan	Z.	155·8	278	e 20 7	[+11]	e 32 16	?	—	—	—
Potsdam		156·1	347	e 20 6	[+10]	—	—	e 20 10	PKP,	e 72·6

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Uzhgorod		156·1	329	e 20 27	[+31]	e 30 56	{+ 4}	24 15	PP	—
Istanbul	N.	156·2	307	e 20 46	PKP₂	e 30 56	{+ 4}	e 25 3	PP	e 82·6
Collmberg	Z.	157·1	346	e 20 7	[+10]	—	—	—	—	—
De Bilt		157·4	357	e 20 6	[+ 8]	e 44 10	SS	e 20 44	PKP₂	e 90·6
Jena	Z.	157·7	347	e 19 58	[0]	e 24 22	PP	e 20 31	PKP₂	—
Kew		157·9	6	i 20 2	[+ 4]	33 36	?	e 24 50	PP	e 77·6
Prague		157·9	342	e 21 27	?	e 21 46	?	e 23 54	PKS	—
Cheb		158·4	347	e 28 28	PPP	e 35 34	PS	e 32 37	?	—
Stuttgart		160·3	350	e 20 12	[+11]	e 31 3	{−11}	e 20 44	PKP₂	e 87·6
Paris		160·7	3	e 20 13	[+11]	e 27 15	[+10]	e 20 46	PKP₂	e 83·6
Strasbourg		160·7	352	e 20 9	[+ 7]	e 31 22	{+ 6}	e 20 46	PKP₂	e 82·6
Triest		162·0	337	e 20 8	[+ 5]	e 31 33	{+10}	e 21 15	PKP₂	—
Pavia		163·8	346	e 21 6	PKP₂	e 48 43	?	—	—	—
Rome		165·7	332	e 20 54	PKP₂	31 36	{− 5}	e 24 49	PP	—
Toledo		167·9	29	e 21 29	PKP₂	—	—	—	—	82·6
Malaga		170·2	—	e 20 6	[− 3]	e 25 15	PP	e 21 26	PKP₂	89·3
Granada		170·3	—	e 19 31a	[−38]	25 52	PP	21 31	PKP₂	—
Alicante		170·6	—	19 26	[−44]	26 42	[−30]	25 0	PP	e 79·0
Tamanrasset	Z.	173·1	—	e 20 15	[+ 4]	—	—	e 21 52	PKP₂	—

Additional readings and note :—
Auckland gives P and S as S and L.
Brisbane ePE = 5m.48s., eZ = 5m.55s., iZ = 6m.10s., ePcPE = 8m.54s., iSSE = 11m.46s.
Riverview iEZ = 6m.26s., iE = 7m.44s. and 8m.16s., eN = 10m.8s., iN = 11m.2s., and 11m.18s., iSSSN = 12m.15s.
Berkeley eN = 35m.40s.
Vladivostok iSKKS = 23m.14s., iScS = 23m.38s.
Huancayo e = 30m.58s.
La Paz eP? = 13m.8s., PS = 26m.26s., eSS = 31m.56s.
Resolute Bay eEN = 35m.16s., 37m.16s., 39m.40s., and 44m.46s.
Rybach'e eSKKS = 27m.33s., eSKSP = 30m.9s., eSS = 36m.46s.
Tashkent iSKKS = 27m.54s.
Kiruna eSKKSE = 29m.18s., eSS?N = 41m.15s., eSSSZ = 46m.7s., and other unidentified readings.
Helwan eZ = 20m.19s.
De Bilt ePP = 24m.34s.
Kew eZ = 20m.37s., e = 30m.29s., ePPS?EZ = 42m.51s.
Stuttgart ePP = 25m.0s., e = 25m.52s., ePPP = 28m.37s., e = 33m.34s., ePSKS = 35m.22s., ePPS = 38m.34s., e = 40m.46s., eSS = 44m.28s.
Paris e = 21m.36s., ePP = 24m.58s., ePPP = 28m.20s., ePPP(Δ > 180°) = 32m.56s., ePPS = 38m.20s., e = 47m.48s. and 47m.58s., eSSP(Δ > 180°) = 52m.6s.
Strasbourg ePP = 24m.34s., ePPP = 28m.39s., eSKKS = 31m.56s., ePPP(Δ > 180°) = 32m.18s., eSKKS(Δ > 180°) = 33m.58s., eSS = 44m.40s. and other unidentified e readings.
Triest eSS = 45m.6s.
Rome eSSZ = 44m.51s.
Malaga ePPP = 29m.31s.
Alicante PPP = 28m.47s., SSS = 53m.8s., Q = 70m.24s.
Tamanrasset eZ = 20m.33s.
Long waves were also recorded at Karapiro, Harvard, Weston, Palisades, Galerazamba, Fort de France, Bermuda, Ivigtut, Aberdeen, Clermont-Ferrand, Almeria, Tananarive, and Pretoria.

Oct. 5d. 14h. 34m. 29s. Epicentre 40°·0N. 76°·1E. (U.S.S.R.).

A = +·1845, B = +·7457, C = +·6402 ; δ = −4 ; h = −2 ;
D = +·971, E = −·2401; G = +·154, H = +·621, K = −·768.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Naryn	1·4	357	e 0 27	0	e 0 47	+ 1
Rybach'e	2·5	0	e 0 47	P*	i 1 24	S_g
Przhevalsk	3·0	35	—	—	i 1 50	S_g
Almata	3·3	11	e 1 3	P_g	i 1 53	S_g
Fergana	3·3	273	e 0 49	− 4	e 1 28	− 7
Krasnogorka	3·3	348	e 0 57	+ 4	i 1 43	S*
Almata II	3·4	16	i 1 6	P_g	i 1 59	S_g
Dzhergetal	3·8	260	e 1 0	− 1	i 1 43	− 4
Ili	4·0	10	i 1 14?	P*	i 2 11?	S_g
Khorog	4·3	236	e 1 7	− 1	e 1 57	− 3
Garm	4·6	260	e 1 11	− 1	e 2 5	− 2
Tchimkent	5·4	297	e 1 41	P*	—	—
Stalinabad	5·9	258	—	—	e 2 45	+ 5

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Oct. 5d. 22h. Mediterranean.

Athens eP*? = 1m.47s., eP_g = 1m.51s., i = 2m.33s., iS_g = 2m.37s.
Istanbul ePN = 3m.30s., eS_gN = 4m.25s.
Messina eZ = 4m.10s., 4m.46s., and 5m.39s.
Timisoara N = 4m.16s.
Prague eP = 4m.44s., e = 5m.10s., 5m.28s., 6m.8s., 7m.55s., and 8m.12s.
Zürich e = 4m.49s. and 6m.2s.
Stuttgart ePZ = 4m.55s., eQ = 11·0m.
Basle e = 4m.58s.
Collmberg eZ = 5m.2s.
Strasbourg eP = 5m.4s., ePP = 5m.23s., e = 5m.55s., 6m.4s., 6m.20s., and 7m.32s.
Ksara e = 5m.17s. and 17m.9s.
Tamanrasset ePZ = 5m.29s.
Paris eP = 5m.34s., e = 5m.41s., eL = 12m.
Triest e = 5m.38s., eSSS? = 7m.33s., iQ? = 7m.54s.
Rome eN = 6m.19s.?, eE = 8m.34s.
Alicante e = 6m.34s.
Kiruna iPZ = 7m.22s.k.
Pavia e = 8m.43s.
Cheb e = 10m.2s.

Oct. 5d. Readings also at 0h. (Apia, Chinchina, and near Bogota), 1h. (Paris and Pavia), 2h. (China Lake, Riverside, Kiruna, Collmberg, Stuttgart, Triest, Pavia, Messina, Tamanrasset, Leninakan, Tsikhlis-Dzhvari (2), near Erevan (2), Gori, Goris (2), Kirivobad (2), Tiflis (2), near Apia (2), near Istanbul and near Manila), 3h. (Tamrasset, Rathfarnham Castle, and near Garm (2), 4h. (near Garm), 6h. (Terre Adélie, Kimberley, near Dzhergetal, Fergana, Garm, Khorog, Samarkand, and Stalinabad), 7h. (Strasbourg), 8h. (Terre Adélie, Manila, Stuttgart, and Huancayo), 9h. (Apia, Andijan, Dzhergetal, Fergana, near Garm, Khorog, Murgab, and Stalinabad), 13h. (Palomar, China Lake, and Tinemaha), 14h. (Apia (2), Auckland, Helwan, Ksara, and near Abastumanj), 16h. (Alberni, Horseshoe Bay, and near Victoria), 17h. (Kimberley, Pretoria, Prague, Samarkand, Stalinabad, near Dzhergetal, Khorog, and Garm (2)), 19h. (Antofagasta), 20h. (Apia (2), Huancayo, Copenhagen, Collmberg, Jena, Strasbourg, Stuttgart, Frunse (2), Krasnogorka, Lunacharskoe, Rybach'e, Tashkent, Tchimkent, near Almata II, Dzhergetal, Fergana, Garm, Khorog, Ili, Naryn (2), Przhevalsk, Samarkand, and Stalinabad), 22h. (near Ashkabad, near Dzhergetal, Garm, and Khorog), 23h. (near La Paz and near Fort de France).

Oct. 6d. 3h. 28m. 37s. Epicentre 30°·1S. 176°·6W.

A = −·8651, B = −·0514, C = −·4990 ; δ = +4 ; h = +1 ;
D = −·059, E = +·998 ; G = +·498, H = +·030, K = −·867.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tuai	N.	10·1	209	—	—	4 18	− 7	—	—	—
Karapiro	N.	10·2	218	—	—	4 23	− 4	—	—	—
Wellington		13·2	210	e 3 13	+ 2	e 5 26	−14	—	—	6·2
Cobb River	E.	14·0	215	—	—	e 5 53	− 6	—	—	—
Kaimata	N.E.	15·7	214	e 3 47	+ 3	—	—	—	—	—
Christchurch		15·9	210	—	—	e 5 53	?	—	—	e 8·6
Apia		16·8	16	e 4 5	+ 7	(e 6 53)	−12	6 33	?	e 6·9
Brisbane		26·7	268	i 5 42	− 1	e 10 26	+ 9	i 6 20	PP	e 13·0
Riverview		27·5	254	e 5 51	+ 1	e 10 33	+ 3	i 6 35	PP	e 13·3
Lick	Z.	84·5	41	e 12 36a	0	—	—	—	—	—
Mount Wilson	Z.	84·5	46	e 12 39	+ 3	—	—	—	—	—
Palomar	Z.	84·7	47	e 12 37	0	—	—	—	—	—
Riverside	Z.	84·8	46	e 12 36	− 1	—	—	—	—	—
Fresno	Z.	85·2	42	e 12 38k	− 1	—	—	—	—	—
China Lake	Z.	85·9	44	e 12 42	− 1	—	—	—	—	—
Shasta Dam		86·5	38	e 12 45	− 1	—	—	—	—	—
Vladivostok		86·8	325	e 12 44	− 3	e 23 31	+ 6	—	—	—
Reno	Z.	87·1	40	e 12 47	− 2	—	—	—	—	—
Boulder City		87·7	46	e 12 52	0	—	—	—	—	—
Tucson		87·9	40	e 12 54	+ 1	—	—	—	—	—
La Plata	E.	93·3	134	—	—	31 41	?	39 5	Q	44·8
Huancayo		93·6	106	—	—	e 23 54	[+ 1]	e 30 59	SS	e 45·7
La Paz		97·0	114	e 12 53	−42	24 29	{− 4}	26 31	PS	48·9
College		97·3	12	13 33	− 3	—	—	—	—	—
Ksara		152·3	286	e 20 10	PKP_2	e 24 9	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.
Potsdam		156·6	346	e 20 17	PKP₂	—	—	—	—	e 86·4
Collmberg	Z.	157·6	344	e 20 29	PKP₂	—	—	—	—	—
De Bilt		158·0	357	e 20 6	[+ 8]	e 37 53	PPS	e 24 23	PP	e 86·4
Prague		158·4	341	e 20 40	PKP₂	e 23 27	PKS	e 21 28	?	—
Kew		158·5	6	e 20 24	PKP₂	—	—	e 24 6	PP	e 81·4
Cheb		158·9	343	e 28 5	PPP	e 31 49	SKKS	e 43 47	SS	—
Stuttgart		160·8	347	e 20 18?	[+17]	e 44 43	SS	e 24 23	PP	e 93·4
Strasbourg		161·2	351	e 20 44	PKP₂	e 31 11	{– 8}	e 24 25	PP	e 81·4
Paris		161·3	2	e 20 13	[+11]	—	—	e 20 47	pPKP	e 82·4
Triest		162·5	335	e 20 10	[+ 7]	e 44 53	SS	e 24 33	PP	e 92·4
Pavia		164·3	344	e 23 55	PKS	—	—	—	—	—
Clermont-Ferrand		164·4	1	(e 21 5)	PKP₂	—	—	—	—	e 85·1
Rome		166·1	329	e 25 30	PP	e 44 54	SS	e 34 18	?	—
Messina	Z.	167·1	312	—	—	e 35 5	?	e 46 24	SSP	—
Malaga		170·7	—	e 20 9	[– 1]	—	—	e 25 28	PP	89·5
Granada		170·8	—	21 51k	PKP₂	31 48	{–19]	25 33	PP	87·9
Alicante		171·2	—	20 33	[+23]	28 18	[+66]	34 54	PS	e 70·5
Tamanrasset	Z.	172·5	—	e 20 12	[+ 1]	—	—	e 21 36	PKP₂	—
Algiers Univ.	Z.	173·4	—	21 9	?	—	—	—	—	—

Additional readings:—
Riverview iZ = 6m.59s., iSN = 10m.37s., iSSN = 12m.0s.
Huancayo e = 25m.49s., 32m.37s., and 43m.47s.
La Paz SS = 32m.23s.
De Bilt ePKP₂ = 20m.43s.
Kew e = 21m.23s., eEN = 32m.48s.
Cheb e = 32m.29s.
Stuttgart ePKP₂Z = 20m.42s., ePSKS = 35m.5s., e = 37m.29s. and 49m.47s.
Strasbourg e = 25m.14s. and 30m.40s., eSS = 45m.23s.?
Paris e = 20m.57s.
Triest e = 29m.9s., eSKKS = 30m.38s., ePSS = 45m.49s.
Pavia e = 33m.55s., 41m.39s., and 49m.25s.
Clermont-Ferrand reading given as SKKS.
Malaga iPP = 20m.53s.
Granada SS = 42m.39s.
Alicante PP = 23m.49s., SS = 43m.35s., SSS = 48m.48s., Q = 62m.40s.
Long waves were also recorded at Auckland, Pasadena, Berkeley, Santa Clara, Seattle, Palisades, Weston, Scoresby Sund, Fort de France, Bogota, Chinchina, Almeria, and Aberdeen

Oct. 6d. 5h. 54m. 42s. Epicentre 53°·3N. 178°·4W. Depth of focus 0·010.

A = –·6000, B = –·0168, C = +·7998 ; δ = –4 ; h = –7 ;
D = –·028, E = +1·000 ; G = –·800, H = –·022, K = –·600.

		Δ	Az.	P.	O – C.	S.	O – C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Mitchell Field		1·8	141	e 0 31	+ 1	1 12	+19	—
Adak		1·8	143	0 26	– 4	1 7	+14	—
College		19·3	40	e 4 32	+12	—	—	—
Victoria		34·3	75	6 42	+ 3	—	—	—
Hungry Horse		39·7	69	i 7 29	+ 5	—	—	e 18·8
Reno	Z.	41·5	84	e 7 36	– 3	—	—	—
Lick	Z.	41·8	88	e 7 40a	– 1	—	—	—
Fresno	Z.	43·3	87	e 8 20	pP	—	—	—
Tinemaha	Z.	44·0	86	e 8 3	+ 4	—	—	—
China Lake	Z.	45·3	87	e 8 8	– 2	—	—	—
Mount Wilson	Z.	46·1	89	e 8 13	– 3	—	—	—
Riverside	Z.	46·6	89	e 8 15	– 5	—	—	—
Palomar	Z.	47·4	89	e 8 23	– 3	—	—	—
Tucson		51·2	85	e 8 58	+ 2	—	—	—
Kiruna	Z.	58·4	352	9 42	– 6	—	—	—
Collmberg	Z.	75·3	354	e 11 27	– 7	—	—	—

Long waves were also recorded at Bermuda and Alicante.

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Oct. 6d. 6h. 1m. 20s. Epicentre 39°·2N. 23°·6E. (as on 1951, April 20d.).

A = +·7120, B = +·3111, C = +·6295 ; δ = 0; h = −2 ;
D = +·400, E = −·916 ; G = +·577, H = +·252, K = −·777.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		1·2	155	i 0 17	− 7	i 0 39	− 2	i 0 14	?	—
Sofia		3·5	357	e 0 52	− 5	1 32	− 8	i 1 9	P_g	2·1
Istanbul		4·6	64	e 1 13	+ 1	e 2 7	0	e 1 58	?	(e 2·1)
Bucharest		5·5	19	e 1 35	P*	e 2 46	S*	e 1 58	P_g	—
Belgrade		6·1	338	—	—	e 2 51	+ 6	i 3 31	S_g	e 4·4
Messina	Z.	6·4	262	e 1 46	+ 8	e 3 9	S*	—	—	—
Timosoara		6·8	346	e 2 14	P_g	e 3 32	S*	—	—	—
Kalossa		8·1	336	e 4 25	?	e 4 28	S_g	—	—	e 5·2
Budapest	N.	8·9	340	e 4 14	S	(e 4 14)	+19	e 5 9	Q	e 7·7
Triest		9·7	315	—	—	i 4 34	+19	e 3 6	?	i 6·2
Prague		12·7	332	—	—	e 5 12	−16	—	—	e 7·9
Cheb		13·5	327	e 3 23	+ 8	—	—	e 4 0	?	—
Stuttgart		14·1	317	e 3 25?	+ 2	—	—	e 5 5	?	e 7·7
Collmberg	Z.	14·2	332	e 3 23	− 1	—	—	—	—	—
Jena	Z.	14·5	328	e 3 27	− 1	—	—	e 4 53	?	—
Witteveen	Z.	17·9	325	e 4 46	PPP	—	—	—	—	—
Tamanrasset	Z.	22·5	229	e 4 56	− 6	—	—	—	—	—

Additional readings :—
Sofia P*EN = 58s., P_gEN = 1m.4s., S*EN = 1m.40s., S_gEN = 1m.46s., iEN = 1m.51s. and 1m.58s.
Bucharest eE = 2m.12s.
Belgrade eNE = 3m.3s.
Long waves were also recorded at Paris, Pavia, Rome, De Bilt, and Potsdam.

Oct. 6d. Readings also at 0h. (Auckland, near Manila, and near Alberni), 1h. (Oaxaca, Vera Cruz, Tacubaya, Puebla, Apia, and Kiruna), 2h. (Christchurch, Wellington, Tuai, Auckland, Riverview, Brisbane, Vladivostok, and near Athens), 3h. (Apia (2)), 4h. (Paris, Strasbourg, Ksara, Kiruna, near Almata II, and near Manila), 6h. (near Apia), 7h. (near Dzhergetal and near Garm), 8h. (near Almata II), 9h. (Vera Cruz, Puebla, near Tacubaya, and near Manila), 10h. (Antofagasta), 11h. (Durham, Pietermaritzburg, Fergana, near Garm, Dzhergetal, Khorog, and near Manila), 12h. (Terre Adélie), 14h. (Concepción), 16h. (near Garm and Dzhergetal), 17h. (Apia), 18h. (Bermuda and Harvard), 20h. (Seattle and near Huancayo), 21h. (La Paz).

Oct. 7d. 6h. 0m. 19s. Epicentre 7°·2N. 75°·0W. Depth of focus 0·010.
(as on 1938, May 2d.).

A = +·2568, B = −·9584, C = +·1245 ; δ = −2 ; h = +7 ;
D = −·966, E = −·259 ; G = +·032, H = −·120, K = −·992.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		2·7	160	i 0 42	− 1	i 1 16	+ 2	i 0 49	PP	—
Balboa Heights		4·8	292	i 0 58	−13	e 2 1	− 5	—	—	—
Huancayo		19·2	181	e 4 17	− 2	e 7 44	− 1	—	—	e 10·0
La Paz		24·6	164	e 5 11	− 1	i 10 25	+61	—	—	i 12·1
Palomar	Z.	46·6	310	e 8 27	+ 7	—	—	—	—	—
Pasadena	Z.	48·0	310	e 8 38	+ 7	—	—	—	—	—
China Lake	Z.	48·2	313	e 8 40	+ 8	—	—	—	—	—
Tinemaha	Z.	49·2	314	e 8 47	+ 7	—	—	—	—	—
Victoria		57·9	324	9 39	− 5	—	—	—	—	—
Tamanrasset	Z.	78·5	68	i 11 59a	+ 7	—	—	—	—	—

Bogota gives also iS_g = 1m.30s.

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Oct. 7d. 12h. 1m. 58s. Epicentre 24°·7S. 70°·2W. Depth of focus 0·010.
(as on 1950, June 29d.).

A = +·3081, B = −·8558, C = −·4155 ; δ = −4 ; h = +3 ;
D = −·941, E = −·339 ; G = −·141, H = +·391, K = −·910.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Antofagasta	E.	1·1	349	i 0 22	0	—	—	—	—	i 0·7
La Paz		8·4	14	2 20	+20	4 45	L	i 4 15	?	5·0
Santa Lucia	N.	8·7	183	e 2 20	+15	3 41	− 1	—	—	5·4
Huancayo		13·5	338	e 3 13	+ 4	—	—	—	—	—
Fayetteville		64·6	339	i 10 27	− 2	—	—	—	—	—
Weston		66·7	359	i 10 42	− 1	—	—	—	—	—
Harvard		66·9	359	i 10 42	− 2	—	—	i 10 57	pP	—
Tucson		68·6	324	i 10 53	− 1	—	—	e 11 8	pP	—
Palomar	Z.	72·8	321	e 11 19	− 1	—	—	—	—	—
Pasadena	Z.	74·2	321	i 11 26k	− 2	—	—	e 11 44	pP	—
China Lake	Z.	75·0	322	i 11 31k	− 1	—	—	e 11 47	pP	—
Tinemaha	Z.	76·3	322	i 11 38k	− 2	—	—	e 11 53	pP	—
Fresno	Z.	76·9	321	e 11 41	− 2	—	—	—	—	—
Lick	Z.	78·4	321	e 11 48k	− 4	—	—	—	—	—
Reno	Z.	78·9	324	e 11 53k	− 1	—	—	—	—	—
Shasta Dam		81·1	323	i 12 4	− 2	—	—	i 12 19	pP	—
Hungry Horse		82·6	332	i 12 12	− 2	—	—	i 12 28	pP	—
Tamanrasset	Z.	87·3	64	i 12 37k	0	—	—	e 12 50	pP	—

Tamanrasset gives also iZ = 13m.34s.

Oct. 7d. Readings also at 0h. (Santa Lucia and near Garm), 3h. (near Dzhergetal, Garm, Khorog, and Stalinabad), 4h. (Huancayo and Saskatoon), 5h. (China Lake (2), Mount Wilson (2), Collmberg, Kiruna, Strasbourg, and Stuttgart), 6h. (Pretoria), 8h. and 9h. (near Alicante), 11h. (Collmberg, Stuttgart, Pretoria, near Athens, Alberni, near Horseshoe Bay, and Victoria), 12h. (Almata, near Almata II (2), Chilisk, Ili, Krasnogorka, and Przhevalsk), 13h. (Prague), 14h. (Samarkand, near Dzhergetal, Garm, Khorog, and Stalinabad), 15h. (Apia, near Athens, and near Ashkabad), 16h. (near Garm), 19h. (near Ashkabad), 21h. (Przhevalsk, near Almata II, Ili, Krasnogorka, and Naryn), 22h. (Hunacayo, La Paz, Santa Lucia, and near Antofagasta), 23h. (Apia, Mount Wilson, China Lake, Tinemaha, and Tamanrasset).

Oct. 8d. 4h. 10m. 34s. Epicentre 40°·3N. 124°·8W.

Intensity VII at Alton, Bridgeville, Grizzly Bluff, Metropolitan, etc, with slight damage; VI at Alderpoint, Bell Springs, Carlotta, Ettersburg, Petrolia, etc.; V at Arcata, Eureka, Ferndale, Hayfork, etc. Epicentre 40°17′N. 124°48′W. Macroseismic area 9000sq.m.

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial No. 762, Washington, 1953, pp.13-14, with macroseismic chart.

A = −·4365, B = −·6280, C = +·6443 ; δ = +4 ; h = −2 ;
D = −·821, E = +·571 ; G = −·368, H = −·529, K = −·765.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Arcata		0·8	43	i 0 22k	+ 4	i 0 29	− 2	—	—	—
Shasta Dam		1·9	78	i 0 33	− 1	—	—	—	—	—
Mineral		2·5	89	i 0 41a	− 2	i 1 11	− 3	—	—	—
Berkeley		3·1	140	i 0 50k	− 1	i 1 28	− 1	i 1 45	S_E	—
San Francisco		3·1	143	e 0 49	− 2	e 1 24	− 5	e 1 10	?	—
Branner	Z.	3·5	144	e 0 55k	− 2	—	—	—	—	—
Santa Clara		3·7	142	i 0 51	− 9	i 2 12	L	—	—	(i 2·2)
Reno		3·9	100	e 1 3	+ 1	e 1 52	+ 2	—	—	—
Corvallis	N.	4·4	14	e 0 54	−16	—	—	—	—	—
Fresno		5·3	130	e 1 22k	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha		6·1	120	e 1 34	0	e 2 58	+13	i 3 3	S*	—
Haiwee		6·8	125	i 1 45k	+ 1	—	—	—	—	—
China Lake		7·2	126	i 1 49k	0	i 3 50	S_g	i 2 30	P_g	—
Santa Barbara		7·2	144	e 1 47	− 2	i 3 8	− 5	—	—	—
Seattle		7·6	13	e 1 57	+ 2	i 3 6	−17	—	—	i 3·5
Pasadena		8·1	137	e 1 59	− 3	i 3 29	− 6	i 2 25	P*	i 3·9
Victoria		8·3	7	2 3	− 1	e 3 30	−10	2 59	?	—
Boulder City		9·0	116	i 2 17	+ 4	—	—	i 2 43	P*	—
Palomar		9·4	135	i 2 18	0	i 4 1	− 6	i 4 4	S	—
Hungry Horse		11·1	40	e 2 41	− 2	—	—	—	—	—
Bozeman		11·4	57	e 2 44	− 3	e 4 37	−19	—	—	—
Tucson		13·8	121	i 3 22	+ 3	i 6 2	+ 8	—	—	—
Lubbock		19·5	101	3 33	−58	8 32	SS	—	—	—
Fayetteville		24·4	88	i 5 18	− 3	—	—	—	—	—
Chicago		28·0	72	e 5 52	− 3	e 10 33	− 5	—	—	—
College		28·0	338	5 56	+ 1	—	—	—	—	—
Tacubaya		30·3	125	e 6 44	?	—	—	—	—	e 16·5
Cleveland		32·5	72	e 6 33k	− 1	e 11 45	− 4	e 13 26	SS	—
Kirkland Lake	Z.	32·6	59	i 6 34a	− 1	—	—	e 17 33	Q	e 19·5
Pittsburgh		33·9	73	—	—	e 12 9	− 2	—	—	—
Morgantown		34·1	76	i 6 47	− 1	e 13 38	?	—	—	—
Pennsylvania		35·3	72	i 6 56	− 3	i 12 29	− 4	—	—	e 14·9
Ottawa		35·9	64	7 2	− 2	12 42	0	15 26	SSS	—
Washington		36·4	75	i 7 9	+ 1	—	—	—	—	i 16·4
Resolute Bay		37·1	12	i 7 12a	− 2	e 13 0	− 1	e 8 39	PP	e 20·0
Shawinigan Falls	N.	37·7	61	e 7 23	+ 4	—	—	—	—	19·2
Fordham		38·2	70	e 7 20	− 3	i 13 24	+ 7	—	—	—
Palisades		38·2	70	i 7 22a	− 1	i 13 18	+ 1	e 8 46	PP	—
Seven Falls	E.	38·9	60	7 28	− 1	13 21	− 7	9 3	PP	19·1
Harvard		39·4	67	i 7 34	+ 1	i 13 37	+ 2	i 16 52	SSS	e 18·9
Miami		39·5	66	i 7 28	− 6	13 35	− 2	—	—	—
Weston		39·7	67	i 7 35	− 1	e 13 40	0	—	—	—
Swan Island		41·9	109	e 9 23	PP	e 14 1	−12	—	—	—
Halifax		44·4	62	—	—	e 14 50	+ 1	—	—	23·0
Bermuda		48·2	79	i 8 43	− 1	e 15 45	+ 2	—	—	e 22·4
San Juan		54·6	94	i 9 30	− 2	i 17 12	+ 1	—	—	—
Chinchina		56·4	114	i 9 50	+ 5	i 17 42	+ 6	e 21 16	SS	25·9
Bogota		57·7	113	i 9 55	0	i 17 53	0	—	—	28·0
Fort de France		60·6	64	—	—	e 18 13	−17	—	—	—
Kiruna		69·0	13	e 14 54	PPP	e 20 59	ScS	e 28 26?	Q	e 30·4
Huancayo		69·3	127	e 10 57	−14	(e 24 53)	SS	e 19 58	?	24·9
La Paz		77·2	125	12 0	+ 3	21 58	+11	22 42	PPS	35·8
De Bilt		78·2	28	—	—	e 22 26?	PS	e 27 14	SS	e 33·4
Paris		79·7	32	e 12 11	0	—	—	e 12 21	PcP	e 31·4
Jena	N.	81·5	26	e 12 27	+ 6	—	—	e 13 5	?	—
Collmberg	Z.	81·6	25	e 12 54	?	—	—	—	—	—
Strasbourg		82·1	29	e 12 18	− 6	e 23 16	PS	e 15 29	PP	—
Stuttgart		82·4	28	e 12 21?	− 4	e 22 46	+ 5	e 36 26?	Q	41·4
Cheb		82·5	26	e 13 4	?	e 22 45	+ 3	e 23 1	ScS	—
Prague		83·1	25	e 12 30	+ 1	e 23 1	ScS	e 28 20	SS	e 33·4
Toledo		83·7	42	i 12 32	0	e 22 47	− 7	15 42	PP	40·4
Tortosa		85·2	38	12 41	+ 2	—	—	—	—	—
Skalnate Pleso		85·7	22	—	—	e 23 36	?	—	—	—
Malaga		85·8	44	i 12 42	0	e 23 11	− 4	—	—	40·8
Granada		85·9	43	i 12 44a	+ 1	e 23 18	+ 2	28 57	SS	39·0
Alicante		86·6	40	12 46	0	e 23 18	− 5	18 11	PPP	e 42·2
Triest		86·7	28	—	—	e 23 5	[− 7]	e 23 25?	S	e 40·4
Almeria		86·8	43	i 12 55	+ 8	23 35	+10	16 21	PP	46·4
Rome	E.	89·5	30	e 16 40	PP	e 23 44	− 6	e 29 16	?	e 38·8
Belgrade	N.E.	89·7	24	e 19 37	?	e 28 27	?	e 32 36	?	e 47·0
Tamanrasset	Z.	102·0	45	e 17 58	PP	—	—	—	—	—
Ksara		104·1	16	e 18 27	PP	e 24 13	PPS	—	—	—
Kimberley	Z.	152·6	72	i 19 28	[−23]	—	—	—	—	—
Pretoria	Z.	153·2	65	i 20 13	PKP_2	—	—	—	—	—

For Notes see next page.

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NOTES TO OCTOBER 8d. 4h. 10m. 34s.

Additional readings :—
Tinemaha i = 1m.38s.
China Lake iZ = 2m.48s., iE = 3m.28s.
Seattle i = 2m.53s. and 2m.59s.
Tacubaya e = 9m.58s. and 14m.16s.
Cleveland eSN = 11m.41s.
Ottawa eN = 14m.44s., ScS = 17m.44s.
Resolute Bay iZ = 8m.4s., eE = 15m.17s.
Palisades eSS? = 16m.12s.
Chinchina eSSEN = 24m.12s.
Bogota iPP = 11m.7s., iSSEN = 19m.54s., iSSSEN = 24m.34s.
Kiruna eN = 15m.58s., eSS?Z = 23m.47s.
La Paz SS = 26m.56s.
Strasbourg e = 12m.38s., ePPP = 22m.44s., eScS = 28m.8s., ePS = 28m.12s., phases as given in bulletin.
Cheb eN = 13m.9s., eS?E = 22m.32s.
Granada ePP = 15m.30s., PS = 24m.27s., SSS = 32m.12s.
Alicante PS = 24m.22s., SSS = 32m.49s.
Almeria PPP = 18m.19s., SS = 29m.23s.
Long waves were also recorded at Guadalajara, Puebla, Vera Cruz, Ivigtut, Scoresby Sund, Christchurch, and at other European stations.

Oct. 8d. 5h. Undetermined shock.
Antofagasta ePE = 35m.9s., eE = 35m.52s., E = 36m.8s.
La Paz iPZ = 35m.17s.a, i = 35m.21s., iP_g = 35m.32s., i = 35m.53s., iS = 36m.5s., i = 36m.11s., L = 36m.24s.
Huancayo eP? = 36m.28s., e = 38m.40s., eL = 39m.8s.
San Juan eP = 41m.21s.
Bermuda eP = 43m.17s.
Tacubaya e = 43m.50s. and 51m.45s.
Fayetteville iP = 44m.17s.
Tucson e = 44m.50s.
Harvard eP = 44m.54s.
Palomar iPZ = 45m.17s.k.
Boulder City iP = 45m.21s., i = 45m.49s.
Pasadena iP = 45m.26s.k, ipPZ = 45m.53s., iZ = 46m.6s.
China Lake iPZ = 45m.30s.k, ipPZ = 45m.58s.
Tinemaha iPZ = 45m.37s.k, ipPZ = 46m.4s.
Berkeley ePZ = 45m.54s.k,
Shasta Dam e = 46m.2s.
Hungry Horse iP = 46m.9s., e = 46m.33s.
Victoria P = 46m.33s., e = 47m.2s.
Tamanrasset iPZ = 46m.34s.k, ipPZ = 47m.4s., eZ = 47m.17s. and 47m.28s.

Oct. 8d. 11h. 32m. 3s. Epicentre 31°·2N. 56°·8E.

A = +·4692, B = +·7170, C = +·5155 ; δ = −2 ; h = +1 ;
D = +·837, E = −·548 ; G = +·282, H = +·431, K = −·857.

		△	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad		6·8	10	e 1 40	− 4	3 7	+ 4	—	—	—
Mary		7·6	32	1 53	− 2	3 23	0	—	—	—
Kizyl-Arvat		7·8	359	i 1 49	− 9	3 21	− 7	—	—	—
Shemakla		11·5	327	—	—	5 14	SS	—	—	—
Samarkand		11·8	42	2 54	+ 1	—	—	—	—	—
Goris		11·9	317	2 50	− 4	—	—	—	—	—
Stalinabad		12·3	50	e 3 1	+ 2	—	—	—	—	—
Obi-garm		13·0	51	i 3 13	+ 4	—	—	—	—	—
Tashkent		14·2	41	—	—	e 6 20	SS	—	—	—
Tiflis		14·2	321	e 3 27	+ 3	—	—	—	—	—
Lunacharskoe		14·3	41	e 3 19?	− 7	—	—	—	—	—
Tchimkent		15·1	39	e 3 34	− 2	—	—	—	—	—
Ksara		17·8	283	e 3 58	−13	e 7 36	+ 8	—	—	—
New Delhi		17·9	92	e 4 11	− 1	e 7 48	+18	8 9	SSS	—
Frunse		18·3	44	e 4 20	+ 3	i 7 49	+10	—	—	—
Naryn		18·5	48	e 4 8	−11	e 7 28	−16	—	—	—
Krasnogorka		18·9	44	e 4 37	+13	—	—	—	—	—
Bombay	E.	19·0	126	i 4 44	PP	e 8 30	SSS	—	—	—
Rybache		19·0	47	e 4 32	+ 6	e 8 10	+15	—	—	—
Poona		19·9	124	i 4 52	PPP	e 8 33	SS	8 49	Q	9·8

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		20·0	45	e 4 41	+ 4	i 8 29	+12	—	—	—
Ili		20·4	44	i 4 41	0	—	—	—	—	—
Przhevalsk		20·6	50	e 4 48?	+ 5	—	—	—	—	—
Helwan		22·0	273	e 4 59	+ 1	e 9 1	+ 5	e 5 13	PP	e 11·8
Hyderabad	N.	24·0	119	—	—	e 10 8	SS	—	—	—
Sverdlovsk		25·8	5	e 5 33	− 1	9 58	− 4	—	—	—
Calcutta	E.	29·3	99	—	—	e 13 6	SSS	—	—	i 17·6
Tamanrasset	Z.	46·1	273	e 8 26	− 2	—	—	e 10 17	PP	—
Pretoria	Z.	62·9	209	e 10 39	+ 9	—	—	—	—	—

Additional readings :—
Poona SSE =9m.20s.
Tamanrasset ePZ =8m.30s., eZ =8m.48s.
Long waves were also recorded at Istanbul and Kiruna.

Oct. 8d. 20h. 55m. 31s. Epicentre 34°·7N. 135°·0E.

Intensity IV at Akasi and Miki ; II-III at Kobe, Toyooka, and Himeji.
Epicentre as adopted. Depth 20km.
Seismological Bulletin of the Cent. Met. Obs., Japan, for October, 1951, Tokyo, 1951, p. 247 with macroseismic chart.

A = − ·5826, B = + ·5826, C = + ·5667 ; δ = −1 ; h = 0 ;
D = + ·707, E = + ·707 ; G = − ·401, H = + ·401, K = − ·824.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Kobe	0·1	96	0 7k	− 1	0 10	− 3
Osaka	0·4	97	0 12	− 1	0 19	− 2
Sumoto	0·4	195	0 10	− 3	0 15	− 6
Himeji	0·5	248	0 9	− 5	0 13	P
Kashiwara	0·7	105	0 12	− 5	0 20	− 8
Toyooka	0·8	350	0 18	0	0 31	0
Takamatu	0·9	244	0 20	0	0 30	− 4
Hikone	1·2	61	0 29	+ 5	—	—
Owase	1·2	122	0 30	+ 6	0 40	− 1
Kameyama	1·2	83	0 26	+ 2	0 43	+ 2
Toyama	2·7	42	1 30	S	(1 30)	+11

Oct. 8d. Readings also at 0h. (Apia (2), Pretoria (2), near Garm and near Manila), 1h. (near Yalta), 2h. (Mount Wilson, Palomar, China Lake, Tinemaha, Fergana, Samarkand, near Murgab, Dzhergetal, and Garm), 3h. (near Almata II), 4h. (near Garm), 5h. (Christchurch and Apia), 6h. (near Ashkabad (3), and near Huancayo), 9h. (near Garm), 11h. (Stuttgart), 12h. (near Almata II and near Garm), 13h. (Strasbourg), 14h. (Palomar, China Lake, Kimberley, Pretoria, near Khorog, Garm, Dzhergetal, Obi-garm, and near Apia), 15h. (Ksara), 16h. (near Ashkabad), 17h. (Nanking), 18h. (near Garm), 19h. (Apia and near Garm (2)), 20h. (Apia (3), and near Taranto), 21h. and 22h. (2) (Apia).

Oct. 9d. 3h. 27m. 23s. Epicentre 36°·2N. 140°·0E. Depth of focus 0·005.
(as on 1951, April 20d.).

Intensity V at Utunomiya, Kumagaya, Maebasi, Kakioka, Nikko, Horigome, Manabe, and Shimodate ; IV at Mito, Tukubasan, Titibu, Shirakawa, Otsu, Hokoda, and Owada ; II-III at Tokyo, Onahama, Hunatu, Osima, and Hukusima. Epicentre 36°·2 140°·3E. Depth 60km.
Seismo. Bull. Cent. Met. Obs., Japan for 1951, Tokyo, 1951, pp. 248, 249, with macroseismic chart.

A = − ·6196, B = + ·5199, C = + ·5880 ; δ = −6 ; h = 0 ;
D = + ·643, E = + ·766 ; G = − ·450, H = + ·378, K = − ·809.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Tukubasan	0·1	—	0 9	− 1	0 17	− 1
Utunomiya	0·4	343	0 11a	− 1	0 20	− 2
Kumagaya	0·5	264	0 15k	+ 2	0 26	+ 3
Tokyo	0·5	200	0 13	0	0 23	0
Maebasi	0·8	285	0 16k	− 1	0 29	0

Continued on next page.

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		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Titibu		0·8	254	0 14	− 3	0 27	− 2
Yokohama		0·8	200	0 16	− 1	0 28	− 1
Shirakawa		0·9	11	0 17	− 1	0 30	− 1
Tyosi		0·9	124	0 14a	− 4	0 23	− 8
Onahama		1·0	45	0 18	− 1	0 32	− 1
Hunatu		1·2	235	0 22k	0	0 39	+ 1
Oiwake		1·2	277	0 23	+ 1	0 40	+ 2
Kohu		1·3	244	0 22	− 1	0 41	+ 1
Mera		1·3	186	0 22	− 1	0 37	− 3
Ajiro		1·4	212	0 21	− 3	0 37	− 6
Inawasiro		1·4	4	0 28	+ 4	0 43	0
Misima		1·4	218	0 21	− 3	0 43	0
Matusiro		1·5	284	0 25k	− 1	0 44	− 1
Nagano		1·5	288	0 29k	+ 3	—	—
Osima		1·5	199	0 23	− 3	—	—
Hukusima		1·6	14	0 26	− 1	0 46	− 1
Matumoto		1·6	271	0 28	+ 1	0 50	+ 3
Takada		1·7	303	0 29	+ 1	—	—
Shizuoka		1·8	227	0 28	− 2	0 50	− 2
Iida		1·9	249	0 33a	+ 2	0 57	+ 3
Niigata		1·9	336	0 37	+ 6	0 58	+ 4
Yamagata		2·1	8	0 33	− 1	1 2	+ 3
Omaesaki		2·2	222	0 38	+ 3	1 11	+ 9
Sendai		2·2	19	0 36	+ 1	1 2	0
Aikawa		2·3	322	0 36	− 1	1 3	− 1
Toyama		2·3	282	0 36k	− 1	1 5	+ 1
Hamamatu		2·4	231	0 36	− 2	1 11	+ 4
Isinomaki		2·5	25	0 19	−20	—	—
Gihu		2·7	253	0 42	0	1 12	− 2
Kanazawa		2·7	277	0 44	+ 2	—	—
Nagoya		2·7	247	0 43	+ 1	—	—
Sakata		2·7	357	0 42	0	1 19	+ 5
Wazima		2·8	295	0 42	− 2	1 7	−10
Hatidyozima		3·1	182	0 55	+ 7	—	—
Mizusawa	E.	3·1	17	i 0 48	0	1 25	+ 1
Hikone		3·2	253	0 49	0	1 31	+ 4
Kameyama		3·2	245	0 50	+ 1	—	—
Tsuruga		3·2	260	0 50	+ 1	1 29	+ 2
Tu		3·2	243	0 57	+ 8	1 42	+15
Akita		3·5	1	0 58	+ 4	1 38	+ 4
Morioka		3·6	14	0 54	− 1	1 36	− 1
Kyoto		3·7	253	0 56	0	—	—
Miyako		3·7	23	0 56?	0	1 34	− 5
Owase		3·8	236	0 55	− 3	—	—
Osaka		4·0	248	1 11	+10	—	—
Kobe		4·2	251	1 8	+ 5	2 7	+15
Toyooka		4·3	263	1 4	− 1	1 59	+ 5
Hatinohe		4·5	15	1 6	− 1	1 48	−11
Sumoto		4·6	248	0 53	−16	1 41	−21
Aomori		4·7	7	1 12	+ 2	—	—
Takamatu		5·2	251	1 30	+13	2 43	+26
Muroto		5·6	240	2 34	8	(2 34)	+ 7
Kôti		5·9	246	1 29	+ 2	2 43	+ 9
Mori		5·9	4	1 40	+13	—	—
Urakawa		6·3	19	1 31	− 1	2 45	+ 1
College		50·4	32	i 8 49	− 4	—	—
Kiruna	Z.	66·9	338	i 10 43a	− 4	—	—
Shasta Dam		72·5	52	e 11 18	− 4	—	—
Hungry Horse		73·2	42	e 11 22	− 4	—	—
China Lake	Z.	78·4	54	e 11 52	− 3	—	—
Boulder City		80·1	53	i 12 2	− 2	—	—
Palomar	Z.	80·3	56	e 12 3	− 2	—	—
Collmberg	Z.	81·3	330	e 12 7	− 4	—	—
Tucson		85·0	54	e 12 26	− 4	—	—

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Oct. 9d. 9h. 11m. 0s. Epicentre 37°·6N. 71°·6E. (as on 1951, May 24d.).

A = +·2507, B = +·7537, C = +·6076 ; δ = +9 ; h = −1 ;
D = +·949, E = −·316 ; G = +·192, H = +·577, K = −·794.

	Δ	Az.	P.	O − C.	S.	O − C.
	°	°	m. s.	s.	m. s.	s.
Khorog	0·1	180	i 0 14	+ 6	i 0 25	+12
Dzhergetal	1·6	349	e 0 34	+ 4	i 1 0	+ 9
Obi-garm	1·9	306	e 0 33?	− 1	i 0 59	0
Murgab	2·0	67	0 35	0	1 1	− 1
Stalinabad	2·4	293	—	—	i 1 7	− 5
Fergana	2·8	3	e 0 46?	− 1	i 1 22?	0
Samarkand	4·1	302	—	—	1 52	− 3
Tchimkent	4·9	343	—	—	e 2 9	− 6
Naryn	5·1	41	—	—	e 2 18	− 2
Frunse	5·8	23	—	—	i 2 40	+ 2
Krasnogorka	6·2	25	e 1 34	− 1	—	—
Ili	7·6	32	1 47	− 8	—	—

Oct. 9d. 9h. 37m. 17s. Epicentre 39°·6N. 69°·5E. (as on 1940, May 6d.).

A = +·2706, B = +·7237, C = +·6349 ; δ = +6 ; h = −2 ;
D = +·937, E = −·350 ; G = +·222, H = +·595, K = −·773.

	Δ	Az.	P.	O − C.	S.	O − C.
	°	°	m. s.	s.	m. s.	s.
Obi-garm	0·9	170	i 0 18?	− 2	e 0 31?	− 3
Stalinabad	1·2	208	i 0 16	− 8	i 0 28	−13
Dzhergetal	1·4	106	e 0 32	+ 5	e 0 59	+13
Tashkent	1·7	355	—	—	e 1 2	+ 8
Fergana	1·9	66	e 0 42	+ 8	e 1 15	+16
Samarkand	1·9	272	e 0 28	− 6	0 52	− 7
Khorog	2·7	142	e 0 49	+ 4	i 1 29	+10
Tchimkent	2·7	2	e 0 52	+ 7	—	—
Ili	7·1	50	i 1 50	+ 2	—	—

Oct. 9d. 10h. 13m. 7s. Epicentre 9°·7N. 69°·8W. (as on 1951, May 25d.).

A = +·3404, B = −·9253, C = +·1674 ; δ = +8 ; h = +7 ;
D = −·938, E = −·345 ; G = +·058, H = −·157, K = −·986.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		6·6	220	i 1 48	+ 7	i 3 6	+ 8	i 3 44	S_g	—
Chinchina		7·4	231	i 1 54	+ 2	i 3 20	+ 2	i 2 27	P_g	—
San Juan		9·3	22	e 2 14	− 3	i 3 49	−16	—	—	—
Fort de France		9·8	59	e 2 20	− 4	i 4 4	−13	—	—	—
Huancayo		22·3	194	e 5 5	+ 4	12 7	L	—	—	(12·1)
La Paz		26·1	175	e 5 29	− 8	—	—	11 33	SS	15·1
Fayetteville		34·4	324	e 8 22	PPP	—	—	—	—	—
Tucson		44·0	307	e 8 12	+ 1	—	—	—	—	—
Boulder City		48·5	310	i 8 48	+ 2	—	—	—	—	—
Palomar	Z.	49·2	306	i 8 53a	+ 1	—	—	—	—	—
Riverside	Z.	49·8	307	e 8 56	0	—	—	—	—	—
Mount Wilson	Z.	50·4	307	e 9 1	0	—	—	—	—	—
China Lake	Z.	50·5	309	i 9 2a	0	—	—	—	—	—
Tinemaha	Z.	51·4	310	i 9 10	+ 1	—	—	—	—	—
Fresno	Z.	52·5	310	e 9 15a	− 2	—	—	—	—	—
Hungry Horse		53·4	325	e 9 24	0	—	—	—	—	—
Reno	Z.	53·4	313	e 9 25k	+ 1	—	—	—	—	—
Berkeley	Z.	54·7	310	i 9 33a	0	—	—	—	—	—
Shasta Dam		55·7	313	e 9 32	− 8	—	—	—	—	—
Victoria		59·1	322	10 3	− 1	—	—	—	—	—
College		76·2	335	11 50	− 2	—	—	—	—	—
Kiruna	Z.	81·2	24	i 12 18	− 1	—	—	—	—	—

Additional readings :—
Bogota iEN = 4m.8s.
Chinchina iS_gZ = 4m.19s.
Huancayo i = 5m.17s., e = 7m.15s.
College e = 12m.8s.

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Oct. 9d. 15h. 40m. 26s. Epicentre 21°·0S. 169°·5E. (as on 1950, June 21d.).

Pasadena suggests depth 100km.

A = −·9187, B = +·1703, D = −·3563 ; δ = −4 ; h = +4 ;
D = +·182, E = +·983 ; G = +·350, H = −·065, K = −·934.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		16·3	244	i 3 53k	+ 1	e 6 49	− 4	—	—	—
Auckland		16·4	165	3 48	− 5	6 48	− 8	i 7 38	Q	8·4
Karapiro	N.	17·7	163	e 3 34?	−36	—	—	—	—	—
Apia		19·2	72	e 4 39	+11	8 10	+11	—	—	e 8·6
Riverview		20·6	228	i 4 43k	0	e 8 30	+ 1	i 4 51	pP	e 9·9
Wellington		20·7	169	i 4 33	−11	i 8 24	− 7	e 5 8	PP	10·2
Kaimata	N.E.	21·5	177	e 4 49	− 3	—	—	—	—	—
Christchurch		22·6	174	e 5 2	− 1	8 59	− 8	i 5 25	pP	e 11·2
Terre Adélie		49·2	194	i 8 9	−43	e 15 11	−47	i 9 18	PcP	22·6
Nanking		71·7	317	e 11 30	+ 4	e 20 46	+ 1	—	—	—
Berkeley	Z.	86·8	48	e 12 50a	+ 3	—	—	—	—	—
Fresno	Z.	88·0	50	e 12 52	− 1	—	—	—	—	—
Mount Wilson	Z.	88·1	53	e 12 54	0	—	—	e 13 13	pP	—
Shasta Dam		88·1	45	e 12 51	− 3	—	—	—	—	—
Riverside	Z.	88·4	53	e 12 55	0	—	—	e 13 14	pP	—
Palomar	Z.	88·5	54	i 12 54	− 2	—	—	i 13 15	pP	—
China Lake	Z.	89·1	49	e 12 58	0	—	—	i 13 18	pP	—
Tinemaha	Z.	89·2	50	e 12 58	− 1	—	—	e 13 15	pP	—
Reno	Z.	89·3	47	e 13 0	+ 1	—	—	—	—	—
Boulder City		91·2	52	i 13 8	0	—	—	—	—	—
Victoria		91·4	39	13 8	− 1	—	—	—	—	—
College		91·7	17	e 13 8	− 2	—	—	e 13 30	pP	—
Ottawa	Z.	121·9	49	e 18 54	[− 2]	—	—	—	—	—
San Juan		127·8	83	e 19 4	[− 4]	—	—	—	—	—
Kiruna	Z.	129·3	346	e 19 10	[− 1]	—	—	—	—	—
Ksara		137·2	297	e 19 29?	[+ 4]	e 35 33	?	—	—	—
Collmberg	Z.	144·6	335	e 19 38	[0]	—	—	—	—	—
Prague		144·9	333	e 19 44	[+ 5]	—	—	e 20 5	pPKP	—
Jena		145·5	334	e 19 43	[+ 3]	—	—	e 19 54	pPKP	—
Rathfarnham C.	Z.	147·6	356	i 19 48	[+ 4]	—	—	e 22 27	PP	—
Stuttgart	Z.	148·1	336	i 19 49a	[+ 5]	—	—	e 20 8	pPKP	—
Strasbourg		148·8	337	i 19 50	[+ 5]	e 22 47	PKS	20 13	pPKP	—
Chur		149·5	335	e 19 52a	[+ 5]	—	—	—	—	—
Zürich		149·5	336	i 19 52a	[+ 5]	—	—	—	—	—
Basle		149·8	336	e 19 53	[+ 6]	—	—	—	—	—
Paris		150·4	342	i 19 54	[+ 6]	—	—	i 20 21	pPKP	e 79·6
Tortosa		158·2	337	i 23 53	PP	—	—	—	—	—
Tamanrasset	Z.	165·1	280	i 20 7k	[+ 1]	e 24 50	PP	i 21 6	PKP_2	—

Additional readings :—
Brisbane eE = 7m.0s., iN = 7m.7s.
Riverview iPPPZ = 5m.13s., iE = 8m.37s., iN = 8m.40s., iE = 8m.44s., iZ = 8m.47s., iE = 8m.54s., iSSE = 9m.3s., iSSSN = 9m.22s.
Wellington iP = 4m.38s., eZ = 5m.23s., iS = 8m.32s.
Christchurch iPP?NZ = 5m.45s., eQEN = 9m.49s.
Riverside eZ = 13m.33s.
China Lake eZ = 13m.38s.
Prague e = 20m.14s., 20m.39s., 20m.57s., 21m.11s., and 21m.42s.
Jena eE = 20m.6s.
Stuttgart eZ = 20m.21s.
Strasbourg esPKP = 20m.25s., e = 20m.32s., 20m.39s., 20m.51s., 21m.6s., and 21m.39s.
Paris i = 20m.3s., 20m.14s., and 20m.44s., e = 21m.12s.
Long waves were also recorded at Kew.

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Oct. 9d. Readings also at 0h. (Ashkabad and Grahamstown), 1h. (Tortosa, near Dzhergetal, Khorog, Obi-garm, and Stalinabad), 4h. (Brisbane, Poona, Bandong, and near Djakarta), 5h. (Kiruna, Collmberg, Tamanrasset, Harvard, Palisades, Palomar, Pasadena, Riverside, China Lake, Tinemaha, and Victoria), 6h. (Apia, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Berkeley, Reno, and Victoria), 7h. (Apia), 8h. (Apia and near Almata II), 9h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Victoria, Guadalajara, near Oaxaca, Puebla, Tacubaya, and Vera Cruz), 10h. (Tacubaya), 12h. (near Antofagasta), 13h. (Apia (2), Brisbane, Riverview, Manila, China Lake, Przhevalsk, near Almata, Almata II, Ili, Krasnogorka, and near La Paz), 15h. (Abastumanj, Gori, near Leninakan, Tiflis, and Tsikhlis-Dzhvari), 16h. (Granada, and near Tsikhlis-Dzhvari), 17h. (near Dzhergetal, Garm, Obi-garm, and Stalinabad), 18h. (Apia (3)), 19h. (Apia (3), Bogota, Chinchina, and Galerazamba), 20h. (Huancayo, Palomar, China Lake, and Tamanrasset), 21h. (Ksara and near Istanbul), 22h. (Nanking, Almata II, Fergana, Tashkent, near Dzhergetal, Garm, Khorog, Obi-garm, Stalinabad, near Apia, near Alberni, Horseshoe Bay, Seattle, and Victoria).

Oct. 10d. 22h. 9m. 12s. Epicentre 9°·5S. 156°·5E. (as on 1950, June 12d.).

A = −·9047, B = +·3934, C = −·1640 ; δ = +14 ; h = +7 ;
D = +·399, E = +·917 ; G = +·150, H = −·065, K = −·986.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Brisbane		18·2	190	i 4 16k	0	e 7 43	+ 6	i 4 32	PP
Riverview		24·7	190	i 5 25k	+ 1	e 9 47	+ 3	e 10 48	SS
Manila		42·6	304	e 9 18	?	—	—	—	—
College		84·9	20	12 35	− 3	—	—	—	—
Shasta Dam		89·5	49	e 13 0	0	—	—	—	—
Fresno	Z.	90·6	53	e 13 4	− 1	—	—	—	—
Reno	Z.	91·2	50	e 13 13a	+ 5	—	—	—	—
Mount Wilson	Z.	91·5	56	e 13 10	0	—	—	—	—
Riverside	Z.	92·1	56	e 13 12	0	—	—	—	—
China Lake	Z.	92·2	54	e 13 13	0	—	—	i 13 18	?
Boulder City		94·4	54	e 13 30	+ 7	—	—	—	—
Tamanrasset	Z.	149·2	299	i 19 50k	[+ 4]	23 34	PP	e 20 4	PKP$_2$

Additional readings :—
Brisbane iZ = 5m.1s., iSSE = 8m.0s.
Riverview eE = 9m.52s.
Tamanrasset eZ = 20m.24s. and 20m.57s.
Long waves were recorded at Christchurch.

Oct. 10d. Readings also at 0h. (Tacubaya, Puebla, Przhevalsk, near Ili, Almata II, and Krasnogorka), 4h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Lick, Fresno, Reno, Victoria, Tamanrasset, Kiruna, and Pretoria), 6h. (Tsikhlis-Dzhvari, and near Garm), 7h. (Kimberley, Samarkand, near Khorog, Obi-garm, Garm, and Dzhergetal), 8h. (Dzhergetal, Samarkand, near Stalinabad, Obi-garm, and Khorog), 9h. (Huancayo and near La Paz), 10h. (China Lake), 12h. (near Nanking), 13h. (Tortosa), 14h. (Santa Lucia, Antofagasta, and near Copiapo), 16h. (Apia, Fergana, near Khorog, Obi-garm, Garm, and Dzhergetal), 17h. (Tortosa, and near Manila), 18h. (Tsikhlis-Dzhavari, Goris, near Gori, Tiflis, Grozny, Leninakan, near Dzhergetal, Garm, Fergana, Khorog, Tashkent, and Obi-garm), 19h. (Kimberley and Grahamstown), 20h. (Apia and near Mizusawa), 23h. (near Apia).

Oct. 11d. 1h. 37m. 35s. Epicentre 4°·5S. 152°·7E. (as on 1950, Sept. 9d.).

A = −·8859, B = +·4573, C = −·0779 ; δ = +1 ; h = +7 ;
D = +·459, E = +·889 ; G = +·069, H = −·036, K = −·997.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·9	178	i 4 53a	−13	i 8 53	−20	i 5 7	pP	—
Riverview		29·2	183	i 5 56a	− 9	i 10 40	−18	i 6 11	pP	e 13·3
Apia		36·2	107	i 7 5	− 1	e 13 16	+29	i 7 15	pP	17·4
Manila		36·7	302	i 7 8	− 2	i 13 3	+ 9	i 8 22	PP	e 17·4
Auckland	N.	38·2	150	e 12 44	?	i 13 8	− 9	i 15 47	SS	16·8
Karapiro	N.	39·2	150	e 6 25?	−66	—	—	—	—	—
Cobb River	E.	40·6	157	e 7 48	+ 5	e 13 49	− 5	—	—	—
Kaimata	N.E.	41·4	159	e 7 47	− 3	e 13 50	−15	—	—	—
Wellington		41·6	155	e 7 24	−27	i 13 51	−17	i 8 0	pP	19·7
Christchurch		42·7	159	i 8 9	+ 9	14 6	−18	i 9 43	PP	e 19·8

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.
Perth		44·0	227	i 8 50	+39	i 14 48	+ 5	17 45	SS	i 21·8
Mizusawa	E.	44·7	348	8 19	+ 3	8 45	?	—	—	—
Bandong		44·9	265	e 8 0	−18	e 14 35	−21	—	—	—
Djakarta		45·7	266	i 8 12	−12	e 14 25	−43	—	—	—
Zi-ka-wei	Z.	46·4	323	i 8 29a	− 1	i 15 53	+35	—	—	—
Nanking		48·6	321	i 8 47a	0	15 46	− 3	—	—	—
Vladivostok		51·0	341	i 9 6	0	e 16 22	0	—	—	—
Honolulu		54·8	60	e 9 37	+ 3	—	—	—	—	—
Terre Adélie		62·7	185	i 10 19	−10	i 18 43	−14	i 10 52	PcP	31·4
Calcutta	E.	68·3	296	i 11 6a	+ 1	i 20 32	+26	13 53	PP	29·8
Kabansk		68·5	332	i 11 6	0	20 5	− 3	—	—	—
Irkutsk		69·8	331	11 13	− 1	20 21	− 2	—	—	—
Colombo	E.	73·6	278	11 30	− 7	20 55	−12	—	—	36·8
Kodaikanal	E.	76·3	281	i 11 50a	− 2	e 21 25	−12	—	—	—
Hyderabad	E.	76·4	289	e 11 47	− 6	i 21 27	−11	22 22	PS	37·0
New Delhi		79·5	300	e 12 5	− 5	e 21 59	−12	22 22	ScS	36·0
Poona		80·9	289	i 12 13	− 4	i 22 13	−13	15 25	PP	—
Przhevalsk		81·5	315	i 12 20	− 1	i 22 31	− 1	e 23 18	PS	—
College		81·6	22	12 22	+ 1	22 31	− 2	—	—	—
Bombay	E.	81·9	289	e 12 20	− 3	e 22 26	−10	—	—	—
Almata II		82·5	315	i 12 25	− 1	e 22 40	− 2	—	—	—
Almata		82·8	315	i 11 52?	−35	i 22 9?	−36	—	—	—
Ili		82·8	316	i 12 28	+ 1	i 22 41	− 4	—	—	—
Naryn		83·0	313	i 12 27	− 1	i 22 44	− 3	—	—	—
Rybach'e		83·2	313	i 12 28	− 1	i 22 46	− 3	e 15 39	PP	—
Krasnogorka		84·0	314	i 12 32	− 1	i 23 3	ScS	—	—	—
Sitka		84·1	32	e 12 35	+ 1	i 22 58	0	—	—	—
Frunse		84·4	313	i 12 34	− 2	i 22 53	− 8	i 23 13	ScS	—
Fergana		86·0	311	e 12 41	− 2	e 23 3	[− 4]	e 16 3	PP	—
Obi-garm		87·3	309	i 12 50?	0	i 23 29?	0	—	—	—
Tchimkent		87·9	312	i 12 51	− 2	i 23 32	− 3	16 30	PP	—
Stalinabad		88·0	309	12 51	− 2	e 23 33	− 3	—	—	—
Tashkent		88·0	311	i 12 50	− 3	i 23 16	[− 5]	i 23 35	ScS	—
Berkeley		88·8	52	e 12 59a	+ 2	i 23 27	[+ 2]	e 16 29	PP	e 40·7
Santa Clara		89·0	52	i 23 31	SKS	(i 23 31)	[+ 4]	—	—	e 41·4
Shasta Dam		89·0	49	i 13 1	+ 3	—	—	—	—	—
Lick	Z.	89·3	52	e 13 5k	+ 6	—	—	e 16 36	PP	—
Samarkand		89·5	309	i 12 58	− 2	—	—	16 35	PP	—
Victoria		89·8	41	13 1	− 1	23 43	−10	23 31	SKS	36·5
Seattle		89·9	42	e 13 6	+ 4	e 23 37	[+ 5]	i 13 25	pP	e 40·4
Fresno		90·7	53	e 13 7a	+ 1	e 23 35	[− 2]	e 16 34	PP	—
Reno		90·9	51	e 13 9a	+ 2	e 23 41	[+ 3]	—	—	e 42·8
Pasadena		91·8	56	i 13 15	+ 4	i 24 17	+ 6	i 13 26	pP	e 41·7
Tinemaha		91·8	53	i 13 15k	+ 4	i 23 46	[+ 3]	i 13 26	pP	e 42·2
China Lake		92·4	54	i 13 18	+ 4	e 23 49	[+ 2]	i 13 29	pP	—
Riverside		92·4	56	i 13 17	+ 3	e 16 39	PP	i 13 28	pP	—
Palomar	Z.	92·8	57	i 13 19	+ 3	—	—	—	—	—
Boulder City		94·6	54	i 13 28	+ 4	i 24 5	[+ 6]	—	—	—
Sverdlovsk		94·9	326	i 13 23	− 2	i 23 42?	[−19]	i 17 15	PP	—
Hungry Horse		95·5	42	i 13 30	+ 2	—	—	—	—	—
Ashkabad		96·2	307	i 13 29	− 2	24 3	[− 5]	—	—	—
Bozeman		97·6	44	—	—	i 24 17	[+ 2]	—	—	—
Tucson		97·8	58	e 13 44	+ 6	—	—	17 44	PP	—
Resolute Bay		100·1	14	e 13 49a	0	i 25 24	+ 3	i 24 20	SKS	e 40·7
Baku		102·3	310	i 21 55?	?	e 28 2?	PPS	—	—	—
Tananarive		102·8	249	—	—	24 32	[− 8]	27 23	PS	52·4
Lenkoran		103·6	309	14 1	− 3	—	—	—	—	—
Lubbock		105·3	57	e 14 49	+36	e 23 53	[−59]	—	—	—
Goris		105·5	310	e 14 11	− 2	i 24 50	[− 3]	—	—	—
Tiflis		106·3	312	i 14 14	P	i 24 53	[− 3]	e 18 39	PP	—
Moscow		107·7	327	14 18	P	i 24 58	[− 4]	i 18 51	PP	—
Tacubaya		108·6	71	i 19 17	PP	—	—	—	—	—
Kiruna	Z.	109·1	342	e 18 30	[− 1]	—	—	—	—	—
Pulkovo		109·7	333	—	—	e 25 6	[− 5]	e 28 28	PS	—
Fayetteville		111·3	53	i 18 36	[0]	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helsinki	N.	111·9	336	—	—	e 34 34	SS	—	—	—
Ksara		114·7	304	i 19 43	PP	31 9	PPS	—	—	—
Upsala		115·1	337	—	—	e 35 48	SS	e 48 25?	Q	e 50·4
Kishinev		115·9	321	18 43	[– 2]	25 33	[– 2]	e 29 28	PS	—
Lwow		117·6	325	e 18 47	[– 1]	e 25 29	[–13]	—	—	—
Istanbul	Z.	117·9	314	e 19 25	[+36]	—	—	—	—	e 67·4
Pretoria	Z.	118·4	238	i 18 48	[– 2]	—	—	—	—	—
Cleveland		119·3	44	i 18 51k	[0]	e 25 45	[– 3]	e 27 11	SKKS	—
Helwan		119·3	301	e 18 51	[0]	e 27 25	{+16}	e 20 10	PP	—
Copenhagen		119·9	335	e 18 52	[– 1]	30 14	PS	e 36 55	SS	52·4
Kimberley	Z.	120·0	235	i 19 12	[+19]	—	—	—	—	—
Skalnate Pleso		120·0	326	e 19 8	[+15]	e 25 48	[– 2]	e 20 44	PP	—
Morgantown		121·1	47	e 18 54	[– 1]	—	—	—	—	—
Ottawa		121·4	37	18 55	[0]	25 55	[0]	27 27	SKKS	50·7
Potsdam		121·8	332	e 18 55	[– 1]	25 53	[– 3]	e 20 30	PP	e 57·4
Ogyalla		121·9	326	e 20 5	PP	e 25 56	[0]	e 30 41	PS	—
Belgrade		122·1	322	e 18 57	[0]	e 27 6	{–22}	e 17 25	?	e 65·4
Pennsylvania		122·1	43	i 18 58	[+ 1]	e 25 56	[– 1]	e 30 19	PS	—
Collmberg	Z.	122·5	331	e 18 57	[– 1]	e 22 32	PKS	e 20 36	PP	—
Prague		122·6	329	e 19 3	[+ 5]	e 26 4	[+ 5]	e 20 42	PP	e 49·4
Seven Falls	E.	123·4	33	—	—	25 58	[– 3]	27 43	SKKS	51·4
Jena		123·5	330	e 19 0	[0]	—	—	e 20 43	PP	—
Cheb		123·6	331	e 20 43	PP	e 25 56	[– 6]	e 30 41	PS	—
Aberdeen		123·8	343	—	—	i 33 27	?	i 53 12	Q	e 62·1
Witteveen	Z.	124·3	336	i 19 1	[0]	—	—	—	—	—
Palisades		124·7	41	i 19 2k	[0]	i 26 6	[+ 1]	e 22 14	PKS	e 58·1
Fordham		124·8	41	e 19 3	[+ 1]	e 27 52	{+ 6}	—	—	—
De Bilt		125·5	336	e 19 5	[+ 2]	e 31 13	PS	e 24 1	PPP	e 56·4
Harvard		125·5	38	i 19 4	[+ 1]	e 27 56	{+ 5}	e 38 3	SS	e 54·2
Weston		125·7	38	i 19 5	[+ 1]	—	—	—	—	—
Triest		125·7	326	e 19 8	[+ 4]	e 26 6	[– 2]	e 21 3	PP	e 59·9
Stuttgart		126·1	330	e 19 3a	[– 1]	e 31 25	PS	i 21 1	PP	e 60·4
Karlsruhe	Z.	126·3	332	i 19 5	[0]	—	—	—	—	—
Taranto		126·3	319	—	—	e 39 25?	SSP	—	—	—
Strasbourg		126·9	331	i 19 6	[0]	e 25 43	[–29]	e 21 3	PP	59·4
Zürich		127·3	330	e 19 6	[– 1]	—	—	—	—	—
Salo		127·5	328	e 19 18	[+11]	e 22 38	PKS	e 20 14	PKP_2	—
Basle		127·7	330	e 19 7	[– 1]	e 23 58	PPP	e 19 52	PKP_2	—
Kew		128·1	338	i 19 6k	[– 2]	e 31 30	PS	i 22 23	PKS	e 57·4
Prato		128·2	325	e 19 25?	[+17]	i 22 25	PKS	—	—	—
Rathfarnham Castle		128·4	344	i 19 5	[– 4]	e 32 1	PS	e 21 15	PP	e 53·4
Pavia		128·5	328	e 19 10k	[+ 1]	e 22 27	PKS	e 39 2?	SS	e 61·0
Rome		128·6	321	i 19 7a	[– 2]	e 27 38	{–33}	e 21 16	PP	—
Paris		129·1	334	i 19 10	[0]	i 22 29	PKS	i 21 17	PP	e 61·4
Huancayo		129·5	109	e 19 13	[+ 2]	e 26 7	[–12]	e 28 17	SKKS	e 52·3
Clermont-Ferrand		131·2	331	i 19 13	[– 1]	e 26 15	[– 8]	i 19 35	PKP_2	e 62·7
La Plata		131·4	146	22 25	PKS	26 13	[–10]	38 43	SS	60·9
Chinchina		131·9	85	i 19 20	[+ 4]	26 14	[–11]	22 48	PKS	50·9
Galerazamba		132·1	79	i 22 49	PKS	e 29 0	{+27}	—	—	—
Bogota		133·4	87	e 19 21	[+ 3]	i 26 33	[+ 5]	i 22 53	PKS	64·2
La Paz		134·6	118	i 19 24	[+ 3]	i 26 37	[+ 7]	i 19 35	pPKP	63·9
Bermuda		135·3	47	e 22 53	PKS	—	—	e 39 59	SS	e 64·0
Tortosa		136·1	329	i 19 25	[+ 2]—	—	—	i 22 55	PP	—
Algiers Univ.	Z.	137·5	322	e 19 15	[–11]	i 22 56	PKS	e 22 6	PP	—
Alicante		138·4	329	19 23	[– 5]	26 32	[– 5]	22 8	PP	e 66·2
Toledo		139·0	332	e 19 16	[–13]	—	—	e 22 17	PP	64·7
San Juan		139·6	66	i 19 30	[0]	—	—	—	—	—
Almeria		140·6	328	i 19 24	[– 8]	26 35	[– 5]	22 35	PP	76·4
Granada		140·9	329	19 30a	[– 2]	26 39	[– 2]	19 57	PKP_2	69·0
Malaga		141·6	330	i 19 26	[– 7]	e 23 6	PKS	e 22 35	PP	e 71·1
Tamanrasset	Z.	143·4	303	i 19 32k	[– 4]	e 22 29	PP	e 26 0	PPP	—
Fort de France		145·2	71	i 19 40	[0]	e 33 22	PS	—	—	e 69·1

For Notes see next page.

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NOTES TO OCTOBER 11d. 1h. 37m. 35s.

Additional readings :—
Brisbane ePE =4m.56s., iN =5m.58s. and 6m.57s., iSZ =8m.58s., isSEN =9m.32s.
Riverview isSN =10m.56s., iE =10m.59s., iN =11m.3s., 11m.30s., and 11m.42s., iE = 11m.50s., eQE =12·0m.
Apia PP =8m.27s.
Manila iPPP =8m.47s., eSS =15m.16s., eSSS =15m.44s.
Wellington eP =7m.37s., iZ =7m.57s., e? =8m.35s., iPcP =9m.12s., PP =9m.35s., PcS = 11m.49s., isS =14m.33s., iSS =17m.8s.
Christchurch iZ =8m.25s., eNZ =9m.0s. and 9m.15s., eSSEN =17m.0s., eScS? =17m.35s.
Perth SSS =18m.55s.
Calcutta SSE =25m.11s.
New Delhi PSN =22m.39s.
Poona ePN =12m.17s., ScSE =22m.28s., PSE =23m.15s., PPSE =23m.33s.
Rybach'e ePPP =17m.33s.
Frunse iPS =24m.22s.?, eSS =28m.55s.
Fergana ePS =24m.21s.
Tchimkent PPP =18m.19s., PS =25m.1s., SS =29m.31s.
Tashkent ePS =24m.25s., eSSS =33m.25s.
Berkeley eZ =13m.40s.
Lick eZ =13m.39s.
Seattle esP? =13m.34s., e =23m.50s., 24m.17s., and 24m.35s., ePPS =25m.22s., e = 26m.10s., eSS =30m.1s., e =31m.35s., ePcP,PKP =34m.45s., e =36m.55s.
Pasadena iZ =13m.31s. and 13m.36s., iSKSE =23m.43s., eQN =38·4m.
Tinemaha eN =24m.6s.
Sverdlovsk iSKKS =24m.5s., PS =26m.13s., SS =31m.10s., SSS =35m.49s.?
Resolute Bay iZ =16m.50s., eZ =17m.20s., eE =26m.58s., eN =28m.42s., 29m.50s., and 31m.32s., eE =37m.7s., eN =37m.37s.
Tananarive e =24m.38s., SS =32m.25s.?, eQ =48m.27s.
Tiflis ePPP =20m.35s.?, ePS =27m.47s.
Moscow SKKS =25m.48s., iPS =28m.13s.
Upsala iN =36m.39s., eN =42m.7s.
Cleveland iPKPZ =19m.3s., ePSEN =30m.6s.
Helwan eZ =19m.2s., eE =29m.46s.
Skalnate Pleso ePS?E =30m.37s.
Ottawa iZ =19m.8s., e =28m.27s., PS =30m.27s., SS =37m.5s., e =40m.5s.
Potsdam eSSN =37m.19s.
Ogyalla e =21m.0s., 21m.47s., and 25m.13s., eN =27m.57s.
Belgrade eNE =40m.10s.
Pennsylvania iPP?Z =20m.57s., eN =27m.20s.
Prague ePPP =24m.29s., ePS =30m.37s., eSS =37m.31s., eSSS =42m.19s. and other unidentified e readings.
Seven Falls eE =28m.44s., PSE =30m.41s., SSE =37m.56s.
Jena eE =19m.20s.
Cheb e =34m.31s., eSS =37m.25s., eSSS =42m.37s.
Witteveen iZ =19m.39s.
Palisades eSKKS =27m.46s., ePS =30m.47s., eSS =38m.1s., e =55m.5s.
Harvard eScS, ScS =40m.43s., eSSS? =43m.37s.
Triest ePPS =32m.11s., eSS =38m.4s.
Stuttgart ePPP =23m.58s., ePPS =32m.37s. and other unidentified e readings.
Strasbourg e =19m.18s., i =19m.43s., e =22m.29s., ePPP =23m.45s., eSKKS =27m.54s., ePS =30m.57s., ePPS =32m.39s., e =33m.37s., eSS =37m.55s., e =40m.53s. and 41m.25s., eSSS =42m.49s., e =49m.25s. and 52m.37s.
Kew e =22m.41s., ePPSEN =33m.15s.
Rathfarnham Castle eZ =22m.10s., ePPSZ =32m.45s., eSSEN =38m.25s., eSSSEN = 47m.10s.
Pavia e =30m.22s. and 31m.31s.
Rome iSKPZ =22m.24s., ePPSE =33m.9s., eSSE =38m.51s.?
Paris iSKP =22m.49s., ePKS =22m.53s., PPP =24m.17s., eSP =31m.31s., iSPP = 33m.6s., eSS =38m.39s. and other unidentified readings.
Huancayo e =19m.52s. and 22m.34s., eSKSP =31m.30s., ePPS =33m.16s., eSS = 39m.7s., e =41m.25s., eSSS =43m.16s.
Clermont-Ferrand ePP =21m.37s., i =22m.58s. and 24m.46s., e =25m.10s., ePS = 31m.43s.
La Plata SKSN =26m.1s., N =41m.1s., QN =48m.13s.
Galerazamba i =23m.10s.
Bogota eSKKSEN =28m.33s.
La Paz isPKP =19m.41s., iPPZ =22m.50s., ipPPZ =23m.5s., i =23m.39s. and 24m.3s., iSKKS =28m.49s., PS =32m.25s., iPPS =34m.1s.
Algiers Univ. Z =19m.26s.
Alicante PPP =25m.13s., PS =32m.45s., PPS =34m.19s., SSS =46m.7s., Q =58m.7s.
Toledo i =19m.29s. and 19m.43s.
Almeria SS =40m.51s.
Granada iPP =23m.22s., PPP =26m.0s., SKKS =29m.0s., SKSP =33m.31s., PPS = 36m.27s., SS =43m.6s., SSS =48m.15s.
Tamanrasset eZ =19m.59s., 22m.13s., and 25m.19s.
Long waves were also recorded at Bergen and Scoresby Sund.

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Oct. 11d. 4h. 52m. 56s. Epicentre 42°·5N. 144°·4E. (as on 1951, June 22d.).

A = −·6013, B = +·4305, C = +·6731 ; δ = −4 ; h = −3 ;
D = +·582, E = +·813 ; G = −·547, H = +·392, K = −·740.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	4·2	218	0 53	−14	1 32	−25	—	—	—
Vladivostok		9·2	278	e 2 15	− 1	i 4 1	− 2	—	—	—
Nanking		22·8	252	e 5 16	+11	9 0	−11	—	—	—
Kabansk		27·1	304	e 5 46	0	e 10 29	+ 5	—	—	—
Irkutsk		28·5	305	e 6 0	+ 1	e 10 46	0	—	—	—
College		43·3	35	8 9	+ 4	—	—	—	—	—
Ili		47·8	307	i 8 33	− 8	—	—	—	—	—
Almata II		47·9	306	e 8 40	− 2	—	—	—	—	—
Rybach'e		49·1	305	e 8 46	− 5	—	—	—	—	—
Sverdlovsk		52·7	317	9 19	+ 1	e 16 52	+ 6	—	—	—
Resolute Bay	Z.	56·7	16	e 9 50	+ 2	—	—	—	—	—
Victoria		61·0	49	10 18	0	—	—	—	—	—
Kiruna	Z.	62·2	339	i 10 27	+ 1	—	—	—	—	—
Moscow		64·3	323	e 10 40	+ 1	—	—	—	—	—
Shasta Dam		66·1	57	i 10 52	+ 1	—	—	—	—	—
Hungry Horse		66·3	46	i 10 54	+ 2	—	—	—	—	—
Reno	Z.	68·3	56	e 11 6a	+ 1	—	—	—	—	—
Lick	Z.	68·5	59	e 11 7a	+ 1	—	—	—	—	—
Fresno	Z.	70·1	58	e 11 17a	+ 1	—	—	—	—	—
Tinemaha	Z.	70·8	58	e 11 21	+ 1	—	—	—	—	—
China Lake	Z.	72·0	58	e 11 29	+ 1	—	—	—	—	—
Mount Wilson	Z.	72·8	59	e 11 34	+ 2	—	—	—	—	—
Riverside	Z.	73·3	59	e 11 36	+ 1	—	—	—	—	—
Boulder City		73·6	56	i 11 40	+ 3	—	—	—	—	—
Copenhagen		74·0	335	e 11 40	+ 1	—	—	—	—	38·1
Palomar	Z.	74·1	59	e 11 42	+ 2	—	—	—	—	—
Collmberg	Z.	77·5	332	e 11 59	0	—	—	—	—	—
Tucson		78·6	57	e 12 6	+ 1	—	—	—	—	—
Ksara		79·8	307	e 8 14	?	e 21 6	?	e 28 51	SS	—
Stuttgart	Z.	80·9	332	e 12 17	0	—	—	—	—	e 44·1
Triest		81·9	328	e 12 25	+ 2	—	—	—	—	—
Paris		83·1	336	e 12 30	+ 1	—	—	—	—	e 49·1
Taranto		84·6	322	—	—	e 23 4?	+ 1	—	—	—
Fayetteville		85·3	46	i 12 40	0	—	—	—	—	—
Ottawa	Z.	85·5	27	12 41	0	—	—	—	—	—
Rome	E.	85·5	326	—	—	e 21 59	?	e 39 55	Q	e 47·2

Paris gives also e = 12m.54s.
Long waves were also recorded at Poona, Potsdam, De Bilt, Pavia, and Granada.

Oct. 11d. 8h. 58m. 53s. Epicentre 41°·1N. 72°·0E. (as on 1947, June 2d.).

A = +·2336, B = +·7188, C = +·6548 ; δ = +1 ; h = −3 ;
D = +·951, E = −·309 ; G = +·202, H = +·623, K = −·756.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Fergana	0·7	193	e 0 14	− 3	e 0 25	− 3
Dzhergetal	2·0	198	0 34	− 1	e 0 58	+ 4
Lunacharskoe	2·0	276	e 0 44?	P_g	e 1 13?	S_g
Tashkent	2·0	276	e 0 37	+ 2	i 1 14	S_g
Tchimkent	2·2	304	i 0 39	+ 1	i 1 17	S_g
Garm	2·5	212	i 0 43	0	i 1 18	+ 4
Frunse	2·7	47	i 0 42	− 3	i 1 21	+ 2
Naryn	3·0	84	e 0 50	0	i 1 26	− 1
Obi-garm	3·0	216	0 53?	+ 3	1 32?	+ 5
Murgab	3·1	151	0 49	− 2	1 39	S*

Continued on next page.

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	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Rybach'e	3·3	65	e 0 52	– 1	e 1 39	S*
Stalinabad	3·5	226	e 1 3	P*	e 1 56	S_g
Khorog	3·6	185	0 58	0	e 1 50	S*
Samarkand	4·1	251	e 1 7	+ 2	e 2 25	S_g
Almata	4·3	58	1 5	– 3	i 2 17	S_g
Almata II	4·5	60	e 1 9	– 2	—	—
Ili	4·7	51	i 1 9	– 5	—	—
Kurmenty	5·0	65	i 1 22	+ 4	—	—
Chilisk	5·3	60	i 1 33	P*	i 2 43	S*
Ashkabad	11·0	258	—	—	e 6 19	S_g
Kizyl-Arvat	12·2	265	—	—	e 6 19	S_g

Oct. 11d. 10h. 38m. 49s. Epicentre 35°·1N, 86°·8E.

A = + ·0458, B = + ·8187, C = + ·5724 ; δ = + 1 ; h = 0 ;
D = + ·998, E = – ·056 ; G = + ·032, H = + ·572, K = – ·820.

		Δ	Az.	P.	O – C.	S.	O – C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Przhevalsk		9·9	321	i 2 25	0	—	—	—
New Delhi		10·4	234	e 2 36	+ 2	—	—	e 5·4
Almata II		10·9	321	i 2 39	– 1	—	—	—
Rybach'e		11·1	314	i 2 40	– 3	—	—	—
Almata		11·2	320	i 2 44	0	—	—	—
Ili		11·6	323	i 2 46	– 4	—	—	—
Frunse		12·2	313	i 2 57	– 1	—	—	—
Andijan		12·7	301	3 15	+10	—	—	—
Fergana		13·0	298	e 3 3	– 6	e 5 15	–20	—
Obi-garm		14·2	290	e 3 20?	– 4	e 5 56?	– 8	—
Stalinabad		14·9	289	e 3 40	+ 6	6 17	– 3	—
Tashkent		15·1	299	e 3 31	– 5	—	—	—
Tchimkent		15·2	303	i 3 41	+ 3	—	—	—
Samarkand		16·4	292	3 55	+ 2	—	—	—
Mary		20·2	284	i 4 40	+ 1	—	—	—
Irkutsk		21·2	28	e 4 51?	+ 2	—	—	—
Ashkabad		23·0	285	i 5 9	+ 2	9 28	+14	—
Kizyl-Arvat		24·6	289	e 5 22	– 1	—	—	—
Sverdlovsk		28·0	328	i 5 54	– 1	e 10 41	+ 3	—
Ksara		41·6	282	e 9 6	PP	—	—	—
Stuttgart	Z.	56·9	309	e 9 47	– 2	—	—	—
Tamanrasset	Z.	70·4	284	e 11 16	– 2	—	—	—

Long waves were recorded at Poona, Collmberg, Potsdam, Kew, and De Bilt.

Oct. 11d. Readings also at 0h. (Dzhergetal, near Garm, Khorog, Obi-garm, and Stalinabad), 1h. (Apia (2)), 3h. (Pretoria), 4h. (Grahamstown), 5h. (Puebla, near Tacubaya, and near Mizusawa (2)), 6h. (near Obi-garm, Stalinabad (2), and near Ashkabad), 9h. (Almata II, Chilisk, Dzhergetal, Ili, Lunacharskoe, Murgab, Samarkand, near Almata, Andijan, Fergana (2), Garm, Khorog, Kurmenty, Obi-garm, Naryn, Rybach'e, and Stalinabad), 10h. (Almata, Murgab, Obi-garm, Rybach'e, Samarkand, Stalinabad, Strasbourg, near Almata II, Chilisk, Dzhergetal, Garm, Ili, Przhevalsk, and Khorog), 11h. (Tinemaha, China Lake, Boulder City, Shasta Dam, Hungry Horse, College, Fayetteville, Andijan, Fergana, Lunacharskoe, Tchimkent, Ksara, Poona, Kodaikanal, near Almata II, Chilisk, Frunse, Ili, Przhevalsk, Rybach'e, and near Mizusawa), 12h. (Puebla and Tacubaya), 13h. (Strasbourg, near Taranto, and near Athens), 14h. (near Mizusawa and near Huancayo), 15h. (Huancayo, Bogota, Puebla, Tacubaya, Vera Cruz, Pasadena, Palomar, and China Lake), 16h. (Palomar, China Lake, Tinemaha, and near Alicante), 17h. (Apia, near Dzhergetal, Garm, Khorog, and Obi-garm), 18h. (Timisoara, near Belgrade, and near Manila), 21h. (Puebla, Tacubaya, Victoria, Almata II, Kurmenty, Rybach'e, near Andijan, Dzhergetal, Fergana, Frunse, Garm, Krasnogorka, Naryn, and near Ashkabad), 22h. (Apia, Brisbane, Oaxaca, Puebla, Tacubaya, and Vera Cruz), 23h. (Huancayo (2), La Paz, near Almata II, and Garm).

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Oct. 12d. 8h. 24m. 55s. Epicentre 15°·3N. 119°·9E. (as on 1941, April 18d.).

Intensity III at Iba and Manila ; II at Baguio and Dagupan.
Epicentre 15°·3N. 120°·3E. (Manila).

A = −·4811, B = +·8365, C = +·2622 ; δ = −6 ; h = +6 ;
D = +·867, E = +·498 ; G = −·131, H = +·227, K = −·965.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Manila		1·2	124	i 0 27	+ 3	—	—
Zi-ka-wei	Z.	15·9	5	3 53	+ 6	e 7 11	SS
Nanking		16·7	357	4 6	+ 9	i 7 17	SS
Kabansk		38·2	346	e 7 22	− 1	—	—
Irkutsk		38·9	345	—	—	13 24?	− 4
Poona	Z.	44·1	281	i 8 11	− 1	—	—
Przhevalsk		44·7	316	e 8 18	+ 2	—	—
Almata II		45·7	317	e 8 26	+ 2	—	—
Almata		46·0	317	i 8 28	+ 1	e 14 53?	−19
Ili		46·2	318	i 8 28	0	—	—
Rybach'e		46·2	315	e 8 28	0	—	—
Frunse		47·4	315	i 8 39	+ 1	—	—
Andijan		48·3	312	i 8 44	− 1	15 40	− 5
Fergana		48·6	311	e 8 47	0	e 15 41	− 8
Obi-garm		49·7	308	i 8 55	− 1	16 2	− 2
Stalinabad		50·4	308	i 8 57	− 4	i 16 9?	− 5
Tashkent		50·7	311	e 9 3	0	e 16 12	− 6
Samarkand		52·0	308	e 9 13	0	—	—
Brisbane	Z.	53·3	142	i 9 14k	− 9	—	—
Ashkabad		58·4	396	i 10 0	0	—	—
Kizyl-Arvat		60·1	307	e 10 10	− 1	—	—
Sverdlovsk		60·7	327	10 12	− 3	i 18 26	− 6
Tiflis		68·9	309	e 11 8	− 1	—	—
Abastumanj		70·4	309	e 11 17	− 1	—	—
Moscow		73·2	324	e 11 33	− 2	—	—
Ksara		76·8	301	e 11 58	+ 3	e 21 46	+ 4
Kiruna	Z.	79·5	338	i 12 6	− 4	—	—
Resolute Bay	Z.	87·6	9	i 12 47k	− 4	—	—
Tamanrasset	Z.	105·5	299	e 18 30	PP	—	—

Resolute Bay gives also eZ = 13m.14s. and 13m.47s.

Oct. 12d. Readings also at 0h. (Pietermaritzburg, Kiruna, Huancayo, Bermuda, near Alicante, near Yalta, near Przhevalsk, Almata II, Ili, Rybach'e, Frunse, Andijan, and Naryn), 1h. (near Manila), 2h. (Apia, Pretoria (3), Kimberley, Grahamstown (2), Fergana, near Obi-garm, Stalinabad, Dzhergetal, Khorog, and Garm), 3h. (Ashkabad), 4h. (Apia), 5h. (Yalta (2)), 6h. (Yalta (3) and near Athens), 7h. (Yalta, and near Apia), 9h. (near Apia), 11h. (Brisbane), 12h. (Ottawa, Poona, Huancayo, and near Dzhergetal), 13h. (Apia and Victoria), 16h. (Brisbane), 17h. (Apia, Palomar, China Lake, and Tinemaha), 18h. (Tinemaha (2), China Lake (2), Pasadena, Lick, Tamanrasset, Bogota, La Paz, Huancayo, and near Apia), 19h. (Krasnogorka, Samarkand, Ili, Rybach'e, Frunse, Obi-garm, Tchimkent, Almata II, near Murgab, Andijan, Naryn, Fergana, Khorog, Garm, and near Athens), 21h. (Palomar, China Lake, Tinemaha, Kirkland, Lake, Palisades, Guadalajara, Oaxaca (2), near Tacubaya (2), Vera Cruz (2), and Puebla (2)), 22h. (Pietermaritzburg, Pretoria, Kimberley, Grahamstown, Puebla, Vera Cruz, and near Tacubaya), 23h. (Tuai, Wellington, and near Garm).

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Oct. 13d. 1h. 16m. 0s. Epicentre 19°·0S. 175°·5W. Depth of focus 0·030.
(as on 1949, May 20d.).

A = −·9433, B = −·0742, C = −·3236 ; δ = +4 ; h = +5 ;
D = −·078, E = +·997 ; G = +·323, H = +·025, K = −·946.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		6·3	35	i 1 25	− 7	i 2 24	−20	—	—
Karapiro	N.	20·4	201	e 4 0	−21	—	—	—	—
Wellington		23·7	199	4 57	+ 4	e 8 59	+10	9 12	?
Cobb River	E.	24·2	202	e 5 5	+ 7	e 9 9	+12	—	—
Kaimata	N.E.	26·0	203	e 5 19	+ 5	—	—	—	—
Christchurch		26·4	200	e 5 30	+12	—	—	e 10 0?	?
Brisbane	Z.	30·1	248	i 5 54k	+ 3	—	—	—	—
Lick	Z.	75·6	42	i 11 20k	− 2	i 11 34	?	i 12 24	pP
Pasadena	Z.	75·9	47	i 11 22	− 2	—	—	e 12 24	pP
Fresno	Z.	76·4	43	e 11 24k	− 2	—	—	e 12 26	pP
Shasta Dam		77·2	39	i 11 29	− 2	—	—	—	—
China Lake	Z.	77·3	45	i 11 29	− 2	—	—	e 12 31	pP
Tinemaha	Z.	77·6	45	i 11 32	− 1	—	—	e 12 32	pP
Reno	Z.	78·0	41	e 11 28a	− 7	—	—	e 12 33	pP
Boulder City		79·2	46	i 11 41	− 1	—	—	i 12 43	pP
Tucson		80·1	51	e 11 47	+ 1	—	—	e 12 48	pP
College		86·3	12	i 12 14	− 4	—	—	i 13 20	pP
Hungry Horse		86·5	37	i 12 17	− 2	—	—	i 13 19	pP
Fayetteville		94·2	53	i 12 54	0	—	—	—	—
Rathfarnham C.	Z.	144·8	10	e 23 16	PKS	29 26	SKKKS	—	—
Collmberg	Z.	147·6	350	19 17	[+ 2]	—	—	e 20 25	pP′
Jena		147·6	350	e 19 18?	[+ 3]	—	—	e 20 23	pP′
Prague		148·0	348	e 19 18	[+ 2]	—	—	—	—
Stuttgart	Z.	150·1	354	e 19 19	[0]	e 19 24	PKP_2	e 20 28	pP′
Paris		150·2	4	e 19 21	[+ 2]	i 19 31	PKP_2	i 20 33	pP′
Strasbourg		150·4	355	i 19 26	[+ 7]	—	—	i 20 35	pP′
Tamanrasset	Z.	176·1	—	i 19 45a	[+ 2]	i 21 24	PKP_2	e 22 31	pP'_2

Additional readings :—
Jena eE = 19m.21s.
Prague e = 19m.45s., 21m.8s., and 21m.38s.
Paris e = 19m.50s.
Strasbourg i = 19m.32s., e = 20m.2s.
Tamanrasset ePPZ = 25m.12s., eZ = 28m.47s.

Oct. 13d. 22h. 28m. 6s. Epicentre 61°·0S. 21°·0W. (as on 1948, Oct. 15d.).

A = +·4549, B = −·1746, C = −·8732 ; δ = −10 ; h = −9 ;
D = −·358, E = −·934 ; G = −·815, H = +·313, K = −·487.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Punta Arenas	N.	27·6	264	—	—	e 11 26	SS	—	—	—
La Plata		35·2	302	6 54	− 4	12 18	−13	8 12	PP	14·3
Buenos Aires		35·7	302	i 7 1	− 1	12 23	−16	—	—	—
Terre Adélie		51·8	171	i 10 25	PcP	e 16 36	+ 3	e 20 6	SS	—
La Paz		55·6	303	i 9 38k	− 2	17 22	− 3	17 46	PPS	27·1
Huancayo		62·7	297	e 10 28	− 1	e 18 56	− 1	e 12 49	PP	—
Tananarive		63·3	81	10 35	+ 2	e 19 12	+ 8	e 26 28	Q	30·4
Christchurch		75·2	191	i 11 52	+ 6	e 21 26	+ 1	e 26 19	SS	e 36·6
Kaimata	N.E.	76·3	189	e 11 51	− 1	—	—	—	—	—
Bogota		77·2	305	i 11 58	+ 1	i 21 42	− 5	i 14 52	PP	36·6
Wellington		77·3	193	i 12 1	+ 3	i 21 45	− 3	e 32 24	Q	e 36·6
Fort de France		82·0	322	e 12 16	− 7	i 22 34	− 3	—	—	—
Riverview		85·3	174	i 12 41a	+ 1	23 9	− 1	e 28 42	SS	e 33·4
Tamanrasset	Z.	86·2	25	e 12 46	+ 2	—	—	e 16 8	PP	—
San Juan		87·0	318	i 12 46	− 2	e 23 12	−15	—	—	—

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.
Brisbane	N.	91·7	175	e 13 12	+ 2	i 24 11	+ 1	23 44	SKS	e 44·0
Almeria		98·7	15	e 13 26	−16	24 57	−13	17 30	PP	52·9
Granada		98·9	13	e 13 44k	+ 1	i 25 26	+15	32 14	SS	49·9
Algiers Univ.	Z.	99·4	19	e 17 48	PP	—	—	—	—	—
Bermuda		99·6	323	e 16 58	PP	e 24 25	[0]	—	—	e 47·1
Helwan		100·0	44	e 13 48	0	25 44	+24	20 21	PPP	—
Alicante		100·4	16	13 44	− 6	25 10	−14	32 9	SS	e47·2
Kodaikanal	E.	103·0	92	—	—	e 24 38	[− 3]	—	—	—
Messina		103·3	28	e 18 54	?	e 33 6	SSP	e 26 6	?	45·6
Ksara		105·2	46	e 18 39	PP	e 28 30	PPS	—	—	—
Taranto		105·8	29	e 21 31	?	—	—	—	—	—
Rome		106·1	25	e 19 5	?	e 28 21	PS	—	—	—
Poona	N.	108·4	85	—	—	e 25 8	[+ 3]	e 28 29	PS	e 52·5
Pavia		108·6	22	e 30 22	PPPS	—	—	—	—	e 57·0
Hyderabad	E.	109·7	89	—	—	e 25 13	[+ 2]	—	—	—
Triest		110·0	25	e 18 55	PP	e 25 15	[+ 3]	e 19 38	?	e 49·3
Fordham		110·2	320	e 19 13	PP	e 28 35	PS	—	—	—
Palisades		110·4	320	e 19 6	PP	e 28 41	PS	e 34 51	SSP	—
Belgrade	Z.	110·7	30	e 19 21a	PP	—	—	—	—	—
Weston		110·9	323	e 19 2	PP	e 34 39	SS	e 28 38	PS	e 51·7
Harvard		111·0	323	e 19 17	PP	e 34 48	SS	e 28 42	PS	e 53·4
Paris		111·1	16	i 19 30	PP	i 30 6	PPS	e 28 50	PS	e 48·9
Strasbourg		111·7	20	e 19 34	PP	e 34 59	SS	e 31 31	?	e 45·9
Stuttgart		112·1	21	e 19 18	PP	e 35 0	SS	e 38 54	SSS	57·9
Kew		113·3	13	e 21 54	PPP	e 29 23	PS	e 35 50	SSP	e 51·9
Fayetteville		113·4	302	i 19 38	PP	—	—	—	—	—
Cheb		113·9	22	e 21 24	?	e 35 55	SSP	e 39 6	SSS	—
Prague		114·3	24	e 19 47	PP	e 26 36	{+ 1}	30 30	PPS	—
Rathfarnham C.	Z.	114·6	10	e 23 40	?	—	—	e 24 19	?	—
De Bilt		114·7	17	e 22 12	PPP	e 35 24	SS	—	—	e 59·9
Collmberg	Z.	115·2	23	e 31 4	PPS	—	—	—	—	—
Tiflis		115·4	49	e 19 55?	PP	—	—	—	—	—
Lwow		116·3	31	e 19 46	PP	—	—	—	—	—
Kizyl-Arvat		117·6	59	19 6	[+18]	e 31 0?	PPS	—	—	—
Tucson		117·6	287	e 18 48	[0]	—	—	e 20 2	PP	—
Kirkland Lake	Z.	118·7	319	e 20 6k	PP	—	—	—	—	—
Calcutta	E.	118·8	95	—	—	e 25 51	[+ 5]	i 30 4	PS	—
Palomar	Z.	121·3	283	e 18 58	[+ 3]	—	—	e 20 26	PP	—
Boulder City		122·5	287	i 19 4	[+ 6]	—	—	i 20 39	PP	—
Pasadena		122·6	283	e 18 56	[− 2]	20 24	PP	e 52 6	Q	e 59·0
Samarkand		122·8	66	19 7	[+ 9]	—	—	—	—	—
China Lake	Z.	123·7	285	e 18 59	[− 1]	—	—	e 20 46	PP	—
Tinemaha	Z.	125·0	284	e 19 2	[0]	—	—	—	—	—
Moscow		125·2	36	e 19 3	[0]	—	—	—	—	—
Tashkent		125·2	67	e 20 56	PP	—	—	—	—	—
Fresno	Z.	125·4	284	e 19 6	[+ 3]	—	—	e 21 14	PP	—
Tchimkent		126·1	67	e 19 4	[0]	—	—	i 21 3	PP	—
Berkeley	Z.	127·5	282	e 19 7	[0]	—	—	e 19 13	?	—
Reno	Z.	127·7	286	e 19 10	[+ 2]	—	—	e 21 7	PP	—
Naryn		128·3	72	i 19 9	[0]	—	—	—	—	—
Frunse		128·8	69	e 19 10	[0]	i 22 34	PKS	—	—	—
Rybach'e		129·2	71	e 19 17?	[+ 7]	i 22 45?	PKS	—	—	—
Krasnogorka		129·4	70	i 19 13	[+ 2]	i 22 35	PKS	—	—	—
Butte		129·5	296	e 19 16	[+ 5]	—	—	—	—	—
Shasta Dam		129·8	284	e 19 11	[− 1]	—	—	—	—	—
Almata		130·2	71	i 22 37	PKS	—	—	—	—	—
Przhevalsk		130·3	73	e 22 41	PKS	—	—	—	—	—
Ili		130·8	71	i 19 12	[− 1]	i 22 37	PKS	—	—	—
Hungry Horse		131·9	297	i 19 15	[− 1]	e 22 32	PKS	—	—	—
Sverdlovsk		133·7	48	19 30	[+11]	28 44	{+ 1}	22 57	PKS	—

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	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Victoria	136·2	290	19 37	[+13]	—	—	—	—	—
Resolute Bay	143·7	334	i 19 32k	[− 5]	e 23 5	PKS	41 36	SS	e 70·8
Irkutsk	149·5	80	e 19 52	[+ 5]	e 33 54	PS	41 54	?	—
Kabansk	150·5	82	e 19 54	[+ 6]	—	—	e 23 33	PP	—
Vladivostok	155·8	126	e 20 8	[+12]	e 23 30	PKS	—	—	—
College	156·1	303	e 19 56	[0]	—	—	i 20 5	PKP_2	—

Additional readings :—
La Plata PPE =8m.6s., SE =12m.6s.
Terre Adélie iPPP =12m.11s., eScS =18m.48s.
La Paz iPPZ =11m.56s., iSS =21m.8s., SSS =23m.28s., i =25m.4s.
Huancayo ePPP =14m.23s., eSS =24m.4s., e =25m.41s.
Christchurch eZ =13m.16s., ePPZ =15m.14s., ePS? =23m.4s., eN =24m.21s., eSSSNZ = 29m.44s., eQEN =31m.34s.
Bogota iSSEN =26m.37s.
Riverview eZ =14m.42s.
Tamanrasset eZ =13m.56s., ePPPZ =17m.52s.
Granada Q =43m.24s.
Helwan eZ =19m.49s.
Alicante PP =17m.41s., Q =41m.2s.
Triest eSKS =24m.54s., ePS =27m.55s., eSS =33m.59s.
Belgrade eNE =27m.53s., 28m.57s., and 36m.41s.
Paris iPPS =29m.13s., i =37m.7s.
Stuttgart e =21m.0s. and 23m.17s., ePS =29m.14s., eQ =51·9m.
Cheb e =27m.39s., 32m.48s., and 34m.20s.
Prague ePS? =28m.59s., eSS =35m.42s., eSSS? =39m.18s.
Sverdlovsk PP =21m.49s., SS =39m.34s.,
Resolute Bay eZ =19m.43s., ePS =33m.7s., e =38m.39s. and 47m.2s.
Long waves were also recorded at Auckland, Istanbul, Upsala, Copenhagen, Potsdam, Clermont-Ferrand, Malaga, and Scoresby Sund.

Oct. 13d. Readings also at 0h. (Bucharest, Campulung, and near Kishinev), 1h. (near Triest), 2h. (Obi-garm, Stalinabad, Naryn, Ili, near Garm, Khorog, Fergana, Samarkand, Tashkent, Andijan, and Murgab), 3h. (near Fergana), 4h. (Stuttgart, Collmberg, Chilisk, near Przhevalsk, Almata II, Ili, near Obi-garm, and near Dzhergetal), 5h. (Huancayo, near Kizyl-Arvat, and near Bogota), 6h. (Strasbourg), 7h. (near Apia, Brisbane, and Huancayo), 8h. (Strasbourg), 10h. (Khorog, Stalinabad, Krasnogorka, near Garm, Samarkand, Dzhergetal, Obi-garm, near Ili (2), Chilisk, and Almata II), 11h. (Tamanrasset), 12h. (near Chilisk, Almata II, and Ili), 14h. (Strasbourg and near Athens), 15h. (Apia and Terre Adélie), 16h. (near Malaga), 18h. (near Shemakla, Tiflis, Goris, Tsikhlis-Dzhvari, and Gori), 19h. (New Delhi, Victoria, Seattle, Pasadena, Palomar, China Lake, Tinemaha, Shasta Dam, Boulder City, Tucson, Fayetteville, Hungry Horse, College, and Alicante), 20h. (Harvard, Weston, Palisades, Bermuda, Kew, and Almeria), 21h. (Palisades, Stalinabad, Fergana, Andijan, near Garm, Khorog, Dzhergetal, and Obi-garm), 22h. (near Ashkabad), 23h. (Copiapo, Santa Lucia, and near Ashkabad).

Oct. 14d. 9h. 29m. 37s. Epicentre 8°·0S. 106°·0E.

A = −·2730, B = +·9520, C = −·1383 ; δ = −4 ; h = +7 ;
D = +·961, E = +·276 ; G = +·038, H = −·133, K = −·990.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		2·0	56	i 0 25	−10	—	—	—	—	—
Djakarta		2·0	24	i 0 37k	+ 2	i 0 54	− 8	—	—	—
Perth		25·5	161	e 6 13	PP	10 25	+28	—	—	i 12·8
Colombo	E.	30·0	298	6 19	+ 7	11 24	+14	—	—	19·9
Kodaikanal	E.	33·7	303	i 6 51	+ 6	e 11 23	−45	14 23	SS	16·0
Hyderabad	E.	37·2	313	i 7 18	+ 3	i 13 7	+ 5	—	—	19·1
Poona		41·2	310	i 7 53	+ 5	i 14 9	+ 7	9 31	PP	19·8
Bombay	E.	42·2	310	e 7 23?	−33	e 13 31	PcS	—	—	—
New Delhi		45·8	324	i 8 23	− 2	i 15 2	− 7	—	—	—
Brisbane		48·5	119	i 8 42k	− 4	i 15 35	−13	—	—	—
Riverview		48·9	128	i 9 0k	+10	i 15 42	−11	i 10 53	PP	e 23·7
Przhevalsk		56·2	337	e 9 44	0	e 17 31	− 2	—	—	—
Naryn		56·4	334	i 9 43	− 2	i 17 33	− 3	—	—	—
Chilisk		57·1	337	e 9 51	+ 1	—	—	—	—	—
Rybach'e		57·2	334	i 9 50	− 1	i 17 43	− 3	10 10	pP	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata II		57·3	336	e 9 49	– 3	e 17 45	– 2	—	—	—
Obi-garm		57·4	327	i 9 53	0	—	—	—	—	—
Almata		57·5	336	i 9 50	– 3	e 17 46	– 4	—	—	—
Fergana		57·6	330	e 9 53	– 1	e 17 47	– 4	—	—	—
Stalinabad		57·8	327	i 9 53	– 2	—	—	—	—	—
Ili		58·0	336	i 9 56	– 7	e 17 49	– 8	—	—	—
Frunse		58·2	333	e 9 55	– 3	—	—	—	—	—
Krasnogorka		58·2	335	i 9 56?	– 2	—	—	—	—	—
Samarkand		59·5	325	i 10 7	0	18 11	– 5	—	—	—
Tashkent		59·5	328	i 10 5	– 2	i 18 10	– 6	—	—	—
Kabansk		59·8	0	e 10 1	– 8	—	—	—	—	—
Irkutsk		60·1	359	e 10 5?	– 6	e 18 15?	– 9	—	—	—
Tchimkent		60·1	330	i 10 9	– 2	i 18 16	– 8	—	—	—
Mary		61·3	322	i 10 20	0	18 39	0	—	—	—
Terre Adélie		63·5	165	e 10 37	+ 3	i 18 59	– 8	i 11 1	PcP	—
Ashkabad		63·7	320	i 10 36	0	i 19 8	– 2	e 10 57	pP	—
Kizyl-Arvat		65·7	321	i 10 46	– 2	19 32	– 2	—	—	—
Christchurch		67·6	134	e 9 56	–65	e 19 43	–14	e 24 8	SS	e 34·2
Auckland	N.	68·3	126	—	—	19 58	– 8	20 25	PS	36·2
Wellington		68·8	131	i 11 19	+11	i 20 0	–11	e 27 48	SSS	e 35·8
Lenkoran		70·5	315	11 22	+ 4	20 30	– 2	—	—	—
Baku		70·6	318	—	—	e 20 39	+ 6	—	—	—
Goris		72·6	316	11 31	0	20 56	0	—	—	—
Pietermaritzburg	Z.	73·6	242	i 11 51	PcP	—	—	—	—	—
Sverdlovsk		74·5	337	11 41	– 1	i 21 12	– 5	—	—	—
Leninakan		74·8	316	e 11 51?	+ 7	—	—	—	—	—
Gori		75·2	317	e 11 46	0	—	—	—	—	—
Pretoria	Z.	75·6	246	i 11 23	–25	—	—	—	—	—
Piatigorsk		76·7	319	11 55	0	i 21 37	– 4	—	—	—
Grahamstown	Z.	76·8	238	i 11 55	0	—	—	—	—	—
Ksara		78·2	307	i 12 5	+ 2	21 59	+ 2	—	—	—
Kimberley	Z.	78·5	242	i 12 9	+ 5	—	—	—	—	—
Helwan	N.	80·8	302	—	—	e 22 23	– 2	—	—	—
Yalta		82·9	317	e 12 28	0	—	—	e 12 48	pP	—
Moscow		84·7	328	i 12 36	– 1	22 59	– 5	e 12 56?	pP	—
Kishinev		87·2	318	e 12 48	– 1	—	—	—	—	—
Athens		88·8	308	e 12 56a	– 1	—	—	—	—	—
Pulkovo		89·7	231	e 13 1	0	e 23 49	– 3	—	—	—
Lwow		90·9	320	e 16 43	PP	e 23 34?	[– 4]	—	—	—
Uzhgorod		91·8	319	e 13 17	+ 6	23 39	[– 4]	16 50	PP	—
Messina		95·2	308	e 15 43	?	e 24 41	+ 1	e 26 6	PS	—
Prague		97·1	320	e 17 29	PP	e 34 53	SSS	e 19 35	PPP	—
Triest		97·2	316	—	—	e 24 10	[– 3]	e 26 38	PS	—
Collmberg	Z.	98·1	321	e 16 57	?	—	—	—	—	—
Potsdam		98·1	322	e 17 49	PP	—	—	—	—	e 59·4
Jena	Z.	98·9	320	e 17 26?	PP	—	—	—	—	—
Stuttgart		100·5	319	e 17 56	PP	—	—	e 18 14	?	e 58·4
Strasbourg		101·4	319	e 17 57	PP	—	—	e 29 59	PKKP	—
Tamanrasset	Z.	102·7	292	e 14 4	+ 4	—	—	e 18 23	PP	—
College		104·1	25	e 18 14	PP	—	—	e 23 58	?	—
Paris		104·9	319	e 18 4	?	—	—	e 18 30	PP	e 54·4
Victoria		122·1	37	18 54	[– 3]	—	—	—	—	—
Shasta Dam		126·1	45	i 19 3	[– 1]	—	—	—	—	—
Hungry Horse		127·5	33	i 19 6	[– 1]	—	—	i 19 29	?	—
Lick	Z.	128·0	48	i 19 7k	[– 1]	—	—	—	—	—
Reno	Z.	128·4	45	e 19 6a	[– 3]	—	—	—	—	—
Fresno	Z.	129·6	48	e 19 10a	[– 1]	—	—	—	—	—
Butte		129·7	34	i 19 9	[– 2]	i 22 26	PKS	—	—	—
Tinemaha	Z.	130·6	48	i 19 15	[+ 2]	i 22 36	PKS	—	—	—
China Lake	Z.	131·4	48	e 19 14	[– 1]	i 22 33	PKS	e 32 26	SKKP	—

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.
Pasadena		131·8	51	i 19 15	[0]	i 22 33	PKS	—	—	—
Palomar	Z.	133·1	51	i 19 17	[– 1]	e 22 38	PKS	—	—	—
Boulder City		133·5	47	e 19 19	[0]	e 22 42	PKS	—	—	—
La Plata	N.	135·7	200	—	—	—	—	65 29	Q	74·0
Tucson		138·2	50	e 19 16	[–11]	—	—	—	—	—
Kirkland Lake	Z.	139·7	6	e 19 28k	[– 2]	—	—	—	—	—
Harvard		145·6	356	i 19 39	[– 1]	—	—	—	—	—
Weston		145·7	356	i 19 39	[– 1]	—	—	—	—	—
Fayetteville		146·5	30	i 19 41	[– 1]	—	—	—	—	—
Palisades		147·1	359	i 19 42	[– 1]	—	—	i 20 2	pPKP	—
Fordham		147·3	359	i 19 45	[+ 2]	—	—	i 20 5	pPKP	—
Morgantown		148·1	9	i 19 56	[+12]	—	—	i 20 58	?	—
Washington		149·1	3	i 19 45	[– 1]	—	—	—	—	—
Tacubaya		153·1	63	e 20 0	[+ 8]	—	—	—	—	—
La Paz	Z.	155·0	195	e 20 7	[+13]	—	—	i 24 20	PP	—
Huancayo	Z.	160·0	177	e 20 4	[+ 3]	—	—	e 21 0	PKP_2	—

Additional readings :—
Kodaikanal ScSE = 17m.3s.
Poona PcPE = 9m.39s., PPPE = 10m.5s., ScPE = 13m.23s., SSE = 17m.11s., ScSE = 17m.38s., QE = 17m.47s., SSSE = 18m.5s.
Riverview eE = 15m.38s., iN = 18m.34s., iEN = 19m.1s., iN = 23m.1s. and 23m.33s.
Terre Adélie i = 11m.28s.
Christchurch eQN = 28m.43s.
Moscow SS = 23m.30s.
Prague ePP = 17m.32s., e = 17m.41s., 17m.54s., 18m.21s., and 19m.2s.
Jena eE = 17m.33s., eZ = 17m.48s., eE = 17m.51s., eZ = 18m.15s., eE = 18m.40s.
Strasbourg e = 18m.6s., ePP = 18m.16s., e = 18m.29s.
Tamanrasset ePKPZ = 17m.32s., eZ = 17m.44s. and 19m.26s., ePPPZ = 20m.31s.
Lick iZ = 19m.25s., eZ = 20m.45s.
Fresno eZ = 19m.29s. and 20m.35s.
Long waves were also recorded at De Bilt and Kew.

Oct. 14d. 18h. Fiji region, very deep.

Apia iS = 20m.39s.
Brisbane iPZ = 23m.50s.k.
Terre Adélie iP = 27m.16s., eS = 34m.23s.
Pasadena iP = 29m.29s.a, esP?Z = 32m.42s.
Berkeley ePZ = 29m.35s.
Lick iPZ = 29m.37s.a, iZ = 29m.47s.
Reno ePZ = 29m.40s.a.
Fresno ePZ = 29m.41s.k.
Palomar iPEN = 29m.42s.
Shasta Dam iP = 29m.45s.
China Lake iPZ = 29m.46s.a, epP?Z = 31m.50s.
Tinemaha iPZ = 29m.48s.a, eZ = 30m.13s., epP?Z = 31m.55s., esP?Z = 32m.55s.
Boulder City iP = 29m.57s.
Tucson iP = 30m.4s., i = 30m.19s.
Victoria P = 30m.5s.
College iP = 30m.21s.
Hungry Horse iP = 30m.29s.
Fayetteville iP = 31m.10s.

Oct. 14d. Readings also at 1h. (Palomar and China Lake), 3h. (Fergana, Khorog, near Garm, Dzhergetal, Obi-garm, and Stalinabad), 5h. (Tamanrasset (2), Pretoria (2), Kimberley, Puebla, and near Tacubaya), 6h. (near Garm), 7h. (2) and 9h. (2) (near Alicante), 12h. (Mount Wilson, Palomar, China Lake, and Tinemaha), 16h. (near Ili, Almata II, and Chilisk), 17h. (Apia), 18h. (near La Paz and near Huancayo), 20h. (College, Shasta Dam, Mount Wilson, China Lake, Tinemaha, Boulder City, and Tucson), 22h. (Murgab, Fergana, Samarkand, near Khorog, Dzhergetal, and Obi-garm).

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Oct. 15d. 10h. 53m. 40s. Epicentre 36°·0N. 140°·1E. (as on 1948, June 4d.).

Intensity V at Shimodate ; IV at Utunomiya, Kakioka, Manabe, Mizukaido, etc. ; II-III at Tukubasan, Kumagaya, Imaichi, Sakura, and Sugito.
Epicentre 36°·1N. 140°·1E. (Tokyo). Depth 45km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for October, 1951, Tokyo, 1951, pp. 249-250, with macroseismic chart on p. 249.

A = −·6221, B = +·5202, C = +·5852 ; δ = +8 ; h = 0 ;
D = +·641, E = +·767 ; G = −·449, H = +·375, K = −·811.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Kakioka	0·2	16	0 12	+ 2	0 17	+ 1
Tukubasan	0·2	0	0 7	− 3	0 13	− 3
Tokyo	0·4	222	0 13a	0	0 21	0
Mito	0·5	38	0 14a	0	0 23	0
Kumagaya	0·6	233	0 13k	− 2	0 21	− 5
Utunomiya	0·6	341	0 13	− 2	0 21	− 5
Yokohama	0·7	213	0 19	+ 2	0 26	− 2
Tyosi	0·7	113	0 18	+ 1	0 29	+ 1
Titibu	0·8	269	0 17	− 1	0 26	− 5
Maebasi	0·9	296	0 17k	− 3	0 28	− 6
Shirakawa	1·1	5	0 23	+ 1	0 36	− 3
Mera	1·1	191	0 21	− 1	—	—
Ajiro	1·2	221	0 37	S	(0 37)	− 4
Hunatu	1·2	245	0 21	− 3	0 36	− 5
Kohu	1·3	254	0 25	0	0 40	− 4
Oiwake	1·3	285	0 26	+ 1	—	—
Misima	1·3	227	0 28	+ 3	0 38	− 6
Osima	1·4	205	0 25	− 2	0 42	− 4
Inawasiro	1·6	0	0 32	+ 2	0 50	− 1
Matumoto	1·7	278	0 48	S	(0 48)	− 6
Nagano	1·7	294	0 28	− 3	—	—
Hukusima	1·8	10	0 32	0	0 52	− 4
Iida	1·9	255	0 29	− 5	0 53	− 6
Sendai	2·3	16	0 42	+ 2	1 11	+ 2
Nagoya	2·7	252	0 47	+ 2	1 23	+ 4

Oct. 15d. 14h. 48m. 59s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030. (as on 4d.).

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Khorog	1·2	48	i 0 31	− 3	—	—	—	—	—
Obi-garm	2·1	342	i 0 42	0	i 1 14	0	—	—	—
Garm	2·3	356	i 0 44	0	—	—	—	—	—
Stalinabad	2·3	323	i 0 43	− 1	i 1 17	0	—	—	—
Dzhergetal	2·6	12	i 0 46	− 1	e 1 23?	0	—	—	—
Murgab	3·2	59	i 0 53	− 1	—	—	—	—	—
Fergana	3·8	15	i 1 1	0	i 1 47	− 1	—	—	—
Samarkand	4·1	319	i 1 4	0	1 53	− 1	—	—	—
Andijan	4·3	20	i 1 6	− 1	i 1 59	0	—	—	—
Tashkent	4·7	349	i 1 13	+ 1	i 2 9	+ 1	—	—	—
Tchimkent	5·6	354	i 1 3?	−20	2 8?	−20	—	—	—
Naryn	6·4	41	i 1 29	− 4	i 2 40	− 6	—	—	—
Frunse	6·9	26	i 1 40	0	i 3 0	+ 2	—	—	—
Rybach'e	7·2	35	i 1 42	− 2	i 3 1	− 4	—	—	—
Krasnogorka	7·5	27	i 1 46	− 1	—	—	—	—	—
Almata	8·2	35	i 1 57	0	i 3 29	+ 1	—	—	—
Przhevalsk	8·4	44	i 1 58	− 1	e 3 32	0	—	—	—
Ili	8·8	33	i 2 2	− 2	—	—	—	—	—
Ashkabad	9·8	281	e 2 15	− 2	—	—	—	—	—
New Delhi	9·8	143	2 18	+ 1	4 0	− 5	4 22	SS	—

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.
Bombay	E.	17·8	172	e 3 1?	–53	—	—	—	—	—
Poona		18·3	170	i 3 56	– 4	i 7 16	+ 4	4 21	PP	8·2
Goris		19·2	286	e 4 10	+ 1	—	—	—	—	—
Tiflis		20·5	293	e 4 24	+ 2	—	—	—	—	—
Leninakan		21·1	290	e 4 35	+ 7	—	—	—	—	—
Sverdlovsk		21·2	345	i 4 34	+ 5	8 18	+12	—	—	—
Piatigorsk		22·1	299	4 39	+ 2	—	—	—	—	—
Kiruna	Z.	41·7	334	i 7 30k	+ 2	—	—	i 7 39	?	—
Stuttgart	Z.	45·5	306	e 7 59	0	—	—	—	—	—
Tamanrasset	Z.	57·1	277	i 9 23k	– 2	i 10 33	sP	e 11 35	PP	—
Pretoria	Z.	73·8	220	i 11 10	– 2	—	—	—	—	—

Additional readings :—
New Delhi P?EN =2m.10s., PPPEN =2m.26s., QE =3m.38s., iSEN =3m.48s., SSSEN = 4m.10s., S_sEN =4m.48s.
Poona PPE =4m.12s., QE =7m.20s., SSE =7m.42s., SSSE =7m.56s., PcSE =11m.46s., ScSE =15m.14s.

Oct. 15d. 21h. 1m. 57s. Epicentre 32°·6N. 134°·5E,

Intensity V at Murotomisaki ; IV at Koti, Sionomisaki, Ichimura ; II-III at Wakayama, Okayama, Sumoto, Matuyama, Kashiwara, Tsuruga, etc.
Epicentre 32°·8N. 134°·3E. Depth 40-50km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for Oct., 1951, Tokyo, 1951, pp.250-252, with macroseismic chart on p.250.

A = –·5916, B = +·6020, C = +·5362 ; δ = –9 ; h = 0 ;
D = +·713, E = +·701 ; G = –·376, H = +·382, K = –·844.

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Muroto	0·7	338	0 12	– 5	0 12	– 7	—	—	—
Simidu	1·3	278	0 23a	– 2	0 47	+ 3	—	—	—
Koti	1·3	319	0 22k	– 3	0 36	– 8	—	—	—
Siomisaki	1·4	51	0 24a	– 3	0 39	– 7	—	—	—
Uwazima	1·8	291	0 28	– 4	—	—	—	—	—
Takamatu	1·8	347	0 28	– 4	0 46	–10	—	—	—
Sumoto	1·8	10	0 29a	– 3	0 48	– 8	—	—	—
Matuyama	1·9	310	0 30	– 4	0 56	– 3	—	—	—
Himeji	1·9	358	0 34	0	1 9	+10	—	—	—
Owase	2·0	44	0 34a	– 1	1 0	– 2	—	—	—
Kobe	2·2	16	0 37a	– 1	1 0	– 6	—	—	—
Osaka	2·2	22	0 44	+ 6	1 11	+ 5	—	—	—
Kyoto	2·6	23	0 42a	– 2	1 11	– 6	—	—	—
Ooita	2·6	285	0 40a	– 4	1 12	– 5	—	—	—
Miyazaki	2·7	255	0 53a	+ 8	1 24	+ 5	—	—	—
Kameyama	2·8	53	0 44	– 3	1 19	– 3	—	—	—
Asosan	2·9	276	0 47	– 1	1 19	– 5	—	—	—
Toyooka	2·9	5	0 47	– 1	1 17	– 7	—	—	—
Yonago	3·0	332	0 45	– 5	1 20	– 7	—	—	—
Matsue	3·1	337	0 45	– 6	—	—	—	—	—
Kumamoto	3·2	275	0 54	+ 2	1 31	– 1	—	—	—
Simonoseki	3·3	295	0 50	– 3	1 27	– 8	—	—	—
Nagoya	3·3	38	0 53	0	1 33	– 2	—	—	—
Gihu	3·4	33	0 53a	– 2	1 32	– 5	—	—	—
Hamamatu	3·4	51	0 55	0	1 33	– 4	—	—	—
Unzendake	3·5	274	0 52	– 5	1 35	– 5	—	—	—
Hukuoka	3·6	288	0 41a	–17	1 21	–21	—	—	—
Saga	3·6	281	0 55a	– 3	1 34	– 8	—	—	—
Hukui	3·7	22	1 3	+ 3	—	—	—	—	—
Omaesaki	3·7	55	1 1	+ 1	—	—	—	—	—
Nagasaki	3·9	273	0 59k	– 3	—	—	—	—	—
Yakusima	4·0	239	1 4	0	1 49	– 3	—	—	—
Iida	4·0	43	1 5	+ 1	—	—	—	—	—
Takayama	4·2	32	1 8	+ 1	—	—	—	—	—
Kanazawa	4·3	23	1 8	0	2 4	+ 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.
Misima		4·5	54	1 11a	0	—	—	—	—	—
Hatidyosima		4·5	82	1 11	0	—	—	—	—	—
Kohu		4·5	47	1 14	+ 3	2 20	+15	—	—	—
Ajiro		4·6	56	1 22	+10	2 29	+22	—	—	—
Toyama		4·6	27	1 21	+ 9	2 41	S_g	—	—	—
Matumoto		4·6	37	1 20	+ 8	2 21	+14	—	—	—
Osima		4·6	61	1 12	0	2 7	0	—	—	—
Ituhara		4·6	291	1 11	– 1	2 1	– 6	—	—	—
Hunatu		4·6	49	1 11k	– 1	—	—	—	—	—
Tomie		4·8	272	1 19	+ 4	2 27	+15	—	—	—
Matusiro		5·0	37	1 14	– 4	2 17	– 1	—	—	—
Mera		5·0	61	1 19	+ 1	2 22	+ 4	—	—	—
Oiwake		5·0	40	1 22	+ 4	2 45	S_g	—	—	—
Titibu		5·1	46	1 22	+ 2	2 37	+17	—	—	—
Nagano		5·1	38	1 22	+ 2	2 23	+ 3	—	—	—
Yokohama		5·1	55	1 30	+10	2 56	?	—	—	—
Tokyo		5·3	53	1 24	+ 2	2 30	+ 5	—	—	—
Maebasi		5·3	43	1 24	+ 2	2 59	S_g	—	—	—
Kumagaya		5·3	47	1 26	+ 4	2 42	+17	—	—	—
Takada		5·4	33	1 39	+15	2 53	S_g	—	—	—
Tukubasan		5·9	50	1 32	+ 1	3 5	S*	—	—	—
Kakioka		5·9	51	1 31	0	3 2	S*	—	—	—
Mito		6·2	51	1 37	+ 2	3 33	S_g	—	—	—
Aikawa		6·2	28	1 35	0	3 12	S*	—	—	—
Niigata		6·5	34	1 34	– 5	2 49	– 6	—	—	—
Shirakawa		6·5	45	1 45	+ 6	—	—	—	—	—
Sendai		7·7	41	2 2	+ 6	3 18	– 7	—	—	—
Vladivostok		10·7	350	e 2 33?	– 5	i 4 52?	+13	—	—	—
Zi-ka-wei	Z.	11·2	266	e 2 41	– 3	4 54	+ 2	—	—	—
Nanking		13·3	272	i 3 8	– 5	i 5 38	– 4	—	—	—
Manila		21·8	217	i 4 57	+ 1	—	—	—	—	—
Kabansk		28·0	321	e 5 55	0	—	—	—	—	—
Irkutsk		29·4	321	e 6 5?	– 2	e 11 6?	+ 5	—	—	—
Calcutta	E.	41·9	268	e 8 2	+ 8	e 14 17	+ 4	i 17 39	SSS	—
Ili		45·6	302	i 8 19?	– 5	—	—	—	—	—
Almata		45·8	301	i 8 27	+ 2	e 15 6	– 3	—	—	—
Rybach'e		46·6	300	e 8 31	– 1	—	—	—	—	—
Naryn		46·8	298	i 8 33	0	i 15 26	+ 2	—	—	—
Bandong		46·9	218	e 8 28	– 6	e 15 22	– 3	—	—	—
Frunse		47·6	300	e 8 40	+ 1	—	—	—	—	—
New Delhi		49·0	281	e 8 47	– 3	e 15 48	– 7	19 13	SS	—
Andijan		49·6	298	e 8 55	0	—	—	—	—	—
Fergana		50·1	298	e 8 59?	0	e 16 8	– 2	—	—	—
Tchimkent		51·3	301	e 9 5	– 3	—	—	—	—	—
Tashkent		51·7	299	e 9 12	+ 1	i 16 30	– 2	—	—	—
Obi-garm		52·0	297	e 9 13	0	i 16 33	– 3	—	—	—
Hyderabad	N.	52·4	267	—	—	16 41	– 1	—	—	—
Stalinabad		52·8	297	e 9 16	– 3	i 16 40	– 7	—	—	—
Samarkand		53·8	298	i 9 28	+ 2	17 3	+ 2	—	—	—
Sverdlovsk		54·8	320	9 29	– 5	17 9	– 5	—	—	—
Poona		55·8	271	e 9 37	– 4	e 17 30	+ 2	17 59	PPS	—
College		55·8	30	i 9 39	– 2	—	—	—	—	—
Bombay	E.	56·5	272	e 9 3?	–43	—	—	—	—	—
Kodaikanal	E.	56·9	261	e 11 51	PP	—	—	—	—	—
Mary		58·3	298	e 10 6	+ 7	—	—	—	—	—
Ashkabad		60·8	299	e 10 24	+ 8	—	—	—	—	—
Brisbane	Z.	62·3	160	i 10 27k	+ 1	—	—	—	—	—
Moscow		67·3	323	10 58	– 1	19 48	– 6	—	—	—
Resolute Bay		68·2	12	i 11 1a	– 3	e 20 4	0	e 11 10	pP	e 28·8
Kiruna	Z.	68·6	337	i 11 3	– 4	—	—	i 11 14	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.
Goris		68·9	304	11 8	– 1	e 20 11	– 2	—	—	—
Tiflis		69·0	307	e 11 8	– 1	e 20 8	– 6	—	—	—
Pulkovo		69·0	329	e 11 10	+ 1	—	—	—	—	—
Gori		69·3	306	e 11 20?	+ 9	—	—	—	—	—
Erevan		69·8	305	—	—	e 20 22	– 1	—	—	—
Victoria		73·6	42	11 36	– 1	—	—	—	—	—
Seattle		74·6	43	i 11 43	0	—	—	i 11 53	?	—
Lwow		77·4	322	e 12 7?	+ 9	—	—	—	—	—
Shasta Dam		78·3	49	i 12 3	0	—	—	—	—	—
Hungry Horse		78·9	39	i 12 6	– 1	—	—	—	—	—
Ksara		78·9	303	e 12 7	0	e 22 24	+19	—	—	—
Uzhgorod		79·1	321	e 12 8	0	—	—	—	—	—
Skalnate Pleso		79·8	323	e 12 12	0	e 23 3	?	e 12 24	PcP	—
Berkeley	Z.	79·9	51	i 12 11a	– 1	—	—	i 12 22	PcP	—
Lick	Z.	80·6	51	i 12 16k	0	—	—	i 12 25	PcP	—
Reno	Z.	80·6	49	e 12 15a	– 1	—	—	e 12 26	PcP	—
Potsdam		81·2	328	e 12 27	PcP	—	—	—	—	e 41·0
Prague		82·1	326	e 12 23	– 1	e 28 27	SS	e 15 41	PP	e 41·0
Fresno	Z.	82·2	51	e 12 23a	– 1	—	—	e 12 33	PcP	—
Belgrade		82·4	318	e 12 26a	+ 1	e 22 40	– 1	e 15 34	PP	e 48·4
Jena		82·8	327	e 12 24	– 3	—	—	e 15 37?	PP	—
Tinemaha	Z.	83·0	50	e 12 29	+ 1	—	—	—	—	—
Witteveen	Z.	83·6	331	e 12 26	– 5	—	—	—	—	—
China Lake	Z.	84·2	50	i 12 33a	– 1	—	—	i 12 43	pP	—
Pasadena		84·8	52	i 12 37a	0	—	—	i 12 47	pP	e 39·4
Triest		85·4	323	e 12 36	– 4	e 23 6	– 5	—	—	e 42·6
Riverside	Z.	85·4	52	i 12 39a	– 1	—	—	i 12 49	pP	—
Stuttgart		85·4	327	e 12 39	– 1	e 23 3	– 8	e 12 48	pP	e 43·0
Boulder City		85·9	49	e 12 43	0	—	—	i 12 53	pP	—
Palomar	Z.	86·1	52	i 12 44a	0	—	—	e 12 54	pP	—
Strasbourg		86·2	328	e 12 48	+ 4	e 23 28	+ 9	e 13 9	?	e 42·0
Kew		87·3	333	—	—	e 23 36	+ 7	—	—	e 43·0
Rathfarnham Castle		87·9	338	e 12 53	0	e 22 19	?	—	—	e 41·7
Paris		88·3	331	e 12 54	– 1	e 24 50	PS	i 16 25	PP	e 44·0
Tucson		90·7	50	e 13 6	0	—	—	e 13 17	pP	—
Alicante		97·9	325	13 43	+ 4	—	—	—	—	e 45·7
Fayetteville		97·9	37	i 13 38	– 1	—	—	—	—	—
Almeria		100·1	325	13 50	+ 1	25 18	– 3	17 54	PP	—
Tamanrasset	Z.	106·5	311	e 18 31	[+ 5]	—	—	e 17 9	?	—
Kimberley	Z.	120·4	253	i 31 12	PPS	—	—	—	—	—
Huancayo		145·8	59	e 19 44	[+ 3]	—	—	i 19 54	pPKP	e 56·4
La Paz	Z.	154·0	55	20 3	[+10]	—	—	—	—	—

Additional readings :—
Calcutta iE = 14m.24s.
Skalnate Pleso eN = 12m.50s., eE = 16m.16s.
Berkeley eZ = 13m.30s.
Prague e = 13m.27s., ePPP = 17m.23s., ePPS? = 23m.44s., e = 24m.19s., eSSS = 31m.27s.
Jena eEZ = 12m.28s., eZ = 12m.35s., eE = 12m.38s.
Stuttgart eZ = 12m.59s., e = 19m.21s.
Paris iP = 12m.57s.
Long waves were also recorded at Palisades, Harvard, Weston, and several European stations.

Oct. 15d. Readings also at 5h. (Jena, Collmberg, Stuttgart, Fayetteville, Tucson, Boulder City, Hungry Horse, Shasta Dam, Mount Wilson, Tinemaha, China Lake, College, and near Vladivostok), 8h. (Harvard, and near Malaga), 12h. (Ksara and near Baku), 13h. (Strasbourg), 15h. (Strasbourg, Stalinabad, Fergana, near Khorog, Obi-garm, Dzhergetal, Murgab, and near Santa Lucia), 17h. (Tacubaya and Puebla), 19h. (near Garm), 20h. (Upsala), 21h. (Palomar, Riverside, Mount Wilson, Tinemaha, China Lake, and Tamanrasset).

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Oct. 16d. 6h. 54m. 33s. Epicentre 76°·7N. 7°·8E. (as on 1950, Sept. 13d.).

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

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kiruna		9·7	150	i 2 17	− 5	—	—	—	—	e 4·4
Scoresby Sund		10·4	246	e 2 28	− 6	—	—	—	—	4·4
Helsinki		17·6	148	e 4 1	− 7	—	—	—	—	e 8·4
Pulkovo		18·7	143	i 4 14	− 8	e 7 45	− 3	—	—	—
Copenhagen		21·2	172	e 4 45	− 4	e 8 52	+11	—	—	10·8
Resolute Bay		22·4	318	e 5 1	− 1	e 9 14	+10	—	—	e 11·8
Moscow		23·7	134	i 5 13	− 1	e 9 31	+ 4	—	—	—
Witteveen	Z.	24·0	181	e 5 11	− 6	—	—	e 5 17	P	—
Rathfarnham C.	Z.	24·1	198	e 4 37?	−41	—	—	—	—	—
Potsdam		24·5	172	i 5 21	− 1	e 9 51	+11	i 5 40	PP	e 12·4
De Bilt		24·7	182	e 5 21	− 3	e 9 53	+ 9	i 5 34	PP	e 11·4
Kew		25·5	190	e 5 40	+ 8	—	—	—	—	e 10·4
Jena		25·9	173	e 5 32	− 3	—	—	e 6 14	PP	—
Prague		26·9	170	e 5 49	+ 4	e 10 16	− 4	e 6 25	PP	—
Raciborzu		27·0	163	e 5 41	− 4	—	—	e 6 38	PP	—
Sverdlovsk		27·2	107	i 5 47	0	10 33	+ 8	—	—	—
Stuttgart		28·0	177	e 5 49	− 6	e 10 45	+ 7	e 14 27	Q	e 15·4
Paris		28·1	187	i 5 51	− 4	e 10 58	+18	i 7 2	PPP	e 12·4
Strasbourg		28·2	179	e 6 3	+ 7	—	—	e 6 51	PP	e 11·4
Triest		31·3	172	—	—	i 11 7	−24	—	—	—
College		37·9	344	i 7 22	+ 2	—	—	—	—	—
Gori		38·1	133	e 7 25	+ 3	—	—	—	—	—
Tiflis		38·4	133	e 7 25	0	—	—	—	—	—
Alicante		38·6	189	7 50	+24	14 4	+41	9 24	PPP	e 18·1
Erevan		39·9	134	e 7 41	+ 4	—	—	—	—	—
Granada		40·0	192	7 35	− 3	13 50	+ 6	9 2	PP	20·0
Almeria		40·2	191	7 30	−10	13 42	− 6	9 6	PP	20·2
Shemakla		40·2	129	e 7 11?	−29	—	—	9 5?	PP	—
Baku		40·6	128	e 7 51	+ 8	—	—	—	—	—
Goris		40·9	131	7 44	− 2	—	—	—	—	—
Irkutsk		41·3	68	e 7 50	+ 1	e 14 8	+ 4	—	—	—
Kabansk		42·0	66	e 7 56	+ 2	e 14 20	+ 6	—	—	—
Tchimkent		42·8	104	i 8 0	− 1	—	—	—	—	—
Ili		43·0	96	e 8 3	0	—	—	—	—	—
Kirkland Lake	Z.	43·3	282	e 8 12	+ 7	—	—	—	—	—
Frunse		43·4	100	e 8 9	+ 3	—	—	—	—	—
Almata		43·6	97	e 8 8	0	—	—	—	—	—
Tashkent		43·7	106	e 8 1?	− 7	i 14 42	+ 3	—	—	—
Ashkabad		44·6	118	e 10 0	PcP	—	—	—	—	—
Ksara		44·8	146	e 8 19	+ 2	e 14 51	− 4	—	—	—
Samarkand		44·8	109	8 17	0	—	—	—	—	—
Ottawa		44·9	278	e 8 14	− 4	e 14 57	+ 1	—	—	24·0
Fergana		45·1	103	e 8 27	+ 7	—	—	—	—	—
Naryn		45·1	98	e 8 20	0	—	—	—	—	—
Mary		45·7	114	e 10 10	PcP	e 15 11	+ 3	—	—	—
Stalinabad		46·2	107	e 8 30	+ 2	—	—	—	—	—
Harvard		46·6	272	—	—	e 15 24	+ 3	—	—	e 22·8
Weston		46·7	272	—	—	e 15 25	+ 3	—	—	e 23·0
Palisades		48·6	273	e 8 45	− 2	e 15 54	+ 5	e 10 42	PP	e 22·9
Cleveland	N.	49·9	281	—	—	e 16 7	0	—	—	—
Butte		52·0	311	i 9 12	− 1	—	—	—	—	—
Tamanrasset	Z.	54·0	183	i 9 24	− 4	—	—	—	—	—
Fayetteville		57·9	290	i 9 53	− 3	—	—	—	—	—
Shasta Dam		58·8	318	e 10 0	− 2	—	—	—	—	—
Reno	Z.	59·5	315	e 10 7	0	—	—	—	—	—
Tinemaha	Z.	61·6	313	e 10 23	+ 1	—	—	—	—	—
Boulder City		62·1	310	e 10 29	+ 4	—	—	—	—	—
Fresno	Z.	62·2	314	e 10 31	+ 5	—	—	—	—	—
China Lake	Z.	62·8	312	e 10 30	0	—	—	—	—	—
Mount Wilson	Z.	64·4	312	e 10 40	0	—	—	—	—	—
Palomar	Z.	65·0	310	e 10 50	+ 6	—	—	—	—	—
Tucson		65·0	305	e 10 43	− 1	—	—	—	—	—

For Notes see next page.

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NOTES TO OCTOBER 16d. 6h. 54m. 33s.

Additional readings :—
Resolute Bay iNZ = 5m.6s., eNZ = 5m.20s., eE = 11m.18s.
Jena eN = 5m.40s., eE = 6m.44s. and 7m.16s.
Prague ePP? = 6m.6s., e = 6m.53s., 7m.4s., and 7m.40s.
Raciborzu ePZ = 5m.46s.
Stuttgart eZ = 5m.57s.
Paris i = 6m.7s., e = 7m.9s., 11m.7s., and 11m.15s.
Tamanrasset eZ = 8m.58s.
Long waves were also recorded at Ivigtut, Seattle, and Pasadena.

Oct. 16d. Readings also at 0h. (Apia, Pietermaritzburg, and Pretoria), 2h. (near Bogota and near Garm), 4h. (near Manila), 7h. (Kiruna and La Plata), 10h. (Paris, Strasbourg, and Port au Prince), 12h. (Big Bear, near Palomar, Pasadena, Riverside, La Paz, near Huancayo, and near Antofagasta), 13h. (Harvard, Strasbourg, Stuttgart, and near La Paz), 16h. (Apia, near Alicante, and near Obi-garm), 17h. (Apia 2)), 18h. (Mizusawa and Nanking), 19h. (Hungry Horse, China Lake, Shasta Dam, College, Kiruna, Copenhagen, Kew, De Bilt, Collmberg, Potsdam, Paris, Stuttgart, Pavia, Triest, Fergana, Garm, Samarkand, Stalinabad, near Andijan, Dzhergetal, Khorog, and Obi-garm (2)), 20h. (Huancayo), 21h. (Apia), 22h. (Apia and Wellington), 23h. (near Chilisk, Ili, and Przhevalsk).

Oct. 17d. 10h. 9m. 44s. Epicentre 42°·6N. 22°·0E.

Intensity VII at Vranje ; VI at Presbrazenje, Bresnica, Zabince, and Tibuzde ; IV at Korbevac, Lepcince, Jovac, etc. Epicentre 42°·6N. 22°·0E. (Strasbourg).

M. D. Uzelac.
Annuaire Macroséismique pour l'année, 1951, de l'Institut Séismologique de Beograd, Nouvelle Série No. II, Beograd, 1953, p. 57.

A = + ·6846, B = + ·2766, C = + ·6744 ; δ = 0 ; h = −3 ;
D = + ·375, E = − ·927 ; G = + ·625, H = + ·253, K = − ·738.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia		1·0	84	0 24	+ 3	0 36	0	0 39	S	—
Belgrade		2·5	334	0 42k	− 1	i 1 21	S_g	i 0 52	P_g	—
Timisoara		3·2	350	1 2	+10	i 1 42	+10	i 1 14	P_g	—
Bucharest		3·5	57	e 0 11	?	i 1 1	?	—	—	—
Kalossa	E.	4·5	332	—	—	e 2 5	0	e 2 36	?	e 2·8
Budapest		5·3	338	1 23	+ 1	e 2 26	+ 1	e 1 33	P*	3·7
Istanbul	N.	5·5	104	(e 2 48)	S*	e 3 2	S_g	—	—	—
Triest		6·7	300	e 1 41	− 1	e 3 4	+ 4	e 2 11	P_g	—
Prague		9·1	328	e 3 1	?	e 3 51	− 9	e 4 32	S*	—
Zürich		10·6	301	e 2 35	− 1	e 4 46	+ 9	—	—	—
Collmberg		10·7	328	e 2 42k	+ 4	e 4 49	+10	—	—	—
Stuttgart		10·9	309	e 2 38	− 2	e 4 36	− 8	—	—	e 6·1
Basle		11·3	301	e 2 51	+ 5	—	—	—	—	e 6·5
Strasbourg		11·6	306	e 3 35?	?	e 4 13	?	—	—	e 6·3
Paris		15·0	300	e 3 26	− 9	—	—	e 4 26	?	—
Tamanrasset	Z.	24·0	220	e 5 19	+ 2	—	—	—	—	—

Additional readings :—
Belgrade iP* = 47s., iP_gS_gNE = 1m.26s., iS_gNW = 1m.29s.
Timisoara iN = 1m.5s., iE = 1m.26s., iSEN = 1m.52s.
Bucharest iE = 15s., iP*EN = 22s., iEN = 29s., iS?E = 45s., iS*E = 1m.18s.
Budapest eN = 2m.59s., iE = 3m.5s. and 3m.17s.
Istanbul S* given as P_g.
Triest iS_gS_g = 3m.52s.
Prague e = 4m.8s., eS_g = 4m,54s,

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Oct. 17d. Readings also at 0h. (Victoria), 2h. (Huancayo, Balboa Heights, near Galerazamba, and Bogota (2)), 5h. (near Apia), 6h. (Apia), 7h. (Tacubaya, Bombay, Calcutta, Dehra Dun, Hyderabad, New Delhi, Poona, and Ksara), 8h. (Strasbourg, Collmberg, Stuttgart, Kiruna, Pasadena, Palomar, China Lake, Berkeley, Lick, Fresno, Reno, and near Apia), 9h. (Tacubaya), 10h. (Strasbourg and near Ashkabad), 12h. (Pretoria, Strasbourg, Paris, Kiruna, Pasadena, Palomar, China Lake, Lick, Reno, Shasta Dam, Boulder City, Tucson, Hungry Horse, College, and near Mitchell Field), 14h. (Almata, Przhevalsk, Naryn, Dzhergetal, Obi-garm, Fergana, near Khorog, and Murgab), 15h. (Jena, Paris, and Strasbourg), 16h. (Strasbourg), 17h. (Tacubaya and Ksara), 18h. (Apia, Tamanrasset, China Lake, Jena, Collmberg, Stuttgart (2), and Nanking), 19h. (Collmberg, Stuttgart, Apia (3), Manila, and near Triest), 20h. (Pretoria), 21h. (near Alicante).

Oct. 18d. 5h. 2m. 41s. Epicentre 28°·8N. 93°·7E. (as on 1950, August 21d.).

Felt at Jorhat, Dibrugarh, North Lakhimpur, and Tezpore. Seismo. Bulletin, Government of India, Met. Dept., October, 1951, pp. 8 and 30.

A = −·0566, B = +·8759, C = +·4793 ; δ = +13 ; h = +2 ;
D = +·998, E = +·065 : G = −·031, H = +·478, K = −·878.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	7·9	219	i 1 59	0	i 3 31	+ 1	2 19	P*	—
New Delhi		14·5	273	e 3 27	− 1	e 6 11	0	3 38	PP	6·1
Hyderabad	E.	18·0	235	i 4 7	− 6	i 7 35	+ 3	—	—	9·4
Przhevalsk		18·4	322	e 4 22	+ 4	—	—	—	—	—
Naryn		19·1	316	e 4 30	+ 3	—	—	—	—	—
Chilisk		19·2	323	e 4 31	+ 3	—	—	—	—	—
Almata		19·7	323	e 4 34	0	—	—	—	—	—
Ili		20·1	323	i 4 39	+ 1	i 8 41	+22	—	—	—
Krasnogorka		20·7	319	e 4 59	+15	—	—	—	—	—
Frunse		20·8	318	e 4 47?	+ 2	—	—	—	—	—
Poona		20·8	246	i 4 43	− 2	i 8 33	0	4 49	PP	9·7
Fergana		21·4	310	e 4 53	+ 2	—	—	—	—	—
Bombay	E.	21·5	248	i 4 54	+ 2	i 8 59	+12	10 7	SSS	—
Nanking		21·9	75	e 4 50	− 7	8 47	− 7	—	—	11·2
Stalinabad		22·9	304	i 5 7	+ 1	—	—	—	—	—
Tashkent		23·5	310	i 5 13	+ 1	i 9 33	+10	—	—	—
Kodaikanal	E.	23·9	225	e 5 12	− 4	e 9 37	+ 7	—	—	12·4
Samarkand		24·5	304	5 25	+ 3	—	—	—	—	—
Irkutsk		24·7	15	5 25	+ 1	e 10 3	+19	—	—	—
Kabansk		25·2	17	5 28	− 1	—	—	—	—	—
Colombo	E.	25·4	214	6 1	PP	10 19?	+23	—	—	—
Mary		27·9	298	—	—	i 11 3	+26	—	—	—
Manila		28·9	113	e 6 7	+ 4	—	—	—	—	—
Sverdlovsk		36·4	331	e 7 9	+ 1	13 4	+14	—	—	—
Ksara		49·1	292	e 9 1	+10	—	—	—	—	—
Yalta		49·2	306	e 8 46	− 6	—	—	—	—	—
Kiruna	Z.	57·4	334	i 9 51k	− 2	—	—	—	—	—
Prague		61·8	315	e 10 30	+ 7	—	—	e 12 36	PP	—
Collmberg	Z.	62·5	316	e 10 25	− 3	—	—	—	—	—
Jena	E.	63·4	316	e 10 31	− 3	e 11 31?	PcP	e 12 40	PP	—
Stuttgart	Z.	65·5	315	e 10 45	− 2	—	—	e 11 7	PcP	—
Strasbourg		66·4	315	e 10 51	− 2	—	—	e 11 23	PcP	—
Paris		69·7	316	e 13 45	PP	—	—	—	—	e 39·3
Alicante		75·8	307	13 36	PP	e 21 36	PS	—	—	—
Toledo		77·6	309	e 11 59	− 1	—	—	e 14 4	PP	—
Tamanrasset	Z.	77·9	290	i 11 59k	− 2	e 12 6	PcP	e 15 3	PP	—
Pretoria	Z.	83·1	236	i 12 32	+ 3	—	—	—	—	—
Pietermaritzburg	Z.	83·8	232	i 13 5	+33	—	—	—	—	—
Huancayo		160·5	326	e 20 47	PKP_2	—	—	—	—	—

Additional readings :—
New Delhi PPPE = 3m.49s., SSSEN = 6m.42s.
Poona PPPE = 5m.1s., QEN = 8m.50s., SSE = 9m.13s., SSSE = 9m.25s., ScPE = 12m.7s.?, ScSE = 15m.47s.?
Prague e = 10m.33s. and 13m.1s.
Strasbourg e = 10m.59s. and 11m.51s.
Long waves were also recorded at De Bilt, Kew, and Rathfarnham Castle.

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Oct. 18d. 8h. 26m. 24s. Epicentre 41°·6N. 142°·0E. Focus at base of Superficial Layers. (as on 1950, May 17d.).

Intensity VII-VIII at Kanagi ; VI at Aomori, Hatinohe, Erimomisaki, Misawa, Shichinohe, Wakanagi ; V at Kusiro, Urakawa, Muroran, Mori, Miyako, Morioka, Mizusawa, Kotoni, Tsukigata ; IV at Sendai, Hukusima, Onahama, Tyosi, Kakioka, and Toro. Epicentre 41°·4N. 142°·1E. Depth 40km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1951, Toyko, 1951, pp.252-254, with macroseismic chart.

A = −·5910, B = +·4617, C = +·6614 ; δ = −10 ; h = −2 ;
D = +·616, E = +·788 ; G = −·521, H = +·407, K = −·750.

	Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Urakawa	0·8	47	0 18a	+ 3	0 32	+ 6	—	—	—
Hatinohe	1·1	198	0 18k	− 1	0 31	− 2	—	—	—
Muroran	1·1	314	0 23k	+ 4	0 40	+ 7	—	—	—
Aomori	1·2	229	0 21k	+ 1	0 36	0	—	—	—
Mori	1·2	295	0 24k	+ 4	0 42	+ 6	—	—	—
Sapporo	1·6	342	0 32k	+ 6	0 59	+13	—	—	—
Miyako	1·8	180	0 29	0	0 49	− 2	—	—	—
Morioka	2·0	198	0 31k	− 1	0 53	− 3	—	—	—
Asahigawa	2·2	7	0 46	+11	1 15	+14	—	—	—
Kusiro	2·3	52	0 36	0	1 6	+ 2	—	—	—
Akita	2·4	229	0 38k	0	1 6	0	—	—	—
Mizusawa	2·6	195	i 0 38	− 3	1 8	− 3	—	—	—
Abashiri	2·9	35	0 48	+ 3	1 30	+11	—	—	—
Isinomaki	3·2	189	0 47k	− 2	1 22	− 5	—	—	—
Nemuro	3·2	57	0 46k	− 3	1 22	− 5	—	—	—
Sakata	3·2	211	0 56	+ 7	1 44	+17	—	—	—
Sendai	3·4	194	0 50a	− 2	1 27	− 5	—	—	—
Yamagata	3·6	201	0 54k	− 1	1 30	− 7	—	—	—
Hukusima	4·0	198	0 58a	− 2	1 50	+ 3	—	—	—
Inawasiro	4·3	200	1 4	− 1	1 58	+ 4	—	—	—
Niigata	4·3	213	1 12	+ 7	2 3	+ 9	—	—	—
Aikawa	4·6	220	1 9	0	1 59	− 3	—	—	—
Shirakawa	4·7	198	1 8a	− 2	2 1	− 4	—	—	—
Onahama	4·8	192	1 6k	− 6	2 4	− 3	—	—	—
Takada	5·3	214	1 22	+ 3	2 25	+ 5	—	—	—
Mito	5·4	195	1 17	− 3	2 24	+ 2	—	—	—
Utunomiya	5·4	200	1 15a	− 5	2 18	− 4	—	—	—
Kakioka	5·5	194	1 19	− 3	2 20	− 5	—	—	—
Tukubasan	5·6	196	1 22	− 1	2 26	− 1	—	—	—
Maebasi	5·7	205	1 22a	− 2	2 29	− 1	—	—	—
Kumagaya	5·8	201	1 26k	0	2 36	+ 4	—	—	—
Nagano	5·8	213	1 26	0	2 31	− 1	—	—	—
Wazima	5·8	225	1 26k	0	2 34	+ 2	—	—	—
Matusiro	5·9	211	1 29a	+ 2	2 35	0	—	—	—
Oiwake	5·9	208	1 28	+ 1	2 35	0	—	—	—
Tyosi	5·9	191	1 24	− 3	2 38	+ 3	—	—	—
Titibu	6·1	203	1 31a	+ 1	2 43	+ 3	—	—	—
Matumoto	6·2	212	1 31a	− 1	—	—	—	—	—
Tokyo	6·2	198	1 29	− 3	2 41	− 1	—	—	—
Toyama	6·2	218	1 30k	− 2	2 42	0	—	—	—
Kanazawa	6·5	221	1 38a	+ 2	2 52	+ 2	—	—	—
Yokohama	6·5	198	1 36	0	3 2	+12	—	—	—
Kohu	6·6	204	1 36	− 1	2 58	+ 6	—	—	—
Takayama	6·6	216	1 30	− 7	2 50	− 2	—	—	—
Ajiro	6·9	200	1 40	− 1	2 52	− 8	—	—	—
Iida	6·9	209	1 27	−14	2 46	−14	—	—	—
Mera	6·9	195	1 36	− 5	—	—	—	—	—
Misima	6·9	201	1 38	− 3	3 6	+ 6	—	—	—
Hukui	7·1	221	1 46	+ 2	—	—	—	—	—
Osima	7·1	198	1 39	− 5	2 55	−10	—	—	—

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.
Shizuoka		7·2	204	1 45	– 1	3 10	+ 3	—	—	—
Gihu		7·4	215	1 48a	0	3 16	+ 4	—	—	—
Nagoya		7·5	213	1 48	– 1	3 22	+ 7	—	—	—
Tsuruga		7·5	220	1 51a	+ 1	3 21	+ 6	—	—	—
Omaesaki		7·6	204	1 51	0	3 33	+16	—	—	—
Vladivostok		7·6	285	i 1 53	+ 2	i 3 25	+ 8	—	—	—
Hikone		7·8	217	1 52	– 2	3 19	– 3	—	—	—
Kameyama		8·0	215	1 56k	– 1	3 35	+ 8	—	—	—
Kyoto		8·2	219	1 58a	– 2	3 30	– 2	—	—	—
Toyooka		8·3	225	1 59a	– 2	3 36	+ 1	—	—	—
Kashiwara		8·6	217	1 54	–11	—	—	—	—	—
Osaka		8·6	218	2 4	– 1	—	—	—	—	—
Saigo		8·6	234	2 7	+ 2	—	—	—	—	—
Hatidyozima		8·7	192	2 3	– 3	—	—	—	—	—
Kobe		8·8	220	2 3a	– 5	3 46	– 1	—	—	—
Owase		8·8	217	2 5	– 3	—	—	—	—	—
Wakayama		9·1	218	2 12	0	—	—	—	—	—
Sumoto		9·2	220	2 11a	– 2	4 4	+ 7	—	—	—
Yonago		9·2	230	2 16	+ 3	3 48	– 9	—	—	—
Himeji		9·3	223	2 8	– 7	—	—	—	—	—
Matsue		9·3	232	2 21	+ 6	4 12	+13	—	—	—
Siomisaki		9·6	212	2 17	– 2	4 17	+10	—	—	—
Takamatu		9·6	223	2 18	– 1	4 12	+ 5	—	—	—
Hamada		10·3	233	2 23k	– 5	4 29	+ 5	—	—	—
Muroto		10·4	219	2 30	0	4 24	– 2	—	—	—
Hirosima		10·5	229	2 31	0	4 28	– 1	—	—	—
Koti		10·5	223	2 28	– 3	4 30	+ 1	—	—	—
Matuyama		10·7	226	2 30a	– 4	4 48	+14	—	—	—
Uwazima		11·2	225	2 49	+ 8	4 53	+ 7	—	—	—
Simidu		11·3	222	2 42	0	5 19	+31	—	—	—
Simonoseki		11·6	232	2 48	+ 2	—	—	—	—	—
Ooita		11·8	228	2 47a	– 2	5 21	+21	—	—	—
Hukuoka		12·2	232	2 52a	– 2	5 10	0	—	—	—
Saga		12·5	232	2 59	+ 1	4 27	–50	—	—	—
Miyazaki		12·8	224	3 3	+ 1	—	—	—	—	—
Unzendake		12·9	230	3 2a	– 2	5 11	–16	—	—	—
Zi-ka-wei	Z.	19·5	245	i 4 22	– 5	7 57	– 3	—	—	—
Nanking		20·8	251	i 4 36a	– 5	i 8 22	– 4	i 7 57	?	—
Kabansk		26·1	306	i 5 31	– 2	10 1	+ 2	—	—	—
Irkutsk		27·6	307	5 44	– 2	10 22	– 2	—	—	—
Manila		32·5	220	i 6 27	– 3	e 6 57	?	—	—	—
College		45·0	34	i 8 12	– 2	i 14 53	+ 3	—	—	—
Chilisk		45·9	296	i 8 21	0	—	—	—	—	—
Przhevalsk		46·2	293	i 8 22	– 2	—	—	—	—	—
Almata		46·9	296	i 8 28	– 1	—	—	—	—	—
Rybach'e		47·8	294	e 8 33	– 3	—	—	—	—	—
Krasnogorka		48·2	296	i 8 37	– 2	—	—	—	—	—
Naryn		48·3	292	i 8 37	– 3	e 15 27	–10	e 9 3	pP	—
Frunse		48·7	295	i 8 41	– 2	i 15 42	0	—	—	—
Andijan		51·1	295	i 8 59	– 2	—	—	—	—	—
Fergana		51·6	295	e 9 3	– 2	—	—	—	—	—
Sverdlovsk		52·1	316	i 9 7	– 2	16 28	– 1	—	—	—
Tashkent		52·9	295	i 9 12	– 3	i 16 31	– 9	—	—	—
New Delhi		53·4	277	i 9 15	– 4	e 16 49	+ 2	11 14	PP	—
Stalinabad		54·5	293	i 9 22	– 5	e 16 54	– 8	—	—	—
Samarkand		55·2	295	9 30	– 2	—	—	—	—	—
Djakarta		57·4	222	i 9 39a	– 9	i 17 29	–11	—	—	—
Bandong		57·6	221	e 9 41	– 8	e 17 35	– 8	—	—	—
Resolute Bay		58·1	15	i 9 49a	– 3	i 17 46	– 4	i 10 4	pP	e 26·1
Hyderabad	E.	58·9	266	i 9 54	– 4	i 17 57	– 3	22 4	SS	—
Mary		59·7	295	i 10 1?	– 3	—	—	10 23	pP	—
Poona		61·7	270	i 10 14	– 3	i 18 24	–12	12 28	PP	28·5
Ashkabad		61·9	297	10 18	0	—	—	—	—	—
Bombay	E.	62·3	271	e 12 37	PP	e 18 47	+ 3	—	—	—
Kiruna	Z.	62·4	338	i 10 18k	– 4	—	—	—	—	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Victoria		63·0	48	10 24	– 2	18 52	0	19 24	PPS	25·9
Moscow		63·9	324	i 10 29	– 3	e 19 0?	– 4	—	—	—
Seattle		64·1	48	i 10 33k	0	e 19 8	+ 2	i 10 44	pP	e 29·6
Kodaikanal	E.	64·3	261	i 10 30a	– 4	i 19 3	–5	—	—	—
Pulkovo		64·5	330	i 10 33	– 3	—	—	—	—	—
Colombo	E.	64·7	256	—	—	19 10	– 3	—	—	e 37·9
Helsinki		66·3	331	—	—	e 20 7	PS	—	—	e 32·6
Shemakla		66·7	305	10 46	– 4	—	—	i 11 10	pP	—
Scoresby Sund		67·6	355	i 10 53	– 2	i 11 23	PcP	i 11 14	pP	33·6
Lenkoran		67·7	303	i 10 54?	– 2	—	—	—	—	—
Piatigorsk		68·0	310	10 55	– 3	—	—	i 11 9	pP	—
Shasta Dam		68·0	55	i 10 56	– 2	—	—	—	—	—
Hungry Horse		68·2	44	i 10 56	– 3	—	—	i 11 15	pP	—
Tiflis		68·4	308	i 10 59	– 1	—	—	e 11 21	pP	—
Gori		68·7	308	10 56	– 6	—	—	—	—	—
Upsala		69·1	334	i 11 5	0	e 20 39?	sS	i 11 29	pP	e 32·6
Tsikhlis-Dzhvari		69·2	308	11 5	0	—	—	—	—	—
Saskatoon		69·4	38	—	—	e 20 5	– 5	i 20 47	PPS	34·6
Abastumanj		69·5	308	i 11 7	0	—	—	—	—	—
Brisbane		69·5	169	i 11 2a	– 5	i 20 6	– 5	i 11 23	pP	e 33·3
Erevan		69·5	306	e 11 5	– 2	—	—	—	—	—
Leninakan		69·5	307	11 12	+ 5	—	—	—	—	—
Berkeley		69·8	57	i 11 6a	– 3	e 20 13	– 2	i 11 24	pP	e 32·3
Reno		70·3	54	e 11 10a	– 2	e 20 20	0	e 11 28	pP	—
Santa Clara		70·3	57	e 11 14	+ 2	i 20 23	+ 3	—	—	—
Butte		70·4	45	i 11 11	– 2	—	—	i 11 29	pP	—
Lick	Z.	70·5	57	i 11 10a	– 3	e 39 0	P'P'	i 11 52	?	—
Fresno		72·1	56	e 11 19k	– 4	e 20 42	+ 1	e 11 40	pP	—
Bergen		72·4	340	i 11 26	+ 1	—	—	—	—	38·6
Yalta		72·7	314	i 11 24	– 2	—	—	—	—	—
Tinemaha		72·8	56	e 11 27	0	e 20 51	+ 2	i 11 48	pP	—
Kishinev		73·7	319	i 11 30	– 2	—	—	—	—	—
Reykjavik	Z.	73·8	353	e 11 51	pP	e 20 38	–23	—	—	—
China Lake		74·0	56	e 11 31	– 3	e 20 59	– 4	i 11 50	pP	—
Lwow		74·0	323	e 11 32	– 2	—	—	—	—	—
Copenhagen		74·1	333	i 11 32a	– 3	—	—	—	—	—
Pasadena		74·7	58	i 11 35	– 3	i 21 7	– 4	i 11 54	pP	e 34·4
Riverside	Z.	75·3	58	e 11 38	– 4	—	—	i 11 58	pP	—
Riverview		75·5	172	i 11 46a	+ 3	i 21 16	– 4	i 12 4	pP	e 36·2
Boulder City		75·6	54	i 11 41	– 2	e 21 21	0	—	—	—
Palomar		76·1	57	e 11 43	– 3	i 21 23	– 3	i 12 4	pP	—
Skalnate Pleso	N.	76·1	324	11 46	0	e 21 28	+ 2	e 12 8	pP	—
Raciborzu		76·3	327	i 11 46	– 1	e 21 49	ScS	e 11 58	pP	—
Potsdam		76·5	331	i 11 48k	0	i 21 52	ScS	i 12 8	pP	e 38·6
Ivigtut		77·2	6	—	—	22 12	SP	—	—	35·6
Collmberg		77·4	330	e 11 50	– 3	e 21 41	+ 1	e 22 17	SP	e 42·6
Prague		77·8	329	e 11 54	– 2	e 21 40	– 5	e 12 15	pP	e 37·6
Budapest		77·9	324	e 11 54	– 2	—	—	i 11 57	pP	43·1
Ogyalla		78·0	325	e 12 0?	+ 3	e 21 53	+ 6	e 12 18	pP	—
Jena		78·2	330	e 11 55	– 3	e 21 58	+ 9	e 14 53	PP	—
Timisoara		78·3	321	11 36?	–22	—	—	—	—	—
Witteveen	Z.	78·4	334	i 11 57	– 2	—	—	i 14 59	PP	—
Ksara		78·9	305	i 12 0a	– 2	22 4	+ 8	—	—	—
Belgrade		79·3	322	e 12 1	– 3	—	—	—	—	e 44·4
De Bilt		79·4	334	e 12 2	– 2	e 21 56?	– 6	e 22 42	PS	e 36·6
Tucson		80·6	56	i 12 10	– 1	e 22 20	+ 6	—	—	—
Stuttgart		80·9	330	i 12 10a	– 2	e 22 16	– 1	e 15 18	PP	e 38·6
Karlsruhe	Z.	81·0	331	e 12 8	– 5	—	—	—	—	—
Strasbourg		81·5	331	i 12 14a	– 2	e 22 23	0	i 12 36	pP	e 37·6
Rathfarnham Castle		81·6	341	e 12 8a	– 8	e 22 25	+ 1	e 12 36	pP	e 42·1
Triest		81·6	326	e 12 13	– 3	e 22 20	– 4	e 12 37	pP	—
Kew		81·7	337	i 12 14a	– 3	e 22 25	0	e 12 25	pP	e 38·6
Chur		82·3	329	e 12 18a	– 2	—	—	e 12 40	pP	—
Zürich		82·3	330	e 12 16a	– 4	e 22 27	– 5	e 12 32	pP	—
Basle		82·5	330	e 12 19	– 2	e 20 2	?	e 12 40	pP	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		82·9	315	e 12 20	– 3	e 22 33	– 5	—	—	—
Kirkland Lake	Z.	83·2	27	e 12 23a	– 1	—	—	e 12 38	pP	—
Neuchatel		83·2	330	e 12 22	– 2	—	—	—	—	—
Paris		83·2	334	i 12 22	– 2	i 22 38	– 3	i 12 44	pP	42·1
Bologna		83·6	327	e 12 25	– 1	e 23 1	+16	—	—	—
Auckland	N.	83·7	155	—	—	i 22 46	0	e 28 22	SS	35·2
Pavia		83·9	328	e 12 29	+ 1	23 3	+15	e 24 16	PPS	42·7
Prato		84·2	326	e 12 28	– 1	e 23 0	+ 9	—	—	—
Taranto		84·2	321	12 34	+ 5	22 36	–15	—	—	—
Helwan		84·4	305	i 12 27a	– 3	22 48	– 5	12 54	pP	—
Karapiro	N.	84·9	153	e 12 36?	+ 3	—	—	—	—	—
Lubbock		84·9	48	11 31	–62	—	—	e 11 49	pP	—
Rome		85·2	324	i 12 31a	– 3	e 23 23	sS	i 12 54	pP	—
Clermont-Ferrand		85·6	332	e 12 34	– 2	e 22 42	[–14]	e 15 56	PP	e 36·0
Chicago		85·7	35	—	—	e 22 52	[– 5]	e 23 12	S	—
Tuai	N.	86·2	153	e 12 36?	– 3	—	—	—	—	—
Messina	Z.	86·8	320	e 12 38	– 4	e 16 3	PP	e 13 18	sP	—
Shawinigan Falls	N.	86·9	23	e 12 40	– 3	—	—	—	—	—
Seven Falls	E.	87·0	22	e 12 50	+ 7	—	—	—	—	—
Fayetteville		87·1	42	i 12 39	– 5	—	—	i 13 15	sP	—
Ottawa		87·1	26	e 12 40	– 4	23 6	[+ 1]	—	—	—
Wellington		87·7	156	i 13 2	pP	e 23 3	[– 6]	e 16 13	PP	40·1
Cleveland		88·4	32	i 12 48k	– 2	i 23 27	– 4	i 13 4	pP	—
Pennsylvania		89·6	29	i 13 0	+ 4	e 23 48	+ 6	i 13 15	pP	—
Pittsburgh		89·9	31	i 12 58	+ 1	i 23 48	+ 3	i 24 17	sS	—
Morgantown		90·6	32	e 12 58	– 2	—	—	e 13 32	pP	—
Harvard		91·0	24	i 13 0	– 2	i 24 31	SP	—	—	e 43·0
Halifax		91·1	18	—	—	e 23 56	0	e 24 30	SP	42·3
Weston		91·2	24	i 13 0	– 3	e 23 16	[–15]	e 24 14	sS	—
Palisades		91·6	26	i 13 5	0	i 23 46	–14	i 13 22	pP	e 45·4
Fordham		91·7	26	e 13 5	0	i 24 2	+ 1	—	—	—
Toledo		93·2	334	i 13 11	– 1	i 16 59	PP	13 31	pP	46·4
Alicante		93·4	331	13 14	+ 1	24 23	+ 7	39 19	Q	e 44·3
Almeria		95·4	332	13 11	–11	24 13	–20	16 55	PP	50·7
Granada		95·5	333	i 13 28k	+ 5	i 24 22	–12	13 40	pP	i 52·7
Malaga		96·2	333	i 13 35	+ 9	e 28 53	?	17 19	PP	50·6
Tacubaya		97·0	57	e 13 34	+ 4	e 26 32	SPP	—	—	—
Bermuda		102·4	23	—	—	e 25 58	sS	—	—	e 49·5
Tamanrasset	Z.	104·3	319	e 14 1	– 1	i 18 25	PP	e 14 21	pP	—
Fort de France		120·0	26	—	—	e 30 2	PS	—	—	—
Bogota		123·5	45	i 20 49	PP	e 26 27	[+35]	e 30 33	PS	61·2
Pretoria	Z.	124·0	264	i 14 28	P	—	—	—	—	—
Pietermaritzburg	Z.	124·4	259	i 18 55	[– 1]	—	—	—	—	—
Kimberley	Z.	128·2	263	i 19 1	[– 2]	—	—	—	—	—
Huancayo		136·1	59	e 19 17	[– 1]	—	—	e 22 5	PP	—
La Paz		144·0	55	i 19 30a	[– 2]	i 29 28	SKKS	i 23 8	PKS	68·1
La Plata	E.	163·0	72	25 12	PP	31 18	SKKS	28 24	PPP	76·4

Additional readings :—

New Delhi PSN = 16m.59s.
Resolute Bay iZ = 10m.9s., isS = 18m.21s., eN = 19m.41s., eEN = 20m.12s., eE = 21m.12s. eN = 23m.31s., eE = 23m.44s.
Poona PcPEN = 10m.48s., PPPE = 14m.2s., PcSE = 14m.46s., PSE = 18m.38s., PPSE = 19m.4s., SSE = 22m.28s., SSSE = 25m.2s., QE = 25m.34s.
Seattle iP? = 10m.51s., iPcP = 11m.8s., ipP? = 11m.14s., iPcP? = 11m.32s., i = 13m.1s. and 13m.59s., eScS? = 20m.1s., e = 21m.24s.
Kodaikanal SKKSE = 38m.14s., SKKKSE = 43m.39s.
Upsala iN = 11m.26s., e = 25m.36s.?.
Brisbane eSSN = 24m.43s.
Berkeley esPZ = 11m.43s., iZ = 12m.4s., ePPZ = 13m.59s., epPPZ = 14m.19s., eSSN = 25m.6s., eN = 29m.42s.
Reno ePKP,PKPZ = 38m.58s.
Tinemaha iZ = 11m.37s.
China Lake iZ = 11m.42s., eN = 21m.37s.
Pasadena iPcPZ = 11m.44s., i = 12m.27s., ePPZ = 14m.27s., eZ = 15m.2s., and 15m.38s., iE = 21m.43s., eQN = 30·9m.
Riverview iSN = 21m.19s., iE = 21m.22s., isSE = 21m.47s., iSSE = 26m.4s., eQE = 32m.24s.

Continued on next page.

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Palomar iZ = 11m.59s. and 12m.22s., iEN = 21m.59s.
Skalnate Pleso eN = 12m.42s., ePPN = 14m.41s., eN = 14m.52s.
Raciborzu ePcPE = 11m.49s., ipPE = 12m.2s., iZ = 12m.11s., and 12m.49s., ePPEZ = 14m.23s., ePPPZ = 16m.22s.
Potsdam isSEN = 22m.12s.
Collmberg eEZ = 13m.29s., eZ = 13m.52s.
Prague e = 12m.34s., 12m.59s., and 13m.57s., ePP = 14m.49s., esPP = 15m.20s., ePPP? = 16m.6s., eZ = 20m.24s., e = 21m.28s., esS = 22m.13s., ePS = 22m.28s., eSS = 26m.30s.
Budapest PN = 12m.1s., iEN = 12m.9s., iN = 12m.34s., iE = 12m.37s.
Ogyalla e = 12m.43s., 13m.50s., and 21m.9s.
Jena eN = 11m.59s. and 12m.18s., ePP?N = 14m.46s., ePPN = 15m.4s.
Belgrade iZ = 12m.5s. and 12m.22s., eZ = 15m.34s.
De Bilt eZ = 18m.19s., eSS = 27m.18s.
Stuttgart iZ = 12m.14s., iPcPZ = 12m.32s., e = 13m.12s., ePS = 22m.46s., e = 24m.0s., eSSS = 30m.24s.
Karlsruhe iZ = 12m.13s., eEN = 12m.16s.
Strasbourg i = 12m.18s., isP = 12m.49s., i = 13m.0s., ePP = 15m.20s., i = 15m.25s., ePPP = 17m.18s., e = 22m.48s., eSS = 27m.52s., eSSS = 30m.56s.
Rathfarnham Castle ePPEN = 15m.25s., eEN = 23m.40s., eSSEN = 27m.48s., eSSSEN = 30m.16s.
Triest iPS = 23m.7s., ePPS = 24m.5s., eSSS = 31m.17s.
Kew isPZ = 12m.39s., iPPZ = 15m.25s., eS?EN = 22m.57s., ePS = 23m.9s., eSSSEN = 33m.46s.
Zürich ePP = 15m.19s., ePS = 22m.56s.
Paris iPP = 15m.35s., iPPP = 17m.32s., iPPPP? = 19m.7s., iPS = 23m.16s., iPPS = 23m.50s., iSS = 28m.16s., iSSS = 31m.48s., Q = 39·6m. and other unidentified readings.
Pavia PP = 16m.5s., e = 20m.12s.
Taranto e = 18m.6s. and 29m.36s.
Helwan eZ = 13m.48s., iZ = 15m.42s., PPZ = 15m.54s.
Rome iPP?Z = 15m.53s.
Clermont-Ferrand eS = 23m.48s.
Ottawa e = 23m.48s., Q = 31m.16s.
Wellington eSS = 29m.3s., Q? = 33m.6s.
Cleveland isSE = 24m.1s., iN = 25m.9s., eSSE = 29m.27s.
Pennsylvania iZ = 14m.2s., eN = 22m.54s.
Weston eSS = 29m.46s.
Palisades isS = 24m.33s., iPS = 25m.9s., iPPS = 25m.42s.
Toledo PcP = 13m.23s., i = 13m.41s.
Alicante PP = 17m.21s., PPP = 19m.15s.
Granada iPP = 17m.9s., SS = 30m.10s., SSS = 34m.51s., Q = 47m.36s.
Malaga PPP = 19m.35s.
Tacubaya e = 14m.9s. and 18m.13s.
Tamanrasset eZ = 17m.17s., and 17m.54s., ipPPZ = 18m.43s., ePPPZ = 20m.34s., eZ = 21m.26s. and 22m.34s., ePKKPZ = 29m.48s., eZ = 30m.24s.
Bogota iPPP?EN = 37m.26s.
La Paz iSS = 41m.26s., SSS = 47m.0s.
La Plata SKSPN = 35m.18s., SSEN = 45m.0s., PSS?N = 48m.6s., SSSE = 50m.54s.
Long waves were also recorded at Aberdeen, Istanbul, Tortosa, and Christchurch.

Oct. 18d. 19h. 57m. 41s. Epicentre 48°·2N. 9°·0E. (as on 1951, March 22d.).

Intensity V-VI in the neighbourhood of Hohenzollernberg-Raichberg ; III at Stuttgart.

See Monthly Seismo. Bull., Stuttgart, for 1951, Sept.

A = + ·6609, B = + ·1046, C = + ·7432 ; δ = + 8 ; h = − 5 ;
D = + ·156, E = − ·988 ; G = + ·743, H = + ·116, K = − ·670.

		Δ	Az.	O.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ravensburg		0·6	135	e 0 14	− 1	i 0 25	− 1	e 0 16	P_g	—
Stuttgart	Z.	0·6	13	i 0 13k	− 2	i 0 26	0	i 0 19	S_g	—
Karlsruhe		0·9	335	e 0 19	− 1	i 0 31	− 3	—	—	—
Strasbourg		0·9	295	e 0 21a	+ 1	e 0 32	− 2	—	—	i 0·6
Zürich		0·9	198	i 0 21k	+ 1	i 0 35	+ 1	—	—	—
Basle		1·2	235	e 0 24a	0	e 0 43	+ 2	—	—	—
Chur		1·4	165	e 0 30k	+ 3	e 0 51	+ 5	—	—	—
Neuchatel		1·8	229	e 0 38	P_g	e 1 2	S_g	—	—	—
Jena		3·2	32	e 1 1	P_g	i 1 40	S*	—	—	—
Collmberg		4·0	38	e 1 17	P_g	e 1 56	+ 4	i 2 11	S_g	—
Prague		4·0	62	e 1 17	?	e 1 53	+ 1	e 1 20	P_g	—
Paris		4·4	278	e 1 33	P_g	e 2 4	+ 2	i 2 27	S_g	—
Raciborzu	Z.	6·3	69	—	—	e 3 8	S*	e 3 27	S_g	—

For Notes see next page.

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NOTES TO OCTOBER 18d. 19h. 57m. 41s.

Additional readings :—
Ravensburg e = 23s.
Stuttgart iZ = 16s.
Strasbourg i = 26s. and 30s.
Jena eN = 1m.6s., eE = 1m.13s., eN = 1m.28s., iEN = 1m.43s., iN = 1m.46s., iE = 1m.59s. and 2m.4s.
Collmberg eP*EZ = 1m.24s., eP_gEZ = 1m.39s., eS_gEZ = 2m.41s.
Prague e = 2m.8s., 2m.15s., and 2m.19s.
Paris e = 1m.50s., eS = 1m.58s., e = 2m.9s., eS_g = 2m.15s., e = 2m.19s.

Oct. 18d. Readings also at 0h. (Athens, Collmberg, Strasbourg, Stuttgart, Kiruna, Tamanrasset (2), Mount Wilson, Riverside, and China Lake), 1h. (Taranto and near Apia), 2h. (Apia and near Yalta), 3h. (Apia, Brisbane, Puebla, and Tacubaya), 4h. (near Chilisk (2)), 5h. (Tucson, China Lake, Hungry Horse, College, and near Mitchell Field), 7h. (Auckland, Christchurch, Cobb River, Kaimata, Karapiro, Tuai, Wellington, Brisbane, Palomar, Riverside, China Lake, Tucson, Boulder City, Lick, Fresno, and Shasta Dam), 8h. (Collmberg and Manila), 9h. (Helwan and near Messina), 10h. (Strasbourg and Ksara), 11h. (Apia (3), Paris, and Strasbourg), 13h. (Auckland and near Apia), 16h. (Almata, Chilisk, Frunse, Krasnogorka, Przhevalsk, near Dzhergetal, Fergana, Murgab, Naryn, and Rybach'e), 17h. (near Alicante), 19h. (Ottawa, Stuttgart, Tiflis, near Erevan, and Tsikhlis-Dzhvari), 20h. (Palomar, China Lake, Harvard, Kiruna, near Bandong, and Djakarta), 21h. (China Lake, Tinemaha, Kiruna, Strasbourg, Stuttgart (2), Tamanrasset, Pretoria, Calcutta, Bombay, Poona, New Delhi, Nanking, and near Bandong), 22h. (Khorog, Samarkand, Tchimkent, near Almata (2), Chilisk (2), Dzhergetal, Fergana, Frunse, Ili (2), Krasnogorka (2), Murgab, Naryn (2), Przhevalsk (2), and Rybach'e (2)).

Oct. 19d. 0h. Off Spitzbergen.

Kiruna iPZ = 56m.38s.a, iZ = 57m.12s., iSZ = 58m.17s., iSSZ = 58m.31s.
Collmberg eZ = 59m.19s.
Jena eZ = 59m.21s. and 59m.28s.
Copenhagen eP = 59m.27s.
Prague eP? = 59m.36s., e = 59m.54s., ePP? = 60m.12s., e = 60m.51s., and 61m.2s.
Stuttgart ePZ = 59m.40s., eS = 64m.6s., eQ = 69·0m.
Strasbourg eP = 59m.47s.
Tamanrasset eZ = 63m.20s.
Kew e = 65m.0s.

Oct. 19d. 14h. 51m. 31s. Epicentre 41°·6N. 142°·0E. Depth of focus 0·005. (as on 18d.).

Intensity V at Gonohe, Sanbongi, Ozawaguchi, Tako, Odate, Sanuma, Yahagi, etc.; IV at Miyako, Morioka, Hatinohe, Aomori, Kusiro, Sitinohe, Misawa, Tukidate, Hukuoka etc.; II-III at Mizusawa, Tyosi, Muroran, Akita, Kogota, Matusima, etc.
Epicentre 41°·3N. 142°·3E. Depth 40km.

Seismological Bulletin if the C.M.O., Japan, for Oct., 1951, Tokyo, 1951, pp.254-256, with macroseismic chart.

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Urakawa	0·8	47	0 17a	0	0 29	0	—	—	—
Hatinohe	1·1	198	0 17k	− 3	0 29	− 7	—	—	—
Muroran	1·1	314	0 25k	+ 5	0 42	+ 6	—	—	—
Aomori	1·2	229	0 21k	− 1	0 38	0	—	—	—
Mori	1·2	295	0 23k	+ 1	0 42	+ 4	—	—	—
Sapporo	1·6	342	0 31k	+ 4	0 53	+ 6	—	—	—
Miyako	1·8	180	0 27	− 3	0 46	− 6	—	—	—
Suttsu	1·8	313	0 30	0	0 58	+ 6	—	—	—
Morioka	2·0	198	0 29a	− 3	0 51	− 6	—	—	—
Asahigawa	2·2	7	0 41	+ 6	1 10	+ 8	—	—	—
Kusiro	2·3	52	0 35	− 2	1 2	− 2	—	—	—
Akita	2·4	229	0 46k	+ 8	1 12	+ 5	—	—	—
Mizusawa	2·6	195	0 41	0	1 5	− 7	—	—	—
Abashiri	2·9	35	0 50	+ 5	1 27	+ 8	—	—	—
Isinomaki	3·2	189	0 47a	− 2	1 21	− 6	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		3·2	57	0 46k	– 3	1 19	– 8	—	—	—
Sakata		3·2	211	0 51	+ 2	1 41	+14	—	—	—
Sendai		3·4	194	0 51	– 1	1 25	– 7	—	—	—
Yamagata		3·6	201	0 54	– 1	1 33	– 4	—	—	—
Hukusima		4·0	198	0 58	– 3	1 43	– 4	—	—	—
Inawasiro		4·3	200	1 6	+ 1	1 57	+ 3	—	—	—
Niigata		4·3	213	1 4	– 1	1 57	+ 3	—	—	—
Aikawa		4·6	220	1 7	– 2	1 57	– 5	—	—	—
Onahama		4·8	192	1 9a	– 3	2 5	– 2	—	—	—
Takada		5·3	214	1 25	+ 6	2 34	+15	—	—	—
Mito		5·4	195	1 16	– 4	2 22	0	—	—	—
Utunomiya		5·4	200	1 16	– 4	2 17	– 5	—	—	—
Kakioka		5·5	194	1 12	– 9	2 42	+18	—	—	—
Tukubasan		5·6	196	1 19	– 4	2 19	– 8	—	—	—
Maebasi		5·7	205	1 21	– 3	2 33	+ 4	—	—	—
Kumagaya		5·8	201	1 25	0	2 33	+ 1	—	—	—
Nagano		5·8	213	1 27	+ 2	2 45	+13	—	—	—
Wazima		5·8	225	1 26a	+ 1	2 30	– 2	—	—	—
Matusiro		5·9	211	1 25	– 2	2 32	– 2	—	—	—
Oiwake		5·9	208	1 30	+ 3	2 37	+ 3	—	—	—
Titibu		6·1	203	1 31	+ 1	—	—	—	—	—
Matumoto		6·2	212	1 31	0	2 51	+10	—	—	—
Tokyo		6·2	198	1 28	– 3	2 38	– 3	—	—	—
Toyama		6·2	218	1 30	– 1	2 44	+ 3	—	—	—
Kanazawa		6·5	221	1 30	– 5	2 52	+ 3	—	—	—
Yokohama		6·5	198	1 37	+ 2	2 53	+ 4	—	—	—
Kohu		6·6	204	1 39	+ 2	2 57	+ 6	—	—	—
Ajiro		6·9	200	1 40	– 1	2 49	–10	—	—	—
Mera		6·9	195	1 33	– 8	2 57	– 2	—	—	—
Misima		6·9	201	1 37	– 4	3 21	+22	—	—	—
Hukui		7·1	221	1 11	–33	—	—	—	—	—
Osima		7·1	198	1 39	– 5	3 1	– 3	—	—	—
Shizuoka		7·2	204	1 41	– 4	3 19	+13	—	—	—
Gihu		7·4	215	1 47	– 1	3 15	+ 4	—	—	—
Nagoya		7·5	213	1 48	– 1	3 11	– 3	—	—	—
Tsuruga		7·5	220	1 50	+ 1	—	—	—	—	—
Vladivostok		7·6	285	i 1 55	+ 5	i 3 33	+17	—	—	—
Hikone		7·8	217	1 52	– 1	3 31	+10	—	—	—
Kameyama		8·0	215	1 59	+ 3	3 32	+ 6	—	—	—
Tu		8·1	214	2 0	+ 3	3 39	+11	—	—	—
Kyoto		8·2	219	1 58	– 1	3 39	+ 8	—	—	—
Osaka		8·6	218	2 7	+ 3	3 51	+10	—	—	—
Kobe		8·8	220	2 7	0	3 54	+ 8	—	—	—
Owase		8·8	217	2 16	+ 9	—	—	—	—	—
Siomisaki		9·6	212	2 11	– 7	—	—	—	—	—
Takamatsu		9·6	223	2 16	– 2	—	—	—	—	—
Muroto		10·4	219	2 27	– 2	4 22	– 3	—	—	—
Koti		10·5	223	2 28	– 2	—	—	—	—	—
Matuyama		10·7	226	2 35	+ 2	4 47	+15	—	—	—
Ooita		11·8	228	3 7	+19	5 30	+32	—	—	—
Hukuoka		12·2	232	2 50k	– 3	5 6	– 2	—	—	—
Saga		12·5	232	3 10	+13	—	—	—	—	—
Zi-ka-wei	Z.	19·5	245	e 4 21	– 3	7 59	+ 3	—	—	—
Nanking		20·8	251	e 4 36	– 2	8 23	+ 2	—	—	—
Kabansk		26·1	306	i 5 31	+ 1	—	—	—	—	—
Irkutsk		27·6	307	i 5 43	0	e 10 23	+ 5	—	—	—
College		45·0	34	i 8 11	0	—	—	i 8 23	pP	—
Chilisk		45·9	296	e 8 20	+ 2	—	—	—	—	—
Przhevalsk		46·2	293	i 8 23	+ 3	—	—	—	—	—
Ili		46·6	297	i 8 24	+ 1	—	—	—	—	—
Almata		46·9	296	i 8 27	+ 1	—	—	—	—	—
Naryn		48·3	292	i 8 37	0	—	—	—	—	—
Frunse		48·7	295	i 8 41	+ 1	—	—	—	—	—
Fergana		51·6	295	i 9 2	0	—	—	—	—	—
Sverdlovsk		52·1	316	i 9 2	– 4	e 16 22	– 1	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tchimkent		52·3	297	i 9 7	0	—	—	—	—	—
Tashkent		52·9	295	9 11	− 1	i 16 38	+ 4	—	—	—
New Delhi		53·4	277	e 9 14	− 1	e 15 5	?	e 10 59	PP	—
Stalinabad		54·5	293	9 24	+ 1	—	—	—	—	—
Samarkand		55·2	295	9 28	0	—	—	—	—	—
Resolute Bay		58·1	15	i 9 47a	− 2	e 17 43	0	i 10 8	pP	—
Poona	Z.	61·7	270	i 10 13	− 1	—	—	—	—	—
Ashkabad		61·9	297	e 10 16	+ 1	—	—	—	—	—
Kiruna		62·4	338	i 10 17k	− 1	—	—	10 31	pP	e 34·5
Kizyl-Arvat		62·7	300	10 21	+ 1	—	—	—	—	—
Victoria		63·0	48	10 21	− 1	—	—	i 10 39	pP	—
Shemakla		66·7	305	10 38	− 8	—	—	—	—	—
Scoresby Sund		67·6	355	e 10 53	+ 1	—	—	—	—	—
Piatigorsk		68·0	310	i 10 54	0	—	—	i 11 8	pP	—
Shasta Dam		68·0	55	i 10 53	− 1	—	—	—	—	—
Hungry Horse		68·2	44	i 10 56	0	—	—	i 11 13	pP	—
Tiflis		68·4	308	i 10 58	+ 1	e 19 57	+ 5	—	—	—
Gori		68·7	308	e 10 55	− 4	—	—	—	—	—
Goris		68·8	304	10 58	− 1	—	—	—	—	—
Brisbane	Z.	69·5	169	i 11 1a	− 3	—	—	i 11 8	P	—
Erevan		69·5	306	i 11 5	+ 1	—	—	—	—	—
Leninakan		69·5	307	e 11 8?	+ 4	—	—	—	—	—
Berkeley	Z.	69·8	57	e 11 6k	+ 1	—	—	i 11 23	pP	—
Reno	Z.	70·3	54	e 11 8a	− 1	—	—	e 11 26	pP	—
Lick	Z.	70·5	57	e 11 10a	0	—	—	i 11 28	pP	—
Fresno	Z.	72·1	56	e 11 17k	− 2	—	—	i 11 37	pP	—
Yalta		72·7	315	e 11 23	0	—	—	—	—	—
Tinemaha		72·8	56	i 11 22	− 1	i 11 42	sP	e 11 37	pP	—
China Lake		74·0	56	e 11 30	0	e 21 8	+12	i 11 48	pP	—
Lwow		74·0	323	i 11 30	0	—	—	e 11 47	pP	—
Copenhagen		74·1	333	i 11 31k	0	—	—	—	—	—
Pasadena	Z.	74·7	58	i 11 34	0	—	—	i 11 48	pP	—
Riverside	Z.	75·3	58	i 11 37	− 1	—	—	i 11 55	pP	—
Boulder City		75·6	54	i 11 40	0	—	—	—	—	—
Uzhgorod		75·6	324	e 11 43	+ 3	—	—	—	—	—
Palomar		76·1	57	e 11 42	0	i 21 22	+ 2	i 12 1	pP	—
Raciborzu	Z.	76·3	327	(11 45)	+ 1	—	—	i 12 3	pP	—
Potsdam		76·5	331	i 11 46	+ 1	—	—	—	—	e 41·5
Collmberg		77·4	330	e 11 50	0	—	—	e 12 7	pP	—
Prague		77·8	329	e 12 4	pP	e 12 12	sP	e 14 45	PP	—
Jena		78·2	330	e 11 56	+ 2	—	—	e 12 13	pP	—
Witteveen	Z.	78·4	334	i 11 57	+ 2	—	—	i 12 14	pP	—
Ksara		78·9	305	i 11 59	+ 1	22 34	PS	—	—	—
Belgrade	Z.	79·3	322	e 12 1	+ 1	—	—	e 12 18	pP	—
Tucson		80·6	56	e 12 9	+ 2	—	—	i 12 27	pP	—
Stuttgart		80·9	330	e 12 9a	0	e 22 23	+12	e 12 26	pP	e 44·5
Strasbourg		81·5	331	i 12 13	+ 1	e 15 11	PP	e 12 30	pP	e 43·5
Rathfarnham Castle		81·6	341	i 12 28	pP	i 12 35	sP	—	—	e 43·5
Kew		81·7	337	i 12 29	pP	—	—	—	—	e 43·5
Zürich		82·3	330	e 12 15a	− 1	—	—	e 12 49	sP	—
Basle		82·5	330	e 12 17	0	—	—	—	—	—
Kirkland Lake	Z.	83·2	27	e 12 35	pP	—	—	—	—	—
Paris		83·2	334	i 12 22	+ 1	—	—	i 12 37	pP	e 39·5
Helwan	Z.	84·4	305	i 12 27a	0	—	—	e 13 6	?	—
Shawinigan Falls	N.	86·9	23	e 12 47	+ 8	—	—	—	—	—
Fayetteville		87·1	42	i 12 40	0	—	—	—	—	—
Ottawa	Z.	87·1	26	e 12 39	− 1	—	—	i 12 58	pP	—
Wellington		87·7	156	12 58	pP	23 22	+ 4	—	—	—
Cleveland		88·4	32	i 13 6a	pP	e 23 27	+ 3	e 23 58	sS	—
Harvard		91·0	24	i 12 59	+ 1	—	—	i 13 17	pP	—
Weston		91·2	24	i 12 59	0	—	—	—	—	—
Tamanrasset	Z.	104·3	319	e 14 20	pP	i 18 51	sPP	e 18 18	PP	—
La Paz		144·0	55	e 19 29	[+ 1]	—	—	—	—	—

For Notes see next page.

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NOTES TO OCTOBER 19d. 14h. 51m. 31s.

Additional readings and note :—
Resolute Bay e =18m.14s.
Kiruna iZ =10m.55s. and 11m.11s.
China Lake iPcP?Z =11m.37s.
Pasadena iPcP?Z =11m.41s., iEZ =11m.52s.
Raciborzu P is given as pP.
Prague e =12m.32s., 12m.55s., and 13m.15s.
Jena eN =12m.6s. and 12m.54s., eE =13m.46s.
Strasbourg i =12m.49s., e =13m.8s.
Paris i =13m.39s., e =14m.26s.
Tamanrasset ipPPZ =18m.37s.
Long waves were also recorded at Triest, De Bilt, Pavia, and Granada.

Oct. 19d. Readings also at 0h. (near Horseshoe Bay), 2h. (Victoria, Pasadena, Riverside, Palomar, China Lake, and Tinemaha), 3h. (Stalinabad, Samarkand, near Khorog, Garm, and Dzhergetal), 5h. (near Apia), 6h. (Paris, Strasbourg, Zürich, and near Stuttgart), 7h. (Collmberg, Stuttgart, near Copiapo, near Rome, and Rocca di Papa), 8h. (Apia (2)), 11h. (Tashkent, Frunse, Almata, near Khorog, Dzhergetal, Murgab, Garm, Fergana, Stalinabad, and Tchimkent), 12h. (La Paz, Tamanrasset, Kimberley, Ksara, Colombo, Kodaikanal, Poona, and Hyderabad ; several shocks), 13h. (Tamanrasset, Collmberg, Pasadena, Riverside, Palomar, China Lake, and Tinemaha), 15h. (near Reykjavik (2)), 16h. (near Apia and near Terre Adélie), 17h. (New Delhi, Poona, Tuai, Auckland, and Wellington), 18h. (Tuai, Auckland, and Wellington), 19h. (Murgab, Tashkent, Tchimkent, near Dzhergetal, Garm, Fergana, Khorog, Andijan, Stalinabad, and Samarkand).

Oct. 20d. 8h. 28m. 0s. Epicentre 36°·1N. 141°·2E. (as on 1951, June 17d.).

Intensity IV at Tyosi, Mito, Tukubasan ; II-III at Kakioka, Onahama, Utunomiya, Hukusima, Hunehiki, Tomioka, and Yokaichiba.
Epicentre 36°·05N. 141°·05E. Depth 30km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for Oct., 1951, Tokyo, 1951, p.256-257, with macroseismic chart p.256.

A = −·6312, B = +·5075, C = +·5866 ; δ = +7 ; h = 0 ;
D = +·627, E = +·779 ; G = −·457, H = +·368, K = −·810.

	Δ	Az.	P.	O − C.	S.	O − C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Tyosi	0·4	216	0 14	+ 1	0 20	− 1	—	—
Mito	0·7	296	0 16	− 1	0 25	− 3	—	—
Kakioka	0·8	279	0 18	0	0 27	− 4	—	—
Onahama	0·9	344	0 22	+ 2	0 31	− 3	—	—
Tukubasan	0·9	277	0 20	0	0 29	− 5	—	—
Tokyo	1·2	251	0 25k	+ 1	0 38	− 3	—	—
Utunomiya	1·2	293	0 22k	− 2	0 34	− 7	—	—
Shirakawa	1·3	322	0 26	+ 1	0 43	− 1	—	—
Yokohama	1·4	242	0 33	+ 6	0 49	+ 3	—	—
Kumagaya	1·5	272	0 30	+ 2	0 50	+ 1	—	—
Mera	1·6	223	0 31	+ 1	0 54	+ 3	—	—
Inawasiro	1·7	329	0 38	+ 7	—	—	—	—
Hukusima	1·8	340	0 33	+ 1	0 55	− 1	—	—
Maebasi	1·8	280	0 32k	0	0 53	− 3	—	—
Ajiro	2·0	237	0 36	+ 1	1 1	− 1	—	—
Osima	2·0	228	0 37	+ 2	1 1	− 1	—	—
Kohu	2·1	258	0 41	+ 4	1 16	S_g	—	—
Misima	2·1	242	0 38	+ 1	—	—	—	—
Oiwake	2·1	276	0 38	+ 1	—	—	—	—
Sendai	2·2	354	0 38a	0	1 5	− 1	—	—
Isinomaki	2·3	2	0 38	− 2	0 55	−14	—	—
Yamagata	2·3	342	0 39	− 1	—	—	—	—
Matusiro	2·4	281	0 40	− 1	1 22	S_g	—	—
Nagano	2·5	283	0 43	0	1 15	+ 1	—	—
Niigata	2·5	317	0 53	P_g	1 25	S_g	—	—

Continued on next page.

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	Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Matumoto	2·6	273	0 51	P_g	1 28	S_g	—	—
Shizuoka	2·6	244	0 44	0	1 7	−10	—	—
Takada	2·6	293	0 50	P_g	—	—	—	—
Iida	2·8	258	0 50	P*	—	—	—	—
Omaesaki	2·9	239	1 2	P_g	1 55	?	—	—
Mizusawa	3·0	359	e 1 3	P_g	1 29	+ 2	1 34	S_g
Sakata	3·0	339	1 7	P_g	1 42	S_g	—	—
Aikawa	3·1	309	0 54	+ 3	1 25	− 4	—	—
Hatidyozima	3·2	201	1 12	P_g	—	—	—	—
Toyama	3·3	280	0 58	+ 5	1 32	− 3	—	—
Miyako	3·6	11	0 58	0	1 32	−10	—	—
Morioka	3·6	0	1 2	+ 4	1 44	+ 2	—	—
Nagoya	3·6	256	1 3	+ 5	1 50	S*	—	—
Akita	3·7	347	1 0	0	1 49	+ 4	—	—
Hikone	4·1	260	1 7	+ 2	—	—	—	—
Kameyama	4·1	253	1 15	P*	2 17	S_g	—	—
Tsuruga	4·2	264	1 17	P*	2 9	S*	—	—
Kyoto	4·6	258	1 26	P*	2 20	S*	—	—
Aomori	4·7	356	1 30	P_g	2 14	+ 4	—	—
Toyooka	5·2	266	2 16	S	(2 16)	− 6	—	—
Sumoto	5·5	253	1 43	P*	2 47	S*	—	—
Takamatsu	6·1	255	2 15	?	—	—	—	—
Urakawa	6·2	11	2 32	?	—	—	—	—
Sapporo	7·0	1	2 11	P*	—	—	—	—
Vladivostok	10·0	317	e 2 28	+ 1	e 4 55	+33	—	—
Przhevalsk	48·0	298	e 8 39	− 4	—	—	—	—
Ili	48·6	300	e 8 44	− 3	—	—	—	—
Krasnogorka	50·1	300	i 8 57	− 2	—	—	—	—

Oct. 20d. Readings also at 0h. (Pretoria, Tacubaya, Puebla, and near Oaxaca), 2h. (Collmberg (2), Santa Lucia, and Antofagasta), 3h. (Pretoria and Prague), 4h. (Auckland, Brisbane (2), near La Paz, near Huancayo, and near Mizusawa), 5h. (Tacubaya (2), Stuttgart, Fergana, near Stalinabad, Garm, and Khorog), 6h. (Tacubaya, Strasbourg, and Rathfarnham Castle), 7h. (near Apia), 8h. (Tacubaya and Manila), 9h. (Raciborzu, Zabrze, and Bytom), 11h. (Manila), 12h. and 14h. (La Paz), 15h. (Fergana, Murgab, Andijan, near Stalinabad, Khorog, Garm, and Samarkand), 16h. (near Garm, Khorog, and Stalinabad), 17h. (Tamanrasset, Stuttgart, Galerazamba, La Paz (2), Huancayo, near Bogota, and near Athens), 18h. (Tortosa), 19h. (near Ashkabad), 21h. (near Antofagasta and La Paz), 22h. (China Lake, Tincmaha, Huancayo, Tamanrasset, near Almata, Ili, Krasnogorka, and Przhevalsk), 23h. (Kirovobad, Leninakan, Shemakla, Tsiklhis-Dzhvari, near Goris, Nakhichevan, Erevan, and Tiflis).

Oct. 21d. 18h. 34m. 0s. Epicentre 37°·7N. 141°·8E. Depth of focus 0·005.
(as on 1951, April 4d.).

Intensity V at Hurukawa; IV at Hukusima, Moniwa, Tomioka, Watari, and Toyama; II-III at Miyako, Shirakawa, Mito, Sendai, Onahama, Tukubasan, Utunomiya, Manabe, Shimodate, etc. Epucentre 37°·7N. 142°·0E. Depth 40km.
Seismological Bulletin of the Central Meteorological Observatory, Japan, for Oct., 1951, Tokyo, 1951, pp.257-258, with macroseismic chart on p.257.

A = −·6234, B = +·4905, C = +·6090; δ = +10; h = −1;
D = +·618, E = +·786; G = −·479, H = +·377, K = −·793.

		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Isinomaki		0·8	333	0 10k	− 7	0 22	− 7
Sendai		0·9	309	0 14k	− 4	0 27	− 4
Onahama		1·1	223	0 19k	− 1	0 33	− 3
Hukusima		1·1	273	0 20	0	0 36	0
Yamagata		1·3	315	0 20	− 3	—	—
Mizusawa	E.	1·5	343	i 0 21	− 5	i 0 41	− 4
Mito		1·7	219	0 27	− 1	0 48	− 2
Miyako		1·9	4	0 25	− 6	0 44	−10
Utunomiya		1·9	233	0 31a	0	0 56	+ 2
Sakata		1·9	308	0 48	S	(0 48)	− 6

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Morioka		2·0	347	0 29	– 3	0 53	– 4
Tukubasan		2·0	322	0 30	– 2	0 56	– 1
Niigata		2·2	276	0 43	+ 8	1 16	+14
Akita		2·4	326	0 35	– 3	1 10	+ 3
Kumagaya		2·5	231	0 42	+ 3	1 14	+ 5
Maebasi		2·6	239	0 40k	– 1	1 13	+ 1
Tokyo		2·6	219	0 40	– 1	1 14	+ 2
Titibu		2·8	243	0 44	0	1 18	+ 1
Aikawa		2·8	276	0 42	– 2	1 9	– 8
Yokohama		2·8	217	0 46	+ 2	—	—
Hatinohe		2·8	356	0 38	– 6	1 11	– 6
Oiwake		2·9	254	0 49	+ 4	1 37	+18
Matusiro		3·1	248	0 48	0	1 30	+ 6
Mera		3·2	210	0 52	+ 3	1 33	+ 6
Aomori		3·2	346	0 47	– 2	—	—
Kohu		3·3	232	0 55	+ 4	1 37	+ 8
Matumoto		3·4	245	0 58	+ 6	1 45	+13
Ajiro		3·4	220	0 55	+ 3	—	—
Osima		3·5	214	0 53	– 1	1 35	+ 1
Misima		3·5	223	0 53	– 1	1 42	+ 8
Toyama		3·8	256	1 4	+ 6	2 0	+18
Iida		3·9	236	0 50	– 9	—	—
Shizuoka		3·9	226	1 2	+ 3	1 47	+ 3
Wazima		3·9	267	1 1	+ 2	—	—
Kanazawa		4·3	255	1 47	S	(1 47)	– 7
Mori		4·5	348	1 0	– 7	—	—
Gihu		4·6	242	1 12	+ 3	2 9	+ 7
Nagoya		4·6	237	1 13	+ 4	2 21	+19
Tu		5·2	237	1 25	+ 8	2 40	+23
Sapporo		5·3	356	1 30	+11	2 34	+15
Kusiro		5·6	20	1 24	+ 1	—	—
Owase		5·8	233	1 27	+ 2	2 37	+ 5
Kiruna	Z.	66·0	339	i 10 39	– 3	—	—
China Lake	Z.	76·3	55	e 11 41	– 3	—	—
Stuttgart	Z.	84·2	331	e 12 23	– 3	—	—

Oct. 21d. 21h. 34m. 14s. Epicentre 23°·9N. 121°·7E. (as on 1951, June 20d.).

Felt strongly in Formosa.
Seismological Notes, Bulletin of the Seismological Society of America, Vol. 42, No. 1, Jan., 1951, p.101.

A = – ·4809, B = + ·7787, C = + ·4029 ; δ = – 3 ; h = + 4 ;
D = + ·851, E = + ·525 ; G = – ·212, H = + ·343, K = – ·915.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	Z.	7·2	358	1 50	+ 1	i 3 15	+ 2	—	—	—
Nanking		8·5	343	i 2 9a	+ 2	—	—	—	—	—
Manila		9·3	184	i 2 12	– 5	—	—	—	—	—
Yakusima		10·2	49	e 2 37	+ 6	e 5 3	SSS	—	—	7·0
Tomie		10·7	34	i 2 50	PP	5 58	L	—	—	(6·0)
Nagasaki		11·4	38	e 2 58	PP	e 7 20	L	—	—	(e 7·3)
Kumamoto		11·9	40	e 2 58	+ 4	5 48	SSS	—	—	7·3
Saga		12·0	37	i 3 7	PP	—	—	—	—	—
Hukuoka		12·3	36	3 6	PP	5 54	SSS	i 3 16	PPP	e 7·1
Ooita		12·7	41	3 14	PP	5 37	+ 9	—	—	7·7
Simonoseki		12·9	37	3 14	PP	i 5 59	SSS	—	—	—
Simidu		13·3	46	e 3 30	PPP	6 30	SSS	—	—	9·0
Uwazima		13·3	43	3 48	?	e 6 41	Q	—	—	(6·7)
Koti		14·1	44	e 3 31	+ 8	e 6 51	SSS	e 3 51	PPP	8·2
Muroto		14·4	47	e 3 26	– 1	e 6 3	– 6	—	—	e 6·7

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Matsue		15·2	38	e 3 58	PP	e 6 52	SS	—	—	—
Yonago		15·3	39	e 4 0	PP	e 6 50	SS	—	—	—
Sumoto		15·5	45	i 3 56	PP	7 10	SSS	—	—	e 7·5
Kobe		15·9	45	e 4 0	PP	e 7 37	Q	e 4 17	PPP	i 8·0
Osaka		16·1	45	e 4 13	PP	i 7 40	Q	—	—	e 8·4
Toyooka		16·2	41	4 8	PP	8 11	L	—	—	(8·2)
Owase		16·2	48	e 3 52	+ 2	7 48	Q	—	—	8·3
Tu		16·8	47	e 3 59	+ 1	7 44	SSS	—	—	—
Kameyama		16·9	46	4 15	PP	7 54	Q	—	—	9·1
Hikone		17·0	45	4 15	PP	i 7 56	Q	—	—	8·9
Nagoya		17·4	46	e 4 21	PP	e 7 52	SSS	—	—	e 9·2?
Gihu		17·4	45	e 4 21	PP	e 7 55	SSS	—	—	9·0
Hukui		17·5	43	e 4 23	PP	e 8 5	Q	—	—	—
Omaesaki		17·9	48	4 49	PP	—	—	—	—	8·6
Kanazawa		18·0	41	e 4 25	PP	e 8 30	Q	—	—	e 10·9
Shizuoka		18·2	48	e 4 28	PP	e 7 43	+ 6	e 4 48	PPP	8·8
Iida		18·2	46	e 4 26	PP	e 8 15	SSS	—	—	—
Hatidyosima		18·4	53	4 23	+ 5	8 2	SS	—	—	—
Misima		18·7	48	e 4 26	+ 4	7 51	+3	4 41	PPP	10·2
Kohu		18·7	47	e 4 40	PP	e 8 30	SSS	—	—	e 10·3
Matumoto		18·7	44	e 4 30	PP	e 8 26	SSS	e 16 31	ScS	—
Wazima		18·7	39	e 4 36	PP	e 8 53	Q	—	—	e 10·9
Osima		18·8	50	e 4 30	+ 7	e 7 49	− 1	8 2	SS	12·9
Matusiro		19·0	42	4 24	− 2	i 7 50	− 5	i 8 21	SS	9·2
Oiwake		19·1	44	e 4 35	+ 8	8 44	SSS	—	—	—
Nagano		19·1	43	e 4 36	+ 9	e 8 30	SS	e 5 13	?	e 16·4
Mera		19·2	48	e 4 36	+ 8	8 27	SS	16 4	ScS	11·6
Titibu		19·3	45	e 4 38	+ 9	e 9 13	Q	—	—	(e 9·2)
Yokohama		19·3	47	e 4 39	+10	8 43	SSS	—	—	—
Takada		19·4	41	i 4 35	+ 5	i 8 34	SS	—	—	—
Kumagaya		19·5	46	4 42	PP	e 8 46	SSS	—	—	—
Maebasi		19·5	45	i 4 38	+ 7	e 8 31	SS	—	—	i 9·0
Tokyo		19·6	48	4 43	PP	e 8 12	+ 4	e 5 0	PPP	e 8·8
Aikawa		19·9	39	e 4 41	+ 5	—	—	—	—	9·1
Utunomiya		20·1	46	e 4 41	+ 3	e 9 14	Q	12 27	PcS	—
Tukubasan		20·1	47	4 41	+ 3	8 41	SS	—	—	—
Mito		20·4	47	e 4 52	+11	e 8 53	SS	—	—	—
Niigata		20·4	40	e 4 55	PP	e 9 2	SSS	i 12 16	ScP	i 15·7
Inawasiro		20·8	42	e 5 0	PP	e 9 0	SS	—	—	13·0
Vladivostok		21·0	22	i 4 50	+ 3	e 8 44	+7	—	—	—
Onahama		21·0	47	5 4	PP	i 9 6	SS	—	—	e 11·1
Hukusima		21·2	45	e 4 59	+10	—	—	—	—	—
Yamagata		21·4	43	e 5 1	+10	e 9 14	SS	—	—	e 13·4
Sendai		21·8	44	e 5 13	PP	e 9 32	SS	9 16	PcP	10·3
Akita		22·1	40	e 5 13	PP	e 9 36	SS	e 5 42	PPP	e 10·7
Mizusawa		22·4	42	5 8	+ 6	9 19	+15	e 9 26	PcP	13·8
Aomori		23·3	39	5 28	+18	9 26	+ 6	6 18	?	11·2
Hatinohe		23·5	40	i 5 16	+ 4	9 46	+23	e 5 46	PP	e 12·3
Mori	N.	24·0	36	5 27	+10	e 10 37	SSS	—	—	i 12·6
Guam		24·1	110	(e 5 21)	+ 3	—	—	—	—	—
Sapporo		25·1	34	e 5 38	+10	e 10 5	+14	e 6 26	PPP	e 13·4
Urakawa		25·3	38	e 5 37	+ 7	e 10 15	+21	e 6 26	PPP	e 12·4
Asahigawa		26·1	35	e 5 46	+ 9	e 10 34	+27	—	—	i 14·0
Nemuro		27·6	38	e 6 7	+16	10 53	+21	34 56	PKKS	13·3
Calcutta	E.	30·7	275	i 6 16a	− 3	i 11 48?	+27	7 34	PPP	—
Irkutsk		31·3	340	i 6 25	+ 1	11 44	+13	—	—	—
Djakarta		33·2	208	e 6 38	− 2	i 11 53	− 7	—	—	—
Bandong		33·6	206	e 6 44	0	i 12 9	+ 3	—	—	—
Dehra Dun	N.	39·2	290	(e 7 25)	− 6	(e 13 28)	− 4	—	—	(20·8)
New Delhi		40·0	287	e 7 37	− 1	13 45	+ 1	9 13	PP	19·2

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.
Przhevalsk		40·2	308	i 7 41	+ 1	—	—	—	—	—
Chilisk		40·4	311	e 7 46	+ 5	—	—	—	—	—
Hyderabad		40·9	270	i 7 43	− 3	13 58	0	9 30	PP	21·3
Ili		41·5	311	e 7 48	− 2	—	—	—	—	—
Naryn		41·7	307	i 7 53	+ 1	i 14 21	+11	—	—	—
Rybach'e		41·9	308	i 7 53?	− 1	14 18?	+ 5	—	—	—
Krasnogorka		42·7	309	i 8 1	+ 1	—	—	—	—	—
Kodaikanal	E.	44·2	261	i 7 40a?	−32	i 14 18	−28	10 10	PP	20·6
Andijan		44·4	305	e 8 15?	+ 1	15 0?	+11	—	—	—
Fergana		44·7	304	i 8 15	− 1	i 14 56?	+ 2	—	—	—
Poona		44·8	273	i 8 15	− 2	i 14 55	0	18 13	SS	20·6
Bombay	E.	45·6	274	i 8 26	+ 2	i 15 24	+18	e 10 12	PP	22·0
Tchimkent		46·6	307	i 8 31	− 1	i 15 27	+ 6	—	—	—
Tashkent		46·7	306	i 8 32	0	i 15 30	+ 8	—	—	—
Stalinabad		46·9	302	i 8 32	− 2	e 15 36?	+11	—	—	—
Samarkand		48·4	303	i 8 46	0	—	—	—	—	—
Mary		52·4	301	9 14	− 2	—	—	—	—	—
Sverdlovsk		54·6	324	e 9 28	− 4	i 17 15	+ 4	—	—	—
Ashkabad		55·2	301	9 42	+ 5	—	—	—	—	—
Perth		55·8	186	i 9 46	+ 5	i 17 46	+18	11 50	PP	i 24·9
Brisbane		59·4	147	i 10 3a	− 3	i 18 10	− 5	e 12 15	PP	i 33·2
Baku		61·4	305	i 10 21	+ 1	—	—	—	—	—
Lenkoran		62·5	303	10 26	− 2	—	—	—	—	—
Riverview		63·9	153	i 10 35a	− 2	i 19 11	− 1	i 10 47	pP	e 26·4
Grozny		64·0	309	e 10 40	+ 2	—	—	—	—	—
Goris		64·3	304	i 10 39	0	—	—	—	—	—
Tiflis		65·0	307	i 10 43	− 1	—	—	—	—	—
Erevan		65·5	305	i 10 47	0	—	—	—	—	—
Gori		65·5	307	i 10 48	+ 1	—	—	—	—	—
Leninakan		65·9	307	10 52	+ 2	—	—	—	—	—
Piatigorsk		65·9	310	10 47	− 3	19 38	+ 1	—	—	—
Tsikhlis-Dzhvari		66·0	307	i 10 52	+ 2	19 40	+ 2	—	—	—
Abastumanj		66·4	307	10 57	+ 4	—	—	—	—	—
Moscow		67·3	323	i 10 58	− 1	i 19 57	+ 3	—	—	—
Sotchi		68·3	310	i 11 0	− 5	i 20 4	− 2	—	—	—
College		68·8	27	e 11 6	− 2	i 20 12	+ 1	—	—	—
Pulkovo		70·3	328	i 11 16	− 1	i 20 32	+ 3	—	—	—
Simferopol		71·9	312	11 27	0	e 20 51	+ 3	—	—	—
Yalta		72·0	312	11 28	0	20 53	+ 4	—	—	—
Kiruna		72·2	337	i 11 27	− 2	i 20 54	+ 3	i 11 40	PcP	e 37·8
Helsinki		72·8	330	e 11 31	− 1	e 21 1	+ 3	e 14 14	PP	e 30·8
Honolulu		73·3	73	i 11 40	+ 5	e 21 6	+ 2	—	—	—
Ksara		73·8	300	i 11 37a	− 1	21 27	+18	—	—	—
Kishinev		74·8	315	11 40	− 4	21 22	+ 2	—	—	—
Apia		75·0	112	11 48	+ 3	e 21 22	− 1	12 19	pP	25·8
Upsala		76·4	331	e 11 49?	− 4	i 21 36	− 2	e 12 3	PcP	e 32·8
Istanbul		76·6	310	i 11 55	+ 1	i 21 36	− 4	e 14 47	PP	e 41·8
Lwow		76·8	319	e 11 53	− 2	i 21 45	+ 3	—	—	—
Sitka		77·0	33	e 12 1	+ 5	e 21 54	+ 9	—	—	—
Bucharest		77·5	313	e 12 2	+ 3	e 21 58	+ 8	e 15 0	PP	38·8
Campulung		77·9	315	e 12 4	+ 3	e 22 7	+13	—	—	—
Auckland	N.	78·5	139	12 31	+27	i 22 6	+ 5	e 27 8	SS	43·8
Helwan		78·8	298	i 12 4a	− 2	i 22 6	+ 2	22 49	PS	—
Resolute Bay		78·9	10	i 12 6a	− 1	i 22 1	− 4	i 12 21	PcP	e 46·7
Skalnate Pleso		79·4	320	12 11	+ 2	e 22 12	+ 2	e 12 18	PcP	e 36·3
Sofia		79·6	312	12 14	+ 4	i 22 18	+ 6	12 22	PcP	44·0
Karapiro	N.	79·6	139	11 46?	−24	—	—	—	—	—
Timisoara		80·1	316	e 12 16	+ 3	e 22 34	ScS	—	—	e 42·8
Cobb River	E.	80·1	143	e 12 20	+ 7	—	—	—	—	—
Raciborzu		80·2	321	e 12 15	+ 1	e 22 20	+ 1	e 12 21	PcP	e 41·8

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.
Kaimata	N.E.	80·4	145	e 12 28	+13	—	—	—	—	—
Kecskemet		80·6	318	e 13 2	+46	e 22 32	+ 9	—	—	—
Copenhagen		80·7	328	i 12 16	0	i 22 24	0	i 12 22	PcP	37·8
Budapest		80·8	318	12 18	+ 1	i 22 27	+ 2	15 26	PP	37·3
Belgrade		81·0	315	e 12 18k	0	e 22 42	+15	i 23 34	PPS	e 44·3
Ogyalla		81·1	319	e 12 15	− 3	e 22 39	+11	e 12 22	PcP	e 37·3
Wellington		81·4	143	i 12 22	+ 2	e 21 59	−32	e 23 37	PPS	33·9
Bergen		81·5	334	i 12 26	+ 5	i 22 37	+ 5	i 35 46	Q	39·5
Athens		81·6	307	e 12 19	− 2	i 22 42	+ 9	e 15 29	PP	—
Christchurch		81·8	146	e 12 25	+ 3	e 22 36	+ 1	e 12 29	PcP	e 39·1
Potsdam		82·0	325	i 12 23a	0	i 22 41	+ 4	e 12 31	PcP	e 40·8
Prague		82·1	322	i 12 25a	+ 1	e 22 41	+ 3	i 12 32	PcP	e 37·8
Vienna		82·1	321	e 12 24?	0	e 22 47	+ 9	e 15 40	PP	—
Scoresby Sund		82·4	349	e 12 25	0	i 22 42	+ 1	28 16	SS	35·8
Collmberg		82·6	324	e 12 25	− 1	e 22 56	+13	e 15 34	PP	e 37·8
Jena		83·5	323	e 12 30	− 1	e 22 56	+ 4	e 15 50	PP	e 39·8
Tananarive		83·9	247	i 12 32	− 1	e 23 0	+ 4	i 12 42	PcP	39·8
Sonneberg		84·0	323	e 12 34	+ 1	e 15 50	PP	e 12 57	PcP	—
Triest		84·9	318	i 12 38	0	i 23 3	− 3	i 23 58	PS	e 38·3
Taranto		85·0	313	12 34	− 4	23 9	+ 2	—	—	—
Witteveen	Z.	85·1	327	i 12 41	+ 2	—	—	—	—	—
Stuttgart		86·0	323	e 12 42	− 1	e 23 26	+ 9	e 16 3	PP	e 42·8
De Bilt		86·3	327	i 12 46a	+ 1	e 23 16	− 4	i 16 18	PP	e 38·8
Karlsruhe		86·3	324	i 12 44	− 1	e 23 27	+ 7	e 16 7	PP	e 42·8
Aberdeen		86·5	333	i 12 54	+ 8	i 23 32	+10	i 16 8	PP	39·4
Chur		86·7	322	e 12 46a	− 1	e 23 2	[−10]	—	—	—
Strasbourg		86·9	323	i 12 47	− 1	i 23 22	− 4	i 16 8	PP	e 41·8
Salo		86·9	320	e 12 52k	+ 4	i 23 38	+12	—	—	e 43·7
Bologna		86·9	319	e 12 51	+ 3	e 23 44	+18	e 24 43	PPS	e 44·0
Zürich		87·1	322	e 12 46a	− 3	e 23 24	− 4	e 16 6	PP	—
Heard Island		87·3	207	—	—	e 23 41	+12	—	—	—
Messina		87·3	311	i 12 49	− 1	e 23 12	[− 4]	i 16 24	PP	—
Rocca de Papa		87·4	314	e 12 53	+ 3	e 23 49	+19	e 16 6	PP	—
Prato		87·4	317	i 12 50	0	i 23 42	+12	—	—	—
Victoria		87·5	37	12 51	0	23 40	+ 9	e 16 28	PP	—
Rome		87·5	314	i 12 49a	− 2	e 23 14	[− 3]	i 16 23	PP	—
Basle		87·5	322	e 12 49	− 2	e 23 41	+10	e 16 13	PP	—
Edinburgh	E.	87·8	333	—	—	23 38	+ 4	—	—	—
Durham		87·8	331	i 13 21	?	i 23 47	+13	e 6 6	?	—
Reyjavik		87·8	346	e 12 53	+ 1	e 23 52	+18	e 16 23	PP	e 40·1
Pavia		87·9	320	e 12 53	0	e 23 13	[−7]	e 24 52	PS	e 44·3
Neuchatel		88·2	322	e 12 53	− 1	e 23 39	+ 1	—	—	—
Seattle		88·5	38	i 12 59a?	+ 3	e 23 44	+ 3	—	—	—
Kew		89·4	328	i 12 58k	− 2	e 23 56	+ 7	i 16 45	PP	e 35·8
Paris		89·6	325	i 13 0	− 1	i 23 57	+ 6	i 13 17	pP	e 43·8
Rathfarnham Castle		90·9	332	i 13 1k	− 6	e 23 54	− 9	e 25 10	PS	e 36·8
Clermont-Ferrand		91·2	322	i 13 8	0	e 24 10	+ 5	e 25 4	PS	—
Shasta Dam		92·4	43	i 13 14	0	—	—	—	—	—
Hungry Horse		92·5	33	i 13 15	+ 1	—	—	—	—	—
Saskatoon		93·3	28	13 24	+ 6	24 21	− 3	—	—	41·3
Berkeley		94·1	46	e 13 23	+ 1	e 24 3	[+ 7]	i 17 10	PP	e 43·0
Barcelona		94·3	319	17 22	PP	24 23	− 9	31 23	SSP	e 44·7
Santa Clara		94·6	46	e 13 36k	+12	i 23 33	[−26]	i 44 58	Q	i 47·2
Reno		94·7	42	e 13 24a	0	e 24 4	[+ 5]	e 17 27	PP	—
Lick	Z.	94·8	46	i 13 26k	+ 1	—	—	i 17 16	PP	—
Ivigtut		94·8	355	17 5	PP	24 45	+ 9	26 1	PS	39·8
Tortosa		95·6	319	e 13 17	−11	i 24 58	+15	—	—	—
Bozeman		95·8	34	e 13 33	+ 4	e 24 53	+ 8	—	—	—
Fresno		96·3	45	e 13 32a	0	e 24 25	{− 2}	e 16 58	PP	—
Algiers Univ.	Z.	96·4	314	e 13 31	− 1	—	—	e 17 22	PP	—
Tinemaha		97·2	44	e 13 34	− 2	e 24 27	−30	e 17 42	PP	—
Alicante		97·7	319	e 13 19	−19	24 19	[+ 4]	19 30	PPP	e 47·0
China Lake	Z.	98·3	44	13 42	+ 1	i 17 43	PP	e 30 14	PKKP	—
Toledo		98·9	320	e 13 9	−34	24 39	{− 7}	17 46	PP	44·0
Pasadena		99·0	47	e 13 44	0	i 24 36	{−11}	i 17 54	PP	i 46·1

Continued on next page.

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		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside	Z.	99·6	47	e 13 47	+ 1	—	—	—	—	—
Almeria		99·9	318	i 13 52	+ 4	i 24 26	[– 1]	i 17 56	PP	42·3
Boulder City		100·0	43	e 13 50	+ 2	—	—	i 14 5	?	—
Palomar	Z.	100·3	47	e 13 52	+ 2	—	—	e 30 12	PKKP	—
Granada		100·4	319	i 13 44a	– 6	25 20	– 4	i 27 47	PPS	i 55·3
Rapid City		100·8	31	e 14 1?	+ 9	e 25 42?	+15	—	—	—
Coimbra		101·1	323	—	—	32 52	SS	—	—	—
Malaga		101·2	319	i 13 47	– 7	i 24 17	[–16]	i 18 7	PP	51·2
Lisbon		102·6	323	e 17 48	PP	25 9	{– 4}	32 49	SS	e 42·6
Tamanrasset	Z.	102·6	302	e 13 59	– 1	e 25 42	0	i 18 18	PP	—
Pretoria	Z.	103·0	247	i 13 0	–62	—	—	—	—	—
Tucson		104·9	44	e 14 21	+11	—	—	18 31	PP	—
Kirkland Lake	Z.	105·7	15	e 18 35	PP	—	—	—	—	—
Kimberley	Z.	106·8	246	i 14 20	P	i 17 49	PKP	i 30 7	PKKP	—
Grahamstown	Z.	106·8	241	i 18 46	PP	—	—	—	—	—
Seven Falls	E.	108·4	9	19 33	PP	26 21	{+27}	34 28	SSP	45·6
Chicago		108·7	23	e 19 23	PP	e 25 23	[+16]	—	—	—
Shawinigan Falls	N.	108·7	10	e 19 16	PP	—	—	—	—	—
Ottawa		109·2	13	e 18 56	PP	e 25 4	[– 5]	e 28 6	PS	—
Cleveland		111·5	19	e 18 40a	[+ 4]	e 25 23	[+ 5]	e 19 14	PP	—
Halifax		111·6	4	e 19 42	PP	e 35 12	SS	e 29 2	PS	—
Harvard		112·8	10	e 18 40	[+ 1]	e 29 12	PS	e 15 1	P	e 56·2
Pittsburg		112·9	17	e 15 4	P	—	—	i 19 55	PP	—
New Kensington		112·9	17	—	—	e 27 21	S	—	—	—
Weston		113·0	10	e 18 37	[– 2]	e 25 36	[+12]	e 35 16	SS	—
Pennsylvania		113·1	16	e 19 35	PP	e 29 6	PS	e 21 51	PPP	—
Morgantown		113·6	18	e 18 36	[– 4]	—	—	e 19 34	PP	—
Palisades		113·8	13	e 18 44	[+ 3]	i 26 37	{+ 5}	e 15 0	P	e 48·4
City College, N.Y.		114·0	13	e 19 34	PP	e 27 17	S	—	—	—
Fordham		114·0	13	e 15 3	P	—	—	e 19 51	PP	—
Washington		115·1	16	e 18 41	[– 2]	i 26 16	{–25}	—	—	—
Milton		119·2	28	i 27 46	S	—	—	e 30 2	PS	—
Tacubaya		121·3	46	e 19 3	[+ 8]	e 34 4	?	e 20 28	PP	e 68·1
Puebla		122·2	46	e 21 30	PP	—	—	22 52	PPP	—
Vera Cruz		123·5	44	e 20 49	PP	—	—	—	—	—
Bermuda		123·7	6	i 19 1	[+ 1]	—	—	i 20 47	PP	—
Miami		126·1	24	e 21 17	PP	e 26 57	[+48]	—	—	—
Swan Island		131·9	32	e 28 51	SKKS	(e 28 51)	{+20}	e 32 33	?	—
Guantanamo Bay		133·5	21	e 33 31	PPS	e 42 49	?	—	—	—
Cuidad Trujillo		136·4	16	30 46	?	31 56	PKKS	—	—	—
San Juan		137·3	11	i 19 24	[– 2]	—	—	e 22 8	PP	—
Fort de France		141·5	4	i 19 28	[– 5]	i 33 21	PS	—	—	—
Galerazamba		141·7	28	i 19 44	[+11]	i 26 34	[– 8]	i 22 18	PP	68·8
Bogota		147·7	29	i 19 47	[+ 3]	i 27 5	[+14]	i 19 58	PKP_2	i 80·2
Punta Arenas	N.	149·3	165	e 21 2	?	e 36 14	PPS	—	—	e 76·1
Huancayo		160·0	57	e 20 5	[+ 4]	e 45 6	SS	e 34 19	SKSP	e 64·1
Concepción	N.	161·9	139	e 28 17	PPP	e 38 44	PPS	44 46	?	—
Santa Lucia	N.	165·6	134	e 20 52	PKP_2	45 46	SS	38 46	PPS	e 76·8
La Paz		168·2	53	i 20 12a	[+ 4]	i 32 16	{+22}	i 21 26	PKP_2	79·3
Antofagasta	E.	168·9	91	20 34	[+25]	46 46	SSP	25 16	PP	—
La Plata		169·0	182	20 16	[+ 7]	27 4	[– 7]	25 16	PP	83·0
Buenos Aires		169·4	179	i 23 9	PKS	—	—	25 32	PP	—

Additional readings :—
Hukuoka iZ = 3m.33s., iE = 3m.36s., iNZ = 3m.42s., iE = 3m.50s., iN = 4m.17s.
Kobe iN = 7m.49s., iE = 7m.56s.
Shizuoka ePPP? = 5m.23s.
Misima SS = 8m.26s.
Kohu e = 5m.4s., PP = 5m.48s.
Osima PP = 5m.0s., PPP = 5m.30s.
Matusiro iZ = 4m.35s. and 7m.4s., iE = 7m.8s.
Mera SS = 9m.55s., e = 14m.36s.
Maebasi ePPEZ = 5m.8s.
Tokyo ePPPEZ = 5m.12s., eSSSNZ = 8m.38s.
Hukusima ePKP,PKP = 36m.31s., ePKP,PKP_2 = 37m.59s.

Continued on next page.

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Sendai ePPE? =6m.14s., ePPPE? =6m.56s., PKP,PKPEN? =37m.58s.
Hatinohe ePPP =6m.6s.
Mori iN =6m.38s. and 7m.10s.
Guam reading has been reduced by 15 minutes.
Sapporo eQ =12m.6s.
Urakawa e =5m.48s.
Dehra Dun readings have been reduced by 2 minutes.
New Delhi ePN =7m.44s., PPN =9m.19s., PPPN =9m.58s., PcSN =13m.21s., iSN = 13m.52s., SSE =16m.42s., SSN =16m.49s., ScSN =17m.50s.
Hyderabad iSE =14m.1s., ScSN =17m.18s.
Kodaikanal PPE =9m.25s.
Poona PPN =10m.13s., PPPN =10m.55s.
Bombay PPSE =15m.42s., SSE =18m.58s., QE =20m.6s.
Perth i =12m.41s. and 15m.56s., SS =21m.24s., SSS =23m.31s.
Brisbane eE =12m.1s. and 12m.28s., iPPPN =13m.38s., iE =13m.55s., ePSN =18m.23s., iPPSEN =18m.31s., eSSN =22m.6s.
Riverview iPcPNZ =10m.58s., iNZ =11m.48s., i =13m.11s., iE =19m.29s., iN = 19m.38s., iE =19m.44s., iN =20m.42s., iSSE =23m.28s., iN =23m.34s. and 26m.11s.
Kiruna iE =11m.59s., iPPPEZ =16m.8s., iE =21m.5s. and 26m.38s.
Helsinki ePcP?E =11m.56s., ePPPE =15m.58s., iE =21m.9s., eE =29m.21s.
Apia PcP =12m.0s.
Upsala ePPE =14m.55s., ePPPE =16m.49s.?, iSN =21m.40s., iScS?E =21m.49s.?, iPSN =22m.29s., iSSE =26m.34s., eSSSN =30m.11s. and many other unidentified readings.
Istanbul eE =14m.8s., ePPPEN =16m.31s., eN =20m.38s., eSKSN =21m.55s.
Bucharest eN =12m.23s., ePPPE =17m.1s., iSE =22m.5s., iN =22m.23s., iPSE = 22m.47s., eSSE =27m.42s., eSSN =27m.47s., eSSSN =30m.39s., eSSSE =31m.3s.
Auckland PPN =15m.26s., iN =33m.17s.
Helwan iE =12m.28s., SKS =22m.16s.
Resolute Bay iZ =12m.56s., iPP =15m.16s., iZ =16m.37s., iN =22m.14s., iEN =22m.30s.
Skalnate Pleso ePPN =14m.34s., eS =22m.21s., ePS =23m.8s., eSS =27m.30s., eSSS = 31m.10s. and other unidentified e readings.
Sofia eEN =12m.44s., PPEN =15m.18s., iSKSEN =22m.28s., ScSEN =22m.58s., eEN = 23m.38s., eSSSEN =30m.38s.
Timisoara eE =18m.57s., eN =19m.1s., eSEN =23m.9s.
Raciborzu iPcPZ =12m.29s., iE =12m.37s., iPPN =15m.10s., eScSZ =22m.33s., ePSN = 23m.6s., iPSE =23m.9s., ePPSZ =23m.28s., eLE =28·8m.
Budapest PN =12m.21s., ePcPN =12m.36s., PPN =15m.29s., eN =16m.55s., iE = 19m.11s., SKSN =22m.35s., eE =22m.48s., eN =22m.56s., PSE =23m.26s., PSN = 23m.29s., PPSN =23m.44s., SSN =27m.38s., SSE =27m.46s.
Belgrade ePPNE =15m.37s., iNE =19m.6s., iSSSNE =28m.37s. iNE =31m.39s.
Ogyalla ePP =15m.43s., ePPP =18m.1s., eS? =22m.12s., ePS?N =22m.46s., eSS = 28m.8s. and other unidentified readings.
Wellington PcP =12m.39s., ePP =15m.0s., eSS =27m.16s.
Bergen iPcSE =22m.46s., iEN =28m.46s., iN =33m.46s. and 34m.34s.
Athens e =22m.11s.
Christchurch eP? =12m.6s., iZ =12m.39s., iPP =15m.44s., PPP =17m.28s., eEN = 22m.12s., ePSEN =23m.16s., eE =27m.31s., eSS =28m.11s., eQEN =34m.16s.
Potsdam ePE =12m.27s., iPcPE =12m.35s., iPPE =15m.45s., iSE =22m.51s., iPSZ = 23m.34s.
Prague ePP =15m.44s., ePPPZ =17m.46s., eSE =22m.51s., ePS =23m.32s., ePPS = 23m.54s., eSSE =27m.36s., eSSN =27m.50s., eSSS =31m.16s., and many other unidentified readings.
Collmberg eEZ =12m.46s., eEN =22m.58s., eSSEN =28m.46s.
Jena eSKS?E =23m.1s., eSEZ =23m.6s., ePS?E =23m.56s., ePS?N =24m.12s., eSS?N = 28m.21s., eSS?E =28m.31s. and other unidentified readings.
Tananarive PP =15m.55s., PPP =17m.40s., iScS =23m.10s., PPS =24m.7s., SS = 28m.34s., SSS =32m.6s., Q =35m.16s.
Triest iPP =16m.7s., iPPP =17m.59s., iSKS? =23m.17s., iSKKS? =23m.31s., iPPS = 24m.36s., iSS =29m.31s.
Taranto e =14m.21s., SS? =28m.9s.
Stuttgart e =13m.3s. and 13m.29s.
De Bilt iSS =29m.39s.
Karlsruhe iZ =13m.4s., eZ =14m.56s.
Aberdeen iPSEN =25m.0s., iSSN =29m.22s., iSSSE =34m.44s. and other unidentified i readings.
Strasbourg ePPP =18m.21s., iS =23m.31s., iPPS =24m.53s., iSS =29m.27s., iSSS? = 34m.8s., iQ =35m.55s., and many other unidentified i readings.
Salo e =16m.38s., eEN =26m.14s.
Zürich ePS =23m.44s.
Messina iZ =13m.14s., iSE =23m.34s.
Rocca di Papa e =18m.54s., eSS =29m.55s.
Rome iZ =13m.45s., iPPPN =18m.26s., iSN =23m.44s., iN =24m.27s., ePSN =24m.44s., iSSN =29m.47s.
Basle e =12m.52s.
Reykjavik eZ =21m.33s., eSSSE =32m.50s.
Pavia ePP =16m.7s., eS =23m.51s.
Seattle i =13m.4s. and 13m.9s., iP? =13m.12s., i =14m.13s., eS? =23m.57s.

Continued on next page.

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Kew i = 13m.5s. and 13m.24s., eZ = 22m.19s., eS? = 24m.20s., ePS = 25m.13s., eSS = 29m.45s., eSSS = 34m.4s.
Paris isP? = 13m.28s., iPP = 16m.36s., iPPP = 18m.40s., iSKS = 23m.10s., iPS = 25m.6s., iPPS? = 25m.17s., iSS = 29m.54s., iPKKP = 30m.32s., iSSS = 33m.26s., and many unidentified i readings.
Rathfarnham Castle iZ = 13m.45s., ePP = 16m.24s., eZ = 27m.16s., eSSEN = 29m.56s.
Clermont-Ferrand i = 13m.14s., e = 15m.54s. and 17m.36s., e = 31m.46s.
Berkeley iZ = 13m.33s., eZ = 16m.22s. and 16m.38s., eN = 23m.37s., iPSN = 25m.10s., eEN = 26m.10s. and 38m.16s.
Barcelona ? = 26m.3s.
Reno eZ = 26m.28s.
Lick iZ = 13m.44s., iPPZ = 17m.7s.
Ivigtut i = 25m.10s., SS = 31m.12s.
Algiers Univ. eZ = 13m.50s., 16m.37s., and 21m.20s.
Tinemaha eN = 23m.4s.
Alicante PP = 17m.21s., SKS = 23m.23s., PPS = 27m.19s., SS = 31m.25s., SSP = 31m.51s., SSS = 34m.57s., Q = 41m.1s.
Toledo PPP = 19m.51s., SKS = 24m.10s., SS? = 32m.54s.
Pasadena ePPZ = 17m.21s., eE = 23m.34s., iN = 25m.30s., iQN = 41·2m.
Almeria PPP = 20m.4s., SS = 32m.20s.
Granada iPP = 18m.17s., PPP = 19m.56s., iSKS = 24m.6s., PS = 27m.8s., iSS = 33m.17s., SSS = 37m.12s., Q = 48m.58s.
Malaga PPP = 20m.13s.
Lisbon iPPP = 20m.24s., iE = 24m.45s., PPS? = 27m.51s., SSSE = 36m.11s.
Tamanrasset iPKPZ = 17m.28s., eZ = 19m.40s., ePPPZ = 20m.4s., iPSZ = 27m.36s., eZ = 30m.5s., iSSZ = 33m.34s., iSSSZ = 37m.30s.
Seven Falls PSE = 28m.43s., SSSE = 38m.32s.
Cleveland eZ = 24m.43s., iPSN = 28m.30s., iN = 33m.2s.
Halifax e = 27m.10s.
Harvard ePP = 19m.45s., iS? = 27m.21s., eQ = 48·5m. and other unidentified readings.
Weston ePS = 29m.6s.
Pennsylvania ePPZ = 19m.47s., eN = 23m.29s.
Palisades ePP = 19m.47s., eS = 27m.18s., iPS = 29m.19s.
Galerazamba iPKPEN = 20m.0s., i = 21m.20s., iSKP = 22m.46s., iSKKS?EN = 27m.55s., iPSKSEN = 30m.41s.
Bogota iSKP = 23m.27s.
Punta Arenas PPN = 24m.30s., ePPPN = 29m.24s., eN = 37m.16s. and 47m.31s., eSSSN = 49m.22s., eN = 51m.46s.
Huancayo ePPP = 27m.34s., eSSS? = 49m.41s. and other unidentified readings.
Santa Lucia N = 35m.23s.
La Paz iZ = 20m.38s., iPKS = 22m.52s., iPPZ = 25m.12s., iZ = 25m.54s., iPPPZ = 29m.18s., iPPS = 39m.4s., SS = 46m.16s., iSSP = 47m.6s., SSS = 52m.26s.
Antofagasta PSE = 34m.8s., SSE = 40m.0s.
La Plata PcPE = 20m.28s., PKPN = 21m.28s., PKPE = 21m.52s., PKSE = 25m.34s., PPE = 26m.46s., SKSN = 28m.4s., PPPE? = 31m.34s., PPPN = 32m.16s., SKKSN = 34m.10s., SKSP? = 35m.52s., PPSE = 40m.58s., SSSE = 53m.4s., E = 59m.46s. and 70m.40s. QE = 74·1m.
Long waves were also recorded at New Plymouth and Guadalajara.

Oct. 21d. 22h. 7m. 54s. Epicentre 44°·5N. 151°·0E. (as on 1950, April 26d.).

A = −·6259, B = +·3469, C = +·6985 ; δ = −1 ; h = −3 ;
D = +·485, E = +·875 ; G = −·611, H = +·339, K = −·716.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa	E.	9·1	237	e 2 36	+22	3 57	− 3	—	—
College		38·8	37	i 7 30	+ 2	—	—	—	—
Resolute Bay		53·4	18	i 9 23k	− 1	—	—	—	—
Hungry Horse		61·4	50	i 10 22	+ 2	—	—	—	—
Kiruna	Z.	62·0	342	i 10 21a	− 3	—	—	—	—
Scoresby Sund		65·2	358	i 10 44k	− 1	—	—	—	—
China Lake	Z.	66·9	62	e 10 58	+ 2	—	—	e 11 13	?
Boulder City		68·5	61	i 11 10	+ 4	—	—	—	—
Raciborzu	Z.	77·2	332	e 11 56	− 1	—	?	e 12 53	?
Collmberg		77·9	335	e 12 0	− 1	—	—	—	—
Prague		78·5	334	e 12 18	PcP	e 22 34?	ScS	—	—
Jena	E.	78·6	335	e 12 5	0	—	—	—	—
Rathfarnham C.	Z.	80·6	347	i 12 3	−13	—	—	—	—
Stuttgart	Z.	81·3	336	e 12 19	− 1	—	—	—	—
Strasbourg		81·9	337	i 12 23	0	—	—	—	—
Paris		83·1	340	i 12 29	0	—	—	i 12 35	PcP

Strasbourg gives also e = 12m.36s. and 12m.52s.

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Oct. 21d. 22h. 55m. 26s. Epicentre 23°·9N. 121°·7E. (as at 21h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Djakarta	Z.	33·2	208	e 6 38	– 2	—	—	—	—
Bandung		33·6	206	e 6 36	– 8	—	—	—	—
Poona	Z.	44·8	273	i 8 15	– 2	—	—	—	—
Brisbane	Z.	59·4	147	i 10 2k	– 4	—	—	—	—
College		68·8	27	e 11 6	– 2	e 20 11	0	—	—
Kiruna	Z.	72·2	337	i 11 27	– 2	—	—	i 11 42	PcP
Helsinki	Z.	72·8	330	e 11 42	+10	—	—	—	—
Resolute Bay		78·9	10	i 12 4k	– 3	—	—	e 12 16	PcP
Raciborzu	Z.	80·2	321	e 12 11	– 3	—	—	—	—
Prague		82·1	322	e 12 26	+ 2	e 22 46	+ 8	e 12 34	PcP
Scoresby Sund		82·4	349	12 25	0	—	—	—	—
Collmberg		82·6	324	e 12 25	– 1	—	—	—	—
Jena	E.	83·5	323	e 12 31	0	—	—	—	—
Witteveen	Z.	85·1	327	i 12 39	0	—	—	—	—
Stuttgart	Z.	86·0	323	e 12 42	– 1	—	—	e 13 0	?
Strasbourg		86·9	323	e 12 48	0	—	—	—	—
Messina	Z.	87·3	311	i 13 1	+11	—	—	i 13 16	?
Victoria		87·5	37	12 51	0	—	—	—	—
Seattle		88·5	38	i 12 58?k	+ 2	—	—	—	—
Paris		89·6	325	e 13 0	– 1	—	—	—	—
Shasta Dam		92·4	43	i 13 14	0	—	—	—	—
Hungry Horse		92·5	33	i 13 16	+ 2	—	—	—	—
Berkeley	Z.	94·1	46	e 13 21k	– 1	—	—	—	—
Reno	Z.	94·7	42	e 13 24k	0	—	—	—	—
Butte		94·8	34	i 13 26	+ 1	—	—	—	—
Lick	Z.	94·8	46	e 13 23k	– 2	—	—	—	—
Fresno	Z.	96·3	45	e 13 30k	– 2	—	—	—	—
Algiers Univ.	Z.	96·4	314	e 17 13	PP	—	—	e 18 4	?
Tinemaha	Z.	97·2	44	e 13 36	0	—	—	—	—
China Lake	Z.	98·3	44	i 13 42	+ 1	—	—	—	—
Pasadena	Z.	99·0	47	e 13 45	+ 1	—	—	—	—
Boulder City		100·0	43	i 13 49	+ 1	—	—	e 17 53	PP
Palomar	Z.	100·3	47	e 13 53	+ 3	—	—	—	—
Tamanrasset	Z.	102·6	302	17 17	PKP	—	—	e 18 14	PP
Tucson		104·9	44	e 18 25	[+ 2]	—	—	—	—
Huancayo		160·0	57	e 20 43	PKP_2	—	—	—	—

Additional readings :—
Raciborzu eZ = 13m.12s. and 13m.59s.
Prague e = 12m.39s. and 13m.1s., eSS = 28m.4s.
Strasbourg e = 13m.2s. and 13m.17s.
Seattle i = 13m.5s. and 13m.17s., ipP? = 13m.23s.
Paris e = 13m.13s., 13m.21s., and 13m.37s.

Oct. 21d. Readings also at 0h. (Pretoria, Kirovobad, near Erevan, Leninakan, Nakhichevan, Shemakla, Tiflis, Tsikhlis-Dzhvari (2), and Goris), 1h. (China Lake, Palomar, Pasadena, Tinemaha, Brisbane, Apia, and near Santa Clara), 3h. (Tamanrasset, Gori, Kirovobad, Tsikhlis-Dzhvari, near Erevan, Leninakan, Lenkoran, Nakhichevan, Shemakla, Tiflis, Goris, near Mizusawa, and near Athens), 4h. (Collmberg), 5h. (Brisbane), 9h. (near Apia), 11h. (Mizusawa and New Delhi), 12h. (Auckland), 13h. (Klyuchi), 14h. (near Stuttgart and Ebingen), 15h. (Kew and Apia), 16h. (La Paz, Apia, and Collmberg), 17h. (near Manila), 21h. (Tacubaya (2), Victoria, China Lake, Kiruna, and near Athens), 22h. (Victoria, Ottawa, Weston, Palisades, Kirkland Lake, and Kiruna).

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Oct. 22d. 3h. 29m. 26s. Epicentre 23°·9N. 121°·7E. (as on 21d.).

Destructive on East Coast of Formosa, especially at Karenko.
Seismo. Notes, Bull. Seismo. Soc. of America, Vol. 42, No. 1, Jan., 1952, p.101.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	Z.	7·2	358	i 1 48	– 1	i 3 13	0	—	—	—
Nanking		8·5	343	i 2 7	0	3 47	+ 2	—	—	—
Manila		9·3	184	i 2 14	– 3	—	—	—	—	—
Yakusima		10·2	49	e 2 37	+ 6	e 4 57	+30	—	—	8·0
Tomie		10·7	34	2 50	PP	e 5 58	L	3 28	PP	(e 6·0)
Nagasaki		11·4	38	e 2 48	+ 1	5 55	L	i 3 22	PP	(5·9)
Kumamoto		11·9	40	2 56	+ 2	5 35	+26	—	—	7·7
Saga		12·0	37	i 3 0	+ 5	—	—	—	—	—
Ituhara		12·2	31	e 3 3	+ 5	e 5 41	SS	—	—	6·6
Hukuoka		12·3	36	i 3 2	+ 3	i 5 44	+26	—	—	6·6
Ooita		12·7	41	3 13	+ 8	5 58	+30	—	—	8·0
Simonoseki		12·9	37	3 18	+11	6 4	+31	—	—	i 8·7
Simidu		13·3	46	3 23	+10	6 14	SS	—	—	7·4
Matuyama		13·9	42	e 3 26	+ 5	e 6 9	+12	—	—	e 7·5
Koti		14·1	44	e 3 27	+ 4	e 6 36	SS	e 3 56	PP	—
Muroto		14·4	47	e 3 34	+ 7	e 6 33	SS	—	—	e 7·0
Okayama		15·1	42	3 50	PP	6 38	SS	—	—	7·7
Takamatu		15·1	43	e 3 36	0	—	—	—	—	—
Matsue		15·2	38	e 3 47	+ 9	6 6	–22	—	—	—
Yonago		15·3	39	i 3 48	+ 9	i 6 8	–22	—	—	6·8
Sumoto		15·5	45	e 3 55	+13	7 30	Q	4 55	PP	9·8
Kobe		15·9	45	e 4 0	+13	e 7 22	Q	e 4 18	PP	e 8·9
Osaka		16·1	45	e 4 0	+11	e 7 40	Q	e 4 28	PP	9·0
Owase		16·2	48	e 3 51	+ 1	6 44	– 7	8 33	Q	10·7
Toyooka		16·2	41	3 57	+ 7	e 7 51	Q	—	—	e 8·7
Tu		16·8	47	e 4 12	+14	e 8 0	Q	—	—	—
Kameyama		16·9	46	4 4	+ 5	7 39	+32	—	—	9·4
Hikone		17·0	45	e 4 8	+ 7	e 7 55	Q	—	—	9·6
Gihu		17·4	45	e 4 15	+ 9	e 8 29	Q	—	—	10·4
Nagoya		17·4	46	e 4 24	+18	e 7 48	+29	e 9 13	Q	e 13·1
Hukui		17·5	43	e 4 18	+11	—	—	—	—	—
Torisima		17·7	63	e 4 8	– 2	e 7 55	+29	—	—	—
Omaesaki		17·9	48	e 4 27	+15	—	—	—	—	9·7
Kanazawa		18·0	41	i 4 23	+10	e 7 34	+11	—	—	e 8·9
Iida		18·2	46	e 4 26	+10	e 8 17	Q	—	—	—
Shizuoka		18·2	48	e 4 7	– 9	e 8 3	+26	4 26	PP	9·5
Hatidyozima		18·4	53	e 4 31	+13	8 6	+25	—	—	—
Kohu		18·7	47	e 4 24	+ 2	e 8 18	+30	4 57	PP	e 10·0
Matumoto		18·7	44	e 4 31	+ 9	e 8 15	+27	—	—	e 11·7
Misima		18·7	48	e 4 21	– 1	7 45	– 3	8 4	SS	10·1
Wazima		18·7	39	e 4 34	+12	e 9 10	Q	—	—	e 11·9
Ajiro		18·8	48	4 23	0	8 8	+18	—	—	—
Osima		18·8	50	e 4 23	0	e 7 56	+ 6	5 7	PP	8·8
Matusiro		19·0	42	4 24	– 2	e 8 9	+14	i 4 56	PP	11·5
Nagano		19·1	43	e 4 33	+ 6	e 8 0	+ 3	e 5 12	PP	i 11·0
Oiwake		19·1	44	e 4 27	0	8 31	+34	e 5 15	PP	e 12·6
Mera		19·2	48	e 4 32	+ 4	(e 8 6)	+ 7	—	—	e 8·1
Titibu		19·3	45	e 4 48	+19	e 6 48	?	—	—	e 8·9
Yokohama		19·3	47	e 4 34	+ 5	8 38	+36	—	—	—
Takada		19·4	41	i 4 46	+16	i 8 56	SS	—	—	—
Kumagaya		19·5	46	4 38	+ 7	e 8 38	+32	—	—	10·7
Maebasi		19·5	45	i 4 35	+ 4	e 8 21	+15	i 4 53	PP	i 10·3
Tokyo		19·6	48	e 4 34	+ 2	7 58	–10	e 4 51	PP	10·0
Aikawa		19·9	39	e 4 37	+ 1	(8 34)	+19	—	—	8·6
Tukubasan		20·1	47	4 38	0	8 44	+25	—	—	—
Utunomiya		20·1	46	e 4 37	– 1	e 8 45	+26	e 5 28	PP	e 11·7
Mito		20·4	47	e 4 52	+11	e 8 35	+10	5 29	PP	i 10·8
Niigata		20·4	40	5 3	+22	9 3	SS	i 5 32?	PP	—
Tyosi	E.	20·4	49	e 4 51	+10	e 8 14	–11	—	—	—
Inawasiro		20·8	42	e 4 53	+ 8	—	—	—	—	e 10·5

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		21·0	22	i 4 44	– 3	8 52	+15	—	—	—
Hukusima		21·2	45	e 4 52	+ 3	e 8 50	+ 9	—	—	—
Yamagata		21·4	43	e 4 56	+ 5	e 9 51	SS	—	—	e 12·7
Sendai		21·8	44	e 5 1	+ 5	e 9 21	+29	e 6 39	PPP	e 12·3
Isinomaki		22·1	44	e 4 54	– 5	—	—	—	—	—
Mizusawa	E.	22·4	42	5 7	+ 5	9 8	+ 4	—	—	13·6
Aomori		23·3	39	5 20	+10	10 32	Q	6 27	PP	i 12·8
Hatinohe		23·5	40	e 5 7	– 5	9 32	+ 9	e 6 1	PP	12·2
Mori		24·0	36	e 5 21	+ 4	10 33	+61	—	—	12·4
Guam		24·1	110	5 24	+ 6	—	—	—	—	—
Suttsu		24·3	33	e 5 11	– 9	e 10 59	Q	6 27	PP	14·8
Sapporo		25·1	34	e 5 44	+16	e 10 5	+14	e 6 20	PP	13·1
Urakawa		25·3	38	e 5 41	+11	e 10 25	+31	e 6 25	PP	e 12·4
Asahigawa		26·1	35	e 5 36	– 1	e 10 16	+ 9	e 6 55	PP	e 12·1
Wakkanai		26·9	31	5 10	–35	10 8	–12	—	—	14·3
Abashiri		27·3	36	e 5 34	–14	10 24	– 3	—	—	15·0
Nemuro		27·6	38	e 6 6	+15	e 10 56	+24	—	—	13·0
Calcutta	E.	30·7	275	i 6 20a	+ 1	i 11 25	+ 4	7 36	PPP	—
Irkutsk		31·3	340	6 20	– 4	—	—	—	—	—
Djakarta		33·2	208	e 6 41	+ 1	i 12 8	+ 8	e 7 47	PP	—
Bandong		33·6	206	e 6 37	– 7	i 11 58	– 8	—	—	—
Dehra Dun	N.	39·2	290	e 9 16	?	e 14 58	?	—	—	21·4
New Delhi		40·0	287	e 7 38	0	i 13 36	– 8	8 40	PP	18·7
Przhevalsk		40·2	308	e 7 45	+ 5	e 13 58	+10	—	—	—
Hyderabad		40·9	270	i 7 40	– 6	i 14 0	+ 2	9 27	PP	—
Almata		41·4	310	i 7 48?	– 2	i 14 15?	+10	—	—	—
Ili		41·5	311	i 7 46	– 4	i 14 13?	+ 6	—	—	—
Naryn		41·7	307	i 7 51	– 1	—	—	—	—	—
Rybach'e		41·9	308	i 7 51	– 3	—	—	—	—	—
Krasnogorka		42·7	309	i 7 57?	– 3	—	—	—	—	—
Colombo	E.	43·5	255	8 12	+ 5	14 47	+11	—	—	23·6
Kodaikanal	E.	44·2	261	i 8 13k	+ 1	i 14 52	+ 6	—	—	20·4
Andijan		44·4	305	i 8 12	– 2	i 14 54	+ 5	—	—	—
Fergana		44·7	304	8 14	– 2	i 14 59	+ 5	—	—	—
Poona		44·8	273	i 8 16	– 1	i 14 57	+ 2	17 58	SS	21·5
Bombay	E.	45·6	274	e 8 21	– 3	e 15 12	+ 6	e 10 7	PP	21·7
Tchimkent		46·6	307	—	—	i 15 29	+ 8	—	—	—
Tashkent		46·7	306	i 8 30	– 2	i 15 26	+ 4	—	—	—
Samarkand		48·4	303	8 43	– 3	e 15 48	+ 2	—	—	—
Mary		52·4	301	i 9 13	– 3	—	—	—	—	—
Mitchell Field		54·2	42	i 9 32	+ 3	e 17 10	+ 4	—	—	—
Sverdlovsk		54·6	324	e 9 25	– 7	i 17 10	– 1	—	—	—
Perth		55·8	186	i 10 2	+21	i 17 34	+ 6	i 14 54	PcS	—
Brisbane		59·4	147	i 10 4k	– 2	i 18 18	+ 3	e 12 28	PP	i 25·2
Baku		61·4	305	e 10 19	– 1	—	—	—	—	—
Lenkoran		62·5	303	10 24	– 4	—	—	—	—	—
Riverview		63·9	153	i 10 41k	+ 4	i 19 20	+ 8	i 13 12	PP	e 29·5
Grozny		64·9	309	e 10 33	– 5	—	—	—	—	—
Tiflis		65·0	307	e 10 42	– 2	e 19 24	– 2	—	—	—
Gori		65·5	307	e 10 49	+ 2	—	—	—	—	—
Erevan		65·5	305	i 10 46	– 1	—	—	—	—	—
Piatigorsk		65·9	310	10 46	– 4	—	—	—	—	—
Tsikhlis-Dzhvari		66·0	307	10 56	+ 6	19 44	+ 6	—	—	—
Abastumanj		66·4	307	e 10 54	+ 1	—	—	—	—	—
Moscow		67·3	323	10 59	0	19 56	+ 2	—	—	—
College		68 8	27	i 11 5	– 3	e 20 17	+ 6	—	—	—
Pulkovo		70 3	328	i 11 17	0	i 20 36	+ 7	—	—	—
Simferopol		71·9	312	e 11 29	+ 2	e 20 54	+ 6	—	—	—
Yalta		72·0	312	11 30	+ 2	20 54	+ 5	—	—	—
Kiruna		72·2	337	i 11 28k	– 1	i 21 0	+ 9	i 11 40	PcP	e 34·4

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helsinki		72·8	330	e 11 39	+ 7	e 20 56	− 2	e 16 4	PPP	e 33·6
Honolulu		73·3	73	i 11 42	+ 7	e 21 26	+22	—	—	—
Ksara		73·8	300	e 11 35	− 3	e 21 23	+14	—	—	—
Kishinev		74·8	315	11 44	0	21 25	+ 5	—	—	—
Apia		75·0	112	11 46	+ 1	e 20 54?	−29	11 59	PcP	e 30·6
Upsala		76·4	331	e 11 57	+ 4	i 21 37?	− 1	e 16 37?	PPP	e 34·6
Istanbul		76·6	310	e 11 51	− 3	e 21 37	− 3	e 14 44	PP	—
Lwow		76·8	319	e 11 54	− 1	e 21 46	+ 4	—	—	—
Sitka		77·0	33	e 12 0	+ 4	e 21 52	+ 7	—	—	—
Bucharest		77·5	313	e 12 9	+10	e 21 52	+ 2	i 22 32	PS	37·6
Campulung		77·9	315	e 12 16	+15	e 22 4	+10	—	—	—
Auckland	N.	78·5	139	i 12 32	+28	i 22 14	+13	i 27 25	SS	e 36·6
Helwan		78·8	298	e 12 1	− 5	i 22 4	0	—	—	—
Resolute Bay		78·9	10	i 12 7k	0	i 22 2	− 3	e 15 11	PP	e 43·0
Skalnate Pleso		79·4	320	e 12 12	+ 3	e 22 15	+ 5	e 15 28	PP	—
Karapiro	N.	79·6	139	11 34?	−36	—	—	—	—	—
Sofia		79·6	312	12 18	+ 8	22 23	+11	e 16 8	PPP	39·4
Timisoara		80·1	316	e 12 12	− 1	e 22 37?	+19	e 15 21	PP	e 36·1
Raciborzu		80·2	321	e 12 16	+ 2	22 24	+ 5	i 15 19	PP	e 31·6
Kaimata	N.E.	80·4	145	e 12 46	PcP	—	—	—	—	—
Kecskenet		80·6	318	—	—	e 22 42	+19	—	—	—
Copenhagen		80·7	328	e 12 19	+ 3	i 22 31	+ 7	—	—	38·6
Budapest		80·8	318	12 21	+ 4	i 22 35	+10	12 39	PcP	35·1
Belgrade		81·0	315	e 12 20k	+ 2	e 22 50	+23	e 12 52	PcP	e 44·0
Ogyalla		81·1	319	e 12 41	PcP	e 22 38	+10	e 15 20	PP	—
Wellington		81·4	143	e 12 25	+ 5	22 29	− 2	e 12 39	PcP	34·3
Bergen		81·5	334	—	—	i 22 41	+ 9	23 10	PS	39·8
Athens		81·6	307	e 12 21	0	e 22 36	+ 3	e 16 2	PP	—
Christchurch		81·8	146	e 12 34	+12	e 22 34	− 1	15 44	PP	e 39·3
Potsdam		82·0	325	e 12 18	− 5	i 22 43	+ 6	i 22 58	ScS	42·6
Prague		82·1	322	i 12 26	+ 2	e 22 43	+ 5	e 15 42	PP	e 36·6
Vienna		82·1	321	e 12 26	+ 2	—	—	—	—	—
Scoresby Sund		82·4	349	12 32	+ 7	22 46	+ 5	15 40	PP	—
Collmberg		82·6	324	e 12 27	+ 1	e 23 6	+23	e 16 2	PP	e 38·6
Jena		83·5	323	e 12 34?	+ 3	e 23 2	+10	e 16 1?	PP	e 42·1
Tananarive		83·9	247	e 12 40	+ 7	e 22 59	+ 3	12 55	PcP	37·6
Sonneberg		84·0	323	e 12 41?	+ 8	e 23 4	+ 7	e 12 54	PcP	—
Triest		84·9	318	12 37?	− 1	i 23 6	0	i 15 59	PP	e 42·4
Taranto		85·0	313	12 45	+ 7	23 13	+ 6	e 28 8	SS	42·0
Witteveen	Z.	85·1	327	i 12 41	+ 2	—	—	—	—	—
Stuttgart		86·0	323	e 12 44	+ 1	e 23 27	+10	e 16 6	PP	e 42·6
De Bilt		86·3	327	i 13 2	+17	e 23 30	+10	—	—	e 40·6
Karlsruhe		86·3	324	e 12 46	+ 1	e 23 32	+12	—	—	e 42·6
Aberdeen		86·5	333	i 16 10	PP	i 23 20	− 2	i 18 5	PPP	44·2
Chur		86·7	322	e 12 49	+ 2	e 23 29	+ 5	—	—	—
Bologna		86·9	319	e 12 56	+ 8	e 23 53	+27	—	—	—
Strasbourg		86·9	323	e 12 49	+ 1	i 23 34	+ 8	i 16 13	PP	e 42·6
Salo		86·9	320	e 12 54	+ 6	e 23 35	+ 9	e 16 45	PP	e 44·8
Zürich		87·1	322	e 12 46	− 3	e 23 24	− 4	e 16 4	PP	—
Messina		87·3	311	e 12 49	− 1	i 23 33	+ 4	i 16 27	PP	—
Prato		87·4	317	e 12 52	+ 2	i 23 52	+22	—	—	—
Rocca di Papa		87·4	314	12 54	+ 4	23 41	+11	30 6	?	—
Basle		87·5	322	e 12 51	0	e 23 33	+ 2	e 16 22	PP	—
Rome		87·5	314	e 12 48k	− 3	i 23 40	+ 9	i 16 21	PP	—
Victoria		87·5	37	13 8	+17	23 22	− 9	e 15 34	PP	—
Durham		87·8	331	—	—	i 23 38	+ 4	—	—	—
Reykjavik		87·8	346	i 13 7	+15	e 24 12	PS	e 29 12	SS	e 40·5
Pavia		87·9	320	e 12 51	− 2	e 23 52	+17	—	—	e 46·8
Neuchatel		88·2	322	e 12 57	+ 3	e 23 51	+13	—	—	—
Seattle		88·5	38	i 13 0?a	+ 4	e 23 46	+ 5	—	—	—
Kew		89·4	328	e 13 0	0	e 23 37	−12	i 16 35	PP	e 33·6
Paris		89·6	325	e 13 3	+ 2	i 23 46	− 5	i 13 21	pP	e 43·6
Rathfarnham Castle		90·9	332	e 13 3	− 4	e 23 57	− 6	e 16 5	PP	e 46·6
Clermont-Ferrand		91·2	322	e 13 10	+ 2	e 23 16	?	i 16 44	PP	—
Terre Adélie		91·6	188	e 13 11	+ 1	—	—	e 16 39	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.
Shasta Dam		92·4	43	i 13 12	– 2	e 24 36	+20	—	—	—
Hungry Horse		92·5	33	i 13 13	– 1	i 24 5	{+ 5}	—	—	—
Mineral		93·1	44	e 13 22	+ 5	—	—	—	—	—
Saskatoon		93·3	28	13 25	+ 7	24 5	{– 1}	—	—	39·5
Berkeley		94·1	46	e 13 21k	– 1	i 24 14	{+ 2}	e 17 1	PP	e 39·7
Barcelona		94·3	319	—	—	e 24 0	[+ 3]	—	—	e 46·8
Santa Clara		94·6	46	e 13 42a	+18	i 24 20	[+21]	i 42 37	Q	e 61·0
Ivigtut		94·8	355	17 57	PP	i 24 10	[+10]	24 55	S	42·6
Lick	Z.	94·8	46	e 13 19a	– 6	—	—	—	—	—
Tortosa		95·6	319	—	—	i 25 45	PS	—	—	48·7
Bozeman		95·8	34	e 13 31	+ 2	e 25 9	+24	—	—	—
Fresno		96·3	45	e 13 35a	+ 3	e 24 28	{+ 1}	—	—	—
Algiers Univ.	Z.	96·4	314	e 13 32	0	i 18 2	?	i 17 27	PP	—
Tinemaha		97·2	44	e 13 34	– 2	i 24 32	{– 2}	—	—	—
Alicante		97·7	319	e 13 48	+10	25 26	+25	17 40	PP	e 47·8
China Lake	Z.	98·3	44	e 13 39	– 2	—	—	—	—	—
Toledo		98·9	320	e 13 46	+ 3	i 25 4	– 7	e 17 47	PP	45·4
Pasadena		99·0	47	e 13 48	+ 4	i 24 43	{– 4}	e 17 47	PP	i 46·5
Almeria		99·9	318	e 13 45	– 3	24 21	[– 6]	17 49	PP	46·1
Boulder City		100·0	43	i 13 54	+ 6	—	—	—	—	—
Palomar	Z.	100·3	47	e 13 55	+ 5	—	—	—	—	—
Granada		100·4	319	13 35k	–15	24 35	[+ 6]	18 14	PP	54·1
Rapid City		100·8	31	e 14 0?	+ 8	e 25 42?	+15	—	—	—
Coimbra		101·1	323	—	—	32 22?	SS	36 46	SSS	47·0
Malaga		101·2	319	e 13 38	–16	27 47	PS	i 18 6	PP	40·9
Lisbon		102·6	323	14 23k	+23	24 24	[–16]	18 13	PP	49·1
Tamanrasset	Z.	102·6	302	e 14 5	+ 5	25 2	{–11}	e 17 16	PKP	50·6
Pretoria	Z.	103·0	247	i 14 9	+ 7	—	—	—	—	—
Tucson		104·9	44	e 14 19	+ 9	—	—	—	—	—
Kirkland Lake	Z.	105·7	15	e 18 38	PP	—	—	—	—	e 57·6
Lincoln		106·4	29	e 14 57	?	e 25 12	[+15]	—	—	—
Seven Falls	E.	108·4	9	e 19 38	PP	26 54	S	22 26	PKS	46·6
Chicago		108·7	23	e 19 2	PP	e 25 19	[+12]	—	—	—
Shawinigan Falls	N.	108·7	10	—	—	e 27 22	?	—	—	55·6
Ottawa		109·2	13	e 18 4	[–27]	e 28 34	PS	—	—	45·6
Cleveland	Z.	111·5	19	e 18 42k	[+ 6]	—	—	e 19 23	PP	—
Halifax		111·6	4	—	—	e 25 37	[+18]	e 29 9	PS	—
Harvard		112·8	10	e 15 1	P	i 26 20	{– 5}	e 18 32	PKP	e 46·4
New Kensington		112·9	17	e 20 29	?	e 26 47	{+22}	—	—	—
Pittsburgh		112·9	17	e 19 34	PP	i 26 38	{+13}	—	—	—
Weston		113·0	10	e 19 43	PP	e 36 4	SSP	—	—	—
Pennsylvania		113·1	16	e 19 33	PP	i 26 11	{–16}	e 21 57	PPP	e 46·5
Morgantown		113·6	18	e 18 51	[+11]	e 25 47	[+20]	—	—	—
Palisades		113·8	13	e 18 34	[– 7]	i 26 45	{+13}	e 19 38	PP	e 48·0
City College, N.Y.		114·0	13	e 19 32	PP	e 25 47	[+19]	—	—	—
Fordham		114·0	13	e 19 35	PP	—	—	—	—	—
Washington		115·1	16	e 18 54	[+11]	—	—	e 19 46	PP	—
Tacubaya		121·3	46	e 18 54	[– 1]	—	—	e 22 31	PPP	—
Vera Cruz		123·5	44	e 19 40	[+40]	—	—	e 20 2	PP	—
Bermuda		123·7	6	e 19 14	[+14]	i 37 57	SSP	e 20 28	PP	—
Bermuda (Navy)		123·8	6	i 18 54	[– 6]	—	—	—	—	—
Swan Island		131·9	32	e 19 19	[+ 3]	—	—	e 22 19	SKP	—
San Juan		137·3	11	i 19 28	[+ 2]	—	—	22 14	SKP	—
Roosevelt Roads		137·5	9	e 20 48	?	e 21 56	PP	—	—	—
Fort de France		141·5	4	e 19 29	[– 4]	—	—	—	—	—
Galerazamba		141·7	28	e 20 2	[+29]	e 26 3	[–39]	e 38 48	SS	e 59·6
Bogota		147·7	29	i 19 45	[+ 1]	i 23 22	PP	e 19 55	PKP_2	—
Huancayo		160·0	57	e 20 6	[+ 5]	e 31 27	{+15}	i 20 46	PKP_2	e 70·3
Santa Lucia	N.	165·6	134	e 20 49	PKP_2	31 47	{+ 6}	25 48	PP	86·6
La Paz		168·2	53	i 20 13	[+ 5]	i 32 14	{+20}	i 21 26	PKP_2	—
Antofagasta	E.	168·9	91	20 42	PKP_2	26 52	[–19]	45 27	SS	82·7
La Plata		169·0	182	20 40	[+31]	—	—	—	—	—
Buenos Aires		169·4	179	e 19 32	[–37]	27 40	[+29]	24 28	PKS	79·6

For Notes see next page.

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Auckland iN =13m.24s.
Resolute Bay iZ =12m.13s., eEN =13m.54s., ePPP =17m.2s., eEN =18m.42s.
Skalnate Pleso e =12m.42s. and 13m.12s., eN =13m.24s., e =16m.0s. and 22m.3s., eSN =22m.18s., ePSE =22m.52s., eSS =27m.52s., eSSS =31m.45s.
Sofia ScSEN =22m.46s., PSEN =23m.3s.
Timisoara iPE =12m.43s., ePSE =23m.4s.
Raciborzu ePE =12m.20s., iZ =12m.43s., iE =13m.15s., iN =22m.49s., ePSN =23m.7s., ePPSZ =23m.16s.
Budapest PN =12m.27s., PPE =15m.27s., iN =15m.53s., SE =22m.39s., ScSN = 22m.55s., eE=23m.9s., PSE=23m.29s., PPSE =23m.48s., eSSE =27m.34s., SSSN = 31m.34s., eSSSE =32m.4s.
Belgrade ePPZ =15m.39s., eNE =18m.43s., eSKSNE =23m.19s., eNW =27m.55s., eNE =31m.15s.
Ogyalla eE =12m.55s., eN =13m.14s., eSE =22m.41s., eE =23m.5s., eSS =27m.55s., eSSS =30m.58s.
Wellington i =13m.52s., PP =15m.48s., i =19m.30s., eS? =21m.57s., SS =27m.37s.
Bergen eN =25m.27s., iN =28m.2s., QN =35·6m.
Athens e =27m.39s.
Christchurch iP =12m.43s., e =13m.30s., ePPPZ =17m.46s., eSEN =22m.44s., ePSEN = 23m.24s., eSSEN =28m.4s., eSSSE =31m.14s., eQEN =34m.24s.
Potsdam iPZ =12m.23s., iSN =22m.47s., iScSE =23m.1s.
Prague e =12m.40s., 12m.44s., and 14m.38s., ePPP =17m.35s., eSN =22m.48s., eSE = 22m.52s., eSS =28m.14s., eSSS =31m.29s.
Scoresby Sund 19m.2s., SS =28m.10s.
Collmberg eZ =16m.13s., eSSEN =28m.34s.
Jena eP?N =12m.37s., ePE =12m.41s., eSE =23m.5s., eSS?N =28m.24s., eSS?E = 28m.34s. and other unidentified readings.
Tananarive PS =23m.50s., eSS? =27m.46s., e =32m.34s.?
Sonneberg eE =12m.51s.?, eSN =23m.7s., eE =23m.44s.
Triest iPPP =17m.45s., iSKS? =23m.20s., iPS =24m.11s., iPPS =24m.52s., iSS = 28m.27s., iSSS =32m.11s., i =35m.8s.
Stuttgart e =13m.3s., 13m.21s., 14m.1s., and 23m.54s., eSS =28m.58s.
Aberdeen iEN =20m.0s., iSEN =23m.35s., iPSN =24m.33s., eSSEN =30m.9s., iSSSEN = 32m.50s.
Strasbourg ePPP =18m.14s., eSKS =23m.11s., iPS =24m.41s., iSS =28m.48s. and 29m.5s., iSSS =32m.36s. and other unidentified i readings.
Zürich eSKS =23m.6s.
Messina iZ =13m.10s.
Rome iZ =12m.56s., iPPPE =18m.33s., iPSN =24m.41s., iSSE =30m.4s.
Victoria S =20m.16s.
Pavia e =20m.53s., i =24m.20s., e =24m.26s.

Continued on next page.

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Seattle iP? =13m.5s., i =13m.19s., iS? =23m.51s.
Kew eZ =13m.41s., iPS =24m.9s., eSSEZ =29m.24s., eSSS =34m.11s.
Paris isP? =13m.31s., iPP =16m.34s., iSKS =23m.36s., iS =23m.52s., isS? =24m.14s., iPPS =25m.36s., iSS =29m.58s., iSPSP =30m.50s. and other unidentified i readings.
Rathfarnham Castle ePSEN =24m.54s., eSSEN =29m.44s., eSSSEN =33m.34s.
Clermont-Ferrand e =14m.4s., ePS =24m.58s.
Berkeley iZ =13m.30s.
Santa Clara iE =44m.25s.
Ivigtut SS =31m.16s.
Lick iZ =13m.33s. and 13m.47s., eZ =14m.59s.
Alicante PPP =19m.40s., SKS =23m.58s., PS =26m.53s., SS =32m.14s., SSS =36m.23s., Q =41m.28s.
China Lake iZ =13m.44s.
Toledo SS =33m.1s.
Pasadena iZ =26m.48s., eQN =41m.10s.
Granada PPP =20m.38s., SKKS =25m.20s., PS =26m.11s., PPS =28m.5s., SS = 33m.2s., Q =50·6m.
Lisbon Z =16m.26s., PPPE =20m.21s., PSZ =27m.8s., PPS =27m.54s., EZ =31m.26s., SSPZ =33m.3s., SSSEZ =36m.34s., EZ =37m.4s., QEN =44m.15s.
Tamanrasset ePPZ =18m.17s., ePPPZ =20m.41s., ePSZ =27m.20s., ePKKPZ = 30m.19s., eSSZ =33m.12s.
Seven Falls PSE =29m.32s., eE =34m.11s. and 38m.24s., SSSE =40m.10s.
Harvard e =24m.42s. and 26m.35s., i =27m.25s., ePS =28m.32s., e =29m.14s. and 29m.41s., eSS? =35m.32s.
Pennsylvania iPPZ =19m.47s., iZ =20m.17s., eN =28m.55s., ePS?Z =29m.3s.
Palisades iS =27m.22s., iPS =29m.4s.
Tacubaya e =19m.29s., i =19m.45s.
Galerazamba eSKSEN =23m.8s., eEN =25m.8s.
Bogota iPPSEN =38m.47s.
Huancayo e =22m.3s. and 23m.11s., ePP =25m.6s., e =39m.21s., eSS? =44m.48s., e =50m.46s.
Santa Lucia N =35m.57s., eSSN =46m.40s.
La Paz iZ =20m.54s., iPPZ =25m.22s., iZ =25m.44s., iPPPZ =30m.2s., iPPS =38m.42s., iSS =46m.20s., iSSP =47m.18s.
Antofagasta E =40m.40s.
La Plata PKPE =20m.52s., PKPN =22m.10s., PKSE =24m.40s., PPN =26m.22s., PPPEN =29m.52s., SKKSN =32m.4s., SKKSE =33m.28s., SKSPEN =35m.52s., E =36m.53s., and 45m.52s., PPSE =48m.52s., PSSN =50m.52s., SSSE =56m.52s., SSS?N =58m.46s., N =74m.46s.
Long waves were also recorded at Edinburgh, Guadalajara, and Puebla.

Oct. 22d. 4h. 28m. 5s. Epicentre 23°·9N. 121°·7E. (as at 3h.).

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking	E.	8·5	343	e 2 7	0	—	—	—	—	—
Yakusima		10·2	49	e 2 36	+ 5	e 4 41	+14	—	—	7·0
Tomie		10·7	34	e 2 42	+ 4	e 5 59	L	—	—	(e 6·0)
Nagasaki		11·4	38	2 47	0	e 6 30	L	i 3 15	PP	(e 6·5)
Kumamoto		11·9	40	e 2 55	+ 1	5 48	+39	—	—	7·8
Ituhara		12·2	31	e 3 3	+ 5	e 5 37	+21	—	—	6·6
Hukuoka		12·3	36	i 2 58	− 1	i 5 27	+ 9	i 3 6	PP	6·3
Ooita		12·7	41	3 14	+ 9	5 43	+15	—	—	—
Simonoseki		12·9	37	3 14	+ 7	—	—	—	—	—
Simidu		13·3	46	3 22	+ 9	e 5 55	+13	—	—	—
Matuyama		13·9	42	e 3 28	+ 7	e 6 7	+10	—	—	—
Koti		14·1	44	e 3 27	+ 4	e 6 19	+17	—	—	—
Muroto		14·4	47	e 3 16	−11	e 6 5	− 4	—	—	e 6·7
Takamatsu		15·1	43	e 3 43	+ 7	e 6 42	+17	—	—	i 7·3
Sumoto		15·5	45	e 3 57	+15	—	—	—	—	—
Kobe		15·9	45	e 3 56	+ 9	e 7 17	+33	e 4 15	PP	e 9·7
Osaka		16·1	45	e 4 1	+12	e 7 35	SS	—	—	10·1
Owase		16·2	48	e 4 1	+11	e 8 7	SS	—	—	—
Toyooka		16·2	41	e 3 47	− 3	e 7 43	SS	—	—	e 9·0
Hikone		17·0	45	e 4 33	PP	e 8 17	SS	—	—	e 11·2
Nagoya		17·4	46	e 4 1	− 5	e 7 28	+9	—	—	e 8·7
Hukui		17·5	43	e 4 23	+16	—	—	—	—	—
Kanazawa		18·0	41	e 4 58	PP	e 8 9	SS	—	—	e 9·6
Shizuoka		18·2	48	e 4 40	PP	e 8 29	SS	—	—	e 11·5
Kohu		18·7	47	e 4 41	PP	e 8 15	+27	—	—	—

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.
Matumoto		18·7	44	e 4 25	+ 3	e 8 6	+18	e 14 37	ScS	—
Misima		18·7	48	4 6	−16	i 8 3	+15	—	—	9·8
Wazima		18·7	39	e 4 41	+19	e 8 53	SS	—	—	e 11·9
Osima		18·8	50	e 4 17	− 6	e 7 44	− 6	—	—	—
Matusiro		19·0	42	e 4 27	+ 1	e 7 44	−11	11 5	Q	11·7
Nagano		19·1	43	e 4 36	+ 9	e 8 35	SS	9 34	Q	10·6
Oiwake		19·1	44	e 4 3	−24	8 13	+16	—	—	e 12·2
Mera		19·2	48	e 4 42	+14	e 8 15	+16	—	—	—
Yokohama		19·3	47	4 13	−16	8 17	+15	—	—	—
Takada		19·4	41	i 4 20	−10	i 8 28	+24	—	—	—
Kunagaya		19·5	46	e 4 47	+16	e 8 34	+28	—	—	—
Maebasi		19·5	45	e 4 33	+ 2	e 8 23	+17	—	—	—
Aikawa		19·9	39	e 4 46	+10	—	—	—	—	9·7
Niigata		20·4	40	4 18	−23	e 8 9	−16	—	—	—
Inawasiro		20·8	42	e 5 1	+16	—	—	—	—	13·1
Onahama		21·0	47	e 5 11	PP	e 8 48	+11	—	—	e 11·7
Hukusima		21·2	45	e 4 56	+ 7	e 8 41	0	—	—	—
Yamagata		21·4	43	e 5 4	+13	—	—	—	—	e 13·2
Sendai		21·8	44	e 4 55	− 1	e 9 18	+26	e 5 26	PP	11·2
Akita		22·1	40	e 5 28	PP	—	—	—	—	e 11·9
Mizusawa		22·4	42	4 10	−52	8 56	− 8	—	—	12·2
Aomori		23·3	39	5 51	?	e 7 27	?	e 6 24	?	—
Hatinohe		23·5	40	—	—	e 8 23	−60	—	—	e 12·0
Sapporo		25·1	34	e 5 50	+22	e 10 32	+41	—	—	e 11·6
Urakawa		25·3	38	e 6 10	+40	e 10 54	+60	—	—	e 12·9
Asahigawa		26·1	35	e 5 46	+ 9	—	—	e 7 0	?	i 13·8
Calcutta	N.	30·7	275	e 6 30	+11	i 11 29	+ 8	—	—	—
Djakarta		33·2	208	i 6 42k	+ 2	i 12 5	+ 5	—	—	—
Bandong		33·6	206	e 6 40	− 4	i 11 58	− 8	—	—	—
Hyderabad	E.	40·9	270	—	—	13 56	− 2	—	—	—
Colombo	E.	43·5	255	8 11	+ 4	14 48	+12	—	—	25·9
Poona		44·8	273	i 8 16	− 1	e 14 56	+ 1	10 11	PP	—
Bombay	E.	45·6	274	i 8 24	0	i 15 6	0	e 10 14	PP	—
Mitchell Field		54·2	42	e 9 28	− 1	—	—	—	—	—
Brisbane		59·4	147	i 10 6k	0	e 18 14	− 1	—	—	—
Riverview		63·9	153	—	—	i 19 49	+37	—	—	e 29·5
College		68·8	27	i 11 7	− 1	20 12	+ 1	—	—	—
Kiruna	Z.	72·2	337	i 11 27	− 2	—	—	i 15 40	PPP	—
Upsala		76·4	331	e 12 41	+48	i 21 33	− 5	e 22 44	PPS	e 37·4
Sitka		77·0	33	i 11 59	+ 3	i 21 49	+ 4	—	—	—
Auckland	N.	78·5	139	—	—	i 22 10	+ 9	—	—	—
Resolute Bay		78·9	10	e 12 4k	− 3	—	—	e 17 55	?	—
Skalnate Pleso		79·4	320	—	—	e 22 21	+11	e 22 27	ScS	e 33·3
Raciborzu		80·2	321	e 12 9	− 5	e 27 12	SS	e 12 32	PcP	—
Copenhagen		80·7	328	e 12 15	− 1	—	—	—	—	—
Belgrade		81·0	315	e 12 28a	+10	—	—	e 15 24	PP	e 43·9
Ogyalla		81·1	319	e 16 16	PP	—	—	e 17 6	PPP	—
Bergen		81·5	334	i 11 51	−30	22 5	−27	—	—	38·9
Prague		82·1	322	e 12 35	+11	e 22 38	0	e 15 56	PP	—
Scoresby Sund		82·4	349	e 12 25	0	—	—	—	—	—
Collmberg		82·6	324	e 12 25	− 1	—	—	—	—	—
Jena	E.	83·5	323	e 12 32	+ 1	—	—	e 12 41	pP	—
Triest		84·9	318	—	—	i 23 4	− 2	—	—	—
Witteveen	Z.	85·1	327	i 12 52	+13	—	—	—	—	—
Stuttgart		86·0	323	e 12 42	− 1	—	—	e 16 5	PP	—
Karlsruhe	Z.	86·3	324	e 12 45	0	—	—	e 16 8	PP	—
Strasbourg		86·9	323	e 12 45	− 3	—	—	—	—	e 47·9
Messina		87·3	311	e 12 48	− 2	—	—	e 15 55?	PP	—
Prato		87·4	317	e 13 6	+16	i 23 31	+ 1	—	—	—
Victoria		87·5	37	12 51	0	23 19	[+ 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.
Seattle		88·5	38	e 12 58?s	+ 2	—	—	—	—	—
Paris		89·6	325	e 12 58	− 3	e 16 32	PP	i 13 15	pP	—
Terre Adélie		91·6	188	e 13 14	+ 4	—	—	—	—	—
Shasta Dam		92·4	43	i 13 13	− 1	—	—	—	—	—
Hungry Horse		92·5	33	e 12 13	−61	—	—	—	—	—
Berkeley	Z.	94·1	46	i 13 23k	+ 1	—	—	i 13 32	pP	—
Reno		94·7	42	e 13 25	+ 1	e 24 0	[+1]	e 17 1	PP	—
Butte		94·8	34	i 13 26	+ 1	—	—	—	—	—
Lick	Z.	94·8	46	i 13 26k	+ 1	—	—	i 13 38	pP	—
Fresno	Z.	96·3	45	e 13 37k	+ 5	—	—	—	—	—
Algiers Univ.	Z.	96·4	314	e 13 39	+ 7	—	—	e 17 30	PP	—
Tinemaha	Z.	97·2	44	e 13 36	0	—	—	—	—	—
China Lake	Z.	98·3	44	i 13 42	+ 1	—	—	—	—	—
Pasadena	Z.	99·0	47	i 13 46	+ 2	—	—	—	—	—
Boulder City		100·0	43	e 13 51	+ 3	—	—	e 17 50	PP	—
Palomar	Z.	100·3	47	e 13 48	− 2	—	—	—	—	—
Granada		100·4	319	18 25k	PP	—	—	—	—	—
Tamanrasset	Z.	102·6	302	14 7	+ 7	e 18 16	PP	e 17 23	PKP	—
Tucson		104·9	44	e 18 41	PP	—	—	—	—	—
Cleveland	Z.	111·5	19	e 19 27k	PP	—	—	—	—	—
Bogota		147·7	29	i 19 48	[+ 4]	—	—	—	—	—
Huancayo		160·0	57	e 20 6	[+ 5]	e 20 42	PKP_2	e 24 26	PP	—
La Paz	Z.	168·2	53	i 20 15a	[+ 7]	—	—	—	—	—

Additional readings :—
Kobe eP?N = 3m.59s., eZ = 7m.33s., eEN = 7m.54s.
Osima e = 5m.59s. and 6m.27s.
Sendai eE = 6m.24s. and 7m.48s.
Poona iP?E = 8m.19s.
Mitchell Field iP = 9m.38s.
Upsala iSN = 21m.44s., eN = 24m.23s.
Raciborzu ePZ = 12m.13s., ePcPE = 12m.28s., eZ = 15m.35s. and 21m.40s.
Belgrade eZ = 13m.59s., 17m.17s., and 18m.42s.
Prague e = 12m.49s., 13m.5s., 14m.0s., and 15m.0s., ePS = 23m.8s., eSS = 27m.55s.
Strasbourg e = 12m.56s., i = 13m.2s.
Seattle e = 13m.15s. and 14m.1s.
Paris e = 13m.10s., i = 13m.27s.
Long waves were also recorded at Edinburgh, Kew, Rathfarnham Castle, Ivigtut Potsdam, Coimbra, Lisbon. and Pavia.

Oct. 22d. 5h. 17m. 44s. Epicentre 23°·9N. 121°·7E. (as at 4h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei		7·2	358	e 1 56	+ 7	e 3 20	+ 7	—	—	—
Nanking	N.	8·5	343	2 4	− 3	3 36	− 9	—	—	—
Yakusima		10·2	49	2 34	+ 3	e 4 38	+11	—	—	—
Tomie		10·7	34	e 2 44	+ 6	—	—	—	—	e 6·4
Nagasaki		11·4	38	2 50	+ 3	e 6 20	L	—	—	(e 6·3)
Kumamoto		11·9	40	e 2 52	− 2	5 56	+47	—	—	—
Hukuoka		12·3	36	i 2 51	− 8	e 4 50	−28	—	—	6·7
Ooita		12·7	41	3 14	+ 9	5 52	+24	—	—	—
Simidu		13·3	46	e 3 15	+ 2	e 5 56	+14	—	—	—
Matuyama		13·9	42	e 3 24	+ 3	e 5 53	− 4	—	—	—
Koti		14·1	44	e 3 28	+ 5	e 6 44	SS	—	—	—
Takamatsu		15·1	43	e 3 42	+ 6	e 6 36	+11	—	—	—
Sumoto		15·5	45	4 6	+24	—	—	—	—	e 11·1
Kobe		15·9	45	e 3 58	+11	—	—	e 7 38	Q	e 10·6
Osaka		16·1	45	e 3 54	+ 5	e 8 5	L	—	—	—
Kameyama		16·9	46	e 4 10	+11	7 40	SS	—	—	8·6
Hikone		17·0	45	e 4 23	+22	—	—	—	—	—
Gihu		17·4	45	e 4 19	+13	—	—	—	—	—
Matumoto	N.	18·7	44	e 4 40	+18	—	—	—	—	—
Matusiro		19·0	42	e 4 41	+15	e 7 37	−18	—	—	10·6

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nagano		19·1	43	e 4 44	+17	e 8 19	+22	—	—	10·4
Oiwake		19·1	44	e 4 47	+20	—	—	—	—	—
Mera		19·2	48	5 25	+57	—	—	—	—	—
Yokohama		19·3	47	4 54	+25	—	—	—	—	—
Kumagaya		19·5	46	e 4 48	+17	e 8 33	+27	—	—	—
Maebasi		19·5	45	i 4 44	+13	—	—	—	—	e 8·9
Aikawa		19·9	39	e 5 0	PP	—	—	—	—	10·1
Mizusawa	E.	22·4	42	5 3	+ 1	9 52	SS	—	—	—
	N.	22·4	42	5 20	+18	9 48	SS	—	—	—
Guam		24·1	110	9 44	S	(9 44)	+10	—	—	—
Urakawa		25·3	38	e 5 29	− 1	e 10 22	SS	—	—	e 12·4
Calcutta	N.	30·7	275	e 9 19	PcP	—	—	—	—	—
Hyderabad	E.	40·9	270	i 7 43	− 3	i 13 59	+ 1	17 24	SS	20·1
Colombo	E.	43·5	255	8 15	+ 8	14 40	+ 4	—	—	—
Poona		44·8	273	i 8 16	− 1	e 14 36	−19	9 40	PP	20·2
Bombay	E.	45·6	274	i 8 31	+ 7	e 15 6	0	e 10 24	PP	—
Brisbane		59·4	147	i 10 6k	0	—	—	—	—	—
Riverview	Z.	63·9	153	i 10 38k	+ 1	—	—	—	—	—
College		68·8	27	e 11 5	− 3	—	—	—	—	—
Kiruna	Z.	72·2	337	i 11 26	− 3	—	—	—	—	—
Resolute Bay		78·9	10	e 12 4	− 3	—	—	—	—	—
Raciborzu	Z.	80·2	321	e 12 6	− 8	e 12 28	PcP	e 15 5	PP	—
Belgrade		81·0	315	e 12 14	− 4	e 12 35	PcP	e 15 29	PP	e 35·4
Prague		82·1	322	e 12 26	+ 2	e 22 38	0	e 15 56	PP	—
Collmberg		82·6	324	e 12 26	0	—	—	—	—	—
Jena	E.	83·5	323	e 12 33	+ 2	—	—	—	—	—
Stuttgart		86·0	323	e 12 41	− 2	—	—	—	—	—
Strasbourg		86·9	323	e 12 47	− 1	—	—	—	—	—
Messina	Z.	87·3	311	e 12 50	0	—	—	e 16 15	PP	—
Prato		87·4	317	e 13 9	+19	i 23 27	− 3	—	—	—
Victoria		87·5	37	12 50	− 1	—	—	—	—	—
Seattle		88·5	38	i 12 58?a	+ 2	i 14 3	?	—	—	—
Paris		89·6	325	e 12 59	− 2	—	—	—	—	—
Shasta Dam		92·4	43	i 13 12	− 2	—	—	—	—	—
Hungry Horse		92·5	33	i 13 14	0	—	—	—	—	—
Berkeley	Z.	94·1	46	e 13 21	− 1	—	—	—	—	—
Reno	Z.	94·7	42	e 13 25a	+ 1	—	—	—	—	—
Butte		94·8	34	e 13 25	0	—	—	—	—	—
Lick	Z.	94·8	46	i 13 28a	+ 3	—	—	—	—	—
Fresno	Z.	96·3	45	e 13 34k	+ 2	—	—	—	—	—
Algiers Univ.	Z.	96·4	314	e 13 32	0	—	—	i 17 27	PP	—
China Lake	Z.	98·3	44	e 13 42	+ 1	—	—	—	—	—
Mount Wilson	Z.	99·0	47	e 13 47	+ 3	—	—	—	—	—
Boulder City		100·0	43	e 13 48	0	—	—	e 17 53	PP	—
Granada		100·4	319	13 46k	− 4	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 14 0	0	—	—	e 18 9	PP	—
San Juan		137·3	11	e 23 51	?	—	—	—	—	—
Bogota		147·7	29	i 25 59	PP	—	—	—	—	—
Huancayo		160·0	57	e 20 6	[+ 5]	—	—	e 20 45	PKP_2	—
La Paz		168·2	53	e 20 12	[+ 4]	—	—	25 16	PP	—

Additional readings :—
Kobe eP?Z = 4m.5s.
Poona PPPN = 10m.25s., SSN = 17m.40s.
Bombay SSE = 18m.50s.
Belgrade eZ = 18m.46s.
Prague eSS = 27m.54s.
Strasbourg i = 13m.19s. and 13m.46s.
Paris i = 13m.1s. and 13m.16s.
Tamanrasset eZ = 17m.41s.
Long waves were also recorded at Dehra Dun, Upsala, and Edinburgh.

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Oct. 22d. 5h. 23m. 53s. Epicentre 23°·9N. 121°·7E. (as at 5h. 17m.).

		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Poona	Z.	44·8	273	i 8 19	+ 2	—	—
Brisbane	Z.	59·4	147	i 10 4a	− 2	—	—
College		68·8	27	i 11 7	− 1	—	—
Kiruna	Z.	72·2	337	i 11 27	− 2	—	—
Upsala		76·4	331	—	—	e 22 50	PPS
Resolute Bay		78·9	10	e 12 5	− 2	—	—
Raciborzu	Z.	80·2	321	e 12 15	+ 1	—	—
Collmberg		82·6	324	e 12 27	+ 1	—	—
Stuttgart		86·0	323	e 12 41	− 2	—	—
Strasbourg		86·9	323	e 12 46	− 2	e 13 7	PcP
Messina	Z.	87·3	311	e 13 6	+16	—	—
Victoria		87·5	37	12 50	− 1	—	—
Seattle		88·5	38	i 12 59	+ 3	—	—
Shasta Dam		92·4	43	i 13 13	− 1	—	—
Hungry Horse		92·5	33	i 13 14	0	—	—
Reno	Z.	94·7	42	e 13 28	+ 4	—	—
Butte		94·8	34	i 13 27	+ 2	—	—
Lick	Z.	94·8	46	i 13 28k	+ 3	—	—
Fresno	Z.	96·3	45	e 13 34	+ 2	—	—
Tinemaha	Z.	97·2	44	e 13 35	− 1	—	—
China Lake	Z.	98·3	44	e 13 40	− 1	—	—
Mount Wilson	Z.	99·0	47	e 13 48	+ 4	—	—
Granada		100·4	319	17 37a	PP	—	—
Lisbon		102·6	323	—	—	23 38	[−62]
Tamanrasset	Z.	102·6	302	e 14 0	0	e 18 21	PP
Fordham		114·0	13	e 19 7	PP	—	—
Huancayo		160·0	57	e 20 44	PKP_2	—	—

Additional readings and note :—
Lick iZ = 13m.31s.
Lisbon E = 30m.31s.
Long waves were also recorded at Hyderabad.

Oct. 22d. 5h. 43m. 3s. Epicentre 23°·9N. 121°·7E. (as at 5h. 23m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	Z.	7·2	358	e 1 47	− 2	—	—	—	—	i 3·6
Nanking	N.	8·5	343	e 2 1	− 6	3 37	− 8	—	—	—
Yakusima		10·2	49	e 2 33	+ 2	e 6 3	L	—	—	8·8
Tomie		10·7	34	e 2 43	+ 5	e 5 33	L	—	—	(e 5·6)
Nagasaki		11·4	38	2 49	+ 2	5 56	L	i 3 10	PP	(5·9)
Kumamoto		11·9	40	2 52	− 2	5 26	+17	—	—	7·4
Ituhara		12·2	31	e 3 1	+ 3	e 5 33	+17	—	—	6·5
Hukuoka		12·3	36	i 2 58	− 1	i 5 23	+ 5	—	—	e 6·5
Ooita		12·7	41	3 10	+ 5	5 42	+14	—	—	7·4
Simonoseki		12·9	37	3 19	+12	5 52	+19	—	—	—
Simidu		13·3	46	e 3 11	− 2	e 6 30	L	—	—	(e 6·5)
Matuyama		13·9	42	e 3 26	+ 5	e 6 2	+ 5	—	—	e 7·4
Koti		14·1	44	e 3 26	+ 3	e 6 20	+18	e 3 51	PP	7·8
Muroto		14·4	47	e 3 23	− 4	e 6 13	+ 4	—	—	e 6·8
Takamatsu		15·1	43	e 3 46	+10	e 6 28	+ 3	—	—	—
Yonago		15·3	39	e 4 24	+45	e 6 39	+ 9	—	—	—
Sumoto		15·5	45	3 55	+13	7 20	+45	—	—	10·6
Kobe		15·9	45	e 3 57	+10	e 7 39	SS	e 4 15	PP	e 9·2
Osaka		16·1	45	e 4 5	+16	e 7 19	+30	i 4 36	PP	9·3
Owase		16·2	48	e 3 57	+ 7	7 46	SS	8 30	Q	10·0
Toyooka		16·2	41	e 3 53	+ 3	e 7 50	SS	—	—	e 9·2
Tu		16·8	47	e 4 9	+11	7 52	SS	—	—	9·4
Kameyama		16·9	46	3 52	− 7	7 35	SS	—	—	8·7
Hikone		17·0	45	e 3 57	− 4	e 7 57	SS	—	—	e 10·2
Gihu		17·4	45	e 4 15	+ 9	e 7 28	+ 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.
Nagoya		17·4	46	e 4 16	+10	e 7 29	+10	—	—	e 8·6
Hukui		17·5	43	e 3 51	−16	—	—	—	—	—
Kanazawa		18·0	41	e 4 44	+31	e 7 59	SS	—	—	e 10·1
Shizuoka		18·2	48	e 3 47	−29	e 7 45	+ 8	4 26	PP	9·9
Hatidyozima		18·4	53	4 27	+ 9	7 47	+ 6	—	—	—
Kohu		18·7	47	e 4 32	+10	e 8 16	+28	—	—	e 12·5
Misima		18·7	48	4 28	+ 6	7 53	+ 5	—	—	10·4
Matumoto		18·7	44	e 4 26	+ 4	e 9 15	Q	—	—	e 16·8
Wazima		18·7	39	e 4 41	+19	e 9 18	Q	—	—	e 12·2
Ajiro		18·8	48	e 4 24	+ 1	e 8 20	+30	—	—	—
Osima		18·8	50	e 4 23	0	e 7 20	−30	4 50	PP	8·3
Matusiro		19·0	42	4 22	− 4	7 33	−22	8 46	Q	11·2
Nagano		19·1	43	e 4 33	+ 6	8 47	SS	e 5 19	PP	i 9·9
Oiwake		19·1	44	e 4 28	+ 1	8 32	+35	—	—	e 12·7
Mera		19·2	48	4 28	0	e 8 2	+ 3	—	—	—
Titibu		19·3	45	e 4 41	+12	—	—	—	—	—
Yokohama		19·3	47	4 29	0	8 33	+31	—	—	—
Takada		19·4	41	i 4 55	+25	i 8 52	SS	—	—	—
Kumagaya		19·5	46	e 4 38	+ 7	e 8 33	+27	—	—	—
Maebasi	Z.	19·5	45	e 4 31	0	e 8 25	+19	—	—	—
Tokyo		19·6	48	e 4 49	+17	8 17	+ 9	e 5 9	PP	e 8·8
Aikawa		19·9	39	e 4 50	+14	—	—	—	—	8·6
Tukubasan		20·1	47	4 56	+18	8 35	+16	—	—	—
Utunomiya		20·1	46	e 4 41	+ 3	—	—	—	—	e 10·5
Mito		20·4	47	e 4 47	+ 6	e 9 16	Q	—	—	—
Niigata		20·4	40	e 4 59	+18	e 9 4	Q	e 5 34	?	e 10·7
Inawasiro		20·8	42	e 5 5	+20	—	—	—	—	12·6
Hukusima		21·2	45	e 4 56	+ 7	e 8 15	−26	—	—	—
Yamagata		21·4	43	e 4 58	+ 7	—	—	—	—	e 13·0
Sendai		21·8	44	e 4 58	+ 2	e 8 50	− 2	e 9 23	SS	12·7
Akita		22·1	40	e 5 6	+ 7	—	—	e 5 49	PP	e 11·8
Isinomaki		22·1	44	e 4 56	− 3	—	—	—	—	—
Mizusawa		22·4	42	5 4	+ 2	9 28	+24	e 9 40	SS	13·4
Aomori		23·3	39	5 55	+45	—	—	e 6 10?	PPP	e 11·4
Hatinohe		23·5	40	e 5 10	− 2	e 9 36	+13	6 0	PPP	e 12·1
Mori		24·0	36	e 5 15	− 2	e 9 44	+12	—	—	12·1
Sapporo		25·1	34	e 5 21	− 7	e 9 45	− 6	e 6 26	PPP	e 11·2
Urakawa		25·3	38	e 5 33	+ 3	e 10 21	SS	e 5 51	PP	e 12·5
Asahigawa		26·1	35	e 5 54	+17	—	—	e 12 15	Q	i 13·4
Wakkanai		26·9	31	e 6 18	+33	11 56	SS	—	—	15·0
Abashiro		27·3	36	e 5 21	−27	—	—	—	—	16·7
Nemuro		27·6	38	e 6 24	+33	11 16	+44	—	—	13·9
Calcutta	N.	30·7	275	i 6 33	+14	i 11 51	+30	—	—	—
Irkutsk		31·3	340	6 25	+ 1	11 29	− 2	—	—	—
Djakarta		33·2	208	i 6 40	0	i 12 6	+ 6	—	—	—
Bandong		33·6	206	e 6 42	− 2	i 12 0	− 6	—	—	—
New Delhi		40·0	287	e 7 38	0	i 13 45	+ 1	9 20	PP	19·3
Przhevalsk		40·2	308	e 7 38	− 2	—	—	—	—	—
Chilisk		40·4	311	e 7 45	+ 4	—	—	—	—	—
Kurmenty		40·4	309	e 7 39	− 2	—	—	—	—	—
Ili		41·5	311	e 7 45	− 5	—	—	—	—	—
Naryn		41·7	307	i 7 53	+ 1	—	—	—	—	—
Colombo	E.	43·5	255	8 8	+ 1	—	—	—	—	18·5
Kodaikanal	E.	44·2	261	8 18	+ 6	14 57	+11	—	—	—
Andijan		44·4	305	e 8 15	+ 1	—	—	—	—	—
Poona		44·8	273	i 8 13	− 4	i 14 51	− 4	18 24	SS	—
Bombay	E.	45·6	274	i 8 26	+ 2	e 15 8	+ 2	i 10 16	PP	—
Mitchell Field		54·2	42	i 9 24	− 5	—	—	—	—	—
Sverdlovsk		54·6	324	e 10 49?	?	18 30?	?	—	—	—
Brisbane		59·4	147	i 10 4a	− 2	e 18 16	+ 1	—	—	—
Lenkoran		62·5	303	10 32	+ 4	—	—	—	—	—
Riverview		63·9	153	i 10 48k	+11	i 19 7	− 5	i 23 23	SS	e 26·2
Grozny		64·0	309	e 10 40	+ 2	—	—	—	—	—
Tiflis		65·0	307	e 10 44	0	—	—	—	—	—
Gori		65·5	307	e 10 43	− 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.
Leninakan		65·9	307	10 51	+ 1	—	—	—	—	—
Abastumanj		66·4	307	e 10 50?	– 3	e 19 40?	– 3	—	—	—
Moscow		67·3	323	i 11 1	+ 2	i 19 50	– 4	—	—	—
College		68·8	27	i 11 2	– 6	e 20 11	0	—	—	—
Pulkovo		70·3	328	i 11 16	– 1	—	—	—	—	—
Yalta		72·0	312	11 25	– 3	—	—	—	—	—
Kiruna	Z.	72·2	337	i 11 22	– 7	—	—	—	—	—
Helsinki		72·8	330	e 11 31	– 1	e 20 56	– 2	i 11 35	P	—
Honolulu		73·3	73	e 11 34	– 1	e 20 21	–43	—	—	—
Ksara		73·8	300	i 11 42	+ 4	21 28?	+19	—	—	—
Kishinev		74·8	315	11 39	– 5	—	—	—	—	—
Apia		75·0	112	e 11 43	– 2	e 21 24?	+ 1	11 51	PcP	—
Upsala		76·4	331	e 11 49	– 4	e 21 34	– 4	e 26 0?	SS	e 34·0
Istanbul	N.	76·6	310	e 11 58	+ 4	e 21 37	– 3	—	—	—
Lwow		76·8	319	e 11 53	– 2	e 21 39	– 3	—	—	—
Sitka		77·0	33	e 11 59	+ 3	e 21 44	– 1	—	—	—
Bucharest		77·5	313	e 12 5	+ 6	e 22 14	PS	e 22 51	PPS	39·0
Helwan		78·8	298	e 12 3	– 3	e 22 3	– 1	—	—	—
Resolute Bay		78·9	40	i 12 3k	– 4	—	—	e 15 20	PP	e 46·0
Skalnate Pleso		79·4	320	12 12	+ 3	e 21 57	–13	e 22 41	PS	—
Karapiro	N.	79·6	139	11 57?	–13	—	—	—	—	—
Sofia		79·6	312	12 12	+ 2	22 13	+ 1	—	—	—
Cobb River	E.	80·1	143	e 12 30	+17	—	—	e 16 27?	PP	—
Timisoara		80·1	316	e 12 20	+ 7	e 22 33	+15	e 15 19	PP	—
Raciborzu		80·2	321	e 12 13	– 1	i 22 14	– 5	e 12 19	PcP	e 38·0
Copenhagen		80·7	328	i 12 17	+ 1	—	—	—	—	—
Budapest		80·8	318	e 12 17	0	i 22 27	+ 2	12 21	PcP	44·0
Belgrade		81·0	315	e 12 18	0	e 23 14	PPS	e 15 32	PP	e 44·3
Ogyalla		81·1	319	e 12 12	– 6	e 22 28	0	e 14 57	PP	—
Wellington		81·4	143	i 12 26	+ 6	e 22 17	–14	i 12 45	PcP	34·4
Bergen	N.	81·5	334	i 18 37	?	i 23 57	PPS	—	—	e 31·0
Athens		81·6	307	e 12 18	– 3	—	—	i 12 24	PcP	—
Christchurch		81·8	146	i 12 33	+11	e 22 42	+ 7	e 15 47	PP	e 39·3
Potsdam		82·0	325	i 12 27k	+ 4	i 22 38	+ 1	i 23 28	PS	44·0
Prague		82·1	322	e 12 23k	– 1	i 22 39	+ 1	e 15 6	PP	e 41·0
Vienna		82·1	321	e 12 23	– 1	—	—	—	—	—
Scoresby Sund		82·4	349	e 12 23	– 2	i 22 45	+ 4	e 12 29	PcP	42·0
Collmberg		82 6	324	e 11 57?	–29	e 22 51	+ 8	e 23 23	PS	e 30·4
Jena		83·5	323	e 12 32?	+ 1	e 22 52	0	e 27 29	SS	—
Tananarive		83·9	247	e 12 28	– 5	23 3	+ 7	17 45	PPP	41·0
Triest		84·9	318	i 12 41	+ 3	i 23 14	+ 8	i 16 6	PP	e 45·0
Taranto		85·0	313	12 44	+ 6	23 12	+ 5	—	—	e 39·0
Witteveen	Z.	85·1	327	i 12 38	– 1	—	—	—	—	—
Stuttgart		86·0	323	e 12 40	– 3	e 23 3	[– 4]	e 16 5	PP	—
Karlsruhe		86·3	324	e 12 41	– 4	23 21	+ 1	e 16 6	PP	—
Aberdeen		86·5	333	i 13 7	+21	i 23 19	– 3	i 29 53	SS	43·8
Chur		86·7	322	e 12 45	– 2	e 23 18	– 6	e 12 51	PcP	—
Bologna		86·9	319	e 12 53	+ 5	e 23 31	+ 5	e 15 53	PP	—
Salo		86·9	320	e 12 53k	+ 5	e 23 23	– 3	e 18 13	PPP	—
Strasbourg		86·9	323	e 12 46	– 2	e 23 27	+ 1	i 16 24	PP	e 46·2
Zürich		87·1	322	e 12 46	– 3	e 23 23	– 5	e 15 10	PP	—
Messina	Z.	87·3	311	e 12 47	– 3	—	—	i 16 18	PP	—
Prato		87·4	317	e 12 48	– 2	i 23 34	+ 4	—	—	—
Rocca di Papa		87·4	314	—	—	e 29 41	SS	—	—	—
Basle		87·5	322	e 12 54	+ 3	e 23 36	+ 5	e 16 20	PP	—
Rome		87·5	314	e 12 47	– 4	e 23 26	– 5	e 16 17	PP	—
Victoria		87·5	37	12 47	– 4	—	—	—	—	—
Durham	E.	87·8	331	—	—	i 23 36	+ 2	i 23 48	?	—
Reykjavik	E.	87·8	346	—	—	e 23 0	[–19]	—	—	e 44·0
Pavia		87·9	320	e 12 36?	–17	e 23 37	+ 2	e 24 25	PS	e 47·3
Neuchatel		88·2	322	e 13 1	+ 7	e 23 26	[+ 4]	—	—	—
Seattle		88·5	38	i 12 56?a	0	e 23 37	– 4	—	—	—
Kew		89·4	328	i 13 7	+ 7	(e 17 57?)	PPP	i 16 33	PP	e 18·0
Paris		89·6	325	e 12 58	– 3	i 23 41	–10	i 13 16	pP	—
Rathfarnham Castle		90·9	332	e 13 21	PcP	—	—	e 15 27	PP	e 49·0

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Clermont-Ferrand		91·2	322	e 13 15	+ 7	e 23 57	– 8	i 16 55	PP	e 32·6
Terre Adélie		91·6	188	e 13 10	0	e 16 37	PP	—	—	—
Shasta Dam		92·4	43	i 13 10	– 4	e 24 19	+ 3	—	—	—
Hungry Horse		92·5	33	i 13 10	– 4	i 23 20	[–27]	—	—	—
Saskatoon		93·3	28	13 27	+ 9	24 1	[+ 9]	—	—	—
Berkeley		94·1	46	e 13 22	0	e 24 0	[+ 4]	e 17 2	PP	—
Barcelona		94·3	319	—	—	e 25 25	PS	—	—	e 49·2
Reno		94·7	42	e 13 25	+ 1	e 24 3	[+ 4]	—	—	—
Ivigtut		94·8	355	—	—	23 59	[– 1]	24 36	S	47·0
Lick	Z.	94·8	46	i 13 21a	– 4	—	—	—	—	—
Tortosa		95·6	319	—	—	i 23 38	[–26]	—	—	52·1
Bozeman		95·8	34	e 13 34	+ 5	e 24 42	– 3	—	—	—
Fresno	Z.	96·3	45	e 13 30k	– 2	—	—	—	—	—
Algiers Univ.	Z.	96·4	314	e 13 18	–14	—	—	e 17 24	PP	—
Tinemaha	Z.	97·2	44	e 13 38	+ 2	—	—	—	—	—
Alicante		97·7	319	e 13 23	–15	24 39	{+ 1}	17 17	PP	e 46·2
China Lake	Z.	98·3	44	e 13 40	– 1	—	—	—	—	—
Toledo		98·9	320	e 13 51	+ 8	—	—	e 17 44	PP	—
Pasadena		99·0	47	e 13 42	– 2	i 24 7	[–15]	e 17 51	PP	e 46·6
Almeria		99·9	318	e 13 28	–20	24 52	{– 1}	17 32	PP	54·8
Boulder City		100·0	43	e 13 48	0	—	—	—	—	—
Palomar	Z.	100·3	47	e 13 50	0	—	—	—	—	—
Granada		100·4	319	14 12k	+22	25 27	+ 3	17 53	PKP	i 51·4
Rapid City		100·8	31	e 14 0?	+ 8	e 24 29?	[– 2]	—	—	—
Lisbon		102·6	323	15 55	?	e 24 43	[+ 3]	—	—	30·4
Tamanrasset	Z.	102·6	302	13 58	– 2	e 25 46	+ 4	e 17 35	PKP	—
Pretoria	Z.	103·0	247	e 29 59	PKKP	—	—	i 30 5	PKKP	—
Tucson		104·9	44	e 14 17	+ 7	—	—	e 18 21	PP	—
Kirkland Lake	Z.	105·7	15	e 18 27	[+ 2]	—	—	—	—	e 61·0
Lincoln		106·4	29	—	—	e 25 18	{–22}	e 26 9	S	—
Kimberley	Z.	106·8	246	i 18 20	[– 7]	—	—	—	—	—
Seven Falls	E.	108·4	9	—	—	e 26 23	S	e 34 8	SS	49·4
Chicago		108·7	23	e 19 6	PP	e 26 22	S	—	—	—
Cleveland	Z.	111·5	19	i 19 31a	PP	—	—	—	—	—
Halifax		111·6	4	—	—	e 26 45	S	e 29 3	PS	—
Harvard		112·8	10	—	—	e 29 14	PS	e 36 26	SS	e 68·1
Weston		113·0	10	e 19 13	PP	e 36 42	SS	—	—	—
Morgantown		113·6	18	e 19 7	[+27]	—	—	e 19 55	PP	—
Palisades		113·8	13	e 19 30	PP	—	—	—	—	—
City College, N.Y.		114·0	13	e 19 34	PP	e 26 35	{+ 2}	—	—	—
Washington		115·1	16	e 18 52	[+ 9]	—	—	e 20 5	PP	—
Tacubaya		121·3	46	e 19 4	[+ 9]	e 20 53	PP	e 22 37	PPP	—
Vera Cruz		123·5	44	e 19 27	[+27]	—	—	—	—	—
San Juan		137·3	11	i 19 30	[+ 4]	—	—	—	—	—
Fort de France		141·5	4	e 22 41	PP	—	—	—	—	—
Bogota		147·7	29	i 19 46	[+ 2]	e 22 59	SKP	i 19 54	PKP_2	—
Huancayo		160·0	57	e 20 4	[+ 3]	e 43 38	SS	e 24 25	PP	e 61·8
La Paz		168·2	53	i 20 4a	[– 4]	31 57	{+ 3}	i 25 14	PP	79·0
La Plata		169·0	182	25 21	PP	29 21	PPP	33 15	SKKS	82·8

Additional readings and notes :—
Kobe eEN =4m.4s. and 4m.22s., eS?N =7m.44s. and 7m.59s.
Shizuoka ePPP? =4m.37s.
Osima PPP =5m.17s.
Matusiro eN =4m.38s.
Tokyo eN =5m.19s. and 8m.41s.
Sendai eE =5m.34s., eQN =10m.49s.
New Delhi PSN =13m.53s., SSN =16m.42s., QN =16m.59s., SSSN =17m.21s.
Bombay PPSE =15m.26s.
Riverview iZ =10m.51s., iEN =19m.23s., iN =19m.41s., iE =19m.48s., iN =19m.58s., iE =20m.59s., 22m.53s., and 23m.36s.
Apia i =12m.18s.
Upsala eN =12m.29s. and 14m.57s., eE =15m.35s. and 18m.42s., eN =20m.55s., eSS?N = 26m.57s., ePKKP?N =30m.35s.
Resolute Bay iZ =12m.10s. and 12m.23s.
Skalnate Pleso e =12m.43s., 15m.19s., and 15m.51s., eN =17m.43s.
Timisoara eE =12m.32s., eN =12m.39s. and 22m.27s., ePS?E =22m.58s.
Raciborzu iZ =12m.30s., iE =13m.4s., iN =13m.11s., ePPPZ =17m.7s., eSN =22m.18s., iScSN =22m.36s., iPSN =23m.0s., ePSZ =23m.5s., ePPSN =23m.22s., eSS?Z = 27m.20s.

Continued on next page.

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Budapest PPN =15m.17s., PPE =15m.20s., eE =22m.22s., iSN =22m.53s., iSE = 23m.3s., eE =24m.2s., iN =24m.36s., eSSE =27m.57s., eSSN =28m.27s., eSSSE = 31m.27s., eSSSN =31m.57s.
Belgrade eZ =13m.13s., eNW =18m.35s.
Ogyalla e =12m.42s., 13m.21s., 22m.46s., 24m.6s., and 24m.41s., eSS =27m.51s.
Wellington iZ =12m.39s., ePPZ =15m.32s., iSS =26m.45s.
Christchurch eQEN =34m.57s.
Potsdam i =15m.18s., iE =19m.4s.
Prague iP=12m.29s., e=12m.46s., eZ=13m.3s., e =14m.4s. and 26m.28s., eSS =28m.12s.
Jena ePN =12m.36s., eE =12m.52s. and 15m.21s., eN =22m.14s., eSN =23m.6s., eEN = 24m.4s., eSS?E =28m.0s.
Tananarive e =12m.35s., ScS =23m.16s., PPS =24m.8s., SS =28m.35s., Q =35m.37s.
Triest i =23m.37s., iPS =24m.18s., iSS =28m.42s.
Stuttgart e =12m.47s. and 13m.8s.
Karlsruhe iZ =12m.47s.
Aberdeen iE =11m.23s., eE =19m.57s., eN =20m.42s., iSN =23m.43s., iE =26m.23s., iN =36m.4s.
Salo e =24m.1s.
Strasbourg i =12m.51s., 13m.4s., 13m.14s., 13m.37s., 14m.38s., and 24m.1s., eSS = 29m.31s.
Messina iZ =12m.52s. and 13m.9s.
Rome eSSE =29m.48s.
Pavia e =23m.58s.
Seattle iP? =13m.4s., i =13m.10s., 13m.22s., 13m.31s., 14m.8s., and 14m.31s., eS? = 23m.45s.
Paris iPP =16m.21s. and 16m.37s., iPPP =18m.43s., iScS =23m.55s., iPS =24m.48s. and other unidentified readings.
Rathfarnham Castle eZ =13m.49s.
Algiers Univ. e =17m.11s.
Alicante PPP =19m.31s., SKS? =23m.27s., PS =26m.14s., PPS =26m.57s., SSP = 31m.55s., SSS =34m.17s., Q =40m.5s.
Pasadena eQN =41m.15s.
Boulder City i =13m.56s.
Granada iPP =18m.12s., PPS =28m.6s., iSS =32m.39s., SSS =37m.36s.
Lisbon iE =17m.17s. and 17m.35s.
Tamanrasset ePPZ =18m.20s., eZ =19m.43s., eSKSZ =24m.39s.
Huancayo e =20m.42s. and 25m.3s.
La Paz iZ =20m.33s. and 25m.29s., PPS =38m.57s.?, SS =45m.57s.?
La Plata PKPN =25m.51s., PPPN =34m.3s.; readings wrongly identified.
Long waves were also recorded at Coimbra, Guadalajara, Puebla, and Edinburgh.

Oct. 22d. 10h. 2m. 47s. Epicentre 3° 0S. 76·9W. Depth of focus 0·020.
(as on 1935, December 14d.).

A = +·2263, B = −·9726, C = −·0520; δ = −13; h = +7;
D = −·974, E = −·227; G = −·012, H = +·051, K = −·999.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		8·2	20	i 1 52	− 5	i 3 27	+ 1	i 2 45	pP	—
Huancayo		9·1	172	i 2 13	+ 4	i 3 54	+ 4	—	—	—
La Paz		16·0	150	i 3 42	+ 5	i 6 40	+11	7 13	SS	8·0
Fort de France		23·5	42	e 4 9	−47	—	—	—	—	—
San Juan		23·8	27	i 4 53	− 6	—	—	e 5 24	PP	—
Palisades		43·9	4	e 7 50	− 2	—	—	—	—	—
Weston		45·5	7	i 8 3	− 2	—	—	—	—	—
Harvard		45·6	7	i 8 4	− 2	—	—	—	—	—
Tucson		47·6	320	i 8 22	+ 1	—	—	i 8 54	pP	—
Palomar	Z.	52·3	317	i 8 59	+ 2	—	—	i 9 32	pP	—
Boulder City		52·5	321	i 9 0	+ 1	—	—	i 9 32	pP	—
Riverside	Z.	53·0	317	i 9 2	0	—	—	i 9 35	pP	—
Pasadena		53·6	317	i 9 7	0	—	—	i 9 39	pP	—
China Lake	Z.	54·2	320	i 9 11	0	e 10 48	PcP	i 9 45	pP	—
Tinemaha	Z.	55·4	319	i 9 20	0	—	—	i 9 52	pP	—
Lick	Z.	57·7	319	i 9 36k	0	—	—	—	—	—
Reno	Z.	57·8	322	e 9 39k	+ 2	—	—	—	—	—
Berkeley	Z.	58·4	319	i 9 43a	+ 2	—	—	—	—	—
Hungry Horse		60·5	333	i 9 55	0	—	—	—	—	—
Victoria		65·3	328	10 26	− 1	—	—	—	—	—
Tamanrasset	Z.	84·2	67	i 12 14	0	i 13 5	sP	i 12 44	pP	—
College		84·7	337	i 12 17	0	—	—	—	—	—
Kiruna		95·5	24	—	—	e 26 37	PS	—	—	e 64·5

Tamanrasset gives also ePPZ =15m.26s.
Long waves were also recorded at Washington,

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Oct. 22d. 10h. 25m. 45s. Epicentre 23°·9N. 121°·7E. (as at 5h.).

		△	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		9·3	184	e 1 43	–34	—	—	—	—	—
Vladivostok		21·0	22	e 4 49	+ 2	i 8 25	–12	—	—	—
Calcutta	E.	30·7	275	—	—	e 11 37	+16	—	—	—
Naryn		41·7	307	i 7 56	+ 4	i 14 22	+12	—	—	—
Rybach'e		41·9	308	e 7 54	0	—	—	—	—	—
Frunse		43·0	309	e 8 5	+ 2	—	—	—	—	—
Andijan		44·4	305	e 8 15	+ 1	i 14 55	+ 6	—	—	—
Fergana		44·7	304	e 8 18?	+ 2	e 14 59	+ 5	—	—	—
Poona	Z.	44·8	273	e 8 18	+ 1	—	—	—	—	—
Tashkent		46·7	306	e 8 33	+ 1	i 15 26	+ 4	—	—	—
Stalinabad		46·9	302	i 8 37	+ 3	e 15 28	+ 3	—	—	—
Samarkand		48·4	303	e 8 46	0	—	—	—	—	—
Mary		52·4	301	e 9 18	+ 2	—	—	—	—	—
Sverdlovsk		54·6	324	9 32	0	17 12	+ 1	—	—	—
Ashkabad		55·2	301	i 9 28	– 9	—	—	—	—	—
Kizyl-Arvat		56·7	303	e 9 48	0	—	—	—	—	—
Brisbane	Z.	59·4	147	i 10 9k	+ 3	—	—	—	—	—
Tiflis		65·0	307	e 10 41	– 3	—	—	—	—	—
Gori		65·5	307	e 10 51	+ 4	—	—	—	—	—
Ksara		73·8	300	e 11 37	– 1	e 21 21	+12	—	—	—
Helwan	Z.	78·8	298	e 12 7	+ 1	—	—	e 12 39	PcP	—
Resolute Bay		78·9	10	e 12 6k	– 1	—	—	—	—	—
Victoria		87·5	37	12 42	– 9	—	—	—	—	—
Alicante		97·7	319	15 43	PP	26 36	PS	42 21	Q	e 48·8
Granada		100·4	319	e 15 57k	PP	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 18 15	PP	—	—	—	—	—

Long waves were also recorded at Copenhagen, Upsala, De Bilt, Kew, and Paris.

Oct. 22d. 11h. 11m. 3s. Epicentre 23°·9N. 121°·7E. (as at 10h.).

		△	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	N.	7·2	358	e 1 45	– 4	—	—	—	—	—
Manila		9·3	184	i 1 40	–37	e 3 29	–36	—	—	—
Yakusima		10·2	49	e 2 33	+ 2	e 4 57	+30	—	—	—
Nagasaki		11·4	38	e 2 39	– 8	e 6 39	L	—	—	(e 6·6)
Kumamoto		11·9	40	e 2 58	+ 4	5 11	+ 2	—	—	e 7·2
Saga		12·0	37	3 13	+18	—	—	—	—	—
Hukuoka		12·3	36	i 3 1	+ 2	i 5 22	+ 4	—	—	6·4
Ooita		12·7	41	e 3 7	+ 2	5 37	+ 9	—	—	e 8·2
Simonoseki		12·9	37	i 3 18	+11	—	—	—	—	—
Simidu		13·3	46	e 3 31	+18	—	—	—	—	8·1
Matuyama		13·9	42	e 3 26	+ 5	e 6 1	+ 4	—	—	e 10·6
Koti		14·1	44	e 3 26	+ 3	e 6 40	SS	e 3 53	PP	8·0
Muroto		14·4	47	e 3 7	–20	e 5 51	–18	—	—	e 6·5
Takamatu		15·1	43	e 3 37	+ 1	e 6 15	–10	—	—	—
Yonago		15·3	39	e 4 19	+40	e 6 36	+ 6	—	—	—
Sumoto		15·5	45	i 3 56	+14	—	—	—	—	i 8·0
Kobe		15·9	45	e 4 25	+38	e 6 38	– 6	—	—	e 9·5
Hikone		17·0	45	e 4 14	+13	—	—	—	—	e 10·0
Gihu		17·4	45	e 4 18	+12	—	—	—	—	—
Nagoya		17·4	46	e 4 15	+ 9	—	—	—	—	—
Misima		18·7	48	e 4 23	+ 1	7 35	–13	—	—	10·3
Osima		18·8	50	e 4 21	– 2	e 7 39	–11	5 6	PPP	9·0
Matusiro		19·0	42	e 4 32	+ 6	7 39	–16	i 4 50	PP	9·7
Nagano	E.	19·1	43	e 4 32	+ 5	e 8 46	+49	—	—	—
Oiwake		19·1	44	e 4 43	+16	—	—	—	—	—
Mera		19·2	48	e 4 26	– 2	e 7 51	– 8	—	—	—
Kumagaya		19·5	46	e 4 51	+20	e 8 44	+38	—	—	—
Maebasi		19·5	45	e 4 52	+21	—	—	—	—	e 9·1
Aikawa		19·9	39	e 4 51	+15	—	—	—	—	11·6
Vladivostok		21·0	22	e 4 45	– 2	i 8 39	+ 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.
Yamagata		21·4	43	e 5 19	+28	—	—	—	—	e 13·7
Sendai		21·8	44	e 4 57	+ 1	e 9 17	+25	10 41	Q	11·0
Mizusawa		22·4	42	e 5 7	+ 5	9 28	+24	9 33	SS	13·4
Urakawa		25·3	38	e 5 37	+ 7	e 10 29	+35	—	—	e 13·6
Calcutta	E.	30·7	275	e 6 22	+ 3	i 11 53	+32	—	—	—
Irkutsk		31·3	340	e 6 19	− 5	e 11 27?	− 4	—	—	—
New Delhi		40·0	287	e 7 38	0	e 13 44	0	9 13	PP	—
Przhevalsk		40·2	308	e 7 46	+ 6	—	—	—	—	—
Hyderabad	E.	40·9	270	e 7 42	− 4	e 14 10	+12	9 28	PP	20·6
Almata		41·4	310	i 7 50	0	—	—	—	—	—
Ili		41·5	311	i 7 48	− 2	—	—	—	—	—
Naryn		41·7	307	i 7 53	+ 1	14 23	+13	—	—	—
Rybach'e		41·9	308	i 7 53	− 1	—	—	—	—	—
Krasnogorka		42·7	309	e 7 59	− 1	—	—	—	—	—
Frunse		43·0	309	i 8 3	0	e 14 43	+14	—	—	—
Colombo	E.	43·5	255	8 17	+10	14 37	+ 1	—	—	25·0
Kodaikanal	E.	44·2	261	e 8 22	+10	e 15 1	+15	—	—	—
Andijan		44·4	305	e 8 14	0	e 14 53	+ 4	—	—	—
Fergana		44·7	304	8 16	0	e 14 57	+ 3	—	—	—
Poona		44·8	273	i 8 17	0	i 14 56	+ 1	10 17	PP	—
Bombay	E.	45·6	274	—	—	e 15 16	+10	—	—	—
Tashkent		46·7	306	e 8 32	0	e 15 23	+ 1	—	—	—
Stalinabad		46·9	302	i 8 33	− 1	e 15 34	+ 9	—	—	—
Samarkand		48·4	303	8 44	− 2	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 29	− 3	17 14	+ 3	—	—	—
Ashkabad		55·2	301	i 9 37	0	—	—	—	—	—
Kizyl-Arvat		56·7	303	e 9 48	0	—	—	—	—	—
Brisbane		59·4	147	i 10 6a	0	e 18 15	0	—	—	—
Shemakla		62·3	305	10 26	0	—	—	—	—	—
Riverview		63·9	153	i 10 55	+18	e 19 7	− 5	i 19 33	PS	e 28·8
Tiflis		65·0	307	e 10 43	− 1	—	—	—	—	—
Erevan		65·5	305	e 10 53	+ 6	19 45	+13	—	—	—
Gori		65·5	307	e 10 51	+ 4	—	—	—	—	—
Leninakan		65·9	307	e 10 50	0	—	—	—	—	—
Piatigorsk		65·9	310	10 47	− 3	—	—	—	—	—
Abastumanj		66·4	307	e 10 52	− 1	—	—	—	—	—
Moscow		67·3	323	10 56	− 3	e 19 54	0	—	—	—
College		68·8	27	e 11 4	− 4	—	—	—	—	—
Yalta		72·0	312	11 26	− 2	e 20 54	+ 5	—	—	—
Kiruna		72·2	337	i 11 27	− 2	e 21 8	+17	e 28 57?	SSS	e 38·0
Helsinki	E.	72·8	330	—	—	e 20 56	− 2	—	—	—
Ksara		73·8	300	i 11 38	0	22 2	PPS	—	—	—
Upsala		76·4	331	—	—	e 21 40	+ 2	e 26 10	SS	e 35·0
Istanbul		76·6	310	e 11 53	− 1	e 21 36	− 4	e 14 48?	PP	—
Lwow		76·8	319	e 11 52	− 3	e 21 43	+ 1	—	—	—
Auckland	N.	78·5	139	—	—	e 22 0	− 1	i 22 24	SKS	e 33·0
Helwan		78·8	298	e 12 3	− 3	e 22 15	+11	—	—	—
Resolute Bay		78·9	10	i 12 5a	− 2	e 21 59	− 6	—	—	e 32·0
Skalnate Pleso		79·4	320	e 13 57	?	e 22 22	+12	e 15 57	PP	e 42·4
Budapest		80·8	318	e 12 27	+10	—	—	e 12 47	?	e 42·4
Belgrade		81·0	315	e 12 36a	+18	e 23 5	+38	—	—	e 49·1
Wellington		81·4	143	—	—	e 22 31	0	e 28 47	SS	e 34·6
Christchurch		81·8	146	e 11 57	−25	e 22 47	+12	e 28 7	SS	e 39·4
Prague		82·1	322	e 11 52	−32	e 22 17	−21	e 12 39	P	e 41·0
Scoresby Sund		82·4	349	i 12 50	+25	—	—	—	—	43·0
Jena		83·5	323	e 12 30	− 1	—	—	e 15 24	PP	—
Triest		84·9	318	e 12 33	− 5	22 59?	− 7	i 23 14	SKS	e 43·6
Stuttgart		86·0	323	e 12 41	− 2	—	—	e 16 8	PP	—
Karlsruhe	Z.	86·3	324	e 12 43	− 2	—	—	—	—	—
Aberdeen		86·5	333	—	—	i 23 22	0	i 28 52	SS	i 40·5
Strasbourg		86·9	323	e 12 46	− 2	e 23 38	+12	e 23 17	SKS	e 42·0
Messina		87·3	311	e 12 56	+ 6	e 23 29	0	e 29 35	SS	—
Rome		87·5	314	e 13 52	+61	e 23 31	0	e 29 34?	SS	—
Victoria		87·5	37	12 48	− 3	—	—	—	—	—
Pavia		87·9	320	e 11 16	?	e 23 33	− 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.
Seattle		88·5	38	e 12 57	+ 1	—	—	—	—	—
Kew		89·4	328	—	—	e 23 44	– 5	—	—	e 44·0
Paris		89·6	325	i 12 58	– 3	e 23 56	+ 5	i 13 18	pP	e 45·1
Rathfarnham Castle		90·9	332	e 18 57	PPP	—	—	—	—	—
Clermont-Ferrand		91·2	322	e 13 9	+ 1	e 22 57?	[–43]	—	—	—
Shasta Dam		92·4	43	e 13 13	– 1	—	—	—	—	—
Hungry Horse		92·5	33	i 13 13	– 1	i 22 26	?	—	—	—
Berkeley	Z.	94·1	46	e 13 18	– 4	—	—	e 13 25	pP	—
Reno	Z.	94·7	42	e 13 26	+ 2	—	—	—	—	—
Butte		94·8	34	e 13 25	0	—	—	—	—	—
Lick	Z.	94·8	46	e 13 22a	– 3	—	—	i 13 28	pP	—
Fresno	Z.	96·3	45	e 13 33	+ 1	—	—	—	—	—
Tinemaha	Z.	97·2	44	e 13 42	+ 6	—	—	—	—	—
Alicante		97·7	319	11 34	?	23 11	?	25 19	PPS	e 44·1
China Lake	Z.	98·3	44	e 13 44	+ 3	—	—	—	—	—
Almeria		99·9	318	11 47	?	—	—	—	—	—
Boulder City		100·0	43	e 13 50	+ 2	—	—	—	—	—
Granada		100·4	319	e 11 48a	?	23 30	?	14 57	?	50·4
Tamanrasset	Z.	102·6	302	14 21	+21	—	—	e 18 14	PP	—
Palisades		113·8	13	—	—	e 29 10	PS	—	—	e 55·6
Bogota		147·7	29	i 19 50	[+ 6]	—	—	—	—	89·4
Huancayo		160·0	57	e 20 6	[+ 5]	e 20 31	PKP_2	e 44 40	SS	e 76·0
La Paz		168·2	53	e 20 11	[+ 3]	38 47	PPS	21 14	PKP_2	—

Additional readings :—
Matusiro iE =4m.56s., eE =8m.41s.
New Delhi SSN =16m.41s.
Hyderabad SSE =17m.24s.
Poona SSE =18m.21s.
Riverview eN =19m.18s., iE =19m.25s., iE =20m.50s. and 23m.59s.
Kiruna eQN =35m.15s.
Upsala eE =21m.51s.
Istanbul eZ =17m.43s., eSKSN =21m.59s., ePSN =22m.15s., eSSE =26m.12s.
Helwan eZ =12m.26s., eN =22m.37s.
Skalnate Pleso e =23m.34s.
Christchurch eSSSE =31m.47s., eQN =34m.27s.
Prague e =13m.24s. and 13m.52s., ePP? =15m.27s.
Jena ePN =12m.34s., eN =12m.58s.
Triest eSSS =31m.23s.
Aberdeen iSSSN =33m.35s., iE =34m.22s.
Strasbourg e =13m.6s. and 13m.22s., eSS =29m.15s., eSSS =32m.57s., e =33m.57s.
Seattle e =13m.9s. and 13m.28s.
Paris esP? =13m.27s., ePP =16m.27s., iPP =16m.41s., eSKS =23m.26s., iSKKS = 23m.41s., ePS =24m.58s., iSP =25m.8s., iPPS =25m.38s., eSS =30m.14s., eSSS? = 34m.8s., eQ =36m.29s. and many unidentified readings.
Alicante SSS =33m.28s., Q =38m.5s.
Granada SS =30m.22s.
La Paz iSS =46m.7s.
Long waves were also recorded at Kanazawa, Pasadena, Harvard, Weston, Ivigtut, Bermuda, Galerazamba, Fort de France, and other European stations.

Oct. 22d. 12h. 48m. 38s. Epicentre 23°·9N. 121°·7E. (as at 11h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	N.	7·2	358	e 1 48	– 1	e 3 12	– 1	—	—	—
Manila		9·3	184	i 1 49	–28	i 4 4	– 1	—	—	—
Yakusima		10·2	49	e 2 33	+ 2	e 4 39	+12	—	—	—
Tomie		10·7	34	e 2 46	+ 8	e 6 16	L	—	—	(e 6·3)
Nagasaki		11·4	38	e 2 45	– 2	—	—	—	—	—
Kumamoto		11·9	40	e 2 58	+ 4	5 27	+18	—	—	—
Saga		12·0	37	2 56	+ 1	—	—	—	—	—
Hukuoka		12·3	36	i 3 13	+14	i 5 31	+13	—	—	6·6
Ooita		12·7	41	3 6	+ 1	5 46	+18	e 15 37	ScS	e 8·1
Simidu		13·3	46	e 3 18	+ 5	—	—	—	—	—
Matuyama		13·9	42	e 3 31	+10	e 6 4	+ 7	—	—	—
Koti		14·1	44	e 3 26	+ 3	e 6 15	+13	e 3 45	PP	7·5
Muroto		14·4	47	e 3 24	– 3	e 6 10	+ 1	—	—	e 6·8
Takamatu		15·1	43	e 3 37	+ 1	e 6 25	0	—	—	—
Yonago		15·3	39	e 3 32	– 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.
Sumoto		15·5	45	e 3 59	+17	e 7 41	Q	—	—	9·8
Kobe		15·9	45	e 3 51	+ 4	e 7 24	SS	e 5 1	?	e 9·5
Osaka		16·1	45	e 4 17	+28	—	—	—	—	8·7
Owase	Z.	16·2	48	e 3 47	− 3	—	—	—	—	13·5
Tu		16·8	47	e 4 13	+15	—	—	—	—	—
Kameyama		16·9	46	4 13	+14	7 41	SS	—	—	9·2
Hikone		17·0	45	e 3 53	− 8	—	—	—	—	—
Gihu		17·4	45	e 3 58	− 8	—	—	—	—	—
Kanazawa		18·0	41	e 3 57	−16	—	—	—	—	—
Matumoto	N.	18·7	44	e 4 40	+18	—	—	—	—	—
Misima		18·7	48	e 3 48	−34	e 7 8	−40	—	—	—
Osima		18·8	50	e 3 57	−26	—	—	—	—	—
Matusiro		19·0	42	4 20	− 6	7 46	− 9	8 3	S	9·3
Nagano	E.	19·1	43	e 4 44	+17	—	—	—	—	11·0
Oiwake		19·1	44	e 4 46	+19	—	—	—	—	—
Mera		19·2	48	e 5 14	PP	—	—	—	—	—
Yokohama		19·3	47	5 42	?	—	—	—	—	—
Kumagaya		19·5	46	e 4 37	+ 6	e 8 33	+27	—	—	—
Maebasi		19·5	45	e 4 35	+ 4	—	—	—	—	e 9·3
Tukubasan		20·1	47	e 5 1	+23	—	—	—	—	—
Vladivostok		21·0	22	i 4 43	− 4	—	—	—	—	—
Sendai		21·8	44	e 4 48	− 8	e 9 14	+22	—	—	11·0
Mizusawa	E.	22·4	42	5 15	+13	9 12	+ 8	—	—	12·6
	N.	22·4	42	5 28	+26	10 35	Q	—	—	13·4
Guam		24·1	110	5 24	+ 6	e 8 42	−52	—	—	—
Calcutta	E.	30·7	275	i 6 22k	+ 3	i 11 19	− 2	—	—	—
Irkutsk		31·3	340	e 6 22	− 2	11 28	− 3	—	—	—
New Delhi		40·0	287	e 7 38	0	i 13 44	0	13 32	PcS	16·8
Przhevalsk		40·2	308	i 7 42	+ 2	—	—	—	—	—
Kurmenty		40·4	309	i 7 41	0	—	—	—	—	—
Hyderabad	E.	40·9	270	i 7 49	+ 3	i 13 57	− 1	9 22	PP	20·5
Almata		41·4	310	i 7 50	0	e 14 9	+ 4	—	—	—
Ili		41·5	311	i 7 49	− 1	—	—	—	—	—
Naryn		41·7	307	i 7 55	+ 3	i 14 13	+ 3	—	—	—
Rybach'e		41·9	308	i 7 53	− 1	—	—	—	—	—
Krasnogorka		42·7	309	i 8 0	0	—	—	—	—	—
Frunse		43·0	309	e 8 4	+ 1	i 14 31	+ 2	—	—	—
Colombo	E.	43·5	255	8 9	+ 2	14 42	+ 6	—	—	25·7
Kodaikanal	E.	44·2	261	e 6 16	?	e 14 55	+ 9	—	—	—
Andijan		44·4	305	i 8 14	0	i 14 48?	− 1	—	—	—
Fergana		44·7	304	e 8 17	+ 1	i 14 54	0	—	—	—
Poona		44·8	273	i 8 17	0	i 14 53	− 2	10 3	PP	21·0
Bombay	E.	45·6	274	e 8 32	+ 8	e 15 6	0	—	—	—
Tchimkent		46·6	307	i 8 29	− 3	i 15 20	− 1	—	—	—
Tashkent		46·7	306	e 8 30	− 2	e 15 26?	+ 4	—	—	—
Stalinabad		46·9	302	i 8 33	− 1	i 15 29?	+ 4	—	—	—
Samarkand		48·4	303	8 46	0	—	—	—	—	—
Mary		52·4	301	i 9 16	0	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 30	− 2	i 17 6	− 5	—	—	—
Ashkabad		55·2	301	9 36	− 1	—	—	—	—	—
Kizyl-Arvat		56·7	303	9 47	− 1	—	—	—	—	—
Brisbane		59·4	147	i 10 7a	+ 1	e 18 15	0	—	—	—
Baku		61·4	305	e 10 23	+ 3	e 18 49	+ 9	—	—	—
Shemakla		62·3	305	10 25	− 1	—	—	—	—	—
Lenkoran		62·5	303	10 28	0	—	—	—	—	—
Riverview		63·9	153	e 10 44	+ 7	i 19 20	+ 8	—	—	—
Goris		64·3	304	10 40	+ 1	19 15	− 2	—	—	—
Tiflis		65·0	307	e 10 45	+ 1	i 19 28	+ 2	—	—	—
Erevan		65·5	305	e 10 48	+ 1	19 34	+ 2	—	—	—
Leninakan		65·9	307	e 10 57	+ 7	—	—	—	—	—
Piatigorsk		65·9	310	10 48	− 2	19 33	− 4	—	—	—
Abastumanj		66·4	307	e 10 55	+ 2	—	—	—	—	—
Moscow		67·3	323	e 10 58	− 1	19 49	− 5	—	—	—
College		68·8	27	e 11 5	− 3	—	—	—	—	—
Pulkovo		70·3	328	e 11 16	− 1	e 20 25	− 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.
Yalta		72·0	312	11 26	– 2	20 45	– 4	—	—	—
Kiruna		72·2	337	i 11 27	– 2	i 20 43	– 8	11 36	PcP	e 36·7
Helsinki	E.	72·8	330	—	—	e 20 53	– 5	—	—	—
Ksara		73·8	300	i 11 39	+ 1	e 21 19	+10	—	—	—
Upsala		76·4	331	e 14 38	PP	e 21 31	– 7	e 26 3	SS	e 38·4
Istanbul		76·6	310	e 11 55	+ 1	e 21 38	– 2	e 14 45	PP	—
Lwow		76·8	319	i 11 54	– 1	i 21 38	– 4	—	—	—
Auckland	N.	78·5	139	—	—	i 22 13	+12	i 22 33	SKS	34·6
Helwan		78·8	298	e 12 7	+ 1	22 2	– 2	17 4	PPP	—
Resolute Bay		78·9	10	i 12 5	– 2	e 21 56	– 9	e 23 2	SKS	—
Raciborzu	Z.	80·2	321	e 12 13	– 1	e 17 30	PPP	e 12 26	PcP	—
Copenhagen		80·7	328	—	—	22 30	+ 6	—	—	40·4
Budapest		80·8	318	e 12 42	+25	—	—	—	—	—
Belgrade		81·0	315	e 12 46	+28	e 22 24	– 3	e 18 44	PPP	e 52·2
Ogyalla		81·1	319	e 13 39	?	e 22 25	– 3	e 22 31	S	—
Wellington		81·4	143	—	—	e 23 3	+32	—	—	e 34·6
Christchurch		81·8	146	e 12 52	+30	e 23 2	+27	e 28 22	SS	e 40·0
Potsdam		82·0	325	—	—	i 22 37	0	—	—	e 42·4
Prague		82·1	322	e 12 23	– 1	e 22 37	– 1	e 12 32	PcP	—
Scoresby Sund		82·4	349	e 12 26	+ 1	22 40	– 1	—	—	43·4
Jena	Z.	83·5	323	e 12 31	0	—	—	—	—	—
Triest		84·9	318	e 12 31	– 7	i 22 56	–10	i 23 11	SKS	—
Stuttgart	Z.	86·0	323	e 12 41	– 2	—	—	—	—	—
Karlsruhe	Z.	86·3	324	e 12 45	0	—	—	—	—	—
Aberdeen	E.	86·5	333	—	—	i 23 8	[– 3]	—	—	—
Strasbourg		86·9	323	i 12 48	0	e 23 26	0	e 16 11	PP	41·4
Messina		87·3	311	e 12 49	– 1	e 23 29	0	—	—	—
Prato		87·4	317	e 12 38	–12	i 23 31	+ 1	—	—	—
Basle		87·5	322	e 13 1	+10	e 23 1	[–16]	—	—	e 50·5
Rome		87·5	314	e 12 32	–19	e 23 11	[– 6]	e 16 4	PP	—
Victoria		87·5	37	12 50	– 1	—	—	—	—	—
Pavia		87·9	320	—	—	e 23 10	[–10]	—	—	e 36·1
Seattle		88·5	38	e 13 0	+ 4	—	—	—	—	—
Kew		89·4	328	—	—	e 23 21	[– 8]	—	—	e 41·4
Paris		89·6	325	e 13 2	+ 1	e 23 40	[+10]	i 16 41	PP	e 46·4
Rathfarnham C.	Z.	90·9	332	e 14 34	?	—	—	—	—	—
Shasta Dam		92·4	43	i 13 14	0	—	—	—	—	—
Hungry Horse		92·5	33	i 13 14	0	—	—	e 16 49	PP	—
Reno	Z.	94·7	42	e 13 24k	0	—	—	—	—	—
Butte		94·8	34	i 13 27	+ 2	—	—	—	—	—
Lick	Z.	94·8	46	e 13 24k	– 1	—	—	—	—	—
Alicante		97·7	319	13 34	– 4	23 54	[–21]	40 22	Q	e 46·9
China Lake	Z.	98·3	44	e 13 41	0	—	—	—	—	—
Almeria		99·9	318	18 16	PP	—	—	—	—	—
Boulder City		100·0	43	e 13 52	+ 4	—	—	e 17 57	PP	—
Palomar	Z.	100·3	47	e 13 46	– 4	—	—	—	—	—
Granada		100·4	319	18 7k	PP	—	—	—	—	58·1
Tamanrasset	Z.	102·6	302	e 14 14	+14	e 18 21	PP	e 17 31	PKP	—
Bogota		147·7	29	i 19 48	[+ 4]	—	—	i 20 16	PKP_2	—
Huancayo		160·0	57	e 20 6	[+ 5]	e 24 59	PP	e 44 36	SS	e 60·9
La Paz		168·2	53	e 20 14	[+ 6]	i 32 2	?	i 21 22	PKP_2	—

Additional readings :—
Hyderabad SSE = 17m.16s.
Poona PPPE = 10m.47s., SSEN = 18m.1s., QE = 18m.52s.
Kiruna iSN = 20m.50s.
Upsala eSN = 21m.37s., eE = 34m.11s.
Istanbul ePPPZ = 16m.35s., eSKSZ = 21m.57s., eEZ = 24m.28s.
Helwan eZ = 12m.25s., iN = 22m.55s.
Resolute Bay i = 12m.14s.
Belgrade eNE = 25m.59s. and 46m.14s.
Ogyalla e = 14m.35s.
Prague e = 12m.47s., 13m.5s., and 22m.50s.
Triest iPS = 23m.53s., iPPS = 24m.38s.
Strasbourg eSKS = 23m.8s., eSS = 29m.13s., eSSS = 32m.52s., and other unidentified readings.
Rome ePSE = 24m.9s., eSSE = 29m.25s.

Continued on next page.

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Seattle e =13m.3s. and 13m.13s.
Paris i =13m.11s., e =16m.54s., i =19m.43s., eScS =23m.58s., eSP =24m.50s., eSS? = 29m.7s., i =31m.9s., e =31m.43s.
Tamanrasset eZ =17m.12s.
Long waves were also recorded at Pasadena, Harvard, Weston, Palisades, Ivigtut, Tacubaya, and other European stations.

Oct. 22d. 13h. 1m. 13s. Epicentre 23°·9N. 121°·7E. (as at 12h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking	E.	8·5	343	e 2 7	0	e 3 45	0	—	—	—
Manila		9·3	183	i 1 53	−24	e 3 48	−17	—	—	—
Yakusima		10·2	49	e 2 34	+ 3	—	—	—	—	—
Nagasaki		11·4	38	e 2 46	− 1	—	—	—	—	—
Kumamoto		11·9	40	e 2 52	− 2	7 18	L	—	—	(7·3)
Hukuoka		12·3	36	i 3 1	+ 2	—	—	—	—	e 6·2
Matuyama		13·9	42	e 3 42	+21	e 5 57	0	—	—	e 9·5
Hikone		17·0	45	e 4 30	+29	—	—	—	—	—
Matumoto	N.	18·7	44	e 4 45	+23	—	—	—	—	—
Matusiro		19·0	42	e 4 33	+ 7	—	—	—	—	e 9·2
Kumagaya		19·5	46	e 4 45	+14	—	—	—	—	—
Vladivostok		21·0	22	—	—	i 7 45	−52	—	—	—
Sendai		21·8	44	e 5 16	+20	e 9 27	+35	—	—	11·2
Mizusawa		22·4	42	e 5 28	+26	e 9 12	+ 8	e 9 17	?	14·4
Dehra Dun	N.	39·2	290	e 8 50	PP	—	—	—	—	—
Przhevalsk		40·2	308	e 7 45	+ 5	—	—	—	—	—
Kurmenty		40·4	309	i 7 43	+ 2	—	—	—	—	—
Ili		41·5	311	i 7 48	− 2	—	—	—	—	—
Naryn		41·7	307	i 7 54	+ 2	—	—	—	—	—
Krasnogorka		42·7	309	i 7 59	− 1	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 30	− 2	i 17 11?	0	—	—	—
Brisbane		59·4	147	i 10 7k	+ 1	—	—	—	—	—
Riverview	N.	63·9	153	—	—	i 19 19	+ 7	—	—	—
Tiflis		65·0	307	e 10 42	− 2	—	—	—	—	—
Piatigorsk		65·9	310	10 48	− 2	19 35	− 2	—	—	—
Abastumanj		66·4	307	e 10 56	+ 3	—	—	—	—	—
Moscow		67·3	323	10 57	− 2	i 19 48	− 6	—	—	—
Yalta		72·0	312	11 26	− 2	20 47	− 2	—	—	—
Kiruna		72·2	337	i 11 27k	− 2	e 20 47	− 4	i 11 35	PcP	i 46·4
Lwow		76·8	319	—	—	i 21 34	− 8	—	—	—
Helwan		78·8	298	12 6	0	21 59	− 5	15 5	PP	—
Resolute Bay		78·9	10	i 12 3k	− 4	e 22 0	− 5	—	—	—
Skalnate Pleso		79·4	320	—	—	e 22 8	− 2	e 22 33	ScS	—
Raciborzu		80·2	321	e 12 14	0	—	—	e 12 26	PcP	e 35·8
Budapest		80·8	318	e 12 17	0	e 22 23	− 2	—	—	37·8
Ogyalla		81·1	319	e 12 2	−16	e 22 9	−19	—	—	—
Potsdam		82·0	325	—	—	i 22 38?	+ 1	—	—	—
Prague		82·1	322	e 12 11	−13	e 22 38	0	e 23 27	PS	e 31·8
Triest		84·9	318	12 49?	+11	i 23 4	− 2	i 23 13	SKS	—
Stuttgart	Z.	86·0	323	e 12 41	− 2	—	—	—	—	—
Karlsruhe	Z.	86·3	324	e 12 46	+ 1	—	—	—	—	—
Aberdeen		86·5	333	—	—	e 23 22	0	e 32 32	SSS	—
Strasbourg		86·9	323	e 12 48	0	e 23 35	+ 9	—	—	—
Victoria		87·5	37	12 49	− 2	23 35	+ 4	—	—	—
Seattle		88·5	38	e 13 4	+ 8	—	—	—	—	—
China Lake	Z.	98·3	44	e 13 41	0	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 17 21	PKP	—	—	e 18 14	PP	—
Huancayo		160·0	57	e 20 5	[+ 4]	—	—	e 20 43	PKP_2	e 64·8
La Paz		168·2	53	e 19 59	[− 9]	—	—	i 24 35	PP	79·7

Additional readings :—
Helwan eZ =17m.2s., SKSN =22m.17s., iN =22m.53s.
Budapest eE =11m.48s., eN =22m.17s.
Ogyalla e =14m.19s. and 20m.16s.
Prague eS? =22m.31s., e =26m.15s.
Triest iPS =23m.53s., iSS =28m.29s.
Strasbourg e =12m.57s. and 13m.16s.
La Paz iZ =20m.15s.
Long waves were also recorded at Colombo and Upsala.

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Oct. 22d. 13h. 10m. 3s. Epicentre 23°·9N. 121°·7E. (as at 13h. 1m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		9·3	184	e 1 38	–39	—	—	—	—	—
Poona	Z.	44·8	273	i 8 18	+ 1	—	—	—	—	—
Brisbane		59·4	147	—	—	i 21 4	SS	—	—	—
Kiruna		72·2	337	i 11 29a	0	—	—	—	—	e 33·6
Resolute Bay		78·9	10	i 12 5	– 2	—	—	e 12 18	PcP	—
Budapest		80·8	318	—	—	e 22 57	PPS	e 24 57	?	—
Triest		84·9	318	—	—	e 23 13	+ 7	e 22 57	SKS	—
Stuttgart	Z.	86·0	323	e 12 44	+ 1	—	—	—	—	—
Aberdeen	N.	86·5	333	i 12 42	– 4	—	—	—	—	—
Strasbourg		86·9	323	e 12 48	0	—	—	e 13 4	PcP	—
Victoria		87·5	37	12 49	– 2	—	—	—	—	—
Paris		89·6	323	i 12 50	–11	—	—	—	—	—
China Lake	Z.	98·3	44	e 13 40	– 1	—	—	—	—	—

Additional readings :—
Resolute Bay e = 12m.47s.
Triest ePPS? = 24m.30s.
Strasbourg e = 13m.24s.

Oct. 22d. 14h. 46m. 42s. Epicentre 23°·9N. 121°·7E. (as at 13h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	N.	7·2	358	e 1 50	+ 1	e 3 17	+ 4	—	—	3·5
Manila		9·3	184	i 1 47	–30	i 3 37	–28	—	—	—
Yakusima		10·2	49	e 2 27	– 4	e 4 41	+14	—	—	—
Kumamoto		11·9	40	e 2 58	+ 4	—	—	—	—	—
Saga		12·0	37	e 3 7	+12	—	—	—	—	—
Hukuoka		12·3	36	e 2 54	– 5	5 34	+16	i 3 7	PP	6·4
Ooita		12·7	41	e 3 13	+ 8	e 5 52	+24	—	—	—
Simidu		13·3	46	e 3 53	+40	—	—	—	—	10·6
Matuyama		13·9	42	e 3 49	+28	e 6 27	+30	—	—	e 10·1
Koti		14·1	44	e 2 58	–25	e 6 19	+17	—	—	—
Muroto		14·4	47	e 3 19	– 8	e 5 37	–32	—	—	e 6·7
Takamatu		15·1	43	e 3 26	–10	e 6 26	+ 1	—	—	—
Osaka		16·1	45	e 4 8	+19	—	—	—	—	—
Hikone		17·0	45	e 4 31	+30	—	—	—	—	—
Gihu		17·4	45	e 4 21	+15	—	—	—	—	—
Matusiro		19·0	42	e 4 14	–12	e 7 51	– 4	8 12	SS	9·1
Nagano		19·1	43	e 4 52	PP	—	—	—	—	e 10·3
Oiwake		19·1	44	e 4 30	+ 3	—	—	—	—	—
Maebasi		19·5	45	e 4 50	PP	—	—	e 5 26	PPP	—
Niigata		20·4	40	e 5 18	PPP	—	—	—	—	—
Vladivostok		21·0	22	e 4 44	– 3	i 8 44	+ 7	—	—	—
Sendai		21·8	44	e 4 11	–45	—	—	—	—	e 11·2
Urakawa		25·3	38	e 5 36	+ 6	e 10 22	+28	—	—	e 12·5
Calcutta	E.	30·7	275	i 6 33a	+14	i 11 22	+ 1	13 28	Q	14·0
New Delhi		40·0	287	e 7 49	+11	e 13 45	+ 1	—	—	—
Przhevalsk		40·2	308	e 7 42	+ 2	—	—	—	—	—
Hyderabad	E.	40·9	270	7 48	+ 2	e 13 55	– 3	9 23	PP	—
Almata		41·4	310	e 7 53	+ 3	—	—	—	—	—
Naryn		41·7	307	i 7 54	+ 2	e 14 14	+ 4	—	—	—
Rybach'e		41·9	308	i 7 54	0	—	—	—	—	—
Krasnogorka		42·7	309	e 8 1	+ 1	—	—	—	—	—
Frunse		43·0	309	e 8 4	+ 1	e 14 31	+ 2	—	—	—
Colombo	E.	43·5	255	8 14	+ 7	14 52	+16	—	—	25·6
Kodaikanal	E.	44·2	261	e 8 12	0	—	—	—	—	—
Fergana		44·7	304	e 8 18	+ 2	e 14 56	+ 2	—	—	—
Poona		44·8	273	i 8 19	+ 2	i 14 57	+ 2	10 9	PP	—
Bombay	E.	45·6	274	e 8 30	+ 6	e 15 4	– 2	—	—	—
Tchimkent		46·6	307	i 8 33	+ 1	—	—	—	—	—
Tashkent		46·7	306	e 8 33	+ 1	e 15 22	0	—	—	—
Stalinabad		46·9	302	i 8 36	+ 2	e 15 25	0	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Samarkand		48·4	303	8 40	– 6	—	—	—	—	—
Mary		52·4	301	i 9 17	+ 1	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 33	+ 1	i 17 17	+ 6	—	—	—
Baku		61·4	305	e 10 23?	+ 3	e 18 49?	+ 9	—	—	—
Shemakla		62·3	305	10 27	+ 1	—	—	—	—	—
Lenkoran		62·5	303	10 27	– 1	—	—	—	—	—
Tiflis		65·0	307	e 10 44	0	e 19 26	0	—	—	—
Piatigorsk		65·9	310	10 48	– 2	e 19 38	+ 1	—	—	—
Abastumanj		66·4	307	e 10 53	0	—	—	—	—	—
Moscow		67·3	323	10 58	– 1	—	—	—	—	—
Yalta		72·0	312	11 26	– 2	20 51	+ 2	—	—	—
Kiruna		72·2	337	i 11 28a	– 1	e 20 52	+ 1	i 11 35	PcP	i 46·6
Ksara		73·8	300	e 11 40	+ 2	e 21 21	+12	—	—	—
Upsala		76·4	331	e 15 47	PP	e 21 13	–25	—	—	e 39·6
Istanbul	Z.	76·6	310	e 11 53?	– 1	—	—	e 9 51	?	—
Helwan		78·8	298	12 6	0	22 6	+ 2	22 24	SKS	—
Resolute Bay		78·9	10	e 12 4	– 3	e 21 56	– 9	—	—	e 41·8
Raciborzu	Z.	80·2	321	e 12 24	+10	e 20 46	?	e 13 53	PP	—
Potsdam		82·0	325	—	—	e 25 10	?	—	—	e 44·3
Prague		82·1	322	(e 12 28)	+ 4	(e 23 18)	PS	—	—	(e 45·3)
Collmberg		82·6	324	e 12 25	– 1	—	—	—	—	—
Jena		83·5	323	e 12 28	– 3	—	—	—	—	—
Triest		84·9	318	—	—	e 22 58	– 8	—	—	—
Stuttgart	Z.	86·0	323	e 12 55	+12	—	—	—	—	—
Aberdeen	E.	86·5	333	—	—	i 22 58	[–13]	—	—	e 44·4
Strasbourg		86·9	323	e 12 47	– 1	e 23 29	+ 3	—	—	e 47·3
Zürich		87·1	322	e 16 16	PP	—	—	—	—	—
Messina		87·3	311	e 12 55	+ 5	e 23 31	+ 2	—	—	—
Rome		87·5	314	e 12 49	– 2	e 23 44	+13	e 16 20	PP	—
Victoria		87·5	37	12 51	0	—	—	—	—	—
Pavia		87·9	320	—	—	e 22 24	?	—	—	—
Paris		89·6	325	—	—	e 26 45	?	—	—	e 47·3
Alicante		97·7	319	25 55	PS	36 44	?	52 48	Q	e 58·8
China Lake	Z.	98·3	44	e 13 41	0	—	—	—	—	—
Granada		100·4	319	—	—	26 11a	+47	—	—	—
Tamanrasset	Z.	102·6	302	e 18 16	PP	—	—	—	—	—
Huancayo		160·0	57	e 20 28	[+27]	—	—	—	—	—

Additional readings and note :—
Hyderabad SSE = 17m.21s.
Poona PPP = 10m.47s.
Kiruna eE = 13m.42s., eS?E = 20m.25s., eQN = 29m.36s.
Upsala eN = 19m.1s., eE = 28m.30s.
Prague readings have been decreased by two minutes.
Strasbourg e = 12m.57s. and 24m.38s.
Rome eSKSE = 23m.13s., eSSE = 29m.35s.
Alicante SS = 43m.58s. ; record wrongly interpreted.
Long waves were also recorded at Wellington, Timisoara, Copenhagen, De Bilt, Clermont-Ferrand, Kew, Harvard, and Palisades.

Oct. 22d. 15h. 29m. 47s. Epicentre 23°·9N. 121°·7E. (as at 14h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking		8·5	343	2 7a	0	—	—	—	—	—
Manila		9·3	184	i 1 53	–24	i 3 43	–22	—	—	—
Yakusima		10·2	49	e 2 33	+ 2	e 4 36	+ 9	—	—	8·8
Tomie	N.	10·7	34	e 2 39	+ 1	e 5 39	L	—	—	(e 5·6)
Unzendake		11·6	39	2 50	0	e 5 12	+11	—	—	—
Kumamoto		11·9	40	e 2 55	+ 1	5 23	+14	—	—	—
Hukuoka		12·3	36	e 3 1	+ 2	i 5 26	+ 8	—	—	6·3
Ooita		12 7	41	3 9	+ 4	5 45	+17	—	—	—
Simonoseki		12·9	37	3 12	+ 5	5 48	+15	—	—	—
Simidu		13·3	46	e 3 24	+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.
Matuyama		13·9	42	e 3 34	+13	e 6 4	+ 7	—	—	e 10·0
Koti		14·1	44	e 3 19	− 4	e 5 17	−45	e 3 44	PP	7·7
Hamada		14·2	37	e 4 25	+61	7 3	+59	—	—	8·2
Muroto		14·4	47	e 3 22	− 5	e 6 15	+ 6	—	—	e 7·0
Takamatu		15·1	43	e 3 36	0	e 6 30	+ 5	—	—	e 7·8
Yonago		15·3	39	e 3 58	+19	e 6 41	+11	—	—	7·8
Sumoto		15·5	45	3 51	+ 9	e 7 9	+34	—	—	e 7·8
Kobe		15·9	45	e 4 19	+32	e 8 16	L	—	—	e 9·9
Osaka		16·1	45	e 3 56	+ 7	—	—	—	—	8·1
Owase		16·2	48	e 3 57	+ 7	—	—	—	—	e 8·4
Toyooka		16·2	41	e 4 3	+13	e 8 7	L	—	—	(e 8·1)
Kameyama		16·9	46	e 4 3	+ 4	7 41	+34	—	—	13·3
Hikone		17·0	45	4 10	+ 9	e 7 58	+48	—	—	e 10·0
Gihu		17·4	45	e 4 18	+12	e 7 51	+32	—	—	—
Nagoya		17·4	46	e 4 19	+13	e 7 54	+35	—	—	—
Kanazawa		18·0	41	e 4 10	− 3	—	—	—	—	e 10·6
Shizuoka		18·2	48	e 4 23	+ 7	e 8 3	+26	—	—	e 9·9
Takayama		18·2	43	e 4 23	+ 7	—	—	—	—	—
Misima		18·7	48	e 4 27	+ 5	e 8 9	+21	—	—	—
Matumoto	N.	18·7	44	e 4 28	+ 6	—	—	—	—	—
Osima		18·8	50	e 4 21	− 2	e 7 24	−26	5 5	PPP	8·6
Matusiro		19·0	42	e 4 5	−21	7 45	−10	i 4 24	P	9·1
Nagano		19·1	43	e 4 35	+ 8	e 8 51	+54	—	—	10·6
Oiwake		19·1	44	e 4 22	− 5	—	—	—	—	—
Mera		19·2	48	e 4 45	+17	e 8 4	+ 5	—	—	—
Kumagaya		19·5	46	e 4 35	+ 4	e 8 27	+21	—	—	—
Maebasi		19·5	45	e 4 34	+ 3	e 8 46	+40	—	—	—
Tokyo		19·6	48	e 4 37	+ 5	i 8 9	+ 1	e 9 23	Q	e 9·7
Aikawa		19·9	39	e 4 42	+ 6	—	—	—	—	10·8
Utunomiya		20·1	46	e 4 39	+ 1	—	—	—	—	—
Niigata		20·4	40	e 4 33	− 8	—	—	—	—	—
Shirakawa		20·7	45	e 4 34	−10	—	—	—	—	—
Vladivostok		21·0	22	i 4 45	− 2	i 8 36?	− 1	—	—	—
Sendai		21·8	44	e 5 3	+ 7	e 9 40	+48	10 34	Q	11·7
Mizusawa		22·4	42	4 56	− 6	8 55	− 9	5 6	P	12·5
Guam		24·1	110	5 21	+ 3	—	—	—	—	—
Urakawa		25·3	38	e 5 6	−24	e 9 54	0	—	—	e 12·9
Calcutta	E.	30·7	275	i 6 28k	+ 9	i 11 24	+ 3	12 59	SS	—
Irkutsk		31·3	340	e 6 20	− 4	11 26	− 5	—	—	—
Djakarta		33·2	208	i 6 44	+ 4	e 12 8	+ 8	—	—	—
Bandong		33·6	206	e 6 46	+ 2	i 12 7	+ 1	—	—	—
New Delhi		40·0	287	e 7 38	0	i 13 45	+ 1	9 16	PP	16·8
Przhevalsk		40·2	308	e 7 39	− 1	—	—	—	—	—
Kurmenty		40·4	309	i 7 41	0	—	—	—	—	—
Hyderabad	E.	40·9	270	i 7 50	+ 4	i 13 58	0	9 23	PP	20·7
Almata		41·4	310	i 7 48	− 2	—	—	—	—	—
Ili		41·5	311	i 7 43	− 7	13 59	− 8	—	—	—
Naryn		41·7	307	i 7 52	0	i 14 12	+ 2	—	—	—
Rybach'e		41·9	308	e 7 55	+ 1	—	—	—	—	—
Krasnogorka		42·7	309	i 7 58	− 2	—	—	—	—	—
Frunse		43·0	309	i 8 5	+ 2	—	—	—	—	—
Colombo	E.	43·5	255	8 11	+ 4	14 43	+ 7	—	—	25·5
Kodaikanal	E.	44·2	261	e 8 16	+ 4	e 14 55	+ 9	—	—	—
Andijan		44·4	305	i 8 12	− 2	14 51	+ 2	—	—	—
Fergana		44·7	304	e 8 15	− 1	i 14 55	+ 1	—	—	—
Poona		44·8	273	i 8 17	0	i 14 55	0	10 2	PP	—
Bombay		45·6	274	i 8 26	+ 2	i 14 59	− 7	18 22	SS	—
Tchimkent		46·6	207	i 8 30	− 2	i 15 19	− 2	—	—	—
Tashkent		46·7	306	e 8 32	0	—	—	—	—	—
Stalinabad		46·9	302	i 8 34	0	i 15 30	+ 5	—	—	—
Samarkand		48·4	303	e 8 45	− 1	—	—	—	—	—
Mitchell Field		54·2	42	i 9 25	− 4	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 30	− 2	—	—	—	—	—
Kizyl-Arvat		56·7	303	e 9 47	− 1	—	—	—	—	—
Brisbane	Z.	59·4	147	i 10 7k	+ 1	i 18 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.
Baku		61·4	305	e 10 30?	+10	e 18 49?	+ 9	—	—	—
Shemakla		62·3	305	10 24	− 2	—	—	—	—	—
Lenkoran		62·5	303	10 27	− 1	i 19 54	+60	—	—	—
Riverview		63·9	153	i 10 42	+ 5	i 19 18	+ 6	—	—	e 29·8
Tiflis		65·0	307	e 10 47	+ 3	e 19 31?	+ 5	—	—	—
Erevan		65·5	305	e 10 45	− 2	19 31	− 1	—	—	—
Gori		65·5	307	e 10 54?	+ 7	—	—	—	—	—
Leninakan		65·9	307	e 10 50	0	—	—	—	—	—
Piatigorsk		65·9	310	10 47	− 3	19 31	− 6	—	—	—
Moscow		67·3	323	10 55	− 4	e 19 45	− 9	—	—	—
College		68·8	27	e 11 4	− 4	—	—	—	—	—
Pulkovo		70·3	328	e 11 15	− 2	—	—	—	—	—
Yalta		72·0	312	11 25	− 3	20 46	− 3	—	—	—
Kiruna		72·2	337	i 11 26	− 3	i 20 46	− 5	i 11 47	PcP	e 32·2
Helsinki		72·8	330	—	—	e 20 53	− 5	—	—	e 36·2
Ksara		73·8	300	i 11 39	+ 1	21 18	+ 9	—	—	—
Kishinev		74·8	315	11 41	− 3	21 15	− 5	—	—	—
Apia		75·0	112	11 45	0	—	—	—	—	—
Upsala		76·4	331	—	—	e 21 33	− 5	e 30 13?	SSS	e 37·2
Istanbul		76·6	310	e 11 53	− 1	e 21 37	− 3	e 14 45	PP	e 29·2
Lwow		76·8	319	i 11 55	0	i 21 41	− 1	—	—	—
Bucharest		77·5	313	e 12 19	+20	—	—	—	—	—
Auckland	N.	78·5	139	—	—	21 55	− 6	i 22 14	SKS	32·9
Helwan		78·8	298	12 7	+ 1	22 4	0	22 19	SKS	—
Resolute Bay		78·9	10	e 12 3	− 4	e 21 58	− 7	—	—	—
Skalnate Pleso		79·4	320	e 12 18	+ 9	e 22 13?	+ 3	e 22 28	SKS	—
Sofia		79·6	312	e 12 13	+ 3	e 22 15	+ 3	—	—	—
Raciborzu		80·2	321	e 12 16	+ 2	e 22 19	0	e 12 20	PcP	e 43·2
Copenhagen		80·7	328	i 12 16	0	22 32	+ 8	23 23	PPS	39·2
Budapest		80·8	318	e 12 33	+16	e 22 23	− 2	e 12 43	?	e 42·9
Belgrade		81·0	315	e 12 22a	+ 4	e 22 26	− 1	—	—	e 52·6
Ogyalla		81·1	319	e 12 19	+ 1	e 22 31	+ 3	e 15 33	PP	—
Wellington		81·4	143	—	—	i 22 32	+ 1	e 27 8	SS	e 34·4
Christchurch		81·8	146	e 12 23	+ 1	e 22 38	+ 3	e 15 38	PP	39·6
Potsdam		82·0	325	e 12 45	+22	i 22 38?	+ 1	—	—	e 40·2
Prague		82·1	322	e 12 27	+ 3	e 22 36	− 2	e 15 51	PP	e 42·2
Scoresby Sund		82·4	349	e 12 17	− 8	e 22 36	− 5	23 40	PS	e 40·2
Collmberg	Z.	82·6	324	e 12 24	− 2	—	—	—	—	—
Jena	Z.	83·5	323	e 12 30	− 1	—	—	—	—	—
Triest		84·9	318	e 12 40	+ 2	i 23 6	0	i 23 22	SKS	e 44·8
Taranto		85·0	313	—	—	e 22 13?	?	—	—	—
Witteveen	Z.	85·1	327	e 12 43	+ 4	—	—	—	—	—
Stuttgart	Z.	86·0	323	e 12 42	− 1	—	—	—	—	—
Karlsruhe	Z.	86·3	324	e 12 44	− 1	—	—	—	—	—
Aberdeen		86·5	333	i 17 0	PP	i 23 21	− 1	—	—	e 41·0
Strasbourg		86·9	323	e 12 47	− 1	—	—	e 16 51	PP	e 44·2
Zürich		87·1	322	e 12 48	− 1	e 23 26	− 2	e 15 55	PP	—
Messina	Z.	87·3	311	e 12 47	− 3	e 23 31	+ 2	—	—	—
Prato		87·4	317	e 12 46	− 4	i 23 33	+ 3	—	—	—
Basle		87·5	322	e 12 52	+ 1	e 22 23	?	e 21 31	?	e 47·2
Rome		87·5	314	e 12 48	− 3	i 23 34	+ 3	e 16 13	PP	—
Victoria		87·5	37	12 50	− 1	23 31	0	—	—	—
Pavia		87·9	320	—	—	e 23 32	− 3	—	—	e 46·2
Neuchatel		88·2	322	—	—	e 29 8	SS	—	—	—
Seattle		88·5	38	e 13 0	+ 4	e 23 46	+ 5	e 24 4	PS	—
Paris		89·6	325	i 13 3	+ 2	—	—	e 16 35	PP	e 46·2
Rathfarnaim C.	Z.	90·9	332	—	—	e 28 28	?	—	—	—
Shasta Dam		92·4	43	i 13 13	− 1	—	—	—	—	—
Hungry Horse		92·5	33	i 13 14	0	e 23 47	[0]	—	—	—
Saskatoon		93·3	28	—	—	e 23 31	[−21]	—	—	—
Berkeley		94·1	46	e 13 22a	0	e 23 51	[− 5]	e 25 11	PS	—
Reno	Z.	94·7	42	e 13 25a	+ 1	—	—	—	—	—
Butte		94·8	34	i 13 28	+ 3	—	—	—	—	—
Ivigtut		94·8	355	17 41	PP	24 31	− 5	—	—	45·2
Lick	Z.	94·8	46	i 13 25a	0	i 15 17	?	—	—	—

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.
Fresno	Z.	96·3	45	e 13 35	+ 3	—	—	—	—	—
Algiers Univ.	Z.	96·4	314	i 17 24a	PP	—	—	—	—	—
Alicante		97·7	319	e 13 43	+ 5	e 25 27	+26	19 55	PPP	e 46·6
China Lake	Z.	98·3	44	e 13 41	0	—	—	—	—	—
Pasadena	Z.	99·0	47	i 13 46	+ 2	—	—	—	—	e 46·9
Almeria		99·9	318	e 18 1	PP	28 29	PPS	—	—	59·8
Boulder City		100·0	43	e 13 52	+ 4	—	—	—	—	—
Granada		100·4	319	i 17 28a	PKP	34 56	SSS	19 14	PP	50·5
Tamanrasset	Z.	102·6	302	14 30	+30	—	—	e 18 14	PP	—
Pretoria	Z.	103·0	247	i 14 31	+29	i 31 13	SS	e 18 55	PP	—
Bermuda		123·7	6	e 22 35	PKS	e 32 5	PPS	—	—	e 61·7
San Juan		137·3	11	e 19 40	[+14]	—	—	—	—	—
Fort de France		141·5	4	e 23 13	SKP	—	—	—	—	—
Bogota		147·7	29	i 19 50	[+ 6]	i 38 11	PPS	—	—	67·2
Huancayo		160·0	57	e 20 5	[+ 4]	e 44 35	SS	—	—	e 75·8
La Paz		168·2	53	e 20 15	[+ 7]	38 47	PPS	25 11	PP	80·9

Additional readings :—
Hukuoka iP = 3m.6s., iN = 3m.16s.
Kobe eE = 4m.40s., eZ = 4m.45s., eN = 5m.45s., eE = 6m.59s.
Sendai e = 8m.50s.
New Delhi PcSN = 13m.35s.
Hyderabad SSE = 17m.17s.
Poona PPPE = 10m.46s., ScSE = 17m.56s.
Mitchell Field iP = 9m.30s.
Riverview iE = 19m.30s., 19m.55s., and 20m.36s.
Kiruna iZ = 12m.35s., eE = 13m.29s. and 19m.49s., eSN = 20m.51s., eE = 29m.13s.?.
Istanbul ePPPZ = 16m.32s., eSKSE = 22m.0s., ePSE = 22m.11s., ePPSE = 22m.22s.?.
Auckland eSSN = 26m.13s
Helwan eZ = 12m.29s.
Skalnate Pleso e = 12m.42s., 15m.19s., and 17m.24s.
Raciborzu ePcPN = 12m.27s., ePPZ = 17m.1s., eScSE = 22m.37s.
Ogyalla e = 14m.17s., 19m.45s., 22m.53s., and 24m.46s.
Christchurch eSS = 28m.13s., eQE = 31m.43s.
Prague e = 12m.34s., 12m.44s., and 13m.24s., ePS = 23m.21s.
Scoresby Sund e = 12m.24s.
Triest iPS = 23m.54s., iSS = 28m.30s.
Strasbourg i = 13m.10s., e = 14m.56s.
Rome eSKSE = 23m.3s., iSSE = 29m.30s.
Seattle e = 13m.12s.,
Paris i = 13m.13s., e = 16m.38s.
Berkeley iZ = 15m.14s.
Alicante PS = 26m.38s., SSS = 35m.37s., Q = 40m.43s.
La Paz iZ = 21m.38s.
Long waves were also recorded at Tananarive, La Plata, Galerazamba, Harvard, Weston, Palisades, and other European stations.

Oct. 22d. 16h. 6m. 55s. Epicentre 23°·9N. 121°·7E. (as at 15h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	N.	7·2	358	e 1 47	– 2	3 13	0	—	—	—
Manila		9·3	184	e 2 0	–17	—	—	—	—	—
Yakusima		10·2	49	e 2 33	+ 2	e 4 30	+ 3	—	—	—
Unzendake		11·6	39	e 2 52	+ 2	e 5 0	– 1	—	—	—
Kumamoto		11·9	40	e 2 57	+ 3	—	—	—	—	—
Saga		12·0	37	2 59	+ 4	—	—	—	—	—
Hukuoka		12·3	36	i 3 2	+ 3	i 5 19	+ 1	—	—	e 6·6
Ooita		12·7	41	3 8	+ 3	5 30	+ 2	—	—	e 8·0
Simidu		13·3	46	e 3 27	+14	—	—	—	—	—
Matuyama		13·9	42	e 3 35	+14	e 6 1	+ 4	—	—	e 8·5
Koti		14·1	44	e 3 26	+ 3	e 6 37	+35	—	—	—
Muroto		14·4	47	e 3 24	– 3	e 5 51	–18	—	—	e 6·3
Takamatu		15·1	43	e 3 29	– 7	e 6 23	– 2	—	—	—
Osaka		16·1	45	e 4 10	+21	—	—	—	—	—
Hikone		17·0	45	e 4 19	+18	e 7 44	+34	—	—	—
Matusiro		19·0	42	e 4 35	+ 9	e 8 26	+31	—	—	e 9·6
Nagano		19·1	43	e 4 59	PP	—	—	—	—	e 11·1
Kumagaya		19·5	46	e 4 53	PP	e 8 41	SS	—	—	—
Maebasi		19·5	45	e 4 58	PP	e 8 31	SS	e 5 9	PPP	—
Niigata		20·4	40	e 5 5	PP	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		21·0	22	e 4 42	– 5	i 8 35	– 2	—	—	—
Sendai		21·8	44	e 4 36	–20	e 8 49	– 3	—	—	11·1
Przhevalsk		40·2	308	e 7 42	+ 2	—	—	—	—	—
Kurmenty		40·4	309	e 7 42	+ 1	—	—	—	—	—
Ili		41·5	311	e 7 51	+ 1	—	—	—	—	—
Naryn		41·7	307	i 7 55	+ 3	i 14 25	+15	—	—	—
Khorog		44·7	299	e 8 17	+ 1	—	—	—	—	—
Poona	Z.	44·8	273	i 8 20	+ 3	—	—	—	—	—
Stalinabad		46·9	302	e 8 50	+16	—	—	—	—	—
Brisbane	Z.	59·4	147	i 10 10k	+ 4	—	—	—	—	—
Tsikhlis-Dzhvari		66·0	307	e 10 51	+ 1	—	—	—	—	—
Yalta		72·0	312	11 26	– 2	20 54	+ 5	—	—	—
Kiruna		72·2	337	i 11 28k	– 1	24 5?	SS	i 11 38	PcP	e 34·6
Ksara		73·8	300	i 11 45	+ 7	i 16 36	PPP	—	—	—
Helwan	Z.	78·8	298	e 12 5	– 1	—	—	e 12 26	PcP	—
Resolute Bay		78·9	10	i 12 4k	– 3	—	—	—	—	—
Skalnate Pleso		79·4	320	e 13 57	?	e 23 16	PPS	e 26 21	SS	—
Raciborzu	Z.	80·2	321	e 12 14	0	e 18 50	?	e 16 14	PP	—
Prague		82·1	322	e 13 10	+46	e 23 28	PS	e 23 38	PPS	e 46·1
Triest		84·9	318	—	—	e 9 24?	?	—	—	—
Stuttgart	Z.	86·0	323	e 12 40	– 3	—	—	—	—	—
Karlsruhe	Z.	86·3	324	e 12 41	– 4	—	—	—	—	—
Strasbourg		86·9	323	e 12 50?	+ 2	—	—	e 13 12	PcP	—
Victoria		87·5	37	12 50	– 1	—	—	—	—	—
Paris		89·6	325	i 13 1	0	—	—	—	—	—
Saskatoon		93·3	28	e 17 5	PP	—	—	—	—	—
Reno	Z.	94·7	42	e 13 29a	+ 5	—	—	—	—	—
Lick		94·8	46	e 13 25a	0	—	—	—	—	—
China Lake	Z.	98·3	44	e 13 40	– 1	—	—	—	—	—
Granada		100·4	319	24 7k	SKS	(24 7)	[–22]	—	—	—
Tamanrasset	Z.	102·6	302	e 18 15	PP	—	—	—	—	—

Additional readings :—
Kiruna iZ = 12m.44s.
Prague e = 14m.0s., 14m.11s., and 14m.49s.
Long waves were also recorded at other European stations.

Oct. 22d. 18h. 42m. 35s. Epicentre 23°·9N. 121°·7E. (as at 16h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking		8·5	343	2 11	+ 4	3 49	+ 4	—	—	—
Manila		9·3	184	i 1 37	–40	—	—	—	—	—
Yakusima		10·2	49	e 2 39	+ 8	—	—	—	—	—
Unzendake		11·6	39	e 2 57	+ 7	e 5 6	+ 5	—	—	—
Saga		12·0	37	3 5	+10	—	—	—	—	—
Hukuoka		12·3	36	i 3 5	+ 6	—	—	—	—	6·8
Ooita		12·7	41	3 14	+ 9	5 37	+ 9	—	—	—
Matuyama		13·9	42	e 4 5	+44	e 6 54	+57	—	—	e 9·5
Koti		14·1	44	e 3 33	+10	e 6 46	+44	—	—	—
Muroto		14·4	47	e 3 26	– 1	—	—	—	—	—
Takamatsu		15·1	43	e 2 41	+ 5	e 5 57	–28	—	—	—
Osaka		16·1	45	e 4 32	?	—	—	—	—	—
Kameyama		16·9	46	e 4 13	+14	e 7 49	+42	—	—	e 8·7
Hikone		17·0	45	e 4 17	+16	—	—	—	—	—
Gihu		17·4	45	e 4 22	+16	e 7 56	+37	—	—	—
Matumoto	N.	18·7	44	e 4 44	+22	—	—	—	—	—
Matusiro		19·0	42	4 44	+18	e 8 2	+ 7	—	—	9·5
Nagano		19·1	43	e 4 25	– 2	—	—	—	—	e 9·4
Oiwake		19·1	44	e 4 41	+14	—	—	—	—	—
Yokohama		19·3	47	e 4 37	+ 8	—	—	—	—	—
Kumagaya		19·5	46	e 4 39	+ 8	e 8 32	+26	—	—	—
Maebasi		19·5	45	e 4 37	+ 6	—	—	—	—	—
Vladivostok		21·0	22	e 4 45	– 2	—	—	—	—	—
Sendai		21·8	44	e 5 1	+ 5	e 9 43	SS	e 9 8	PcP	11·2
Calcutta	E.	30·7	275	i 6 16k	– 3	i 11 25	+ 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.
Irkutsk		31·3	340	6 20	– 4	—	—	—	—	—
New Delhi		40·0	287	e 7 32	– 6	e 13 44	0	13 33	PcS	16·8
Przhevalsk		40·2	308	e 7 38	– 2	—	—	—	—	—
Hyderabad	E.	40·9	270	i 7 41	– 5	e 13 32	–26	9 14	PP	—
Almata		41·4	310	e 7 48	– 2	—	—	—	—	—
Naryn		41·7	307	e 7 48	– 4	i 14 14	+ 4	—	—	—
Rybach'e		41·9	308	e 7 52	– 2	—	—	—	—	—
Krasnogorka		42·7	309	i 7 57	– 3	—	—	—	—	—
Frunse		43·0	309	i 8 1	– 2	—	—	—	—	—
Colombo	E.	43·5	255	8 0	– 7	14 33	– 3	—	—	25·2
Kodaikanal	E.	44·2	261	e 8 10	– 2	e 14 49	+ 3	—	—	—
Fergana		44·7	304	8 15	– 1	e 14 58	+ 4	—	—	—
Poona		44·8	273	i 8 11	– 6	i 14 30	–25	9 56	PP	—
Bombay	E.	45·6	274	i 8 19	– 5	e 14 52	–14	10 8	PP	—
Tchimkent		46·6	307	i 8 29	– 3	i 15 26	+ 5	—	—	—
Tashkent		46·7	306	e 8 29	– 3	i 15 21?	– 1	—	—	—
Stalinabad		46·9	302	i 8 32	– 2	e 15 29?	+ 4	—	—	—
Samarkand		48·4	303	8 46	0	—	—	—	—	—
Mary		52·4	301	i 9 13	– 3	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 28	– 4	17 8	– 3	—	—	—
Ashkabad		55·2	301	i 9 35	– 2	i 17 28	+ 8	—	—	—
Kizyl-Arvat		56·7	303	e 9 44	– 4	—	—	—	—	—
Brisbane	Z.	59·4	147	i 9 59k	– 7	—	—	—	—	—
Baku		61·4	305	e 10 19	– 1	—	—	—	—	—
Shemakla		62·3	305	10 23	– 3	18 57	+ 5	—	—	—
Lenkoran		62·5	303	10 22	– 6	18 56	+ 2	—	—	—
Tiflis		65·0	307	e 10 40	– 4	e 19 31?	+ 5	—	—	—
Erevan		65·5	305	e 10 44	– 3	19 37	+ 5	—	—	—
Gori		65·5	307	e 10 47?	0	—	—	—	—	—
Piatigorsk		65·9	310	10 45	– 5	—	—	—	—	—
Abastumanj		66·4	307	e 10 54	+ 1	—	—	—	—	—
Yalta		72·0	312	11 22	– 6	e 20 47	– 2	—	—	—
Kiruna		72·2	337	i 11 28	– 1	e 20 54	+ 3	e 29 43	Q	e 39·2
Ksara		73·8	300	i 11 34	– 4	21 59	PS	—	—	—
Upsala		76·4	331	—	—	i 29 49	SSS	—	—	e 39·4
Istanbul	Z.	76·6	310	e 11 50	– 4	—	—	—	—	—
Lwow		76·8	319	e 11 51	– 4	—	—	—	—	—
Helwan		78·8	298	12 2	– 4	e 21 58	– 6	e 12 31	PcP	—
Resolute Bay		78·9	10	e 12 3	– 4	e 22 2	– 3	—	—	e 40·8
Skalnate Pleso		79·4	320	—	—	e 22 43	SKS	—	—	—
Raciborzu	Z.	80·2	321	e 12 11	– 3	—	—	—	—	—
Copenhagen		80·7	328	e 12 11	– 5	—	—	—	—	41·4
Ogyalla		81·1	319	e 16 56	PP	e 23 15	PS	—	—	—
Potsdam		82·0	325	i 12 22k	– 1	i 22 57?	+20	—	—	e 42·4
Prague		82·1	322	e 12 35	+11	e 22 52	+14	e 16 10	PP	e 43·4
Scoresby Sund		82·4	349	e 12 24	– 1	—	—	—	—	—
Collmberg	Z.	82·6	324	e 12 20	– 6	—	—	—	—	—
Jena	Z.	83·5	323	e 12 27	– 4	—	—	—	—	—
Triest		84·9	318	e 12 42	+ 4	e 23 7	+ 1	—	—	—
Witteveen	Z.	85·1	327	e 12 43	+ 4	—	—	—	—	—
Stuttgart	Z.	86·0	323	e 12 38	– 5	—	—	—	—	—
Strasbourg		86·9	323	e 12 44	– 4	—	—	—	—	—
Messina		87·3	311	e 12 47	– 3	e 23 25	– 4	e 23 53	ScS	—
Rome		87·5	314	e 12 44	– 7	e 23 25	– 6	e 16 15	PP	—
Victoria		87·5	37	12 53	+ 2	—	—	—	—	—
Paris		89·6	325	12 57	– 4	—	—	i 13 4	PcP	e 45·4
Reno	Z.	94·7	42	e 13 29a	+ 5	—	—	—	—	—
Lick	Z.	94·8	46	e 13 23k	– 2	—	—	—	—	—
China Lake	Z.	98·3	44	e 13 41	0	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 18 8	PP	—	—	—	—	—

For Notes see next page.

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NOTES TO OCTOBER 22d. 18h. 42m. 35s.

Additional readings :—
Poona PPSE =14m.52s.
Upsala eN =29m.56s.
Prague e =12m.47s., 13m.39s., and 14m.48s., eS? =23m.2s.
Strasbourg e =13m.27s.
Paris e =15m.24s.
Tamanrasset eZ =17m.54s.
Long waves were also recorded at Palisades, Harvard, Weston, Bermuda, and other European stations.

Oct. 22d. 20h. 24m. 45s. Epicentre 23°·9N. 121°·7E. (as at 18h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		9·3	184	i 1 57	−20	e 3 49	−16	—	—	—
Yakusima		10·2	49	e 2 33	+ 2	—	—	—	—	—
Unzendake		11·6	39	e 3 1	+11	—	—	—	—	—
Saga		12·0	37	3 10	+15	—	—	—	—	—
Hukuoka		12·3	36	e 3 0	+ 1	e 5 25	+ 7	—	—	e 6·2
Ooita		12·7	41	e 3 7	+ 2	—	—	—	—	—
Koti		14·1	44	e 3 48	PP	e 6 43	SS	—	—	—
Hamada		14·2	37	4 34	+70	7 14	L	—	—	(7·2)
Matusiro		19·0	42	4 20	− 6	e 7 47	− 8	e 8 8	?	9·2
Kumagaya		19·5	46	e 4 47	+16	—	—	—	—	—
Tokyo		19·6	48	—	—	e 7 54	−14	—	—	—
Vladivostok		21·0	22	e 4 43	− 4	i 8 38	+ 1	—	—	—
Calcutta	E.	30·7	275	e 6 19	0	i 11 29	+ 8	13 9	SS	14·8
Irkutsk		31·3	340	e 6 20	− 4	e 11 25?	− 6	—	—	—
New Delhi		40·0	287	e 7 38	0	i 13 42	− 2	—	—	17·0
Przhevalsk		40·2	308	e 7 38	− 2	—	—	—	—	—
Almata		41·4	310	e 7 51	+ 1	—	—	—	—	—
Ili		41·5	311	e 7 49	− 1	—	—	—	—	—
Naryn		41·7	307	i 7 53	+ 1	i 14 10	0	—	—	—
Rybach'e		41·9	308	e 7 53	− 1	e 14 12	− 1	—	—	—
Krasnogorka		42·7	309	i 8 2	+ 2	—	—	—	—	—
Frunse		43·0	309	i 8 5	+ 2	—	—	—	—	—
Fergana		44·7	304	e 8 16	0	e 14 55?	+ 1	—	—	—
Poona		44·8	273	i 8 18	+ 1	i 14 56	+ 1	10 6	PP	—
Bombay	E.	45·6	274	e 8 26	+ 2	e 14 58	− 8	10 16	PP	—
Tchimkent		46·6	307	i 8 32	0	—	—	—	—	—
Tashkent		46·7	306	e 8 32	0	e 15 21	− 1	—	—	—
Stalinabad		46·9	302	i 8 33	− 1	—	—	—	—	—
Ashkabad		55·2	301	i 9 38	+ 1	—	—	—	—	—
Kizyl-Arvat		56·7	303	9 47	− 1	—	—	—	—	—
Brisbane	Z.	59·4	147	i 10 6a	0	—	—	—	—	—
Tsikhlis-Dzhvari		66·0	307	e 10 54	+ 4	—	—	—	—	—
Kiruna		72·2	337	i 11 27	− 2	—	—	i 11 51	PcP	e 38·4
Ksara		73·8	300	e 11 40	+ 2	e 21 55	PPS	—	—	—
Helwan	Z.	78·8	298	e 12 4	− 2	—	—	e 13 27	?	—
Prague		82·1	322	e 15 40	PP	—	—	—	—	—
Triest		84·9	318	—	—	e 22 47	−19	—	—	—
Strasbourg		86·9	323	e 12 53?	+ 5	—	—	—	—	—
Paris		89·6	325	e 13 3	+ 2	—	—	—	—	e 47·2
Reno	Z.	94·7	42	e 13 28a	+ 4	—	—	—	—	—
Lick		94·8	46	i 13 25a	0	—	—	—	—	—
China Lake	Z.	98·3	44	e 13 40	− 1	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 18 16	PP	—	—	—	—	—
Pennsylvania		113·1	16	—	—	i 35 31	SS	—	—	—

Additional readings :—
Calcutta e?E =12m.29s.
Paris e? =12m.54s., i =13m.11s.
Lick iZ =13m.51s.
Long waves to this or the next 20h. shock were also recorded at Palisades, Weston, Bermuda, Scoresby Sund, and other European stations.

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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Oct. 22d. 20h. 51m. 39s. Epicentre 23°·9N. 121°·7E. (as at 20h. 24m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking	E.	8·5	343	e 2 4	– 3	3 42	– 3	—	—	—
Manila		9·3	184	i 1 53	–24	e 3 45	–20	—	—	—
Yakusima		10·2	49	e 2 27	– 4	e 5 11	L	—	—	(e 5·2)
Tomie		10·7	34	e 2 46	+ 8	—	—	—	—	—
Unzendake		11·6	39	2 59	+ 9	e 5 5	+ 4	—	—	—
Kumamoto		11·9	40	e 2 56	+ 2	—	—	—	—	—
Saga		12·0	37	2 59	+ 4	—	—	—	—	—
Hukuoka		12·3	36	e 2 59	0	e 5 29	+11	i 3 9	PP	6·5
Ooita		12·7	41	3 8	+ 3	5 49	SS	—	—	e 9·3
Simonoseki		12·9	37	3 47	+40	—	—	—	—	—
Simidu		13·3	46	e 3 19	+ 6	—	—	—	—	—
Koti		14·1	44	e 3 17	– 6	e 6 47	+45	—	—	—
Muroto		14·4	47	e 3 27	0	e 6 36	+27	—	—	e 7·2
Takamatu		15·1	43	e 3 35	– 1	—	—	—	—	—
Sumoto		15·5	45	3 55	+13	6 44	+ 9	—	—	e 7·8
Osaka		16·1	45	e 4 8	+19	—	—	—	—	—
Kameyama		16·9	46	e 3 32	–27	e 7 14	+ 7	—	—	e 8·2
Hikone		17·0	45	e 3 58	– 3	—	—	—	—	—
Gihu		17·4	45	e 4 24	+18	—	—	—	—	—
Nagoya		17·4	46	e 4 26	+20	—	—	—	—	—
Matusiro		19·0	42	4 19	– 7	e 7 43	–12	e 8 2	S	e 8·8
Oiwake		19·1	44	e 4 43	+16	—	—	—	—	—
Kumagaya		19·5	46	e 4 42	+11	e 8 19	+13	—	—	—
Maebasi		19·5	45	e 4 40	+ 9	—	—	—	—	—
Tokyo		19·6	48	e 4 51	+19	e 8 35	+27	e 5 8	PPP	10·8
Niigata		20·4	40	e 4 41	0	—	—	—	—	—
Vladivostok		21·0	22	i 4 44	– 3	i 8 31	– 6	—	—	—
Sendai		21·8	44	e 5 6	+10	e 9 38	SS	—	—	11·2
Urakawa		25·3	38	e 6 41	PPP	—	—	—	—	e 13·6
Calcutta	E.	30·7	275	e 6 7	–12	i 11 34	+13	14 4	SSS	15·2
Irkutsk		31·3	340	e 6 22	– 2	—	—	—	—	—
New Delhi		40·0	287	e 7 36	– 2	i 11 42	?	—	—	16·6
Przhevalsk		40·2	308	e 7 44	+ 4	—	—	—	—	—
Hyderabad	E.	40·9	270	7 54	+ 8	—	—	17 8	SS	—
Naryn		41·7	307	i 7 53	+ 1	i 14 15	+ 5	—	—	—
Rybach'e		41·9	308	i 7 56	+ 2	—	—	—	—	—
Krasnogorka		42·7	309	i 7 59	– 1	—	—	—	—	—
Frunse		43·0	309	e 8 3	0	i 14 33	+ 4	—	—	—
Colombo	E.	43·5	255	8 24	+17	14 39	+ 3	—	—	25·5
Kodaikanal	E.	44·2	261	—	—	18 24	SS	—	—	—
Fergana		44·7	304	e 8 15	– 1	i 14 55	+ 1	—	—	—
Poona		44·8	273	i 8 16	– 1	i 14 59	+ 4	10 4	PP	—
Tchimkent		46·6	307	e 8 34	+ 2	—	—	—	—	—
Tashkent		46·7	306	e 8 28?	– 4	e 15 23?	+ 1	—	—	—
Stalinabad		46·9	302	i 8 34	0	e 15 28	+ 3	—	—	—
Samarkand		48·4	303	8 44	– 2	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 31	– 1	—	—	—	—	—
Ashkabad		55·2	301	e 9 35	– 2	—	—	—	—	—
Brisbane	Z.	59·4	147	i 10 5s	– 1	—	—	—	—	—
Shemakla		62·3	305	10 25	– 1	—	—	—	—	—
Lenkoran		62·5	303	10 26	– 1	—	—	—	—	—
Goris		64·3	304	10 39	0	—	—	—	—	—
Tiflis		65·0	307	e 10 49?	+ 5	e 19 29?	+ 3	—	—	—
Gori		65·5	307	e 10 49	+ 2	—	—	—	—	—
Leninakan		65·9	307	e 10 49	– 1	—	—	—	—	—
Piatigorsk		65·9	310	10 48	– 2	—	—	—	—	—
Tsikhlis-Dzhvari		66·0	307	e 10 52	+ 2	—	—	—	—	—
Abastumanj		66·4	307	e 10 58	+ 5	—	—	—	—	—
Moscow		67·3	323	e 10 56	– 3	e 19 51	– 3	—	—	—
Yalta		72·0	312	11 25	– 3	e 20 48	– 1	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kiruna		72·2	337	i 11 25	– 4	e 25 35	SS	—	—	e 40·8
Ksara		73·8	300	i 11 40	+ 2	e 21 44	+35	—	—	—
Upsala		76·4	331	e 14 42	PP	e 20 52	–46	—	—	e 38·4
Istanbul	Z.	76·6	310	e 11 54	0	e 21 38	– 2	—	—	—
Lwow		76·8	319	e 11 52	– 3	—	—	—	—	—
Helwan	Z.	78·8	298	e 12 6	0	—	—	—	—	—
Resolute Bay		78·9	10	e 12 3	– 4	e 22 3	– 2	—	—	e 42·0
Skalnate Pleso		79·4	320	e 18 32	?	21 34	?	—	—	—
Raciborzu	Z.	80·2	321	e 12 13	– 1	—	—	e 14 48	PP	—
Prague		82·1	322	e 12 25	+ 1	e 22 39	+ 1	—	—	e 42·4
Collmberg	Z.	82·6	324	e 12 27	+ 1	—	—	—	—	—
Jena	Z.	83·5	323	e 12 34	+ 3	—	—	—	—	—
Triest		84·9	318	e 12 36	– 2	i 23 3	– 3	—	—	e 43·4
Taranto		85·0	313	—	—	e 22 21?	?	—	—	—
Stuttgart	Z.	86·0	323	e 12 41	– 2	—	—	—	—	—
Karlsruhe	Z.	86·3	324	e 12 44	– 1	—	—	—	—	—
Aberdeen		86·5	333	e 20 6	?	e 26 26	?	e 28 16	SS	—
Strasbourg		86·9	323	e 12 47	– 1	—	—	e 15 48	PP	—
Messina		87·3	311	e 13 3	+13	e 23 30	+ 1	e 22 49	SKS	—
Rome	E.	87·5	314	e 12 51	0	e 23 30	– 1	e 16 18	PP	—
Victoria		87·5	37	12 49	– 2	—	—	—	—	—
Pavia		87·9	320	—	—	e 23 35	0	e 22 28	?	—
Paris		89·6	325	e 13 11	+10	—	—	—	—	—
Reno	Z.	94·7	42	e 13 25	+ 1	—	—	—	—	—
Lick	Z.	94·8	46	e 13 26k	+ 1	—	—	—	—	—
Fresno	Z.	96·3	45	e 13 32	0	—	—	—	—	—
China Lake	Z.	98·3	44	e 13 41	0	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 18 10	PKP	—	—	i 18 19	PP	—
Huancayo		160·0	57	e 20 11	[+10]	—	—	e 20 44	PKP_2	—
La Paz	Z.	168·2	53	e 19 51	[–17]	—	—	—	—	—

Additional readings :—
Poona PPS = 15m.8s.
Kiruna eE = 24m.21s.?, eE = 29m.30s.
Upsala eN = 18m.41s., iSN = 21m.0s., eN = 31m.9s.?.
Skalnate Pleso e = 25m.33s. and 27m.51s.
Prague eP = 12m.40s., e = 13m.15s.
Strasbourg e = 13m.14s.
Rome eSKSE = 22m.57s.?, eSSN = 29m.37s.
Pavia e? = 30m.52s.
Paris e = 13m.15s.

Oct. 22d. 23h. 36m. 25s. Epicentre 23°·9N. 121°·7E. (as on 20h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking	E.	8·5	343	—	—	1 0	?	—	—	—
Manila		9·3	184	e 0 5	?	—	—	—	—	—
Vladivostok		21·0	22	e 4 51	+ 4	i 8 48	+11	—	—	—
Calcutta	E.	30·7	275	e 5 46	–33	i 12 52	Q	—	—	i 14·8
Irkutsk		31·3	340	e 6 22	– 2	e 11 26	– 5	—	—	—
New Delhi		40·0	287	e 7 40	+ 2	e 13 42	– 2	—	—	—
Przhevalsk		40·2	308	e 7 42	+ 2	—	—	—	—	—
Almata		41·4	310	e 7 50	0	—	—	—	—	—
Ili		41·5	311	i 7 50	0	—	—	—	—	—
Naryn		41·7	307	i 7 55	+ 3	e 14 6	– 4	—	—	—
Rybach'e		41·9	308	i 7 55	+ 1	—	—	—	—	—
Krasnogorka		42·7	309	e 8 2	+ 2	—	—	—	—	—
Frunse		43·0	309	e 8 5	+ 2	—	—	—	—	—
Fergana		44·7	304	e 8 17	+ 1	—	—	—	—	—
Poona		44·8	273	i 8 20	+ 3	—	—	—	—	—
Tchimkent		46·6	307	e 8 32	0	e 15 12	– 9	—	—	—
Tashkent		46·7	306	e 8 34	+ 2	—	—	—	—	—
Samarkand		48·4	303	8 47	+ 1	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 32	0	—	—	—	—	—
Ashkabad		55·2	301	e 9 40	+ 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.
Brisbane	Z.	59·4	147	i 10 6k	0	—	—	—	—	—
Goris		64·3	304	e 10 40	+ 1	—	—	—	—	—
Gori		65·5	307	e 10 43	– 4	—	—	—	—	—
Abastumanj		66·4	307	e 11 0	+ 7	—	—	—	—	—
Kiruna		72·2	337	i 11 26	– 3	e 25 13	SS	i 11 47	PcP	e 32·1
Upsala		76·4	331	—	—	e 32 17	SSS	—	—	e 40·3
Bucharest		77·5	313	(e 11 59)	0	(e 22 11)	ScS	—	—	—
Resolute Bay		78·9	10	e 12 4	– 3	—	—	e 12 15	PcP	—
Raciborzu	Z.	80·2	321	e 12 11	– 3	e 16 19	?	e 12 48	PcP	—
Collmberg	Z.	82·6	324	e 12 25	– 1	—	—	—	—	—
Jena	Z.	83·5	323	e 12 29	– 2	—	—	—	—	—
Stuttgart	Z.	86·0	323	e 12 43	0	—	—	—	—	—
Messina	E.	87·3	311	e 18 30	PPP	—	—	—	—	e 48·4
Rome	E.	87·5	314	—	—	e 28 16	SS	e 31 29	SSS	—
Victoria		87·5	37	12 50	– 1	—	—	—	—	—
Kew		89·4	328	—	—	e 29 35	SS	—	—	—
China Lake	Z.	98·3	44	e 13 40	– 1	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 18 16	PP	—	—	—	—	—

Additional readings and note :—
Nanking eE = 35m.47s. (earlier than To) these readings and that of Manila for this shock are unaccountable.
Kiruna eE = 14m.35s.?.
Bucharest readings have been increased by 9m.
Long waves are also recorded at Palisades, Scoresby Sund and other European stations

Oct. 22d. Readings also at 0h. (Manila, Nanking, and Vladivostok), 1h. (Mizusawa, China Lake, Tinemaha, Victoria (2), Resolute Bay, Collmberg, Kiruna, and Potsdam), 2h. (near Shemakla), 4h. (Brisbane, Wellington, China Lake, Tinemaha, Seattle, Victoria (4), Resolute Bay, Basle, and Kiruna), 5h. (Aberdeen, Victoria, and Bogota), 6h. (Apia, Victoria (3), Kiruna (3), Belgrade, and near Reykjavik), 7h. (Apia, Brisbane (2), Christchurch, Wellington, Manila, Vladivostok, China Lake (2), Seattle, Victoria (5), Resolute Bay (2), and Huancayo), 8h. (Auckland (2), Karapiro, Nanking, Victoria, and Seattle), 9h. (Christchurch, Cobb River, Kaimata, Tuai, Wellington, Brisbane (2), Nanking, China Lake (2), Victoria (2), Resolute Bay, Kew, Kiruna, Stuttgart, and Tamanrasset), 10h. (De Bilt, Paris, Potsdam, Alicante (2), Almeria (2), Granada (2), and Tamanrasset), 11h. (Manila, Victoria (2), Resolute Bay, La Paz, near Bogota, and Galerazamba), 12h. (Victoria and Paris), 13h. (Victoria), 14h. (Brisbane, Vladivostok, Kizyl-Arvat, Naryn, Samarkand, Tashkent, near Fergana, Garm, Khorog, Stalinabad, and Tchimkent), 15h. (Kiruna (2), Victoria (2), Resolute Bay, and near Kurmenty), 16h. (Kiruna, China Lake, Victoria, Poona, and near Copiapo), 17h. (Nanking, Vladivostok (2), Calcutta, and Kiruna), 18h. (Vladivostok (2), Calcutta, Fergana, Khorog, Tchimkent, near Garm, Samarkand, and Stalinabad), 19h. (Apia (2), Huancayo, and near Athens), 21h. (near Chilisk), 22h. (Apia), 23h. (Kiruna and Ksara).

Oct. 23d. 1h. 19m. 36s. Epicentre 23°·9N. 121°·7E. (as on 22d.).

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	7·2	358	e 1 51	+ 2	—	—	—	—	—
Nanking	8·5	342	e 2 6	– 1	—	—	—	—	—
Manila	9·3	184	i 2 18	+ 1	i 4 6	+ 1	—	—	—
Yakusima	10·2	49	e 2 35	+ 4	e 4 53	SS	—	—	—
Tomie	10·7	34	e 2 45	+ 7	e 5 57	L	—	—	(e 6·0)
Unzendake	11·6	39	2 55	+ 5	5 0	– 1	—	—	—
Kumamoto	11·9	40	e 2 55	+ 1	5 46	Q	—	—	7·4
Saga	12·0	37	3 1	+ 6	—	—	—	—	—
Hukuoka	12·3	36	2 53	– 6	5 13	– 5	e 3 5	PP	6 1
Ooita	12·7	41	3 12	+ 7	5 52	SS	—	—	e 8·0
Simidu	13·3	46	e 3 24	PP	e 6 30	L	—	—	(e 6·5)
Matuyama	13 9	42	e 3 31	PP	e 6 11	SS	—	—	e 8·4
Koti	14·1	44	e 3 30	+ 7	e 6 27	SS	—	—	8·4
Hamada	14·2	37	e 4 26	+62	7 8	+64	—	—	e 8·4
Muroto	14·4	47	e 3 30	+ 3	e 5 52	–17	—	—	e 6·4

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.
Takamatu		15·1	43	e 3 43	+ 7	e 6 54	SS	—	—	e 8·1
Matsue		15·2	38	e 3 55	PP	—	—	—	—	—
Yonago		15·3	39	e 3 56	PP	e 6 59	SS	—	—	—
Sumoto		15·5	45	i 3 54	PP	6 56	SS	—	—	9·3
Osaka		16·1	45	e 4 6	PP	e 7 43	Q	—	—	e 9·1
Tu		16·8	47	4 23	PP	8 15	L	—	—	(8·2)
Kameyama		16·9	46	4 19	PP	7 16	+ 9	—	—	10·9
Hikone		17·0	45	e 4 15	PP	e 7 30	SS	—	—	e 10·6
Gihu		17·4	45	e 4 27	PP	e 8 16	Q	—	—	10·8
Nagoya		17·4	46	e 4 7	+ 1	—	—	—	—	—
Torisima		17·7	63	e 3 14	−56	e 6 37	−49	—	—	—
Kanazawa		18·0	41	e 3 46	−27	e 7 55	+23	—	—	e 10·2
Shizuoka		18·2	48	e 4 26	PP	—	—	—	—	e 10·5
Misima		18·7	48	e 4 49	PPP	e 8 11	SS	—	—	9·7
Matumoto	N.	18·7	44	e 4 29	+ 7	—	—	—	—	—
Wazima		18·7	39	e 4 40	PP	—	—	—	—	e 11·2
Matusiro		19·0	42	4 19	− 7	8 1	+ 6	—	—	10·5
Nagano		19·1	43	e 4 37	PP	e 9 11	Q	—	—	i 9·9
Oiwake		19·1	44	e 4 36	PP	—	—	—	—	—
Yokohama		19·3	47	e 4 52	PPP	—	—	—	—	—
Kumagaya		19·5	46	e 4 33	+ 2	e 8 33	SS	—	—	—
Maebasi		19·5	45	e 4 40	PP	8 28	SS	—	—	—
Tokyo		19·6	48	e 4 32	0	e 8 52	SSS	e 7 32	?	9·9
Aikawa		19·9	39	e 4 44	+ 8	—	—	—	—	11·5
Tukubasan		20·1	47	e 4 55	PP	—	—	—	—	—
Utunomiya		20·1	46	e 4 42	+ 4	—	—	—	—	—
Vladivostok		21·0	22	i 4 56?	+ 9	i 8 35?	− 2	—	—	—
Yamagata		21·4	43	e 5 7	PP	—	—	—	—	e 11·7
Sendai		21·8	44	e 5 4	+ 8	e 9 12	+20	e 9 50	SSS	10·8
Mizusawa		22·4	42	5 1	− 1	e 9 3	− 1	e 5 4	P	13·2
Miyako		23·2	41	e 5 9	0	—	—	—	—	11·2
Sapporo		25·1	34	e 5 37	+ 9	—	—	—	—	e 13·2
Urakawa		25·3	38	e 5 40	+10	e 10 20	+26	e 11 44	Q	e 13·4
Calcutta	E.	30·7	275	i 9 31	?	i 11 18	− 3	—	—	—
Irkutsk		31·3	340	6 22	− 2	—	—	—	—	—
Djakarta		33·2	208	i 6 39a	− 1	i 11 58	− 2	—	—	—
Bandong		33·6	206	e 6 42	− 2	i 12 2	− 4	—	—	—
New Delhi		40·0	287	e 7 39	+ 1	i 13 42	− 2	i 9 27	PP	i 17·2
Przevalsk		40·2	308	e 7 36	− 4	—	—	—	—	—
Hyderabad	E.	40·9	270	i 7 45	− 1	i 13 53	− 5	9 15	PP	—
Almata		41·4	310	i 7 49	− 1	—	—	—	—	—
Ili		41·5	311	i 7 48	− 2	—	—	—	—	—
Naryn		41·7	307	i 7 53	+ 1	i 14 14	+ 4	—	—	—
Rybach'e		41·9	308	i 7 52	− 2	—	—	—	—	—
Krasnogorka		42·7	309	i 8 1	+ 1	—	—	—	—	—
Frunse		43·0	309	i 8 2	− 1	i 14 29	0	—	—	—
Colombo	E.	43·5	255	8 9	+ 2	14 54	+18	—	—	26·4
Kodaikanal	E.	44·2	261	i 8 9	− 3	e 14 48	+ 2	—	—	—
Andijan		44·4	305	—	—	e 14 53	+ 4	—	—	—
Fergana		44·7	304	i 8 17	+ 1	i 14 54	0	—	—	—
Poona		44·8	273	i 8 15	− 2	i 14 53	− 2	10 6	PP	21·2
Bombay	E.	45·6	274	i 8 24	0	i 15 8	+ 2	i 10 10	PP	—
Tchimkent		46·6	307	i 8 28	− 4	15 20	− 1	—	—	—
Tashkent		46·7	306	i 8 33?	+ 1	15 18?	− 4	—	—	—
Samarkand		48·4	303	8 44	− 2	—	—	—	—	—
Mary		52·4	301	i 9 17	+ 1	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 30	− 2	i 17 7	− 4	—	—	—
Ashkabad		55·2	301	i 9 37	0	17 23	+ 3	—	—	—
Kizyl-Arvat		56·7	303	i 9 52	+ 4	—	—	—	—	—
Brisbane		59·4	147	i 10 5k	− 1	i 18 14	− 1	—	—	—
Baku		61·4	305	e 10 21	+ 1	—	—	—	—	—
Shemakla		62·3	305	10 29	+ 3	18 55	+ 3	—	—	—
Riverview		63·9	153	i 10 32a	− 5	i 19 12	0	i 10 46	pP	e 28·2
Goris		64·3	304	10 39	0	19 17	0	—	—	—
Tiflis		65·0	307	i 10 44?	0	i 19 30?	+ 4	—	—	—

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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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Erevan		65·5	305	e 10 50	+ 3	19 34	+ 2	—	—	—
Gori		65·5	307	e 10 46	− 1	—	—	—	—	—
Leninakan		65·9	307	e 10 54	+ 4	—	—	—	—	—
Piatigorsk		65·9	310	10 45	− 5	—	—	—	—	—
Tsikhlis-Dzhvari		66·0	307	e 10 54	+ 4	—	—	—	—	—
Abastumanj		66·4	307	e 10 55	+ 2	—	—	—	—	—
Moscow		67·3	323	i 10 58	− 1	i 19 48	− 6	—	—	—
College		68·8	27	e 11 6	− 2	—	—	—	—	—
Pulkovo		70·3	328	i 11 20	+ 3	e 20 27	− 2	—	—	—
Yalta		72·0	312	11 25	− 3	20 47	− 2	—	—	—
Kiruna		72·2	337	i 11 27	− 2	e 20 49	− 2	i 11 40	PcP	e 33·9
Helsinki		72·8	330	—	—	e 20 51	− 7	—	—	e 33·4
Ksara		73·8	300	i 11 37a	− 1	21 17	+ 8	21 55	PPS	—
Kishinev		74·8	315	e 11 50	+ 6	—	—	—	—	—
Upsala		76·4	331	—	—	e 21 27?	−11	—	—	e 34·4
Istanbul		76·6	310	e 11 55	+ 1	e 21 37	− 3	e 14 50?	PP	e 42·4
Lwow		76·8	319	i 11 54	− 1	i 21 38	− 4	—	—	—
Auckland	N.	78·5	139	—	—	22 2?	+ 1	—	—	—
Helwan		78·8	298	12 3	− 3	22 2	− 2	15 4	PP	—
Resolute Bay		78·9	10	e 12 5k	− 2	e 21 59	− 6	—	—	e 31·0
Skalnate Pleso		79·4	320	e 12 6	− 3	e 22 8	− 2	e 22 32	ScS	31·9
Timisoara		80·1	316	e 12 37	+24	e 22 17	− 1	e 22 14	S	—
Raciborzu		80·2	321	e 12 8	− 6	—	—	e 15 20	PP	e 42·4
Copenhagen		80·7	328	e 12 16	0	22 19	− 5	—	—	39·4
Budapest		80·8	318	12 26	+ 9	e 22 24	− 1	e 17 6	PPP	42·4
Belgrade		81·0	315	e 12 18a	0	e 22 26	− 1	e 15 31	PP	e 49·1
Ogyalla		81·1	319	e 12 42	+24	e 22 31	+ 3	e 23 7	PS	—
Wellington		81·4	143	13 14	+54	i 22 28	− 3	27 49	SS	34·9
Christchurch		81·8	146	12 34	+12	e 22 34	− 1	e 28 4	SS	e 39·4
Potsdam		82·0	325	e 12 23	0	i 22 35	− 2	e 15 29	PP	e 32·4
Prague		82·1	322	e 12 19	− 5	e 22 39	+ 1	e 15 44	PP	e 33·4
Scoresby Sund		82·4	349	e 12 23	− 2	e 22 38	− 3	28 8	SS	37·4
Collmberg		82·6	324	e 12 26	0	e 21 1	?	—	—	e 42·9
Jena		83·5	323	e 12 31	0	—	—	e 15 56	PP	—
Tananarive		83·9	247	—	—	e 22 57	+ 1	—	—	e 41·1
Sonneberg	E.	84·0	323	—	—	e 22 46	−11	—	—	—
Triest		84·9	318	e 12 38	0	i 23 2	− 4	i 24 36	PPS	e 40·6
Taranto		85·0	313	—	—	e 22 54	[− 7]	—	—	—
Witteveen	Z.	85·1	327	i 12 40	+ 1	—	—	—	—	—
Stuttgart		86·0	323	e 12 41	− 2	e 22 58	[− 9]	e 16 1	PP	e 43·4
Karlsruhe	Z.	86·3	324	e 12 36	− 9	—	—	—	—	—
De Bilt		86·3	327	e 12 47	+ 2	e 23 20	0	—	—	e 40·4
Aberdeen		86·5	333	—	—	i 23 9	[− 2]	i 29 24	SS	e 42·4
Strasbourg		86·9	323	e 12 45	− 3	i 23 27	+ 1	e 28 54	SS	e 42·4
Bologna		86·9	319	e 14 7	?	e 23 30	+ 4	—	—	—
Zürich		87·1	322	e 12 48	− 1	e 23 21	− 7	e 16 10	PP	—
Messina		87·3	311	e 12 49	− 1	i 23 28	− 1	e 23 12	SKS	—
Prato		87·4	317	e 12 28	−22	i 22 31	−59	—	—	—
Basle		87·5	322	e 12 54	+ 3	e 23 31	0	—	—	e 46·6
Rome		87·5	314	e 12 50	− 1	i 23 29	− 2	e 16 15	PP	—
Pavia		87·9	320	15 49	PP	e 23 21	[+ 1]	e 29 37	SS	e 43·0
Neuchatel		88·2	322	—	—	e 23 33	− 5	—	—	—
Seattle		88·5	38	i 13 0?k	+ 4	i 23 44	+ 3	—	—	—
Kew		89·4	328	e 16 29	PP	e 23 42	− 7	e 33 29	SSS	e 40·4
Paris		89·6	325	i 12 59	− 2	i 23 47	− 4	i 16 37	PP	e 45·4
Rathfarnham Castle		90·9	332	i 13 4	− 3	e 23 54	− 9	—	—	e 48·4
Clermont-Ferrand		91·2	322	e 26 6	PPS	(e 30 18)	SS	—	—	e 30·3
Shasta Dam		92·4	43	i 13 13	− 1	—	—	—	—	—
Hungry Horse		92·5	33	i 13 15	+ 1	—	—	—	—	—
Mineral		93·1	44	e 13 18	+ 1	—	—	—	—	—
Berkeley		94·1	46	e 13 22a	0	e 23 42	[−14]	e 17 12	PP	e 43·8
Reno	Z.	94·7	42	e 13 25a	+ 1	—	—	—	—	—
Butte		94·8	34	e 13 26	+ 1	e 24 38	+ 2	—	—	—
Ivigtut		94·8	355	—	—	24 26	−10	—	—	45·4
Lick	Z.	94·8	46	i 13 25a	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fresno	Z.	96·3	45	e 13 33	+ 1	—	—	—	—	—
Tinemaha	Z.	97·2	44	e 13 38	+ 2	—	—	—	—	—
Alicante		97·7	319	13 39	+ 1	24 6	[– 9]	26 34	PS	e 46·4
China Lake	Z.	98·3	44	e 13 39	– 2	—	—	—	—	—
Pasadena	Z.	99·0	47	e 13 45	+ 1	—	—	—	—	e 46·6
Riverside	Z.	99·6	47	e 13 45	– 1	—	—	—	—	—
Almeria		99·9	318	e 14 16	+28	24 40	[+13]	18 20	PP	59·3
Boulder City		100·0	43	i 13 50	+ 2	—	—	i 17 52	PP	—
Palomar	Z.	100·3	42	e 13 45	– 5	—	—	—	—	—
Granada		100·4	319	16 3	P	24 21	[– 8]	16 48	PP	49·5
Tamanrasset	Z.	102·6	302	e 13 59	– 1	30 18	PKKP	i 18 15	PP	—
Tucson		104·9	44	e 14 12	+ 2	—	—	e 18 21	PP	—
Seven Falls	E.	108·4	9	—	—	26 27	S	e 34 11	SS	44·3
Ottawa		109·2	13	—	—	e 26 30	S	e 38 30	SSS	—
Vermont		110·6	11	—	—	26 10	S	—	—	—
Fayetteville		111·4	30	e 18 27	[– 9]	—	—	—	—	—
Cleveland		111·5	19	—	—	e 26 57	S	e 28 54	PS	—
Palisades		113·8	13	e 19 40	PP	e 27 9	S	e 35 12	SS	e 59·5
Bermuda		123·7	6	e 20 46	PP	e 37 33	SS	—	—	e 58·6
Bogota		147·7	29	i 20 0	[+16]	e 30 5	{0}	i 20 12	PKP_2	—
Huancayo		160·0	57	e 20 5	[+ 4]	e 44 2	SS	e 24 30	PP	e 65·8
La Paz		168·2	53	i 20 12a	[+ 4]	i 32 8	{+14}	25 13	PP	80·8
La Plata		169·0	182	25 12	PP	38 48	PPS	45 48	SS	77·5

Additional readings :—
Matusiro i =6m.3s., SE =7m.22s.
Mizusawa S?N =9m.7s.
New Delhi QN =16m.40s.
Poona ePN =8m.18s., PPE =10m.3s., PPPE =10m.48s., SSE =18m.9s., SSN =18m.34s.
Bombay iPPSE =15m.26s., SSE =18m.51s.
Riverview iPcPZ =11m.2s., iSSN =23m.23s.
Kiruna ePPPE =16m.1s., iN =20m.36s., iPPSE =21m.40s., eSSE =25m.43s., eSSSE = 28m.5s., eE =29m.1s., eN =29m.8s., eQN =30·7m.
Upsala eSE =21m.33s., eN =21m.47s. and 22m.51s., eSSS?N =28m.36s.
Istanbul ePPPZ =16m.29s., eSKSEN =21m.57s., ePSN =22m.11s., ePPS?N =22m.32s.
Helwan eZ =12m.33s., SKSN =22m.12s.
Skalnate Pleso e =14m.40s., eS =22m.1s.
Raciborzu ePN =12m.11s., ePZ =12m.14s.
Budapest PE =12m.29s., eE =15m.36s., eN =22m.40s., eE =27m.24s.
Belgrade ePPSNE =23m.28s.
Ogyalla e =13m.54s., 14m.39s., and 15m.52s., eE =22m.45s., eSS =25m.30s., e =27m.54s.
Wellington i =23m.27s., eSSS =30m.19s.
Christchurch SE =22m.42s., eSSSEN =31m.34s., eQN =33m.39s.
Prague e =12m.40s., 13m.8s., 13m.51s., 14m.31s., and 22m.56s., ePS? =23m.42s., eSS =27m.54s.
Scoresby Sund 23m.48s.
Jena eP?N =12m.34s., eE =13m.4s.
Triest iSKS? =23m.21s., iSS =28m.49s.
Stuttgart eSS =29m.8s.
Aberdeen iSE =23m.39s.
Strasbourg e =12m.48s., 13m.58s., 15m.32s., 17m.32s., and 18m.49s., eSKS? =22m.54s., eSSS =33m.24s.
Messina eE =16m.27s.
Rome ePPPZ =18m.26s., iSSE =29m.30s.
Seattle i =13m.38s., 14m.6s., and 14m.14s., e =24m.0s.
Kew ePS =25m.14s., eSS =30m.1s., e =37m.2s.
Paris ipP? =13m.23s., ipPP =16m.45s., ePPPP =20m.4s., eSKS? =23m.37s., isS? = 24m.7s., iSP =24m.53s., iSS =29m.51s., ePSPS =30m.48s., eQ =36m.45s., ePKP, PKP =39m.31s. and other unidentified readings.
Lick iZ =13m.40s., 13m.44s., and 14m.1s.
Alicante SSS =35m.44s., Q =40m.24s.
Granada SKS =22m.33s. PPS =27m.3s., iSS =32m.6s.
1 minute.
Seven Falls eE =38m.35s.
Palisades e =38m.50s., 40m.31s., and 43m.34s., eQ =50m.52s.
Bogota eSKPEN =23m.57s.
Huancayo i =20m.45s., e =51m.36s.
La Paz iZ =20m.28s. and 25m.24s., iSS =46m.7s.
La Plata SKKSE =33m.30s., SKSPN =35m.36s., SSN =45m.42s., PSSE =49m.12s., PSSN =50m.48s., E =52m.18s., SSS?E =67m.54s., E =73m.0s.
Long waves were also recorded at Harvard, Weston, Fort de France, Galerazamba, Dehra Dun, and other European stations.

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Oct. 23d. 6h. 13m. 32s. Epicentre 17°·8S. 178°·8W. Depth of focus 0·070.
(as on 1951, May 25d.).

A = −·9526, B = −·0199, C = −·3038 ; δ = +14 ; h = +5 ;
D = −·021, E = +1·000 ; G = +·304, H = +·006, K = −·953.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		7·9	60	(1 59)	+ 3	1 59	P	—	—
Karapiro	N.	20·6	193	—	—	17 28?	?	—	—
Tuai	N.	21·2	187	—	—	e 16 59	?	—	—
Wellington		24·0	192	e 4 38	+ 1	i 18 6	?	—	—
Cobb River	E.	24·3	196	—	—	e 18 25	?	—	—
Kaimata	N.E.	26·0	197	—	—	e 19 5	?	—	—
Brisbane	Z.	27·7	245	i 5 13k	+ 3	—	—	—	—
Berkeley	Z.	76·7	44	i 11 3a	+ 1	—	—	—	—
Lick	Z.	76·8	43	i 11 3a	0	—	—	—	—
Pasadena	Z.	77·4	48	i 11 5a	− 1	—	—	—	—
Fresno	Z.	77·7	45	i 11 8a	0	—	—	—	—
Palomar	Z.	77·9	50	i 11 10a	+ 1	—	—	—	—
Riverside	Z.	77·9	48	i 11 8a	− 1	—	—	—	—
Shasta Dam		78·3	41	i 11 11	0	—	—	—	—
China Lake	Z.	78·7	47	i 11 14a	+ 1	—	—	—	—
Tinemaha	Z.	78·9	45	i 11 15	+ 1	—	—	—	—
Reno	Z.	79·2	43	e 11 16a	0	—	—	—	—
Boulder City		80·7	48	i 11 24	+ 1	—	—	e 12 42	pP
Tucson		81·9	52	i 11 30	0	—	—	—	—
Victoria		82·4	35	11 31	− 1	—	—	—	—
College		85·7	12	i 11 47	− 1	—	—	—	—
Hungry Horse		87·4	37	i 11 56	0	—	—	—	—
Kiruna	Z.	128·5	350	i 18 10	[− 2]	—	—	—	—
Rathfarnham C.	Z.	144·1	7	i 18 41	[0]	e 25 2	[0]	—	—
Raciborzu	Z.	145·0	342	i 18 44	[+ 2]	—	—	—	—
Collmberg	Z.	145·3	349	i 18 44	[+ 1]	—	—	—	—
Jena		145·9	348	e 18 47	[+ 3]	—	—	e 20 1	?
Stuttgart	Z.	148·4	352	e 18 47	[0]	—	—	—	—
Strasbourg		148·8	352	e 18 49	[+ 1]	—	—	e 21 3	pPKP
Paris		149·0	358	i 18 54	[+ 6]	—	—	i 19 0	PKP_2
Tamanrasset	Z.	173·6	—	e 19 14	[+ 1]	—	—	—	—

Additional readings :—
Rathfarnham Castle iZ = 18m.51s., eZ = 19m.52s.
Stuttgart iZ = 18m.52s., eZ = 18m.58s.
Strasbourg i = 18m.54s. and 19m.0s.
Paris i = 19m.4s., ipPKP? = 19m.34s.

Oct. 23d. 8h. 55m. 13s. Epicentre 23°·9N. 121°·7E. (as at 1h.).

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	7·2	358	e 1 51	+ 2	3 17	+ 4	—	—	—
Nanking	8·5	343	i 2 4	− 3	3 42	− 3	—	—	—
Manila	9·3	184	i 2 17	0	i 4 4	−1	—	—	—
Yakusima	10·2	49	e 2 32	+ 1	e 4 40	SS	—	—	8·0
Unzendake	11·6	39	2 53	+ 3	5 0	− 1	—	—	—
Kumamoto	11·9	40	e 3 3	PP	5 51	Q	—	—	9·0
Saga	12·0	37	3 1	+ 6	—	—	—	—	—
Hukuoka	12·3	36	3 0	+ 1	5 26	SS	i 3 10	PP	6·6
Ooita	12·7	41	e 3 21	PPP	5 44	SS	—	—	e 9·3
Simonosaki	12·9	37	3 20	PP	i 5 36	SS	—	—	i 7·5
Simidu	13·3	46	e 3 37	PPP	e 6 37	L	—	—	(e 6·6)
Matuyama	13·9	42	e 3 29	+ 8	e 6 5	+ 8	—	—	e 9·8
Kôti	14·1	44	e 3 27	+ 4	e 6 10	+ 8	—	—	7·6
Takamatu	15·1	43	e 3 35	− 1	e 6 31	+ 6	—	—	e 7·8
Yonago	15·3	39	e 4 1	PPP	e 6 45	SS	—	—	—

Continued on next page.

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		△	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sumoto		15·5	45	e 3 46	+ 4	e 6 48	SS	—	—	7·5
Kobe		15·9	45	e 4 7	PPP	e 7 46	Q	—	—	e 9·4
Osaka		16·1	45	e 4 3	PP	e 8 1	L	—	—	(e 8·0)
Owase		16·2	48	3 57	+ 7	—	—	—	—	—
Tu		16·8	47	e 4 23	PPP	—	—	—	—	—
Kameyama		16·9	46	e 4 13	PP	e 8 1	Q	—	—	10·3
Hikone		17·0	45	e 4 11	PP	e 7 39	SSS	—	—	e 11·6
Gihu		17·4	45	e 4 44	+38	—	—	—	—	—
Nagoya		17·4	46	e 4 19	PP	e 7 57	SSS	—	—	e 10·9
Torisima		17·7	63	e 4 16	+ 6	e 7 43	SS	—	—	—
Kanazawa		18·0	41	e 4 15	+ 2	—	—	e 9 16	Q	e 11·5
Takayama		18·2	43	e 4 11	− 5	—	—	—	—	—
Iida		18·2	46	e 4 27	PP	—	—	—	—	e 13·3
Misima		18·7	48	e 4 29	+ 7	e 8 13	SS	—	—	10·0
Matumoto		18·7	44	e 4 29	+ 7	e 8 17	SS	—	—	e 14·3
Matusiro		19·0	42	4 22	− 4	8 1	+ 6	8 55	PcP	12·0
Nagano		19·1	43	e 4 43	PP	—	—	e 9 16	Q	13·2
Titibu		19·3	45	e 4 31	+ 2	—	—	—	—	—
Kumagaya		19·5	46	e 4 41	PP	e 8 43	SSS	—	—	—
Maebasi		19·5	45	e 4 47	PP	e 8 38	SS	—	—	—
Niigata		20·4	40	e 5 5	PPP	—	—	—	—	i 10·8
Vladivostok		21·0	22	i 4 44	− 3	i 8 35?	− 2	—	—	—
Yamagata		21·4	43	e 5 9	PP	—	—	—	—	e 13·0
Sendai		21·8	44	e 5 2	+ 6	e 9 32	SS	11 22	Q	12·5
Mizusawa		22·4	42	5 4	+ 2	e 9 6	+ 2	e 9 12	S	12·8
Sapporo		25·1	34	e 5 59	PP	e 10 16	+25	—	—	e 13·8
Urakawa		25·3	38	e 5 22	− 8	e 10 2	+ 8	—	—	e 13·9
Calcutta	E.	30·7	275	i 6 20	+ 1	i 11 25	+ 4	12 57	SS	—
Irkutsk		31·3	340	6 23	− 1	11 31	0	—	—	—
Djakarta		33·2	208	e 6 39	− 1	e 12 0	0	—	—	—
Bandong		33·6	206	e 6 41	− 3	e 12 5	− 1	—	—	—
Dehra Dun	N.	39·2	290	e 6 35	−56	e 13 25	− 7	—	—	—
New Delhi		40·0	287	e 7 38	0	i 13 45	+ 1	9 31	PPP	—
Przhevalsk		40·2	308	e 7 41	+ 1	—	—	—	—	—
Kurmenty		40·4	309	i 7 47	+ 6	—	—	—	—	—
Hyderabad	E.	40·9	270	(e 7 48)	+ 2	(i 13 46)	−12	(e 9 23)	PP	—
Almata		41·4	310	i 7 51	+ 1	i 14 13	+ 8	—	—	—
Ili		41 5	311	e 7 48?	− 2	—	—	—	—	—
Naryn		41·7	307	i 7 52	0	—	—	—	—	—
Rybach'e		41·9	308	i 7 52	− 2	e 14 17	+ 4	—	—	—
Krasnogorka		42·7	309	e 7 59	− 1	—	—	—	—	—
Frunse		43·0	309	i 8 3	0	i 14 35	+ 6	—	—	—
Colombo	E.	43·5	255	8 8	+ 1	14 41	+ 5	—	—	23·1
Kodaikanal	E.	44·2	261	e 8 6	− 6	e 14 45	− 1	—	—	—
Andijan		44·4	305	i 8 15	+ 1	e 15 4	+15	—	—	—
Fergana		44·7	304	e 8 16	0	i 14 58	+ 4	—	—	—
Poona		44·8	273	i 8 14	− 3	14 38	−17	9 54	PP	21·0
Bombay		45·6	274	i 8 23	− 1	i 15 8	+ 2	i 10 14	PP	—
Tashkent		46·7	306	i 8 32	0	i 15 24	+ 2	—	—	—
Stalinabad		46·9	302	i 8 34	0	—	—	—	—	—
Samarkand		48·4	303	e 8 45	− 1	—	—	—	—	—
Mary		52·4	301	i 9 16	0	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 29	− 3	i 17 10	− 1	—	—	—
Ashkabad		55·2	301	i 9 37	0	17 29	+ 9	—	—	—
Kizyl-Arvat		56·7	303	e 9 46	− 2	—	—	—	—	—
Brisbane		59·4	147	i 10 6a	0	i 18 12	− 3	—	—	—
Baku		61·4	305	e 10 23	+ 3	e 18 50	+10	—	—	—
Shemakla		62·3	305	10 25	− 1	18 54	+ 2	—	—	—
Lenkoran		62·5	303	10 27	− 1	18 57	+ 3	—	—	—
Riverview		63·9	153	i 10 40a	+ 3	i 19 19	+ 7	i 10 50	pP	—
Goris		64·3	304	i 10 37	− 2	—	—	—	—	—
Tiflis		65·0	307	i 10 42?	− 2	i 19 33?	+ 7	—	—	—
Erevan		65·5	305	i 10 55	+ 8	19 44	+12	—	—	—
Gori		65·5	307	e 10 51	+ 4	e 19 38	+ 6	—	—	—
Leninakan		65·9	307	e 10 50?	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Borzhomi		66·0	307	e 11 2?	+12	e 19 51?	+13	—	—	—
Abastumanj		66·4	307	—	—	e 19 52	+ 9	—	—	—
Moscow		67·3	323	e 11 1	+ 2	i 19 51	− 3	—	—	—
College		68·8	27	11 4	− 4	e 20 18	+ 7	—	—	—
Pulkovo		70·3	328	—	—	e 20 27	− 2	—	—	—
Yalta		72·0	312	11 26	− 2	20 50	+ 1	—	—	—
Kiruna		72·2	337	i 11 28	− 1	i 20 51	0	e 14 8	PP	e 34·8
Helsinki		72·8	330	e 11 35	+ 3	e 21 5	+ 7	—	—	—
Ksara		73·8	300	i 11 36	− 2	21 56	PPS	—	—	—
Kishinev		74·8	315	11 40	− 4	21 15	− 5	—	—	—
Upsala		76·4	331	e 12 9	+16	e 21 33	− 5	e 26 14	SS	e 34·8
Istanbul		76·6	310	e 11 52	− 2	e 21 33	− 7	e 14 42	PP	—
Lwow		76·8	319	—	—	i 21 39	− 3	—	—	—
Bucharest	E.	77·5	313	e 14 11	?	e 21 52	+ 2	—	—	—
Auckland	N.	78·5	139	e 12 10	+ 6	i 22 5	+ 4	—	—	—
Helwan		78·8	298	i 12 5a	− 1	22 4	0	15 5	PP	—
Resolute Bay		78·9	10	e 12 2k	− 5	e 21 59	− 6	—	—	e 33·3
Skalnate Pleso		79·4	320	e 12 17	+ 8	e 22 7	− 3	e 15 7	PP	—
Timisoara		80·1	316	e 13 5?	+52	e 22 20	+ 2	—	—	—
Raciborzu		80·2	321	e 12 16	+ 2	e 14 52	?	e 12 28	PcP	e 42·8
Copenhagen		80·7	328	e 12 14	− 2	i 22 27	+ 3	—	—	39·8
Budapest		80·8	318	e 12 17	0	e 22 12	−13	e 23 4	PS	e 43·8
Belgrade		81·0	315	e 15 19	PP	e 22 28	+ 1	e 34 0	Q	e 45·1
Ogyalla		81·1	319	e 13 3	?	e 22 32	+ 4	e 17 7	PPP	—
Wellington		81·4	143	—	—	22 23	− 8	e 27 47	SS	34·4
Bergen		81·5	334	—	—	e 22 31	− 1	—	—	39·4
Christchurch		81·8	146	e 12 20	− 2	e 22 32	− 3	15 19	PP	e 39·8
Potsdam		82·0	325	i 12 29	+ 6	i 22 40	+ 3	i 23 22	PS	e 36·8
Prague		82·1	322	e 12 28	+ 4	e 22 41	+ 3	e 23 25	PS	e 41·8
Scoresby Sund		82·4	349	e 12 27	+ 2	i 22 47	+ 6	33 53	Q	40·8
Jena	E.	83·5	323	e 12 26?	− 5	e 22 52	0	e 15 58?	PP	—
Sonneberg	E.	84·0	323	—	—	e 22 53	− 4	—	—	—
Triest		84·9	318	e 12 40	+ 2	i 23 8	+ 2	i 24 2	PS	e 39·8
Taranto		85·0	313	13 18	+40	23 8	+ 1	15 18	?	—
Stuttgart		86·0	323	e 12 41	− 2	e 23 7	[0]	e 16 1	PP	e 43·8
Karlsruhe		86·3	324	e 12 47	+ 2	—	—	—	—	45·8
De Bilt		86·3	327	e 12 47	+ 2	e 23 13	[+ 4]	i 23 25	ScS	e 41·8
Aberdeen		86·5	333	—	—	i 23 12	[+ 1]	—	—	e 43·4
Strasbourg		86·9	323	e 12 52?	+ 4	e 23 15	[+ 2]	e 16 9	PP	e 42·8
Prato		87·4	317	e 12 50	0	i 23 35	+ 5	—	—	—
Basle		87·5	322	e 12 49	− 2	e 23 23	[+ 6]	e 16 16	PP	e 45·8
Rome		87·5	314	e 12 47a	− 4	e 23 12	[− 5]	e 16 12	PP	—
Victoria		87·5	37	5 51	?	e 23 33	+ 2	24 9	PS	—
Edinburgh	E.	87·8	333	—	—	e 23 25	[+ 6]	—	—	—
Pavia		87·9	320	e 12 20?	−33	e 23 29	− 6	e 15 59	PP	e 45·2
Seattle		88·5	38	e 12 57	+ 1	i 23 47	+ 6	—	—	—
Kew		89·4	328	e 12 8	−52	e 23 49	0	e 23 33	SKS	e 39·8
Paris		89·6	325	e 13 0	− 1	e 23 34	[+ 4]	i 16 31	PP	e 42·8
Rathfarnham Castle		90·9	332	e 13 13	+ 6	e 24 17	+14	—	—	—
Clermont-Ferrand		91·2	322	e 14 11	+63	e 30 29	SSP	e 33 59	SSS	e50·5
Shasta Dam		92·4	43	e 13 11	− 3	—	—	—	—	—
Hungry Horse		92·5	33	i 13 12	− 2	—	—	—	—	—
Berkeley		94·1	46	e 13 22	0	e 24 0	[+ 4]	—	—	—
Reno	Z.	94·7	42	e 13 25	+ 1	—	—	—	—	—
Butte		94·8	34	e 13 23	− 2	—	—	—	—	—
Ivigtut		94·8	355	—	—	24 33	− 3	33 17	?	46·8
Lick	Z.	94·8	46	i 13 26a	+ 1	—	—	—	—	—
Fresno	Z.	96·3	45	e 13 27	− 5	—	—	—	—	—
Alicante		97·7	319	13 35	− 3	25 7	+ 6	26 24	PS	e 46·1
China Lake	Z.	98·3	44	e 13 41	0	—	—	—	—	—
Pasadena	Z.	99·0	47	e 13 45	+ 1	—	—	—	—	e 45·8
Boulder City		100·0	43	e 13 50	+ 2	—	—	e 17 30	PP	—
Granada		100·4	319	e 16 8	?	e 26 47	PS	—	—	50·3
Tamanarasset	Z.	102·6	302	e 18 10	PKP	—	—	i 18 20	PP	—
Lisbon		102·6	323	—	—	24 41	[+ 1]	25 26	S	e 45·8

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	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson	104·9	44	e 14 41	+31	—	—	—	—	—
Ottawa	109·2	13	—	—	e 26 35	S	e 44 49	Q	56·8
Cleveland	111·5	19	—	—	e 25 35	[+17]	e 26 54	S	—
Palisades	113·8	13	e 19 40	PP	e 27 13	S	e 30 32	PPS	e 61·0
Bermuda	123·7	6	e 20 55	PP	e 32 10	PPS	e 23 20	PPP	e 60·0
Fort de France	141·5	4	e 22 31	PP	—	—	—	—	—
Bogota	147·7	29	i 19 53	[+ 9]	—	—	—	—	—
Huancayo	160·0	57	e 20 6	[+ 5]	e 31 17	{+ 5}	e 24 27	PP	e 75·1
La Paz	168·2	53	i 20 13k	[+ 5]	i 27 13	[+ 2]	i 25 3	PP	82·8
La Plata	169·0	182	8 17	?	31 59	{+ 1}	—	—	57·0

Additional readings :—
Kobe ePN = 4m.12s., eEN = 4m.22s. and 5m.46s., eSZ = 7m.57s.
Matusiro i = 6m.11s.
Nagano i = 10m.56s.
Sendai eN = 8m.41s., eSN = 9m.41s.
Mizusawa ePN = 5m.12s.
New Delhi iN = 16m.47s.
Hyderabad eE = (17m.21s.), readings have been increased by 1m.
Poona ePN = 8m.18s., PPE = 10m.46s., PPSE = 14m.56s., SSE = 18m.14s.
Bombay PPSE = 15m.23s., SSE = 18m.30s., SSN = 18m.36s.
Riverview iZ = 11m.5s., iPSN = 19m.46s., eE = 20m.35s.
Kiruna eE = 17m.10s., ePSN = 21m.25s., eE = 22m.6s., eN = 22m.24s., iN = 24m.7s. and 24m.36s., eE = 27m.0s., eSSSN = 28m.47s.?, eSSS?E = 29m.3s., iZ = 29m.20s., eQEN = 31·8m.
Upsala iSE = 21m.29s., eN = 25m.13s. and 27m.26s., e = 30m.2s.
Istanbul eZ = 12m.16s. and 17m.50s., eSKSE = 21m.58s., ePSE = 22m.13s.
Helwan PSE = 22m.47s.
Skalnate Pleso eN = 13m.22s., e = 23m.12s. and 23m.56s., eSS = 27m.52s., e = 29m.47s.
Budapest eN = 13m.47s., iE = 21m.47s., eE = 41m.17s.
Ogyalla eSN = 22m.37s., eE = 22m.57s., e = 23m.13s. and 23m.28s.
Christchurch eSE = 22m.42s., eSSEN = 27m.47s., eSSSE = 31m.27s., eQEN = 35m.7s.
Prague e = 12m.55s., ePS = 23m.8s., eSS = 28m.27s.
Jena ePZ = 12m.29s., eE = 12m.41s., eSN = 22m.56s.
Triest iSKS? = 23m.26s., eSS = 28m.56s.
Stuttgart eZ = 13m.7s., e = 15m.8s., ePS = 23m.53s., eSS = 28m.47s.
Strasbourg e = 13m.19s.
Rome iSE = 23m.34s., iSSE = 29m.44s.
Pavia eSS = 29m.2s.
Seattle iP? = 13m.6s., i = 14m.0s.
Paris ePS = 24m.55s.
Lick iZ = 13m.38s. and 13m.52s.
Alicante SKS? = 24m.21s., SS = 31m.13s., SSS = 35m.23s., Q = 40m.17s.
Granada ePS = 28m.20s., eSS = 33m.20s.
Lisbon PSEN = 27m.42s.
Cleveland eSSE = 34m.32s.
Palisades ePKS = 22m.29s., eSSS? = 39m.13s.
Bermuda e = 28m.47s. and 30m.14s.
Huancayo i = 20m.43s., e = 24m.16s., ePPS = 38m.25s., e = 41m.26s., eSS = 44m.38s., eSSS = 50m.55s.
La Paz iPKP$_2$Z = 21m.15s., iSKKS = 31m.59s., PPS = 38m.47s., iSS = 46m.3s., SSP = 47m.1s.
La Plata SKSE = 15m.53s., SKSPN = 33m.41s., PSSN = 45m.41s., N = 47m.59s.
Long waves were also recorded at Harvard, Weston, Saskatoon, and several European stations.

Oct. 23d. 13h. 27m. 15s. Epicentre 23°·9N. 121°·7E. (as at 8h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		9·3	184	(i 2 15)	– 2	(i 3 59)	– 6	—	—	—
Vladivostok		21·0	22	e 4 46	– 1	e 8 20	–17	—	—	—
Calcutta	E.	30·7	275	i 10 10	?	i 13 45	SSS	—	—	i 16·8
Naryn		41·7	307	e 7 54	+ 2	e 14 16	+ 6	—	—	—
Rybach'e		41·9	308	e 7 55	+ 1	—	—	—	—	—
Frunse		43·0	309	e 8 27?	+24	—	—	—	—	—
Andijan		44·4	305	e 8 16	+ 2	e 14 55	+ 6	—	—	—
Fergana		44·7	304	—	—	14 58	+ 4	—	—	—
Bombay	E.	45·6	274	e 9 45	PcP	—	—	e 10 14	PP	—
Tchimkent		46·6	307	e 8 33	+ 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		46·7	306	—	—	i 15 21	– 1	—	—	—
Mary		52·4	301	—	—	e 16 50	+ 8	—	—	—
Sverdlovsk		54·6	324	9 31	– 1	17 10	– 1	—	—	—
Piatigorsk		65·9	310	10 47	– 3	—	—	—	—	—
Kiruna		72·2	337	i 11 29k	0	e 20 45	– 6	e 39 13	P'P'	e 44·2
Ksara		73·8	300	e 9 4?	?	e 18 52	?	—	—	—
Resolute Bay		78·9	10	e 12 4	– 3	—	—	—	—	—
Copenhagen		80·7	328	—	—	i 22 18	– 6	e 22 35	ScS	40·8
Prague		82·1	322	(e 12 22)	– 2	—	—	—	—	(e 47·8)
Stuttgart		86·0	323	e 12 45?	+ 2	—	—	—	—	e 44·8
Victoria		87·5	37	12 51	0	—	—	—	—	—
Reno	Z.	94·7	42	e 13 23a	– 1	—	—	—	—	—
Lick	Z.	94·8	46	i 13 26a	+ 1	—	—	—	—	—
China Lake	Z.	98·3	44	e 13 42	+ 1	—	—	—	—	—
Huancayo		160·0	57	e 20 45	PKP_2	e 24 20	PP	e 17 43	?	—

Additional readings and notes :—
Manila readings have been increased by 3 minutes.
Kiruna iZ = 15m.1s., eS?E = 20m.28s., eN = 43m.9s., eZ = 43m.58s.
Prague e = (14m.25s.) and (14m.46s.); readings have been increased by 3 minutes.
Long waves were also recorded at several European stations.

Oct. 23d. 18h. 18m. 46s. Epicentre 23·9N. 121·7E. (as at 13h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		9·3	184	e 2 17	0	e 4 3	– 2	—	—	—
Vladivostok		21·0	22	i 4 58	+11	i 8 53	+16	—	—	—
Calcutta	E.	30·7	275	—	—	e 11 38	+17	—	—	i 18·7
Irkutsk		31·3	340	e 6 25	+ 1	—	—	—	—	—
Przhevalsk		40·2	308	e 7 41	+ 1	—	—	—	—	—
Hyderabad	E.	40·9	270	—	—	e 17 43	SSS	—	—	—
Almata		41·4	310	e 7 51	+ 1	e 14 21	+16	—	—	—
Ili		41·5	311	e 7 50	0	—	—	—	—	—
Naryn		41·7	307	i 7 54	+ 2	—	—	—	—	—
Rybach'e		41·9	308	e 7 53	– 1	e 14 30	+17	—	—	—
Krasnogorka		42·7	309	i 8 0	0	—	—	—	—	—
Frunse		43·0	309	e 8 2	– 1	—	—	—	—	—
Andijan		44·4	305	8 15	+ 1	i 15 5	+16	—	—	—
Fergana		44·7	304	—	—	e 15 0	+ 6	—	—	—
Poona		44·8	273	i 8 17	0	e 18 13	SS	—	—	—
Bombay	E.	45·6	274	—	—	e 18 14?	SS	e 18 51	?	—
Tchimkent		46·6	307	e 8 32	0	—	—	—	—	—
Tashkent		46·7	306	e 8 34	+ 2	—	—	—	—	—
Stalinabad		46·9	302	e 8 34	0	e 15 41	+16	—	—	—
Samarkand		48·4	303	8 46	0	—	—	—	—	—
Mary		52·4	301	—	—	e 16 53	+11	—	—	—
Sverdlovsk		54·6	324	9 29	– 3	e 17 19	+ 8	—	—	—
Ashkabad		55·2	301	e 9 37	0	e 17 35	+15	—	—	—
Baku		61·4	305	—	—	e 18 59	+19	—	—	—
Tsikhlis-Dzhvari		66·0	307	e 10 38	–12	—	—	—	—	—
Moscow		67·3	323	e 10 57	– 2	—	—	—	—	—
Sotchi		68·3	310	e 10 57	– 8	—	—	—	—	—
Kiruna		72·2	337	i 11 30	+ 1	—	—	i 11 48	PcP	e 37·8
Ksara		73·8	300	e 11 43?	+ 5	e 21 53	ScS	—	—	—
Resolute Bay		78·9	10	e 12 4	– 3	—	—	—	—	e 45·0
Prague		82·1	322	e 16 39	PP	—	—	—	—	e 41·3
Collmberg	Z.	82·6	324	e 12 31	+ 5	—	—	—	—	—
Cheb		83·5	323	—	—	e 30 48	SSS	—	—	—
Stuttgart		86·0	323	e 12 42	– 1	—	—	—	—	e 46·2
Strasbourg		86·9	323	e 12 51	+ 3	—	—	e 16 20	PP	e 45·2
China Lake	Z.	98·3	44	e 13 39	– 2	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 18 15	PP	—	—	—	—	—

Long waves were also recorded at Palisades, Harvard, Weston, and several European stations.

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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Oct. 23d. Readings also at 0h. (College, Shasta Dam, Boulder City, Lick, Reno, China Lake, Palomar, Pasadena, Riverside, Tinemaha, Tucson, and near Apia (2)), 2h. (Victoria, Huancayo, and Manila), 3h. (Paris, Christchurch, Manila, and Vladivostok (2)), 4h. (Bergen, near Murgab, Khorog, and Andijan), 5h. (Apia and Christchurch), 8h. (Nanking and Upsala), 10h. (Manila, Ksara, and Kiruna), 11h. (Victoria, Strasbourg, Stuttgart, Poona, and Manila), 12h. (Apia, Cobb River, Kaimata, Wellington, near Auckland, Christchurch, and Tuai, and near Prague), 13h. (Apia, Vladivostok, Victoria, Resolute Bay (2), and near Manila), 14h. (Apia, near Alicante and near Prague), 15h. (Apia, Manila, and near Santa Clara), 16h. (Algiers University and near Alicante), 20h. (Palomar, Pasadena, China Lake, Victoria, and Apia), 21h. (Victoria and near Manila), 22h. (Kew, Kiruna, Vladivostok, Calcutta, Bombay, and near Apia (2)), 23h. (Paris, De Bilt, Stuttgart, and Potsdam).

Oct. 24d. 1h. 48m. 10s. Epicentre 41°·9N., 143°·6E. Depth of focus 0·010.
(as on 1950, September 4d.).

Intensity IV at Kusiro, Shiranuka, Otsu, and Oda ; II-III at Urakawa, Meguro, etc.
Epicentre 42°·1N. 144°·0E. Depth 60km.
Seismological Bulletin of the Cent. Met. Obs., Japan, for October, 1951, Tokyo, 1951, p. 258-259, with macroseismic chart, p. 258.

A = −·6009, B = +·4430, C = +·6653 ; δ = −5 ; h = −2 ;
D = +·593, E = +·805 ; G = −·536, H = +·395, K = −·747.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Urakawa		0·7	292	0 15	− 3	0 26	− 5	—	—
Kusiro		1·2	28	0 15	− 8	0 26	−14	—	—
Nemuro		2·0	46	0 27	− 6	0 48	− 9	—	—
Sapporo		2·0	305	0 28	− 5	0 54	− 3	—	—
Hatinohe		2·1	229	0 35	+ 1	1 2	+ 2	—	—
Abashiri		2·2	13	0 25	−11	—	—	—	—
Mori		2·3	275	0 35	− 2	1 6	+ 1	—	—
Aomori		2·4	243	0 45	+ 7	1 8	+ 1	—	—
Miyako		2·6	208	0 41	0	1 12	0	—	—
Morioka		2·9	220	0 47	+ 2	1 21	+ 2	—	—
Akita		3·4	232	1 2	+10	—	—	—	—
Mizusawa		3·4	316	1 1	+ 9	1 33	+ 1	—	—
Isinomaki		3·9	208	2 16	S	(2 16)	+32	—	—
Sendai		4·2	211	1 16	+13	1 52	+ 1	—	—
Hukusima		4·8	212	1 12	+ 1	—	—	—	—
Inawashiro		5·1	213	1 15	− 1	—	—	—	—
Mito		6·0	205	1 32	+ 4	2 41	+ 5	—	—
Kumagaya		6·6	211	1 50	+14	2 54	+ 4	—	—
Oiwake		6·8	217	2 20	?	—	—	—	—
Yokohama		7·1	207	2 9	+26	—	—	—	—
Osima		7·8	207	1 55	+ 3	3 18	− 2	—	—
College		44·1	35	i 7 59	− 1	—	—	—	—
Resolute Bay		57·5	16	i 9 38	− 3	—	—	—	—
Kiruna	Z.	62·6	339	i 10 13k	− 3	—	—	—	—
Shasta Dam		66·9	56	e 10 45	+ 1	—	—	—	—
Hungry Horse		67·1	45	i 10 46	+ 1	—	—	—	—
China Lake	Z.	72·9	57	e 11 21	+ 1	—	—	e 11 36	pP
Mount Wilson	Z.	73·6	59	e 11 32	+ 8	—	—	—	—
Boulder City		74·5	56	i 11 32	+ 2	—	—	—	—
Collmberg	Z.	77·7	331	e 11 48	0	—	—	—	—
Stuttgart	Z.	81·2	332	e 12 7	+ 1	—	—	—	—
Strasbourg		81·8	332	e 12 11	+ 1	—	—	—	—
Paris		83·4	335	i 12 18	0	—	—	—	—
Fayetteville		86·1	44	i 12 29	− 2	—	—	—	—
Harvard		90·2	26	e 13 8	pP	—	—	—	—
Weston		90·4	26	i 12 53	+ 1	—	—	—	—

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Oct. 24d. 3h. 24m. 47s. Epicentre 40°·1S. 173°·8E. (as on 1949, July 21d.).

Intensity IV near the epicentre. Epicentre 40°·1S. 174°·0E.

R. C. Hayes.
Earthquake origins in New Zealand during the year 1951, New Zealand Journal of Science and Technology, Sec. B, Vol. 34, No. 4, January, 1953, p. 256.

A = −·7626, B = +·0828, C = −·6416 ; δ = +7 ; h = −2 ;
D = +·108, E = +·994 ; G = +·638, H = −·069, K = −·767.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
New Plymouth	E.	1·0	11	i 0 25	+ 4	i 0 43	+ 7
Cobb River	E.	1·3	219	i 0 29	+ 4	i 0 50	+ 6
Wellington		1·4	148	i 0 29	+ 2	i 0 49	+ 3
Karapiro	N.	2·6	32	0 43?	− 1	i 1 13?	− 4
Tuai	N.	2·9	63	0 45	− 3	1 17	− 7
Kaimata	N.E.	3·0	217	i 0 49	− 1	1 25	− 2
Auckland	N.	3·3	14	0 52	− 1	i 1 31	− 4
Christchurch		3·5	194	i 0 56	− 1	i 1 35	− 5

Oct. 24d. 3h. 39m. 0s. Epicentre 23°·9N. 121°·7E. (as on 23d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei		7·2	358	e 1 48	− 1	e 3 14	+ 1	—	—	—
Manila		9·3	184	i 2 18	+ 1	i 4 2	− 3	—	—	—
Yakusima		10·2	49	e 2 31	0	e 4 36	SS	—	—	—
Tomie	N.	10·7	34	e 2 35	− 3	—	—	—	—	8·2
Nagasaki		11·4	38	e 2 52	+ 5	—	—	e 7 14	?	—
Unzendake		11·6	39	2 48	− 2	e 4 55	− 6	—	—	—
Kumamoto		11·9	40	e 2 58	+ 4	—	—	—	—	8·1
Saga		12·0	37	i 2 56	+ 1	—	—	—	—	—
Hukuoka		12·3	36	2 51	− 8	5 20	+ 2	5 11	S	6·6
Ooita		12·7	41	3 10	+ 5	e 5 34	+ 6	—	—	e 8·8
Simidu		13·3	46	e 3 12	− 1	—	—	—	—	9·0
Matuyama		13·9	42	e 3 47	+26	e 6 7	+10	—	—	—
Kôti		14·1	44	e 3 30	+ 7	e 6 4	+ 2	—	—	7·2
Hamada		14·2	37	3 22	− 2	6 0	− 4	—	—	9·4
Sumoto		15·5	45	e 3 59	PP	7 40	+65	—	—	10·5
Toyooka		16·2	41	e 4 0	PP	—	—	—	—	—
Matusiro		19·0	42	4 14	−12	7 24	−31	—	—	9·8
Oiwake		19·1	44	e 5 14	?	—	—	—	—	—
Vladivostok		21·0	22	i 4 52	+ 5	8 35	− 2	—	—	—
Calcutta	E.	30·7	275	e 6 26	+ 7	i 11 24	+ 3	13 20	SSS	14·2
Irkutsk		31·3	340	6 19	− 5	e 11 24	− 7	—	—	—
Djakarta		33·2	208	e 6 46	+ 6	e 12 13	+13	—	—	—
Bandong		33·6	206	e 6 39	− 5	e 12 1	− 5	—	—	—
New Delhi		40·0	287	e 7 36	− 2	i 13 42	− 2	—	—	—
Przhevalsk		40·2	308	e 7 39	− 1	—	—	—	—	—
Almata		41·4	310	e 7 48	− 2	e 14 9	+ 4	—	—	—
Ili		41·5	311	i 7 48	− 2	i 14 7	0	—	—	—
Naryn		41·7	307	i 7 51	− 1	i 14 12	+ 2	—	—	—
Rybach'e		41·9	308	i 7 52	− 2	e 14 13	0	—	—	—
Frunse		43·0	309	i 8 3	0	i 14 30	+ 1	—	—	—
Colombo	E.	43·5	255	8 10	+ 3	14 39	+ 3	—	—	—
Kodaikanal	E.	44·2	261	e 8 12	0	—	—	—	—	—
Andijan		44·4	305	i 8 13	− 1	—	—	—	—	—
Fergana		44·7	304	8 14	− 2	i 14 55	+ 1	—	—	—
Poona		44·8	273	i 8 16	− 1	17 59	SS	15 4	PS	21·0
Bombay	E.	45·6	274	e 8 34	+10	15 0	− 6	e 10 14	PP	19·2
Tchimkent		46·6	307	i 8 29	− 3	i 15 22	+ 1	—	—	—
Tashkent		46·7	306	i 8 31	− 1	i 15 22	0	—	—	—
Stalinabad		46·9	302	i 8 34	0	i 15 27	+ 2	—	—	—
Samarkand		48·4	303	8 43	− 3	—	—	—	—	—
Mary		52·4	301	i 9 15	− 1	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 28	− 4	17 6	− 5	—	—	—
Ashkabad		55·2	301	i 9 36	− 1	17 24	+ 4	—	—	—
Kizyl-Arvat		56·7	303	9 48	0	—	—	—	—	—
Brisbane	Z.	59·4	147	i 10 5a	− 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		61·4	305	e 10 20	0	e 18 44	+ 4	—	—	—
Shemakla		62·3	305	10 20	– 6	18 50	– 2	—	—	—
Lenkoran		62·5	303	10 25	– 3	—	—	—	—	—
Riverview	N.	63·9	153	—	—	e 19 14	+ 2	—	—	—
Tiflis		65·0	307	e 10 41?	– 3	i 19 29?	+ 3	—	—	—
Erevan		65·5	305	e 10 49	+ 2	19 35	+ 3	—	—	—
Gori		65·5	307	e 10 45	– 2	—	—	—	—	—
Piatigorsk		65·9	310	10 46	– 4	19 34	– 3	—	—	—
Tsikhlis-Dzhvari		66·0	307	e 10 54	+ 4	—	—	—	—	—
Abastumanj		66·4	307	e 10 55	+ 2	—	—	—	—	—
Moscow		67·3	323	10 56	– 3	19 50	– 4	—	—	—
Pulkovo		70·3	328	—	—	e 20 21	– 8	—	—	—
Yalta		72·0	312	e 11 25	– 3	—	—	—	—	—
Kiruna		72·2	337	i 11 25s	– 4	e 20 37	–14	e 25 24	SS	e 36·4
Helsinki	N.	72·8	330	—	—	e 21 28	PS	—	—	e 39·0
Ksara		73·8	300	i 11 37	– 1	21 19	+10	—	—	—
Kishinev		74·8	315	—	—	e 21 12	– 8	—	—	—
Upsala		76·4	331	—	—	e 21 24	–14	e 33 3?	Q	e 39·0
Istanbul	Z.	76·6	310	e 11 52	– 2	—	—	—	—	—
Lwow		76·8	319	e 12 51	+56	e 22 39	+57	—	—	—
Helwan		78·8	298	e 12 3	– 3	e 22 2	– 2	—	—	—
Resolute Bay		78·9	10	e 12 2	– 5	e 21 59	– 6	—	—	e 43·0
Skalnate Pleso		79·4	320	e 15 30	PP	e 22 23	[+ 1]	e 23 46	?	e 42·5
Copenhagen		80·7	328	—	—	e 22 23	– 1	—	—	39·0
Potsdam		82·0	325	e 12 30	+ 7	i 22 37	0	e 22 42	S	e 42·0
Prague		82·1	322	e 12 24	0	e 22 40	+ 2	e 15 24	PP	e 43·0
Scoresby Sund		82·4	349	e 12 26	+ 1	e 22 50	+ 9	34 18	Q	41·0
Collmberg	Z.	82·6	324	e 12 24	– 2	—	—	—	—	—
Cheb	E.	83·5	323	e 16 27	?	e 22 53	+ 1	23 36	PS	—
Jena		83·5	323	e 12 27	– 4	—	—	e 12 43	PcP	—
Triest		84·9	318	e 12 33	– 5	22 58	– 8	—	—	e 46·5
Stuttgart		86·0	323	e 12 40	– 3	23 6	–11	e 24 14	PS	e 47·0
De Bilt		86·3	327	e 12 54	+ 9	e 23 5	[– 4]	e 23 28	S	e 43·0
Aberdeen		86·5	333	—	—	i 23 27	+ 5	—	—	e 44·7
Strasbourg		86·9	323	e 12 46	– 2	e 23 23	– 3	24 25	PS	e 43·5
Messina	E.	87·3	311	—	—	e 23 27	– 2	—	—	e 55·5
Rome		87·5	314	e 13 2	+11	e 23 21	[+ 4]	e 29 40	SS	—
Victoria		87·5	37	12 48	– 3	—	—	—	—	—
Pavia		87·9	320	—	—	e 23 27	– 8	e 28 48	SS	e 46·2
Seattle		88·5	38	12 59	+ 3	—	—	e 13 25	?	—
Kew		89·4	328	e 12 50	–10	e 23 26	[– 3]	—	—	e 44·0
Paris		89·6	325	e 12 58	– 3	e 23 54	+ 3	e 13 18	pP	e 46·0
Rathfarnham C.	Z.	90·9	332	e 12 54	–13	—	—	—	—	—
China Lake	Z.	98·3	44	e 13 40	– 1	—	—	—	—	—
Mount Wilson	Z.	99·0	47	e 13 43	– 1	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 17 42	?	—	—	e 18 13	PP	—
Palisades		113·8	13	—	—	e 39 2	SSS	—	—	e 63·6
Bogota		147·7	29	e 19 49	[+ 5]	—	—	—	—	—
Huancayo		160·0	57	e 20 43	PKP$_2$	—	—	—	—	—
La Paz	Z.	168·2	53	e 20 17	[+ 9]	—	—	—	—	—

Additional readings :—
Calcutta e? = 13m.51s.
Poona PPE = 9m.59s., PPPE = 10m.41s., iSEN = 14m.30s., PSEN = 14m.34s., QEN = 18m.52s.?.
Bombay i = 10m.23s.
Kiruna eSE = 20m.46s., eQEN = 29·5m.
Prague e = 12m.39s. and 12m.54s.
Cheb eSSE = 28m.12s., eSSSE = 32m.18s.
Jena eE = 13m.26s. and 14m.4s.
Stuttgart eSS = 29m.0s., e = 35m.24s. and 39m.36s.
Strasbourg e = 13m.5s., 23m.0s., 28m.8s., 28m.42s., and 33m.48s.
Pavia e = 36m.12s.
Paris e = 16m.27s. and 16m.43s., eSKS = 23m.38s., ePS = 24m.48s., ePPS = 25m.22s.
Long waves were also recorded at Mizusawa, Belgrade, Budapest, Basle, Neuchatel, Zürich, Alicante, Clermont-Ferrand, Harvard, Weston, Bermuda, and Dehra Dun.

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Oct. 24d. 6h. 26m. 24s. Epicentre 23°·9N. 121°·7E. (as at 3h. 39m.).

	Δ	Az.	P.	O – C.	S.	O – C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Nanking	8·5	343	e 2 4	– 3	3 42	– 3	—
Manila	9·3	184	i 2 11	– 6	i 3 55	–10	—
Vladivostok	21·0	22	e 4 49	+ 2	e 8 40	+ 3	—
Irkutsk	31·3	340	e 6 53?	+29	e 12 6?	+35	—
Przhevalsk	40·2	308	e 7 45	+ 5	—	—	—
Ili	41·5	311	i 7 49	– 1	—	—	—
Naryn	41·7	307	e 7 47	– 5	14 6	– 4	—
Rybach'e	41·9	308	i 7 56	+ 2	—	—	—
Krasnogorka	42·7	309	i 8 0	0	—	—	—
Frunse	43·0	309	e 7 53	–10	—	—	—
Andijan	44·4	305	e 8 15	+ 1	—	—	—
Fergana	44·7	304	—	—	e 14 51	– 3	—
Tashkent	46·7	306	e 8 33	+ 1	e 15 21	– 1	—
Samarkand	48·4	303	e 8 43	– 3	—	—	—
Sverdlovsk	54·6	324	e 9 36	+ 4	—	—	—
Goris	64·3	304	e 10 44	+ 5	—	—	—
Kiruna	72·2	337	e 11 23	– 6	—	—	e 41·9
Huancayo	160·0	57	e 20 41	PKP_2	—	—	—

Long waves were also recorded at Pavia, Potsdam, Stuttgart, Kew, Aberdeen, and Rathfarnham Castle.

Oct. 24d. 13h. 42m. 14s. Epicentre 23°·9N. 121°·7E. (as at 6h.).

		Δ	Az.	P.	O – C.	S.	O – C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Manila		9·3	184	i 2 21	+ 4	e 4 8	+ 3	—
Calcutta	E.	30·7	275	—	—	e 13 33	SSS	e 18·5
Poona	Z.	44·8	273	i 8 17	0	—	—	—
Kiruna	Z.	72·2	337	e 11 26	– 3	—	—	—
Ksara		73·8	300	e 11 59	PcP	e 21 51	ScS	—
Resolute Bay		78·9	10	e 12 2	– 5	—	—	—
Stuttgart		86·0	323	e 12 43?	0	—	—	e 48·8
Victoria		87·5	37	12 49	– 2	—	—	—
Reno	Z.	94·7	42	e 13 26k	+ 2	—	—	—
Lick	Z.	94·8	46	i 13 25k	0	—	—	—
China Lake	Z.	98·3	44	e 13 41	0	—	—	—
Huancayo		160·0	57	e 20 44	PKP_2	—	—	—

Long waves were also recorded at Pavia, Clermont-Ferrand, Paris, Potsdam, Copenhagen, De Bilt, Kew, Rathfarnham Castle, and Scoresby Sund.

Oct. 24d. 19h. 23m. 14s. Epicentre 41°·8N. 143°·0E. (as on 1945, April 10d.).

Intensity VI at Oshamanbe ; V at Urakawa, Senmaya, Kanagi, etc. ; IV at Hatinohe, Mori, Kushiro, Aomori, Morioka, etc. ; II-III at Sapporo, Miyako, Misawa, Hiradate, etc. Epicentre 41°·8N. 142°·6E. Depth 20km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for Oct., 1951, Tokyo, 1951, p.259-261, with macroseismic chart p.259.

A = –·5971, B = +·4500, C = +·6641 ; δ = +6 ; h = –2 ;
D = +·602, E = +·799 ; G = –·530, H = +·400, K = –·748.

	Δ	Az.	P.	O – C.	S.	O – C.		Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Urakawa	0·4	330	0 17	+ 4	0 24	+ 3	—	—		—
Muroran	1·6	290	0 31	+ 1	0 48	– 3	—	—		—
Hatinohe	1·7	221	0 35k	+ 4	0 56	+ 2	—	—		—
Sapporo	1·8	316	0 34a	+ 2	0 55	– 1	—	—		—
Mori	1·9	279	0 35	+ 1	0 56	– 3	—	—		—
Aomori	1·9	240	0 38k	+ 4	—	—	—	—		—
Asahigawa	2·0	347	0 40	P_g	1 9	S_g	—	—		—
Miyako	2·3	200	0 42k	+ 2	1 6	– 3	—	—		—
Suttsu	2·3	296	0 42	+ 2	1 7	– 2	—	—		—
Abashiri	2·4	18	0 46	P*	1 16	S*	—	—		—

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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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		2·4	51	0 47	P*	1 15	S*	—	—	—
Morioka		2·5	213	0 45k	+ 2	1 14	0	—	—	—
Akita		3·0	227	0 55	P*	1 30	+ 3	—	—	—
Mizusawa		3·0	208	0 56	P*	1 28	+ 1	—	—	—
Isinomaki		3·6	202	0 53	− 5	—	—	—	—	—
Sakata		3·8	221	1 18	P_g	2 0	S*	—	—	—
Sendai		3·9	205	1 4	+ 2	1 51	+ 1	—	—	—
Yamagata		4·1	211	1 7	+ 2	2 2	+ 7	—	—	—
Hukusima		4·5	207	1 12k	+ 1	2 4	− 1	—	—	—
Inawashiro		4·8	209	1 23	P*	2 36	S_g	—	—	—
Niigata		4·9	220	2 10	S	(2 10)	− 5	—	—	—
Onahama		5·1	199	1 23	+ 3	2 32	S*	—	—	—
Aikawa		5·2	226	1 23	+ 2	2 25	+ 3	—	—	—
Mito		5·8	201	1 29	0	2 46	+ 8	—	—	—
Utunomiya		5·8	206	1 30	+ 1	2 41	+ 3	—	—	—
Kakioka		6·0	202	1 32	0	—	—	—	—	—
Tukubasan		6·0	203	1 32	0	2 37	− 6	—	—	—
Maebasi		6·2	211	1 36k	+ 1	2 57	+ 9	—	—	—
Kumagaya		6·3	207	1 40	+ 4	2 57	+ 7	—	—	—
Nagano		6·3	218	1 40	+ 4	3 14	S*	—	—	—
Tyosi		6·3	196	1 40	+ 4	3 1	+11	—	—	—
Oiwake		6·5	214	1 44	+ 5	3 8	+13	—	—	—
Titibu		6·5	209	1 53	P*	3 14	S*	—	—	—
Wazima		6·5	229	1 41	+ 2	—	—	—	—	—
Tokyo		6·6	204	1 40	− 1	3 1	+ 3	—	—	—
Toyama		6·8	223	1 46	+ 2	—	—	—	—	—
Yokohama		6·9	203	1 45	0	3 8	+ 3	—	—	—
Kohu		7·1	211	1 54	+ 6	2 26	P_g	—	—	—
Kanazawa		7·2	225	1 53	+ 4	—	—	—	—	—
Takayama		7·2	220	1 55	+ 6	—	—	—	—	—
Mera		7·3	201	1 50	0	3 10	− 5	—	—	—
Ajiro		7·4	206	1 46	− 6	—	—	—	—	—
Misima		7·4	207	1 52	0	3 27	+ 9	—	—	—
Osima		7·5	203	1 53	0	3 15	− 5	—	—	—
Gihu		8·0	219	2 8	+ 8	—	—	—	—	—
Nagoya		8·1	218	2 5	+ 3	—	—	—	—	—
Hamamatu		8·2	212	2 13	+10	4 7	S*	—	—	—
Vladivostok		8·3	283	i 2 7	+ 3	i 3 40	0	—	—	—
Hikone		8·4	221	2 9	+ 3	—	—	—	—	—
Toyooka		8·9	228	2 18	+ 6	—	—	—	—	—
Osaka		9·2	222	2 23	+ 7	—	—	—	—	—
Kobe		9·4	223	2 18	0	—	—	—	—	—
Oiwase		9·4	217	2 14	− 4	—	—	—	—	—
Sumoto		9·8	223	2 30a	+ 6	—	—	—	—	—
Kôti		11·1	225	2 43	0	—	—	—	—	—
Ooita		12·4	230	3 4	+ 3	—	—	—	—	—
Hukuoka		12·9	235	3 6a	− 1	6 2	SSS	—	—	—
Irkutsk		28·0	307	5 53	− 2	10 33	− 5	—	—	—
Manila		33·2	222	i 6 38	− 2	—	—	—	—	—
Kurmenty		46·7	295	i 8 28	− 4	—	—	—	—	—
Przhevalsk		46·8	294	i 8 31	− 2	e 15 12?	−12	—	—	—
Ili		47·2	297	i 8 34	− 2	i 15 21	− 8	—	—	—
Almata		47·5	296	e 8 37	− 1	—	—	—	—	—
Krasnogorka		48·7	296	i 8 45	− 3	—	—	—	—	—
Naryn		48·9	293	i 8 47	− 3	e 15 42	−11	—	—	—
Frunse		49·3	296	i 8 50	− 3	—	—	—	—	—
Andijan		51·7	295	i 9 9	− 2	i 16 26	− 6	—	—	—
Fergana		52·2	295	i 9 14	− 1	e 16 33?	− 6	—	—	—
Sverdlovsk		52·5	317	i 9 12	− 5	—	—	—	—	—
Tchimkent		52·9	298	i 9 17	− 3	—	—	—	—	—
Tashkent		53·5	297	e 9 20	− 4	e 16 46	−11	—	—	—
Samarkand		55·8	296	9 41	0	17 20	− 8	—	—	—
Resolute Bay		57·7	16	i 9 52	− 3	—	—	e 10 55	PcP	—
Ashkabad		62·5	298	e 10 25	− 3	—	—	—	—	—
Kiruna	Z.	62·5	338	i 10 24k	− 4	i 10 35	?	i 11 4	PcP	—

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.
Poona	z.	62·5	271	i 10 24	– 4	—	—	—	—	—
Kizyl-Arvat		63·3	300	e 10 36	+ 3	—	—	—	—	—
Moscow		64·2	324	10 37	– 2	—	—	—	—	—
Scoresby Sund		67·5	355	i 10 58	– 2	—	—	—	—	—
Piatigorsk		68·5	311	11 3	– 3	—	—	—	—	—
Tiflis		68·9	308	e 11 7	– 2	—	—	—	—	—
Gori		69·1	309	e 11 7	– 3	—	—	—	—	—
Goris		69·3	305	e 11 8	– 3	—	—	—	—	—
Reno	z.	69·6	55	e 11 14a	+ 1	—	—	—	—	—
Lick	z.	69·8	58	i 11 15k	+ 1	i 11 24	?	i 11 39	PcP	—
Abastumanj		70·0	309	e 11 16	+ 1	—	—	—	—	—
Zugdidi		70·1	310	e 11 17	+ 1	—	—	—	—	—
Sotchi		70·6	312	e 11 15	– 4	—	—	—	—	—
Fresno	z.	71·3	57	e 11 22k	– 1	—	—	—	—	—
Tinemaha	z.	72·1	57	i 11 30	+ 2	—	—	—	—	—
Yalta		73·1	315	i 11 31	– 3	—	—	—	—	—
China Lake	z.	73·3	57	i 11 34	– 1	—	—	—	—	—
Pasadena	z.	74·0	59	i 11 39	0	—	—	—	—	—
Copenhagen		74·2	334	i 11 38a	– 2	—	—	—	—	—
Riverside	z.	74·6	59	e 11 42	– 1	—	—	—	—	—
Raciborzu	z.	76·5	327	e 11 52	– 2	e 14 0	?	e 12 32	?	—
Potsdam		76·7	332	e 11 53	– 2	—	—	—	—	e 46·8
Prague		78·0	330	e 12 14	+12	e 13 11	?	e 12 45	?	—
Jena		78·4	331	e 12 2	– 2	—	—	e 12 30	?	—
Witteveen	z.	78·5	336	i 12 2a	– 2	—	—	—	—	—
Ksara		79·4	306	e 12 7	– 2	e 22 57	PS	—	—	—
Stuttgart	z.	81·0	332	e 12 16	– 2	—	—	e 12 22	P	—
Strasbourg		81·7	332	i 12 21	– 1	—	—	e 12 49	?	—
Triest		81·9	327	e 12 21	– 2	—	—	e 12 17	P	e 39·8
Zürich		82·5	331	e 12 23	– 3	—	—	—	—	—
Basle		82·7	332	e 12 26	– 1	—	—	—	—	—
Paris		83·3	336	i 12 28	– 2	i 13 3	?	i 12 35	PcP	e 41·8
Harvard		90·5	25	i 13 5	0	—	—	—	—	—
Weston		90·7	25	i 13 5	– 1	—	—	—	—	—
Tamanrasset	z.	104·6	320	e 18 0	?	—	—	e 18 27	PP	—

Long waves were also recorded at Kew and Pavia.

Oct. 24d. 23h. 47m. 41s. Epicentre 36°·7N. 141°·2E. (as on 1951, September 25d.).

Intensity IV at Mito, Nikko, Makabe, Kasama, Otsu, Watari; II-III at Onahama, Utunomiya, Tukubasan, etc. Epicentre 36°·6N. 141°·1E. Depth 40km.
Seismological Bulletin of the Cent. Met. Obs., Japan, for October, 1951, Tokyo, 1951, p. 261, with macroseismic chart.

A = – ·6263, B = + ·5036, C = + ·5951; δ = + 1; h = – 1;
D = + ·627, E = + ·779; G = – ·464, H = + ·373, K = – ·804.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Onahama	0·3	314	0 12	+ 1	0 19	+ 1
Mito	0·7	242	0 16k	– 1	0 24	– 4
Kakioka	0·9	240	0 19	– 1	0 29	– 5
Shirakawa	0·9	298	0 20	0	0 30	– 4
Tukubasan	1·0	241	0 19	– 2	0 29	– 7
Tyosi	1·0	195	0 21	0	0 31	– 5
Utunomiya	1·1	262	0 19	– 3	0 30	– 9
Hukusima	1·2	331	0 25	+ 1	0 39	– 2
Inawashiro	1·2	315	0 31	+ 7	0 46	+ 5
Kumagaya	1·6	247	0 28	– 2	0 45	– 6
Tokyo	1·6	229	0 27	– 3	—	—
Sendai	1·6	351	0 30	0	0 49	– 2
Isinomaki	1·7	3	0 33	+ 2	0 55	+ 1
Maebasi	1·8	260	0 31a	– 1	0 51	– 5
Titibu	1·8	247	0 41	+ 9	—	—

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		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Mera		2·1	212	0 36	– 1	0 55	– 9
Oiwake		2·2	260	0 39	+ 1	1 1	– 5
Ajiro		2·4	226	0 43	+ 2	1 2	–10
Matusiro		2·4	266	1 6	S	(1 6)	– 6
Misima		2·4	225	0 39	– 2	1 7	– 5
Mizusawa	E.	2·4	359	0 52	+11	1 15	+ 3
Osima		2·4	217	0 41	0	—	—
Matumoto		2·6	260	0 51	+ 7	1 27	+10
Shizuoka		2·8	233	0 49	+ 2	—	—
Miyako		3·0	12	0 50	0	1 23	– 4
Akita		3·1	344	1 15	+24	—	—
Toyama		3·2	270	1 21	+29	—	—
Gihu		3·8	251	1 4	+ 3	—	—
Hatinohe		3·8	4	1 3	+ 2	—	—
Nagoya		3·8	247	1 2	+ 1	1 41	– 6
Aomori		4·1	356	1 34	+29	2 12	+17
Hikone		4·3	252	1 14	+ 6	2 2	+ 2
Kameyama		4·3	245	1 44	+36	—	—

Oct. 24d. Readings also at 0h. (Manila), 1h. (Tchimkent, Ili, Kurmenty, Przhevalsk, Krasnogorka, Frunse, near Andijan, Fergana, Murgab, Dzhergetal, Garm, Stalinabad, and Khorog), 3h. (Calcutta), 4h. (Brisbane, Pasadena, Riverside, Palomar, China Lake, and Tamanrasset), 5h. (Kew, Brisbane, La Paz, Pasadena (2), Riverside (2), Palomar, China Lake (2), Tinemaha, Tamanrasset, and near Apia), 6h. (Manila and Kiruna), 7h. (Manila, Ksara, Kiruna, Potsdam, Clermont-Ferrand, and Kew), 8h. (Vladivostok, Apia, Triest (2), Rome, Clermont-Ferrand, Paris, Stuttgart, Potsdam, Kew, Aberdeen, De Bilt, and near Manila), 9h. (Manila, Ksara, Paris, Strasbourg, and near Kurmenty), 10h. (Scoresby Sund, Kiruna, and near Santa Lucia), 11h. (Apia and near Kurmenty), 12h. (Strasbourg, Leninakan, near Borzhomi, Abastumanj, Tsikhlis-Dzhvari, and Tiflis), 13h. (Apia, Ksara, Naryn, Samarkand, Ili, Przhevalsk, Krasnogorka, Rybach'e, Frunse, Tchimkent, near Andijan, Fergana, Murgab, Garm, Dzhergetal, Khorog, and Stalinabad), 15h. (Paris, Triest, Manila, and near Ottawa), 16h. (near Alicante (2) and near Istanbul), 17h. (Manila and Poona), 18h. (Rome, Paris, Potsdam, and Calcutta), 19h. (Vladivostok, Ksara, and near Palisades (2)), 20h. (Apia, Manila, Kiruna, and near Granada), 21h. (Victoria, Kew, Paris, and near Athens), 22h. (Palisades, Fergana, Murgab, near Dzhergetal, Garm, Stalinabad, Khorog, and near Taranto), 23h. (Ksara, Manila, Stalinabad, Andijan, near Garm, Fergana, Dzhergetal, Khorog, and Murgab).

Oct. 25d. 4h. 6m. 22s. Epicentre 16°·6N, 92°·6W. Depth of focus 0·010.

Felt at Chiapa de Corzo (Chiapas). Epicentre 16°35′N, 92°35′W. Depth about 100km. Monthly seismic bulletin, Tacubaya, Oct., 1951, p.5.

A = –·0435, B = –·9578, C = +·2839 ; δ = –13 ; h = +5 ;
D = –·999, E = +·045 ; G = –·013, H = –·284, K = –·959.,

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		4·0	276	e 0 59	– 1	1 55	+ 9	—	—	—
Vera Cruz		4·2	308	e 1 3	0	2 0	+ 9	i 2 20	?	—
Puebla		5·9	295	e 1 27	+ 1	2 41	+ 8	—	—	—
Tacubaya		6·9	295	1 37k	– 3	—	—	—	—	3·3
Guadalajara		11·0	293	—	—	e 5 47	?	—	—	—
Galerazamba		17·8	106	e 4 2	– 1	e 7 23	+ 8	—	—	9·6
Lubbock		18·9	336	3 20	–55	8 2	+23	—	—	—
Fayetteville		19·5	357	i 4 27	+ 5	i 8 37	?	—	—	—
Bogota		21·7	121	i 4 26	–18	e 8 22	–11	i 4 48	pP	13·6
Lawrence		22·4	355	e 4 57	+ 6	—	—	—	—	—
Tucson		22·7	317	i 4 55	+ 1	e 9 25	sS	—	—	—
San Juan		25·3	81	e 5 51	sP	—	—	—	—	—
Washington		26·1	28	e 5 1	?	—	—	e 5 47	pP	—
Cleveland		26·6	18	i 6 33k	PPP	e 10 3	+ 6	e 11 18	SS	—
Palomar	Z.	27·5	313	i 5 38	– 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		27·6	319	i 5 42	+ 2	e 16 1	ScS	—	—	—
Riverside	Z.	28·2	313	i 5 43	– 3	—	—	—	—	—
Pasadena	Z.	28·9	313	i 5 48	– 4	—	—	—	—	—
Palisades		29·2	30	e 3 4	?	e 11 11	sS	—	—	i 14·9
China Lake	Z.	29·3	316	i 5 54	– 1	—	—	—	—	—
Bermuda		29·8	53	e 7 1	PP	—	—	—	—	e 15·6
Fort de France		30·3	89	e 6 31	pP	e 12 5	SS	—	—	e 15·8
Tinemaha	Z.	30·5	317	i 6 4	– 2	—	—	—	—	—
Fresno	Z.	31·3	316	e 6 11k	– 2	—	—	—	—	—
Harvard		31·5	31	e 6 16	+ 1	—	—	—	—	e 18·2
Weston		31·5	31	e 6 13	– 2	—	—	—	—	e 16·0
Ottawa		32·0	23	6 23	+ 4	11 56	sS	7 40	PPP	18·2
Lick	Z.	32·9	315	i 6 26k	– 1	—	—	—	—	—
Reno	Z.	32·9	320	e 6 28a	+ 1	—	—	—	—	—
Huancayo		33·2	148	e 6 4	–26	e 11 10	–31	—	—	e 15·1
Butte		33·7	336	i 6 38	+ 4	—	—	—	—	—
Shasta Dam		35·2	320	e 6 45	– 2	—	—	e 9 7	PcP	—
Hungry Horse		36·2	337	i 6 57	+ 2	i 13 3	sS	—	—	—
Victoria		40·6	329	7 32	0	—	—	—	—	—
La Paz		40·8	142	e 7 51	pP	13 10	–27	16 8	SS	18·8
Resolute Bay		58·1	359	i 9 46k	0	e 18 8	sS	e 10 31	?	e 34·1
College		60·6	337	i 10 1	– 2	—	—	—	—	—
Kiruna		83·1	22	e 11 20	–56	e 22 51	+25	—	—	—
Stuttgart	Z.	85·2	41	e 12 22	– 5	—	—	—	—	—
Triest	Z.	89·3	43	e 12 1	–45	—	—	e 12 30	pP	—
Ksara		109·8	46	(e 19 29)	PP	(33 56)	SS	—	—	—

Additional readings and note :—
Bogota iEN = 5m.35s., isS = 9m.17s.
Ottawa e = 15m.26s.
Lick iZ = 6m.30s. and 7m.6s.
Ksara readings have been reduced by 21m.
Long waves were also recorded at Seattle, Scoresby Sund, Kew, Paris, Strasbourg, Potsdam, and Rome.

Oct. 25d. 12h. 19m. 40s. Epicentre 23°·9N. 121°·7E. (as on 24d,).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	Z.	7·2	358	e 1 47	– 2	3 12	– 1	—	—	—
Nanking		8·5	343	2 3	– 4	i 3 41	– 4	—	—	—
Manila		9·3	184	i 2 20	+ 3	e 4 12	+ 7	—	—	—
Yakusima		10·2	49	e 2 35	+ 4	e 4 38	+11	—	—	7·1
Tomie		10·7	34	e 2 42	+ 4	—	—	—	—	e 7·0
Nagasaki		11·4	38	e 2 56	PP	—	—	—	—	e 6·7
Kumamoto		11·9	40	e 2 58	+ 4	5 41	+32	—	—	8·0
Saga		12·0	37	3 2	+ 7	—	—	i 3 8	PP	—
Hukuoka		12·3	36	e 2 58	– 1	e 5 26	+ 8	i 3 10	PP	i 6·7
Simidu		13·3	46	3 33	PPP	7 4	Q	—	—	9·0
Matuyama		13·9	42	e 3 28	+ 7	e 6 13	SS	—	—	e 9·2
Koti		14·1	44	e 3 27	+ 4	e 6 26	SS	e 3 48	PPP	7·5
Muroto		14·4	47	e 3 29	+ 2	e 6 34	SSS	—	—	e 7·3
Takamatu		15·1	43	e 3 44	+ 8	e 6 46	SS	e 3 59	PPP	i 9·8
Sumoto		15·5	45	3 52	PP	e 7 11	SSS	—	—	—
Kobe	Z.	15·9	45	e 3 58	PP	—	—	e 4 33	?	e 7·5
Osaka		16·1	45	e 4 5	PP	e 8 5	?	e 4 38	?	9·9
Owase		16·2	48	3 55	+ 5	—	—	—	—	e 7·9
Tu		16·8	47	4 1	+ 3	7 37	SSS	8 23	Q	9·5
Kameyama		16·9	46	3 57	– 2	7 36	SSS	8 40	Q	11·7
Hikone		17·0	45	e 3 57	– 4	e 7 48	SSS	—	—	e 11·1
Gihu		17·4	45	e 4 11	+ 5	e 8 6	SSS	—	—	11·1
Nagoya		17·4	46	e 4 23	PP	—	—	e 8 42	Q	e 11·4
Hukui		17·5	43	e 4 1	– 6	—	—	—	—	—
Omaesaki		17·9	48	e 4 20	+ 8	—	—	—	—	12·6

Continued on next page,

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kanazawa		18·0	41	e 4 18	+ 5	e 7 27	− 5	—	—	10·9
Iida		18·2	46	e 4 34	PP	e 7 53	SS	—	—	e 8·9
Matumoto		18·7	44	e 4 27	+ 5	e 8 27	SSS	—	—	e 11·9
Misima		18·7	48	e 4 14	− 8	e 8 14	SS	—	—	9·5
Osima		18·8	50	e 4 20	− 3	e 7 26	−24	—	—	8·4
Matusiro		19·0	42	4 19	− 7	7 57	+2	i 5 16	?	9·4
Nagano		19·1	43	e 4 42	PP	e 8 46	SSS	i 9 44	Q	e 12·2
Oiwake		19·1	44	e 4 22	− 5	e 8 33	SSS	—	—	e 12·3
Mera		19·2	48	e 4 39	PP	e 8 8	+ 9	—	—	e 10·0
Kumagaya		19·5	46	e 4 34	+ 3	e 8 42	SSS	—	—	—
Maebasi		19·5	45	e 4 57	PPP	e 8 37	SS	—	—	e 9·3
Tokyo		19·6	48	e 4 34	+ 2	e 8 4	− 4	e 4 54	PP	e 10·1
Aikawa		19·9	39	e 3 41	−55	—	—	—	—	11·4
Utunomiya		20·1	46	e 4 39	+ 1	—	—	—	—	—
Mito	N.	20·4	47	e 3 20?	?	—	—	—	—	—
Niigata		20·4	40	e 4 42	+ 1	8 31	+ 6	—	—	—
Onahama		21·0	47	e 5 14	PP	e 9 22	SS	—	—	12·7
Vladivostok		21·0	22	i 4 42?	− 5	—	—	—	—	—
Hukusima		21·2	45	e 5 16	PP	—	—	—	—	—
Sendai		21·8	44	e 5 12	+16	9 37	SS	e 5 27	PP	11·9
Akita		22·1	40	e 5 36	PPP	—	—	—	—	e 13·0
Mizusawa		22·4	42	e 5 34	PP	e 10 5	SSS	e 10 8	Q	e 12·8
Aomori		23·3	39	5 54	+44	e 8 52	−28	6 49?	?	e 11·3
Mori	N.	24·0	36	e 6 3	PPP	—	—	—	—	e 13·3
Sapporo		25·1	34	e 6 14	PPP	e 10 59	SS	e 13 34	Q	e 15·2
Calcutta	E.	30·7	275	i 6 32k	+13	i 11 46	+25	13 3	PcS	—
Irkutsk		31·3	340	e 6 21	− 3	e 11 33	+ 2	—	—	—
Bandong		33·6	206	e 6 46	+ 2	e 12 13	+ 7	—	—	—
Dehra Dun	N.	39·2	290	—	—	e 14 8	PcS	—	—	e 18·9
New Delhi		40·0	287	e 7 39	+ 1	i 13 42	− 2	9 43	PPP	19·1
Przhevalsk		40·2	308	i 7 41	+ 1	—	—	—	—	—
Kurmenty		40·4	309	i 7 43	+ 2	—	—	—	—	—
Hyderabad	E.	40·9	270	i 7 47	+ 1	e 13 54	− 4	16 58	SS	—
Almata		41·4	310	i 7 52	+ 2	e 14 14	+ 9	—	—	—
Ili		41·5	311	e 7 49	− 1	e 14 14	+ 7	—	—	—
Naryn		41·7	307	i 7 52	0	i 14 17	+ 7	—	—	—
Rybach'e		41·9	308	i 7 53	− 1	—	—	—	—	—
Krasnogorka		42·7	309	i 8 0	0	e 14 30	+ 6	—	—	—
Frunse		43·0	309	i 8 2	− 1	e 14 33	+ 4	—	—	—
Colombo	E.	43·5	255	8 17	+10	14 45	+ 9	—	—	26·8
Kodaikanal	E.	44·2	261	e 8 17	+ 5	e 14 45	− 1	—	—	20·8
Fergana		44·7	304	e 8 13	− 3	e 14 57	+ 3	—	—	—
Poona		44·8	273	i 8 17	0	i 14 55	0	10 3	PP	21·0
Bombay	E.	45·6	274	e 8 26	+ 2	i 14 57	− 9	e 10 17	PP	21·0
Tchimkent		46·6	307	i 8 32	0	—	—	—	—	—
Tashkent		46·7	306	i 8 34	+ 2	i 15 27	+ 5	—	—	—
Stalinabad		46·9	302	8 34	0	i 15 30	+ 5	—	—	—
Samarkand		48·4	303	i 8 45	− 1	—	—	—	—	—
Mary		52·4	301	i 9 15	− 1	—	—	—	—	—
Sverdlovsk		54·6	324	i 9 29	− 3	i 17 11	0	—	—	—
Ashkabad		55·2	301	i 9 37	0	17 30?	+10	—	—	—
Brisbane		59·4	147	i 10 5k	− 1	i 18 18	+ 3	—	—	—
Baku		61·4	305	e 10 16	− 4	e 18 45?	+ 5	—	—	—
Shemakla		62·3	305	10 23	− 3	18 54	+ 2	—	—	—
Lenkoran		62·5	303	10 26	− 2	—	—	—	—	—
Riverview		63·9	153	i 10 47a	+10	i 19 24	+12	i 19 40	sS	—
Goris		64·3	304	i 10 38	− 1	i 19 19?	+ 2	—	—	—
Tiflis		65·0	307	e 10 43	− 1	—	—	—	—	—
Erevan		65·5	305	e 10 45	− 2	—	—	—	—	—
Gori		65·5	307	e 10 56?	+ 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.
Leninakan		65·9	307	e 10 52?	+ 2	—	—	—	—	—
Piatigorsk		65·9	310	10 48?	− 2	—	—	—	—	—
Tsikhlis-Dzhvari		66·0	307	10 59	+ 9	19 47	+ 9	—	—	—
Abastumanj		66·4	307	e 11 5?	+12	e 19 55?	+12	—	—	—
Moscow		67·3	323	10 57	− 2	19 53	− 1	—	—	—
College		68·8	27	e 11 3	− 5	20 18	+ 7	—	—	—
Pulkovo		70·3	328	e 11 19	+ 2	e 20 31	+ 2	—	—	—
Yalta		72·0	312	—	—	20 44	− 5	—	—	—
Helsinki	N.	72·8	330	—	—	e 21 0	+ 2	—	—	—
Ksara		73·8	300	e 11 39	+ 1	21 20	+11	—	—	—
Kishinev		74·8	315	11 44	0	—	—	—	—	—
Upsala		76·4	331	e 16 35	PPP	i 21 39	+ 1	e 28 52	SSS	e 35·3
Istanbul	Z.	76·6	310	e 11 53	− 1	—	—	—	—	—
Lwow		76·8	319	e 11 54	− 1	21 45	+ 3	—	—	—
Bucharest		77·5	313	e 12 41	?	e 21 56	+ 6	—	—	—
Auckland	N.	78·5	139	12 15	+11	22 7	+ 6	e 27 20	SS	e 33·4
Helwan		78·8	298	e 12 6	0	22 2	− 2	15 5	PP	—
Resolute Bay		78·9	10	e 12 3	− 4	e 22 2	− 3	—	—	e 31·4
Skalnate Pleso		79·4	320	e 12 34	+25	e 22 7	− 3	e 26 14	SS	—
Timisoara		80·1	316	e 21 20?	?	e 23 20?	PS	—	—	e 43·3
Raciborzu		80·2	321	e 12 13	− 1	—	—	e 15 36	PP	e 42·3
Copenhagen		80·7	328	e 12 16	0	i 22 24	0	—	—	40·3
Budapest		80·8	318	e 12 20?	+ 3	e 22 50	+25	e 23 20?	PS	e 43·3
Belgrade		81·0	315	e 12 22	+ 4	e 22 51	+24	—	—	e 42·7
Ogyalla		81·1	319	e 12 27	+ 9	e 27 44	SS	e 16 46	PPP	—
Christchurch		81·8	146	e 12 25	+ 3	22 35	0	e 27 45	SS	e 39·8
Potsdam		82·0	325	e 12 23	0	i 22 40	+ 3	i 22 43	S	41·3
Prague		82·1	322	e 12 23	− 1	e 22 46	+ 8	e 27 50	SS	e 39·3
Collmberg		82·6	324	e 12 25	− 1	—	—	e 15 32	PP	e 44·3
Cheb		83·5	323	e 12 37	+ 6	e 22 51	− 1	e 23 40	PS	e 35·3
Jena		83·5	323	e 12 30	− 1	e 22 58	+ 6	e 15 53?	PP	—
Triest		84·9	318	e 12 37	− 1	e 23 4	− 2	e 28 46	SS	e 40·6
Witteveen	Z.	85·1	327	i 12 31	− 8	—	—	—	—	—
Stuttgart		86·0	323	e 12 39	− 4	e 23 20	+ 3	e 16 0	PP	e 44·3
De Bilt		86·3	327	e 12 38	− 7	e 22 32	−48	—	—	e 43·3
Karlsruhe		86·3	324	e 12 43	− 2	—	—	—	—	e 45·3
Aberdeen		86·5	333	—	—	i 23 50	+28	i 24 55	PPS	46·2
Bologna		86·9	319	—	—	e 24 44	PPS	—	—	—
Strasbourg		86·9	323	e 12 47	− 1	e 23 29	+ 3	e 24 30	PS	e 41·3
Zürich		87·1	322	e 12 49	0	—	—	—	—	—
Messina	E.	87·3	311	e 12 47	− 3	e 23 41	+12	—	—	e 49·4
Basle		87·5	322	e 20 22	?	—	—	—	—	e 46·8
Rome		87·5	314	e 12 54	+ 3	e 23 32	+ 1	e 12 16	?	e 41·4
Victoria		87·5	37	12 48	− 3	—	—	—	—	—
Durham	N.	87·8	331	—	—	i 23 37	+ 3	—	—	i 38·2
Pavia		87·9	320	e 24 46	PS	e 23 27	− 8	e 29 32	SS	e 36·6
Seattle		88·5	38	e 12 57	+ 1	e 23 40	− 1	—	—	—
Kew		89·4	328	e 20 17	?	e 23 30	[+ 1]	e 23 59	S	e 45·3
Paris		89·6	325	e 24 42	?	i 24 55	PS	i 25 27	PPS	e 42·3
Rathfarnham C.	Z.	90·9	332	e 17 22	?	e 34 10	SSS	e 19 44	?	e 37·2
Shasta Dam		92·4	43	e 13 13	− 1	—	—	—	—	—
Hungry Horse		92·5	33	i 13 12	− 2	—	—	—	—	—
Reno	Z.	94·7	42	e 12 26a	−58	—	—	—	—	—
Butte		94·8	34	i 13 25	0	—	—	—	—	—
Alicante		97·7	319	e 13 43	+ 5	24 35	{− 3}	27 39	PPS	e 46·8
China Lake	Z.	98·3	44	e 13 40	− 1	—	—	—	—	—
Lisbon		102·6	323	17 42	PP	26 42	PS	34 17	?	42·8
Tamanrasset	Z.	102·6	302	e 18 12	PP	—	—	—	—	—
Ottawa		109·2	13	—	—	e 24 56	[−13]	—	—	—
Cleveland		111·5	19	i 20 5k	?	e 25 13	[− 5]	e 29 45	PPS	—
Palisades		113·8	13	—	—	e 30 16	PPS	—	—	e 61·3
Fort de France		141·5	4	e 20 3	[+30]	—	—	—	—	—
Galerazamba		141·7	28	—	—	(40 20)	SS	—	—	40·3
Bogota		147·7	29	i 19 52	[+ 8]	e 30 52	{+46}	e 23 3	PKS	78·3
Huancayo		160·0	57	e 20 5	[+ 4]	e 44 10	SS	e 20 44	PKP,	e 68·6
La Paz		168·2	53	e 20 6	[− 2]	31 50	{− 4}	38 49	PPS	82·2

For Notes see next page.

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NOTES TO OCTOBER 25d. 12h. 19m. 40s.

Additional readings :—
Hukuoka PPP =3m.38s., iSS =5m.39s.
Tokyo eN =5m.1s., ePPP =5m.10s., eE =8m.50s.
Sendai QE =10m.47s.
Calcutta SSSE =14m.3s.
New Delhi SSN =16m.28s., QN =16m.49s., ScSN =17m.29s.
Hyderabad E =9m.26s.
Poona PPPN =10m.59s., PPSEN =15m.10s., SSN =18m.20s.
Bombay iSSE =16m.2s., QE =18m.44s.
Riverview ePSN =19m.50s., iScSN =20m.36s.
Upsala eN =25m.23s.?, eE =34m.47s.
Bucharest eP?N =13m.0s., eE =22m.17s.
Helwan eZ =13m.44s., iN =22m.30s.
Skalnate Pleso e =12m.59s., 16m.28s., 21m.45s., 22m.29s., and 30m.38s.
Raciborzu eZ =13m.42s. and 19m.33s.
Belgrade eZ =13m.4s., eNW =26m.30s.
Ogyalla e =13m.50s. and 21m.40s.
Christchurch eQEN =34m.0s.
Prague e =12m.34s., 12m.49s., 13m.5s., 21m.59s., and 34m.20s.
Cheb e =13m.43s., eN =22m.33s., eS =23m.3s., ePPS? =24m.20s., e =25m.47s., 27m.37s., 30m.43s., and 31m.45s.
Jena eSE =22m.40s., eSS?N =28m.42s.
Triest eZ =13m.15s., iSKS? =23m.29s., ePS =23m.58s.
Stuttgart eSS =28m.57s., e =37m.38s.
Aberdeen iE =27m.45s., iSSSN =33m.5s.
Strasbourg e =13m.30s. and 14m.10s., eSS =33m.12s., e =35m.20s.
Rome ePP?Z =16m.10s., eSSE =29m.25s.
Seattle e =13m.1s. and 13m.16s.
Kew eSS =30m.30s., eSSSEN =35m.25s.
Paris i =27m.32s. and 27m.44s.
Alicante Q =39m.17s.
Cleveland eSE =27m.14s., eE =31m.19s.
Huancayo ePKP =20m.22s., e =30m.27s.
Long waves were also recorded at Tananarive, Harvard, Weston, Pasadena, Saskatoon, Ivigtut, and at other European stations.

Oct. 25d. Readings also at 0h. (Tananarive, Huancayo, and China Lake), 1h. (Rome), 3h. (Manila), 4h. (near Athens and Istanbul), 5h. (near Mizusawa), 6h. (Apia), 7h. (near Istanbul, near Ottawa (2), Shawinigan Falls (2), Seven Falls, and Palisades), 8h. (near Apia), 9h. (Nanking and near Apia), 13h. (near Istanbul), 17h. (Tamanrasset, Ksara, and Apia), 18h. (Samarkand, near Garm, Dzhergetal, and Khorog), 20h. (near Athens), 21h. (Santa Lucia, Manila, Vladivostok, Victoria, Calcutta, and near Tsikhlis-Dzhvari), 22h. (Paris and Potsdam), 23h. (Puebla and Tacubaya).

Oct. 26d. 5h. Region of Solomon Islands.

Auckland eN =38m.2s., eSN =45m.25s., eLN =46°7m.
Brisbane iP =39m.32s., iPPEN =39m.46s., ePPPEN =40m.3s., iSN =43m.17s., eSSN = 44m.5s.
Riverview iPZ =40m.36s.k, iN =40m.41s., ipPZ =40m.49s., eN =44m.41s., iSE = 45m.8s., iN =45m.12s., 45m.37s., and 46m.12s., iSSSN =46m.43s., eLEZ =47·3m.
Manila e =43m.58s.
Djakarta 44m.39s.
Christchurch eSE =47m.4s., eLEN =49m.15s.
Lick ePZ =47m.35s.a, iZ =47m.41s. and 48m.19s.
Berkeley ePZ =47m.45s.a, eLE =73·4m.
Mineral iPZ =47m.45s.a.
Riverside ePZ =47m.46s.
China Lake ePZ =47m.48s., eZ =47m.53s.
Victoria P =47m.48s.
Mount Wilson eP?Z =47m.49s.
Reno ePZ =47m.51s.k.
Palomar eP?Z =47m.53s.
Tinemaha eP?Z =47m.53s.
Wellington eSS =48m.30s., i =49m.30s., L =51·0m., iScS =51m.52s.
Ksara ePKP? =56m.45s.?, e =72m.17s.
Long waves were also recorded at Perth, Palisades, Bermuda, Clermont-Ferrand, Paris, Potsdam, Triest, and Kew.

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Oct. 26d. Readings also at 0h. (Apia, Stuttgart, Tamanrasset, Paris, La Paz, Huancayo, Bermuda, Rome, Bogota, and Victoria : several shocks), 1h. (Apia and near Santa Clara), 3h. (Apia (2) and near Mizusawa), 6h. (Apia, Victoria, and Manila), 7h. Resolute Bay and Victoria), 9h. (Collmberg and Raciborzu (2)), 10h. (Pasadena, Riverside, Palomar, Tinemaha, Tashkent, Tchimkent, near Stalinabad, Garm, Dzhergetal, Samarkand, Khorog, Fergana, Andijan, and near Manila), 12h. (Tamanrasset), 13h. (Strasbourg), 14h. (Apia), 15h. (Strasbourg, Paris, Stuttgart, Stalinabad, Samarkand, near Dzhergetal, Garm, and Khorog), 16h. (near Manila), 17h. (Piatigorsk, Leninakan, Erevan, Zugdidi, Sotchi, near Borzhomi, Gori, Tiflis, Grozny, Tsikhlis-Dzhvari, Abastumanj, Goris, Shemakla, and near Manila), 20h. (Palisades (2), Puebla, near Tacubaya, and near Tsikhlis-Dzhvari), 21h. (Brisbane, Przhevalsk, near Kurmenty (2), Chilisk, and Ili), 22h. (near Stuttgart), 23h. (Horseshoe Bay, Alberni (2), near Victoria (3), and near Kurmenty).

Oct. 27d. 17h. Off the coast of Chile.

Antofagasta ePE =23m.27s., eE =24m.14s. and 24m.56s.
Santa Lucia eN =25m.2s., N =25m.37s. and 26m.6s.
La Paz iP =25m.20s., S? =27m.25s., L =28m.57s.
Buenos Aires eP =26m.12s., S =28m.52s.
Huancayo eP =26m.14s., eS =29m.18s., eL =30m.16s.
La Plata N =27m.48s., S?N =29m.6s., E =29m.12s., LN =29·6m.
Fayetteville iP =33m.20s.
Tucson iP =33m.41s.
Palomar iPZ =34m.6s.
Boulder City iP =34m.11s.
Pasadena iPZ =34m.13s.k, iZ =34m.20s.
China Lake iPZ =34m.17s.k, iZ =34m.24s.
Tinemaha iPZ =34m.26s.k.
Hungry Horse iP =35m.1s.
Tamanrasset ePZ =35m.37s.

Oct. 27d. Readings also at 1h. (near Tananarive), 2h. (Victoria (4)), 4h. (Tamanrasset, Brisbane, Stuttgart, near Chur, Zürich, and Basle), 5h. (Kiruna), 6h. (La Paz, Paris, Strasbourg, and near Santa Lucia), 7h. (Strasbourg), 8h. (near Ashkabad). 10h. (near Goris), 13h. (Murgab, Samarkand, Fergana, near Khorog, Stalinabad, Garm, Dzhergetal, and near Apia), 14h. (Triest), 15h. (Alberni and Victoria), 16h. (Brisbane), 18h. (Huancayo and Apia), 19h. (Apia and near Huancayo).

Oct. 28d. 1h. 53m. 34s. Epicentre 27°·3N. 53°·2E. (as on 1950, Jan. 22d.).

A = + ·5330, B = + ·7125, C = + ·4562 ; δ = −14 ; h = +3 ;
D = + ·801, E = − ·599 ; G = + ·272, H = + ·365, K = − ·890.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad		11·5	21	e 2 56	+ 8	—	—	—	—	—
Kizyl-Arvat		12·0	11	—	—	e 5 0	−11	—	—	—
Lenkoran		12·0	343	—	—	5 1	−10	—	—	—
Mary		12·6	33	e 3 4	+ 1	e 5 26	0	—	—	—
Tiflis		16·0	338	3 44	− 4	e 6 43	− 3	—	—	—
Ksara		16·3	298	—	—	7 12?	SS	—	—	—
Tsikhlis-Dzhvari		16·5	333	e 3 55	+ 1	—	—	—	—	—
Samarkand		16·8	39	i 3 53	− 5	—	—	—	—	—
Stalinabad		17·2	45	i 3 58?	− 5	—	—	—	—	—
Piatigorsk		18·6	338	4 14	− 7	7 45	− 1	—	—	—
Tashkent		19·3	39	e 4 25	− 4	—	—	—	—	—
Helwan		19·4	284	e 4 34	+ 4	i 8 10	+ 6	e 7 18	?	i 11·0
Bombay	E.	19·9	111	e 4 40	+ 4	i 8 34	+19	—	—	—
Tchimkent		20·1	37	i 4 33?	− 5	—	—	—	—	—
Fergana		20·2	40	e 4 34	− 5	e 8 16	− 5	—	—	—
Andijan		20·7	45	4 40	− 4	e 8 22	− 9	—	—	—
Poona		20·9	109	i 4 51	+ 5	i 8 46	+11	—	—	—
New Delhi		21·2	81	e 4 49	0	i 8 40	− 1	—	—	—
Yalta		23·0	325	5 8	+ 1	—	—	—	—	—
Frunse		23·3	43	e 5 10	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Krasnogorka		23·9	41	e 5 14	– 2	—	—	—	—	—
Istanbul		24·2	312	e 9 43	S	(e 9 43)	+ 8	—	—	—
Almata		25·0	44	e 5 26	– 1	—	—	—	—	—
Ili		25·4	42	i 5 29	– 2	—	—	—	—	—
Moscow		30·6	343	e 6 24	+ 6	—	—	—	—	—
Collmberg	Z.	38·6	320	e 7 26	0	—	—	—	—	—
Copenhagen		40·7	326	i 7 45k	+ 1	—	—	—	—	—
Tamanrasset	Z.	43·2	276	i 8 9a	+ 5	—	—	i 9 52	PP	—
Paris		44·4	313	e 8 11	– 3	—	—	i 8 16	P	—
Kiruna		45·1	344	i 8 17a	– 3	e 10 16	PP	e 10 49	PPP	—

October 28d. 1h. 55m. 49s. Epicentre 23°·9N. 121°·7E. (as on 25d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		9·3	184	e 2 20	+ 3	e 4 8	+ 3	—	—	—
Vladivostok		21·0	22	e 4 46	– 1	e 8 34	– 3	—	—	—
Calcutta	E.	30·7	275	e 8 22	?	i 12 56	SS	—	—	—
Irkutsk		31·3	340	e 6 22	– 2	e 11 27	– 4	—	—	—
Poona		44·8	273	i 8 18	+ 1	e 14 44	–11	—	—	—
Sverdlovsk		54·6	324	i 9 30	– 2	e 17 2	– 9	—	—	—
Brisbane	Z.	59·4	147	i 10 8	+ 2	—	—	e 9 33	?	—
Riverview		63·9	153	e 10 37	0	e 19 14	+ 2	e 20 46	ScS	—
Pulkovo		70·3	328	—	—	e 20 31	+ 2	—	—	—
Kiruna		72·2	337	i 11 28	– 1	i 20 49	– 2	e 21 51	PPS	e 38·2
Helsinki	E.	72·8	330	—	—	e 20 52	– 6	—	—	—
Ksara		73·8	300	14 53?	PP	—	—	—	—	—
Istanbul	N.	76·6	310	e 11 40?	–14	—	—	—	—	—
Lwow		76·8	319	—	—	e 21 37	– 5	—	—	—
Resolute Bay		78·9	10	e 12 5	– 2	e 22 4	– 1	—	—	e 43·3
Collmberg	Z.	82·6	324	e 12 29	+ 3	—	—	—	—	—
Triest		84·9	318	—	—	e 32 54	SSS	—	—	e 45·9
De Bilt		86·3	327	—	—	e 23 11	– 9	—	—	e 48·2
Rome	Z.	87·5	314	—	—	e 24 1	+30	—	—	e 37·0
Victoria		87·5	37	(12 50)	– 1	—	—	—	—	—
Seattle		88·5	38	e 12 59	+ 3	—	—	—	—	—
Paris		89·6	325	i 12 58	– 3	—	—	—	—	e 48·2
Mineral	Z.	93·1	44	e 13 17k	0	—	—	—	—	—
Reno	Z.	94·7	42	e 13 25a	+ 1	—	—	—	—	—
Lick	Z.	94·8	46	e 13 24	– 1	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 18 10	PP	—	—	—	—	—
Huancayo		160·0	57	e 20 43	PKP_2	—	—	—	—	—

Kiruna gives also eS?N = 20m.37s., iN = 24m.2s., eE = 24m.48s., and 26m.41s., eN = 26m.47s., iE = 27m.58s., eN = 35m.56s.
Victoria reading has been reduced by 10m.
Long waves were also recorded at Harvard, Weston, Palisades, and at other European stations.

Oct. 28d. 6h. 47m. 44s. Epicentre 57°·8S. 156°·5E.

A = –·4911, B = +·2135, C = –·8446 ; δ = +11 ; h = –8 ;
D = +·399, E = +·917 ; G = +·775, H = –·337, K = –·535.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Terre Adelie		11·4	211	i 2 50	+ 3	e 4 37	–19	e 4 45	S	—
Christchurch		17·5	42	i 4 8	+ 1	e 7 21	0	i 4 34	PP	e 8·3
Kaimata	N.E.	18·0	37	e 4 14	+ 1	e 7 24	– 8	—	—	—
Cobb River	E.	19·7	37	e 4 32	– 2	e 8 27	+17	—	—	e 10·5
Wellington		20·2	42	i 4 36	– 3	i 8 32	+11	e 9 49	Q	11·6
Tuai	N.	23·3	44	e 5 10	0	e 9 33	+13	—	—	—
Karapiro	N.	23·5	39	4 16?	–56	—	—	—	—	—
Auckland	N.	24·2	38	i 5 21	+ 2	i 10 11	SS	—	—	11·3
Riverview		24·2	349	i 5 23a	+ 4	i 9 18	–17	i 5 34	pP	i 10·7
Brisbane		30·4	355	i 6 16a	0	i 11 20	+ 4	i 6 26	pP	i 13·4

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.
Perth		37·8	298	—	—	i 13 24	+13	i 14 58	?	—
Bandong		63·2	304	10 31	− 1	—	—	—	—	—
Djakarta		64·2	303	10 37	− 2	—	—	—	—	—
Manila		77·8	325	i 12 1	0	—	—	—	—	—
La Plata		83·2	153	12 40	+11	22 40	− 9	—	—	39·9
Kimberley	Z.	84·8	222	i 12 36	− 1	—	—	—	—	—
Pretoria	Z.	86·2	226	i 12 14	−30	—	—	—	—	—
Colombo	E.	88·7	285	13 21	+24	23 36	− 7	—	—	—
La Paz		97·3	137	e 13 36	0	24 30	{− 5}	i 24 43	S	45·3
Huancayo		98·5	129	e 13 33	− 9	e 25 5	− 3	e 17 39	PP	e 46·6
Bombay	E.	102·5	285	—	—	e 25 43	+ 2	—	—	—
Vladivostok		102·6	342	e 14 1	+ 1	e 25 39	− 3	i 18 16	PP	—
Bogota		114·0	122	i 19 38	PP	i 29 12	PS	i 22 27	PKS	54·3
Pasadena		115·8	67	e 18 33	[−12]	—	—	e 19 43	PP	e 52·3
Riverside	Z.	116·1	67	e 18 43	[− 2]	—	—	—	—	—
Lick	Z.	116·7	61	e 18 43k	[− 3]	—	—	e 19 48	PP	—
Berkeley		116·9	61	e 19 51	PP	e 29 41	PS	e 36 28	SSP	e 53·8
Fresno	Z.	117·2	63	e 18 44k	[− 3]	—	—	e 19 53	PP	—
Tinemaha	Z.	118·1	65	e 19 3	[+14]	—	—	—	—	—
Mineral	Z.	119·1	60	e 18 52k	[+ 1]	—	—	e 19 40	PP	—
Reno	Z.	119·3	62	e 18 50a	[− 1]	—	—	e 20 10	PP	—
Rybach'e		120·1	302	e 20 14	PP	e 27 14	{− 1}	e 22 45	PPP	—
Stalinabad		120·3	295	e 18 53	[0]	—	—	—	—	—
Almata		120·4	304	e 20 21	PP	—	—	—	—	—
Andijan		120·5	299	e 18 52	[− 2]	—	—	e 20 22	PP	—
Fergana		120·5	299	e 18 51	[− 3]	—	—	—	—	—
Ili		120·9	304	e 18 52	[− 3]	—	—	—	—	—
Frunse		121·3	301	e 18 53	[− 2]	e 27 39	{+17}	e 20 27	PP	—
Samarkand		122·2	294	e 18 54	[− 3]	—	—	i 20 38	PP	—
Tashkent		122·4	297	—	—	e 27 24	{− 6}	e 37 13	SS	—
Mary		123·2	289	e 23 38	PPP	e 25 53	[− 7]	—	—	—
Seattle		124·5	54	e 19 0	[− 1]	—	—	e 19 31	?	e 67·3
Victoria		124·7	53	18 59	[− 3]	(42 16)	SSS	—	—	42·3
Ashkabad		125·3	287	i 19 3	[0]	—	—	—	—	—
Lenkoran		130·8	280	21 43?	PP	22 43	PKS	—	—	—
Ksara		134·0	265	19 22?	[+ 2]	33 36?	PPS	—	—	—
Erevan		134·1	278	e 21 58	PP	—	—	—	—	—
Tiflis		135·1	280	19 21	[− 1]	—	—	—	—	—
Tsikhlis-Dzhvari		135·8	279	e 19 25	[+ 2]	—	—	—	—	—
Sverdlovsk		137·4	306	i 19 25	[− 1]	e 29 4	{− 1}	i 22 16	PP	—
Tamanrasset	Z.	139·2	224	i 19 20a	[− 9]	—	—	i 19 30	PKP	—
Cleveland		140·4	88	i 19 29	[− 2]	i 23 5	PKS	e 22 32	PP	—
Bermuda		142·3	114	i 19 27	[− 8]	i 23 11	PKS	i 22 41	PP	e 68·8
Yalta		142·6	275	e 19 30	[− 5]	—	—	—	—	—
Istanbul		143·0	267	i 19 32	[− 4]	—	—	—	—	—
Palisades		144·1	96	i 19 31	[− 7]	e 42 43	SSP	i 22 47	PP	e 72·4
Kirkland Lake	Z.	145·6	81	i 19 36k	[− 4]	—	—	—	—	—
Ottawa		146·2	88	e 19 38	[− 3]	e 43 16?	SSP	e 47 46	SSS	—
Harvard		146·4	96	i 19 38	[− 4]	e 42 11	SS	i 23 9	PP	e 77·3
Weston		146·5	96	i 19 38	[− 4]	e 42 12	SS	e 22 55	PP	—
Kishinev		147·1	275	e 19 43	[0]	—	—	—	—	—
Moscow		147·4	294	e 19 45	[+ 2]	—	—	—	—	—
Messina		148·0	250	e 19 47	[+ 3]	e 35 2	?	—	—	e 81·9
Shawinigan Falls	N.	148·5	89	e 19 40	[− 5]	—	—	—	—	—
Resolute Bay		149·3	28	e 19 46a	[0]	—	—	—	—	e 72·0
Belgrade	Z.	150·2	264	i 19 51a	[+ 3]	—	—	e 20 1	PKP_2	—
Lwow		151·4	275	e 19 41	[− 9]	e 30 7	{−19}	e 23 31	PP	—
Uzhgorod		151·6	273	e 19 55	[+ 5]	—	—	—	—	—
Rome		152·3	251	i 19 47	[− 4]	e 43 14	SS	e 23 44	PP	—
Algiers Univ.	Z.	152·6	232	i 19 50a	[− 1]	e 23 48	PP	e 20 20	PKP_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.
Triest		154·3	259	i 19 53	[– 1]	e 30 26	{–16}	e 24 8	PP	e 80·3
Almeria		154·9	223	19 45	[– 9]	26 47	[–13]	31 9	SKKS	83·1
Alicante		155·4	228	19 52	[– 3]	e 23 26	PKS	—	—	e 79·2
Granada		155·6	221	19 35k	[–20]	26 26	[–34]	i 24 7	PP	77·0
Pavia		156·3	253	—	—	e 41 11	?	e 73 30	Q	e 81·5
Cheb		157·7	267	e 22 21	?	e 26 55	[– 7]	e 24 21	PP	—
Collmberg	z.	158·1	268	e 19 56	[– 3]	—	—	e 20 33	PKP_2	—
Toledo		158·1	223	i 19 59	[0]	e 27 16	[+13]	i 20 51	PKP_2	—
Kiruna		158·2	314	e 19 56	[– 3]	e 43 58	SS	i 20 33	PKP_2	e 80·8
Jena	z.	158·6	267	e 19 58?	[– 1]	e 24 28	PP	e 20 37	PKP_2	—
Potsdam		158·6	272	e 19 58	[– 1]	—	—	—	—	e 86·3
Stuttgart		158·7	261	e 20 0	[+ 1]	e 37 43	PPS	e 20 35	PKP_2	e 85·3
Strasbourg		159·3	259	i 20 39k	PKP_2	e 37 52	PPS	e 24 35	PP	e 87·3
Copenhagen		160·3	280	e 20 2	[+ 1]	—	—	24 29	PP	—
Paris		162·2	252	i 20 1	[– 2]	i 31 33	{+ 9}	e 19 55	?	e 78·3
De Bilt		162·7	265	e 19 46	[–18]	e 45 4	SS	e 24 40	PP	e 87·3
Kew		165·2	256	e 20 6	[0]	e 38 52	PPS	e 24 40	PP	e 82·3
Aberdeen		168·5	278	i 28 38	PPP	—	—	—	—	e 93·8
Rathfarnham C.	z.	169·3	254	e 21 39	PKP_2	—	—	e 24 41	PP	—

Additional readings :—
Christchurch e =4m.48s., eEZ =6m.26s., eSZ =7m.36s.
Wellington iZ =4m.44s.
Riverview iPPZ =5m.48s., iSSZ =9m.54s., iN =10m.0s., iSSSEZ =10m.9s.
Brisbane iPPN =7m.9s., isSN =11m.26s.
La Plata SKSN =22m 34s , PKKPE =27m.34s.?, N =27m.40s., SSN =30m.40s., SSSE = 35m.4s., SSSN =35m.40s., PPPE =37m.4s.
La Paz PS =26m.24s., PPS =27m.8s., SS =31m.38s.
Huancayo e =24m.38s. and 32m.3s., eL? =40m.38s.
Vladivostok eSKS =24m.26s.
Bogota iSSEN =33m.49s.
Rybach'e ePS =30m.16s.
Frunse ePPP =23m.15s.
Cleveland ePPE =24m.11s., eSE =32m.38s.
Bermuda i =24m.21s. and 34m.38s.
Palisades iPP =23m.29s., e =28m.28s., 32m.19s., and 33m.10s., ePS =34m.20s.
Ottawa e =33m.16s. and 38m.34s.
Belgrade eZ =20m.21s., eNE =21m.32s. and 24m.28s.
Rome eSKKS?Z =31m.6s., ePSKS?N =34m.48s.
Algiers Univ. eZ =19m.58s.
Triest iPKP$_2$Z =20m.43s., iPPP$_2$Z =33m.18s., ePSKS =34m.17s., eSS =43m.44s., ePSS =44m.31s.
Almeria PP =24m.21s.
Granada PKP$_2$ =20m.15s., PPP =27m.17s., iSKKS =30m.53s., SKSP =34m.26s., SS = 43m.53s.
Cheb e =31m.48s., eSKSP? =32m.45s., e =33m.48s. and 34m.45s., ePPS? =37m.22s., e =39m.16s.
Toledo e =23m.52s. and 23m.59s., PP? =24m.32s., e =26m.36s. and 29m.49s.
Kiruna ePP?E =24m.9s., ePPP?EN =27m.43s., eSSS?E =49m.52s., eQE =68·9m. and other unidentified readings.
Stuttgart ePPZ =24m.26s., eZ =25m.2s., ePPP =28m.34s., e =29m.40s., eZ =32m.36s., ePSKSZ =34m.53s., e =41m.22s., 46m.4s., and 55m.10s.
Strasbourg i =20m.48s., ePPP =28m.23s., e =29m.23s., eSS =44m.3s. and 44m.35s., eSSS =50m.26s., e =54m.53s. and 59m.6s.
Paris iPKP$_2$ =21m.1s., iSKP =23m.30s., iPP =24m.45s., iSKS? =26m.52s., iPP (Δ >180°)=27m.32s., iPPP=28m.18s. and 28m.24s., iPPP (Δ >180°)=32m.10s. and 32m.29s., iSKKS? (Δ >180°) =34m.10s., iPPS =38m.21s., iSPP (Δ >180°) = 42m.55s., and other unidentified readings.
Kew ePPZ =21m.22s., eZ =29m.16s., ePS =31m.34s., eSSS? =42m.12s.
Aberdeen iN =29m.42s., iE =32m.52s. and 37m.48s.
Long waves were also recorded at New Plymouth, Santa Lucia, Santa Clara, Saskatoon, Clermont-Ferrand, Scoresby Sund, and Ivigtut.

Oct. 28d. Readings also at 0h. (near Manila), 1h. (Samarkand, near Khorog, Garm, Stalinabad, and Dzhergetal), 5h. (La Paz and near Huancayo), 6h. (Brisbane), 8h. (near Mizusawa), 9h. (near Huancayo), 10h. (near Alicante (3)), 11h. (near Apia and near Reykjavik), 13h. (Huancayo), 14h. (Antofagasta, College, Alberni, Horseshoe Bay, Victoria, Seattle, Hungry Horse, Shasta Dam, Mineral, Reno, Lick, Fresno, Tinemaha, Riverside, Pasadena, Butte, and near Reykjavik), 15h. (Manila, Brisbane, Kiruna, and Tamanrasset), 16h. (Tortosa), 20h. (near La Paz), 21h. (Andijan, Samarkand, Frunse, Rybach'e, Krasnogorka, Almata II, Ili, Przhevalsk, near Khorog, Murgab, Dzhergetal, Garm, Stalinabad, Fergana, and Naryn), 22h. (Brisbane and Kiruna), 23h. (Calcutta and Prague).

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Oct. 29d. 16h. 38m. 2s. Epicentre 43°·5N. 17°·5E.

Intensity VII at Mostar ; IV at Citlak, Gradnice, Nevesinje, etc. ; III at Blatnica. Epicentre 43°·3N. 17°·8E. (Strasbourg).

M. D. Uzelac.
Annuaire macroséismique pour l'Année, 1951, de l'Institut Séismologique, Nouvelle Série No. 11, Belgrade, 1953, p. 58.

A = +·6940, B = +·2188, C = +·6859 ; δ = −3 ; h = −3 ;
D = +·301, E = −·954 ; G = +·654, H = +·206, K = −·728.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		2·5	58	e 0 40a	− 3	i 1 11	− 3	i 0 45	P*	—
Taranto		3·0	183	0 54	+ 4	1 28	+ 1	1 38	S_g	—
Triest		3·4	310	e 1 0	+ 5	i 1 47	S*	i 1 11	P_g	—
Timisoara		3·5	48	i 1 6	P*	e 1 37	− 3	e 1 58	S_g	—
Kecskemet	N.	3·8	24	e 1 16	P_g	e 2 7	S_g	—	—	—
Rocca di Papa		3·9	246	0 58	− 4	e 1 43	− 7	—	—	e 2·4
Rome		4·0	249	i 1 4a	0	i 1 56	+ 4	e 1 16	P_g	—
Budapest		4·1	14	e 1 15	P*	i 2 15	S_g	i 1 24	P_g	2·4
Sofia		4·3	98	1 18	P*	e 2 0	0	2 18	S*	e 2·5
Ogyalla		4·4	6	—	—	e 2 2	0	e 2 17	S*	e 2·8
Bologna		4·6	285	e 1 21	P*	e 2 10	+ 3	e 2 33	S_g	e 2·8
Prato		4·7	277	e 1 24	P*	i 2 16	S*	—	—	—
Vienna		4·8	351	e 1 21	P*	e 2 38	S_g	e 1 34	P_g	e 2·9
Salo	E.	5·4	295	e 1 27	+ 3	e 2 34	+ 6	e 1 47	P_g	—
Messina		5·5	197	—	—	e 2 16	−14	—	—	e 3·2
Skalnate Pleso		6·0	17	e 1 30	− 2	e 2 43	0	e 1 45	P*	e 3·7
Pavia		6·2	288	e 1 39	+ 4	e 2 51	+ 3	e 3 4	S*	—
Bucharest		6·3	78	e 1 28	− 8	e 3 10	S*	e 2 10	P_g	3·5
Chur		6·5	303	e 1 43k	+ 4	e 3 2	+ 7	—	—	—
Raciborzu		6·6	4	e 1 40	− 1	e 3 2	+ 4	e 8 35	PcP	i 4·4
Prague		6·9	344	e 1 55	+10	e 3 0	− 5	e 2 2	P*	e 4·1
Zürich		7·4	305	e 1 54	+ 2	e 3 31	+13	e 3 5	?	—
Cheb	E.	7·5	334	—	—	e 3 56	S*	—	—	—
Stuttgart		7·8	315	e 1 57	− 1	e 3 29	+ 1	e 2 16	P*	e 4·4
Basle		8·0	303	e 2 4	+ 4	e 3 36	+ 3	—	—	e 4·2
Neuchatel		8·2	299	e 2 5	+ 2	e 3 42	+ 4	—	—	—
Karlsruhe		8·4	314	e 2 4	− 2	e 4 11	S*	e 4 29	S_g	—
Jena	N.	8·4	334	e 2 8	+ 2	e 3 45	+ 2	e 4 13	S*	e 4·9
Strasbourg		8·5	310	i 2 10a	+ 3	e 3 40	− 5	i 2 30	P*	e 4·5
Potsdam		9·4	343	—	—	e 4 50	S*	e 5 16	S_g	—
Paris		11·7	302	e 2 50	− 1	—	—	—	—	—
Rathfarnham C.	Z.	18·5	310	e 4 44	PP	—	—	—	—	e 12·4
Tamanrasset	Z.	22·9	209	e 5 5	− 1	—	—	e 5 17	PP	—
Kiruna		24·4	3	i 5 20a	− 1	—	—	i 5 43	PP	e 13·4
College		71·4	353	e 11 21	− 3	—	—	—	—	—
Hungry Horse		79·1	329	i 12 4	− 4	—	—	—	—	—

Additional readings :—
Belgrade iZ,NW = 48s., e$P_g$$S_g$NE = 1m.4s., i$S_g$NW = 1m.17s., i$S_g$NE = 1m.22s.
Triest iS_g = 2m.1s.
Timisoara ePEN = 1m.15s., eP_gE = 1m.23s.?, eEN = 1m.29s., eN = 2m.5s., eP_gE = 2m.21s., eN = 2m.24s.
Kecskemet eE = 1m.36s. and 2m.10s., eN = 2m.23s.
Rome iE = 1m.35s. and 1m.43s., eS*Z = 2m.8s.
Budapest SN = 2m.18s.
Sofia eEN = 2m.20s., S_gEN = 2m.26s.
Ogyalla eS? = 2m.36s.
Bologna eP_g? = 1m.44s.
Salo eN = 1m.53s. and 2m.47s., iS* = 3m.0s.
Skalnate Pleso e = 2m.3s. and 2m.8s.
Pavia e = 2m.11s. and 3m.33s.
Bucharest eN = 3m.15s.
Raciborzu eP*Z = 1m.53s., eN = 2m.5s., eP_gZ = 2m.9s., iZ = 2m.29s., eS_gEZ = 3m.41s.
Prague eP* = 2m.13s., eP_g = 2m.32s., iS = 3m.14s., eS* = 3m.40s. and many unidentified e readings.
Stuttgart eZ = 2m.0s. and 2m.5s., eP*?Z = 2m.20s., eS?Z = 3m.18s., eZ = 3m.51s., e = 4m.4s. and 4m.16s.

Continued on next page.

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Karlsruhe eZ = 2m.15s.
Jena eN = 2m.12s. and 2m.30s., eE = 2m.33s., eEN = 3m.18s., eE = 3m.31s., eN = 3m.34s., eS?E = 3m.49s., eN = 4m.5s. and 4m.19s., eE = 4m.30s., eS$_g$?E = 4m.42s., eS$_g$?N = 4m.45s.
Strasbourg e = 2m.17s., 3m.1s., and 3m.10s., eS = 3m.35s., iS = 3m.52s., i = 4m.8s., and 4m.23s.
Kiruna iZ = 5m.37s.
Long waves were also recorded at Kew and Copenhagen.

Oct. 29d. 21h. 16m. 35s. Epicentre 30°·3N. 68°·3E. Depth of focus 0·010. (as on 1938, Dec. 1d.).

A = + ·3198, B = + ·8036, C = + ·5020 ; δ = + 5 ; h = + 2 ;
D = + ·928, E = − ·370 ; G = + ·186, H = + ·466, K = − ·865.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
New Delhi		7·9	100	e 1 54	0	i 3 19	− 3	—	—	—
Stalinabad		8·3	3	e 1 55	− 4	—	—	—	—	—
Garm		8·8	10	e 2 6	0	—	—	—	—	—
Mary		9·0	326	e 2 10	+ 1	—	—	—	—	—
Samarkand		9·4	354	i 2 10	− 4	—	—	—	—	—
Fergana		10·5	15	e 2 28	− 1	e 4 28	+ 3	—	—	—
Andijan		10·9	16	e 2 34	0	—	—	—	—	—
Tashkent		11·0	4	e 2 37?	+ 1	—	—	—	—	—
Ashkabad		11·2	316	e 2 42	+ 4	—	—	—	—	—
Tchimkent		12·0	4	e 2 55	+ 6	—	—	—	—	—
Bombay	E.	12·1	159	—	—	e 5 25?	SS	—	—	i 6·9
Poona		12·7	155	e 2 57	− 1	e 5 32	+14	5 56	SSS	6·0
Naryn		12·7	27	e 2 57	− 1	i 5 17	− 1	—	—	—
Kizyl-Arvat		13·2	315	—	—	e 5 32	+ 2	—	—	—
Frunse		13·5	20	e 3 9	0	e 5 33	− 4	—	—	—
Rybach'e		13·6	25	e 3 9	− 1	—	—	—	—	—
Almata II		14·8	27	e 3 25	0	—	—	—	—	—
Calcutta	E.	19·5	109	—	—	i 8 1	+ 9	—	—	—
Tiflis		22·1	307	e 4 43	− 5	—	—	—	—	—
Piatigorsk		24·2	312	5 13	+ 5	—	—	—	—	—
Ksara		27·6	285	—	—	e 12 25?	ScP	—	—	—
Kiruna		46·8	337	i 8 19k	− 3	e 19 59	SSS	e 18 59	?	e 24·7

Additional readings :—
New Delhi PPE = 2m.2s., P*E = 2m.11s., P$_g$E = 3m.9s.?, SSEN = 3m.31s., SSSEN = 3m.41s., S*EN = 3m.46s., S$_g$EN = 4m.7s.
Poona SSE = 5m.47s.
Long waves were also recorded at Kew, Copenhagen and Potsdam.

Oct. 29d. 22h. 48m. 56s. Epicentre 44°·3N. 10°·8E. (as on 1937, Dec. 10d.).

A = + ·7053, B = + ·1345, C = + ·6960 ; δ = − 5 ; h = − 3 ;
D = + ·187, E = − ·982 ; G = + ·684, H = + ·130, K = − ·718.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bologna		0·4	62	i 0 11	− 2	i 0 18	− 3	—	—	—
Prato		0·5	153	i 0 14	0	i 0 23	0	—	—	—
Salo		1·3	351	i 0 27	+ 2	i 0 44	0	i 0 30	P$_g$	—
Triest		2·5	57	i 0 41	− 2	i 1 4	−10	i 1 18	S*	—
Chur		2·7	341	e 0 47k	+ 2	e 1 18	− 1	—	—	—
Rome	N.	2·7	153	e 1 0	P$_g$	e 1 19	0	e 1 27	S*	—
Zürich		3·4	334	e 0 55a	0	e 1 36	− 1	e 1 6	P$_g$	—
Neuchatel		3·8	316	e 1 2	+ 1	e 1 43	− 4	—	—	—
Basle		4·0	327	e 0 59	− 5	e 1 47	− 5	e 1 17	P$_g$	—
Stuttgart	Z.	4·6	347	e 1 10	− 2	e 2 1	− 6	e 2 32	S$_g$	—
Strasbourg		4·8	335	e 1 14	− 1	e 2 7	− 5	e 1 39	P$_g$	—
Karlsruhe		5·0	342	e 1 34	P*	—	—	—	—	—
Prague		6·3	22	e 1 41	+ 5	e 2 53	+ 3	e 2 10	P$_g$	—
Jena		6·7	7	e 1 38?	− 4	e 3 21	S*	e 2 2	P*	—
Collmberg		7·2	11	e 1 45	− 4	e 3 21	+ 8	e 2 21	P$_g$	e 4·2

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.
Paris		7·3	311	i 1 37	–13	—	—	—	—	e 4·1
Raciborzu		7·8	39	—	—	e 3 36	+ 8	e 3 59	S*	e 5·1
Tamanrasset	Z.	21·9	193	e 5 2	+ 5	—	—	—	—	—

Additional readings :—
Triest iP_gZ = 45s.
Rome eS_gN = 1m.44s.
Stuttgart eZ = 1m.18s. and 1m.27s., eP_g?Z = 1m.31s., eZ = 1m.35s. and 1m.48s., eS?Z = 1m.58s., eZ = 2m.14s.
Strasbourg iP_g = 1m.35s., i = 1m.56s., iS* = 2m.21s., iS_g = 2m.32s., i = 2m.43s., e = 2m.49s.
Prague e = 1m.56s., eP_g = 2m.22s., i = 2m.40s., e = 3m.7s. and 3m.14s., eS* = 3m.22s., eS_g = 3m.36s., e = 3m.48s.
Jena eP_g?Z = 2m.9s., eZ = 2m.29s. and 2m.40s., eS?EZ = 2m.51s., eS*?E = 3m.37s., eS_g?EN = 3m.42s., eE = 3m.52s.
Collmberg eP_gZ = 2m.40s., eS*?EZ = 3m.48s., eEZ = 3m.52s.
Raciborzu eSSN = 3m.41s., eS_gZ = 4m.16s.
Long waves were also recorded at Pavia and Potsdam.

Oct. 29d. Readings also at 0h. (Kew, Durham, Paris, Strasbourg, Copenhagen, Potsdam, near Almata II, Chilisk, Kurmenty, and Przhevalsk), 2h. (near Apia), 3h. (Ashkabad and near Leninakan), 5h. (near Ashkabad), 9h. (Puebla and near Tacubaya), 12h. (Brisbane, Tamanrasset, Lick, Mineral, Reno, Riverside, Palomar, and Pasadena, 13h. (Puebla, Vera Cruz (2), and near Tacubaya (2)), 14h. (Terre Adelie), 15h. Auckland, Christchurch, Wellington, Brisbane, Terre Adelie, Tamanrasset, Resolute Bay, Stuttgart, and Collmberg), 17h. (near Bogota), 18h. (Brisbane, Garm, near Dzhergetal, Khorog, and Naryn), 19h. (near Huancayo), 21h. (Alberni and Terre Adelie),.

Oct. 30d. 15h. 44m. 39s. (I) } Epicentre 43°·5N. 82°·0E.
16h. 14m. 32s. (II) }

A = +·1013, B = +·7206, C = +·6859 ; δ = –2 ; h = –3 ;
D = +·990, E = –·139 ; G = +·095, H = +·679, K = –·728.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Chilisk	2·6	273	e 0 48	+ 4	—	—	—	—	—
I	Kurmenty	2·8	262	i 0 47	0	—	—	—	—	—
II		2·8	262	i 0 47	0	—	—	—	—	—
II	Przhevalsk	2·8	250	e 0 51	+ 4	—	—	—	—	—
I	Almata II	3·3	268	e 0 58	+ 5	—	—	—	—	—
II		3·3	268	i 0 58	+ 5	—	—	—	—	—
I	Ili	3·6	279	i 0 59	+ 1	—	—	—	—	—
II		3·6	279	i 1 0	+ 2	—	—	—	—	—
I	Almata	3·7	268	i 1 2	+ 2	i 2 4	S_g	—	—	—
II		3·7	268	i 1 2	+ 2	i 2 7	S_g	—	—	—
I	Rybach'e	4·5	258	i 1 12	+ 1	—	—	—	—	—
II		4·5	258	e 1 12	+ 1	e 2 15	S*	—	—	—
I	Naryn	4·9	247	e 1 22	+ 5	i 2 25	S*	—	—	—
II		4·9	247	e 1 18	+ 1	i 2 14	– 1	—	—	—
I	Krasnogorka	5·0	270	e 1 19	+ 1	—	—	—	—	—
II		5·0	270	i 1 18	0	—	—	—	—	—
I	Frunse	5·5	266	e 1 26	+ 1	i 2 49	S*	—	—	—
II		5·5	266	i 1 27	+ 2	—	—	—	—	—
I	Andijan	7·7	252	—	—	i 3 10	–15	—	—	—
I	Murgab	8·0	233	e 2 5	+ 5	—	—	—	—	—
II		8·0	233	2 0	0	3 32	– 1	—	—	—
I	Dzhergetal	9·2	246	e 2 18	+ 2	i 3 58	– 5	—	—	—
II		9·2	246	e 2 17	+ 1	i 3 58	– 5	—	—	—
I	Garm	9·9	247	i 2 25	0	—	—	—	—	—
II	Khorog	10·0	236	2 30	+ 3	4 22	0	—	—	—
I	Stalinabad	11·2	248	—	—	4 48	– 4	—	—	—
II		11·2	248	2 41	– 3	e 4 41	–11	—	—	—
I	Samarkand	11·9	256	2 47	– 7	—	—	—	—	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I New Delhi		15·4	196	e 3 29	−11	6 31	− 1	i 3 37	PP	6·2
II		15·4	196	e 3 29	−11	6 32	0	6 46	SS	6·2
I Irkutsk		17·3	50	e 4 2	− 2	7 17	+ 1	—	—	—
II		17·3	50	4 0	− 4	—	—	—	—	—
I Sverdlovsk		19·0	323	i 4 25	− 1	—	—	—	—	—
II		19·0	323	i 4 25	− 1	—	—	—	—	—
II Kizyl-Arvat		19·8	267	e 4 34	− 1	—	—	—	—	—
I Calcutta	E.	21·6	162	—	—	8 51?	+ 2	—	—	i 13·3
II	E.	21·6	162	e 5 0	+ 6	i 8 42	− 7	—	—	—
I Bombay	E.	25·7	200	e 5 44	+11	e10 8	+ 7	—	—	—
II	E.	25·7	200	e 5 35	+ 2	e 9 59	− 2	—	—	—
I Poona		25·8	197	i 5 34	0	e 9 56	− 6	6 18	PP	11·0
II		25·8	197	i 5 30	− 4	i 10 2	0	6 12	PP	10·7
I Tiflis		27·3	279	e 5 46	− 2	—	—	—	—	—
II		27·3	279	e 5 46	− 2	—	—	—	—	—
I Moscow		30·8	310	6 11	− 9	—	—	—	—	—
II		30·8	310	e 6 16	− 4	—	—	—	—	—
I Kiruna		40·0	328	i 7 35a	− 3	—	—	—	—	e 19·8
II		40·0	328	i 7 36	− 2	e 16 56	SS	—	—	e 18·5
I Prague		45·3	304	e 8 26	+ 5	e 8 32	?	e 20 29	Q	21·6
II		45·3	304	—	—	—	—	e 20 28	Q	e 21·6
I Collmberg	Z.	45·8	305	e 8 22	− 3	—	—	—	—	—
I Jena		46·7	305	e 8 30	− 2	e 8 36	?	e 11 8	PPP	—
II	Z.	46·7	305	e 8 30	− 2	e 8 47	?	e 10 20	PP	—
I Stuttgart		49·0	303	8 46	− 4	—	—	e 8 53	P	e 27·4
II		49·0	303	8 46	− 4	—	—	—	—	e 26·3
I Strasbourg		49·9	304	e 8 59	+ 2	—	—	—	—	—
II		49·9	304	e 8 55	− 2	—	—	—	—	—
I Tamanrasset	Z.	65·1	278	e 10 40	− 5	—	—	—	—	—
II	Z.	65·1	278	e 10 42	− 3	—	—	e 10 50	?	—
II Kimberley	Z.	89·0	228	i 13 3	+ 5	—	—	—	—	—

Additional readings :—
New Delhi I iSE = 6m.15s., SSSE = 6m.42s. ; II iSEN = 6m.15s.
Poona I SSE = 11m.13s., SSSE = 11m.31s. ; II PPPE = 6m.25s., SSE = 10m.58s., SSSE = 11m.12s.
Kiruna II iZ = 7m.41s. and 7m.49s., ePPZ = 8m.45s., eQN = 16·0m.
Long waves to both shocks were recorded at Helsinki, Upsala, Copenhagen, Kew, De Bilt, Paris, Potsdam, and Pavia ; also to shock II at Bergen.

Oct. 30d. Readings also at 2h. (near Garm), 5h. (Terre Adélie, Bermuda, and near Apia), 6h. (Kimberley and near Andijan), 7h. (Apia (2)), 9h. (Kimberley), 10h. (Terre Adélie and near Apia), 14h. (Strasbourg, Collmberg, Stuttgart, Kiruna, Kew, Samarkand, near Andijan, Khorog, Stalinabad, Dzhergetal, and Garm), 15h. (Paris and near Malaga (2)), 16h. (Apia), 18h. (near Chilisk), 19h. (Almata II, Kurmenty, near Ili, Przhevalsk, Chilisk, and near Santa Clara (2)), 20h. (Apia, Stalinabad, near Dzhergetal, Garm, and Khorog), 21h. (Mount Wilson, Riverside, China Lake, near La Paz, and near Santa Clara), 22h. (Victoria and near Garm), 23h. (Wellington and near Garm).

Oct. 31d. 6h. 56m. 18s. Epicentre 0°·7S. 98°·1E. (as on 1951, February 13d.).

A = −·1409, B = +·9899, C = −·0122 ; δ = −10 ; h = +7 ;
D = +·990, E = +·141 ; G = +·002, H = −·012, K = −1·000.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		11·3	123	e 2 47	+ 1	e 5 2	+ 8	—	—	—
Colombo	E.	19·7	293	4 42?	+ 8	8 4	− 6	—	—	—
Kodaikanal	E.	23·2	299	i 5 18a	+ 9	i 9 28	+10	12 27	PcS	—
Calcutta	E.	25·0	339	i 5 27	0	i 9 47	− 2	5 55	PP	—
Hyderabad		26·4	314	i 5 44	+ 4	i 10 13	+ 1	6 27	PP	12·6
Poona		30·6	310	i 6 18	0	i 11 18	− 2	7 7	PP	14·4
Bombay	E.	31·6	310	e 6 29	+ 3	i 11 36	+ 1	9 24	PcP	14·4
New Delhi		35·3	327	e 6 57	− 2	i 12 26	− 7	8 10	PP	—
Perth		35·3	153	e 6 22	−37	i 12 47	+14	—	—	14·8
Dehra Dun	N.	36·3	330	e 8 54?	PP	e 12 54	+ 6	e 16 18	Q	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking		38·0	29	i 7 20a	– 1	i 13 10	– 4	i 8 51	PP	—
Zi-ka-wei		38·7	33	i 7 26	– 1	13 20	– 5	—	—	—
Naryn		46·5	338	i 8 29	– 2	i 15 16	– 3	—	—	—
Przhevalsk		46·5	341	8 31	0	—	—	—	—	—
Kurmenty		47·1	342	e 8 33	– 2	—	—	—	—	—
Rybach'e		47·3	339	i 8 37	0	i 15 28	– 3	—	—	—
Andijan		47·4	333	i 8 39	+ 1	i 15 28	– 4	—	—	—
Fergana		47·4	333	8 36	– 2	15 25	– 7	—	—	—
Almata II		47·6	340	e 8 38	– 1	—	—	—	—	—
Almata		47·7	340	i 8 41	+ 1	—	—	—	—	—
Frunse		48·3	337	i 8 44	– 1	i 15 41	– 4	—	—	—
Ili		48·3	341	i 8 42	– 3	—	—	—	—	—
Tashkent		49·3	332	e 8 51	– 2	i 15 54	– 5	—	—	—
Tchimkent		49·9	333	i 8 58	+ 1	i 16 5	– 2	—	—	—
Mary		50·7	323	i 9 3	0	16 16	– 2	—	—	—
Tananarive		52·8	247	e 9 33	+14	e 16 47	0	12 44	PP	24·9
Ashkabad		53·1	321	i 9 21	0	i 16 47	– 4	—	—	—
Vladivostok		53·1	31	i 9 19	– 2	—	—	—	—	—
Kizyl-Arvat		55·1	322	9 32	– 4	—	—	—	—	—
Mizusawa	E.	55·9	40	9 44	+ 2	e 17 27	– 2	—	—	—
	N.	55·9	40	e 9 52	+10	e 17 19	–10	—	—	—
Brisbane		58·9	121	i 10 3a	0	i 18 9	+ 1	i 22 17	SS	i 32·5
Riverview		59·5	129	i 10 10a	+ 3	i 18 21	+ 5	i 10 24	pP	e 27·4
Erevan		63·5	317	e 10 35	+ 1	19 5	– 2	—	—	—
Tiflis		63·9	318	10 35	– 2	19 6	– 6	—	—	—
Leninakan		64·2	317	e 10 45?	+ 6	—	—	—	—	—
Tsikhlis-Dzhvari		64·2	317	e 10 43	+ 4	—	—	—	—	—
Gori		64·5	318	e 10 30?	–11	e 19 6?	–13	—	—	—
Sverdlovsk		64·8	339	e 10 39	– 4	19 17	– 6	—	—	—
Borzhomi		64·9	318	e 10 44	+ 1	19 22	– 2	—	—	—
Piatigorsk		66·1	320	10 51	0	19 30	– 9	—	—	—
Ksara		67·6	307	i 10 58	– 3	20 8	+11	13 40	PP	—
Helwan		70·3	302	e 11 19	+ 2	20 24	– 5	21 12	SKS	—
Yalta		72·2	317	11 28	– 1	20 46	– 5	—	—	—
Terre Adélie		72·6	163	e 11 41	+10	i 20 59	+ 3	—	—	—
Moscow		74·4	329	i 11 40	– 2	i 21 9	– 7	—	—	—
Istanbul		74·8	313	e 11 42	– 2	i 21 14	– 6	—	—	e 38·7
Kimberley	Z.	75·1	240	i 11 47	+ 1	—	—	—	—	—
Kishinev		76·5	319	11 53	– 1	21 33	– 6	—	—	—
Bucharest		77·7	316	e 12 16	+16	e 21 49	– 3	e 22 20	PS	—
Christchurch		78·3	134	i 12 7	+ 4	i 22 2	+ 3	e 15 12	PP	e 39·8
Auckland	N.	78·9	127	e 12 17	+10	i 22 12	+ 7	27 4	SS	e 36·5
Wellington		79·5	132	12 22	+12	i 22 10	– 1	i 12 30	PcP	35·9
Pulkovo		79·6	332	e 12 9	– 1	i 22 6	– 6	—	—	—
Lwow		80·3	321	i 12 14	0	e 22 13	– 7	—	—	—
Timisoara		81·4	317	e 12 26	+ 6	e 22 9?	–22	e 15 12	PP	—
Belgrade		81·7	315	e 12 23a	+ 1	e 22 31	– 3	e 13 1	PcP	e 43·1
Helsinki	N.	82·3	332	—	—	e 22 32	– 8	e 27 35	SS	e 37·7
Skalnate Pleso		82·6	320	e 12 12	–14	22 42	– 1	e 28 12	SS	—
Taranto		83·5	311	—	—	e 21 42?	–70	—	—	—
Ogyalla	N.	83·7	318	e 12 16	–16	e 22 52	– 2	e 28 24	SS	—
Raciborzu		84·1	321	e 12 34	0	e 22 59	+ 1	e 23 9	ScS	e 58·7
Messina		84·6	309	e 12 37	+ 1	i 23 2	– 1	i 13 21	?	—
Upsala		85·8	330	—	—	e 32 10	SSS	—	—	e 41·7
Kiruna	Z.	86·0	337	i 12 43k	0	—	—	i 16 17	PP	—
Prague		86·5	320	e 12 48	+ 2	e 23 33	+11	e 16 25	PP	e 42·7
Triest		86·5	316	e 12 45	– 1	i 23 19	– 3	i 23 14	SKS	—
Rome		87·2	312	i 12 50a	+ 1	i 23 27	– 1	e 29 14	SS	e 36·3
Collmberg		87·5	321	e 12 51	0	e 23 27	– 4	e 15 49	PP	e 35·2
Potsdam		87·5	323	i 12 53k	+ 2	i 23 28	– 3	i 23 18	SKS	e 38·7
Mitchell Field		87·6	38	e 12 51	0	—	—	—	—	—

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.
These data are considered public domain and may be freely distributed or copied for non-profit purposes provided the previous references are quoted.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Cheb		87·8	320	e 12 54	+ 2	e 23 48	+14	e 15 54	PP	e 34·8
Copenhagen		88·1	326	e 12 54	0	i 23 37	0	23 23	SKS	40·7
Bologna		88·2	315	e 13 21	+27	e 23 40	+ 2	—	—	—
Jena		88·3	320	e 12 54	− 1	e 23 37	− 2	e 16 21	PP	—
Pavia		89·7	316	e 13 4	+ 3	e 23 32	[+ 1]	e 18 49	PPP	e 48·8
Stuttgart		89·8	319	e 13 0	− 2	e 23 48	− 5	e 16 42	PP	e 45·7
Zürich		90·2	317	e 13 3	− 1	e 23 50	− 6	e 13 28	pP	—
Karlsruhe		90·3	320	e 13 5	+ 1	e 23 54	− 3	—	—	—
Strasbourg		90·7	319	e 13 7	+ 1	i 24 0	− 1	e 16 44	PP	—
Basle		90·9	317	e 13 8	+ 1	e 23 59	− 4	—	—	—
Witteveen	Z.	91·4	324	i 13 12	+ 3	—	—	—	—	—
Bergen	N.	92·0	331	—	—	e 24 10	− 2	e 33 27	SSS	e 40·7
De Bilt		92·4	322	i 13 14	0	i 24 14	− 2	e 23 48	SKS	e 43·7
Tamanrasset	Z.	92·7	293	i 17 1	PP	—	—	—	—	—
Clermont-Ferrand		94·0	316	—	—	e 22 48	?	—	—	—
Paris		94·2	319	e 13 20	− 2	e 24 19	{+ 7}	i 13 34	pP	e 57·7
Algiers Univ.	Z.	94·5	306	e 13 26	+ 3	e 16 48	PP	e 13 55	pP	—
Kew		95·8	322	i 13 30a	+ 1	e 24 43	− 2	e 17 21	PP	e 39·7
Aberdeen		96·1	328	i 17 10	PP	i 24 50	+ 2	i 24 3	SKS	e 49·0
Durham		96·2	325	e 13 42	+11	i 24 9	[+ 1]	i 17 26	PP	—
Alicante		97·2	309	e 13 54	+18	i 24 12	[− 1]	e 17 34	PP	e 46·7
Almeria		98·9	307	e 14 5	+22	24 41	{− 5}	18 11	PP	54·6
Rathfarnham Castle		99·1	324	—	—	e 25 16	+ 3	e 24 54	SKKS	e 41·7
Granada		99·7	307	e 14 6	+19	24 38	[+12]	18 12	PP	53·0
Toledo		99·8	310	e 13 2	−45	—	—	—	—	62·7
Malaga		100·4	347	i 13 54	+ 4	—	—	i 17 50	PP	63·5
College		100·7	22	e 13 36	−16	—	—	e 17 24	PP	—
Resolute Bay		105·3	4	e 14 18	+ 6	—	—	—	—	—
Sitka		109·6	27	e 19 10	PP	i 28 47	PS	—	—	—
Victoria		120·6	30	e 19 6	[+12]	e 22 42	PKS	—	—	55·7
Seattle		121·6	31	e 20 20	PP	—	—	—	—	e 75·7
Hungry Horse		125·0	25	i 19 4	[+ 2]	—	—	i 20 58	PP	—
Shasta Dam		125·9	38	e 18 32	[−32]	—	—	—	—	—
Mineral	Z.	126·6	38	e 19 9a	[+ 4]	—	—	i 21 7	PP	—
Butte		127·5	26	e 19 17	[+10]	—	—	e 23 47	PPP	—
Reno	Z.	128·2	37	e 19 12a	[+ 3]	—	—	e 21 7	PP	—
Lick	Z.	128·3	40	i 19 11a	[+ 2]	—	—	i 20 59	PP	—
Fresno	Z.	129·9	39	e 19 15k	[+ 3]	—	—	—	—	—
Tinemaha	Z.	130·6	38	e 19 17	[+ 4]	i 22 40	PKS	e 21 27	PP	—
China Lake	Z.	131·8	39	e 19 16	[0]	i 22 42	PKS	e 21 41	PP	—
Pasadena	Z.	132·5	41	i 19 20	[+ 3]	i 22 43	PKS	e 21 35	PP	e 56·3
Rapid City		132·8	21	e 19 44?	[+27]	32 27?	PS	—	—	—
Riverside	Z.	133·1	41	e 19 20	[+ 2]	—	—	—	—	—
Boulder City		133·5	37	e 19 22	[+ 3]	—	—	i 23 5	PKS	—
Palomar	Z.	133·8	41	e 19 28	[+ 9]	—	—	—	—	—
Ottawa		135·2	353	22 9	PP	23 16	PKS	40 0	SS	71·7
Harvard		137·4	347	e 19 22	[− 4]	—	—	—	—	e 77·1
Weston		137·4	347	e 18 55	[−31]	—	—	—	—	58·7
La Plata		138·1	210	23 6	PKS	27 0	[+24]	25 54	PPP	63·8
Tucson		138·4	37	e 19 34	[+ 6]	—	—	—	—	—
Palisades		139·2	349	e 19 29	[0]	—	—	e 22 22	PP	e 74·3
Cleveland	Z.	139·4	359	i 22 22k	PP	—	—	—	—	—
Bermuda		144·6	334	i 19 39	[+ 1]	i 23 6	PKS	e 41 37	SS	e 68·2
Tacubaya		154·9	41	e 20 14?	[+20]	—	—	e 23 34	PP	—
Puebla		155·8	40	e 20 8?	[+12]	—	—	e 20 30	PKP_2	—
San Juan		156·6	319	e 20 11	[+14]	—	—	e 23 58	PP	—
La Paz		158·2	219	e 20 22	[+23]	i 31 10	{+ 7}	e 21 2	PKP_2	75·8
Huancayo		165·7	207	e 20 13	[+ 7]	e 31 51	{+ 9}	e 25 29	PP	e 70·9
Bogota		171·3	—	i 20 32	[+22]	i 29 35	?	i 46 38	SS	87·7

Additional readings :—
Kodaikanal ScSE = 16m.15s.
Calcutta SSE = 10m.37s.
Hyderabad SSE = 10m.41s.

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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Poona PPE =7m.14s., PPPN =7m.25s., PPPE =7m.28s., PcPE =9m.14s., PcPN = 9m.18s., SSN =13m.4s., SSE =13m.7s., SSSE =13m.17s., ScSE =16m.26s.
Bombay QE =13m.2s.
New Delhi PcSN =13m.10s., SSN =14m.27s.
Nanking iN =13m.6s.
Tananarive e =14m.13s., ePS =17m.2s., e =19m.55s., Q =22·7m.
Riverview isSN =18m.35s., iScSE =19m.58s., iSSN =22m.7s.
Helwan eZ =12m.3s.
Bucharest eN =12m.47s., eSE =21m.52s.
Christchurch ePEN =12m.12s., SSEN =27m.2s., eSSSN =30m.22s., eQE =31m.57s.
Auckland eQN =32·9m.
Wellington e =25m.31s., SS =26m.10s., Q =32·5m.
Timisoara eSN =22m.13s.?
Belgrade eNW =13m.13s., eNE =14m.42s., eSSNW =28m.11s.
Skalnate Pleso ePE =12m.17s., e =12m.50s., 13m.6s., 14m.4s., and 23m.4s., ePS = 23m.19s., e =23m.58s. and 31m.48s.
Ogyalla e =13m.50s., 15m.10s., 23m.10s., 24m.2s., and 24m.57s.
Raciborzu eN =12m.45s., eZ =13m.2s. and 17m.6s., eN =17m.10s., ePSZ =23m.34s.
Upsala eSSSN =32m.17s., eN =34m.54s.
Kiruna iZ =12m.59s., iPPPZ =18m.10s.
Prague e =13m.0s., 13m.17s., 13m.29s., and 14m.9s., eSKSE =23m.12s., eSKSN = 23m.19s., ePS =24m.13s., ePPSE =24m.25s., eSS =28m.39s., e =31m.48s.
Triest isSKS? =23m.46s., iPS =24m.11s., iPPS =24m.58s., SS =28m.50s.?, eSSS = 32m.33s.
Rome eN =28m.40s.
Collmberg eZ =13m.58s.
Cheb ePN =12m.57s., eSKS =23m.18s., ePS =24m.28s.
Copenhagen 23m.52s.
Jena eEZ =13m.26s., eN =14m.0s., ePP?E =16m.36s., eE =16m.54s. and 17m.19s., ePPP?N =18m.32s., eSKS?E =23m.22s.
Pavia ePS =25m.7s., eSS =30m.19s., e =35m.46s.
Stuttgart e =14m.12s. and 20m.43s., eSKS =23m.32s., ePS =24m.59s., e =25m.11s., eSS =29m.48s., e =36m.24s.
Zürich ePP? =16m.46s., eSKS =23m.33s.
Strasbourg eSKS =23m.31s., ePS =25m.8s., ePPS =26m.2s., eSS? =29m.18s., eSSS = 33m.30s. and other unidentified e readings.
De Bilt ePS =25m.36s.
Paris iPP =17m.8s., ePPP =19m.23s., ePPPP =21m.1s., eSKS =23m.56s., eSKKS = 24m.8s., SP =25m.49s., ePS? =25m.54s., ePPS =26m.49s. and other unidentified readings.
Kew eSKSE =24m.9s., eSSEN =31m.14s., eSSSN =37m.12s.
Aberdeen iPPPE =19m.28s., iPSN =25m.49s., iPPSE =26m.19s., iSSEN =31m.8s., eSSSN =34m.36s., eN =43m.38s.
Alicante SS =31m.22s.
Granada PPP =20m.36s., iSKKS =25m.32s., PPS =28m.18s., SS =32m.45s.
Mineral iZ =19m.22s., 19m.40s., and 20m.17s.
Lick iZ =19m.25s., eZ =20m.7s.
Pasadena iZ =20m.34s., iSKPEN =22m.47s., eZ =24m.28s., eSKSP =31m.42s., eSS = 39m.54s.
La Plata PKSE =23m.18s., SKKSEN =29m.6s., SS?N =40m.24s., SSE =41m.6s., N =44m.54s., SSS?E =45m.24s., N =54m.36s., QN =54·2m.
Tacubaya e =24m.15s., 24m.58s., and 25m.32s.
Puebla e =21m.6s. and 22m.6s.
La Paz PP =24m.42s., PPS =37m.42s.?, iSS =45m.6s., i =50m.27s.
Huancayo e =28m.25s., 30m.55s., 35m.12s., 45m.42s., and 51m.6s.
Bogota iPPEN =26m.0s.
Long waves were also recorded at Santa Clara, Saskatoon, Concepción, Ivigtut, and Edinburgh.

Oct. 31d. 8h. 3m. 7s. Epicentre 0°·7S. 98°·1E. (as at 6h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		11·3	123	e 2 52	+ 6	e 5 10	+16	—	—	—
Colombo	E.	19·7	293	4 33	− 1	8 15	+ 5	—	—	—
Kodaikanal	E.	23·2	299	e 5 14	+ 5	i 9 24	+ 6	12 23	PcS	—
Calcutta	N.	25·0	339	e 5 28	+ 1	i 9 50	+ 1	—	—	—
Hyderabad	N.	26·4	314	e 6 25	PP	10 23	+11	—	—	—
Poona		30·6	310	i 6 16	− 2	i 11 17	− 3	9 10	PcP	—
Bombay	E.	31·6	310	e 6 25	− 1	i 11 32	− 3	—	—	13·0
New Delhi		35·3	327	e 7 15	+16	i 12 24	− 9	1 8 22	PP	—
Naryn		46·5	338	e 8 28	− 3	i 15 12	− 7	—	—	—
Przhevalsk		46·5	341	i 8 31	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kurmenty		47·1	342	e 8 30	– 5	—	—	—	—	—
Almata II		47·6	340	e 8 37	– 2	—	—	—	—	—
Almata		47·7	340	i 8 38	– 2	—	—	—	—	—
Samarkand		49·2	328	e 8 42	–10	—	—	—	—	—
Tchimkent		49·9	333	i 8 56	– 1	i 16 3	– 4	—	—	—
Irkutsk		53·0	5	e 9 23	+ 2	—	—	—	—	—
Ashkabad		53·1	321	i 9 19	– 2	—	—	—	—	—
Vladivostok		53·1	31	e 9 17?	– 4	—	—	—	—	—
Brisbane	Z.	58·9	121	e 10 4a	+ 1	—	—	—	—	—
Gori		64·5	318	e 10 36	– 5	—	—	—	—	—
Sverdlovsk		64·8	339	i 10 40	– 3	i 19 16	– 7	—	—	—
Piatigorsk		66·1	320	10 47	– 4	—	—	—	—	—
Ksara		67·6	307	i 11 3	+ 2	—	—	—	—	—
Pretoria	Z.	71·6	243	i 22 35	?	—	—	—	—	—
Yalta		72·2	317	11 27	– 2	20 41	–10	—	—	—
Moscow		74·4	329	11 37	– 5	21 5	–11	—	—	—
Kimberley	Z.	75·1	240	i 11 46	0	—	—	—	—	—
Auckland	N.	78·9	127	—	—	i 22 15	+10	—	—	—
Lwow		80·3	321	i 12 13	– 1	i 22 12	– 8	—	—	—
Raciborzu	Z.	84·1	321	e 12 34?	0	—	—	e 15 42	PP	—
Messina		84·6	309	e 12 42	+ 6	e 23 0	– 3	—	—	—
Kiruna	Z.	86·0	337	e 12 40	– 3	—	—	—	—	—
Prague		86·5	320	e 13 3	+17	e 23 18?	– 4	e 16 30	PP	—
Triest		86·5	316	—	—	i 23 10	[– 1]	e 23 16	S	—
Collmberg	Z.	87·5	321	e 12 49	– 2	—	—	e 16 23	PP	—
Stuttgart	Z.	89·8	319	e 13 0	– 2	—	—	—	—	—
Zürich		90·2	317	e 19 6	PPP	—	—	—	—	—
Strasbourg		90·7	319	e 13 12	+ 6	—	—	e 14 22	?	—
Tamanrasset	Z.	92·7	293	e 13 17	+ 2	—	—	e 16 58	PP	—
Algiers Univ.	Z.	94·5	306	e 13 31	+ 8	—	—	—	—	—
College		100·7	22	e 13 37	–15	—	—	e 17 46	PP	—
Hungry Horse		125·0	25	i 19 2	[0]	—	—	i 20 45	PP	—
Mineral	Z.	126·6	38	i 19 11k	[+ 6]	—	—	—	—	—
Butte		127·5	26	e 21 5	PP	—	—	—	—	—
Reno	Z.	128·2	37	e 19 9a	[0]	—	—	—	—	—
Fresno	Z.	129·9	39	e 19 13	[+ 1]	—	—	—	—	—
Tinemaha	Z.	130·6	38	e 19 15	[+ 2]	—	—	—	—	—
China Lake	Z.	131·8	39	e 19 17	[+ 1]	e 22 39	PKS	e 21 39	PP	—
Pasadena	Z.	132·5	41	e 19 17	[0]	e 22 41	PKS	—	—	—
Rapid City		132·8	21	16 2?	?	—	—	—	—	—
Boulder City		133·5	37	e 19 21	[+ 2]	—	—	i 19 29	PKP_2	—
Palomar	Z.	133·8	41	e 19 21	[+ 2]	—	—	—	—	—
Bermuda		144·6	334	i 19 38	[0]	—	—	—	—	—
Tacubaya		154·9	41	e 20 8	[+14]	—	—	e 20 41	PKP_2	—
Puebla		155·8	40	—	—	e 28 30	?	—	—	—
San Juan		156·6	319	e 20 5	[+ 8]	—	—	—	—	—
La Paz		158·2	219	e 25 21	PP	—	—	—	—	—
Huancayo		165·7	207	e 20 14	[+ 8]	—	—	—	—	—

Additional readings :—
Kodaikanal ScSE =16m.11s.
Poona SSE =13m.11s.
New Delhi ScSN =17m.10s.
Raciborzu eZ =14m.13s.
Prague e =13m.18s., 13m.36s., and 14m.6s., eS =23m.35s.
Triest esS? =23m.47s., ePS =24m.16s., ePPS =24m.54s.
Long waves were also recorded at Tananarive.

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Oct. 31d. 10h. 22m. 14s. Epicentre 0°·7S. 98°·1E. (as at 8h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		11·3	123	e 2 54	+ 8	e 5 12	+18	—	—	—
Colombo	E.	19·7	293	4 35	+ 1	8 27	+17	—	—	16·1
Kodaikanal	E.	23·2	299	5 17	+ 8	i 9 27	+ 9	12 26	PcS	—
Calcutta	E.	25·0	339	e 5 27	0	i 9 51	+ 2	—	—	—
Hyderabad	N.	26·4	314	e 5 38	– 2	i 10 11	– 1	—	—	—
Poona		30·6	310	i 6 17	– 1	i 11 17	– 3	9 0	PcP	14·5
Bombay	E.	31·6	310	e 6 27	+ 1	i 11 34	– 1	7 35	PP	14·8
New Delhi		35·3	327	e 6 56	– 3	i 12 25	– 8	—	—	16·2
Nanking		38·0	29	i 7 20a	– 1	13 9	– 5	—	—	i 17·6
Zi-ka-wei	Z.	38·7	33	i 7 26	– 1	13 27	+ 2	9 0	PP	—
Naryn		46·5	338	i 8 30	– 1	i 15 15	– 4	—	—	—
Przhevalsk		46·5	341	8 31	0	—	—	—	—	—
Kurmenty		47·1	342	e 8 32	– 3	—	—	—	—	—
Andijan		47·4	333	8 38	0	i 15 28	– 4	—	—	—
Fergana		47·4	333	8 36	– 2	15 26	– 6	—	—	—
Stalinabad		47·5	329	8 34	– 4	i 15 25	– 9	—	—	—
Almata II		47·6	340	e 8 38	– 1	—	—	—	—	—
Almata		47·7	340	i 8 40	0	15 35	– 1	—	—	—
Ili		48·3	341	i 8 43	– 2	—	—	—	—	—
Tashkent		49·3	332	e 8 51	– 2	i 15 53	– 6	—	—	—
Tchimkent		49·9	333	i 8 56	– 1	i 16 3	– 4	—	—	—
Tananarive		52·8	247	e 17 0	PS	—	—	—	—	e 26·6
Irkutsk		53·0	5	9 18	– 3	—	—	—	—	—
Ashkabad		53·1	321	i 9 20	– 1	i 16 47	– 4	—	—	—
Vladivostok		53·1	31	i 9 19	– 2	e 16 47	– 4	—	—	—
Kizyl-Arvat		55·1	322	—	—	e 17 11	– 7	—	—	—
Brisbane		58·9	121	i 10 5k	+ 2	i 18 11	+ 3	—	—	—
Riverview	N.	59·5	129	—	—	e 18 19	+ 3	19 58	ScS	—
Goris		61·9	317	e 10 24	0	—	—	—	—	—
Kirovobad		62·4	318	10 25	– 2	—	—	—	—	—
Erevan		63·5	317	—	—	19 3	– 4	—	—	—
Tiflis		63·9	318	10 36	– 1	19 8	– 4	—	—	—
Leninakan		64 2	317	e 10 46?	+ 7	—	—	—	—	—
Tsikhlis-Dzhvari		64·2	317	e 10 45	+ 6	—	—	—	—	—
Gori		64·5	318	e 10 36	– 5	—	—	—	—	—
Sverdlovsk		64·8	339	i 10 40	– 3	i 19 16	–7	—	—	—
Borzhomi		64·9	318	e 10 42	– 1	—	—	—	—	—
Piatigorsk		66·1	320	10 48	– 3	19 34?	– 5	—	—	—
Ksara		67·6	307	10 54?	– 7	20 28	+31	—	—	—
Helwan		70·3	302	e 11 31	+14	20 22	– 7	—	—	—
Yalta		72·2	317	11 26	– 3	20 42	– 9	—	—	—
Moscow		74·4	329	11 39	– 3	21 7	– 9	—	—	—
Istanbul		74·8	313	e 11 42	– 2	e 21 13	– 7	—	—	—
Kimberley	Z.	75·1	240	i 11 18	–28	—	—	—	—	—
Christchurch		78·3	134	—	—	e 22 6	+ 7	e 27 26	SS	e 39·8
Auckland	N.	78·9	127	—	—	i 22 12	+ 7	—	—	e 43·0
Lwow		80·3	321	i 12 14	0	i 22 14	– 6	—	—	—
Belgrade	Z.	81·7	315	e 12 22a	0	—	—	e 12 38	PcP	—
Raciborzu		84·1	321	e 12 34	0	—	—	e 18 27	PPP	—
Messina		84·6	309	e 12 38	+ 2	e 23 0	– 3	—	—	—
Kiruna	Z.	86·0	337	i 12 43k	0	—	—	i 16 15	PP	—
Prague		86·5	320	e 13 58	+72	e 24 22	+60	—	—	e 43·8
Triest		86·5	316	e 12 52	+ 6	e 23 25	+ 3	e 16 17	PP	e 47·1
Rome	Z.	87·2	312	—	—	e 23 9	[– 6]	—	—	—
Potsdam		87·5	323	e 12 52	+ 1	i 23 27	– 4	—	—	e 43·8
Collmberg	Z.	87·5	321	e 12 51	0	—	—	—	—	—
Mitchell Field		87·6	38	i 12 50	– 1	—	—	—	—	—
Jena	Z.	88·3	320	e 12 54	– 1	—	—	—	—	—
Pavia		89·7	316	—	—	e 23 37	[+ 6]	—	—	—
Stuttgart		89·8	319	e 13 1	– 1	e 23 48	– 5	—	—	e 54·8

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.
Zürich		90·2	317	e 13 3	– 1	e 23 53	– 3	e 14 13	?	—
Strasbourg		90·7	319	e 13 6	0	e 24 0	– 1	—	—	e 47·8
De Bilt		92·4	322	—	—	e 24 14	– 2	—	—	e 47·8
Tamanrasset	Z.	92·7	293	i 13 18	+ 3	—	—	—	—	—
Paris		94·2	319	e 13 43	+21	—	—	e 14 25	?	e 45·8
College		100·7	22	e 13 50	– 2	—	—	e 17 22	PP	—
Hungry Horse		125·0	25	i 19 3	[+ 1]	—	—	i 20 41	PP	—
Shasta Dam		125·9	38	i 19 6	[+ 2]	—	—	—	—	—
Mineral	Z.	126·6	38	i 19 7k	[+ 2]	—	—	i 21 2	PP	—
Butte		127·5	26	i 19 9	[+ 2]	—	—	i 21 6	PP	—
Reno	Z.	128·2	37	e 19 10a	[+ 1]	—	—	e 21 13	PP	—
Lick	Z.	128·3	40	e 19 11a	[+ 2]	—	—	e 21 26	PP	—
Fresno	Z.	129·9	39	e 19 14k	[+ 2]	e 22 32	PKS	e 21 18	PP	—
Tinemaha	Z.	130·6	38	e 19 15	[+ 2]	i 22 35	PKS	e 21 32	PP	—
China Lake		131·8	39	e 19 18	[+ 2]	i 22 41	PKS	e 21 26	PP	—
Pasadena		132·5	41	e 19 19	[+ 2]	i 22 42	PKS	e 21 37	PP	—
Riverside	Z.	133·1	41	e 19 20	[+ 2]	e 22 45	PKS	e 21 40	PP	—
Boulder City		133·5	37	e 19 22	[+ 3]	—	—	i 21 52	PP	—
Palomar	Z.	133·8	41	e 19 22	[+ 3]	—	—	—	—	—
Tucson		138·4	37	e 19 29	[+ 1]	—	—	e 22 12	PP	—
Palisades		139·2	349	e 19 32	[+ 3]	—	—	—	—	—
Bermuda		144·6	334	i 19 39	[+ 1]	—	—	—	—	—
Tacubaya		154·9	41	e 20 11	[+17]	—	—	—	—	—
San Juan		156·6	319	e 20 15	[+18]	—	—	—	—	—
La Paz		158·2	219	e 20 8	[+ 9]	e 24 34	PP	e 21 16	PKP_2	—
Huancayo		165·7	207	e 20 12	[+ 6]	—	—	—	—	e 81·3

Additional readings :—
Kodaikanal ScSE = 16m.14s.
Poona SSEN = 13m.11s., SSSEN = 13m.31s., ScSEN = 16m.42s.
Bombay ScPE = 12m.45s., QE = 13m.26s., SSSE = 13m.46s.
New Delhi ScSN = 17m.12s.
Riverview eE = 18m.26s.
Raciborzu eN = 13m.37s.
Kiruna iZ = 12m.56s.
Triest ePPPZ = 18m.13s., eSKS = 23m.9s., ePS = 23m.48s., eSS = 29m.1s.
Jena eEZ = 13m.6s., eZ = 14m.3s.
Stuttgart eZ = 14m.3s.
Strasbourg e = 13m.19s., 13m.36s., 13m.50s., and 14m.10s.
Lick eZ = 20m.52s.
Long waves were also recorded at Kew.

Oct. 31d. 11h. 43m. 44s. Epicentre 58°·0S. 10°·0W.

Very approximate.

A = + ·5244, B = – ·0925, C = – ·8464 ; δ = –6 ; h = –8 ;
D = – ·174, E = – ·985 ; G = – ·834, H = + ·147, K = – ·532.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Punta Arenas	N.	33·7	252	—	—	e 14 1	?	—	—	—
Kimberley	Z.	37·9	54	i 6 48	–32	—	—	—	—	—
La Plata		39·1	285	7 34	+ 3	13 22	– 9	9 4	PP	16·0
Concepcion		45·7	273	e 8 29	+ 5	e 15 5	– 3	—	—	21·3
Terre Adelie		53·7	166	e 9 27	+ 1	i 16 54	– 5	e 11 23	PP	21·5
Tananarive		57·1	71	—	—	e 17 45	0	e 21 35	SS	e 25·3
La Paz		59·4	289	i 10 4	– 2	i 18 18	+ 3	i 11 18	PP	28·5
Huancayo		66·9	285	e 10 57	+ 1	e 19 49	0	e 23 58	SS	e 31·1
Christchurch		78·8	182	e 21 51	S	e 22 4	0	e 26 36	SS	e 37·3
Wellington		81·0	183	—	—	e 22 32	+ 5	e 23 12	PS	e 35·9
Tamanrasset	Z.	81·5	15	i 12 20a	– 1	—	—	e 15 39	PP	—
Fort de France		83·7	311	e 12 33	+ 1	e 22 51	– 3	—	—	—
Auckland	N.	85·4	183	—	—	e 23 16	+ 5	—	—	e 35·9
Galerazamba		86·5	297	e 12 55	+ 9	i 23 21	– 1	i 24 3	PS	42·7
Riverview		87·2	164	e 17 2	PP	e 23 26	– 2	—	—	e 37·5

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		94·1	35	e 17 10	PP	e 23 58	[+ 2]	e 17 28	?	—
Granada		95·0	5	—	—	19 52	PPP	27 10	?	46·2
Alicante		96·3	7	e 9 36	?	e 21 18	?	—	—	e 49·6
Ksara		99·2	37	16 14	?	25 54	+40	—	—	—
Bermuda		101·0	315	—	—	e 28 11	PPS	e 32 31	PSS	e 47·8
Rome	Z.	101·3	17	e 18 21	PP	—	—	—	—	—
Pavia		104·0	13	—	—	e 29 0	PPS	e 43 8	Q	—
Cheb		109·3	15	—	—	e 33 52	SS	e 40 34	Q	—
Kew		109·4	6	—	—	e 28 2	PS	e 36 16	SSS	e 51·3
Prague		109·6	16	—	—	e 34 36	SS	—	—	—
De Bilt		110·4	10	e 19 31	PP	e 34 46	SS	—	—	e 45·3
Palomar	Z.	126·3	276	e 19 23	[+18]	—	—	—	—	—
Riverside	Z.	127·1	276	e 19 6	[0]	—	—	—	—	—
Mount Wilson	Z.	127·6	276	e 19 12	[+ 5]	—	—	—	—	—
China Lake	Z.	128·6	278	e 19 9	[0]	—	—	—	—	—
Fresno	Z.	130·5	277	e 19 16	[+ 3]	—	—	—	—	—
Lick	Z.	131·9	276	e 19 18k	[+ 2]	—	—	—	—	—
Mineral	Z.	134·1	279	e 19 9k	[−11]	—	—	—	—	—
Resolute Bay	Z.	143·4	334	e 19 33	[− 3]	—	—	—	—	—

Additional readings :—
La Plata PcPN =10m.28s., PcPE =10m.40s., N =11m.16s., SE =13m.40s.
Terre Adelie iScS =19m.11s.
Tananarive eSSS =23m.38s.
La Paz iPS =18m.40s., iScS =20m.2s., iSS =22m.16s., iSSS =24m.52s.
Huancayo e =12m.30s., eQ =27·3m.
Christchurch eQEN =32·3m.
Wellington e =33m.4s.
Tamanrasset eZ =12m.36s., 13m.53s., and 14m.10s.
Riverview eE =31m.17s., 32m.32s., and 34m.56s.
Long waves were also recorded at Brisbane, Palisades, Weston, and other European stations.

Oct. 31d. 19h. 14m. 25s. Epicentre 43°·5N. 82°·0E. (as on 30d.)

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chilisk		2·6	273	i 0 51	P_g	—	—	—	—	—
Przhevalsk		2·8	250	i 0 55	P_g	—	—	—	—	—
Ili		3·6	279	i 1 4	P*	—	—	—	—	—
Almata		3·7	268	i 1 6	P*	i 2 10	S_g	—	—	—
Rybach'e		4·5	258	i 1 19	P*	i 2 26	S_g	—	—	—
Naryn		4·9	247	e 1 22	+ 5	i 2 48	S_g	—	—	—
Frunse		5·5	266	i 1 29	+ 4	i 3 9	S_g	—	—	—
Andijan		7·7	252	—	—	i 4 19	S_g	—	—	—
Murgab		8·0	233	—	—	i 3 33?	0	—	—	—
Fergana		8·2	251	e 2 10	+ 7	—	—	—	—	—
Tchimkent		9·2	267	i 2 22	+ 6	—	—	—	—	—
Stalinabad		11·2	248	i 2 46	+ 2	e 4 46	− 3	—	—	—
New Delhi		15·4	196	e 3 35	− 5	i 6 18	−14	—	—	6·2
Ashkabad		18·7	261	e 4 16	− 6	—	—	—	—	—
Sverdlovsk		19·0	323	i 4 28	+ 2	—	—	—	—	—
Kizyl-Arvat		19·8	267	e 4 28	− 7	—	—	—	—	—
Calcutta	E.	21·6	162	e 4 14	−40	i 8 46	− 3	—	—	—
Baku		24·0	274	e 9 52?	S	(e 9 52?)	+20	—	—	(e 14·0)
Bombay	E.	25·7	200	e 5 35?	+ 2	i 10 13	+12	—	—	—
Poona		25·8	197	i 5 32	− 2	e 9 58	− 4	11 2	SS	12·0
Kirovobad		26·5	277	5 41	0	—	—	—	—	—
Piatigorsk		28·0	285	5 52	− 3	—	—	—	—	—
Tsikhlis-Dzhvari		28·3	279	e 5 56	− 1	—	—	—	—	—
Moscow		30·8	310	6 20	0	—	—	—	—	—
Yalta		34·0	289	6 49	+ 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pulkovo		34·9	316	i 6 57	+ 2	—	—	—	—	—
Lwow		39·4	300	e 7 34	+ 1	—	—	—	—	—
Kiruna	z.	40·0	328	i 7 38k	0	—	—	i 8 10	?	—
Copenhagen		44·8	312	e 8 22	+ 5	—	—	—	—	22·6
Prague		45·3	304	e 8 18	− 3	e 18 25	SS	e 10 44	PPP	e 23·8
Collmberg	z.	45·8	305	e 8 26	+ 1	—	—	e 10 11	PP	—
Cheb		46·5	304	—	—	e 21 12	?	—	—	e 23·0
Jena		46·7	305	e 8 34	+ 2	—	—	e 10 23	PP	e 25·1
Triest		47·3	298	i 8 38	+ 1	e 17 39	?	e 19 33	SS	—
Stuttgart		49·0	303	e 8 51a	+ 1	—	—	—	—	e 25·6
Strasbourg		49·9	304	e 8 58	+ 1	—	—	e 10 13	PcP	25·9
Zürich		49·9	302	e 8 47	−10	—	—	—	—	—
Basle		50·4	302	e 9 2	+ 1	—	—	—	—	—
Paris		53·0	306	i 9 22	+ 1	—	—	e 10 28	PcP	—
Tamanrasset	z.	65·1	278	i 10 43k	− 2	—	—	—	—	—
Kimberley	z.	89·0	228	i 12 56	− 2	—	—	—	—	—

Additional readings and notes :—
Baku gives S as P and L as S.
Poona SSSE =11m.22s.?.
Prague e =8m.22s., 8m.37s., and 9m.6s.
Jena eE =8m.40s., eEN =9m.25s. and 10m.59s.?, eN =11m.23s.
Strasbourg e =8m.39s.
Paris e? =8m.48s., i =9m.30s. and 10m.33s.
Long waves were also recorded at De Bilt, Helsinki, Upsala, and Potsdam

Oct. 31d. 20h. 58m. 20s. Epicentre 36°·8N. 121°·4W. (as on 1949, Sept. 8d.).

Intensity VI at Hollister, with slight damage ; V at Gilroy ; IV at Newark, San Jose, Santa Cruz, San Francisco, and San Martin.
Epicentre 36°54′N. 121°25′W. Macroseismic area 2500sq.m.

L. M. Murphy and W. K. Cloud.
U.S. Earthquakes, 1951, serial No. 762, Washington, 1953, p.15.

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

		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Santa Clara		0·6	321	e 0 11k	− 4	i 0 19	− 7
Tinemaha		2·5	89	i 0 44a	+ 1	i 1 18	+ 4
Santa Barbara	z.	2·7	149	e 0 46	+ 1	i 1 48	+29
China Lake	z.	3·2	108	e 0 51	− 1	i 1 38	+ 6
Pasadena		3·7	134	i 1 0	0	i 1 47	+ 2
Shasta Dam		4·0	359	i 0 59	− 5	—	—
Tucson		9·8	114	e 2 36	P*	e 4 52	S*
Hungry Horse		12·8	23	i 3 12	+ 6	—	—
Palisades		36·8	69	e 4 42	?	—	—

China Lake gives also iSEN =1m.44s.

Oct. 31d. Readings also at 1h. (Stuttgart), 2h. (Apia and near Malaga), 5h. (Brisbane, Guam, Pasadena, Riverside, China Lake, Tinemaha, Shasta Dam, Mineral, Reno, Fresno, Boulder City, Hungry Horse, College, Collmberg, Stuttgart, and Tamanrasset) 6h. (Brisbane, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Shasta Dam, Mineral, Reno, Fresno, Hungry Horse, Victoria, College, and near Garm), 7h. (Resolute Bay, and near Alicante), 8h. (Bermuda, Mount Wilson, Riverside, China Lake, Tinemaha, Andijan, Tchimkent, near Dzhergetal, Fergana, Garm, Khorog, Stalinabad, and near La Paz), 9h. (Apia, Tashkent, Resolute Bay, Kiruna, Zabrze (2), Raciborzu (2), Collmberg (2), Stuttgart, Pretoria, and near Huancayo), 12h. (near Ashkabad and near Mizusawa), 14h. (Strasbourg, near Kurmenty, and near Ashkabad), 16h. (near Alicante and Granada), 17h. (near Apia), 19h. (near Christchurch, Kaimata, Karapiro, Tuai, Wellington, Kew, Kodaikanal, Erevan, Leninakan, near Abastumanj, Borzhomi, Gori, Kirovobad, Piatigorsk, Tiflis, and Tsikhlis-Dzhvari), 22h. (Apia, Almeria, and Granada).

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Nov. 1d. 7h. New Hedbrides?

Brisbane iPZ = 52m.58s.a, iPP?EN = 53m.12s., eSEN = 56m.19s., eN = 56m.30s.
Apia iP = 53m.20s., i = 53m.46s., S = 57m.40s.
Riverview eP?Z = 54m.8s., eS?N = 58m.16s., iSS?N = 59m.5s., eLE = 60m.
Tananarive iP = 58m.13s., iPcS = 63m.10s.
Christchurch e = 60m.
Lick ePZ = 61m.6s.a, iZ = 61m.41s.
Mount Wilson eP?Z = 61m.16s., eZ = 61m.34s.
Palomar ePZ = 61m.17s., eZ = 61m.38s.
China Lake ePZ = 61m.18s., eZ = 61m.39s. and 61m.48s.
Tinemaha ePZ = 61m.19s., eZ = 61m.33s.
Fresno eZ = 61m.26s.
Tamanrasset ePKP$_2$Z = 69m.14s., eZ = 72m.52s., iPPZ = 73m.2s.

Nov. 1d. 11h. 10m. 33s. Epicentre 3°·7S. 35°·7E.

Felt at Kericho and Nairobi (Kenya), Singida, Morogoro, and Iringa (Tanganyika).

J. P. Henderson.
Some Notes on Earth Tremors in East Africa, East African Met. Department Technical Memorandum No. 4, 1953, pp. 9 and 23.

A = +·8104, B = +·5824, C = −·0641 ; δ = +5 ; h = +7 ;
D = +·584, E = −·812 ; G = −·052, H = −·037, K = −·998.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		19·0	143	4 32	+ 6	8 3	+ 8	e 8 14	?	10·7
Pretoria	Z.	23·1	197	i 5 10	+ 2	—	—	—	—	—
Kimberley	Z.	27·0	202	i 5 13	−32	—	—	—	—	—
Grahamstown	Z.	30·7	195	i 6 17	− 2	—	—	—	—	—
Helwan		33·6	353	i 6 46k	+ 2	12 9	+ 3	8 17	PPP	—
Ksara		37·3	0	i 7 20k	+ 4	13 16	+12	—	—	—
Tamanrasset	Z.	39·5	313	i 7 36a	+ 2	—	—	i 9 41	PcP	e 17·1
Bombay	E.	42·9	57	i 8 3	+ 1	e 14 34	+ 7	9 42	PcP	—
Poona		43·6	58	i 8 8	0	i 14 37	− 1	9 28	PcP	21·7
Lenkoran		44·0	15	8 23?	+12	15 1?	+18	—	—	—
Goris		44·1	12	8 13	+ 1	—	—	—	—	—
Erevan		44·4	9	e 8 17	+ 3	14 58	+ 9	—	—	—
Leninakan		44·9	8	e 8 21	+ 3	—	—	—	—	—
Istanbul	Z.	45·0	353	e 8 20	+ 1	—	—	—	—	—
Colombo	E.	45·3	76	8 20	− 1	—	—	—	—	22·3
Kirovobad		45·3	11	8 22	+ 1	—	—	—	—	—
Messina	E.	45·7	338	—	—	e 15 12	+ 4	—	—	—
Shemakla		45·7	13	9 7?	+43	15 54?	+46	—	—	—
Baku		45·8	15	e 8 29	+ 4	e 15 19	+10	—	—	—
Borzhomi		45·9	8	e 8 26?	0	—	—	—	—	—
Tiflis		46·0	9	i 8 28	+ 1	e 15 22	+10	—	—	—
Gori		46·1	8	e 8 19	− 9	—	—	—	—	—
Ashkabad		46·5	25	i 8 32	+ 1	—	—	—	—	—
Kizyl-Arvat		46·6	21	i 8 31	− 1	—	—	—	—	—
Sotchi		47·2	4	e 8 36	0	—	—	—	—	—
Mary		47·7	28	i 8 41?	+ 1	—	—	—	—	—
Piatigorsk		48·0	7	8 43	0	—	—	—	—	—
Yalta		48·0	358	8 44	+ 1	—	—	—	—	—
Rome		50·1	338	e 8 59	0	—	—	—	—	e 30·8
Belgrade		50·2	346	e 9 1k	+ 1	e 14 7	PcS	e 10 8	PcP	—
Algiers Univ.	Z.	50·5	326	i 9 0	− 2	e 11 0	PP	i 10 19	PcP	—
Kishinev		50·9	354	e 8 55?	−10	—	—	—	—	—
Samarkand		51·9	30	i 9 14	+ 2	—	—	—	—	—
Stalinabad		52·0	33	i 9 12	− 1	—	—	—	—	—
Khorog		52·8	36	e 9 21	+ 2	—	—	—	—	—
Triest	Z.	52·9	341	e 9 20k	0	e 16 51	+ 3	e 10 17	PcP	e 34·6
Uzhgorod		53·4	350	i 9 25?	+ 1	—	—	—	—	—
Alicante		53·6	325	e 9 30	+ 5	e 17 39	+41	10 23	PcP	e 28·7
Almeria		53·8	322	i 9 33	+ 7	17 31	+30	11 47	PP	28·9
Lwow		54·3	352	e 9 30	0	e 17 17	+10	—	—	—

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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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		54·3	31	i 9 29	– 1	i 17 10	+ 3	—	—	—
Granada		54·7	322	i 9 35k	+ 2	i 17 22	+ 9	—	—	28·8
Fergana		54·9	33	i 9 35	0	—	—	—	—	—
Malaga		54·9	321	e 9 54	+19	e 18 3	+47	e 12 20	PP	29·9
Tchimkent		55·1	30	i 9 36	0	—	—	—	—	—
Andijan		55·5	33	i 9 39	0	i 17 32	+ 8	—	—	—
Raciborzu		55·7	346	e 9 40	0	—	—	e 11 48	PP	—
Zürich		56·2	338	e 9 43k	– 1	e 17 56	+23	—	—	—
Prague		56·6	345	e 9 46a	– 1	e 17 50	+12	e 12 58	PPP	e 25·8
Basle		56·7	338	e 9 47k	– 1	e 16 7	?	e 16 50	?	—
Toledo		56·7	324	i 9 48	0	e 17 44	+ 4	e 12 3	PP	30·5
Stuttgart		57·1	340	e 9 50k	0	e 17 56	+11	e 13 27	PPP	—
Cheb	E.	57·2	343	—	—	e 15 44	?	—	—	e 26·6
Strasbourg		57·5	339	i 9 53	0	e 17 50	0	e 10 49	PcP	e 30·2
Karlsruhe	Z.	57·6	340	e 9 53	– 1	—	—	e 13 33	PPP	—
Naryn		58·0	35	e 9 58	+ 1	—	—	—	—	—
Collmberg	Z.	58·1	344	e 9 57	– 1	—	—	e 10 49	PcP	—
Jena		58·2	343	e 9 58	0	—	—	e 10 9	pP	—
Potsdam		59·1	344	e 10 4	0	—	—	—	—	e 31·5
Moscow		59·3	2	10 6	0	—	—	—	—	—
Paris		59·7	335	i 10 9	0	i 18 23	+ 4	i 10 17	pP	e 32·4
Almata		59·7	33	e 10 8	– 1	—	—	—	—	—
Almata II		60·0	33	i 10 11	0	—	—	—	—	—
De Bilt		61·3	340	—	—	e 18 45	+ 6	—	—	e 30·5
Witteveen	Z.	61·4	341	i 10 22a	+ 2	—	—	i 10 30	pP	—
Copenhagen		62·2	346	e 10 33	+ 7	—	—	—	—	31·5
Kew		62·9	336	e 10 3	–27	e 19 1	+ 1	i 10 31	pP	e 32·5
Pulkovo		63·4	357	i 10 35	+ 1	—	—	—	—	—
Sverdlovsk		63·6	15	i 10 34	– 1	19 9	+ 1	—	—	—
Rathfarnham Castle		66·8	334	e 9 57?	–59	e 19 19	–29	e 22 59	SS	e 32·4
Kiruna	Z.	72·2	354	i 11 28a	– 1	—	—	i 11 35	pP	—
Seattle		132·3	339	e 19 21	[+ 5]	—	—	e 19 39	pPKP	—
Mineral	Z.	138·1	333	e 19 20a	[– 7]	—	—	—	—	—
Tinemaha	Z.	139·1	327	e 19 30	[+ 1]	—	—	i 19 41	pPKP	—
China Lake	Z.	139·6	325	e 19 23	[– 7]	—	—	i 19 32	pPKP	—
Fresno	Z.	140·1	328	e 19 26k	[– 5]	—	—	—	—	—
Berkeley	Z.	140·5	331	e 19 28	[– 3]	—	—	—	—	—
Lick	Z.	140·6	331	e 19 27k	[– 5]	—	—	e 21 44	PP	—
Palomar	Z.	140·6	322	e 19 29	[– 3]	—	—	—	—	—
Riverside	Z.	140·8	324	i 19 35	[+ 3]	—	—	—	—	—
Mount Wilson	Z.	141·0	324	e 19 29	[– 3]	—	—	i 19 36	pPKP	—

Additional readings :—
Helwan iZ = 6m.57s.
Tamanrasset iZ = 7m.43s. and 9m.51s.
Poona PPE = 9m.54s., PPPE = 10m.46s., PSE = 15m.0s., ScSE = 17m.35s., SSE = 18m.10s., QE = 19m.8s.
Belgrade eZ = 9m.9s.
Algiers Univ. eZ = 9m.8s.
Triest iZ = 9m.28s., ePPZ = 11m.17s., eSPZ = 17m.12s., eSS = 20m.6s.
Alicante PP = 12m.1s., PPS = 18m.17s., ScS = 19m.21s., Q = 24m.19s.
Malaga ePPP = 13m.40s.
Prague e = 17m.36s.
Toledo i = 9m.58s. and 12m.19s., e = 18m.39s.
Stuttgart eZ = 9m.58s.
Strasbourg i = 10m.0s., e = 10m.14s., ePP = 12m.3s., eSS = 21m.33s.
Karlsruhe eZ = 10m.0s.
Collmberg eZ = 10m.4s.
Jena eE = 10m.45s.
Paris isP = 10m.21s., e = 10m.34s., iPcP = 10m.53s., iPP = 12m.27s., e = 17m.48s., eSP = 18m.44s., eSPP = 18m.53s., eSS = 22m.24s., e = 23m.31s., eSSS = 24m.37s.
Kew eSSEN = 22m.37s.
Kiruna iZ = 12m.46s.
Long waves were also recorded at Clermont-Ferrand, Tortosa, Barcelona, Florence, Pavia, La Paz, and Huancayo.

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Nov. 1d. 11h. 25m. 46s. Epicentre 24°·9S. 179°·6E. Depth of focus 0·090.
(as on 1946, August 4d.).

A = −·9081, B = +·0063, C = −·4187 ; δ = −1 ; h = +3 ;
D = +·007, E = +1·000 ; G = +·419, H = −·003, K = −·908.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Karapiro	N.	13·4	194	3 14?	+22	—	—	—	—
Wellington		16·8	193	e 3 27	+ 2	e 6 17	+ 7	—	—
Cobb River	E.	17·1	199	e 3 35	+ 7	e 6 26	+11	—	—
Kaimata	N.E.	18·8	199	3 46	+ 2	6 48	+ 4	—	—
Christchurch		19·4	196	e 3 49	0	e 6 44	−10	e 7 14	SS
Brisbane	Z.	24·0	258	i 4 26k	− 5	—	—	—	—
Berkeley	Z.	82·9	44	i 11 23a	0	—	—	e 11 34	?
Lick	Z.	83·0	44	e 11 23k	− 1	—	—	i 11 37	?
Pasadena	Z.	83·3	48	i 11 25	0	—	—	—	—
Palomar	Z.	83·7	50	i 11 27	0	—	—	—	—
Riverside	Z.	83·7	48	i 11 28	+ 1	—	—	—	—
Fresno	Z.	83·8	45	e 11 27a	− 1	—	—	—	—
China Lake	Z.	84·6	47	i 11 32	0	—	—	e 13 34	pP
Shasta Dam		84·6	40	i 11 32	0	—	—	—	—
Mineral	Z.	84·9	41	i 11 33a	0	—	—	e 11 42	PcP
Tinemaha	Z.	85·0	46	i 11 32	− 2	—	—	—	—
Tucson		87·3	53	e 11 47	+ 2	—	—	e 13 50	pP
College		93·0	13	i 12 6	− 5	—	—	e 13 52	pP
Huancayo		98·3	107	—	—	e 45 25	Q	—	—
Palisades		118·0	55	—	—	e 40 43	SSS	—	—
Bermuda		123·8	66	—	—	e 39 11	SSS	—	—
Kiruna	Z.	135·2	348	i 20 49	PP	—	—	—	—
Collmberg	Z.	151·7	343	e 18 46	[+ 6]	—	—	e 20 52	pPKP
Stuttgart	Z.	155·0	346	e 19 9	[+25]	—	—	—	—
Paris		156·0	357	i 19 15	[+29]	—	—	—	—
Tamanrasset	Z.	174·2	—	i 20 39	PKP_2	—	—	—	—

Additional readings :—
Brisbane iZ = 4m.33s., 4m.45s., and 5m.2s.
Collmberg eZ = 18m.55s.

Nov. 1d. 13h. 43m. 29s. Epicentre 33°·9N. 139°·6E. (as on 1950, August 17d.).

Intensity II-III at Hatidyozima and Onagigawa, Seismo. Bull. Cent. Met. Obs., Japan, 1951, November, Tokyo, 1951, p. 298, with macroseismic chart.

A = −·6334, B = +·5391, C = +·5552 ; δ = +7 ; h = +1 ;
D = +·648, E = +·762 ; G = −·423, H = +·360, K = −·832.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Hatidyozima	0·6	166	0 13	− 2	0 26	0
Osima	0·9	348	0 19	− 1	0 36	+ 2
Mera	1·0	11	0 19	− 2	0 35	− 1
Ajiro	1·2	340	0 23	− 1	0 42	+ 1
Misima	1·3	336	0 25a	0	0 47	+ 3
Omaesaki	1·3	301	0 27a	+ 2	0 50	+ 6
Shizuoka	1·4	317	0 27	0	0 53	+ 7
Yokohama	1·5	1	0 30	+ 2	0 49	0
Tokyo	1·8	4	0 29	− 3	0 54	− 2
Kohu	1·9	334	0 34	0	1 3	+ 4
Iida	2·2	318	0 44	+ 6	—	—
Kumagaya	2·2	355	0 35	− 3	1 6	0
Maebasi	2·5	350	0 46	+ 3	1 12	− 2
Mito	2·6	16	0 46	+ 2	—	—
Oiwake	2·6	341	0 41	− 3	1 17	0
Utunomiya	2·6	5	0 41	− 3	1 11	− 6
Matumoto	2·7	330	0 49	+ 4	1 23	+ 4
Nagano	3·0	339	0 51	+ 1	—	—
Hikone	3·1	298	0 51	0	1 39	+10
Kyoto	3·4	291	0 53	− 2	1 46	+ 9
Toyama	3·4	326	1 2	+ 7	1 38	+ 1
Inawasiro	3·7	6	0 54	− 6	1 35	−10
Hukusima	3·9	10	1 1	− 1	1 40	−10

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Nov. 1d. 18h. 49m. 34s. Epicentre 37°·2N. 69°·3E. (as on 1940, October 5d.).

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

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stalinabad		1·4	343	i 0 30	+ 3	i 0 53	+ 7	—	—	—
Khorog		1·8	82	i 0 32	0	i 0 55	− 1	—	—	—
Garm		2·0	24	i 0 36	+ 1	i 1 2	0	—	—	—
Dzhergetal		2·5	37	0 43	0	1 15	+ 1	—	—	—
Samarkand		3·1	324	0 48	− 3	1 28	− 1	—	—	—
Fergana		3·7	31	e 1 0	0	1 40	− 5	—	—	—
Murgab		3·8	71	i 1 2	+ 1	i 1 57	S*	—	—	—
Tashkent		4·1	0	e 1 17	P*	e 1 54	− 1	—	—	—
Andijan		4·3	33	1 8	0	i 1 58	− 2	—	—	—
Tchimkent		5·1	2	e 1 22	+ 2	—	—	—	—	—
Mary		5·9	276	e 1 34	+ 3	2 45	+ 5	—	—	—
Naryn		6·7	49	e 1 40	− 2	i 3 44	S_g	—	—	—
Frunse		7·0	34	i 1 44	− 2	i 3 3	− 5	i 2 17	P_g	—
Rybach'e		7·4	43	—	—	e 4 5	S_g	—	—	—
Almata		8·4	42	i 2 4	− 2	i 4 27	S_g	—	—	—
Almata II		8·6	43	e 2 7	− 2	—	—	—	—	—
Przhevalsk		8·8	50	2 8	− 3	—	—	—	—	—
New Delhi	E.	10·8	140	e 2 33	− 6	e 5 29	S*	—	—	—
Poona		19·0	167	e 4 22	− 4	e 8 23	+28	—	—	10·1

Additional readings :—
Frunse iS_g = 3m.50s.
New Delhi eEN = 5m.42s., iEN = 5m.51s. and 6m.4s.

Nov. 1d. 19h. 12m. 59s. Epicentre 5°·0N. 82°·5W. (as on 1949, January 9d.).

A = +·1300, B = −·9877, C = +·0866 ; δ = −5 ; h = +7 ;
D = −·991, E = −·131 ; G = +·011, H = −·086, K = −·996.

		Δ	Az.	P.	O − C.	S.	O − C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Balboa Heights		4·9	35	i 1 16	− 1	—	—	—
Bogota		8·4	92	i 2 10	+ 4	i 3 55	+12	—
Huancayo		18·7	157	e 4 23	+ 1	e 8 1	+13	—
Puebla		20·7	314	e 4 47	+ 3	—	—	—
San Juan		20·8	48	i 4 45	0	e 8 41	+ 8	—
Tacubaya		21·7	314	e 4 56	+ 1	—	—	—
La Paz		25·7	146	i 5 43	+10	i 10 37	+36	14·4
Bermuda		31·8	31	—	—	e 13 30	SS	—
Fayetteville		32·8	342	i 6 32	− 5	—	—	—
Tucson		37·9	319	e 7 19	− 1	—	—	—
Palomar		42·6	316	i 7 59	0	—	—	—
Boulder City		42·8	321	i 8 1	0	—	—	—
Riverside	Z.	43·3	316	i 8 4	− 1	—	—	—
Pasadena		44·0	316	i 8 11	0	—	—	—
China Lake	Z.	44·5	319	i 8 14	− 1	—	—	—
Lick	Z.	48·1	318	i 8 42_a	− 1	—	—	—
Reno	Z.	48·1	322	e 8 42_a	− 1	—	—	—
Berkeley	Z.	48·8	318	e 8 46_a	− 3	—	—	—
Mineral	Z.	49·7	321	i 8 53_k	− 3	—	—	—
Shasta Dam		50·4	322	e 8 56	− 5	—	—	—
Hungry Horse		50·9	334	i 9 3	− 2	—	—	—
Resolute Bay	Z.	70·0	356	e 11 11	− 4	—	—	—
College		75·2	336	i 11 43	− 3	—	—	—
Tamanrasset	Z.	86·3	68	e 12 48	+ 3	—	—	—

Lick gives also eZ = 9m.12s.

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Nov. 1d. 20h. 19m. 6s. Epicentre 37°·2N. 69°·3E. (as at 18h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stalinabad		1·4	343	i 0 30	+ 3	i 0 52	+ 8	—	—	—
Khorog		1·8	82	i 0 32	0	i 0 56	0	—	—	—
Garm		2·0	24	0 36	+ 1	i 1 4	+ 2	—	—	—
Dzhergetal		2·5	37	0 44	+ 1	1 18	+ 4	—	—	—
Samarkand		3·1	324	0 47?	− 4	1 34?	+ 5	—	—	—
Fergana		3·7	31	e 1 0	0	—	—	—	—	—
Murgab		3·8	71	i 1 2	+ 1	i 1 57	S*	—	—	—
Tashkent		4·1	0	e 1 21	P_g	2 11	S_g	—	—	—
Andijan		4·3	33	e 1 8	0	1 58	− 2	2 24	S_g	—
Tchimkent		5·1	2	e 1 25	+ 5	2 57	S_g	—	—	—
Mary		5·9	276	e 1 29	− 2	e 3 13	S_g	—	—	—
Naryn		6·7	49	e 1 37	− 5	i 3 8	+ 8	—	—	—
Frunse		7·0	34	e 1 54	+ 8	e 3 2	− 6	e 2 3	P*	—
Rybach'e		7·4	43	—	—	e 4 4	S_g	—	—	—
Almata		8·4	42	i 2 4	− 2	—	—	—	—	—
Almata II		8·6	43	e 2 7	− 2	—	—	—	—	—
Przhevalsk		8·8	50	2 8	− 3	4 43	S_g	—	—	—
New Delhi		10·8	140	e 2 34	− 5	e 5 1	+19	—	—	e 5·8
Bombay	E.	18·5	169	—	—	e 6 54	?	—	—	i 10·8
Poona		19·0	167	e 4 22	− 4	e 8 23	+28	9 23	SSS	10·0
Tiflis		19·4	291	e 4 30	0	—	—	—	—	—
Piatigorsk		21·0	298	4 51	+ 4	—	—	—	—	—
Ksara		27·3	273	e 5 55	+ 7	e 12 57	L	—	—	(e 13·0)
Tamanrasset	Z.	56·1	274	e 9 44	+ 1	—	—	—	—	—

Additional readings :—
Frunse iP_g = 2m.16s., iS_g = 3m.48s.
Poona QE = 8m.51s.

Nov. 1d. Readings also at 0h. (Apia), 4h. (Andijan, near Dzhergetal, Fergana, Garm, and near Kurmenty), 5h. (near Ashkabad), 6h. (Apia), 7h. (Fergana, near Dzhergetal, Garm, and Khorog), 8h. (near Santa Clara and near Garm), 10h. (Nanking, Mount Wilson, Palomar, Riverside, China Lake, and Tinemaha), 11h. (Tamanrasset, Algiers Univ., Granada, Bucharest, near Istanbul, Sofia, and near Apia), 12h. (Terre Adélie), 13h. (Stuttgart, Almata II, Krasnogorka, Borzhomi, Erevan, Tiflis, near Akhalkalaki, Leninakan, Tsikhlis-Dzhvari, near Chilisk, Ili, Kurmenty, Przhevalsk, and near Piatigorsk), 14h. (Wellington and Brisbane), 17h. (Tortosa and Terre Adélie), 19h. (Huancayo), 20h. (Andijan, Tashkent, Tchimkent, near Almata II, Chilisk, Ili, Kurmenty, Dzhergetal, Fergana, Garm, Khorog, Stalinabad, and near Santa Clara ; three shocks), 21h. (near Dzhergetal, Garm, Khorog, and Stalinabad), 23h. (Apia).

Nov. 2d. 21h. 55m. 42s. Epicentre 42°·2N. 45°·5E.

A = +·5208, B = +·5300, C = +·6692 ; δ = −4 ; h = −3 ;
D = +·713, E = −·701 ; G = +·469, H = +·477, K = −·743.

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tiflis	0·7	227	i 0 16	− 1	—	—	—	—	—
Gori	1·1	258	i 0 23	+ 1	—	—	—	—	—
Borzhomi	1·6	257	i 0 25?	− 5	—	—	—	—	—
Tsikhlis-Dzhvari	1·6	253	i 0 30	0	i 0 51	0	—	—	—
Kirovobad	1·6	149	i 0 36	P_g	—	—	—	—	—
Akhalkalaki	1·7	242	i 0 32	+ 1	i 0 54	0	—	—	—
Erevan	2·2	200	i 0 40	+ 2	—	—	—	—	—
Piatigorsk	2·6	316	0 48	+ 4	1 21	+ 4	—	—	—
Goris	2·8	167	i 1 10	+23	—	—	—	—	—
Shemakla	2·8	124	1 11?	+24	—	—	—	—	—
Baku	3·8	117	e 1 7	P*	—	—	—	—	—
Yalta	8·6	291	2 8	− 1	3 48	0	—	—	—
Ashkabad	10·7	109	i 2 38	0	i 4 41	+ 2	—	—	—
Ksara	11·3	225	i 2 47	+ 1	—	—	—	—	i 6·3
Istanbul	12·4	270	e 2 56?	− 5	e 5 15	− 6	e 6 11	Q	e 7·9

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.
Kishinev		12·8	298	3 4?	– 2	5 36?	+ 6	—	—	—
Mary		13·4	105	—	—	6 7	SS	—	—	—
Bucharest		14·3	286	e 3 36	+10	e 6 15	+ 9	e 3 47	PP	10·3
Moscow		14·5	342	3 23	– 5	6 1	–10	—	—	—
Samarkand		16·4	92	—	—	7 5	+ 9	—	—	—
Sofia		16·4	273	e 3 50	– 3	e 6 32	–24	e 4 21	PPP	—
Lwow		16·7	304	i 3 59	+ 2	i 7 9	+ 6	—	—	—
Helwan		16·8	227	3 57	– 1	7 24	SS	e 4 29	PPP	—
Athens		17·2	291	e 4 9	+ 6	—	—	—	—	—
Sverdlovsk		17·6	28	i 4 4	– 4	i 7 10	–13	—	—	—
Tashkent		17·8	84	e 4 11	0	i 7 34	+ 6	—	—	—
Tchimkent		17·8	79	i 4 13	+ 2	—	—	—	—	—
Timisoara		17·8	290	e 4 13	+ 2	e 7 58	SSS	i 4 21	PP	e 9·4
Belgrade		18·3	286	e 4 13a	– 4	e 7 46	+ 7	e 4 49	PPP	e 11·6
Skalnate Pleso		18·9	301	e 4 53	PPP	e 7 56	+ 3	—	—	e 10·8
Budapest		19·4	295	i 4 33	+ 3	i 8 17	+13	i 4 47	PP	—
Fergana		19·8	85	e 4 36	+ 1	i 8 19	+ 6	—	—	—
Pulkovo		19·9	338	i 4 36	0	i 8 16	+ 1	—	—	—
Ogyalla		20·1	296	e 4 56	PP	e 8 25	+ 6	—	—	e 9·6
Andijan		20·2	284	4 40	+ 1	i 8 21	0	—	—	—
Raciborzu		20·4	303	e 4 41	0	e 8 37	+12	i 5 6	PP	i 13·1
Taranto		21·2	275	4 25	–24	7 30	–71	—	—	—
Vienna		21·3	297	e 4 51	+ 1	e 8 42	– 1	—	—	—
Frunse		21·4	76	i 4 54	+ 3	i 8 52	+ 7	—	—	—
Helsinki		22·0	333	i 4 56a	– 2	i 9 4	+ 8	—	—	—
Rybach'e		22·6	77	e 5 7	+ 4	e 9 20	+13	—	—	—
Naryn		22·7	80	i 5 8	+ 4	i 9 23	+14	—	—	—
Prague		22·8	302	i 5 5a	0	e 9 13	+ 2	e 5 42	PP	e 11·7
Triest		23·1	290	i 5 7k	– 1	i 9 18	+ 2	e 5 39	PP	—
Almata		23·1	75	i 5 13	+ 5	i 9 25	+ 9	—	—	—
Messina		23·2	271	5 12	+ 3	i 9 14	– 4	i 5 35	PP	14·7
Collmberg		23·9	304	e 5 18	+ 2	e 9 42	+12	—	—	e 13·3
Potsdam		24·0	307	i 5 18a	+ 1	i 9 48	+16	—	—	e 13·3
Cheb		24·1	302	e 5 26	+ 8	e 9 35	+ 1	e 10 25	SS	e 11·4
Rome		24·4	281	5 18?	– 3	i 9 50	+11	i 10 48	SSS	—
Upsala		24·6	325	i 5 22?	– 1	e 9 37	– 5	i 10 45	SS	e 11·7
Jena		24·7	303	e 5 24	0	e 9 37	– 7	e 6 7	PPP	e 13·8
Sonneberg		24·9	302	e 5 34	+ 8	e 9 51	+ 4	e 9 58	S	—
Florence		25·0	285	i 5 27	0	i 9 58	+ 9	—	—	i 17·1
Copenhagen		25·3	314	i 5 31	+ 1	i 9 57	+ 3	i 5 53	?	12·8
Chur		25·9	293	e 5 33	– 2	—	—	e 5 40	P	—
Stuttgart		26·1	298	e 5 35k	– 2	e 10 7	0	e 6 11	PP	e 13·8
Pavia		26·3	290	e 5 30	– 9	e 10 4	– 7	—	—	e 16·9
Zürich		26·5	295	e 5 38k	– 3	e 10 20	+ 6	i 5 46	P	—
Karlsruhe		26·6	299	e 5 41	– 1	e 10 18	+ 2	e 6 7	?	14·3
Strasbourg		27·1	297	e 5 45	– 1	i 10 28	+ 4	i 6 18	PP	14·3
Basle		27·2	295	e 5 51	+ 4	e 10 29	+ 4	e 7 41	?	—
Witteveen	Z.	28·0	308	e 5 56	+ 1	—	—	—	—	—
Kiruna		29·0	340	i 6 3a	– 1	e 11 2	+ 8	i 6 51	PP	e 13·8
New Delhi		29·0	106	e 6 6	+ 2	i 10 55	+ 1	12 45	SSS	13·5
Bergen		30·4	322	—	—	e 11 8	– 8	—	—	13·8
Paris		30·5	298	e 6 16	– 1	i 11 23	+ 5	i 13 28	SSS	e 14·3
Kew		32·2	303	e 6 35	+ 3	e 11 40	– 5	e 13 18	SS	e 14·3
Bombay	E.	32·8	126	e 6 59	+22	i 12 5	+11	8 10	PPP	—
Algiers Univ.	Z.	33·0	273	e 6 31	– 8	—	—	e 7 29	PP	14·2
Aberdeen		33·5	314	—	—	i 11 12	–53	e 14 54	SSS	i 20·0
Poona	E.	33·7	124	e 6 48	+ 3	i 12 14	+ 6	8 8	PPP	17·1
Alicante		35·0	280	e 7 0	+ 4	12 36	+ 8	14 48	SS	e 16·8
Rathfarnham Castle		35·8	307	e 6 56	– 7	e 12 22	–19	—	—	e 16·0
Almeria		37·0	278	i 7 8	– 5	12 52	– 7	8 32	PP	20·6

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Toledo		37·0	283	i 7 11	– 2	12 50	– 9	i 7 24	?	e 23·8
Hyderabad	E.	37·4	120	—	—	13 9	+ 4	—	—	—
Granada		37·7	280	7 48a	?	i 13 18	+ 8	16 16	SSS	17·6
Tamanrasset	Z.	38·4	253	i 7 25a	0	e 13 25	+ 5	e 9 37	PcP	—
Calcutta	E.	40·6	104	e 10 21	PPP	i 13 59	+ 5	—	—	—
Kabansk		41·6	55	7 53	+ 2	14 13	+ 5	—	—	—
Nanking		57·7	74	e 9 57	+ 2	i 17 57	+ 4	—	—	—
Resolute Bay		60·5	349	e 10 14	0	e 18 31	+ 2	—	—	e 28·3
College		72·8	7	i 11 31	– 1	—	—	—	—	—
Kimberley	Z.	73·1	198	i 11 33	– 1	—	—	—	—	—
Grahamstown	Z.	77·1	196	i 11 57	0	—	—	—	—	—
Ottawa		78·3	322	12 3	0	21 54	– 5	—	—	42·8
Bermuda		82·0	307	—	—	e 22 49	+12	—	—	e 38·8
Cleveland		83·9	323	i 12 33a	0	i 22 54	– 2	—	—	—
Hungry Horse		88·0	347	i 12 54	+ 1	—	—	—	—	—
Victoria		89·1	352	13 4	+ 6	—	—	—	—	e 54·6
Fayetteville		93·8	328	i 13 20	0	—	—	—	—	—
Shasta Dam		96·8	350	e 13 33	– 1	—	—	—	—	—
China Lake	Z.	100·8	345	e 16 27	?	—	—	—	—	—
Terre Adelie		130·2	148	e 22 42	PKS	—	—	—	—	—

Additional readings :—
Bucharest eS?N = 6m.25s.
Sofia eEN = 4m.58s.
Helwan eE = 5m.26s., SSE = 7m.52s.
Timisoara eN = 8m.16s.?
Belgrade eZ = 5m.38s.
Skalnate Pleso e = 4m.58s., eS = 8m.2s.
Budapest ePPN = 4m.44s., SSN = 8m.57s., PcSE = 12m.19s., PcSN = 12m.25s., ScSE = 15m.19s., ScSN = 15m.31s.
Ogyalla e = 5m.0s., eE = 5m.18s., e = 5m.46s., 6m.23s., and 8m.3s., eS = 8m.36s.
Raciborzu iZ = 4m.50s., iPPN = 5m.9s., PPPZ = 5m.15s.?, iZ = 6m.1s., ePcPN = 8m.45s., eSSE = 9m.29s., eSSSN = 11m.25s., ePcSNZ = 12m.15s.?, eScSE = 16m.0s.
Prague e = 5m.21s. and 6m.1s., eSS = 10m.13s.
Triest iZ = 5m.18s., ePcPZ = 8m.53s., iSS = 10m.16s., iSSS = 10m.40s.
Messina i = 10m.15s.
Collmberg eZ = 5m.24s. and 6m.35s.
Potsdam ePEN = 5m.21s., iN = 8m.11s., iZ = 9m.53s., iN = 11m.11s.
Cheb e = 5m.37s. and 7m.3s., eN = 7m.59s.
Upsala iE = 5m.33s., iPPN = 5m.45s., eN = 7m.2s., eSN = 9m.33s., iN = 9m.48s., iSSE = 10m.17s.
Jena eN = 5m.27s., eEN = 5m.32s. and 6m.15s., eSE = 9m.54s., eSN = 10m.2s., eE = 11m.38s., eSS?N = 12m.28s., eSS?E = 12m.48s.
Stuttgart eZ = 5m.49s., ePPZ = 6m.7s., e = 12m.28s.
Strasbourg i = 5m.51s., e = 5m.56s. and 7m.42s., iSS = 11m.44s., eSS = 11m.48s., eSSS = 12m.12s.
Kiruna ePPPZ = 7m.6s., iSEN = 10m.44s., eSSZ = 11m.55s., iSSE = 11m.58s., iSSN = 12m.6s., iPcSZ = 13m.1s., eScS?Z = 16m.54s. and many unidentified readings.
New Delhi PPEN = 7m.2s.
Paris e = 7m.0s., i = 13m.48s. and 14m.6s.
Alicante PPP = 8m.48s.
Granada PcP = 9m.45s.
Long waves were also recorded at De Bilt, Clermont-Ferrand, Palisades, and Pasadena.

Nov. 2d. Readings also at 0h. (Tortosa, Apia (2)), 1h. (near Kurmenty), 3h. (Bombay (2), Colombo (2), Stuttgart, Tamanrasset (2), Copiapo, Antofagasta, La Paz, La Plata, Santa Lucia, Mount Wilson, China Lake (2), Riverside (2), Leninakan, Erevan, near Borzhomi, Tiflis, Tsikhlis-Dzhvari, Akhalkalaki (2), and near Manila), 4h. (Berkeley, Fresno, Lick, Mineral, Reno, China Lake, Pasadena, Riverside, Kiruna, Stuttgart, Collmberg, Jena, Strasbourg, Tamanrasset, Poona, near Ili, Chilisk, and Almata II), 7h. (Wellington), 8h. (Brisbane), 9h. (near Prague), 11h. (near Malaga, near Athens, and near Erevan), 12h. (Granada), 13h. (Strasbourg), 14h. (near Erevan), 15h. (Terre Adelie, Wellington, Riverview, Brisbane (2), China Lake, Stuttgart, and Collmberg), 16h. (Tamanrasset, near Alicante, and near La Paz), 18h. (near Tacubaya and Puebla), 19h. (Wellington, Tsikhlis-Dzhvari, and near Garm), 20h. (Terre Adelie), 21h. (Palisades, Ili, Gori, Tiflis, Zugdidi, Kirovobad (4), near Piatigorsk, Borzhomi, Akhalkalaki, Tsikhlis-Dzhvari, near Kurmenty, Chilisk, and Almata II), 22h. (near Kirovobad (3), Goris, Shemakla, Akhalkalaki (4), Borzhomi (3), Erevan, Gori (4), Tiflis (3), Tsikhlis-Dzhvari (4), and Zugdidi (3)), 23h. (Tamanrasset, near Gori, Goris, Akhalkalaki (3), Borzhomi (3), Erevan, Kirovobad (3), Piatigorsk, Shemakla, and Tiflis (2)).

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Nov. 3d. 2h. 26m. 26s. Epicentre 47°·3N. 7°·1E. (as on 1949, Nov. 21d.).

Intensity IV at Neuchatel.

Dr. E. Wanner.
Jahresbericht des Erdbebendienstes der Schweiz im Jahre, 1951, Zürich, 1952, p. 3, with macroseismic chart fig. 4.

A = +·6754, B = +·0841, C = +·7326 ; δ = −6 ; h = −4 ;
D = +·124, E = −·992 ; G = +·727, H = +·091, K = −·681.

		Δ	Az.	P.	O − C.	S.	O − C.
		°	°	m. s.	s.	m. s.	s.
Neuchatel		0·3	199	e 0 0	P_g	i 0 1	S_g
Basle		0·2	55	e 0 16	+ 3	e 0 27	+ 6
Zürich		1·0	86	e 0 22	+ 1	e 0 39	+ 3
Strasbourg		1·4	19	—	—	e 0 57	+11
Stuttgart	Z.	2·0	44	—	—	e 1 13	+11
Triest	Z.	4·9	108	e 1 11	− 6	e 2 13	− 2

Additional readings :—
Strasbourg e = 0m.59s. and 1m.4s., i = 1m.15s.
Stuttgart iS_gZ = 1m.18s., eZ = 1m.22s.

Nov. 3d. 8h. Suggested depth 100km.
Bogota iP = 51m.58s., iS = 52m.24s., isS = 52m.32s.
Balboa Heights iP = 52m.39s., iS = 53m.38s.
Huancayo eP = 55m.5s., eS? = 58m.13s.
San Juan eP = 55m.8s., e? = 55m.35s.
La Paz eP = 56m.48s., iS = 60m.14s., i = 60m.57s.
Fayetteville iP = 58m.33s.
Tucson eP = 59m.4s., e = 59m.36s.
Palomar iPZ = 60m.15s.
Riverside ePZ = 60m.20s.
Mount Wilson ePZ = 60m.24s.
China Lake ePZ = 60m.27s.
Tinemaha ePZ = 60m.35s.
Shasta Dam e = 60m.36s.
Lick ePZ = 60m.38s.a.
Hungry Horse eP = 60m.40s.
Reno ePZ = 60m.48s.a.
College eP = 63m.5s.
Tamanrasset iPZ = 63m.21s.k, epPZ = 63m.43s., isPZ = 63m.52s., ePP?Z = 66m.22s.

Nov. 3d. 13h. 32m. 13s. Epicentre 23°·9N. 121°·7E. (as on October 28d.).

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	Z.	7·2	358	e 2 29	?	i 3 25	SS	—	—	—
Nanking		8·5	343	e 2 5	− 2	e 2 57	?	i 3 6	?	—
Manila		9·3	184	e 2 9	− 8	i 4 9	+ 4	i 2 20	P	i 5·1
Vladivostok		21·0	22	e 4 47?	0	e 8 38	+ 1	—	—	—
Calcutta		30·7	275	—	—	e 11 23	+ 2	—	—	i 15·5
Irkutsk		31·3	340	e 6 32?	+ 8	e 11 47?	+16	—	—	—
Naryn		41·7	307	e 7 56	+ 4	e 14 25	PPS	—	—	—
Frunse		43·0	309	i 8 5	+ 2	—	—	—	—	—
Andijan		44·4	305	e 8 18	+ 4	—	—	—	—	—
Fergana		44·7	304	e 8 21	+ 5	e 15 8	+14	—	—	—
Poona		44·8	273	i 8 16	− 1	i 14 58	+ 3	10 0	PP	19·1
Bombay	E.	45·6	274	i 8 23	− 1	e 15 7	+ 1	e 10 9	PP	—
Tashkent		46·7	306	e 8 34	+ 2	e 15 30?	+ 8	—	—	—
Stalinabad		46·9	302	e 8 34	0	e 15 31	+ 6	—	—	—
Sverdlovsk		54·6	324	e 9 34	+ 2	—	—	—	—	—
Ashkabad		55·2	301	i 9 40	+ 3	e 17 30	+10	—	—	—
Kizyl-Arvat		56·7	303	e 9 47	− 1	—	—	—	—	—
Brisbane	Z.	59·4	147	i 10 3k	− 3	—	—	—	—	—
Tiflis		65·0	307	—	—	e 19 30	+ 4	—	—	—
Kiruna	Z.	72·2	337	i 11 15	−14	—	—	—	—	—
Ksara		73·8	300	e 11 45	+ 7	e 22 5	PPS	—	—	—
Collmberg	Z.	82·6	324	e 12 27	+ 1	—	—	—	—	—
Stuttgart	Z.	86·0	323	e 12 45	+ 2	—	—	—	—	—
Tamanrasset	Z.	102·6	302	e 18 15	PP	—	—	—	—	—

Additional readings :—
Manila iS? = 3m.45s.
Poona PPPE = 10m.51s., PPSE = 15m.8s., SSE = 18m.8s.

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Nov. 3d. 13h. 43m. 28s. Epicentre 35°·8N. 140°·8E. Depth of focus 0·005.
(as on October 2d.).

Intensity V at Shimodate, Katakura, and Hiraishi; IV at Tyosi, Tukubasan, Mito, Tokyo, Yokohama, etc.; II-III at Utunomiya, Kumagaya, Tomisaki, Shirakawa, etc. Epicentre as adopted. Depth 60km.

Seismological Bulletin of the Cent. Met. Obs., Japan, for November, 1951, Tokyo, 1951, p. 299-300, with macroseismic chart, p. 299.

A = −·6300, B = +·5138, C = +·5823; δ = −4; h = 0;
D = +·632, E = +·775; G = −·451, H = +·368, K = −·813.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tyosi	0·1	—	0 13a	+ 3	0 23	+ 5	—	—	—
Mito	0·7	335	0 14	− 1	0 21	− 6	—	—	—
Tukubasan	0·7	306	0 12	− 3	0 22	− 5	—	—	—
Tokyo	0·8	263	0 16k	− 1	0 27	− 2	—	—	—
Yokohama	1·0	249	0 19	0	0 33	0	—	—	—
Onahama	1·1	4	0 26a	+ 6	0 40	+ 4	—	—	—
Utunomiya	1·1	315	0 17k	− 3	0 29	− 7	—	—	—
Kumagaya	1·2	287	0 19k	− 3	0 33	− 5	—	—	—
Mera	1·2	222	0 22	0	0 36	− 2	—	—	—
Shirakawa	1·4	340	0 23k	− 1	0 40	− 3	—	—	—
Titibu	1·4	278	0 23	− 1	0 39	− 4	—	—	—
Maebasi	1·5	293	0 23k	− 3	0 38	− 7	—	—	—
Osima	1·5	228	0 27k	+ 1	0 42	− 3	—	—	—
Ajiro	1·6	242	0 27	0	0 44	− 3	—	—	—
Misima	1·7	246	0 19	− 9	0 38	−12	—	—	—
Kohu	1·8	265	0 29	− 1	0 54	+ 2	—	—	—
Inawashiro	1·9	343	0 31	0	0 52	− 2	—	—	—
Oiwake	1·9	286	0 28	− 3	0 50	− 4	—	—	—
Hukusima	2·0	352	0 30	− 2	0 51	− 6	—	—	—
Shizuoka	2·1	247	0 34	0	0 58	− 1	—	—	—
Matusiro	2·2	291	0 34k	− 1	1 0	− 2	—	—	—
Matumoto	2·3	281	0 37k	0	1 5	+ 1	—	—	—
Nagano	2·3	292	0 35k	− 2	1 0	− 4	—	—	—
Iida	2·4	263	0 40	+ 2	1 18	+11	—	—	—
Omaesaki	2·4	240	0 39	+ 1	1 4	− 3	—	—	—
Takada	2·4	302	0 38	0	1 7	0	—	—	—
Sendai	2·5	2	0 40	+ 1	1 7	− 2	—	—	—
Yamagata	2·5	352	0 41	+ 2	1 8	− 1	—	—	—
Niigata	2·5	327	0 38	− 1	1 7	− 2	—	—	—
Hamamatu	2·7	247	0 46	+ 4	1 15	+ 1	—	—	—
Hatidyozima	2·7	196	0 46	+ 4	1 19	+ 5	—	—	—
Isinomaki	2·7	9	0 43	+ 1	1 11	− 3	—	—	—
Takayama	2·9	277	0 45	0	1 20	+ 1	—	—	—
Aikawa	3·0	317	0 44	− 3	1 19	− 3	—	—	—
Toyama	3·0	287	0 46	− 1	1 20	− 2	—	—	—
Nagoya	3·2	259	0 48	− 1	—	—	—	—	—
Gihu	3·3	263	0 50	− 1	1 39	+10	—	—	—
Mizusawa	3·3	5	e 0 54	+ 3	1 34	+ 5	e 0 57	P	—
Wazima	3·5	298	0 54	0	—	—	—	—	—
Kameyama	3·7	257	0 58	+ 2	1 40	+ 1	—	—	—
Tu	3·7	255	0 50	− 6	1 36	− 3	—	—	—
Hikone	3·8	264	1 2	+ 4	—	—	—	—	—
Miyako	3·9	13	0 52?	− 7	1 40?	− 4	—	—	—
Morioka	3·9	4	1 0	+ 1	1 43	− 1	—	—	—
Tsuruga	3·9	269	0 58	− 1	—	—	—	—	—
Kyoto	4·2	262	0 59	− 4	1 56	+ 4	—	—	—
Owase	4·2	247	1 2	− 1	2 3	+11	—	—	—
Kobe	4·7	258	1 15	+ 5	2 20?	+16	—	—	—
Hatinohe	4·8	8	1 16	+ 4	2 6	− 1	—	—	—
Aomori	5·0	0	1 26	+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.
Takamatu		5·7	258	1 23	– 1	2 51	SS	—	—	—
Muroto		6·0	247	1 32	+ 4	2 39	+ 2	—	—	—
Kôti		6·4	252	1 35	+ 1	2 56?	+10	—	—	—
Urakawa		6·5	12	1 37	+ 2	2 47	– 2	—	—	—
Matuyama		6·9	256	1 40	– 1	3 30	SSS	—	—	—
Poona		60·9	273	i 10 7	– 1	10 42	sP	e 13 58?	PPP	15·3
Resolute Bay		63·9	14	i 10 25a	– 3	—	—	e 10 41	pP	—
Kiruna		67·5	339	i 10 35	–16	e 24 14	SS	i 11 20	PcP	e 27·5
China Lake	Z.	78·1	54	e 11 56	+ 2	—	—	—	—	—
Mount Wilson	Z.	78·7	56	e 12 0	+ 3	—	—	—	—	—
Copenhagen		78·8	334	i 12 59	+62	—	—	—	—	30·5
Palomar	Z.	80·0	56	e 12 8	+ 4	—	—	—	—	—
Collmberg	Z.	81·9	330	e 12 13	– 1	—	—	—	—	—
Jena		82·8	330	e 12 19	+ 1	—	—	e 12 28	PcP	—
Cheb		83·1	330	e 13 50	?	—	—	—	—	—
Stuttgart		85·4	330	e 12 31	– 1	—	—	—	—	e 35·5
Strasbourg		86·2	331	i 12 36	+ 1	—	—	—	—	e 35·5
Kew		86·6	336	e 16 32	?	—	—	—	—	e 36·5
Paris		88·0	334	i 12 44	0	e 14 57	?	e 12 47	PcP	e 35·5
Tamanrasset	Z.	108·0	317	15 41	?	—	—	e 18 36	PP	—

Kiruna gives also eE=16m.32s.?, eZ=18m.9s., eN=18m.50s. and 23m.6s., eE=25m.50s.
Long waves were also recorded at Rathfarnham Castle, Upsala, De Bilt, Potsdam, Triest, and Messina.

Nov. 3d. Readings also at 0h. (near Kurmenty, near Almata, Almata II, and Przhevalsk), 1h. (Messina, Ashkabad, Tashkent, Almata II, Frunse, Naryn, Tchimkent, Andijan near Samarkand, Fergana, Murgab, Dzhergetal, Khorog, and Garm (2)), 2h. (Apia), 3h. (Goris, Kirovobad, near Piatigorsk, Erevan, Leninakan, Borzhomi, Akhalkalaki, Tsikhlis-Dzhvari, Gori, and Tiflis), 4h. (Naryn, near Almata II, Kurmenty, Ili, Przhevalsk, near Piatigorsk, Erevan, Kirovobad, Borzhomi (2), Akhalkalaki (2), Tsikhlis-Dzhvari (2), and Tiflis (2)), 5h. (Sotchi, Goris, Piatigorsk, Kirovobad, near Leninakan, Erevan, Borzhomi, Akhalkalaki, Tsikhlis-Dzhvari, and Tiflis), 6h. (Apia (2), Kirovobad, near Borzhomi, Tsikhlis-Dzhvari, and Tiflis), 7h. (China Lake, Tinemaha, Victoria, Goris, Piatigorsk, Kirovobad, near Akhalkalaki (2), Borzhomi (2), and Tiflis (2)), 8h. (Fort de France, Leninakan, near Borzhomi, Akhalkalaki, and Tiflis), 9h. and 11h. (near Akhalkalaki), 12h. (near Erevan), 13h. (Brisbane and near Kurmenty), 15h. (near Garm, Dzhergetal, and Khorog), 16h. (Tamanrasset, Algiers Univ., Stalinabad, and near Klyuchi), 17h. (Basle, near Alicante (2), and near Garm), 18h. (Nanking and Zi-ka-wei), 20h. (Algiers Univ., Tashkent, near Fergana, Samarkand, Khorog, Dzhergetal, Garm, and Stalinabad).

Nov. 4d. 8h. 54m. 32s. Epicentre 5°·2S. 147°·5E. Depth of focus 0·020.

A = –·8399, B = +·5351, C = –·0901 ; δ = –12 ; h = +7 ;
D = +·537, E = +·843 ; G = +·076, H = –·048, K = –·996.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·8	167	i 4 50k	+ 1	i 8 43	0	i 5 17	pP	—
Riverview		28·7	173	i 5 44k	0	i 10 17	– 3	i 6 42	sP	—
Manila		32·8	307	e 6 8	–12	e 13 16	SS	e 7 11	PP	—
Perth		39·8	223	7 20	+ 1	i 13 3	– 8	9 3	PP	—
Auckland	N.	40·2	145	—	—	i 13 21	+ 4	i 16 42	SS	e 23·0
Apia		41·0	104	7 36	+ 7	—	—	i 7 46	?	—
Karapiro	N.	41·4	145	9 28?	PP	—	—	—	—	—
Tuai	N.	42·9	146	e 7 48	+ 4	—	—	—	—	—
Wellington		43·4	150	i 7 48	0	i 13 58	– 6	i 9 42	PcP	e 20·5
Christchurch		44·1	154	7 59	+ 5	i 14 13	– 1	e 15 23	sS	e 23·1
Mizusawa	E.	44·5	353	8 2	+ 5	14 16	– 3	—	—	—
Nanking		46·0	325	i 8 8a	– 1	i 14 35	– 6	e 8 57	pP	—
Vladivostok		50·1	345	e 8 39	– 1	i 15 39	+ 1	i 9 30	pP	—
Terre Adelie		61·6	183	i 10 1?	– 2	e 18 1?	– 9	i 10 51?	pP	—
Klyuchi		62·3	8	e 10 5	– 2	—	—	—	—	—
Mitchell Field		64·6	23	i 10 24	+ 2	—	—	—	—	—
Irkutsk		68·0	333	10 41	– 3	19 23	– 5	e 11 37	pP	—
Poona		76·3	291	e 11 18	–15	e 21 2	– 1	e 12 23	pP	—
Bombay	E.	77·3	291	i 12 33	pP	e 21 2	–11	i 21 28	ScS	—
Przhevalsk		78·3	315	11 45	+ 1	—	—	e 12 45	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.
Almata II		79·3	316	e 11 49	0	—	—	—	—	—
Almata		79·6	316	i 11 50	– 1	i 21 30	– 8	i 12 47	pP	—
Rybach'e		80·0	314	—	—	i 21 35	– 7	—	—	—
Frunse		81·1	314	i 11 59	0	i 21 43	–10	e 12 49	pP	—
Andijan		82·2	311	e 12 4	0	21 57	– 7	13 5	pP	—
Fergana		82·6	311	e 12 4	– 2	i 21 56	–12	e 12 58	pP	—
College		84·2	23	i 12 14	0	—	—	i 13 10	pP	—
Stalinabad		84·4	309	i 12 13	– 2	i 22 14	–12	13 10	pP	—
Tashkent		84·6	312	i 12 16?	0	i 22 18?	–10	i 13 9?	pP	—
Tchimkent		84·6	313	e 12 14	– 2	e 22 16	–12	e 13 16	pP	—
Mary		89·7	307	—	—	23 8	– 8	e 24 51	sS	—
Berkeley	Z.	93·3	52	e 12 59a	+ 1	—	—	e 16 46	PP	—
Shasta Dam		93·4	49	e 13 0	+ 2	—	—	—	—	—
Lick	Z.	93·8	52	e 13 2a	+ 2	i 16 46	PP	i 13 37	pP	—
Mineral	Z.	94·0	50	e 13 2a	+ 1	i 16 51	PP	i 14 4	pP	—
Fresno	Z.	95·3	53	e 13 9k	+ 2	e 17 2	PP	e 14 5	pP	—
Reno		95·4	51	e 13 10k	+ 3	e 23 10	[–16]	e 13 50	pP	—
Pasadena		96·5	57	i 13 15k	+ 3	i 23 28	[– 4]	e 14 11	pP	—
Tinemaha	Z.	96·5	54	i 13 15	+ 3	e 17 10	PP	e 14 11	pP	—
China Lake		97·0	54	e 13 16	+ 1	i 23 33	[– 2]	i 17 15	PP	—
Riverside	Z.	97·1	57	i 13 18k	+ 3	—	—	e 14 15	pP	—
Palomar		97·5	57	i 13 20k	+ 3	i 23 37	[0]	e 14 19	pP	—
Boulder City		99·2	54	e 13 31	+ 6	—	—	e 17 33	PP	—
Hungry Horse		99·5	41	i 13 27	+ 1	—	—	i 17 35	PP	—
Butte		100·6	44	e 17 41	PP	—	—	—	—	—
Tucson		102·6	58	e 13 44	+ 4	—	—	—	—	—
Kiruna		108·1	340	i 17 55	[–13]	e 24 1	[–26]	e 27 17	sS	e 38·5
Ksara		110·8	303	e 18 30?	[+16]	e 29 46	PPS	i 19 51	?	—
Kimberley	Z.	115·4	236	i 29 7	PKKP	—	—	—	—	—
Collmberg	Z.	120·6	328	e 19 55	PP	—	—	—	—	—
Stuttgart	Z.	124·6	327	e 19 38?	[+58]	—	—	—	—	—
Palisades		128·6	39	i 18 50	[+ 2]	i 21 46	SKP	—	—	—
Fordham		128·7	39	—	—	e 21 48	SKP	—	—	—
Harvard		129·2	36	i 18 51	[+ 2]	i 21 50	SKP	—	—	—
Weston		129·4	36	—	—	i 21 49	SKP	—	—	—
Huancayo		134·1	112	e 19 3	[+ 5]	e 39 32	SS	—	—	—
Algiers Univ.	Z.	134·8	318	e 20 2	pPKP	e 23 23	?	e 22 8	PP	—
La Paz		138·7	122	e 19 14	[+ 7]	e 25 58	[– 1]	22 34	PP	—
Tamanrasset	Z.	139·4	299	i 19 10k	[+ 2]	i 20 36	sPKP	i 20 11	pPKP	—
San Juan		144·7	65	i 19 18	[0]	—	—	i 20 23	pPKP	—
Fort de France		150·3	69	—	—	e 34 28	?	—	—	—

Additional readings :—
Brisbane eN =5m.14s., iPPEN =5m.31s., isSEN =9m.37s.
Riverview iPPNZ =6m.50s., isS?N =12m.1s., iSSN =12m.7s., iScS?N =15m.34s.
Manila ePPP =8m.45s.
Perth i =9m.43s., SSS =15m.55s.
Wellington eSSS =17m.39s.
Christchurch eSSEN =17m.38s., eQEN =20m.8s.
Nanking isSEN =16m.2s.
Terre Adelie iPP =12m.19s.?
Irkutsk esS =20m.57s.
Poona sPE =13m.12s., eS?E =20m.28s., iE =20m.48s., 21m.17s., and 21m.49s.
Almata isS =23m.9s.
Frunse isS =23m.26s.
Andijan isS =23m.36s.
Fergana isS =23m.37s.
Stalinabad iS =23m.56s.
Tashkent isS =23m.56s.
Tchimkent ePPP =17m.24s., esS =24m.1s.
Lick eZ =13m.58s., 14m.38s., and 17m.39s.
Reno ePPZ =17m.6s.
Pasadena eZ =14m.51s. and 16m.1s., ePPZ =17m.15s., iZ =19m.14s.
China Lake eZ =14m.53s.
Palomar iZ =14m.56s.
Kiruna eSPE =28m.1s., eN =28m.4s., eE =32m.56s., eSS?N =33m.21s.
Huancayo e =20m.53s., 22m.12s., and 24m.5s.
La Paz SS =40m.8s.
Tamanrasset iPPZ =22m.19s., ePPPZ =25m.30s.
Long waves were also recorded at Alicante and Almeria.

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Nov. 4d. 11h. 9m. 41s. Epicentre 11°·8N. 126°·2E. (as on 1942, June 14d.).

Intensity VI at Catbalogan ; V at Tacloban and Borongan ; III at Virar and Surigao.
Epicentre 12°·8N. 125°·3E. (Manila) ; 11°·8N. 125°·1E. (Strasbourg).

A = −·5783, B = +·7901, C = +·2031 ; δ = −6 ; h = +6 ;
D = +·807, E = +·591 ; G = −·120, H = +·164, K = −·979.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		5·8	299	i 1 24	− 5	i 2 28	−10	—	—	—
Guam		18·2	83	4 24	+ 8	—	—	e 5 27	?	—
Yakusima		19·0	11	e 4 28	+ 2	8 6	+11	—	—	—
Zi-ka-wei		19·8	349	i 4 35	0	e 8 15	+ 2	—	—	—
Kagosima		20·1	11	4 41	+ 3	8 31	+12	—	—	9·3
Miyazaki		20·6	13	e 4 47	+ 4	i 8 40	+11	—	—	—
Tomie		20·9	7	4 49	+ 3	—	—	—	—	—
Nagasaki		21·1	9	e 4 52	+ 4	—	—	—	—	—
Unzendake		21·2	10	4 52	+ 3	—	—	—	—	—
Nanking		21·3	343	i 4 50a	0	i 8 41	− 2	—	—	—
Saga		21·7	9	e 4 50	− 5	8 45	− 6	—	—	—
Simidu		21·8	15	4 58	+ 2	9 0	+ 8	—	—	—
Hukuoka		22·0	10	5 1	+ 3	i 9 1	+ 5	e 6 30	?	10·9
Muroto		22·6	18	e 5 7	+ 4	e 9 7	0	—	—	e 10·4
Kôti		22·7	16	e 5 9	+ 5	e 9 16	+ 7	e 16 16	ScS	—
Matuyama		22·8	14	e 5 11	+ 6	e 9 17	+ 6	16 21	ScS	—
Takamatu		23·5	16	i 5 17	+ 5	e 9 25	+ 2	16 22	ScS	—
Owase		24·0	20	5 21	+ 4	9 46	+14	—	—	—
Kobe		24·2	19	e 5 24	+ 5	e 10 4	+29	e 6 9	PPP	—
Tu		24·7	20	e 5 22	− 2	e 9 43	− 1	—	—	—
Kameyama		24·8	20	5 28	+ 3	9 43	− 3	—	—	e 11·5
Hikone		25·1	20	e 5 33	+ 5	e 9 53	+ 2	—	—	—
Kohu		26·3	24	e 5 53	+14	e 16 35	ScS	—	—	—
Kanazawa		26·4	20	—	—	e 11 37	SS	—	—	—
Matumoto	N.	26·5	21	e 5 46	+ 5	—	—	—	—	—
Toyama		26·7	19	e 5 50	+ 7	9 54	−23	e 16 38	ScS	—
Tokyo		26·8	25	6 3	+19	e 11 9	+50	i 11 37	SS	e 12·0
Matusiro		26·9	20	5 45	0	10 17	− 3	—	—	11·7
Oiwake		26·9	22	e 5 50	+ 5	—	—	—	—	—
Kumagaya		27·0	24	e 6 27	PP	e 10 29	+ 7	—	—	—
Nagano	E.	27·0	20	e 5 57	+12	—	—	—	—	—
Maebasi		27·1	23	e 5 54	+ 8	e 10 33	+ 9	i 7 9	?	e 12·3
Mizusawa		30·3	23	6 31	+16	12 21	?	12 36	?	16·3
Miyako		31·1	23	—	—	e 11 15	−13	—	—	—
Vladivostok		31·6	9	i 6 26	0	i 11 33	− 2	—	—	—
Calcutta	E.	37·6	292	i 7 16	− 2	i 13 3	− 5	8 41	PP	—
Irkutsk		44·1	341	i 8 10	− 2	14 40	− 5	—	—	—
Colombo	E.	45·9	268	8 22	− 4	15 20	+ 9	—	—	25·3
Hyderabad	E.	46·5	283	8 28	− 3	15 10	− 9	18 41	SS	23·1
Brisbane		46·9	146	i 8 36a	+ 2	i 15 27	+ 2	i 13 59	PcS	—
Kodaikanal	E.	47·8	274	e 8 40	− 1	—	—	—	—	—
New Delhi		48·6	298	i 8 41k	− 6	e 15 32	−17	e 18 30	ScS	21·8
Poona		50·8	285	i 9 1	− 3	i 16 9	−11	16 17	PS	23·3
Riverview		51·2	154	i 9 12a	+ 5	i 16 32	+ 7	i 20 6	SS	e 24·7
Przhevalsk		51·5	316	i 9 9	0	—	—	—	—	—
Bombay	E.	51·8	285	i 9 8	− 4	i 16 26	− 7	i 11 10	PP	24·1
Klyuchi		51·8	24	e 9 19	+ 7	16 37	+ 4	—	—	—
Almata II		52·4	317	e 9 15	− 1	—	—	—	—	—
Almata		52·7	317	i 9 16	− 2	e 16 40	− 6	—	—	—
Naryn		52·8	314	i 9 16	− 3	e 16 43	− 4	—	—	—
Rybach'e		53·0	315	9 18	− 3	e 16 42	− 8	—	—	—
Frunse		54·2	315	i 9 27	− 2	i 17 14	+ 8	—	—	—
Khorog		54·9	307	i 9 33	− 2	17 12	− 4	—	—	—
Andijan		55·2	312	i 9 35?	− 2	e 17 16?	− 4	—	—	—
Fergana		55·5	311	e 9 36	− 3	i 17 16	− 8	—	—	—

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.
Garm		56·3	311	9 42	– 3	—	—	—	—	—
Stalinabad		57·4	309	i 9 47	– 6	i 17 41	– 8	—	—	—
Tashkent		57·6	312	i 9 52?	– 2	i 17 44?	– 7	—	—	—
Tchimkent		57·6	313	i 9 51	– 3	17 43	– 8	—	—	—
Samarkand		58·9	309	i 9 59	– 4	e 17 59	– 9	—	—	—
Mary		62·6	307	i 10 25	– 3	—	—	—	—	—
Ashkabad		65·4	306	i 10 45	– 2	—	—	—	—	—
Apia		66·5	110	e 11 23	PcP	—	—	—	—	—
Auckland	N.	66·5	139	—	—	19 49	+ 5	—	—	e 28·5
Sverdlovsk		66·9	328	i 10 54	– 2	i 19 42	– 7	—	—	—
Kizyl-Arvat		67·1	308	i 10 55	– 2	—	—	—	—	—
Wellington		69·2	143	—	—	20 18	+ 2	—	—	e 31·3
Christchurch		69·4	146	—	—	20 23	+ 5	e 25 19	SS	e 34·8
Baku		72·0	309	i 11 27	– 1	e 21 5	+16	—	—	—
Lenkoran		72·9	307	11 31	– 2	20 54	– 5	—	—	—
Kirovobad		74·7	310	11 41	– 2	e 21 13	– 6	—	—	—
Goris		74·8	308	11 43	– 1	—	—	—	—	—
Tiflis		75·9	311	i 11 48	– 2	—	—	—	—	—
Erevan		76·2	309	i 11 50	– 2	—	—	—	—	—
Gori		76·4	311	e 11 52	– 1	—	—	—	—	—
Akhalkalaki		76·9	311	11 54	– 2	—	—	—	—	—
Borzhomi		76·9	311	11 54	– 2	—	—	—	—	—
Tsikhlis-Dzhvari		76·9	311	11 55	– 1	—	—	—	—	—
Piatigorsk		77·0	313	11 58	+ 2	—	—	—	—	—
College		77·7	26	12 1	+ 1	—	—	—	—	—
Terre Adelie		79·2	173	i 12 9	+ 1	i 22 4	– 4	i 23 0	PPS	—
Moscow		79·5	325	12 9	– 1	22 4	– 7	—	—	—
Pulkovo		82·9	330	i 12 27	– 1	i 22 39	– 7	—	—	—
Yalta		83·3	314	12 28	– 2	22 46	– 4	—	—	—
Ksara		83·8	303	i 12 31a	– 1	23 1	+ 6	—	—	—
Kiruna		85·0	338	i 12 24a	–14	i 23 8	{+ 3}	e 12 38	P	40·1
Helsinki		85·4	331	i 12 39a	– 1	i 23 5	[+ 2]	e 13 3	?	e 41·3
Kishinev		86·4	318	e 12 49	+ 4	—	—	—	—	—
Istanbul		87·7	312	e 12 51	– 1	e 23 28	{+ 3}	—	—	—
Helwan		88·4	300	i 12 53a	– 2	23 31	{+ 1}	e 23 49	ScS	—
Lwow		88·8	321	i 12 56	– 1	i 23 38	– 6	—	—	—
Bucharest		88·9	316	e 13 1	+ 3	e 23 41	– 3	e 16 32	PP	—
Upsala		89·0	332	e 12 53	– 5	i 23 36	{+ 2}	e 29 36	SS	e 43·3
Resolute Bay		90·0	10	i 13 4a	+ 1	i 23 54	0	i 25 22	PPS	—
Uzhgorod		90·2	319	i 13 3	– 1	23 51	– 5	—	—	—
Skalnate Pleso		91·3	321	e 22 43	?	e 24 1	– 5	—	—	—
Sofia		91·3	314	13 9	0	e 24 3	– 3	e 16 50	PP	—
Raciborzu		92·3	322	e 13 12	– 1	e 23 45	[– 1]	e 18 51	PPP	—
Athens		92·5	309	e 16 55	PP	—	—	e 17 0	PP	—
Belgrade		92·7	316	e 17 58a	PP	e 24 2	{ 0}	e 26 59	?	e 56·5
Potsdam		94·3	326	i 13 22a	– 1	26 1	PS	i 17 14	PP	e 44·3
Victoria		94·3	39	13 23	0	—	—	—	—	—
Prague		94·5	323	e 13 22a	– 1	e 24 37	+ 3	e 24 7	SKS	e 46·3
Collmberg	Z.	94·8	324	e 13 23	– 2	e 17 11	PP	e 19 44	?	—
Cheb		95·7	324	e 23 51	?	e 24 6	[+ 1]	e 26 16	PS	e 48·3
Jena		95·8	324	e 13 28	– 1	—	—	e 17 19	PP	—
Triest		96·7	319	e 13 33	0	e 24 51	– 2	i 24 7	SKS	e 48·7
Witteveen	Z.	97·6	328	i 13 37k	– 1	—	—	—	—	—
Shasta Dam		98·0	46	e 13 43	+ 4	—	—	—	—	—
Stuttgart		98·2	324	e 13 39	– 1	e 24 13	[– 5]	e 17 46	PP	e 50·3
Messina		98·5	312	e 13 39	– 3	e 24 7	[–13]	e 17 44	PP	—
De Bilt		98·7	328	—	—	e 26 49	PS	—	—	e 48·3
Mineral	Z.	98·7	46	e 13 45	+ 3	—	—	—	—	—
Rome		99·1	316	e 13 43	– 1	e 24 14	[– 9]	27 33	PPS	e 48·0
Strasbourg		99·1	324	i 13 44k	0	—	—	e 41 19	Q	e 48·3

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.
Florence		99·2	318	e 13 44	– 1	e 24 17	[– 6]	—	—	—
Zürich		99·2	323	e 13 43a	– 2	—	—	e 17 41	PP	—
Berkeley		99·4	48	—	—	e 32 25	SSP	—	—	e 47·9
Basle		99·7	323	e 13 45	– 2	—	—	e 17 51	PP	—
Lick	Z.	99·9	48	e 13 51	+ 3	—	—	e 17 6	?	—
Hungry Horse		100·0	36	e 13 52	+ 4	—	—	—	—	—
Reno		100·3	46	e 13 53	+ 3	e 24 51	{– 5}	—	—	—
Fresno	Z.	101·5	48	e 13 57	+ 2	—	—	—	—	—
Paris		101·9	326	i 13 56	– 1	i 24 50	[+14]	i 18 5	PP	e 50·3
Pretoria	Z.	102·2	246	i 13 25	–33	—	—	i 17 35	PP	—
Tinemaha	Z.	102·5	48	e 18 27	PP	—	—	e 30 19	PKKP	—
Clermont-Ferrand		103·3	323	i 19 16	?	—	—	—	—	e 60·3
China Lake	Z.	103·5	48	e 14 7	+ 3	e 17 35	?	e 30 15	PKKP	—
Rathfarnham Castle		103·6	333	e 31 31	?	—	—	—	—	e 48·3
Pasadena		103·8	51	e 18 25	PP	—	—	e 30 13	PKKP	e 47·6
Palomar	Z.	105·1	51	e 18 36	PP	—	—	e 30 8	PKKP	—
Boulder City		105·4	47	e 18 46	PP	—	—	—	—	—
Kimberley	Z.	105·5	244	i 18 28	PP	—	—	—	—	—
Algiers Univ.	Z.	108·0	315	e 18 24	[– 5]	—	—	e 18 50	PP	—
Alicante		109·5	318	18 59	PP	26 3	{+ 1}	29 29	PPS	e 52·0
Tucson		110·1	49	e 18 57	PP	—	—	—	—	—
Toledo		110·9	321	i 19 13	PP	—	—	e 22 40	?	—
Almeria		111·7	318	18 34	[– 3]	29 30	PPS	19 6	PP	59·6
Tamanrasset	Z.	112·5	301	i 18 40	[+ 2]	e 29 42	PPS	e 15 5	P	—
Fayetteville		119·0	37	i 18 54	[+ 3]	—	—	—	—	—
Ottawa	Z.	119·7	17	e 18 55	[+ 3]	—	—	—	—	—
Morgantown		123·3	24	e 18 59	[0]	—	—	—	—	—
Harvard		123·6	15	i 19 3	[+ 3]	—	—	—	—	—
Palisades		124·3	18	i 19 3	[+ 2]	e 37 37	SS	e 30 52	PS	e 66·0
San Juan		147·6	22	i 19 46	[+ 3]	—	—	i 20 39	PKP_2	—
Chinchina		152·6	52	(i 19 47)	[– 4]	(e 43 10)	SS	(i 19 58)	PKP_2	(81·1)
Fort de France		152·7	15	e 19 53	[+ 1]	—	—	—	—	—
Bogota		154·1	51	i 20 3	[+10]	i 40 21	?	i 20 25	PKP_2	—
Huancayo		158·9	93	i 20 6	[+ 6]	e 45 6	SSP	—	—	e 89·9
La Paz		165·3	110	i 20 9a	[+ 3]	27 16	[+ 7]	i 21 11	PKP_2	78·8

Additional readings and note :—

Kobe iN =6m.29s.
Toyama ePP? =6m.47s.
Tokyo eN =8m.29s.
Calcutta SSE =15m.31s.
Hyderabad PPE =10m.13s.
Brisbane ePPEN =10m.30s., iPPZ =10m.35s., iPPPEN =11m.5s., iSSN =18m.56s.
New Delhi iN =16m.29s., QN =19m.27s., SSSN =19m.54s.
Poona PPE =10m.53s., ScPE =14m.2s., PPSE =16m.27s., SSE =19m.39s., QE = 21m.12s., SSSE =21m.20s.
Riverview iPSN =16m.47s., iN =17m.2s., eN =20m.18s., iZ =20m.32s.
Bombay PPPE =12m.14s., iPSE =16m.37s., PPSE =16m.42s., iSSE =20m.13s.
Christchurch eQEN =29m.54s.
Terre Adelie iPS =22m.43s., iSS =26m.58s., iSSS? =30m.13s.
Kiruna iE =12m.41s., iZ =13m.43s., iSKS =22m.49s., ePSE =23m.54s., ePSNZ = 23m.59s., eN =24m.39s., eE =27m.43s., eN =28m.7s.
Upsala eE =15m.16s., iE =23m.52s., eSSS?N =33m.55s.
Resolute Bay iZ =13m.42s.
Prague eSKS? =24m.7s., e =24m.56s., and 25m.49s.
Cheb e =35m.45s. and 38m.43s.
Jena eE =13m.50s., eN =14m.52s.
Triest ePPZ =17m.27s., ePPPZ =19m.34s., SKKS =24m.21s.?, ePS =26m.3s., eSS = 31m.29s.
Stuttgart eS =25m.19s., ePS =26m.37s.
Messina eZ =13m.58s., e =24m.29s., ePS? =26m.42s.
Rome ePP?Z =17m.39s., eN =26m.52s.
Strasbourg e =14m.3s. and 14m.32s.
Paris i =13m.59s., ipP? =14m.7s., ipPP? =18m.15s., iPPP =20m.39s., ipPPP? = 20m.47s., iSP =27m.10s., i =27m.19s., iPPS =28m.4s., iQ =42m.28s.
Alicante PP =19m.49s., SSS =37m.59s., Q =45m.21s.
Almeria PPP =21m.26s.
Tamanrasset iPKP?Z =18m.26s., eZ =20m.22s., iPPPZ =21m.35s.
Chinchina readings have been increased by one minute.
Huancayo e =25m.3s. and 47m.58s.
La Paz iZ =20m.22s., PKS =23m.33s., iPPZ =25m.7s., iSKKS =31m.49s., iSS =46m.19s.
Long waves were also recorded at Weston, Aberdeen, Kew, Copenhagen, Bergen, Pavia, and Malaga.

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Nov. 4d. Readings also at 0h. (Terre Adelie, Apia, and near Manila), 1h. (Apia), 2h. (Terre Adelie), 3h. (Victoria, Horseshoe Bay, and near Apia), 4h. (New Delhi, Leninakan, Piatigorsk, Kirovobad (2), near Tiflis (2), Tsikhlis-Dzhvari (2), Borzhomi (2), Akhalkalaki, and near Mizusawa), 8h. (Apia, near Alicante (2), near Tiflis, Akhalkalaki, Tsikhlis-Dzhvari, and Borzhomi), 9h. (near Akhalkalaki), 10h. (Murgab, Tashkent, Almata II, Przhevalsk, Samarkand, Naryn, near Dzhergetal, Fergana, Andijan, Garm, Khorog, Stalinabad, Tchimkent, and Rybach'e), 12h. (Apia), 13h. (Copiapo, La Paz, and near Antofagasta), 14h. (Mount Wilson, Riverside, Palomar, China Lake, Tucson, Boulder City, Mineral, Shasta Dam, Hungry Horse, Victoria, College, Resolute Bay, Fayetteville, Kiruna, Raciborzu, and Kimberley), 17h. (Manila, Kiruna, Kimberley, Pretoria, Terre Adelie, Brisbane, Riverview, Mount Wilson, and China Lake), 19h. (Victoria and near Garm), 20h. (Kiruna, Christchurch, near Karapiro, Tuai, New Plymouth, Cobb River, Kaimata, and Wellington), 21h. (Terre Adelie) 22h. (Kiruna, College, Shasta Dam, Hungry Horse, Butte, Lick, Reno, Palomar, China Lake, Tinemaha, Tashkent, Almata II, Przhevalsk, near Dzhergetal, Garm, Fergana, Stalinabad, Andijan, Samarkand, Tchimkent, Naryn and Frunse), 23h. (Kiruna (2) and Prague).

Nov. 5d. 18h. 3m. 19s. Epicentre 40°·8N. 77°·7E. (as on 1951, April 20d.).

A = +·1617, B = +·7418, C = +·6509 ; δ = +8 ; h = −2 ;
D = +·977, E = −·213 ; G = +·139, H = +·636, K = −·759.

	Δ	Az.	P.	O − C.	S.	O − C.
	°	°	m. s.	s.	m. s.	s.
Naryn	1·4	296	i 0 24	− 3	i 0 46	0
Przhevalsk	1·8	17	0 33	+ 1	1 1	+ 5
Rybach'e	2·1	323	i 0 37	0	i 1 5	+ 1
Kurmenty	2·3	11	i 0 42	+ 2	e 1 16	+ 7
Almata	2·5	347	e 0 44	+ 1	i 1 26	S_g
Almata II	2·5	354	i 0 44	+ 1	e 1 20	S*
Chilisk	2·8	11	i 0 49	+ 2	i 1 33	S_g
Frunse	3·1	312	e 0 52	+ 1	i 1 39	S_g
Krasnogorka	3·1	322	i 0 51	0	i 1 40	S_g
Ili	3·2	352	e 0 53	+ 1	i 1 43	S_g
Murgab	3·8	231	i 0 58?	− 3	1 40?	− 7
Andijan	4·0	271	i 1 3	− 1	i 2 6	S*
Fergana	4·5	267	e 1 10	− 1	i 2 17	S*
Dzhergetal	5·2	254	e 1 17	− 4	—	—
Garm	6·0	255	e 1 26	− 6	—	—
Tashkent	6·4	277	—	—	e 3 27	S_g
Obi-garm	6·5	254	e 1 33	− 6	e 2 48	− 7
Stalinabad	7·2	255	—	—	e 3 4	− 9
Kiruna	z. 40·7	331	i 7 40a	− 4	—	—

Nov. 5d. Readings also at 0h. (near Garm and near Akhalkalaki), 1h. (near Akhalkalaki, near Jena, and near Malaga), 2h. (Prague), 3h. (near Kurmenty), 4h. (Almata II, Garm, Frunse, Tchimkent, near Andijan, Dzhergetal, Khorog, Kurmenty, Murgab, Naryn, and Przhevalsk), 5h. (Wellington, Berkeley, College, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Shasta Dam, Boulder City, Collmberg, Kiruna, Stuttgart, Tamanrasset, and near Mizusawa), 6h. (Kiruna), 8h. (Tashkent (2), Tchimkent, near Andijan (2), Dzhergetal (2), Fergana (2), Garm (2), Khorog (2), Murgab, and Stalinabad (2)), 9h. and 10h. (near Manila), 11h. (near Akhalkalaki), 12h. (Athens and near Istanbul), 13h. (Kiruna, Tamanrasset, near Athens, near Messina (2), and near Istanbul), 14h. (Stalinabad, near Andijan, Dzhergetal, and Garm), 15h. (near Dzhergetal), 16h. (Apia), 17h. (near Dzhergetal), 19h. (Bogota, Galerazamba, Harvard, and Palisades), 21h. (Victoria).

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Nov. 6d. 0h. 50m. 40s. Epicentre 29°·0N. 96°·0E. (as on 1951, Aug. 1d.).

Felt at Dibrugarh and Jorhat. Epicentre as adopted.
Seismo. Bull. Gov. of India Met. Department, November, 1951, p. 4.

A = −·0916, B = +·8712, C = +·4823 ; δ = −1 ; h = +2 ;
D = +·995, E = +·105 ; G = −·051, H = +·480, K = −·876.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	9·5	229	e 2 23	+ 3	i 4 1	− 9	5 0	S_g	—
New Delhi		16·5	273	e 3 49	− 5	i 6 59	+ 1	4 4	PP	—
Hyderabad	E.	19·8	238	e 4 36	+ 1	e 8 25	+12	—	—	—
Nanking		19·9	74	i 4 34a	− 2	e 8 18	+ 3	—	—	—
Naryn		20·5	318	e 4 43	+ 1	i 8 32	+ 5	—	—	—
Almata II		20·6	318	i 4 46	+ 3	—	—	—	—	—
Almata		20·9	318	e 4 48	+ 2	i 8 45	+10	—	—	—
Rybach'e		21·0	314	e 4 46	− 1	e 8 45	+ 8	—	—	—
Khorog		22·0	299	4 59	+ 1	9 6	+10	—	—	—
Frunse		22·1	314	e 5 0	+ 1	i 9 10	+12	—	—	—
Andijan		22·6	307	5 4	+ 1	9 12	+ 5	—	—	—
Poona		22·8	247	i 5 6	+ 1	i 9 15	+ 4	5 40	PP	10·9
Fergana		22·9	306	e 5 7?	+ 1	i 9 16?	+ 3	—	—	—
Bombay	E.	23·4	249	i 5 13	+ 2	i 9 26	+ 5	5 49	PP	10·1
Garm		23·5	304	5 15	+ 3	—	—	—	—	—
Obi-garm		23·8	301	i 5 15	0	i 9 30	+ 2	—	—	—
Irkutsk		24·1	12	5 21	+ 3	9 39	+ 5	—	—	—
Stalinabad		24·5	301	i 5 20	− 2	e 9 37	− 3	—	—	—
Tashkent		25·0	306	i 5 29	+ 2	—	—	—	—	—
Samarkand		26·1	301	5 37	0	i 10 8	+ 1	—	—	—
Vladivostok		32·0	55	i 6 27	− 3	—	—	—	—	—
Ashkabad		32·5	297	e 6 35	+ 1	e 11 51	+ 2	—	—	—
Sverdlovsk		37·3	328	i 7 17	+ 1	13 5	+ 1	—	—	—
Kirovobad		41·9	300	7 54	0	—	—	—	—	—
Tiflis		43·1	302	e 8 6	+ 2	—	—	—	—	—
Piatigorsk		44·4	305	8 7	− 7	—	—	—	—	—
Moscow		48·9	321	8 50	0	—	—	—	—	—
Ksara		50·9	291	i 9 7	+ 2	e 18 47	ScS	—	—	—
Istanbul	Z.	54·9	302	e 9 35	0	—	—	—	—	—
Kiruna		58·1	334	i 9 56k	− 2	e 18 4	+ 6	—	—	e 27·7
Prague		63·2	315	e 11 29	+57	e 18 26	?	e 13 8	PP	—
Potsdam	Z.	63·4	318	e 10 53	+19	—	—	—	—	—
Collmberg	Z.	63·7	315	e 10 36	0	—	—	—	—	—
Triest	Z.	64·8	310	e 10 42	− 1	—	—	e 11 9	PcP	—
Messina	Z.	65·7	302	e 10 47	− 1	—	—	e 13 24	PP	—
Stuttgart	Z.	66·8	314	e 10 56	0	—	—	—	—	—
Strasbourg		67·8	315	e 11 1	− 1	—	—	e 11 42	PcP	—
Paris		70·9	316	e 9 40	?	—	—	—	—	e 42·3
College		74·3	23	i 11 39	− 2	—	—	i 11 53	PcP	—
Resolute Bay	Z.	76·3	4	e 11 50	− 2	—	—	—	—	—
Brisbane		78·3	130	i 12 3k	0	—	—	i 12 42	?	—
Tamanrasset	Z.	79·7	290	i 12 11k	0	—	—	e 15 12	PP	—
Pretoria	Z.	84·8	236	i 12 37	0	—	—	—	—	—
Pietermaritzburg	Z.	85·5	232	i 12 42	+ 1	—	—	—	—	—
Hungry Horse		98·4	19	i 13 42	+ 1	—	—	—	—	—

Additional readings :—
Calcutta S*E = 4m.36s.
New Delhi PPPE = 4m.11s.
Poona QE = 9m.49s., SSSE = 10m.22s.
Bombay SSE = 10m.21s.
Kiruna iZ = 10m.3s. and 10m.15s.
Prague e = 12m.31s., 13m.35s., and 13m.57s.
Triest iZ = 10m.50s.
Stuttgart eZ = 11m.3s.
Tamanrasset eZ = 12m.31s. and 13m.0s.
Long waves were also recorded at De Bilt.

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Nov. 6d. 4h. Suggested region of Philippines.

Manila e =38m.32s.
Vladivostok eP =41m.0s., eS =45m.1s.
Irkutsk eP =43m.0s.
Rybach'e eP =44m.12s.
Almata eP =44m.19s.?
Frunse eP =44m.34s.
Fergana eP =44m.42s.
Tashkent eP =44m.46s., eS =51m.40s.
Samarkand eP =45m.2s., S =52m.7s.
Mary eP =45m.32s.
Calcutta eE =45m.33s., iE =50m.33s. and 51m.32s.
Sverdlovsk eP =45m.56s.
Bombay eE =46m. and 65m.33s.
Ksara eP =48m.5s., eS =59m.22s.?
Tiflis eS =55m.56s.
Kiruna eN =56m.9s. and 57m.13s., eE =57m.16s., 58m.5s., and 64m.0s., eN =73m.37s., eLEN =75m.30s.
Yalta eS =57m.0s.
Istanbul eZ =58m.29s.
Long waves were also recorded at La Paz, Weston, and at other European stations.

Nov. 6d. 14h. 57m. 14s. Epicentre 47°·5N. 153°·9E. (foreshock of large earthquake at 16h.).

A = −·6090, B = +·2983, C = +·7350 ; δ = +9 ; h = −4 ;
D = +·440, E = +·898 ; G = −·660, H = +·323, K = −·678.

	Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	7·2	238	1 47	− 2	3 9	− 4	—	—	—
Abashiri	7·6	246	1 56	+ 1	3 34	+11	—	—	—
Kusiro	8·1	240	2 0	− 2	3 29	− 6	—	—	—
Wakkanai	8·7	261	2 24	+14	4 9	+19	—	—	—
Asahigawa	8·9	249	2 13	+ 1	—	—	—	—	—
Urakawa	9·5	240	2 22	+ 2	4 2	− 8	—	—	—
Klyuchi	9·8	23	e 2 46	+22	—	—	—	—	—
Sapporo	9·9	248	2 31	+ 6	4 25	+ 5	—	—	—
Muroran	10·5	245	2 41	+ 6	—	—	—	—	—
Mori	10·9	245	2 45	+ 5	4 52	+ 8	—	—	—
Aomori	11·5	239	2 57	+ 9	5 25	+26	—	—	—
Mizusawa	12·5	232	2 58	− 4	5 11	−12	5 8	S	—
Akita	12·7	237	3 9	+ 4	5 14	−14	—	—	—
Sendai	13·3	231	3 10	− 3	5 24	−18	—	—	—
Hukusima	13·9	230	3 22	+ 1	5 44	−13	—	—	—
Inawasiro	14·2	231	3 28	+ 4	6 1	− 3	—	—	—
Onahama	14·3	227	3 20	− 6	5 55	−11	—	—	—
Shirakawa	14·5	229	3 23	− 5	6 5	− 6	—	—	—
Mito	14·9	227	3 33	− 1	6 12	− 8	—	—	—
Tukubasan	15·2	227	3 37	− 1	6 14	−14	—	—	—
Kumagaya	15·6	229	3 48	+ 5	6 33	− 4	—	—	—
Maebasi	15·6	230	3 46	+ 3	6 40	+ 3	—	—	—
Tokyo	15·8	227	4 0	+15	7 20	+38	—	—	—
Nagano	15·9	233	3 47	0	6 35	− 9	—	—	—
Oiwake	15·9	231	3 46	− 1	—	—	—	—	—
Matusiro	16·0	232	3 40	− 8	6 31	−15	—	—	—
Vladivostok	16·1	262	i 3 49	0	i 7 17	+28	—	—	—
Matumoto	16·3	232	3 51	− 1	7 15	+22	—	—	—
Kohu	16·4	230	3 53	0	—	—	—	—	—
Toyama	16·4	235	3 48	− 5	7 4	+ 8	—	—	—
Misima	16·6	227	3 59	+ 3	—	—	—	—	—
Nagoya	17·7	233	4 6	− 4	—	—	—	—	—
Hikone	18·0	234	4 12	− 1	—	—	—	—	—
Kameyama	18·2	233	4 17k	+ 1	8 4	+27	—	—	—
Kobe	19·0	236	4 24	− 2	8 10	+15	—	—	—
Takamatu	19·9	237	4 35	− 1	8 27	+12	—	—	—
Muroto	20·6	234	4 42	− 1	—	—	—	—	—
Kôti	20·7	235	4 44	0	8 35	+ 4	—	—	—
Hirosima	20·8	240	4 43	− 2	8 34	+ 1	—	—	—
Matuyama	21·0	239	4 40a	− 7	8 44	+ 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.
Ooita		22·1	239	5 2	+ 3	9 14	+16	—	—	—
Hukuoka		22·5	242	5 3	+ 1	9 12	+ 7	—	—	—
Saga		22·8	242	5 8	+ 3	—	—	—	—	—
Kumamoto		22·9	240	5 6	0	—	—	—	—	—
Yakusima		24·8	237	5 20	− 5	9 58	+12	—	—	—
Zi-ka-wei	Z.	29·7	250	i 6 10a	0	11 4	− 2	—	—	—
Nanking		30·8	254	i 6 19	− 1	i 11 19	− 4	—	—	—
Irkutsk		31·8	299	—	—	12 2	+24	—	—	—
College		35·2	39	6 58	0	—	—	—	—	—
Manila		42·7	232	(i 7 58)	− 2	i 7 58	P	—	—	—
Resolute Bay		50·0	19	i 8 57a	− 1	e 16 9	0	e 18 45	ScS	e 22·6
Przhevalsk		51·7	294	e 9 12	+ 1	—	—	—	—	—
Victoria		52·7	57	9 17	− 1	—	—	—	—	—
Sverdlovsk		53·7	317	i 9 25	− 1	e 16 58	− 1	—	—	—
Frunse		53·8	297	i 9 26	0	—	—	—	—	—
Seattle		53·8	57	i 9 37k	+11	—	—	e 11 0	PP	—
Andijan		56·4	296	i 9 46	+ 1	—	—	—	—	—
Fergana		57·0	296	e 9 58	+ 8	—	—	—	—	—
Tchimkent		57·1	299	i 9 51	+ 1	i 17 52	+ 7	—	—	—
Calcutta	E.	57·4	269	e 9 50	− 3	—	—	—	—	—
Shasta Dam		57·7	64	i 9 53	− 2	—	—	—	—	—
Hungry Horse		57·9	53	i 9 55	− 1	—	—	—	—	—
Tashkent		57·9	298	i 9 57	+ 1	i 18 4	+ 9	—	—	—
Obi-garm		59·3	296	i 10 2	− 4	—	—	—	—	—
Berkeley	Z.	59·5	66	e 10 8	+ 1	—	—	e 12 52	PP	—
Kiruna		59·8	342	i 10 8a	− 1	e 18 7	−13	e 12 24	PP	e 28·2
Stalinabad		59·9	296	i 10 9?	− 1	e 18 9?	−12	—	—	—
Reno	Z.	60·0	63	e 10 10	− 1	—	—	—	—	—
Lick		60·3	66	i 10 11	− 2	—	—	i 10 22	pP	—
Samarkand		60·3	298	10 12	− 1	—	—	—	—	—
New Delhi		60·9	282	e 10 16	− 1	e 18 31	− 3	—	—	—
Fresno	Z.	61·8	66	e 10 31k	+ 8	—	—	—	—	—
Scoresby Sund		62·3	359	i 10 26	0	—	—	—	—	30·8
Tinemaha	Z.	62·5	65	e 10 32	+ 4	—	—	—	—	—
China Lake	Z.	63·7	65	e 10 35	− 1	—	—	i 10 42	pP	—
Moscow		64·1	226	i 10 38	0	—	—	—	—	—
Pasadena		64·5	67	e 10 40	− 1	—	—	e 10 49	pP	—
Mary		64·7	300	i 10 41	− 1	e 19 27	+ 5	—	—	—
Helsinki		65·0	335	e 10 52	+ 8	e 19 21	− 5	—	—	e 33·8
Boulder City		65·3	63	e 10 46	0	—	—	i 11 18	PcP	—
Palomar	Z.	65·8	67	i 10 47	− 2	—	—	i 10 57	pP	—
Ashkabad		66·5	301	i 10 55	+ 1	e 19 51	+ 7	—	—	—
Kizyl-Arvat		67·0	304	10 58	+ 1	—	—	—	—	—
Upsala		67·2	338	i 10 58a	0	e 19 55	+ 3	e 20 24	PS	e 33·8
Djakarta		67·6	232	—	—	e 14 41	PP	—	—	—
Hyderabad	E.	67·6	272	—	—	e 21 3	+66	—	—	—
Bergen	Z.	69·5	344	11 12	0	—	—	—	—	—
Poona		69·9	276	i 11 16	+ 1	20 37	+13	11 36	PcP	—
Tucson		70·3	63	e 11 16	− 1	—	—	—	—	—
Bombay	E.	70·4	277	i 11 19	+ 1	e 20 32	+ 2	—	—	—
Piatigorsk		70·4	315	11 17	− 1	—	—	—	—	—
Kirovobad		71·2	311	i 11 24	+ 1	—	—	—	—	—
Tiflis		71·3	312	11 24	+ 1	—	—	—	—	—
Goris		72·1	308	—	—	19 53	−57	—	—	—
Copenhagen		72·2	339	e 11 30	+ 1	—	—	—	—	34·8
Sotchi		72·4	316	i 11 30	0	20 56	+ 3	—	—	—
Erevan		72·6	311	i 11 32	+ 1	i 21 0	+ 4	—	—	—
Kirkland Lake		73·8	34	e 11 34	− 4	—	—	—	—	—
Lwow		73·8	330	i 11 31	− 7	e 20 58	−11	—	—	—
Yalta		74·2	320	11 41	+ 1	21 14	0	—	—	—
Kishinev		74·4	325	11 41	− 1	—	—	—	—	—
Brisbane	Z.	74·6	181	e 11 41	− 2	—	—	—	—	—
Potsdam		75·0	337	i 11 47a	+ 2	—	—	—	—	e 37·8
Uzhgorod		75·4	329	e 11 49	+ 2	—	—	—	—	—
Raciborzu		75·6	333	e 11 49	+ 1	—	—	e 11 59	PcP	—

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.
Skalnate Pleso		75·7	331	e 11 51	+ 2	e 21 34	+ 4	e 26 4	SS	—
Collmberg	Z.	76·0	336	i 11 51	0	—	—	—	—	—
Jena		76·7	337	e 11 55	0	—	—	e 12 4	pP	—
Prague		76·7	335	i 11 55	0	e 21 34	– 7	e 14 26	PP	e 39·8
Fayetteville		76·9	50	i 11 56	0	—	—	—	—	—
Cheb		77·3	337	e 12 8	+10	e 21 59	+11	e 22 8	PS	—
Ottawa		77·8	34	11 59	– 2	21 52	– 1	—	—	40·1
Shawinigan Falls	N.	77·8	31	e 12 1	0	—	—	—	—	—
Rathfarnham C.	Z.	78·2	349	e 32 14	?	—	—	—	—	—
Cleveland	Z.	78·7	39	i 11 59k	– 7	—	—	i 12 6	P	—
Kew		79·0	344	e 32 8	?	—	—	—	—	e 44·3
Istanbul		79·2	321	e 12 10	+ 2	e 22 10	+ 2	—	—	—
Karlsruhe	Z.	79·3	338	e 12 9	0	—	—	—	—	—
Stuttgart		79·3	337	e 12 10a	+ 1	—	—	—	—	e 40·8
Belgrade		79·4	328	i 12 10a	+ 1	e 22 14	+ 4	e 12 26	pP	e 48·1
Strasbourg		79·9	338	i 12 14	+ 2	e 22 26	+10	i 12 27	pP	e 37·8
Zürich		80·8	338	i 12 17a	0	—	—	—	—	—
Basle		80·9	338	e 12 17k	0	—	—	—	—	—
Morgantown		80·9	40	i 12 17	0	—	—	e 12 34	pP	—
Paris		80·9	342	i 12 19	+ 2	e 22 36	+10	i 23 37	PPS	e 41·8
Triest		80·9	334	i 12 17	0	e 22 21	– 5	—	—	—
Harvard		81·8	32	e 12 21	– 1	—	—	—	—	e 42·2
Ksara		81·8	312	i 12 13	– 9	i 23 27	PS	—	—	—
Weston		82·0	32	i 12 22	– 1	e 22 36	– 1	—	—	—
Palisades		82·2	35	e 12 23	– 1	e 35 21	Q	i 12 33	pP	—
Florence		83·3	334	i 12 31	+ 1	—	—	—	—	i 54·2
Clermont-Ferrand		83·7	340	—	—	i 22 32	–22	—	—	—
Rome		84·7	332	12 37	0	23 7	+ 3	—	—	—
Messina		86·9	329	e 12 48	0	e 24 41	PPS	—	—	e 47·4
Helwan		87·3	313	12 53	+ 3	33 16	SSS	e 13 43	?	—
Alicante		91·5	340	13 10	0	24 20	+12	—	—	e 47·3
Tamanrasset	Z.	104·5	330	17 33	?	e 18 37	PP	e 17 55	PKP	—
La Paz		133·7	63	19 22	[+ 3]	i 38 19	P′P′	21 58	PP	—

Additional readings :—
Resolute Bay iZ = 9m.3s., eSS = 19m.48s.
Seattle i = 10m.4s., e = 10m.19s.
Kiruna iZ = 10m.41s. and 11m.52s., eZ = 13m.1s., eE = 18m.29s., eZ = 18m.58s., iScSN = 20m.8s., eN = 22m.54s., eE = 22m.59s., eZ = 24m.55s., eQEN = 25·2m.
China Lake iZ = 10m.45s.
Upsala eN = 22m.10s.
Poona PPE = 13m.58s., eE = 20m.3s.
Raciborzu ePE = 11m.54s.
Skalnate Pleso e = 12m.9s., eN = 12m.17s., e = 12m.28s., 13m.0s., and 17m.59s., eN = 21m.8s.
Jena eN = 12m.32s.
Prague e = 12m.2s., 12m.8s., 12m.25s., 12m.48s., 13m.11s., and 14m.4s.
Strasbourg e = 12m.37s. and 12m.50s.
Paris i = 12m.27s., 12m.35s., 22m.47s., 23m.19s., 23m.46s., and 25m.42s.
Palisades i = 26m.14s.
Tamanrasset ePKKPZ = 29m.58s.
Long waves were also recorded at Bermuda, Christchurch, De Bilt, and Pavia.

Nov. 6d. 16h. 40m. 6s. Epicentre 47°·5N. 153°·9E. (as at 14h.).

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	7·2	238	1 48	– 1	3 8	– 5	—	—	—
Abasiri	7·6	246	1 58	+ 3	3 35	+12	—	—	—
Kusiro	8·1	240	2 1	– 1	3 34	– 1	—	—	—
Wakkanai	8·7	261	2 5	– 5	—	—	—	—	—
Asahigawa	8·9	249	2 23	+11	—	—	—	—	—
Urakawa	9·5	240	2 22	+ 2	4 11	+ 1	—	—	—
Kiyuchi	9·8	23	i 2 41	+17	—	—	—	—	—
Sapporo	9·9	248	2 29	+ 4	4 20	0	—	—	—
Muroran	10·5	245	2 41	+ 6	5 0	+25	—	—	—
Suttsu	10·7	249	2 28	–10	4 0	–39	—	—	—

Continued on next page.

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1951 932

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mori	10 9	245	2 39	– 1	4 58	+14	—	—	—
Hatinohe	11 3	236	2 44	– 2	4 45	– 9	—	—	—
Aomori	11·5	239	2 49	+ 1	5 24	+25	—	—	—
Miyako	11·7	232	2 42	– 9	4 45?	–19	—	—	—
Morioka	12·1	234	2 54	– 3	4 54	–20	—	—	—
Mizusawa	12·5	232	3 1	– 1	5 18	– 5	—	—	8·6
Akita	12·7	237	3 5	0	5 27	– 1	—	—	—
Sendai	13·3	231	3 8	– 5	5 20	–22	—	—	—
Yamagata	13·5	232	3 16	+ 1	6 11	+24	—	—	—
Hukusima	13·9	230	3 22	+ 1	—	—	—	—	—
Inawasiro	14·2	231	3 30	+ 6	5 57	– 7	—	—	—
Onahama	14·3	227	3 27	+ 1	5 57	– 9	—	—	—
Niigata	14·5	234	3 50	+22	6 30	+19	—	—	—
Shirakawa	14·5	229	3 20	– 8	6 0	–11	—	—	—
Aikawa	14·9	236	3 30	– 4	6 22	+ 2	—	—	—
Mito	14·9	227	3 36	+ 2	6 31	+11	—	—	—
Utunomiya	15·1	229	3 33	– 3	—	—	—	—	—
Tyosi	15·2	224	3 40	+ 2	—	—	—	—	—
Takada	15·5	234	3 40	– 2	6 59	+15	—	—	—
Kumagaya	15·6	229	3 45k	+ 2	6 33	– 4	—	—	—
Maebasi	15·6	230	3 44	+ 1	—	—	—	—	—
Tokyo	15·8	227	3 45k	0	6 23	–19	—	—	—
Nagano	15·9	233	3 48	+ 1	6 54	+10	—	—	—
Oiwake	15·9	231	3 48	+ 1	—	—	—	—	—
Titibu	15·9	229	3 47	0	—	—	—	—	—
Matusiro	16·0	232	3 36a	–12	6 31	–15	—	—	—
Vladivostok	16·1	262	i 3 48	– 1	—	—	—	—	—
Wazima	16·1	237	3 49	0	6 45	– 4	—	—	—
Yokohama	16·1	227	3 45	– 4	—	—	—	—	—
Matumoto	16·3	232	3 54	+ 2	7 6	+13	—	—	—
Kohu	16·4	230	3 57	+ 4	7 34	+38	—	—	—
Mera	16·4	225	3 37	–16	6 19	–37	—	—	—
Toyama	16·4	235	3 52	– 1	7 5	+ 9	—	—	—
Ajiro	16·6	227	3 54	– 2	—	—	—	—	—
Misima	16·6	227	3 55	– 1	7 20	+20	—	—	—
Osima	16·7	226	4 1	+ 4	6 56	– 7	—	—	—
Kanazawa	16·8	236	3 58	0	7 7	+ 2	—	—	—
Takayama	16·8	234	3 54	– 4	—	—	—	—	—
Iida	16·9	231	4 1	+ 2	7 23	+16	—	—	—
Shizuoka	17·1	228	4 2	0	7 24	+12	—	—	—
Hukui	17·4	238	4 10	+ 4	7 24	+15	—	—	—
Omaesaki	17·5	229	4 6	– 1	7 20	– 1	—	—	—
Gihu	17·6	233	4 12	+ 4	7 34	+11	—	—	—
Hamamatu	17·6	229	3 57	–11	7 46	+23	—	—	—
Nagoya	17·7	233	4 8	– 2	7 34	+ 8	—	—	—
Hatidyozima	17·9	224	4 14	+ 2	8 16	+46	—	—	—
Hikone	18·0	234	4 11	– 2	7 47	+15	—	—	—
Kameyama	18·2	233	4 17k	+ 1	7 52	+15	—	—	—
Tu	18·2	233	4 19	+ 3	7 30	– 7	—	—	—
Kyoto	18·4	236	4 20	+ 2	8 5	+24	—	—	—
Owase	18·9	232	4 24	0	7 59	+ 6	—	—	—
Kobe	19·0	236	4 27a	+ 1	8 15	+20	—	—	—
Saigo	19·0	240	4 30	+ 4	—	—	—	—	—
Mitchell Field	19·5	63	i 4 35	+ 4	i 8 11	+ 5	—	—	—
Yonago	19·5	239	4 35	+ 4	8 14	+ 8	—	—	—
Siomisaki	19·6	233	4 22	–10	—	—	—	—	—
Takamatu	19·9	237	4 36a	0	8 14	– 1	—	—	—
Muroto	20·6	234	4 44a	+ 1	8 32	+ 3	—	—	—
Kôti	20·7	235	4 45	+ 1	8 41	+10	—	—	—
Hirosima	20·8	240	4 43	– 2	8 35	+ 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.
Matuyama		21·0	239	4 41	– 6	8 43	+ 6	—	—	—
Uwazima		21·5	239	4 56	+ 4	9 2	+15	—	—	—
Simidu		21·6	237	4 57	+ 3	8 57	+ 8	—	—	—
Ooita		22·1	239	5 1a	+ 2	9 7	+ 9	—	—	—
Hukuoka		22·5	242	5 4a	+ 2	8 48	–17	—	—	—
Saga		22·8	242	5 9	+ 4	—	—	—	—	—
Kumamoto		22·9	240	5 5	– 1	9 10	– 3	—	—	—
Miyazaki		23·1	236	5 13k	+ 5	9 26	+10	—	—	—
Nagasaki		23·4	241	5 15	+ 4	9 35	+14	—	—	—
Kagosima		23·9	238	5 19	+ 3	—	—	—	—	—
Tomie		24·2	243	5 20	+ 1	—	—	—	—	—
Yakusima		24·8	237	5 22	– 3	9 59	+13	—	—	—
Zi-ka-wei		29·7	250	i 6 9a	– 1	e 11 6	0	—	—	—
Nanking		30·8	254	i 6 19	– 1	i 11 20	– 3	—	—	—
Irkutsk		31·8	299	6 28	0	—	—	—	—	—
College		35·2	39	6 56	– 2	12 30	– 1	—	—	—
Sitka		42·5	50	i 8 1	+ 2	e 14 24	+ 2	—	—	—
Manila		42·7	232	e 7 58	– 2	e 14 30	+ 6	i 9 40	PP	—
Honolulu		46·5	107	e 8 34	+ 3	i 15 16	– 3	—	—	—
Resolute Bay		50·0	19	i 8 57a	– 1	e 16 13	+ 4	i 11 23	PP	—
Przhevalsk		51·7	294	9 12	+ 1	—	—	—	—	—
Almata II		51·9	296	e 9 12	0	—	—	—	—	—
Almata		52·1	296	i 9 15	+ 1	—	—	—	—	—
Victoria		52·7	57	9 16	– 2	16 34	–12	9 28	pP	22·2
Rybach'e		53·1	296	i 9 21	0	—	—	—	—	—
Sverdlovsk		53·7	317	i 9 25	– 1	i 17 6	+ 7	—	—	—
Frunse		53·8	297	i 9 27	+ 1	—	—	—	—	—
Seattle		53·8	57	e 9 29k	+ 3	e 17 14	+13	10 48	PcP	—
Andijan		56·4	296	e 9 45	0	—	—	—	—	—
Fergana		57·0	296	e 9 48	– 2	—	—	—	—	—
Tchimkent		57·1	299	i 9 54	+ 4	e 18 14	PPS	—	—	—
Calcutta	E.	57·4	269	i 9 47a	– 6	i 17 59	+10	12 1	PP	27·5
Shasta Dam		57·7	64	i 9 53	– 2	—	—	—	—	—
Hungry Horse		57·9	53	i 9 58	+ 2	—	—	—	—	—
Tashkent		57·9	298	i 9 54?	– 2	i 18 14?	+19	—	—	—
Garm		58·7	296	i 10 1	– 1	—	—	—	—	—
Dehra Dun	N.	59·2	283	e 10 0	– 5	e 17 42	–30	—	—	31·6
Obi-garm		59·3	296	10 1	– 5	—	—	—	—	—
Saskatoon		59·3	45	10 9	+ 3	18 15	+ 1	19 44	ScS	29·9
Berkeley		59·5	66	e 10 6k	– 1	e 18 18	+ 2	e 22 18	SS	28·0
Kiruna		59·8	342	i 10 6a	– 3	i 18 30	+10	i 11 1	PcP	i 29·4
Stalinabad		59·9	296	i 10 9	– 1	—	—	—	—	—
Reno		60·0	63	e 10 12k	+ 1	e 18 8	–15	—	—	e 24·9
Santa Clara		60·1	66	i 10 15	+ 4	i 18 17	– 7	—	—	e 25·0
Lick		60·3	66	e 10 11a	– 2	e 18 26	0	—	—	e 25·0
Samarkand		60·3	298	10 11	– 2	—	—	—	—	—
New Delhi		60·9	282	i 10 15k	– 2	i 18 29	– 5	11 8	PcP	29·3
Fresno		61·8	66	e 10 22a	– 1	e 18 48	+ 2	e 22 28	SS	—
Scoresby Sund		62·3	359	i 10 24	– 2	i 18 54	+ 2	i 12 52	PP	27·9
Pulkovo		63·6	332	e 10 33	– 2	i 19 16	+ 8	—	—	—
China Lake		63·7	65	e 10 32	– 4	e 19 9	– 1	i 10 48	pP	—
Moscow		64·1	326	i 10 38	0	19 23	+ 9	—	—	—
Pasadena		64·5	67	i 10 39	– 2	i 19 16	– 3	i 10 54	pP	i 29·6
Mary		64·7	300	e 10 40	– 2	19 24	+ 2	—	—	—
Helsinki		65·0	335	e 10 43	– 1	e 19 22	– 4	e 13 9	PP	e 31·4
Riverside	Z.	65·1	67	e 10 41	– 4	e 39 34	P'P'	i 10 56	pP	—
Boulder City		65·3	63	e 10 26	–20	—	—	e 10 44	pP	—
Palomar	Z.	65·8	67	e 10 46	– 3	i 19 34	– 1	—	—	—
Ashkabad		66·5	301	i 10 54	0	19 50	+ 6	—	—	—
Kizyl-Arvat		67·0	304	i 11 0	+ 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.
Upsala		67·2	338	e 10 56?	– 2	e 19 56?	+ 4	e 15 13	PPP	e 29·9
Djakarta		67·6	232	e 10 55	– 6	i 19 52	– 5	—	—	—
Hyderabad		67·6	272	i 11 0	– 1	i 19 59	+ 2	13 33	PP	31·9
Apia		68·3	143	e 11 8	+ 3	e 19 36	–30	—	—	e 19·9
Reykjavik		68·7	358	e 11 7	0	e 20 18	+ 8	e 21 11	ScS	32·4
Bergen		69·5	344	i 11 11a	– 1	i 20 12	– 8	21 18	PPS	32·1
Poona		69·9	276	i 11 15	0	i 20 25	+ 1	11 36	PcP	33·2
Shemakla		70·1	310	11 6	–10	—	—	—	—	—
Ivigtut		70·2	12	e 11 9	– 8	—	—	i 11 17	P	32·8
Tucson		70·3	63	e 11 15	– 2	i 20 30	+ 1	—	—	—
Bombay	E.	70·4	277	e 11 17	– 1	i 20 30	0	i 14 1	PP	33·4
Piatigorsk		70·4	315	i 11 16	– 2	—	—	—	—	—
Kirovobad		71·2	311	11 22	– 1	20 42	+ 2	—	—	—
Tiflis		71·3	312	e 11 23	0	20 45	+ 4	—	—	—
Gori		71·4	313	11 28	+ 4	—	—	—	—	—
Tsikhlis-Dzhvari		72·0	313	11 30	+ 2	20 53	+ 4	—	—	—
Goris		72·1	308	11 27	– 1	—	—	—	—	—
Lincoln		72·1	49	i 11 28	0	e 20 41	– 9	—	—	—
Zugdidi		72·1	314	e 11 32	+ 4	—	—	—	—	—
Copenhagen		72·2	339	e 11 29	0	i 20 57	+ 6	—	—	33·9
Akhalkalaki		72·3	313	e 11 31	+ 2	—	—	—	—	—
Leninakan		72·4	312	11 42?	+12	21 14?	+21	—	—	—
Sotchi		72·4	316	11 32	+ 2	—	—	—	—	—
Kodaikanal	E.	73·4	268	i 11 27?	– 9	i 21 5	0	14 18	PP	34·4
Aberdeen	E.	73·8	347	i 11 49	+11	i 21 14	+ 5	i 21 59	PS	—
Kirkland Lake	Z.	73·8	34	i 11 37	– 1	—	—	e 11 34	P	—
Lwow		73·8	330	e 11 36	– 2	e 21 9	0	—	—	—
Colombo	E.	74·2	263	11 40	0	21 13	– 1	—	—	47·9
Yalta		74·2	320	11 39	– 1	21 17	+ 3	—	—	—
Kishinev		74·4	325	11 40	– 2	i 21 14	– 4	—	—	—
Brisbane		74·6	181	i 11 41a	– 2	i 21 12	– 6	i 12 3	PcP	e 40·9
Lubbock		74·6	57	11 45	+ 2	21 20	+ 2	—	—	—
Potsdam		75·0	337	i 11 47a	+ 2	i 21 23	0	i 14 31	PP	e 33·9
Uzhgorod		75·4	329	i 11 51	+ 4	—	—	—	—	—
Raciborzu		75·6	333	e 11 48	0	e 22 14	PS	e 11 52?	PcP	e 37·9
Skalnate Pleso		75·7	331	e 11 52	+ 3	e 21 34	+ 4	e 14 33	PP	e 35·9
Durham		76·0	346	i 11 50	– 1	i 21 40	+ 6	i 12 4	PcP	—
Witteveen	Z.	76·2	341	e 11 54	+ 2	—	—	—	—	—
Sonneberg		76·6	337	e 11 59	+ 5	e 21 48	+ 8	e 15 0?	PP	e 35·9
Jena		76·7	337	e 11 54	– 1	e 21 43	+ 2	e 14 55	PP	e 35·9
Prague		76·7	335	i 11 56a	+ 1	e 21 40	– 1	i 12 7	PcP	e 35·9
Fayetteville		76·9	50	i 11 53	– 3	e 20 56	–47	—	—	—
De Bilt		77·2	341	i 11 58	+ 1	e 21 52	+ 5	i 22 12	PS	e 34·9
Cheb		77·3	337	11 58	0	e 21 48	0	e 14 58	PP	e 32·0
Budapest		77·5	331	i 12 3	+ 4	21 51	+ 1	12 10	PcP	38·4
Ogyalla		77·5	332	e 12 5	+ 6	e 21 55	+ 5	e 15 10	PP	—
Bucharest		77·6	325	e 12 3	+ 3	e 21 50	– 1	e 14 50	PP	38·9
Vienna		77·7	333	i 12 2	+ 2	e 21 56	+ 4	e 15 0	PP	—
Kecskemet		77·8	331	e 12 12	+11	—	—	—	—	—
Ottawa		77·8	34	11 58	– 3	21 48	–5	15 3	PP	—
Shawinigan Falls	N.	77·8	31	e 11 59	– 2	21 53	0	14 58	PP	—
Seven Falls	E.	78·0	30	e 12 4	+ 2	21 54	– 1	—	—	33·5
Rathfarnham Castle		78·2	349	i 12 14	+11	e 22 15	+18	e 22 30	PS	e 43·9
Timisoara		78·3	328	i 12 10k	+ 7	e 22 4	+ 5	e 14 59	PP	e 39·9
Cleveland		78·7	39	i 12 4k	– 2	i 21 56	– 7	i 12 34	PcP	—
Kew		79·0	344	i 12 8	+ 1	i 22 0	– 6	e 12 39	PcP	e 44·9
Istanbul		79·2	321	e 12 11	+ 3	i 22 12	+ 4	e 22 20	SKS	—
Karlsruhe		79·3	338	e 12 10	+ 1	e 22 12	+ 3	—	—	e 35·9
Stuttgart		79·3	337	e 12 8	– 1	e 22 14	+ 5	e 15 14	PP	e 38·9
Belgrade		79·4	328	e 12 9	0	i 22 17	+ 7	i 15 17	PP	e 31·0

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vermont		79·5	33	e 12 7	– 3	i 22 11	0	—	—	—
Strasbourg		79·9	338	e 12 12k	0	i 22 15	– 1	e 15 2	PP	e 35·9
Sofia		80·1	325	i 12 18	+ 5	i 22 23	+ 5	15 23	PP	e 31·4
New Kensington		80·2	39	e 12 16	+ 2	i 21 18	–61	—	—	—
Pittsburgh		80·2	39	e 12 9	– 5	i 22 17	– 2	i 12 12	P	—
Pennsylvania		80·8	37	i 12 17	0	e 22 23	– 2	e 15 22	PP	—
Zürich		80·8	338	e 12 17a	0	e 22 24	– 1	e 15 32	PP	—
Basle		80·9	338	e 12 16	– 1	e 22 21	– 5	—	—	—
Morgantown		80·9	40	i 12 19	+ 2	e 22 36	+10	—	—	—
Paris		80·9	342	i 12 18	+ 1	i 22 27	+ 1	i 12 25	PcP	e 38·9
Triest		80·9	334	i 12 15a	– 2	e 22 23	– 3	12 21	PcP	e 41·8
Chur		81·0	336	e 12 17	– 1	e 22 30	+ 3	e 12 22	PcP	e 37·6
Riverview		81·0	183	i 12 20k	+ 2	i 22 25	– 2	i 23 18	PS	34·2
Neuchatel		81·6	338	e 12 21	0	e 22 30	– 3	—	—	—
Harvard		81·8	32	e 12 21	– 1	i 22 34	– 1	e 15 22	PP	—
Ksara		81·8	312	e 12 22	0	i 23 35?	PPS	—	—	—
Weston		82·0	32	i 12 22	– 1	e 22 34	– 3	—	—	—
Palisades		82·2	35	i 12 22	– 2	i 22 34	– 5	i 12 38	pP	—
City College, N.Y.		82·3	35	e 12 25	0	i 28 45	SS	—	—	—
Fordham		82·3	35	12 27	+ 2	22 36	– 4	—	—	—
Halifax		82·5	26	e 12 30	+ 4	e 22 42	0	23 42	PPS	38·7
Pavia		82·6	336	e 12 28	+ 2	i 22 50	+ 7	e 15 34	PP	e 41·5
Bologna	Z.	82·7	335	e 12 32	+ 5	—	—	—	—	—
Washington		82·7	38	i 12 29	+ 2	e 22 5	–39	—	—	—
Guadalajara		83·2	67	e 12 57	+28	e 22 57	ScS	—	—	—
Florence		83·3	334	e 12 31	+ 1	e 22 48	– 2	—	—	—
Clermont-Ferrand		83·7	340	i 12 34	+ 2	e 23 6	+12	e 15 54	PP	—
Athens		84·0	322	e 12 33	0	i 22 58	+ 1	—	—	—
Rome		84·7	332	i 12 36a	– 1	23 7	+ 3	i 13 9	pP	40·3
Columbia		85·1	44	i 12 42	+ 3	i 23 4	– 4	—	—	—
Auckland	N.	86·0	163	e 12 24	–19	i 23 4	[– 3]	i 24 11	PS	35·8
Perth		86·2	212	e 12 47	+ 3	23 19	0	29 2	SS	i 43·5
Tacubaya		86·8	65	i 12 38k	– 9	e 23 18	[+ 5]	i 13 5	PcP	—
Messina		86·9	329	i 12 49a	+ 1	23 23	– 3	16 15	PP	—
Helwan		87·3	313	e 12 49	– 1	23 18	[+ 2]	25 42	PPS	—
Puebla		87·6	64	e 13 13	+22	e 23 20?	[+ 2]	e 15 7	PP	e 42·3
Barcelona		88·0	339	e 13 54	+61	23 24	[+ 3]	16 53	PP	e 40·3
Vera Cruz		88·8	63	e 12 45k	–12	e 23 25	[– 1]	—	—	—
Cobb River	E.	89·8	166	e 13 4	+ 2	e 23 53	0	—	—	—
Wellington		90·3	165	13 2	– 2	i 23 56	– 1	16 9	PP	41·9
Toledo		90·8	343	i 13 9	+ 3	i 24 5	+ 3	17 24	PP	47·2
Kaimata	N.E.	91·0	168	e 13 22	+15	e 24 2	– 1	—	—	—
Merida		91·2	57	e 13 0	– 8	e 23 47	[+ 7]	e 28 54	SS	—
Alicante		91·5	340	e 13 14	+ 4	i 24 24	+16	17 0	PP	e 43·8
Christchurch		92·1	167	13 16	+ 4	24 14	+ 1	e 17 9	PP	e 44·2
Algiers Univ.	Z.	92·2	337	i 13 14	+ 1	e 25 36	PS	e 16 54	PP	e 40·9
Lisbon		92·8	347	12 48a	–28	i 23 59	[+10]	18 37	PPP	43·0
Bermuda		93·3	33	i 13 22	+ 4	i 24 25	+ 1	i 17 2	PP	—
Granada		93·3	342	13 5k	–13	23 2	{–64}	16 20	PP	47·1
Almeria		93·4	341	e 13 17	– 1	24 12	–12	16 59	PP	50·5
Malaga		93·9	343	e 13 7	–14	e 24 26	– 3	—	—	49·9
Tamanrasset	Z.	104·5	330	e 14 10	+ 2	e 27 43	PS	i 17 57	PKP	50·9
San Juan		105·2	40	e 18 31	PP	—	—	—	—	—
Galerazamba		107·4	51	i 18 53	PP	e 30 17	PPS	i 21 53	PPP	45·9
Fort de France		110·6	37	e 18 56	[+22]	i 28 48	PS	—	—	—
Chinchina		112·0	55	i 20 15	PP	i 29 54	PS	—	—	—
Bogota	E.	113·2	54	i 19 48	PP	i 24 2	?	i 35 18	SS	—
Tananarive		114·7	269	e 22 45	PPP	e 29 27	PS	35 18	SS	62·9
Huancayo		125·8	67	e 19 6	[+ 2]	e 26 12	[+ 4]	e 21 11	PP	e 52·4
Pretoria	Z.	132·4	278	i 19 44?	[+27]	—	—	—	—	—
La Paz		133·7	63	i 19 24	[+ 5]	i 26 10	[–19]	i 22 16	PP	65·2
Kimberley	Z.	136·7	277	i 19 32	[+ 8]	—	—	—	—	—
La Plata		153·2	74	20 12	PKP,	27 54	[+56]	23 48	PP	70·5

For Notes see next page.

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Additional readings :—
Manila iPPP =10m.8s.
Resolute Bay iZ =9m.30s.
Victoria PcP =9m.50s., PP =11m.18s., SS =20m.22s.
Seattle iP =9m.36s., ePP =11m.37s., ePPP =12m.56s., ePcS =14m.35s., and other unidentified readings.
Calcutta PPPE =13m.31s., PcSE =14m.39s., PPSE =18m.22s., SSE =21m.51s.
Saskatoon SS =21m.58s., Q =27m.6s.
Berkeley eZ =11m.4s., eQEN =25m.6s.
Kiruna iScSE =20m.5s., iSSE =22m.17s., iSSSE =24m.50s., and other i readings.
New Delhi PPPN =14m.3s., PcSN =15m.0s., PSN =19m.45s., ScSN =20m.13s., SSN = 22m.34s., SSSN =25m.5s., QN =25m.16s.
China Lake iZ =10m.36s. and 11m.1s., ePKP,PKPZ =39m.27s.
Pasadena iPcPZ =11m.7s., ePPZ =13m.27s., iQN =26·3m.
Helsinki ePPPN =14m.43s., eSKSN =20m.46s.
Riverside iZ =10m.45s.
Palomar iZ =10m.50s. and 10m.57s.
Upsala e =14m.13s., eE =14m.30s., iPSN =20m.23s., eScSE =20m.56s.?, eSSE = 24m.19s., eSSN =24m.24s., eSSSN =27m.8s., eSSS?E =27m.27s.
Hyderabad PSE =21m.3s., SSE =24m.38s.
Reykjavik iPZ =11m.10s., eN =27m.42s.
Bergen iSSEN =25m.0s.?, iN =28m.20s., eE =30m.12s.
Poona PPN =13m.57s., PPPN =15m.46s., PSN =20m.57s., PPSN =21m.8s., SSN = 24m.57s., SSSN =28m.11s., QN =29m.53s.
Bombay PSE =20m.58s., PPSE =21m.10s., SSE =25m.2s., QE =30m.10s.
Copenhagen i =11m.33s. and 21m.34s.
Kodaikanal SSE =25m.45s., QE =30m.54s.
Aberdeen iE =13m.34s., 16m.22s., 23m.9s., and 26m.9s.
Brisbane iScSN =21m.48s., iSSN =25m.55s.
Potsdam iP =11m.51s., iPPN =14m.35s., iPPPNZ =16m.24s., iPPPE =16m.30s., i = 18m.20s., iSE =21m.27s., iPSN =22m.6s.
Raciborzu iE =12m.14s., eE =12m.52s.?, ePPN =14m.40s., ePPPE =16m.36s., ePPSN = 22m.22s.
Skalnate Pleso e =12m.25s., eN =13m.44s., e =15m.28s., ePS =22m.13s., eSS =26m.30s., eSSS =29m.54s.
Durham iScSEN =22m.11s., iPSN =22m.25s., iE =26m.45s., iN =27m.3s.
Sonneberg eE =13m.1s., eSE =21m.53s.
Jena iPZ =11m.58s., eEN =12m.37s., eN =12m.58s., ePPN =14m.59s., ePPP?E = 17m.11s., eS?E =21m.33s.?, eS?N =21m.36s., ePS?N =22m.17s., ePS?E =22m.41s.
Prague ePP =14m.58s., ePPP =16m.45s., ePS =22m.14s., eSS =26m.43s., eSSS = 30m.8s. and other unidentified e readings.
De Bilt eSS =27m.26s.
Cheb ePPP? =16m.50s., eSE =21m.37s., ePPS?N =22m.52s., eSSE =26m.16s., eSSSE = 29m.34s., and other unidentified e readings.
Budapest iN =12m.26s., PPN =14m.57s., PPE =15m.3s., SE =21m.54s., iSKSN = 22m.9s., iE =22m.16s., PSN =22m.34s., PPSE =22m.54s., SSEN =26m.54s., eN =27m.44s., SSSN =30m.34s., eSSSE =31m.9s.
Ogyalla e =12m.53s., ePPP =17m.18s., e =21m.27s., ePSN =22m.39s., eSSS =30m.48s.
Bucharest ePPPN =16m.35s., eSE =21m.59s., iPSN =22m.42s.
Ottawa i =12m.1s., PPP =16m.52s., ScS =22m.14s., SS =27m.6s., SSS =30m.30s.
Shawinigan Falls iN =12m.3s., SSN =27m.1s., SSSN =30m.56s.
Rathfarnham Castle eEN =13m.29s. ,18m.14s., and 26m.12s., eSSSEN =30m.54s.
Timisoara eSE =22m.9s.?, ePSE =22m.35s.?, eSSE =26m.48s.
Kew ePPP =16m.46s., ePS =22m.28s. and other e readings.
Karlsruhe iNZ =12m.13s., eZ =12m.26s.
Stuttgart iP =12m.13s., eZ =12m.45s., e =13m.34s., 18m.18s., and 19m.10s.
Belgrade iZ =12m.12s., eNW =14m.53s. and 18m.33s., eNE =24m.24s. and 28m.33s.
Strasbourg ePP =15m.20s., ePPP =17m.12s., iPS =23m.1s., eSS =27m.15s., and other unidentified i readings.
Sofia PSEN =23m.7s.
Pennsylvania iN =13m.2s., eNZ =13m.46s., eSS?N =27m.19s.
Basle e =21m.54s. and 22m.37s.
Paris iPP =15m.17s., iPPP =17m.7s., iPPPP =18m.47s., iScS =22m.45s., iPS =23m.9s., iSPP =23m.33s., and numerous other i readings.
Triest iSKS? =22m.39s., iPS =23m.30s., iPPS =24m.15s., eSS =27m.37s.
Riverview iNZ =1?m.37s. iE =22m.30s., iN =22m.35s., iE =22m.53s., SSN =27m.45s.
Harvard iPPP =17m.0s., iScS =23m.6s., i =25m.43s., eSS =27m.54s., iPKKP =30m.35s.
Halifax S =22m.22s., SS =27m.48s.
Pavia e =14m.0s. and 19m.5s., i =25m.44s., eSS =31m.51s.
Guadalajara e =13m.14s., 24m.40s., and 26m.2s.
Clermont-Ferrand i =12m.40s., e =19m.0s.
Athens e =22m.55s., i =23m.10s. and 24m.1s.
Rome PP =15m.59s., SSS =32m.35s.
Auckland iN =13m.10s., SSN =29m.2s., eSSS?N =33m.9s.
Perth i =22m.41s.
Tacubaya e =23m.29s. and 27m.7s.
Helwan PSN =25m.12s.

Continued on next page.

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Barcelona PPP =19m.6s., PS =24m.25s., SS =29m.16s.
Wellington e =20m.56s., i =22m.4s., iSKS =23m.23s., PS =24m.56s., eSS =29m.36s., iPKKP? =30m.4s., SSS =33m.5s., eQ =38·1m.
Toledo e =13m.55s., 16m.28s., and 19m.16s.
Alicante PPP =19m.10s., iPS =25m.32s., PPS =26m.8s., SS =30m.24s., SSS =34m.26s., Q =39m.4s.
Christchurch eEN =14m.26s., i?Z =14m.31s., ePPPNZ =19m.9s., SKS =23m.40s., PS =25m.14s., eSS =30m.29s., eSSSEN =34m.14s., eQEN =38m.24s.
Algiers Univ. eZ =16m.4s.
Lisbon pP?N =12m.56s., PSNZ =25m.20s., SSNZ =30m.27s., SSP =30m.32s., SSS = 33m.53s.
Bermuda iPS =25m.34s., iSS =30m.42s.
Malaga e =13m.16s. and 13m.33s.
Tamanrasset eZ =17m.26s., iPPZ =18m.34s., ePPPZ =20m.51s., eZ =21m.43s., ePKKPZ =29m.53s., eZ =30m.21s., eSSZ =33m.51s.
Galerazamba eSSEN =35m.44s.
Tananarive e =31m.12s. and 38m.21s., eSSS =40m.9s.
Huancayo ePP? =23m.42s., e =24m.18s., eSKKS? =27m.26s., ePS? =31m.5s., e = 36m.23s., eSS =38m.10s., eSSS =42m.35s.
La Paz iZ =21m.56s. and 22m.42s., iPKS =22m.51s., iSKKS =28m.54s., iPPS = 33m.54s., iSS =39m.55s., SSS =44m.42s.
La Plata PKP_2N =21m.36s., PKP_2E =21m.48s., PKSN =25m.18s., PPE =25m.36s., PPPE =30m.24s., PPPN =30m.36s., E =32m.6s., SKKSE =32m.48s., SKKSN = 32m.54s., SKKKSE =34m.12s., SKSPE =38m.12s., PPSE =42m.0s., PPS?N = 42m.30s., N =44m.42s., SN =48m.36s., PSSN =49m.18s., SSSN =53m.12s.
Long waves were also recorded at Antofagasta, Karapiro, Edinburgh, Coimbra, and Tortosa.

Nov. 6d. 17h. 54m. 41s. Epicentre 45°·0N. 73°·6W.

Intensity IV at Burlington, Richford, Swanton, Altona, and Ellenberg.
Epicentre as adopted. Macroseismic area 8000sq.m.

L. M. Murphy and W. K. Cloud.
U.S. Earthquakes, serial No. 762, Washington, 1953, p.7, with macroseismic chart p.6.

A = +·2003, B = −·6806, C = +·7047 ; δ = −6 ; h = −4 ;
D = −·959, E = −·282,; G = +·199, H = −·676, K = −·710.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Vermont		0·6	151	i 0 20	+ 5	i 0 30	+ 4	—	—
Ottawa		1·5	285	0 31	+ 3	0 52	+ 3	i 0 35	P_g
Shawinigan Falls	N.	1·7	21	0 31	0	0 53	− 1	i 0 35	P_g
Seven Falls	E.	2·9	42	0 51	+ 3	i 1 23	− 1	1 29	S*
Harvard		2·9	150	i 0 48	0	1 27	+ 3	i 0 51	P*
Weston		3·1	148	0 50	− 1	1 24	− 5	0 58	P*
Palisades		4·0	183	i 1 3	− 1	i 2 1	S*	i 1 10	S_g
Fordham		4·1	183	i 1 15	P*	i 2 8	S_g	—	—
City College	E.	4·2	184	1 14	P*	—	—	—	—
Buffalo (Larkin)		4·2	242	—	—	e 2 11	S*	e 2 14	S_g
Buffalo		4·3	246	e 3 12	?	—	—	e 3 18	?
Kirkland Lake	Z.	5·4	308	—	—	e 2 25	− 3	i 2 53	S_g
Cleveland		6·7	242	e 2 38	?	i 3 0	0	i 3 26	S*
Morgantown		7·1	224	e 3 15	S	(e 3 15)	+ 5	i 4 41	?
Cheb	N.	55·2	51	e 9 40	+ 3	e 17 9	−11	e 14 9	ScP
Prague		56·3	51	e 9 45	0	e 17 1	−33	e 11 44	PP

Additional readings :—
Harvard i =54m., iS =1m.31s., i =1m.35s.
Weston S* =1m.38s.
Cleveland iSE =3m.31s.
Prague eP =9m.29s.

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Nov. 6d. 18h. 50m. 28s. Epicentre 47°·5N. 153°·9E. (as at 16h.).

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	7·2	238	1 48	– 1	3 11	– 2	—	—	—
Abasiri	7·6	246	1 59	+ 4	3 29	+ 6	—	—	—
Kusiro	8·1	240	2 3	+ 1	3 29	– 6	—	—	—
Wakkamai	8·7	261	2 18	+ 8	4 10	+20	—	—	—
Asahigawa	8·9	249	2 19	+ 7	—	—	—	—	—
Urakawa	9·5	240	2 22	+ 2	4 10	0	—	—	—
Klyuchi	9·8	23	e 2 32?	+ 8	e 4 47?	+30	—	—	—
Sapporo	9·9	248	2 30	+ 5	4 19	– 1	—	—	—
Muroran	10·5	245	2 36	+ 1	—	—	—	—	—
Mori	10·9	245	2 42	+ 2	4 56	+12	—	—	—
Aomori	11·5	239	2 59	+11	5 32?	+33	—	—	—
Miyako	11·7	232	2 47	– 4	—	—	—	—	—
Morioka	12·1	234	2 56	– 1	4 56	–18	—	—	—
Mizusawa	12·5	232	e 2 58	– 4	5 10	–13	—	—	8·3
Akita	12·7	237	3 22	+17	5 40	+12	—	—	—
Isinomasaki	12·9	230	3 12	+ 5	—	—	—	—	—
Sendai	13·3	231	3 8	– 5	5 29	–13	—	—	—
Yamagata	13·5	232	3 40	+25	6 10	+23	—	—	—
Hukusima	13·9	230	3 30	+ 9	5 49	– 8	—	—	—
Inawasiro	14·2	231	3 28	+ 4	6 1	– 3	—	—	—
Onahama	14·3	227	3 29	+ 3	5 51	–15	—	—	—
Niigata	14·5	234	3 17	–11	6 0	–11	—	—	—
Shirakawa	14·5	229	3 30	+ 2	6 10?	– 1	—	—	—
Aikawa	14·9	236	3 30	– 4	6 17	– 3	—	—	—
Mito	14·9	227	3 35	+ 1	6 26	+ 6	—	—	—
Utunomiya	15·1	229	3 30	– 6	6 6	–19	—	—	—
Tukubasan	15·2	227	3 37	– 1	—	—	—	—	—
Kumagaya	15·6	229	3 42	– 1	6 41	+ 4	—	—	—
Maebasi	15·6	230	3 50	+ 7	6 33	– 4	—	—	—
Nagano	15·9	233	3 49	+ 2	6 55	+11	—	—	—
Oiwake	15·9	231	3 39	– 8	—	—	—	—	—
Titibu	15·9	229	3 47	0	—	—	—	—	—
Matusiro	16·0	232	3 41	– 7	6 30	–16	—	—	—
Vladivostok	16·1	262	e 3 48	– 1	e 7 2	+13	—	—	—
Wazima	16·1	237	3 53	+ 4	6 47	– 2	—	—	—
Matumoto	16·3	232	3 53	+ 1	7 18	+25	—	—	—
Kohu	16·4	230	3 50	– 3	7 22?	+26	—	—	—
Toyama	16·4	235	3 50	– 3	6 44	–12	—	—	—
Misima	16·6	227	3 54	– 2	6 15	–45	—	—	—
Takayama	16·8	234	3 47	–11	—	—	—	—	—
Shizuoka	17·1	228	4 3	+ 2	—	—	—	—	—
Nagoya	17·7	233	4 9	– 1	7 52	+26	—	—	—
Hikone	18·0	234	4 12	– 1	—	—	—	—	—
Kameyama	18·2	233	4 11	– 5	8 7	+30	—	—	—
Tu	18·2	233	4 14	– 2	—	—	—	—	—
Kyoto	18·4	236	4 19	+ 1	8 8	+27	—	—	—
Kobe	19·0	236	4 25	– 1	8 1	+ 6	—	—	—
Sumoto	19·4	236	4 30k	0	8 8	+ 4	—	—	—
Yonago	19·5	239	4 34	+ 3	8 14	+ 8	—	—	—
Takamatu	19·9	237	4 35	– 1	8 17	+ 2	—	—	—
Hamada	20·6	241	4 45	+ 2	—	—	—	—	—
Muroto	20·6	234	4 44a	+ 1	—	—	—	—	—
Kôti	20·7	235	4 45	+ 1	8 36	+ 5	—	—	—
Hirosima	20·8	240	4 42a	– 3	8 30	– 3	—	—	—
Matuyama	21·0	239	4 41a	– 6	8 37	0	—	—	—
Hukuoka	22·5	242	5 4a	+ 2	9 14	+ 9	—	—	—
Saga	22·8	242	5 11	+ 6	—	—	—	—	—
Kumamoto	22·9	240	5 6	0	—	—	—	—	—
Miyazaki	23·1	236	5 12	+ 4	—	—	—	—	—
Nagasaki	23·4	241	5 14	+ 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.
Kagosima		23·9	238	5 20k	+ 4	—	—	—	—	—
Tomie		24·2	243	5 22	+ 3	—	—	—	—	—
Yakusima		24·8	237	5 23	− 2	9 47	+ 1	—	—	—
Irkutsk		31·8	299	e 6 28	0	—	—	—	—	—
College		35·2	39	6 56	− 2	—	—	—	—	—
Resolute Bay		50·0	19	i 8 57a	− 1	e 16 10	+ 1	—	—	—
Przhevalsk		51·7	294	9 12	+ 1	—	—	—	—	—
Almata		52·1	296	i 9 14	0	—	—	—	—	—
Victoria		52·7	57	9 14	− 4	—	—	—	—	—
Naryn		53·7	295	i 9 27	+ 1	—	—	—	—	—
Sverdlovsk		53·7	317	i 9 25	− 1	e 17 31	+32	—	—	—
Seattle		53·8	297	i 9 37k	+11	—	—	—	—	—
Tchimkent		57·1	299	e 9 56	+ 6	—	—	—	—	—
Shasta Dam		57·7	64	i 9 52	− 3	—	—	—	—	—
Hungry Horse		57·9	53	i 9 53	− 3	—	—	—	—	—
Khorog		58·8	293	10 3	+ 1	—	—	—	—	—
Berkeley	Z.	59·5	66	e 10 4	− 3	—	—	—	—	—
Kiruna	Z.	59·8	342	i 10 7	− 2	—	—	i 11 27	PcP	—
Stalinabad		59·9	296	10 9	− 1	—	—	—	—	—
Reno		60·0	63	e 10 14	+ 3	e 18 21	− 2	e 12 30	PP	—
Lick	Z.	60·3	66	e 10 14a	+ 1	—	—	—	—	—
Samarkand		60·3	298	10 12	− 1	—	—	—	—	—
New Delhi		60·9	282	i 10 15	− 2	e 18 32	− 2	22 53	SS	—
Fresno	Z.	61·8	66	e 10 24a	+ 1	—	—	—	—	—
Scoresby Sund		62·3	359	i 10 24	− 2	—	—	—	—	27·5
Tinemaha	Z.	62·5	65	i 10 26	− 2	—	—	—	—	—
China Lake	Z.	63·7	65	i 10 33	− 3	—	—	—	—	—
Moscow		64·1	326	i 10 34	− 4	—	—	—	—	—
Pasadena	Z.	64·5	67	i 10 42	+ 1	—	—	—	—	—
Helsinki		65·0	335	e 10 42	− 2	e 19 19	− 7	e 20 40	PPS	e 32·5
Riverside	Z.	65·1	67	e 10 45	0	—	—	i 10 51	?	—
Boulder City		65·3	63	i 10 48	+ 2	—	—	i 10 55	?	—
Palomar	Z.	65·8	67	i 10 52	+ 3	—	—	i 10 57	?	—
Ashkabad		66·5	301	i 10 55	+ 1	—	—	—	—	—
Upsala		67·2	338	i 10 57a	− 1	e 19 52	0	e 13 39	PP	e 33·5
Djakarta		67·6	232	e 10 57	− 4	i 19 54	− 3	—	—	—
Reykjavik	Z.	68·7	358	i 11 8	+ 1	—	—	—	—	—
Bergen		69·5	344	i 11 16a	+ 4	e 25 38?	SSP	e 21 22	PPS	e 36·5
Poona		69·9	276	i 11 16	+ 1	i 20 27	+ 3	13 46	PP	33·7
Ivigtut		70·2	12	—	—	20 30	+ 2	—	—	35·5
Bombay	E.	70·4	277	i 11 20	+ 2	i 20 33	+ 3	21 9	PS	33·4
Tiflis		71·3	312	i 11 12	−11	—	—	—	—	—
Gori		71·4	313	e 11 26	+ 2	—	—	—	—	—
Zugdidi		72·1	314	i 11 31	+ 3	—	—	—	—	—
Copenhagen		72·2	339	i 11 29	0	e 21 3	+12	21 48	PS	34·5
Akhalkalaki		72·3	313	e 11 30	+ 1	—	—	—	—	—
Sotchi		72·4	316	11 32	+ 2	—	—	—	—	—
Kirkland Lake	Z.	73·8	34	e 11 35	− 3	—	—	—	—	—
Lwow		73·8	330	i 11 47	+ 9	—	—	—	—	—
Kishinev		74·4	325	e 11 41	− 1	—	—	—	—	—
Brisbane	Z.	74·6	181	i 11 39k	− 4	—	—	i 11 58	PcP	—
Potsdam		75·0	337	i 11 45a	0	—	—	—	—	e 36·5
Uzhgorod		75·4	329	i 11 48	+ 1	—	—	—	—	—
Raciborzu		75·6	333	i 11 48	0	—	—	—	—	e 42·5
Skalnate Pleso		75·7	331	11 49	0	e 21 39	+ 9	29 2	SSS	—
Collmberg	Z.	76·0	336	i 11 50	− 1	—	—	i 12 2	PcP	—
Witteveen	Z.	76·2	341	e 11 53	+ 1	—	—	—	—	—
Sonneberg		76·6	337	e 11 57	+ 3	e 21 41?	+ 1	e 21 47?	S	—
Jena		76·7	337	e 11 54	− 1	e 21 35	− 6	e 14 58	PP	—
Prague		76·7	335	i 11 54a	− 1	e 21 40	− 1	e 12 3	PcP	e 35·5
De Bilt		77·2	341	i 11 58	+ 1	—	—	—	—	—
Cheb	N.	77·3	337	e 11 59	+ 1	e 21 44	− 4	e 22 57	PS	—
Budapest		77·5	331	12 0	+ 1	21 54	+ 4	e 22 0	S	e 42·0
Ogyalla	E.	77·5	332	e 11 57	− 2	—	—	—	—	—
Bucharest		77·6	325	e 11 54	− 6	e 21 50	− 1	e 21 56	S	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ottawa		77·8	34	e 11 57	– 4	—	—	—	—	—
Shawinigan Falls N.		77·8	31	e 11 58	– 3	e 21 50	– 3	—	—	—
Rathfarnham Castle		78·2	349	e 12 12	+ 9	—	—	—	—	e 49·5
Timisoara		78·3	328	i 12 6k	+ 3	e 22 16	+17	e 22 21?	ScS	e 51·5
Cleveland	Z.	78·7	39	i 12 4k	– 2	—	—	i 12 17	PcP	—
Kew		79·0	344	e 12 7	0	—	—	—	—	e 49·5
Istanbul	Z.	79·2	321	e 11 46	–22	—	—	—	—	—
Karlsruhe	Z.	79·3	338	i 12 9	0	—	—	e 12 53	PcP	—
Stuttgart	Z.	79·3	337	i 12 9a	0	—	—	—	—	—
Belgrade		79·4	328	i 12 10a	+ 1	e 22 8	– 2	—	—	e 48·7
Strasbourg		79·9	338	i 12 12	0	—	—	—	—	e 37·5
Pittsburgh		80·2	39	i 12 7	– 7	i 22 15	– 4	—	—	—
Zürich		80·8	338	i 12 17a	0	e 22 28	+ 3	—	—	—
Basle		80·9	338	e 12 17a	0	—	—	—	—	—
Morgantown		80·9	40	e 12 24	+ 7	—	—	e 12 36	?	—
Paris		80·9	342	i 12 19	+ 2	e 13 33	?	—	—	e 35·5
Triest		80·9	334	i 12 17a	0	e 22 25	– 1	i 12 26	PcP	—
Harvard		81·8	32	i 12 20	– 2	—	—	—	—	—
Ksara		81·8	312	i 12 22?	0	—	—	—	—	—
Weston		82·0	32	i 12 21	– 2	e 22 33	– 4	—	—	—
Palisades		82·2	35	i 12 21	– 3	—	—	—	—	—
City College, N.Y.		82·3	35	i 12 24	– 1	—	—	—	—	—
Pavia	Z.	82·6	336	e 12 27	+ 1	—	—	—	—	—
Florence		83·3	334	i 12 32	+ 2	e 22 45	– 5	—	—	—
Clermont-Ferrand		83·7	340	i 12 42	+10	e 24 14	PPS	e 15 44	PP	e 32·2
Athens		84·0	322	e 12 33	0	—	—	—	—	—
Rome	Z.	84·7	332	i 12 36a	– 1	—	—	—	—	—
Messina	Z.	86·9	329	i 12 46	– 2	—	—	—	—	—
Helwan	Z.	87·3	313	e 12 50	0	e 23 29	0	e 24 49	PS	—
Wellington		90·3	165	e 21 49	?	23 27	[– 8]	—	—	42·5
Alicante		91·5	340	13 6	– 4	24 16	+ 8	16 35	PP	e 45·2
Algiers Univ.	Z.	92·2	337	e 13 11	– 2	—	—	e 16 10	PP	—
Tamanrasset	Z.	104·5	330	e 14 5	– 3	e 18 29	PP	i 17 53	PKP	—
Pretoria	Z.	132·4	278	i 22 8?	PP	—	—	—	—	—
La Paz		133·7	63	e 19 32	[+13]	39 32	SS	e 21 44	PP	65·5
Kimberley	Z.	136·7	277	i 19 37	[+13]	—	—	—	—	—

Additional readings :—
Seattle e =10m.23s., 10m.36s., and 10m.42s.
Lick iZ =10m.21s., eZ =11m.6s.
Tinemaha iZ =10m.31s., and 10m.37s.
China Lake iZ =10m.38s. and 10m.44s.
Pasadena iZ =10m.49s. and 10m.57s.
Upsala iN =14m.5s., eE =19m.21s., ePSN =20m.20s., eE =21m.32s., eSSE =24m.22s., eN =24m.34s.?, and 27m.48s., eE =29m.3s.
Poona PS =21m.0s., PPS =21m.13s., SS =25m.23s., SSS =27m.51s.
Bombay PPSE =21m.23s., SSE =25m.20s., QE =30m.1s.
Raciborzu ePE =11m.52s., iZ =12m.11s.
Skalnate Pleso e =11m.57s., 12m.13s., 12m.58s., and 20m.44s., eE =21m.48s. and 22m.11s.
Jena eN =13m.28s., eS?E =21m.45s.
Prague e =12m.18s., 13m.19s., 13m.36s., 15m.3s., and 16m.20s., ePS =22m.12s., eSS = 26m.32s., eSSS =30m.20s.
Ogyalla eN =12m.2s., e =13m.50s. and 14m.21s.
Strasbourg i =12m.52s. and 13m.25s.
Paris i =12m.23s. and 12m.29s.
Triest eSKS? =22m.40s., eSS? =27m.56s.
Clermont-Ferrand i =13m.11s., e =13m.56s., 19m.32s., and 29m.8s.
Athens e? =12m.29s.
Alicante PPP =18m.50s., PPS =25m.56s.
Tamanrasset ePKKPZ =29m.51s., eZ =30m.6s.

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Nov. 6d. 21h. 28m. 0s. Epicentre 42°·5N. 144°·4E. Depth of focus 0·005.
(as on 1951, Oct. 11d.).

Intensity IV at Kusiro, Chanai, Onnebira, Nakachanbetsu, and Honbetsu; II-III at Kenebetsu, Toro, and Kuttari. Epicentre 42°·3N. 144°·9E. Depth 50-60km.

Seismo. Bull, Cent. Met. Obs., Japan, Nov., 1951, Tokyo, 1951, pp.300-301, with macroseismic chart.

		Δ	Az.		P.	O−C.	S.	O−C.
		°	°		m. s.	s.	m. s.	s.
Kusiro		0·5	0		0 16	+ 3	0 26	+ 3
Nemuro		1·2	46		0 24	+ 2	0 40	+ 2
Urakawa		1·3	254		0 24	+ 1	0 42	+ 2
Abasiri		1·5	357		0 22	− 4	0 41	− 4
Sapporo		2·3	284		0 44	+ 7	—	—
Hatinohe		2·9	228		0 41	− 4	1 19	0
Miyako		3·4	214		0 50?	− 2	1 30?	− 2
Morioka		3·7	222		0 59	+ 3	1 38	− 1
Mizusawa	N.	4·2	218	e	1 27	+24	1 50	− 2
Sendai		5·0	214		1 52	+38	—	—
Inawasiro		5·9	215		2 35	S	(2 35)	+ 1
Utunomiya		6·9	213		2 52	S	(2 52)	− 7
Kumagaya		7·4	213		2 56	S	(2 56)	−15

Nov. 6d. 22h. 21m. 2s. Epicentre 26°·0S. 70°·2W. Depth of focus 0·010.
(as on 1950, Dec. 2d.).

Approximate.

A = +·3049, B = −·8468, C = −·4360; δ = +13; h = +3;
D = −·941, E = −·339; G = −·148, H = +·410, K = −·900.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copiapo	N.	1·4	186	0 24	− 1	—	—	—	—	—
Antofagasta	E.	2·3	355	0 24	−13	i 0 42	P	—	—	—
Santa Lucia	N.	7·4	183	e 2 35	?	—	—	—	—	e 3·7
La Paz		9·6	12	i 2 20	+ 3	i 4 12	+ 8	i 2 30	PP	4·9
Buenos Aires		13·2	133	e 5 10	S	(e 5 10)	−20	—	—	—
La Plata		13·8	133	—	—	6 28	SS	—	—	6·9
Huancayo		14·7	340	—	—	e 6 13	+ 8	—	—	e 7·2
San Juan		44·3	7	i 7 54	− 8	—	—	—	—	—
Fayetteville		65·8	339	i 10 33	− 4	—	—	—	—	—
Weston		68·0	359	i 10 49	− 2	—	—	—	—	—
Harvard		68·2	359	i 10 49	− 3	—	—	—	—	—
Tucson		69·7	324	e 11 1	0	—	—	—	—	—
Ottawa		71·2	356	i 11 8	− 2	—	—	—	—	—
Palomar	Z.	73·8	321	e 11 25	− 1	—	—	e 11 40	pP	—
Kirkland Lake	Z.	74·3	353	e 11 26	− 2	—	—	—	—	—
Riverside	Z.	74·6	321	e 11 30	0	—	—	—	—	—
Boulder City		74·7	323	i 11 31	0	—	—	—	—	—
Pasadena	Z.	75·2	321	e 11 33	− 1	—	—	e 11 46	pP	—
China Lake	Z.	76·0	323	e 11 38	0	—	—	e 11 51	pP	—
Tinemaha	Z.	77·3	322	e 11 46	0	—	—	e 11 58	pP	—
Lick	Z.	79·4	321	e 11 57a	0	—	—	i 12 55	?	—
Reno	Z.	79·9	323	e 12 1k	+ 1	—	—	—	—	—
Kimberley	Z.	82·0	118	i 12 15	+ 4	—	—	—	—	—
Shasta Dam		82·2	323	i 12 10	− 2	—	—	—	—	—
Hungry Horse		83·8	333	i 12 20	0	—	—	—	—	—
Tamanrasset	Z.	87·9	64	i 12 42k	+ 2	e 16 15	PP	i 12 54	pP	—
Poona	Z.	146·0	95	i 19 34	[+ 6]	—	—	—	—	—

Additional readings :—
La Paz i = 3m.43s., iSS = 4m.39s.
La Plata S?N = 6m.34s.
Palomar eZ = 11m.49s.
Tinemaha eZ = 11m.52s.
Tamanrasset iZ = 13m.10s., and 16m.23s,

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Nov. 6d. Readings also at 3h. (near Reykjavik), 4h. (Fergana, near Alnata II, Andijan (2), Dzhergetal, Garm, Murgab, and Obi-garm), 5h. (Nanking, Calcutta, Bombay, Poona, and Kiruna), 6h. (Huancayo and near Bogota), 7h. (La Paz (2), China Lake, Tinemaha, Kimberley, and Tananarive), 8h. (Pretoria, Palomar, Riverside, China Lake, Tinemaha, Victoria, Bermuda, Calcutta, and near Athens), 11h. (near Kurmenty), 12h. (near Fort de France and near Garm), 15h. (Dzhergetal, Obi-garm, Samarkand, Tashkent, Tchimkent, near Andijan, Fergana, Garm, Khorog, Kurmenty, and Stalinabad), 16h. and 17h. (Kiruna), 19h. (Kiruna and near Kurmenty), 20h. (Ksara, Collmberg, Kiruna, Basle, Paris, Strasbourg, Stuttgart, Triest, Fayetteville, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Shasta Dam, Hungry Horse, College, Resolute Bay, and near Mizusawa), 21h. (Bombay, Poona, and near Athens), 22h. (near Almata II, Chilisk, III, and Kurmenty), 23h. (near Garm).

Nov. 7d. 4h. 35m. 18s. Epicentre 21°·0S. 178°·0W. Depth of focus 0·080. (as on 1950, Sept. 8d.).

A = −·9338, B = −·0326, C = −·3563 ; δ = −1 ; h = +4 ;
D = −·035, E = +·999 ; G = +·356, H = +·012, K = −·934.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Brisbane	Z.	27·2	251	i 5 4a	+ 2	—	—	—	—
Lick	Z.	78·6	43	i 11 8k	+ 1	—	—	—	—
Pasadena	Z.	79·0	48	i 11 9	0	—	—	—	—
Palomar	Z.	79·5	49	i 11 13k	+ 1	—	—	—	—
Fresno	Z.	79·5	45	e 11 12	0	—	—	—	—
Riverside	Z.	79·5	48	i 11 12	0	—	—	—	—
Shasta Dam		80·2	40	i 11 16	+ 1	—	—	—	—
China Lake	Z.	80·4	47	i 11 16k	0	—	—	—	—
Tinemaha	Z.	80·6	46	i 11 17	0	—	—	—	—
Reno	Z.	81·1	42	e 11 20	0	—	—	—	—
Boulder City		82·3	47	e 11 27	+ 1	—	—	—	—
College		88·7	13	i 11 54	− 3	—	—	e 13 53	pP
Ksara		147·5	300	—	—	e 29 31	PPS	—	—
Collmberg	Z.	148·5	347	e 18 47	[+ 5]	—	—	—	—
Stuttgart	Z.	151·7	349	e 18 54	[+ 8]	—	—	—	—
Strasbourg		152·1	352	e 18 52?	[+ 6]	—	—	—	—
Tamanrasset	Z.	176·3	—	e 19 11	[+ 4]	—	—	—	—

Nov. 7d. 5h. 0m. 15s. Epicentre 47°·5N. 153°·9E. (as on 6d.).

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		35·2	39	i 7 9	+11	—	—	—	—	—
Resolute Bay		50·0	19	e 9 0k	+ 2	—	—	—	—	—
Shasta Dam		57·7	64	i 9 54	− 1	—	—	—	—	—
Hungry Horse		57·9	53	i 9 56	0	—	—	—	—	—
Kiruna		59·8	342	i 10 11	+ 2	—	—	—	—	e 34·0
Reno	Z.	60·0	63	e 10 7	− 4	—	—	—	—	—
Butte		60·1	53	e 10 9	− 2	—	—	—	—	—
Lick	Z.	60·3	66	i 10 25	+12	—	—	—	—	—
Fresno	Z.	61·8	66	e 10 21	− 2	—	—	—	—	—
Tinemaha	Z.	62·5	65	i 10 28	0	—	—	i 10 40	?	—
China Lake	Z.	63·7	65	i 10 34	− 2	—	—	i 10 47	pP	—
Pasadena	Z.	64·5	67	e 10 39	− 2	—	—	i 10 53	pP	—
Riverside	Z.	65·1	67	e 10 43	− 2	—	—	e 10 55	pP	—
Boulder City		65·3	63	i 10 46	0	e 15 45	ScP	—	—	—
Palomar	Z.	65·8	67	i 10 48	− 1	—	—	i 11 0	pP	—
Tucson		70·3	63	e 11 17	0	—	—	—	—	—
Collmberg	Z.	76·0	336	e 11 53	+ 2	—	—	—	—	—
Jena		76·7	337	e 11 58	+ 3	—	—	e 12 53	?	—
Fayetteville		76·9	50	i 11 56	0	—	—	i 12 7	PcP	—
Stuttgart	Z.	79·3	337	e 12 12	+ 3	—	—	—	—	—
Strasbourg		79·9	338	e 12 17	PcP	—	—	e 12 57	?	—
Paris		80·9	342	e 12 20	PcP	—	—	—	—	—
Triest	Z.	80·9	334	e 12 15	− 2	e 13 19	?	e 12 20	PcP	—
Harvard		81·8	32	i 12 24	+ 2	—	—	—	—	—

Paris gives also i = 12m.43s., 12m.57s., e = 14m.2s. and 16m.25s.
Long waves were also recorded at Ksara.

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Nov. 7d. 8h. 41m. 45s. Epicentre 47°·5N. 153°·9E. (as at 5h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa	E.	12·5	232	—	—	5 21	– 2	—	—
Kiruna	Z.	59·8	342	i 10 10a	+ 1	—	—	—	—
China Lake	Z.	63·7	65	e 10 34	– 2	—	—	—	—
Mount Wilson	Z.	64·5	67	e 10 39	– 2	—	—	—	—
Palomar	Z.	65·8	67	e 10 46	– 3	—	—	—	—
Collmberg	Z.	76·0	336	e 11 51	0	—	—	—	—
Jena		76·7	337	e 11 59	+ 4	—	—	e 12 9	PcP
Stuttgart	Z.	79·3	337	e 12 10	+ 1	—	—	e 12 24	?
Strasbourg		79·9	338	e 12 14	+ 2	—	—	e 12 32	?
Paris		80·9	342	e 12 33	+16	—	—	—	—
Ksara		81·8	312	—	—	e 31 8	SSS	—	—

Nov. 7d. Readings also at 0h. (Bombay, Poona, Kiruna, Tamanrasset, Goris, Leninakan, Kirovobad, near Akhalkalaki, Gori, Piatigorsk, Tiflis, Tsikhlis-Dzhvari, and Zugdidi), 1h. (Nanking), 2h. (Terre Adelie, Auckland, Christchurch, Wellington, Andijan, Almata II, Dzhergetal, Naryn, Tchimkent, near Garm, Khorog, Murgab, Obi-garm, and Stalinabad), 3h. (near Almata II), 4h. (China Lake, Mount Wilson, Riverside, Tinemaha, Collmberg, Kiruna, and near Mizusawa), 5h. (Lick, Tinemaha, China Lake, Mount Wilson, Shasta Dam, Hungry Horse, Huancayo, La Paz, and near Manila), 7h. (Resolute Bay, and near Alicante), 8h. (Poona (2), Mount Wilson, China Lake, Palomar, Collmberg, Stuttgart, Strasbourg, and Kiruna), 9h. (Horseshoe Bay, near Victoria, and near Almata II), 13h. (Santa Lucia, La Paz, Goris, near Erevan, Kirovobad, Shemakla, Tiflis, and Tsikhlis-Dzhvari), 14h. (Apia), 15h. (Borzhomi, Kirovobad, near Piatigorsk, Tiflis, and Tsikhlis-Dzhvari), 17h. (Collmberg (2)), 18h. (Collmberg, Potsdam, Stuttgart, Strasbourg, Paris, Triest, Kiruna (2), Copenhagen, De Bilt, Kew, and near Akhalkalaki), 20h. (near Akalkalaki), 21h. (near Collmberg), 22h. (Jena, Stuttgart, near Prague, and near New Delhi).

Nov. 8d. 0h. 28m. 36s. Epicentre 41°·6N. 142°·0E. Focus at base of Superficial Layers. (as on 1951, October 19d.).

Intensity II-III at Hatinohe and Misawa.
Tokyo gives epicentre 41°·5N. 142°·0E. Depth 40km.

Seismological Bulletin of the Cent. Met. Obs., Japan, for November, 1951, Tokyo, 1951. p. 301, with macroseismic chart on page 301.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Urakawa	0·8	47	0 13	– 2	0 25	– 1
Muroran	1·1	314	0 17	– 2	0 30	– 3
Hatinohe	1·1	198	0 19	0	0 33	0
Mori	1·2	295	0 20	0	0 36	0
Aomori	1·2	229	0 21	+ 1	—	—
Sapporo	1·6	342	0 25	– 1	0 44	– 2
Miyako	1·8	180	0 28	– 1	0 50	– 1
Morioka	2·0	198	0 32	0	0 54	– 2
Akita	2·4	229	0 51	+13	1 27	+21
Mizusawa	2·6	195	e 0 43	+ 2	1 13	+ 2
Isinomaki	3·2	189	0 51	+ 2	—	—
Sendai	3·4	194	0 51	– 1	—	—
Hukusima	4·0	198	1 12	+12	2 8	+21
Inawasiro	4·3	200	1 12	+ 7	2 10	+16
Shirakawa	4·7	198	1 22	+12	2 5	0
Onahama	4·8	192	1 17	+ 5	2 6	– 1
Utunomiya	5·4	200	1 13	– 7	—	—
Mito	5·4	195	2 13	S	(2 13)	– 9
Tukubasan	5·6	196	2 26	S	(2 26)	– 1
Maebasi	5·7	205	2 27	S	(2 27)	– 3
Kumagaya	5·8	201	2 8	+42	2 52	+20
Oiwake	5·9	208	1 48	+21	—	—
Tokyo	6·2	198	1 38	+ 6	3 5	+23
Yokohama	6·5	198	2 49	S	(2 49)	– 1

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Nov. 8d. 13h. 45m. 8s. Epicentre 55°·6N. 160°·4W.

A = −·5347, B = −·1903, C = +·8233; δ = −6 ; h = −8 ;
D = −·335, E = +·942 ; G = −·776, H = −·276, K = −·568.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mitchell Field		10·3	256	(e 2 34)	+ 2	—	—	—	—	(i 6·0)
College		11·2	29	e 2 55	+11	—	—	—	—	e 6·5
Sitka		14·0	71	e 3 41	PPP	i 6 22	SS	—	—	—
Klyuchi		21·6	288	e 4 48	− 6	—	—	—	—	—
Victoria		23·6	91	5 13	0	9 29	+ 4	5 44	PP	11·6
Seattle		24·7	91	e 5 27	+ 3	i 9 54	+10	i 5 57	PP	e 13·2
Ferndale	Z.	28·1	106	e 6 8	+13	—	—	—	—	—
Hungry Horse		29·0	84	i 6 1	− 3	e 12 24	SS	—	—	—
Shasta Dam		29·0	103	e 5 56	− 8	—	—	—	—	—
Mineral	Z.	29·7	103	e 6 2k	− 8	e 12 32	SS	—	—	—
Resolute Bay		31·1	28	e 6 30a	+ 8	—	—	—	—	e 20·8
Berkeley		31·1	108	e 6 22	0	i 11 28	0	i 6 27	P	e 14·9
Saskatoon		31·2	73	7 1	+38	11 40	+11	—	—	16·2
Butte		31·2	85	e 6 20	− 3	—	—	e 9 42	?	—
Reno	Z.	31·2	102	e 6 17k	− 6	—	—	—	—	—
Santa Clara		31·6	108	e 6 29	+ 3	i 11 10	−25	—	—	—
Lick	Z.	31·8	108	i 6 21a	− 7	—	—	—	—	—
Bozeman		32·2	85	e 6 28	− 4	e 11 40	− 5	—	—	—
Fresno	Z.	33·2	106	e 6 32k	− 8	—	—	e 6 56	?	e 14·6
Honolulu		34·3	174	e 6 34	−16	e 12 30	+13	—	—	—
China Lake		35·1	104	e 6 49	− 8	—	—	—	—	—
Pasadena		36·1	108	e 6 59	− 6	e 12 36	− 9	e 14 58	SS	e 16·2
Boulder City		36·5	102	e 7 2	− 7	—	—	—	—	—
Riverside	Z.	36·6	108	e 7 5	− 5	—	—	—	—	—
Palomar		37·4	107	e 7 8	− 8	—	—	—	—	—
Rapid City		37·6	82	e 7 19	+ 1	e 13 18	+10	—	—	—
Tucson		41·5	102	i 7 44	− 6	e 14 3	− 4	—	—	—
Vladivostok		44·1	283	i 8 2	−10	i 14 36	− 9	—	—	—
Kirkland Lake	Z.	47·5	63	e 8 43	+ 5	—	—	—	—	e 27·4
Chicago		47·8	75	8 59	+18	e 15 33	− 5	—	—	—
Fayetteville		48·1	84	i 8 40	− 3	—	—	e 13 30	?	—
Scoresby Sund		50·8	17	—	—	e 16 34	+14	20 4	SS	25·9
Cleveland		51·3	70	i 9 23k	+15	e 16 22	− 4	i 9 31	P	e 26·6
Ottawa		51·6	63	9 10	0	—	—	—	—	—
Irkutsk		51·9	309	9 8	− 4	16 38	+ 3	—	—	—
Morgantown		53·4	71	e 9 38	+14	—	—	—	—	—
Vermont		53·5	62	e 10 4	?	e 17 9	+12	—	—	—
Pennsylvania		53·7	68	i 9 28	+ 2	e 17 10	+11	e 19 20	ScS	—
Guadalajara		54·7	105	e 13 44	?	—	—	—	—	—
Washington		55·5	69	i 9 43	+ 4	e 17 33	+ 9	—	—	—
Palisades		55·6	66	e 9 52a	+12	i 17 29	+ 4	—	—	—
City College, N.Y.		55·8	66	—	—	i 17 34	+ 6	—	—	—
Harvard		55·8	63	—	—	e 17 40	+12	—	—	e 25·7
Weston		56·0	63	i 9 44	+ 1	e 17 27	− 3	—	—	—
Kiruna		56·9	359	i 9 51k	+ 2	e 17 52	+10	e 12 8	PP	e 28·2
Columbia		57·0	76	—	—	e 17 41	− 2	—	—	e 28·2
Tacubaya		58·0	102	e 9 53	− 4	e 20 58	?	—	—	e 31·2
Halifax		58·1	56	12 28	PP	18 16	+18	—	—	—
Nanking		59·2	283	e 10 0	− 5	18 2	−10	—	—	—
Vera Cruz		59·9	99	—	—	e 18 13	− 8	e 24 24	SSS	e 27·5
Sverdlovsk		63·1	336	i 10 33	+ 1	i 19 19	+17	—	—	—
Bergen	N.	63·8	8	—	—	e 19 37	+26	—	—	e 30·9
Helsinki		64·5	357	—	—	e 19 33	+14	e 23 28	SS	e 32·9
Pulkovo		64·7	354	e 10 45	+ 3	e 19 41	+19	—	—	—
Upsala		64·9	2	e 10 37	− 6	e 19 40	+16	i 11 17	PcP	e 31·9

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.
Aberdeen	N.	66·2	13	i 17 27	?	e 20 4	PS	i 28 36	Q	e 36·4
Bermuda		67·0	66	—	—	e 20 49	ScS	e 27 30	SSS	e 35·4
Edinburgh		67·3	14	—	—	e 20 3	+ 9	—	—	—
Moscow		68·1	349	i 11 5	+ 1	i 20 19	+16	—	—	—
Durham		68·6	13	e 10 3	−64	i 20 29	+20	—	—	—
Copenhagen		68·9	5	i 11 27	PcP	e 20 36	PS	21 36	?	32·9
Almata		70·2	320	i 11 15	− 2	i 20 42	+14	—	—	—
Rybach'e		71·2	320	e 11 21	− 2	e 20 49	+ 9	—	—	—
Frunse		71·4	321	i 11 23	− 1	i 20 57	+15	—	—	—
Manila		71·7	269	e 11 22?	− 4	—	—	—	—	—
De Bilt		72·0	9	e 11 32	+ 4	e 21 7	+18	e 21 52	PPS	e 36·9
Kew		72·0	13	e 11 30	+ 2	e 21 11	+22	e 21 41	PPS	e 37·9
Naryn		72·1	319	e 11 29	+ 1	i 21 5	+15	—	—	—
Potsdam		72·3	5	i 12 18a	?	i 21 30	PS	i 21 38	PPS	e 36·9
Collmberg	Z.	73·3	4	e 11 38	+ 3	—	—	—	—	—
Jena		73·6	5	e 11 41	+ 4	e 21 22	+15	e 11 54	PcP	—
Tchimkent		73·7	324	i 11 29	− 9	i 21 8	0	—	—	—
Andijan		74·1	321	e 11 39	− 1	i 21 26	+14	—	—	—
Cheb		74·5	5	e 11 48?	+ 6	e 21 26	+ 9	e 22 26	PPS	—
Prague		74·6	3	e 12 20	?	e 21 37	+19	e 22 21	PPS	e 37·9
Fergana		74·6	321	e 11 42	− 1	i 21 26	+ 8	—	—	—
Tashkent		74·6	323	i 11 42	− 1	i 21 26	+ 8	—	—	—
Lwow		74·9	3	e 11 47	+ 3	e 21 37	+15	—	—	—
Paris		75·0	12	e 11 44	− 1	i 21 43	+20	i 12 4	PcP	e 36·9
Karlsruhe	Z.	75·2	8	e 11 32	−15	—	—	—	—	—
Stuttgart		75·6	7	e 11 51	+ 3	e 21 52	+23	e 12 4	PcP	e 40·9
Strasbourg		75·7	8	e 11 52	+ 3	e 13 9	?	e 12 12	PcP	—
Uzhgorod		76·1	358	e 11 54	+ 3	e 21 54	+19	—	—	—
Basle		76·7	9	e 11 58	+ 3	—	—	—	—	e 52·0
Obi-garm		76·8	322	i 11 51	− 4	i 21 46	+ 4	—	—	—
Samarkand		76·9	325	e 11 56	0	—	—	—	—	—
Zürich		77·0	9	e 12 1	+ 5	—	—	—	—	—
Stalinabad		77·3	322	i 11 58	0	i 21 59	+11	—	—	—
Budapest	E.	77·3	0	e 12 14	PcP	e 22 29	PS	e 14 35	PP	e 50·9
San Juan		77·4	76	e 11 57	− 1	e 21 50	+ 1	—	—	—
Kishinev		77·5	354	e 12 0	+ 1	e 22 6	+16	—	—	—
Clermont-Ferrand		78·1	12	e 12 16	PcP	—	—	—	—	e 40·3
Galerazamba		78·5	87	—	—	e 22 30	+29	—	—	39·9
Triest		79·0	5	e 12 7	0	e 22 20	+14	e 15 18	PP	e 41·4
Timisoara		79·0	358	—	—	e 22 52	?	e 23 22	PPS	—
Pavia		79·2	8	e 13 47	?	e 22 28	+20	e 23 35	PPS	e 37·1
Yalta		79·5	349	e 12 11	+ 1	e 22 28	+17	—	—	—
Sotchi		79·7	345	e 11 30?	−41	e 21 38?	−35	—	—	—
Belgrade		79·9	359	e 12 28a	PcP	e 22 54	+38	—	—	e 56·5
Bucharest		80·2	355	e 14 10	?	e 22 38	ScS	e 15 17	PP	—
Mary		80·4	327	e 12 17	+ 2	e 22 36	ScS	—	—	—
Tiflis		80·7	341	12 17	+ 1	e 22 37	+13	—	—	—
Kizyl-Arvat		80·7	332	12 17	+ 1	—	—	—	—	—
Florence		80·8	7	e 12 36?	+19	e 22 54	+29	—	—	—
Shemakla		81·0	338	—	—	22 32	+ 5	—	—	—
Ashkabad		81·1	330	e 12 20	+ 2	—	—	—	—	—
Kirovobad		81·4	339	e 12 21	+ 1	e 22 44	ScS	—	—	—
Erevan		82·3	341	e 12 25	0	22 52	ScS	—	—	—
Goris		82·6	338	12 26	0	22 49	+ 6	—	—	—
Rome		82·7	6	e 12 30	+ 3	22 57	ScS	—	—	—
New Delhi		82·8	311	e 12 24	− 3	i 22 46	+ 1	23 3	ScS	—
Toledo		82·8	18	e 12 31	+ 4	i 22 55	ScS	—	—	46·5
Nakhichevan		83·0	338	e 13 2	+34	—	—	—	—	—
Fort de France		83·1	74	—	—	e 22 55	+ 7	—	—	—
Istanbul	N.	83·4	353	e 12 29	− 1	e 22 56	+ 5	e 23 51	PS	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Alicante		84·9	16	12 36	– 2	e 23 24	+18	18 2	PPP	e 41·6
Granada		85·5	18	e 12 31a	–10	i 23 9	– 3	i 28 45	SS	50·1
Almeria		86·0	18	12 22	–21	23 22	+ 5	16 1	PP	50·2
Algiers Univ.	Z.	86·9	14	e 12 45	– 3	e 23 37	+11	—	—	—
Ksara		89·9	347	e 13 6	+ 4	i 25 21	?	—	—	—
Brisbane	N.	91·8	220	—	—	i 23 32	[–11]	e 23 56	S	—
Hyderabad		92·0	305	—	—	e 23 48	[+ 4]	24 44	S	—
Poona		93·1	309	e 13 13	– 4	e 23 52	[+ 1]	24 18	S	—
Bombay	E.	93·2	310	e 13 27	+10	e 24 0	[+ 9]	i 24 37	S	—
Helwan		94·3	350	e 14 6	?	e 24 4	[+ 7]	e 17 30	PP	—
Auckland	N.	94·5	200	—	—	i 24 18	–16	—	—	42·5
Huancayo		97·1	101	e 18 11	PKP	e 24 53	– 3	e 24 22	SKS	e 40·2
Riverview		98·2	219	i 13 30a	–10	i 25 6	+ 1	e 17 37	PP	e 45·1
Wellington		98·8	199	—	—	e 23 53	[–28]	e 40 11	Q	e 45·4
Colombo	E.	100·4	299	—	—	e 24 23	[– 6]	—	—	57·9
Tamanrasset	Z.	101·0	13	e 18 6	PP	—	—	i 18 22	PKP	—
Christchurch		101·4	200	—	—	e 25 27	– 5	e 24 14	SKS	e 46·0
La Paz		104·7	97	14 48	+39	i 24 45	[– 4]	28 19	PPS	49·9
Pretoria	Z.	149·5	344	i 19 48	[+ 1]	—	—	—	—	—

Additional readings and notes :—
Mitchell Field readings have been reduced by 15 minutes.
Victoria SS = 10m.46s.
Seattle i = 5m.42s., e = 9m.59s. and 11m.15s.
Berkeley iZ = 6m.52s., eN = 12m.34s.
Pasadena ePcPZ = 9m.11s.
Pennsylvania iNZ = 9m.52s., eSS?N = 20m.58s.
Palisades iP = 10m.8s., e = 13m.50s.
Kiruna iPcPZ = 10m.26s., iPP?Z = 12m.16s., ePcS?N = 14m.25s., ePSE = 18m.2s., ePPS?Z = 18m.19s., eScSN = 19m.40s.?, eSS?N = 22m.19s., and many other unidentified readings.
Helsinki eE = 21m.17s.
Upsala ePPPE = 14m.40s., eSE = 19m.43s., iN = 20m.43s., iE = 21m.21s., eSSS?N = 27m.14s.
De Bilt eSSS = 29m.10s.
Kew eZ = 13m.26s., eEN = 23m.32s., eSSS? = 29m.16s.
Potsdam iS?N = 21m.12s., iE = 22m.52s. and 26m.38s.?.
Jena eN = 12m.24s., eE = 12m.27s., eN = 13m.25s., ePS?N = 22m.17s.
Cheb e = 16m.4s. and 24m.10s., eSS? = 27m.22s.
Prague e = 12m.33s., ePP? = 15m.2s., e = 23m.15s.
Paris iPP = 14m.54s., iSKS = 21m.57s., iPPS = 22m.23s., iPSP = 22m.48s., iSS = 26m.41s., iSSS = 30m.10s., iPKKP? = 30m.31s. and many unidentified i readings.
Stuttgart ePZ = 11m.58s., eZ = 12m.38s., 12m.50s., and 13m.44s., ePPZ = 15m.4s., ePPP = 16m.52s., e = 21m.12s., ePPS = 23m.2s., eSS = 26m.52s., eSSS = 31m.52s.
Budapest eN = 18m.19s., eS?N = 22m.10s.
Triest iSKS? = 22m.42s., ePS = 23m.22s., ePPS = 23m.57s.
Pavia e = 14m.4s., eSS = 28m.2s.
Belgrade ePcPZ = 12m.59s., ePPNE = 16m.6s., ePPSNW = 24m.3s.
New Delhi PSN = 23m.34s., iN = 28m.37s.
Toledo e = 29m.20s. and 29m.52s.?.
Istanbul ePPN = 15m.56s.?.
Alicante PS = 24m.18s., PPS = 24m.40s., SS = 29m.2s., SSS = 32m.42s., Q = 35m.28s.
Granada PP = 15m.45s.
Almeria PPP = 18m.2s.
Brisbane iSSN = 29m.53s.
Poona eE = 24m.32s., PSE = 26m.13s., PPSE = 26m.48s.
Helwan eZ = 18m.1s.
Huancayo ePS = 25m.59s., ePPS = 26m.52s., eSS = 31m.11s., e = 31m.26s., eSSS = 35m.39s., e = 37m.9s.
Riverview iSKSEN = 24m.8s., eSE = 24m.50s., iN = 28m.34s., eSSN = 31m.35s., eSSPN = 31m.44s.
Wellington iPS = 26m.6s., iSS = 31m.34s.
Christchurch ePSN = 26m.37s., eSSEN = 31m.42s., eSSSEN = 35m.42s., eQE = 40m.52s.
La Paz PPZ? = 19m.8s., i = 19m.38s., iS = 26m.46s., i = 29m.22s.
Long waves were also recorded at Ivigtut, Pittsburgh, Puebla, La Plata, Terre Adélie, Apia, Dehra Dun, Neuchatel, Rathfarnham Castle, and Tortosa.

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Nov. 8d. 19h. 34m. 15s. Epicentre 19°·2N. 155°·5W. (as on 1951, Sept. 16d.).

Felt over all the Southern part of Hawaii, Intensity VI at Kahuku.
Epicentre 19°·0N. 155°·75W. (U.S.C.G.S.).

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial No. 762, Washington, 1953, p.19.

G. A. Macdonald and C. K. Wentworth.
Hawaiian Volcanoes during 1951. A contribution to General Geology, Geological Survey, Bulletin 996-D, Washington, 1954, p.179.

A = −·8600, B = −·3919, C = +·3269 ; δ = +5 ; h = +5 ;
D = −·415, E = +·910 ; G = −·297, H = −·136, K = −·945.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hawaii Volcanic Obs.		0·3	43	0 9	− 2	0 16	− 2	—	—	—
Honolulu		3·0	314	i 0 44	− 6	e 1 19	− 8	—	—	—
Berkeley		34·4	51	e 6 50k	− 1	e 14 7	SS	e 8 15	PPP	e 15·3
Lick	Z.	34·6	51	i 6 53k	0	—	—	i 7 57	PP	—
Shasta Dam		35·5	45	e 7 1	+ 1	—	—	—	—	—
Fresno	Z.	35·8	52	e 7 3a	0	—	—	—	—	—
Mineral	Z.	35·9	46	i 7 3a	− 1	—	—	—	—	—
Pasadena		36·3	58	i 7 7	0	—	—	—	—	—
Reno	Z.	36·8	48	e 7 17	+ 6	—	—	—	—	—
Riverside	Z.	36·9	58	i 7 11	− 1	—	—	—	—	—
Tinemaha	Z.	37·1	54	e 7 23	+ 9	—	—	—	—	—
China Lake		37·2	54	i 7 15	0	—	—	—	—	—
Palomar		37·2	59	i 7 15	0	—	—	—	—	—
Seattle		39·1	36	e 7 36	+ 5	—	—	—	—	e 17·8
Boulder City		39·4	55	i 7 34	+ 1	—	—	—	—	—
Tucson		42·0	62	e 7 56	+ 2	e 14 13	− 1	—	—	—
Hungry Horse		44·3	38	i 8 11	− 2	—	—	e 9 59	PP	—
College		45·9	4	i 8 23	− 3	—	—	—	—	—
Tacubaya		52·9	79	e 9 30	+10	—	—	—	—	—
Fayetteville		56·0	58	i 9 43	0	—	—	—	—	—
Chicago		61·1	52	—	—	e 18 32	−5	—	—	—
Resolute Bay		64·0	14	e 10 34	− 4	—	—	—	—	—
Morgantown		67·1	54	(i 11 0)	+ 3	—	—	—	—	—
Brisbane	Z.	68·1	229	i 11 4a	0	—	—	—	—	—
Ottawa		69·5	48	—	—	20 21	+ 1	—	—	34·2
Palisades		71·4	52	e 11 28	+ 4	—	—	—	—	—
Huancayo		84·8	105	e 12 42	+ 5	e 23 12	+ 7	e 24 23	PPS	e 38·4
La Paz		92·9	106	e 13 9	− 7	24 29	+ 9	17 21	PP	—
Tamanrasset	Z.	134·3	25	e 19 15	[− 5]	e 22 39	PKS	e 21 54	PP	—

Morgantown reading has been increased by 3m.
Long waves were also recorded at Santa Clara

Nov. 8d. Readings also at 0h. (Puebla, Tacubaya, Jena, near Collmberg, near Almata II, Chilisk, Ili, and Kurmenty), 1h. (near Apia (2) and near La Paz), 3h. (near Kurmenty), 4h. (Puebla, Tacubaya, and Kiruna), 5h. (China Lake, Tinemaha, Kiruna, Brisbane, and near Djakarta), 6h. (Apia, Brisbane, near Almata II, Ili, and Chilisk), 7h. (Kiruna and near Ashkabad), 8h. (near Akhalkalaki), 12h. (Zürich), 13h. (near Dzhergetal), 14h. (Jena), 15h. (Jena and Ksara), 16h. (Kew, Paris, Pavia, and near Alicante), 17h. (Przhevalsk, near Almata II, Ili, and Chilisk), 18h. (Apia), 19h. (near Ashkabad), 20h. (Apia, Bombay, and near Dzhergetal), 21h. (Apia and Terre Adelie), 22h. (Bucharest, Algiers Univ., and Apia (3)), 23h. (Cobb River, Kaimata, Karapiro, Tuai, Wellington, Apia, and Brisbane).

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Nov. 9d. 5h. 52m. 45s. Epicentre 24°·6N. 121°·1E. (as on 1950, Nov. 2d.).

A = −·4702, B = +·7794, C = +·4140 ; δ = −5 ; h = +3 ;
D = +·856, E = +·517 ; G = −·214, H = +·354, K = −·910.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	Z.	6·5	2	e 1 47	+ 8	3 9	+14	—	—	—
Nanking		7·7	345	1 57a	+ 1	3 25	0	—	—	—
Vladivostok		20·5	23	i 4 41	− 1	8 47	+20	—	—	—
Przhevalsk		39·3	309	e 7 35	+ 3	—	—	—	—	—
Almata II		40·3	309	e 7 45	+ 5	—	—	—	—	—
Almata		40·6	309	e 7 45	+ 2	e 14 0	+ 6	—	—	—
Naryn		40·9	306	e 7 47	+ 1	—	—	—	—	—
Rybach'e		41·0	307	e 7 48	+ 2	—	—	—	—	—
Frunse		42·2	307	e 7 55	− 1	e 14 25	+ 8	—	—	—
Andijan		43·5	304	8 8	+ 1	14 44	+ 8	—	—	—
Fergana		43·5	304	e 8 10	+ 3	e 14 50	+14	—	—	—
Poona	Z.	44·2	272	i 8 11	− 1	—	—	—	—	—
Bombay	E.	45·0	273	e 8 21	+ 2	e 15 4	+ 6	18 17	SS	—
Obi-garm		45·4	301	8 23	+ 1	—	—	—	—	—
Tchimkent		45·7	306	e 8 24	0	e 15 17	+ 9	—	—	—
Tashkent		45·9	305	e 8 26	0	e 15 17	+ 6	—	—	—
Stalinabad		46·1	301	8 29	+ 1	—	—	—	—	—
Samarkand		47·5	301	8 41	+ 3	15 41	+ 7	—	—	—
Sverdlovsk		53·7	324	e 9 25	− 1	17 3	+ 4	—	—	—
Brisbane	Z.	60·2	147	e 10 19	+ 7	—	—	—	—	—
Kirovobad		63·2	306	i 10 31	− 1	—	—	—	—	—
Goris		63·4	303	e 10 32	− 2	—	—	—	—	—
Tiflis		64·2	306	e 10 36	− 3	—	—	—	—	—
Borzhomi		65·2	306	e 10 45	0	—	—	—	—	—
Tsikhlis-Dzhvari		65·2	306	e 10 48	+ 3	—	—	—	—	—
College		68·5	27	e 11 0	− 6	—	—	—	—	—
Kiruna		71·4	337	e 11 23	− 1	e 20 45	+ 3	i 11 32	PcP	e 38·6
Upsala		75·5	330	—	—	e 29 49	SSS	e 30 49	Q	e 35·2
Istanbul	Z.	75·7	309	e 11 47	− 2	—	—	—	—	—
Resolute Bay		78·3	9	e 12 7	+ 4	—	—	—	—	—
Prague		81·5	322	e 12 37	+16	e 22 54	+22	e 16 35	PP	—
Collmberg	Z.	81·7	323	e 12 22	0	—	—	e 15 28	PP	—
Cheb		82·6	322	e 16 27	PP	e 25 21	?	e 26 36	?	—
Jena		82·6	323	e 12 27	+ 1	—	—	e 13 3	?	—
Stuttgart		85·1	323	e 12 39	0	—	—	—	—	e 47·2
Hungry Horse		92·2	33	i 13 9	− 4	—	—	—	—	—
Shasta Dam		92·3	43	e 13 9	− 4	—	—	—	—	—
Butte		94·5	34	e 13 19	− 4	—	—	—	—	—
Tinemaha	Z.	97·0	44	e 13 28	− 7	—	—	—	—	—
China Lake	Z.	98·2	44	e 13 36	− 4	—	—	—	—	—
Tamanrasset	Z.	101·7	302	e 17 22	?	—	—	i 18 12	PP	—
Fayetteville		111·0	30	i 17 3	?	—	—	—	—	—
Huancayo		160·0	55	e 20 40	PKP_2	—	—	—	—	—
La Paz	Z.	168·2	49	i 20 5	[− 3]	—	—	25 23	PP	—

Additional readings :—
Kiruna ePPPZ = 15m.32s., eQN = 30·2m.
Prague e = 13m.27s., 18m.36s., 28m.38s., and 31m.46s.
Long waves were also recorded at Palisades, Copenhagen, De Bilt, Kew, Potsdam, and Triest.

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Nov. 9d. 7h. 57m. 28s. Epicentre 47°·5N. 153°·9E. (as on 7d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		9·8	23	e 2 46?	+22	—	—	—	—	—
Zi-ka-wei	Z.	29·7	250	6 8a	− 2	—	—	—	—	—
Nanking		30·8	254	e 6 13	− 7	e 11 14	− 9	—	—	—
Irkutsk		31·8	299	e 6 33	+ 5	e 12 8	+30	—	—	—
College		35·2	39	i 7 1	+ 3	—	—	—	—	—
Resolute Bay		50·0	19	i 9 1a	+ 3	—	—	—	—	—
Sverdlovsk		53·7	317	i 9 27	+ 1	—	—	—	—	—
Frunse		53·8	297	i 9 27	+ 1	—	—	—	—	—
Andijan		56·4	296	9 47	+ 2	—	—	—	—	—
Fergana		57·0	296	e 9 51	+ 1	—	—	—	—	—
Tchimkent		57·1	299	e 9 50	0	—	—	—	—	—
Shasta Dam		57·7	64	e 9 45	−10	—	—	—	—	—
Tashkent		57·9	298	e 9 56	0	e 18 17	+22	—	—	—
Mineral	Z.	58·4	63	e 10 0k	0	—	—	—	—	—
Berkeley	Z.	59·5	66	e 10 11	+ 4	—	—	—	—	—
Kiruna		59·8	342	i 10 11a	+ 2	e 18 19?	− 1	e 13 57	PPP	e 29·0
Stalinabad		59·9	296	i 10 7?	− 3	e 18 44?	PS	—	—	—
Reno	Z.	60·0	63	e 10 27	+16	—	—	—	—	—
Lick	Z.	60·3	66	e 10 10k	− 3	—	—	—	—	—
Fresno	Z.	61·8	66	e 10 26a	+ 3	—	—	—	—	—
Tinemaha	Z.	62·5	65	e 10 33	+ 5	—	—	e 10 44	pP	—
Pulkovo		63·6	332	e 10 38	+ 3	—	—	—	—	—
China Lake	Z.	63·7	65	i 10 37	+ 1	—	—	i 10 43	pP	—
Moscow		64·1	326	10 38	0	—	—	—	—	—
Pasadena	Z.	64·5	67	e 10 41	0	—	—	—	—	—
Mary		64·7	300	10 45	+ 3	—	—	—	—	—
Riverside	Z.	65·1	67	e 10 43	− 2	—	—	—	—	—
Palomar	Z.	65·8	67	i 10 50	+ 1	—	—	—	—	—
Ashkabad		66·5	301	i 10 57	+ 3	—	—	—	—	—
Kizyl-Arvat		67·0	304	11 1	+ 4	—	—	—	—	—
Upsala		67·2	338	i 10 58a	0	e 19 54	+ 2	e 29 57	Q	e 34·5
Poona		69·9	276	i 11 15	0	e 20 22	− 2	—	—	—
Shemakla		70·1	310	11 34?	+18	—	—	—	—	—
Tucson		70·3	63	e 11 18	+ 1	—	—	—	—	—
Bombay	E.	70·4	277	i 11 19	+ 1	i 20 32	+ 2	21 10	PPS	—
Kirovobad		71·2	311	i 11 25	+ 2	—	—	—	—	—
Tiflis		71·3	312	11 25	+ 2	—	—	—	—	—
Goris		72·1	308	i 11 31	+ 3	—	—	—	—	—
Copenhagen		72·2	339	e 11 17	−12	e 20 56	+ 5	21 10	PS	35·5
Erevan		72·6	311	e 11 32	+ 1	21 2	+ 6	—	—	—
Nakhichevan		72·8	310	13 10?	?	—	—	—	—	—
Lwow		73·8	330	e 11 37	− 1	e 21 8	− 1	—	—	—
Kishinev		74·4	325	11 42	0	—	—	—	—	—
Potsdam		75·0	337	i 11 48k	+ 3	—	—	—	—	e 39·5
Uzhgorod		75·4	329	11 49	+ 2	—	—	—	—	—
Collmberg		76·0	336	e 11 52	+ 1	—	—	—	—	—
Prague		76·7	335	e 11 58	+ 3	e 21 44	+ 3	—	—	—
Fayetteville		76·9	50	i 11 58	+ 2	—	—	—	—	—
De Bilt		77·2	341	e 11 50	− 7	—	—	—	—	e 40·5
Rathfarnham C.	Z.	78·2	349	e 12 14	+11	e 13 4	?	—	—	—
Cleveland		78·7	39	e 11 26	−40	e 22 3	− 1	—	—	—
Kew		79·0	344	e 12 9	+ 2	—	—	—	—	e 37·5
Istanbul	Z.	79·2	321	e 11 47	−21	—	—	—	—	—
Stuttgart	Z.	79·3	337	e 12 11	+ 2	—	—	—	—	e 41·5
Morgantown		80·9	40	i 12 21	+ 4	—	—	—	—	—
Triest		80·9	334	e 12 10	− 7	e 22 17	− 9	—	—	—
Ksara		81·8	312	i 12 25a	+ 3	e 25 5	?	—	—	—
Palisades		82·2	35	—	—	e 22 35	− 4	—	—	—
Helwan	Z.	87·3	313	e 12 53	+ 3	e 13 44	?	—	—	—
La Paz		133·7	63	i 19 48	[+29]	26 22	[− 7]	22 17	PP	—

Additional readings :—
Kiruna eN = 13m.4s., ePSE = 18m.34s., eSSS?N = 24m.57s.
Upsala eSE = 20m.1s.
La Paz SS = 40m.18s.
Long waves were also recorded at Christchurch and other European stations.

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. 9d. 8h. 14m. 56s. Epicentre 47°·5N. 153°·9E. (as at 7h.).

		Δ	Az.	P.	O – C.
		°	°	m. s.	s.
Kiruna	Z.	59·8	342	e 10 11	+ 2
Tinemaha	Z.	62·5	65	e 10 28	0
China Lake	Z.	63·7	65	e 10 35	– 1
Pasadena	Z.	64·5	67	e 10 40	– 1
Riverside	Z.	65·1	67	e 10 43	– 2
Palomar	Z.	65·8	67	e 10 48	– 1
Collmberg	Z.	76·0	336	e 11 52	+ 1
Stuttgart	Z.	79·3	337	e 12 12	+ 3
Strasbourg		79·9	338	e 12 56	+44

Nov. 9d. 8h. 24m. 55s. Epicentre 47°·5N. 153°·9E. (as at 8h. 14m.).

		Δ	Az.	P.	O – C.	S.	O – C.		Supp.		L.
		°	°	m. s.	s.	m. s.	s.		m. s.		m.
College		35·2	39	i 6 59	+ 1	—	—		i 7 11	pP	—
Resolute Bay	Z.	50·0	19	i 9 0a	+ 2	—	—		—	—	—
Shasta Dam		57·7	64	e 9 56	+ 1	—	—		—	—	—
Hungry Horse		57·9	53	e 9 57	+ 1	—	—		—	—	—
Kiruna	Z.	59·8	342	i 10 10	+ 1	—	—		i 10 34	pP	—
Tinemaha	Z.	62·5	65	e 10 28	0	—	—		i 10 40	pP	—
China Lake	Z.	63·7	65	i 10 35	– 1	—	—		i 10 46	pP	—
Pasadena	Z.	64·5	67	e 10 42	+ 1	—	—		i 10 52	pP	—
Riverside	Z.	65·1	67	e 10 43	– 2	—	—		i 10 55	pP	—
Boulder City		65·3	63	e 10 45	– 1	—	—		i 10 59	pP	—
Palomar	Z.	65·8	67	i 10 49	0	—	—		i 11 0	pP	—
Poona	Z.	69·9	276	i 11 15	0	—	—		—	—	—
Tucson		70·3	63	e 11 17	0	—	—		i 11 29	pP	—
Collmberg	Z.	76·0	336	e 11 51	0	—	—		—	—	—
Fayetteville		76·9	50	i 11 56	0	—	—		—	—	—
Stuttgart	Z.	79·3	337	e 12 11	+ 2	—	—		—	—	—
Strasbourg		79·9	338	e 12 15	+ 3	—	—		—	—	—
Morgantown		80·9	40	e 12 19	+ 2	—	—		—	—	—
Paris		80·9	342	i 12 15	– 2	(e 22 5)	–21		i 12 23	pP	e 22·1
Ksara		81·8	312	e 12 31	+ 9	—	—		e 14 38	PP	—
Pavia		82·6	336	e 13 40	?	—	—		—	—	—
Clermont-Ferrand		83·7	340	—	—	e 29 5	SS		—	—	—

Nov. 9d. 22h. 7m. 58s. Epicentre 22°·1S. 68°·7W. Depth of focus 0·015.
(as on 1950, June 11d.).

Intensity V between south latitudes 22° and 23°. Epicentre 22°·25S. 68°·5W. Depth 100km.

F. Greve.
Boletin del Año, 1951, Instituto Sismólogico, Universidad de Chile, Santiago, p. 40.

E. Silgado.
Datos Sismólogicos del Peru, 1951. Boletin No. 8 Lima, Peru, 1953, p. 22.

A = + ·3369, B = – ·8641, C = – ·3740 ; δ = + 5 ; h = + 4 ;
D = – ·932, E = – ·363 ; G = – ·136, H = + ·348, K = – ·927.

		Δ	Az.	P.	O – C.	S.	O – C.		Supp.		L.
		°	°	m. s.	s.	m. s.	s.		m. s.		m.
Antofagasta	E.	2·2	226	0 41	+ 4	i 1 12	+ 7		i 1 15	?	—
Copiapo		5·4	195	e 1 8	–12	2 23	+ 2		2 17	S	—
La Paz		5·6	6	i 1 20k	– 2	i 2 28	+ 2		i 1 56	PP	i 2·9
Santa Lucia	N.	11·4	188	e 2 47	+ 7	4 55	+10		—	—	5·4
Huancayo		11·8	327	e 2 44	– 1	e 5 12	+17		i 2 56	pP	—
Concepcion	N.	15·2	193	3 33	+ 4	e 6 37	+23		—	—	—
Buenos Aires		15·3	146	e 3 29	– 1	6 52	sS		—	—	—
La Plata		15·9	146	3 38	0	6 26	– 4		4 8	pP	7·3
Bogota		27·1	349	i 5 38	+ 5	i 10 14	+14		i 6 17	pP	—
Punta Arenas	N.	31·1	182	—	—	11 19	+16		—	—	13·4

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.
Balboa Heights		32·6	341	e 6 18	– 3	—	—	—	—	—
Galerazamba		33·3	349	i 7 19	+52	i 11 19	–18	i 12 22	SS	13·0
Fort de France		37·3	14	i 6 58	– 3	i 12 28	–11	—	—	e 16·8
San Juan		40·3	5	i 7 21	– 5	—	—	i 7 51	pP	—
Merida		47·4	333	e 8 32	+ 9	—	—	e 10 29	PP	—
Vera Cruz		49·0	325	e 8 53	+17	—	—	—	—	—
Puebla		50·0	323	e 8 46	+ 3	e 15 46	+ 4	—	—	—
Tacubaya		50·9	322	e 8 57	+ 7	e 16 1	+ 6	e 10 7	PcP	—
Bermuda		54·3	5	i 9 21	PcP	i 16 44	+ 3	—	—	—
Washington		61·2	354	i 10 2	– 1	—	—	i 10 32	pP	—
Morgantown		62·3	351	i 10 9	– 2	—	—	i 10 39	pP	—
Fayetteville		62·7	337	i 10 13	0	—	—	—	—	—
Fordham		62·8	357	e 10 12	– 2	e 18 24	– 7	—	—	—
Palisades		63·0	357	e 10 13a	– 3	i 18 31	– 3	i 10 48	pP	e 30·0
Pittsburgh		63·1	351	i 9 51	–25	i 18 34	– 1	i 10 21	PcP	—
Pennsylvania		63·2	353	i 10 44	pP	e 18 35	– 1	11 6	sP	—
Weston		64·2	358	e 10 22	– 1	e 18 50	+ 1	—	—	—
Harvard		64·3	358	i 10 22	– 2	e 19 45	sS	—	—	e 25·0
Cleveland		64·4	350	i 10 23	– 2	i 18 48	– 3	i 10 53	pP	—
Chicago		65·9	345	e 11 4	pP	e 20 0	sS	—	—	—
Halifax		66·6	5	—	—	19 18	0	—	—	e 26·8
Tucson		67·4	323	i 10 44	0	e 19 37	+10	—	—	—
Ottawa		67·5	355	10 42	– 2	19 28	– 1	13 11	PP	—
Seven Falls	E.	68·9	359	e 10 55	+ 2	—	—	—	—	—
Kirkland Lake	Z.	70·7	353	i 11 2k	– 2	i 11 56	sP	i 11 34	pP	—
Palomar		71·8	320	i 11 12	+ 2	i 20 27	+ 8	i 11 35	pP	—
Boulder City		72·4	322	i 11 15	+ 1	i 20 32	+ 6	—	—	—
Riverside		72·5	319	i 11 15k	+ 1	e 20 35	+ 8	i 11 49	pP	—
Pasadena		73·1	319	i 11 19k	+ 1	e 20 38	+ 4	e 11 48	pP	e 31·0
China Lake		73·9	321	i 11 23k	0	e 20 48	+ 6	i 11 51	pP	—
Tinemaha		75·1	321	i 11 31k	+ 1	i 21 4	+ 8	i 11 50	pP	—
Fresno		75·8	321	e 11 33k	0	e 21 7	+ 4	e 14 7	PP	—
Lick	Z.	77·3	320	i 11 43k	+ 1	—	—	—	—	—
Santa Clara		77·5	320	e 11 44a	+ 1	e 21 37	+15	i 12 20	pP	—
Reno		77·7	323	e 11 45a	+ 1	e 21 32	+ 8	e 12 1	pP	—
Berkeley		78·0	320	i 11 47k	+ 1	e 21 33	+ 6	e 12 22	pP	—
Mineral	Z.	79·3	322	i 12 4	+11	—	—	—	—	—
Shasta Dam		79·9	322	i 11 56	0	—	—	—	—	—
Hungry Horse		81·0	332	i 12 2	0	—	—	—	—	—
Grahamstown	Z.	82·4	122	i 12 10	+ 1	—	—	—	—	—
Malaga		84·2	47	i 12 17	– 1	e 22 35	+ 4	—	—	—
Seattle		84·5	327	i 12 22k	+ 2	i 22 47	+13	i 13 10	pP	—
Ivigtut		84·6	11	—	—	22 38	+ 3	28 26	SS	—
Tamanrasset	Z.	85·0	63	i 12 22k	0	e 22 57	+18	e 12 45	pP	40·0
Almeria		85·6	48	i 12 36	+11	15 54	PP	17 46	PPP	47·3
Victoria		85·6	327	12 25	0	—	—	—	—	—
Toledo		86·2	45	i 12 28	0	i 23 1	+11	13 0	pP	e 34·5
Pretoria	Z.	86·5	116	i 12 31	+ 1	—	—	—	—	—
Pietermaritzburg	Z.	86·8	121	i 12 39	+ 8	—	—	—	—	—
Alicante		87·7	47	e 12 21	–14	i 23 13	+ 9	17 52	PPP	e 44·5
Terre Adelie		88·5	192	i 12 43	+ 4	i 23 26	+14	i 16 20	PP	—
Algiers Univ.	Z.	89·4	50	i 12 42	– 1	—	—	i 13 15	pP	—
Christchurch		93·8	220	—	—	e 24 20	+21	e 23 32	SKS	e 42·5
Wellington		93·8	223	—	—	23 37	[+12]	i 24 17	S	—
Kew		94·5	36	—	—	e 23 45	[+17]	e 24 34	S	e 47·0
Paris		94·8	39	e 13 8	0	i 24 18	+11	i 16 54	PP	e 43·0
Auckland	N.	96·2	226	—	—	24 42	+23	26 22	PS	—
Aberdeen		96·5	30	i 20 7	?	i 24 40	+18	e 31 37	SS	e 37·8
Pavia		97·3	44	e 22 38	?	23 45	[+ 2]	—	—	e 41·6
De Bilt		97·8	37	—	—	e 24 1	SKKS	—	—	e 42·0
Strasbourg		97·8	41	e 17 22	PP	e 23 58	[+12]	e 30 32	SS	—
Scoresby Sund		98·0	14	e 24 3	SKS	e 24 48	+14	—	—	51·0
Florence		98·1	46	e 13 54	pP	i 24 52	+17	i 26 34	PS	—
Rome		98·2	48	e 14 7	pP	i 24 52	+16	e 23 53	SKS	—
Stuttgart		98·7	41	e 13 25	– 1	e 24 2	[+11]	e 18 20	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.
Messina	E.	99·0	52	e 17 17	PP	e 24 59	+16	e 23 54	SKS	—
Triest		100·4	44	e 13 31	− 3	e 24 5	[+ 6]	e 17 37	PP	e 52·3
Jena		101·0	39	e 13 40?	+ 4	—	—	e 17 40	PP	—
Cheb		101·1	40	e 17 59	PP	e 25 13	+12	e 24 15	SKS	—
Collmberg	Z.	101·9	39	e 13 44	+ 4	—	—	e 17 47	PP	—
Potsdam		102·4	38	—	—	e 25 2	− 9	e 24 8	SKS	e 51·0
Prague		102·4	41	e 17 8	?	e 25 19	+ 8	e 17 50	PP	—
Copenhagen		103·1	35	—	—	25 24	+ 7	24 26	SKS	—
College		105·3	334	13 55	0	—	—	—	—	—
Tananarive		105·5	118	—	—	e 41 15	Q	—	—	e 48·2
Upsala		107·0	32	e 14 48	pP	e 25 34	S	e 19 25	pPP	e 44·0
Helwan	Z.	109·0	64	e 18 46	PP	—	—	—	—	—
Kiruna		109·9	23	e 18 29	[+13]	e 27 13	PS	e 19 37	pPP	e 44·0
Helsinki		110·7	32	—	—	e 28 36	PS	e 34 20	SS	e 47·0
Ksara		113·7	61	i 19 15	PP	29 51	PS	19 49	pPP	—
Bombay	E.	143·9	88	i 19 22	[+ 2]	i 42 41	SSP	i 22 36	PP	—
Poona		144·8	89	i 19 23	[+ 1]	26 28	[+12]	22 29	PP	—
Colombo	E.	146·1	112	i 19 35	[+11]	30 23	PKKP	—	—	—
Mizusawa	E.	149·3	311	e 19 43	[+14]	e 20 14	pPKP	—	—	—
Nanking		168·1	328	e 20 34	PKP_2	i 25 26	pPP	—	—	—
Manila		168·2	233	e 20 2	[+11]	—	—	—	—	—

Additional readings and notes :—
Santa Lucia N =3m.2s., 3m.50s., and 4m.25s.
La Plata S?N =6m.44s.
Palisades i =19m.31s. and 20m.57s., eQ =26m.0s.
Pittsburgh i =19m.25s.
Pennsylvania iNZ =11m.27s., iZ =11m.39s., iPPZ =12m.39s., iZ =13m.18s., isS?N = 19m.37s.
Cleveland ipPE =10m.57s., iPSE =19m.40s., esSE =20m.12s., isPSE =21m.9s.
Ottawa e =19m.34s., SS =23m.48s., SSS =26m.42s.
Palomar iZ =11m.17s. and 11m.45s., iE =21m.4s.
Riverside iZ =11m.19s.
Pasadena iZ =11m.23s. and 12m.5s., ePPZ =14m.9s., iE =21m.20s.
China Lake iZ =11m.27s. and 11m.57s.
Tinemaha iZ =11m.38s., eZ =12m.6s.
Santa Clara esSE =22m.22s.
Berkeley ePPZ =14m.56s., isSN =22m.35s., eSSN =26m.44s.
Seattle i =12m.26s., 12m.29s., and 12m.44s., isP? =13m.32s., i =13m.52s., 13m.58s., and 14m.45s., epS? =23m.44s.
Ivigtut 23m.38s.
Tamanrasset isPZ =12m.55s., ePPZ =15m.41s., ePSZ =23m.47s.
Toledo i =12m.32s., SS =23m.51s.
Alicante PPS =24m.56s., SSP =29m.26s.
Terre Adélie i =12m.49s., 13m.21s., and 13m.41s., e =15m.52s.
Algiers Univ. iZ =12m.51s., eZ =13m.37s. and 14m.2s.
Christchurch ePSEN =25m.2s., eSSEN =30m.27s., eQN =36m.42s.
Wellington iPS =25m.17s., PPS =26m.26s., e =36m.32s., ePKP,PKP? =37m.37s.
Paris iPP =16m.59s., iSKS =23m.38s., iSKKS =23m.43s., iPS =25m.14s., iSPP = 25m.44s., iPPS =26m.11s., iPScS? =26m.29s., iSS? =29m.50s., and other unidentified i readings.
Auckland eN =25m.37s., iSSN =31m.25s., eN =36m.52s.
Pavia e =34m.7s.
Strasbourg e =17m.34s., 23m.14s., and 24m.59s., i =25m.34s.
Scoresby Sund e =25m.42s.
Rome eZ =17m.48s. and 18m.8s., eE =26m.36s.
Stuttgart eS =25m.2s., ePPS =27m.8s., eSS =32m.2s.
Messina ePPSE =26m.54s., eE =28m.49s.
Triest ePKP?Z =17m.14s., epPP =18m.2s., esSKS =25m.7s., esS =26m.1s., ePS = 26m.11s., ePPS =27m.23s., eSS =31m.50s.
Jena ePP?N =17m.44s., eE =18m.22s.
Cheb eSPP? =27m.27s., eSS? =32m.56s.
Potsdam iEN =25m.23s., eN =32m.38s., eZ =32m.44s., eZ =38m.20s.
Prague epPPN =18m.15s., esPPN =18m.27s., e =19m.51s., ePPP =20m.18s., eSKS = 24m.21s., eSP =26m.19s., eSS =32m.56s., esSS =33m.38s., eSSS =36m.20s.
Copenhagen 26m.24s.
Upsala eSKKS?N =25m.30s., eSE =26m.21s., eE =27m.43s., eN =33m.2s.
Helwan eZ =19m.30s. and 20m.11s.
Kiruna eN =22m.2s.?, eE =25m.43s., eSPZ =28m.11s., eSSZ =33m.57s., eZ =37m.3s.
Poona PKSEZ =23m.16s., iEZ =24m.40s., SKKKSN =29m.26s., PSN =32m.46s., PPSN =35m.0s., SSPN =41m.28s.
Mizusawa readings are given as for a local shock.
Long waves were also recorded at Clermont-Ferrand and Rathfarnham Caslte.

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Nov. 9d. Readings also at 0h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Fresno, Berkeley, Lick, Reno, Mineral, Shasta Dam, Hungry Horse, College, Butte, Collmberg, Kiruna, Stuttgart, Stalinabad, near Andijan, Dzhergetal, Khorog, Obi-garm, and near Ashkabad), 1h. (Terre Adelie), 2h. (near Istanbul), 3h. (Dzhergetal, Obi-garm, Tchimkent, near Khorog, Samarkand, and Stalinabad), 4h. (Apia), 5h. (Apia and near Djakarta), 7h. (Huancayo, Andijan, Fergana, Frunse, Naryn, Stalinabad, Tchimkent, near Dzhergetal, Garm, Khorog, Murgab, and Obi-garm), 8h. (Apia, Wellington, Ashkabad, and near Mizusawa (2)), 9h. (Strasbourg, near Almata II, and near Akhalkalaki), 10h. (near Klyuchi), 12h. (near Akhalkalaki), 13h. (Apia, China Lake, Resolute Bay, Collmberg, Kiruna, Stuttgart, and Granada), 14h. (near Victoria), 15h. (Ashkabad, Frunse, Krasnogorka, near Almata II, Chilisk, Naryn, and Przhevalsk), 16h. (Mount Wilson, Palomar, China Lake, Resolute Bay, Collmberg, Kiruna, and Stuttgart), 17h. (Jena and near Collmberg), 18h. and 19h. (2) (near Apia), 20h. (Merida, Tacubaya, Puebla, and Vera Cruz), 21h. (Apia).

Nov. 10d. 5h. 32m. 5s. Epicentre 17°·0S. 177°·0W. (as on 1951, April 20d.).

A = −·9556, B = −·0501, C = −·2906 ; δ = +13 ; h = +5 ;
D = −·052, E = +·999 ; G = +·290, H = +·015, K = −·957.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		s.
Apia		6·0	60	i 1 27	− 5	i 2 37	− 6	7 43	?	—
Auckland	N.	21·1	198	i 4 54	+ 6	i 9 37	SSS	i 8 56	PcP	11·0
Karapiro	N.	21·8	195	4 55?	− 1	—	—	—	—	—
Tuai	N.	22·3	192	e 5 7	+ 6	—	—	—	—	—
New Plymouth	E.	23·3	196	e 6 8	?	e 9 36	+16	—	—	—
Wellington		25·2	195	e 5 27	− 2	i 9 50	− 2	6 12	PP	11·6
Cobb River	E.	25·6	198	e 5 38	+ 6	e 10 32	+33	e 4 9	?	—
Christchurch		27·9	196	—	—	e 10 29	− 8	—	—	e 12·4
Brisbane		29·6	244	i 6 8a	− 1	i 11 6	+ 2	e 7 2	PP	e 13·2
Riverview	N.	33·1	233	—	—	i 12 6	+ 7	—	—	e 14·3
Terre Adélie		56·6	198	i 9 49	+ 2	e 17 49	PS	—	—	—
Manila		68·8	294	e 11 8	0	—	—	—	—	—
Santa Clara	E.	74·9	42	—	—	e 21 22	0	—	—	—
Berkeley		75·0	42	e 11 47k	+ 2	e 21 23	0	e 26 31	SS	e 31·1
Lick	Z.	75·0	42	e 11 48k	+ 3	—	—	—	—	—
Pasadena		75·6	47	i 11 50	+ 2	—	—	—	—	e 30·9
Fresno	Z.	75·9	44	e 11 49a	− 1	—	—	—	—	—
Vladivostok		76·0	324	i 11 50	− 1	e 21 31	− 3	—	—	—
Palomar	Z.	76·1	48	i 11 53	+ 2	—	—	—	—	—
Riverside	Z.	76·1	48	i 11 50	− 1	—	—	—	—	—
Shasta Dam		76·5	39	e 11 53	− 1	—	—	—	—	—
Mineral	Z.	76·8	40	e 11 55	0	—	—	—	—	—
China Lake	Z.	76·9	46	i 11 55	− 1	—	—	—	—	—
Reno	Z.	77·5	43	e 12 1k	+ 2	—	—	—	—	—
Boulder City		78·9	47	e 12 7	0	—	—	i 12 12	P	—
Tucson		80·0	51	i 12 14	+ 1	e 22 4	−13	—	—	—
College		84·6	12	i 12 27	− 9	—	—	—	—	—
Tacubaya		84·6	68	e 18 32	?	i 22 12	−51	—	—	—
Hungry Horse		85·8	36	e 12 43	+ 1	—	—	—	—	—
Fayetteville		94·2	53	i 13 22	0	—	—	—	—	—
Huancayo		97·4	105	—	—	e 25 10	+11	e 32 10	SSP	e 45·8
Kiruna		128·0	351	e 24 57	?	e 50 5	?	e 59 12	Q	e 62·6
Rathfarnham C.	Z.	143·1	8	e 26 16	PPP	—	—	—	—	—
Raciborzu	Z.	144·8	343	e 19 40	[+ 1]	—	—	—	—	—
Collmberg	Z.	144·9	348	e 19 38	[− 1]	—	—	—	—	—
Jena	E.	145·5	351	e 19 42	[+ 2]	—	—	—	—	—
Prague		145·8	348	e 19 43	[+ 2]	e 26 46	[− 2]	e 23 9	PP	—
Ksara		146·1	306	i 19 43	[+ 2]	—	—	e 24 24	?	—
Istanbul	Z.	147·2	322	e 19 47	[+ 4]	—	—	—	—	—
Stuttgart		147·9	353	e 19 48	[+ 4]	—	—	e 19 55	PKP_2	e 78·9
Paris		148·3	2	i 19 52	[+ 7]	—	—	i 19 55	PKP_2	e 82·9
Strasbourg		148·3	354	i 19 52a	[+ 7]	—	—	i 19 56	PKP_2	—
Belgrade	Z.	148·6	336	e 19 43	[− 2]	—	—	e 20 50	?	—
Helwan	Z.	151·1	302	e 19 58	[+ 9]	e 23 34	PKS	e 21 25	?	—
Clermont-Ferrand		151·3	0	i 20 1	[+12]	—	—	i 20 13	PKP_2	—
Tamanrasset	Z.	173·8	338	e 20 16	[+ 5]	e 25 41	PP	e 21 46	PKP_2	—

For Notes see next page.

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NOTES TO NOVEMBER 10d. 5h. 32m. 5s.

Additional readings :—
Auckland iPPN = 5m.33s., iN = 5m.56s., 7m.15s., and 8m.7s.
Wellington PPP = 6m.25s.
Brisbane iZ = 6m.17s., iEN = 11m.15s.
Jena eE = 20m.4s., 20m.47s., and 21m.38s.
Prague e = 20m.8s., 20m.36s., and 21m.34s., ePP = 22m.30s.
Stuttgart eZ = 20m.25s. and 20m.55s.
Paris i = 20m.6s., 20m.36s., and 20m.55s., iPP? = 22m.49s.
Strasbourg e = 20m.22s. and 21m.29s.
Tamanrasset iZ = 22m.33s., eZ = 28m.50s.
Long waves were also recorded at La Paz, Palisades, Harvard, Scoresby Sund, Potsdam, Copenhagen, Kew, De Bilt, and Upsala.

Nov. 10d. 7h. 12m. 26s. Epicentre 3°·0S. 139°·5E. Depth of focus 0·015.
(as on 1940, April 1d.).

A = −·7594, B = +·6486, C = −·0520 ; δ = +7 ; h = +7 ;
D = +·649, E = +·760 : G = +·040, H = −·034, K = −·999.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		25·3	314	e 5 8	− 8	i 5 18	P	—	—	—
Brisbane		27·6	154	i 5 44k	+ 7	i 11 38	SS	e 10 44	?	e 12·2
Riverview		32·5	162	15 38	?	16 59	ScS	i 17 9	?	i 17·5
Perth		36·4	215	i 14 44	?	i 16 42	ScS	—	—	i 19·1
Zi-ka-wei	z.	38·1	335	e 7 11k	+ 3	i 13 10	+19	—	—	—
Nanking		40·0	332	e 7 18	− 6	i 13 18	− 1	—	—	—
Vladivostok		46·4	352	e 8 13	− 2	—	—	—	—	—
Irkutsk		62·6	336	e 10 10?	− 3	e 18 25	− 4	—	—	—
Terre Adelie		63·7	178	i 10 21	+ 1	—	—	—	—	—
Poona	z.	68·0	292	i 10 39	− 8	—	—	—	—	—
Almata		72·5	318	i 11 21	+ 7	—	—	—	—	—
Naryn		72·5	315	11 18	+ 4	20 28	+ 1	—	—	—
Rybach'e		72·8	316	e 11 22	+ 6	e 20 32	+ 2	—	—	—
Frunse		74·0	316	i 11 18?	− 5	—	—	—	—	—
Andijan		74·9	313	e 11 34	+ 6	e 20 55	+ 1	—	—	—
Fergana		75·2	313	e 11 28	− 2	e 20 54	− 3	—	—	—
Obi-garm		76·3	311	e 11 30	− 6	—	—	—	—	—
Stalinabad		76·9	311	i 11 35	− 5	i 21 13	− 2	—	—	—
Tashkent		77·3	313	e 11 37	− 5	—	—	—	—	—
Tchimkent		77·3	315	e 11 48	+ 6	—	—	—	—	—
Mary		82·1	309	e 12 12?	+ 4	e 22 13?	+ 3	—	—	—
Sverdlovsk		86·4	327	i 12 37	+ 8	22 57	+ 5	—	—	—
Tamanrasset		131·3	62	e 19 1	[+ 4]	—	—	e 21 16	PP	—
Huancayo		142·3	114	e 19 21	[+ 3]	—	—	—	—	—
La Paz		146·5	127	e 19 42	pPKP	—	—	—	—	—

Long waves were also recorded at Palisades, Pasadena, Tinemaha, Auckland, Wellington, Kew, and Rome.

Nov. 10d. 22h. 15m. 21s. Epicentre 41°·2N. 142°·5E. Depth of focus 0·005.
(as on 1951, March 10d.).

Intensity V at Kanagi ; IV at Kanita ; II-III at Hatinohe, Aomori, Muroran, etc.
Epicentre 41°·1N. 142°·5E. Depth 40km.

Seismological Bulletin of the Cent. Met. Obs., Japan, for November, 1951, Tokyo, 1951, p. 302, with macroseismic chart.

A = −·5987, B = +·4594, C = +·6561 ; δ = −4 ; h = −2 ;
D = +·609, E = +·793 ; G = −·521, H = +·399, K = −·755.

	Δ	Az.	P.	O − C.	S.	O − C.
	°	°	m. s.	s.	m. s.	s.
Hatinohe	1·0	228	0 17a	− 2	0 29	− 4
Urakawa	1·0	13	0 19	0	0 33	0
Aomori	1·4	254	0 19a	− 5	0 35	− 8
Miyako	1·6	194	0 25a	− 2	0 44	− 3
Muroran	1·6	315	0 23	− 4	0 35	−12

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Mori		1·7	302	0 25	– 3	0 40	–10
Morioka		1·8	214	0 28 a	– 2	0 50	– 2
Mizusawa	N.	2·3	207	0 35	– 2	e 1 2	– 2
Akita		2·4	231	0 36	– 2	1 4	– 3
Isinomaki		2·9	198	1 0	+15	—	—
Nemuro		3·1	47	0 51	+ 3	1 22	– 2
Sendai		3·2	203	0 48	– 1	1 24	– 3
Hukusima		3·8	206	0 57	– 1	1 47	+ 5
Onahama		4·4	197	1 9	+ 3	1 59	+ 2
Shirakawa		4·4	204	1 7	+ 1	1 59	+ 2
Aikawa		4·6	228	1 5	– 4	1 54	– 8
Mito		5·1	199	1 16	0	2 32	SS
Utunomiya		5·1	205	1 23	+ 7	—	—
Maebasi		5·5	210	1 28	+ 7	2 37	SS
Kumagaya		5·6	207	1 23	0	2 26	– 1
Oiwake		5·7	214	1 26	+ 2	—	—
Misima		6·7	206	1 44	+ 6	—	—

Nov. 10d. Readings also at 0h. (Kiruna), 1h. (Harvard), 2h. (near Obi-garm (2)), 4h. (Pasadena, Riverside, Palomar, China Lake, Tinemaha, Vera Cruz, Puebla, near Manzanillo, Tacubaya, Guadalajara, near Mizusawa, Andijan, Ashkabad, near Dzhergetal, Obi-garm, and Khorog), 6h. (Apia and Tacubaya), 7h. (Messina, Brisbane, and near Apia (3)), 8h. (Palisades and Kiruna), 9h. (Samarkand, Tashkent, Stalinabad, near Almata, Almata II, Obi-garm, Garm, Rybach'e, Naryn, Dzhergetal, Tchimkent, Frunse, Fergana, and Andijan), 10h. (Strasbourg), 11h. (Wellington, Rybach'e, Almata II, Tchimkent, near Naryn, Fergana, and Andijan), 17h. (near Alicante), 18h. (Ashkabad (2) and near Apia (3)), 19h. (Pasadena, Palomar, China Lake, Tacubaya, Puebla, and Vera Cruz), 21h. (Apia (2)), 22h. (Tamanrasset, La Paz, near Antofagasta, Copiapo, near Prague, and Collmberg).

Nov. 11d. 12h. 15m. 21s. Epicentre 45°·8N. 151°·4E. (as on 1948, November 20d.).

A = –·6142, B = +·3349, C = +·7146 ; δ = +5 ; h = –4 ;
D = +·479, E = +·878 ; G = –·627, H = +·342, K = –·700.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		4·8	242	1 37	P_g	—	—	—	—	—
Urakawa		7·2	243	1 48	– 1	3 11	– 2	—	—	—
Sapporo		7·7	253	2 1	+ 5	3 36	+11	—	—	—
Aomori		9·2	241	2 18	+ 2	4 25	+22	—	—	—
Miyako		9·3	232	2 18	+ 1	—	—	—	—	—
Mizusawa	E.	10·1	232	e 2 35	+ 7	4 11	–14	—	—	—
Akita		10·3	238	2 29	– 3	4 36	+ 6	—	—	—
Sendai		10·8	230	2 38	– 1	4 29	–13	—	—	—
Hukusima		11·4	229	2 45	– 2	4 48	– 8	—	—	—
Inawasiro		11·8	230	2 54	+ 1	5 1	– 5	—	—	—
Onahama		11·8	225	3 2	+ 9	4 55	–11	—	—	—
Klyuchi		12·0	25	e 3 3	+ 8	—	—	—	—	—
Shirakawa		12·1	228	2 59	+ 2	4 59	–15	—	—	—
Mito		12·5	225	3 5	+ 3	5 10	–13	—	—	—
Utunomiya		12·7	227	2 58	– 7	—	—	—	—	—
Maebasi		13·2	229	3 11	0	5 34	– 6	—	—	—
Kumagaya		13·2	227	3 14	+ 3	5 33	– 7	—	—	—
Matusiro		13·5	232	3 17	+ 2	5 59	+12	—	—	—
Nagano		13·5	232	3 22	+ 7	6 11	SS	—	—	—
Oiwake		13·5	230	3 23	+ 8	—	—	—	—	—
Matumoto		13·9	231	3 27	+ 6	—	—	—	—	—
Toyama		14·0	235	3 19	– 3	6 1	+ 2	—	—	—
Vladivostok		14·2	266	i 3 25	+ 1	i 6 22	SS	—	—	—
Osima		14·3	224	3 20	– 6	6 29	SS	—	—	—
Hikone		15·6	233	3 42	– 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kameyama		15·8	231	3 55	+10	6 52?	+10	—	—	—
Kyoto		16·0	233	3 43	− 5	6 50	+ 4	—	—	—
Osaka		16·4	233	3 59	+ 6	7 12	+16	—	—	—
Kobe		16·6	234	3 55	− 1	7 23?	SS	—	—	—
Sumoto		17·0	234	4 2	+ 1	—	—	—	—	—
Siomisaki		17·2	231	4 7	+ 4	—	—	—	—	—
Kôti		18·4	235	4 18	0	7 48	+ 7	—	—	—
Ooita		19·7	238	4 37	+ 3	8 17	+ 7	—	—	—
Hukuoka		20·2	240	4 42k	+ 3	8 23	+ 2	—	—	—
Saga		20·5	240	4 46	+ 4	—	—	—	—	—
Kagosima		21·5	236	4 55	+ 3	8 33	−14	—	—	—
Zi-ka-wei	Z.	27·4	249	5 50	+ 1	10 33	+ 5	—	—	—
Nanking		28·6	254	5 59a	− 1	e 10 51	+ 3	—	—	—
Irkutsk		31·1	300	—	—	e 11 52	+24	—	—	—
College		37·6	37	i 7 19	+ 1	—	—	—	—	—
Manila		40·3	230	e 7 40	0	—	—	—	—	—
Almata II		51·1	296	e 9 8	+ 2	—	—	—	—	—
Resolute Bay		52·1	18	e 9 13a	− 1	—	—	—	—	—
Naryn		52·9	294	e 9 20	0	—	—	—	—	—
Frunse		53·0	297	e 9 23	+ 2	—	—	—	—	—
Sverdlovsk		53·7	318	9 25	− 1	17 3	+ 4	—	—	—
Andijan		55·5	295	i 9 39	0	e 17 29	+ 5	—	—	—
Fergana		56·1	295	e 9 43	0	e 17 33?	+ 1	—	—	—
Tashkent		57·2	298	e 9 51	0	—	—	—	—	—
New Delhi		59·5	282	e 10 6	− 1	e 18 14	− 2	10 53	PcP	—
Samarkand		59·5	297	i 10 6	− 1	—	—	—	—	—
Shasta Dam		60·0	61	e 10 12	+ 1	—	—	—	—	—
Hungry Horse		60·3	50	i 10 13	0	—	—	—	—	—
Mineral	Z.	60·7	61	i 10 15a	0	—	—	i 10 49	PcP	—
Kiruna		60·8	341	e 10 15	− 1	e 18 44	+11	e 20 7	ScS	e 29·6
Berkeley	Z.	61·8	64	e 10 21	− 2	—	—	i 10 31	?	—
Reno	Z.	62·3	61	e 10 24a	− 2	—	—	—	—	—
Lick	Z.	62·5	64	e 10 27a	− 1	i 10 51	PcP	i 10 32	?	—
Butte		62·5	51	e 10 27	− 1	—	—	—	—	—
Mary		64·0	298	e 10 37	− 1	—	—	—	—	—
Fresno	Z.	64·1	63	e 10 36a	− 2	—	—	—	—	—
Moscow		64·5	325	e 10 43	+ 2	—	—	—	—	—
Ashkabad		65·9	300	i 10 50	0	e 19 40	+ 3	—	—	—
China Lake	Z.	66·0	63	i 10 49a	− 1	—	—	—	—	—
Pasadena	Z.	66·7	65	e 10 54	− 1	—	—	—	—	—
Riverside	Z.	67·3	65	e 10 58	− 1	—	—	—	—	—
Boulder City		67·6	62	i 11 0	− 1	—	—	—	—	—
Palomar	Z.	68·1	65	e 11 2	− 2	—	—	—	—	—
Poona		68·4	275	i 11 6	0	e 20 5	− 2	11 22	PcP	31·6
Bombay	E.	68·8	276	e 11 12	+ 4	e 20 13	+ 2	24 54	SS	—
Shemakla		69·8	309	11 5	− 9	—	—	—	—	—
Piatigorsk		70·4	314	11 18	0	e 20 32	+ 2	—	—	—
Lenkoran		70·9	306	11 22	+ 1	20 38	+ 2	—	—	—
Kirovobad		70·9	310	i 11 22	+ 1	—	—	—	—	—
Tiflis		71·1	311	11 23	+ 1	20 46	+ 8	—	—	—
Erevan		72·3	310	e 11 30	+ 1	—	—	—	—	—
Nakhichevan		72·5	308	e 13 3?	?	—	—	—	—	—
Tucson		72·6	62	e 11 30	− 1	—	—	—	—	—
Yalta		74·3	319	e 11 41	0	e 21 19	+ 4	—	—	—
Lwow		74·4	328	i 11 42	0	e 21 9	− 7	—	—	—
Potsdam		75·9	336	e 11 53	+ 3	—	—	—	—	e 41·6
Uzhgorod		76·0	328	e 11 53	+ 2	—	—	—	—	—
Raciborzu	Z.	76·2	332	e 11 53	+ 1	—	—	e 13 13	?	—
Kirkland Lake	Z.	76·2	33	e 11 59	+ 7	—	—	—	—	—
Collmberg		76·8	335	e 11 55	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Witteveen	Z.	77·2	340	i 12 1	+ 4	—	—	—	—	—
Prague		77·5	334	e 12 0	+ 1	e 22 27	PS	e 14 56	PP	e 38·6
Jena	E.	77·6	335	e 11 59	− 1	e 21 52?	+ 1	e 12 8	PcP	—
De Bilt		78·2	340	i 12 7	+ 4	e 22 9	+12	—	—	e 34·6
Riverview		79·3	180	—	—	i 22 3	− 6	e 32 33	Q	e 40·0
Rathfarnham Castle		79·4	347	—	—	e 27 9	SS	—	—	—
Fayetteville		79·4	49	i 12 8	− 1	—	—	—	—	—
Istanbul		79·4	320	e 12 9	0	e 22 8	− 2	—	—	—
Belgrade		79·9	327	e 12 13a	+ 1	e 22 43	PS	—	—	e 51·1
Kew		80·1	342	—	—	e 29 16	SS	—	—	e 44·6
Ottawa		80·1	33	e 12 15	+ 2	—	—	—	—	—
Stuttgart		80·2	336	e 12 14	0	e 22 33	+14	e 12 27	PcP	e 39·6
Karlsruhe	Z.	80·2	337	e 12 14	0	—	—	—	—	—
Strasbourg		80·8	336	e 12 15	− 2	e 22 41	ScS	i 12 21	PcP	e 38·2
Triest		81·6	332	e 12 20	− 1	e 22 22	−11	e 15 19	PP	e 39·8
Zürich		81·7	336	e 12 21a	− 1	e 22 24	−10	—	—	—
Ksara		81·7	311	i 12 23a	+ 1	e 23 46	PPS	—	—	—
Paris		81·9	340	i 12 23	0	i 22 33	− 3	i 12 27	PcP	e 44·6
Morgantown		83·3	38	i 12 28	− 2	—	—	—	—	—
Florence		84·1	332	e 12 33	− 1	e 23 14	+16	—	—	—
Weston		84·3	31	e 12 35	0	—	—	—	—	e 44·8
Palisades		84·6	33	e 12 35	− 1	—	—	—	—	e 52·9
Clermont-Ferrand		84·6	339	i 12 39	+ 3	—	—	—	—	e 45·0
Messina	E.	87·4	327	—	—	e 31 23	SSS	e 35 53	Q	e 46·4
Christchurch		90·9	165	—	—	e 24 19	+16	—	—	e 45·6
La Paz	Z.	136·0	61	e 19 27	[+ 4]	—	—	—	—	—

Additional readings :—
New Delhi PPSN = 18m.24s.
Kiruna iZ = 10m.22s., eN = 13m.18s., eZ = 14m.22s., eScS?N = 20m.19s., eSSEN = 22m.39s.?
Poona SSE = 24m.40s.
Prague e = 12m.44s. and 13m.48s.
Jena eE = 12m.31s. and 13m.20s.
Stuttgart eZ = 12m.17s.
Strasbourg e = 13m.17s. and 13m.41s.
Triest esP?Z = 12m.59s., epPPZ = 15m.44s., esS? = 23m.10s.
Paris i = 12m.43s. and 12m.53s., iPP = 15m.35s., ePPPP = 19m.15s., ePSP = 23m.51s., eSS? = 28m.19s.
Long waves were also recorded at Scoresby Sund, Cheb, Rome, Pavia, Copenhagen, and Upsala.

Nov. 11d. Readings also at 2h. (China Lake, Palomar, Pasadena, Riverside, Tinemaha, and Tacubaya), 3h. (Apia (3)), 4h. (China Lake, Mount Wilson, Palomar, Apia (3), and near Manila), 5h. (Palisades, Pasadena, and near Apia (2), 6h. (La Paz), 10h. (Apia (3)), 11h. (Berkeley, Mount Wilson, Palomar, Stuttgart, Garm, Samarkand, Tchimkent, near Almata (2), Almata II, Andijan (2), Dzhergetal (2), Fergana (2), Frunse (2), Khorog (2), Murgab (2), Naryn (2), Przhevalsk, and Tashkent), 12h. (China Lake, Mount Wilson, Palomar, Tacubaya, Puebla, Merida, and near Vera Cruz), 13h. (near Almata II), 15h. (Frunse, Murgab, near Andijan, Almata II, Dzhergetal, Fergana, Naryn, and near Ashkabad), 16h. (Antofagasta, Andijan, Fergana, near Dzhergetal, Garm, Khorog, Obi-garm, Samarkand, and Stalinabad), 17h. (Dzhergetal, Fergana, near Andijan, Garm, Khorog, and Samarkand), 19h. (Basle, Zürich, Stuttgart, and near Bogota), 20h. (Kiruna, Strasbourg, Paris, Collmberg, Stuttgart, near Dzhergetal, Fergana, Garm, and Khorog), 21h. (Apia), 22h. (Terre Adelie, Antofagasta, Huancayo, near La Paz, Stalinabad, near Andijan, Dzhergetal, Fergana, Garm (2), Obi-garm, near Manila, and near Athens), 23h. (China Lake, Palomar, Pasadena, Riverside, Shasta Dam, Tinemaha, Butte, Fayetteville, Tucson, Harvard, San Juan, Collmberg, Istanbul, Ksara, and near Huancayo (2)).

Nov. 12d. 8h. 9m. 26s. Epicentre 47°·5N. 153°·9E. (as on 9d.).

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	7·2	238	1 44	− 5	3 2	−11	—	—	—
Abasiri	7·6	246	1 57	+ 2	3 28	+ 5	—	—	—
Kusiro	8·1	240	2 1	− 1	3 25	−10	—	—	—
Asahigawa	8·9	249	2 14	+ 2	—	—	—	—	—
Urakawa	9·5	240	2 16	− 4	3 55	−15	—	—	—

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.
Klyuchi		9·8	23	2 37	PP	—	—	—	—	—
Sapporo		9·9	248	2 27	+ 2	4 32	+12	—	—	—
Mori		10·9	245	2 38	− 2	4 57	+13	—	—	—
Hatinohe		11·3	236	2 39	− 7	4 34	−20	—	—	—
Aomori		11·5	239	2 45	− 3	5 24	SSS	—	—	—
Miyako		11·7	232	2 42	− 9	4 38?	−26	—	—	—
Morioka		12·1	234	2 50	− 7	5 0	−14	—	—	—
Mizusawa	E.	12·5	232	2 55	− 7	5 7	−16	—	—	—
Isinomaki		12·9	230	2 47	−20	—	—	—	—	—
Sendai		13·3	231	3 6	− 7	5 3	−39	—	—	—
Hukusima		13·9	230	3 11	−10	—	—	—	—	—
Aikawa		14·9	236	3 29	− 5	—	—	—	—	—
Mito		14·9	227	3 19	−15	—	—	—	—	—
Utunomiya		15·1	229	3 24	−12	—	—	—	—	—
Tukubasan		15·2	227	3 32	− 6	—	—	—	—	—
Takada		15·5	234	3 40	− 2	—	—	—	—	—
Kumagaya		15·6	229	3 39k	− 4	—	—	—	—	—
Maebasi		15·6	230	3 39	− 4	6 36	− 1	—	—	—
Tokyo		15·8	227	3 42	− 3	6 42	0	—	—	—
Nagano		15·9	233	3 45	− 2	—	—	—	—	—
Oiwake		15·9	231	3 44	− 3	—	—	—	—	—
Matusiro		16·0	232	3 42	− 6	6 37	− 9	—	—	—
Vladivostok		16·1	262	e 3 46	− 3	e 6 56	+ 7	—	—	—
Wazima		16·1	237	3 48	− 1	6 53	+ 4	—	—	—
Yokohama		16·1	227	3 43	− 6	—	—	—	—	—
Matumoto		16·3	232	3 51k	− 1	7 4	+11	—	—	—
Kohu		16·4	230	3 54	+ 1	—	—	—	—	—
Mera		16·4	225	3 49	− 4	6 46	−10	—	—	—
Toyama		16·4	235	3 45	− 8	6 57	+ 1	—	—	—
Misima		16·6	227	3 49	− 7	7 26	SS	—	—	—
Kanazawa		16·8	236	3 58	0	—	—	—	—	—
Takayama		16·8	234	3 53	− 5	—	—	—	—	—
Iida		16·9	231	4 1	+ 2	—	—	—	—	—
Shizuoka		17·1	228	3 59	− 3	7 16	+ 4	—	—	—
Hukui		17·4	238	4 6	0	—	—	—	—	—
Gihu		17·6	233	4 4	− 4	7 53	SS	—	—	—
Hamamatu		17·6	229	4 8	0	7 14	− 9	—	—	—
Nagoya		17·7	233	4 7	− 3	7 51	SS	—	—	—
Tsuruga		17·8	236	4 8	− 3	7 35	+ 7	—	—	—
Hikone		18·0	234	4 12	− 1	7 39	+ 7	—	—	—
Kameyama		18·2	233	4 14k	− 2	7 46	+ 9	—	—	—
Kyoto		18·4	236	4 18	0	7 51	+10	—	—	—
Osaka		18·8	236	4 22	− 1	8 13	SS	—	—	—
Owase		18·9	232	4 26k	+ 2	—	—	—	—	—
Kobe		19·0	236	4 21	− 5	8 0	+ 5	—	—	—
Sumoto		19·4	236	4 29	− 1	8 5	+ 1	—	—	—
Mitchell Field		19·5	63	e 4 32	+ 1	i 8 14	+ 8	—	—	—
Yonago		19·5	239	4 33	+ 2	i 8 15	+ 9	—	—	—
Siomisaki		19·6	233	4 34	+ 2	8 31	SS	—	—	—
Takamatu		19·9	237	4 34	− 2	8 8	− 7	—	—	—
Hamada		20·6	241	4 41	− 2	8 34	+ 5	—	—	—
Muroto		20·6	234	4 40a	− 3	8 23	− 6	—	—	—
Kôti		20·7	235	4 43	− 1	8 28	− 3	—	—	—
Hirosima		20·8	240	4 44	− 1	8 35	+ 2	—	—	—
Matuyama		21·0	239	4 44	− 3	8 46	+ 9	—	—	—
Simidu		21·6	237	4 54	0	8 55	+ 6	—	—	—
Ooita		22·1	239	5 4	+ 5	9 7	+ 9	—	—	—
Hukuoka		22·5	242	5 4a	+ 2	9 15	+10	—	—	—
Kumamoto		22·9	240	5 0	− 6	—	—	—	—	—
Miyazaki		23·1	236	5 33k	PP	9 23	+ 7	—	—	—
Unzendake		23·2	241	5 6	− 3	—	—	—	—	—
Nagasaki		23·4	241	5 15	+ 4	9 35	+14	—	—	—
Kagosima		23·9	238	5 17	+ 1	9 56	+26	—	—	—
Yakusima		24·8	237	5 22	− 3	10 12	+26	—	—	—
Zi-ka-wei		29·7	250	6 7a	− 3	11 5	− 1	i 6 11	P	—

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		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking		30·8	254	6 18a	– 2	11 20	– 3	i 6 22	P	—
Irkutsk		31·8	299	6 33	+ 5	11 56	+18	—	—	—
College		35·2	39	i 6 59	+ 1	e 12 32	+ 1	—	—	—
Sitka		42·5	50	i 8 7	+ 8	e 14 32	+10	—	—	—
Manila		42·7	232	e 7 54	– 6	i 14 17	– 7	9 55	PPP	—
Resolute Bay		50·0	19	i 8 59a	+ 1	—	—	—	—	—
Przhevalsk		51·7	294	9 12	+ 1	—	—	—	—	—
Almata II		51·9	296	i 9 13	+ 1	—	—	—	—	—
Almata		52·1	296	e 9 14	0	—	—	—	—	—
Victoria		52·7	57	9 19	+ 1	16 55	+ 9	e 19 8	ScS	—
Naryn		53·7	295	e 9 25	– 1	i 17 6	+ 7	—	—	—
Sverdlovsk		53·7	317	e 9 26	0	20 59	SS	11 23	PP	—
Frunse		53·8	297	e 9 27	+ 1	i 19 13	ScS	i 10 25	PcP	—
Seattle		53·8	57	e 9 59	+33	—	—	—	—	e 30·6
Andijan		56·4	296	e 9 44	– 1	—	—	—	—	—
Fergana		57·0	296	9 50	0	—	—	—	—	—
Tchimkent		57·1	299	i 9 50	0	—	—	—	—	—
Calcutta	E.	57·4	269	i 9 58	+ 5	i 18 17	+28	—	—	—
Shasta Dam		57·7	64	i 9 57	+ 2	—	—	—	—	—
Hungry Horse		57·9	53	i 9 57	+ 1	e 17 57	+ 2	—	—	—
Tashkent		57·9	298	i 9 56	0	—	—	—	—	—
Mineral	Z.	58·4	63	i 10 1a	+ 1	—	—	—	—	—
Garm		58·7	296	i 10 1	– 1	—	—	—	—	—
Obi-garm		59·3	296	i 10 18?	+12	e 18 39?	+25	—	—	—
Saskatoon		59·3	45	10 15	+ 9	18 17	+ 3	—	—	29·6
Berkeley		59·5	66	e 10 8	+ 1	i 18 29	+13	e 12 32	PP	e 27·8
Kiruna		59·8	342	i 10 10a	+ 1	i 18 28	+ 8	e 10 55	PcP	e 28·6
Stalinabad		59·9	296	i 10 10	0	i 18 31	+10	—	—	—
Reno	Z.	60·0	63	e 10 12	+ 1	—	—	—	—	—
Santa Clara		60·1	66	e 10 16	+ 5	e 18 15	– 9	—	—	e 26·7
Lick	Z.	60·3	66	e 10 14a	+ 1	e 18 26	0	—	—	—
Samarkand		60·3	298	10 13	0	—	—	—	—	—
New Delhi		60·9	282	e 10 15	– 2	22 35	SS	12 30	PP	25·4
Bozeman		61·2	53	e 10 32	+13	e 18 38	0	—	—	—
Fresno	Z.	61·8	66	e 10 22a	– 1	—	—	—	—	—
Scoresby Sund		62·3	359	i 10 28	+ 2	i 19 7	+15	e 12 44	PP	30·6
Tinemaha		62·5	65	e 10 30	+ 2	e 18 58	+ 4	i 10 35	P	—
Pulkovo		63·6	332	i 10 41	+ 6	—	—	—	—	—
China Lake	Z.	63·7	65	e 10 36	0	—	—	i 10 42	P	—
Moscow		64·1	326	e 10 39	+ 1	e 19 23	+ 9	—	—	—
Pasadena		64·5	67	e 10 39	– 2	e 19 12	– 7	i 10 46	P	e 26·6
Mary		64·7	300	i 10 45	+ 3	—	—	—	—	—
Helsinki		65·0	335	e 10 46	+ 2	e 19 35	+ 9	e 20 41	ScS	e 30·6
Riverside	Z.	65·1	67	e 10 43	– 2	—	—	i 10 50	P	—
Boulder City		65·3	63	e 10 46	0	—	—	—	—	—
Palomar		65·8	67	e 10 50	+ 1	i 19 35	0	—	—	—
Ashkabad		66·5	301	i 10 57	+ 3	e 19 55	+11	—	—	—
Upsala		67·2	338	i 10 58a	0	e 19 58	+ 6	e 13 17	PP	e 32·6
Djakarta		67·6	232	e 11 4k	+ 3	i 20 2	+ 5	—	—	—
Hyderabad		67·6	272	i 11 4	+ 3	i 20 4	+ 7	13 34	PP	—
Bergen		69·5	344	i 11 19	+ 7	e 20 28	+ 8	25 11	SS	e 31·6
Poona		69·9	276	i 11 16	+ 1	e 20 26	+ 2	13 56	PP	—
Tucson		70·3	63	e 11 17	0	e 20 25	– 4	—	—	—
Bombay	E.	70·4	277	i 11 18	0	i 20 31	+ 1	i 13 54	PP	33·4
Piatigorsk		70·4	315	11 18	0	—	—	—	—	—
Kirovobad		71·2	311	i 11 24	+ 1	—	—	—	—	—
Lenkoran		71·3	308	11 26	+ 3	20 52	+11	—	—	—
Tiflis		71·3	312	11 25	+ 2	e 20 52	+11	—	—	—
Borzhomi		71·9	313	e 11 28	+ 1	—	—	—	—	—
Goris		72·1	308	i 11 29	+ 1	—	—	—	—	—
Lincoln		72·1	49	e 12 39	+71	e 21 46	PPS	—	—	—
Copenhagen		72·2	339	i 11 36k	+ 7	e 21 0	+ 9	25 46	SS	34·6
Leninakan		72·4	312	e 11 37	+ 7	—	—	—	—	—
Erevan		72·6	311	i 11 32	+ 1	21 3	+ 7	—	—	—
Kodaikanal	E.	73·4	268	(i 11 37)	+ 1	(i 21 14)	+ 9	(14 28)	PP	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Aberdeen	E.	73·8	347	i 12 4	PcP	i 21 24	+15	e 32 29	Q	39·5
Kirkland Lake	Z.	73·8	34	e 11 42a	+ 4	—	—	—	—	—
Lwow		73·8	330	11 39	+ 1	i 21 17	+ 8	—	—	—
Simferopol		73·8	321	11 42	+ 4	—	—	—	—	—
Colombo	E.	74·2	263	11 54?	+14	21 9	− 5	—	—	46·6
Yalta		74·2	320	11 41	+ 1	21 22	+ 8	—	—	—
Brisbane		74·6	181	i 11 44k	+ 1	i 21 14	− 4	e 21 56	PS	—
Lubbock		74·6	57	e 10 48	−55	—	—	e 12 7	PcP	—
Potsdam		75·0	337	i 11 47	+ 2	i 21 30	+ 7	i 22 14	PPS	e 35·6
Uzhgorod		75·4	329	e 11 48	+ 1	21 33	+ 6	—	—	—
Raciborzu		75·6	333	e 11 52	+ 4	e 22 17	PPS	e 15 3	PP	—
Skalnate Pleso		75·7	331	12 6	+17	e 21 34	+ 4	e 12 20	PcP	—
Chicago		75·8	43	e 11 58	+ 8	e 21 34	+ 3	—	—	—
Collmberg		76·0	336	i 11 51	0	e 21 45	+11	e 12 10	PcP	e 36·6
Durham		76·0	346	i 12 4	+13	i 21 41	+ 7	—	—	—
Witteveen	Z.	76·2	341	e 11 54	+ 2	—	—	—	—	—
Sonneberg		76·6	337	e 12 2	+ 8	e 21 54	+14	e 12 7?	PcP	e 38·6
Jena		76·7	337	e 11 55	0	e 21 44?	+ 3	e 15 9	PP	e 37·9
Prague		76·7	335	12 2k	+ 7	e 21 42	+ 1	e 14 57	PP	e 34·6
Fayetteville		76·9	50	i 11 57	+ 1	—	—	—	—	—
De Bilt		77·2	341	i 12 5k	+ 8	i 21 58	+11	e 27 34	?	e 34·6
Cheb		77·3	337	12 4	+ 6	e 21 54	+ 6	e 14 58	PP	e 38·1
Budapest		77·5	331	12 4	+ 5	e 21 55	+ 5	15 0	PP	e 39·6
Ogyalla		77·5	332	e 12 4	+ 5	e 21 52	+ 2	e 15 2	PP	—
Bucharest		77·6	325	e 12 6	+ 6	e 21 59	+ 8	—	—	—
Ottawa		77·8	34	e 12 0	− 1	21 56	+ 3	16 56	PPP	35·6
Shawinigan Falls	N.	77·8	31	e 12 5	+ 4	21 55	+ 2	—	—	—
Rathfarnham Castle		78·2	349	i 12 6a	+ 3	e 22 48	PS	e 15 10	PP	e 32·1
Timisoara		78·3	328	13 34?	?	—	—	—	—	—
Buffalo		78·6	37	e 12 12	+ 7	e 22 5	+ 3	—	—	—
Cleveland		78·7	39	i 12 7k	+ 1	i 22 9	+ 6	i 23 21	PPS	—
Kew		79·0	344	i 12 10a	+ 3	e 22 10	+ 4	i 15 9	PP	e 31·6
Istanbul		79·2	321	e 12 10	+ 2	i 22 16	+ 8	e 15 16	PP	e 39·0
Karlsruhe	Z.	79·3	338	e 12 13	+ 4	—	—	i 12 17	PcP	e 37·6
Stuttgart		79·3	337	e 12 10	+ 1	e 22 14	+ 5	e 22 54	PS	40·6
Belgrade		79·4	328	e 12 12k	+ 3	e 22 50	PS	e 12 50	?	e 42·9
Strasbourg		79·9	338	e 12 14	+ 2	e 22 14	− 2	e 23 17	PPS	e 36·6
Pennsylvania		80·8	37	i 12 21	+ 4	e 22 30	+ 5	i 15 21	PP	—
Basle		80·9	338	e 12 19	+ 2	e 22 24	− 2	—	—	—
Morgantown		80·9	40	i 12 14	− 3	—	—	e 13 44	?	—
Paris		80·9	342	i 12 20	+ 3	i 22 30	+ 4	e 15 25	PP	e 41·6
Triest		80·9	334	e 12 18	+ 1	e 22 29	+ 3	e 23 16	PS	e 39·4
Chur		81·0	336	e 12 14	− 4	—	—	e 12 20	P	e 45·6
Riverview		81·0	183	e 12 2	−16	i 22 11	−16	i 22 53	PS	e 33·7
Neuchatel		81·6	338	e 12 23	+ 2	—	—	—	—	—
Harvard		81·8	32	i 12 25	+ 3	e 22 37	+ 2	e 23 50	PPS	e 48·0
Ksara		81·8	312	e 12 23	+ 1	22 56	ScS	—	—	—
Weston		82·0	32	i 12 24	+ 1	e 22 42	+ 5	e 27 44	SS	—
Palisades		82·2	35	e 12 26	+ 2	i 22 44	+ 5	e 27 48	SS	e 44·6
City College, N.Y.		82·3	35	i 12 29	+ 4	i 22 41	+ 1	—	—	—
Fordham		82·3	35	e 12 27	+ 2	22 49	+ 9	—	—	—
Halifax		82·5	26	—	—	e 22 52	+10	e 28 22	SS	—
Washington		82·7	38	i 12 30	+ 3	—	—	—	—	e 33·3
Florence		83·3	334	i 12 37	+ 7	e 23 10	ScS	i 24 6	PPS	—
Clermont-Ferrand		83·7	340	i 12 38	+ 6	e 23 10	+16	—	—	e 44·1
Athens		84·0	322	e 12 34	+ 1	—	—	i 12 37	P	—
Rome		84·7	332	i 12 44k	+ 7	i 23 13	+ 9	28 55	SS	39·8
Auckland	N.	86·0	163	e 24 6	PS	23 5	[− 2]	e 29 16	SS	35·7
Perth		86·2	212	—	—	i 23 28	+ 9	i 28 50	SS	—
Tacubaya		86·8	65	e 12 32	−15	e 23 28	+ 3	—	—	—
Messina	E.	86·9	329	e 12 56	+ 8	i 23 35	+ 9	—	—	—
Helwan		87·3	313	e 12 54	+ 4	23 22	[+ 6]	e 24 10	PS	—
Barcelona		88·0	339	e 13 41	?	23 49	+13	—	—	e 45·8
Wellington		90·3	165	e 13 2	− 2	i 23 55	− 2	e 16 46	PP	42·1
Toledo		90·8	343	e 13 13	+ 7	e 23 53	− 9	29 54	SS	46·1

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Alicante		91·5	340	13 12	+ 2	23 50	{– 2}	17 12	PP	e 45·1
Christchurch	N.	92·1	167	—	—	e 24 14	+ 1	e 23 34	SKS	e 42·8
Algiers Univ.	Z.	92·2	337	e 13 12	– 1	—	—	—	—	—
Bermuda		93·3	33	i 13 31	+13	i 24 30	+ 6	e 25 43	PS	—
Granada		93·3	342	13 2a	–16	23 56	[+ 4]	26 50	PPS	47·0
Almeria		93·4	341	12 51	–27	23 47	[– 5]	16 23	?	50·5
Tamanrasset	Z.	104·5	330	e 14 12	+ 4	—	—	e 18 30	PP	50·6
Fort de France		110·6	37	e 19 15	PP	—	—	—	—	—
Bogota		113·2	54	i 19 54	PP	i 35 24	SS	i 33 47	?	e 57·6
Huancayo		125·8	67	e 19 7	[+ 3]	e 28 2	{+ 9}	e 31 4	PS	e 52·9
La Paz		133·7	63	i 19 25	[+ 6]	i 27 4	[+35]	i 22 4	PP	64·6
Kimberley	Z.	136·7	277	i 19 24	[0]	—	—	—	—	—
La Plata		153·2	74	20 28	PKP_2	30 34	{– 2}	62 34	Q	71·3

Additional readings and note :—
Resolute Bay iZ = 9m.4s., i = 9m.16s., e = 9m.55s.
Frunse ePPP = 12m.49s., ePS = 17m.24s., iSS = 21m.4s., iSSS = 23m.10s.
Berkeley eSSEN = 22m.28s., eQEN = 25m.16s.
Kiruna ePPPEN = 13m.51s., ePPPZ = 14m.0s., ePcSZ = 15m.2s., iPPSN = 18m.58s., eScSZ = 20m.1s., eSSN = 22m.27s., eSSSE = 25m.6s. and other unidentified readings.
New Delhi PPPN = 13m.58s., SSSN = 25m.5s.
Scoresby Sund i = 20m.29s.
Pasadena i = 10m.52s., iEZ = 11m.11s.
Helsinki eSSSN = 26m.51s.
Riverside eZ = 10m.56s.
Palomar iZ = 10m.55s. and 11m.3s.
Upsala iN = 11m.2s., iPcPN = 11m.14s., e = 11m.50s., iPPPN = 15m.14s., eN = 19m.24s., iN = 23m.58s., eSSN = 24m.26s., eSSSE = 27m.22s.
Hyderabad SSN = 24m.37s.
Bergen iZ = 11m.22s.
Poona PcPE = 11m.31s., eSN = 20m.30s., PPSE = 21m.2s., ScSEN = 21m.10s., SSN = 25m.19s.
Bombay PPPE = 15m.46s., PSE = 20m.58s., PPSE = 21m.10s., SSE = 25m.20s., Q = 30m.11s.
Kodaikanal SSE = (26m.2s.); readings have been increased by 1 minute.
Aberdeen iE = 16m.59s., iSSE = 26m.24s., eSSSE = 29m.29s.
Brisbane iZ = 11m.47s., iSKSN = 21m.44s.
Potsdam iP = 11m.52s., iSE = 21m.34s.?
Raciborzu eN = 11m.56s., ePcPE = 12m.0s., eN = 14m.4s., eZ = 14m.16s.
Collmberg e = 13m.43s.
Jena iPE = 12m.0s., eN = 12m.46s., 14m.10s., and 22m.43s.
Prague ePcPZ = 12m.15s., e = 12m.55s., eSE = 21m.46s., eScS?N = 22m.10s., eScS?E = 22m.14s., ePSN = 22m.24s., eSS = 26m.44s.
Cheb e = 17m.58s., 23m.5s., and 25m.10s.
Budapest iE = 12m.8s., PcPN = 12m.15s., SN = 21m.59s., PPSE = 23m.2s., SSN = 26m.54s., eSSE = 27m.5s., eSSSN = 30m.48s.
Ogyalla e = 12m.48s.
Kew e = 18m.22s., ePS = 22m.55s., eSSEN = 27m.3s.
Istanbul eE = 22m.38s., ePSN = 23m.1s., eSSEN = 27m.26s.
Stuttgart iP = 12m.16s., eZ = 12m.28s., e = 12m.54s., ePP = 14m.52s., e = 26m.22s., 29m.10s., and 32m.46s., eQ = 37·6m.
Strasbourg i = 12m.20s., iScS = 22m.25s., ePS = 23m.12s., e = 26m.8s. and 26m.58s., eSS = 27m.45s., eSSS = 31m.6s.
Pennsylvania eZ = 12m.39s., eN = 12m.48s., iZ = 12m.53s., iN = 24m.24s.
Paris iPPP = 17m.23s., iPPPP = 19m.3s., iS = 22m.35s., iScS = 22m.43s., iPS = 23m.6s., iPPS = 23m.27s., iSPP = 23m.41s., iSS = 27m.41s., and many other unidentified readings.
Riverview iSE = 22m.6s., iN = 22m.20s., eSSN = 27m.28s.
Harvard eSS = 27m.39s., e = 28m.37s.
Rome iZ = 13m.26s., SSS = 32m.21s.
Wellington ePPP = 18m.50s., iSKS = 23m.25s., iPS = 25m.13s., SS = 29m.27s.
Toledo e = 13m.16s. and 14m.51s.
Alicante S = 24m.36s., SS = 30m.51s., SSS = 34m.50s., Q = 39m.10s.
Christchurch ePSN = 25m.19s., eN = 29m.24s.
Bermuda eSS = 30m.46s.
Granada eSS = 31m.45s., SSS = 36m.1s.
Tamanrasset eZ = 17m.36s., iZ = 18m.1s.
Huancayo ePKS? = 23m.10s., ePPS = 32m.19s., e = 33m.48s., eSS = 37m.52s. and 38m.14s., eSSS = 42m.10s.
La Paz iPKSZ = 22m.50s., SKKS = 28m.34s., iPPS = 34m.5s., iSS = 39m.37s., SSP = 40m.9s., i = 41m.54s.
La Plata E = 29m.4s., PPSE = 37m.58s., SSSN = 48m.16s., N = 59m.28s.
Long waves were also recorded at Apia, Pavia, Malaga, and Coimbra.

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Nov. 12d. 8h. 50m. 10s. Epicentre 47°·5N. 153°·9E. (as at 8h. 9m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa	E.	12·5	232	3 2	0	5 1	–22	—	—
Resolute Bay		50·0	19	e 8 58k	0	—	—	—	—
Kiruna	Z.	59·8	342	i 10 9	0	—	—	—	—
Scoresby Sund		62·3	359	e 10 25	– 1	—	—	—	—
Tinemaha	Z.	62·5	65	e 10 38	+10	—	—	—	—
China Lake	Z.	63·7	65	e 10 35	– 1	—	—	i 10 45	?
Pasadena	Z.	64·5	67	e 10 49	+ 8	—	—	—	—
Riverside	Z.	65·1	67	e 10 43	– 2	—	—	e 10 52	?
Palomar	Z.	65·8	67	i 11 0	+11	—	—	—	—
Poona	Z.	69·9	276	i 11 14	– 1	—	—	—	—
Copenhagen		72·2	339	e 11 29	0	—	—	—	—
Collmberg		76·0	336	e 11 50	– 1	—	—	—	—
Jena	E.	76·7	337	e 11 56	+ 1	—	—	—	—
Stuttgart	Z.	79·3	337	e 12 9	0	—	—	—	—
Strasbourg		79·9	338	e 12 13	+ 1	—	—	e 12 42	?
Basle		80·9	338	e 12 18	+ 1	—	—	—	—
Paris		80·9	342	e 12 18	+ 1	e 12 26	PcP	i 12 21	P

Long waves were also recorded at Bombay, Timisoara, and Clermont-Ferrand.

Nov. 12d. 9h. 13m. 46s. Epicentre 24°·4S. 178°·5W. Depth of focus 0·050.

A = –·9114, B = –·0239, C = –·4108 ; δ = –2 ; h = +4 ;
D = –·026, E = +1·000 ; G = +·411, H = +·011, K = –·912.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		12·3	32	i 2 43	– 3	i 4 46	–12	—	—	—
Auckland	N.	13·7	203	i 3 4	+ 1	e 5 21	– 7	—	—	—
Tuai	N.	14·8	193	3 44	+29	e 6 21	+30	—	—	—
New Plymouth	E.	15·9	202	e 3 30	+ 3	e 6 20	+ 7	e 3 40	PP	—
Wellington		17·8	197	3 41	– 5	i 6 46	– 2	i 14 46	ScS	—
Cobb River	E.	18·2	202	e 3 49	– 1	e 6 54	– 2	—	—	—
Kaimata	N.E.	19·9	202	4 9	+ 2	e 7 26	0	—	—	—
Christchurch		20·4	198	i 4 13	+ 1	7 31	– 4	e 7 44	?	—
Brisbane		25·8	256	i 5 2k	0	e 8 54	–11	i 6 6	pP	—
Riverview		27·9	243	i 5 23k	+ 2	i 9 42	+ 4	i 6 31	pP	—
Terre Adélie		49·2	200	i 8 16	0	i 14 53	0	9 34	pP	—
Manila		70·6	296	e 10 38	– 2	i 19 17	– 7	—	—	—
Djakarta		73·5	271	i 11 0	+ 3	i 19 58	+ 2	—	—	—
Mitchell Field		76·0	2	i 12 5	+54	—	—	i 12 34	?	—
Berkeley	Z.	81·4	42	i 11 41k	+ 1	e 15 22	PP	i 13 4	pP	—
Lick	Z.	81·6	42	i 11 42k	+ 1	—	—	—	—	—
Pasadena		81·7	47	i 11 42	+ 1	—	—	i 13 4	pP	—
Nanking	Z.	82·0	310	i 11 44a	+ 1	—	—	i 14 54	PP	—
Palomar		82·1	48	i 11 45a	+ 2	i 21 35	+ 8	i 13 7	pP	—
Riverside		82·1	47	i 11 44a	+ 1	—	—	i 13 7	pP	—
Fresno	Z.	82·2	43	e 11 44a	0	—	—	e 13 11	pP	—
China Lake	Z.	83·0	45	i 11 49a	+ 1	—	—	i 13 13	pP	—
Shasta Dam		83·1	39	i 11 50	+ 2	—	—	i 13 14	pP	—
Mineral	Z.	83·4	40	i 11 50k	0	—	—	i 13 14	pP	—
Tinemaha		83·4	44	i 11 53k	+ 3	i 21 40	0	e 13 14	pP	—
Reno		83·9	41	e 11 54k	+ 2	—	—	e 13 17	pP	—
Boulder City		85·0	47	i 12 0	+ 2	i 21 54	– 1	—	—	—
Tucson		85·7	52	i 12 3	+ 2	e 21 56	– 6	—	—	—
Victoria		87·7	33	12 10	– 1	—	—	e 13 38	pP	—
Tacubaya		88·6	68	e 12 23	+ 8	e 22 14	[+ 5]	e 22 37	S	—
Butte		92·0	39	i 12 32	+ 1	—	—	i 13 56	pP	—
College		92·1	12	i 12 30	– 1	e 22 56	– 4	—	—	—
Hungry Horse		92·5	37	i 12 33	0	—	—	i 13 58	pP	—
Huancayo		96·8	107	e 12 58	+ 5	i 23 3	[+ 9]	e 14 23	pP	e 38·4
Resolute Bay		111·7	16	e 17 52	[+ 1]	—	—	e 18 40	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.
Ottawa		115·7	49	e 19 32	PP	—	—	—	—	—
Palisades		116·3	55	e 18 2	[0]	—	—	—	—	—
San Juan		117·3	81	e 18 4	[0]	—	—	e 18 29	?	—
Kimberley	Z.	122·6	204	i 18 16	[+ 2]	—	—	—	—	—
Pretoria	Z.	123·9	209	i 18 18	[+ 1]	—	—	—	—	—
Scoresby Sund		131·9	11	i 18 42	[+10]	—	—	i 20 56	?	—
Kiruna	Z.	135·0	350	i 18 24	[−14]	i 21 34	SKP	i 18 38	PKP	—
Copenhagen		147·7	349	i 19 3	[+ 3]	—	—	—	—	—
Ksara		148·6	295	i 19 4	[+ 2]	—	—	22 40	PP	—
Rathfarnham C.	Z.	150·5	10	i 19 14	[+10]	—	—	e 20 39	pPKP	—
Potsdam	Z.	150·7	347	i 19 5	[+ 1]	—	—	—	—	—
Skalnate Pleso		151·2	335	19 25	[+20]	e 22 23	PKS	e 21 3	pPKP	—
Raciborzu		151·3	338	e 19 6	[0]	e 22 30	PKS	e 19 11	PKP_2	—
Witteveen	Z.	151·3	354	i 19 15k	[+ 9]	—	—	i 20 46	pPKP	—
Collmberg		151·7	345	e 19 6	[0]	e 22 54	PP	i 20 48	pPKP	—
Istanbul	Z.	151·7	313	e 19 6	[0]	—	—	i 19 13	PKP_2	—
Jena		152·4	346	e 19 7	[0]	e 23 29	PP	e 20 53	pPKP	—
Prague		152·5	343	i 19 17a	[+19]	e 21 36	sPKP	e 20 49	pPKP	—
Helwan	Z.	152·9	288	19 8	[0]	—	—	20 59	pPKP	—
Cheb		153·0	346	e 19 31	[+23]	—	—	e 20 53	pPKP	—
Belgrade		154·5	328	e 19 21k	[+11]	—	—	—	—	—
Karlsruhe	Z.	154·8	350	e 19 13	[+ 2]	—	—	e 19 35	PKP_2	—
Stuttgart	Z.	154·9	349	e 19 12	[+ 1]	—	—	e 20 33	pPKP	—
Strasbourg		155·4	351	i 19 14	[+ 3]	—	—	e 20 0	PKP_2	—
Paris		155·6	0	i 19 3	[− 9]	e 25 17	[−25]	e 23 22	PP	—
Basle		156·4	350	e 19 24	[+11]	—	—	i 19 4f	PKP_2	—
Triest	Z.	156·6	340	e 19 33	[+20]	—	—	e 20 38	pPKP	—
Chur		156·7	348	e 18 13	[−60]	—	—	i 18 46	?	—
Clermont-Ferrand		158·7	357	i 19 18	[+ 2]	i 19 54	PKP_2	i 21 1	pPKP	—
Toledo		163·9	16	i 20 18	PKP_2	—	—	—	—	—
Alicante		166·0	8	19 48	[+25]	44 56	SS	21 4	pPKP	80·4
Granada		166·5	19	19 51a	[+28]	26 42	[+50]	—	—	—
Malaga		166·7	21	i 19 26	[+ 3]	i 25 49	[− 3]	i 20 31	PKP_2	—
Tamanrasset	Z.	176·0	247	i 19 30a	[+ 2]	e 31 21	SKKS	i 21 12	pPKP	—

Additional readings :—

Auckland iN =4m.34s., iSN =5m.35s., PcP?N =7m.23s.
Wellington i =3m.47s., eS =6m.41s., esScS =17m.29s.
Cobb River eE =4m.1s. and 11m.7s.
Brisbane epPN =6m.9s., iE =7m.39s., ePcPN =8m.29s., eE =9m.54s., eSSEN =11m.6s., iEZ =11m.28s.
Riverview iEZ =6m.41s., iN =11m.56s., i =12m.8s., iE =12m.14s., iN =12m.18s., iE = 12m.23s., iScSN =15m.30s., iEN =18m.15s.
Terre Adélie iScS =17m.28s.
Manila ePP =13m.5s., iPPP =14m.10s.
Pasadena iNZ =11m.52s., iZ =13m.18s., iPKKPZ =30m.11s., ePKP,PKPZ =38m.21s., iSKP,PKPZ =41m.12s.
Palomar iNZ =11m.56s., eSKP,PKPZ =41m.11s.
Riverside iZ =11m.55s., iPKKPZ =30m.10s., ePKP,PKPZ =38m.17s., eSKP,PKPZ = 41m.9s.
China Lake iZ =11m.59s. and 14m.4s., iPKKPZ =30m.9s., ePKP,PKPZ =38m.17s., eSKP,PKPZ =41m.6s.
Tinemaha iZ =12m.2s. and 14m.11s., eSKP,PKPZ =41m.7s.
Huancayo e =15m.54s. and 23m.49s.
Kiruna iZ =18m.28s.
Potsdam iZ =19m.11s., eEN =19m.14s.
Skalnate Pleso PKP_2? =19m.44s., e =20m.34s., epPKP_2E =21m.17s.
Raciborzu eZ =19m.18s.
Collmberg iEZ =19m.14s. and 19m.23s.
Jena eEZ =19m.12s., eE =19m.29s. and 19m.49s.
Prague iZ =19m.28s., ePKP_2 =19m.40s., e =19m.50s., epPKPZ =20m.59s., epPKP_2? = 21m.19s., e =23m.55s., eSKS? =26m.45s.
Helwan eZ =19m.18s., PKP_2Z =19m.32s.
Cheb eN =19m.37s., e =27m.40s.
Belgrade e =19m.35s. and 19m.46s.
Stuttgart eZ =19m.22s., 19m.38s., and 20m.58s.
Strasbourg i =19m.22s. and 19m.39s.
Paris i =19m.23s., 19m.41s., and 19m.46s., iPKP_2 =19m.53s., e =23m.54s. and 25m.5s.
Triest ePKPZ =19m.45s., ePKP_2Z =20m.21s.?
Alicante SKS =26m.30s., PS =28m.32s., SSP =46m.28s.
Malaga iPP =24m.18s.
Tamanrasset eZ =19m.56s., iPKP_2Z =21m.3s., ipPKP_2Z =22m.39s., ePPZ =25m.0s., eZ =28m.12s., iPPPZ =29m.54s.

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Nov. 12d. 9h. 36m. 36s. Epicentre 17°·0N. 61°·0W. Depth of focus 0·010.
(as on 1948, Oct. 27d.).

Felt at Antigua.

A = +·4639, B = −·8369, C = +·2906 ; δ = +5 ; h = +5 ;
D = −·875, E = −·485 ; G = +·141, H = −·254, K = −·957.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		2·3	184	i 0 29	− 8	—	—	—	—	—
San Juan		5·0	287	i 1 9	− 5	i 2 1	−10	—	—	—
Bermuda		15·7	348	i 3 31	− 6	i 6 10	−18	—	—	—
Washington		26·0	332	e 5 34	+ 8	—	—	—	—	—
Palisades		26·4	339	e 5 30	+ 1	e 10 30	sS	i 6 4	pP	—
Weston		26·8	344	—	—	(e 10 44)	sS	—	—	e 10·7
Harvard		27·0	344	i 5 36	+ 1	e 10 41	sS	i 5 54	pP	—
Morgantown		27·9	328	i 5 40	− 3	e 11 12	+54	—	—	—
Cleveland		30·1	329	i 6 4a	+ 2	i 13 9	SSS	i 6 15	pP	—
Ottawa		30·9	341	i 6 11	+ 1	—	—	—	—	—
Shawinigan Falls	N.	31·0	345	e 6 13	+ 3	—	—	—	—	—
Huancayo		32·1	207	e 6 16	− 4	e 11 14	−10	e 7 12	PP	—
Kirkland Lake	Z.	34·8	338	i 6 45a	+ 2	—	—	—	—	—
Tacubaya		36·3	280	e 7 10	pP	—	—	—	—	—
Tucson		47·4	299	i 8 26	0	—	—	—	—	—
Boulder City		51·1	304	i 8 55	0	—	—	i 7 15	?	—
Butte		51·5	317	i 8 58	0	—	—	—	—	—
Palomar		52·5	300	i 9 5a	0	—	—	i 9 29	pP	—
Riverside	Z.	53·0	301	i 9 8	− 1	—	—	—	—	—
Hungry Horse		53·1	319	i 6 56	?	—	—	—	—	—
China Lake	Z.	53·3	303	i 9 11a	0	—	—	i 9 24	?	—
Pasadena		53·7	301	i 9 13	− 1	—	—	i 9 23	?	—
Tinemaha	Z.	53·9	304	i 9 17	+ 1	—	—	—	—	—
Fresno	Z.	55·1	304	e 9 23a	− 1	—	—	—	—	—
Reno	Z.	55·4	307	e 9 25a	− 1	—	—	—	—	—
Rathfarnham C.	Z.	55·7	36	i 9 41	+12	—	—	—	—	—
Lick	Z.	56·7	304	i 9 36a	0	—	—	—	—	—
Mineral	Z.	56·9	308	i 9 37a	0	—	—	—	—	—
Shasta Dam		57·5	308	i 9 40	− 1	—	—	—	—	—
Victoria		59·2	317	8 52	−61	—	—	—	—	—
Resolute Bay		60·6	350	e 10 3	0	—	—	—	—	—
Tamanrasset	Z.	62·4	73	i 10 18a	+ 3	—	—	e 12 32	PP	—
Strasbourg		63·4	44	e 10 35	+13	—	—	—	—	—
Stuttgart	Z.	64·4	44	e 10 31	+ 3	—	—	e 10 39	?	—
Jena		66·0	42	e 10 51	+13	e 23 8	SS	e 11 54	?	—
Collmberg		66·9	42	e 10 48	+ 4	23 2	SS	16 6	?	32·0
Triest	Z.	67·7	47	e 10 48	− 1	e 13 27	PP	e 11 15	pP	—
Prague		67·8	42	e 11 2	pP	—	—	—	—	—
Kiruna	Z.	71·3	23	i 11 12k	+ 1	—	—	—	—	—
College		73·4	334	e 11 23	0	—	—	—	—	—
Istanbul	Z.	79·1	50	e 12 10	pP	—	—	—	—	—
Brisbane	Z.	146·9	246	i 19 34a	[+ 5]	—	—	i 19 49	pPKP	—

Additional readings :—
Palisades eS = 10m.33s., iSS = 15m.55s.
Cleveland iE = 6m.10s.
Palomar iZ = 9m.17s.
Riverside iZ = 9m.24s., eZ = 10m.16s.
Jena eE = 24m.18s.

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Nov. 12d. 19h. 21m. 28s. Epicentre 47°·5N. 153°·9E. (as at 8h. 50m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	12·5	232	e 5 20	S	(e 5 20)	– 3	—	—	—
Zi-ka-wei	Z.	29·7	250	i 6 12a	+ 2	e 11 3	– 3	—	—	—
Nanking		30·8	254	6 22a	+ 2	e 11 24	+ 1	—	—	—
College		35·2	39	i 6 56	– 2	—	—	—	—	—
Resolute Bay		50·0	19	i 8 57a	– 1	—	—	—	—	—
Shasta Dam		57·7	64	e 9 54	– 1	—	—	—	—	—
Hungry Horse		57·9	53	i 9 55	– 1	—	—	—	—	—
Mineral	Z.	58·4	63	i 10 5k	+ 5	—	—	—	—	—
Kiruna		59·8	342	i 10 9a	0	e 22 48	SS	e 25 32?	Q	e 29·7
Reno	Z.	60·0	63	e 10 16a	+ 5	—	—	—	—	—
Butte		60·1	53	e 10 10	– 1	—	—	—	—	—
Lick	Z.	60·3	66	i 10 12a	– 1	—	—	—	—	—
Fresno	Z.	61·8	66	e 10 3k	–20	—	—	—	—	—
Tinemaha	Z.	62·5	65	e 10 28	0	—	—	e 10 38	?	—
China Lake	Z.	63·7	65	i 10 35	– 1	—	—	i 10 44	?	—
Pasadena	Z.	64·5	67	e 10 39	– 2	—	—	i 10 49	?	—
Riverside	Z.	65·1	67	e 10 42	– 3	—	—	e 10 52	?	—
Boulder City		65·3	63	i 10 45	– 1	—	—	—	—	—
Poona		69·9	276	i 11 18	+ 3	e 20 24	0	—	—	—
Tucson		70·3	63	e 11 16	– 1	—	—	—	—	—
Bombay	E.	70·4	277	e 11 21	+ 3	e 20 33	+ 3	—	—	—
Kirkland Lake	Z.	73·8	34	e 11 37a	– 1	—	—	—	—	—
Potsdam		75·0	337	e 11 46	+ 1	—	—	—	—	e 41·5
Collmberg		76·0	336	e 12 9	PcP	—	—	—	—	—
Jena		76·7	337	e 11 55	0	e 12 8	PcP	e 12 39	?	—
Prague		76·7	335	e 11 56	+ 1	—	—	e 12 10	PcP	—
Fayetteville		76·9	50	i 11 55	– 1	—	—	i 12 8	PcP	—
Ottawa		77·8	34	e 11 59	– 2	—	—	—	—	—
Shawinigan Falls N.		77·8	31	e 12 9	+ 8	—	—	—	—	—
Rathfarnham Castle		78·2	349	i 12 2	– 1	—	—	—	—	e 40·5
Kew		79·0	344	i 12 7	0	—	—	—	—	e 43·5
Istanbul	Z.	79·2	321	e 12 9	+ 1	—	—	—	—	—
Stuttgart		79·3	337	e 12 10	+ 1	e 22 3	–6	—	—	e 41·5
Morgantown		80·9	40	i 12 17	0	—	—	—	—	—
Paris		80·9	342	i 12 18	+ 1	e 23 22	PS	i 17 14	PPP	e 40·5
Triest		80·9	334	e 12 17	0	—	—	—	—	e 40·0
Ksara		81·8	312	i 12 24	+ 2	e 23 52	PPS	—	—	—
Weston		82·0	32	i 12 23	0	—	—	—	—	—
Palisades		82·2	35	i 12 22	– 2	—	—	—	—	—
Helwan	Z.	87·3	313	i 12 52	+ 2	—	—	—	—	—

Additional readings :—
Mizusawa SE = 5m.47s., eSN = 5m.50s.
Prague e = 12m.22s., 12m.38s., and 13m.13s.
Paris e = 12m.34s. and 18m.14s.
Long waves were also recorded at Copenhagen, De Bilt, Strasbourg, Florence, and Rome.

Nov. 12d. Readings also at 2h. (near Dzhergetal), 3h. (Apia (2), near Dzhergetal, and near Djakarta), 4h. (China Lake, Apia, Stuttgart, Resolute Bay, near Mizusawa, and near Akhalkalaki), 5h. (near Istanbul), 7h. (Apia, near Garm, and near Akhalkalaki), 8h. (Mizusawa, Resolute Bay, Mount Wilson, Riverside, Palomar, China Lake (2), Kiruna (2), Paris (2), Strasbourg (2), Stuttgart (3), and Collmberg (4)), 9h. (Karapiro, Scoresby Sund, Tortosa, Kiruna, Stuttgart, Mount Wilson, Riverside, Palomar, and near Mizusawa), 10h. (Strasbourg, Paris, Almata, near Andijan, Naryn, Dzhergetal, Frunse, Garm, Tchimkent, Khorog, Almata II, and near Huancayo), 11h. (near Istanbul, near Ashkabad, near Chilisk, Almata II, Przhevalsk, and Ili), 13h. (Apia, Andijan, near Khorog, Garm (2), Dzhergetal, Obi-garm, and Fergana), 14h. (Apia and Tananarive), 17h. (near Huancayo), 19h. (China Lake, Reno, Boulder City ,Hungry Horse, Shasta Dam, College, Mitchell Field, Palisades, Weston, Collmberg, and Kiruna), 20h. (Palisades, Collmberg, and near Andijan), 22h. (Collmberg, Stuttgart, Strasbourg, Paris, Kiruna, Harvard, Apia, New Delhi, and near Djakarta).

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Nov. 13d. 7h. 57m. 37s. Epicentre 14°·1N. 146°·4E. (as on 1947, Dec. 22d.).

A = −·8082, B = +·5369, C = +·2421 ; δ = +6 ; h = +6 ;
D = +·553, E = +·833 ; G = −·202, H = +·134, K = −·970.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		24·6	275	e 5 19	− 4	—	—	—	—	—
Zi-ka-wei	Z.	28·5	311	5 56	− 3	e 10 42	− 4	—	—	—
Nanking		30·9	310	e 6 21k	+ 1	e 11 17	− 7	i 7 22	PP	—
Vladivostok		31·5	340	6 25	− 1	i 11 35	+ 1	—	—	—
Riverview		47·9	175	e 9 10	+28	i 15 21	−18	—	—	e 21·6
Irkutsk		50·7	328	e 9 3	0	16 18	0	—	—	—
Przhevalsk		64·4	311	e 10 38	− 2	—	—	—	—	—
Almata		65·5	312	e 10 49	+ 2	—	—	—	—	—
College		67·1	25	e 10 55	− 2	—	—	i 10 58	P	—
Frunse		67·2	311	e 10 58	0	—	—	—	—	—
Andijan		68·9	308	e 11 9	0	20 13	0	—	—	—
Fergana		69·3	308	e 11 10	− 1	e 20 16	− 1	—	—	—
Poona	Z.	69·4	285	e 11 7	− 5	—	—	—	—	—
Bombay	E.	70·3	286	e 11 18	+ 1	e 20 28	− 1	—	—	—
Garm		70·5	307	e 11 16	− 2	—	—	—	—	—
Tchimkent		70·9	310	e 11 21	0	e 20 35	− 1	—	—	—
Obi-garm		71·0	307	e 11 20	− 2	—	—	—	—	—
Tashkent		71·2	309	e 11 22?	− 1	e 20 41?	+ 1	—	—	—
Stalinabad		71·7	307	e 11 41	+15	—	—	—	—	—
Sverdlovsk		76·0	326	11 50	− 1	21 29	− 5	—	—	—
Mary		77·3	307	i 11 58	0	—	—	—	—	—
Ashkabad		80·0	306	12 15	+ 2	—	—	—	—	—
Kizyl-Arvat		81·4	308	12 21	+ 1	—	—	—	—	—
Shasta Dam		81·9	50	i 12 23	0	—	—	—	—	—
Berkeley	Z.	82·5	53	e 12 27k	+ 1	—	—	—	—	—
Mineral	Z.	82·5	50	i 12 27a	+ 1	—	—	—	—	—
Lick	Z.	83·1	53	i 12 29a	0	—	—	—	—	—
Resolute Bay		83·7	14	e 12 33	+ 1	—	—	—	—	—
Reno	Z.	84·0	50	e 12 35a	+ 2	—	—	—	—	—
Fresno	Z.	84·7	53	e 12 37a	0	—	—	—	—	—
Hungry Horse		85·8	41	i 12 43	+ 1	—	—	—	—	—
Tinemaha	Z.	85·8	53	e 12 43	+ 1	—	—	—	—	—
China Lake	Z.	86·6	54	e 12 46	0	—	—	i 12 51	PcP	—
Pasadena	Z.	86·6	56	e 12 47	+ 1	—	—	i 12 50	PcP	—
Riverside	Z.	87·3	56	e 12 50	0	—	—	—	—	—
Butte		87·5	43	e 12 50	− 1	—	—	—	—	—
Palomar	Z.	87·9	57	e 12 45	− 8	—	—	—	—	—
Boulder City		88·8	53	i 12 57	0	—	—	i 13 2	PcP	—
Kiruna		89·6	342	e 12 59	− 2	e 23 48	− 3	e 36 23?	Q	e 44·4
Piatigorsk		89·6	316	e 12 51	−10	23 34	[+ 4]	—	—	—
Yalta		95·4	318	—	—	e 24 4	[+ 1]	—	—	—
Ksara		98·6	308	e 14 59	+77	24 43	{− 1}	—	—	—
Collmberg	Z.	103·3	332	e 18 25	PP	—	—	—	—	—
Stuttgart		106·8	332	e 18 40?	PP	—	—	—	—	e 57·4
Triest		106·8	328	e 18 49	PP	—	—	e 20 5	?	e 58·3
Strasbourg		107·6	333	e 18 41	PP	—	—	e 19 42	?	—
La Paz	Z.	146·6	99	e 19 51	[+ 9]	i 23 7	PP	i 19 55	PKP$_2$	—

Strasbourg also gives e? = 18m.30s.
Long waves were also recorded at Harvard, Weston, Palisades, Bermuda, De Bilt, Potsdam, Paris, and Pavia.

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Nov. 13d. 11h. 24m. 44s. Epicentre 40°·4N. 125°·1W. (as on 1951, April 1d.).

A = −·4391, B = −·6248, C = +·6456 ; δ = −2 ; h = −2 ;
D = −·818, E = +·575 ; G = −·371, H = −·528, K = −·764.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shasta Dam		2·1	82	i 0 35	− 2	—	—	—	—	—
Santa Clara		3·9	139	e 2 9	+67	i 2 48	+58	—	—	—
Tinemaha		6·3	120	i 1 38	+ 2	i 3 3	+13	—	—	—
Haiwee		7·0	125	e 1 48	+ 2	i 3 29	+21	—	—	—
China Lake	Z.	7·5	125	i 1 53	0	—	—	i 2 3	?	—
Victoria		8·1	9	2 1	− 1	—	—	—	—	—
Pasadena		8·4	136	i 2 4	− 2	i 3 36	− 7	i 2 13	?	—
Riverside	Z.	8·9	133	i 2 9	− 3	—	—	—	—	—
Boulder City		9·2	115	i 2 19	+ 3	—	—	—	—	i 5·2
Palomar	Z.	9·6	134	i 2 20	− 1	—	—	i 2 33	?	—
Butte		10·7	54	e 2 37	− 1	—	—	—	—	—
Hungry Horse		11·2	41	i 2 44	0	—	—	—	—	—
Tucson		14·1	121	i 3 26	+ 3	—	—	—	—	e 8·0

Long waves were also recorded at Seattle, Palisades, and Bermuda.

Nov. 13d. 14h. 1m. 47s. Epicentre 36°·1N. 52°·5E.

Given by stations of U.S.S.R.

A = +·4930, B = +·6425, C = +·5866 ; δ = −5 ; h = 0 ;
D = +·793, E = −·609 ; G = +·357, H = +·465, K = −·810.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lenkoran		3·9	314	1 21?	P_g	2 15?	S_g	—	—	—
Kizyl-Arvat		4·2	44	e 1 12?	+ 5	1 59?	+ 2	—	—	—
Ashkabad		5·0	67	e 1 12	− 6	e 2 25	+ 7	—	—	—
Kirovobad		6·7	316	e 1 52	+10	—	—	—	—	—
Mary		7·7	76	e 1 55	− 1	3 23	− 2	—	—	—
Piatigorsk		10·7	321	e 2 48	+10	4 50	+11	—	—	—
Stalinabad		13·2	74	e 3 11	0	e 5 36	− 4	—	—	—
Ksara		13·8	265	e 3 35	+16	—	—	—	—	—
Obi-garm		13·9	74	i 3 12	− 9	—	—	—	—	—
Tashkent		14·1	63	e 3 22	− 1	—	—	—	—	—
Tchimkent		14·6	60	e 3 31	+ 1	—	—	—	—	—
Fergana		15·7	68	e 3 40	− 4	—	—	—	—	—
Andijan		16·2	67	e 3 46	− 4	—	—	—	—	—
Istanbul		19·0	292	e 4 37	+11	e 8 10	+15	—	—	e 11·0
Naryn		19·1	65	e 4 22	− 5	—	—	—	—	—
Almata		20·1	60	e 4 39	+ 1	—	—	—	—	—
Przhevalsk		21·0	63	e 4 45	− 2	—	—	—	—	—
Collmberg	Z.	31·9	311	e 6 33	+ 4	—	—	—	—	—
Kiruna		36·6	340	e 8 34	PP	e 17 19	Q	i 8 39	PP	—
Tamanrasset	Z.	42·6	265	i 8 1 a	+ 2	—	—	—	—	—

Nov. 13d. Readings also at 0h. (Triest), 1h. (Naryn, near Andijan, Dzhergetal, Garm, Khorog (2), Obi-garm, Samarkand, and Stalinabad), 2h. (Nanking, Zi-ka-wei, La Paz (2), Huancayo, Fayetteville, Harvard, Bermuda, Tucson, College, Tamanrasset, Collmberg, Kiruna, Bogota, San Juan, and near Fort de France), 3h. (China Lake and Palomar), 5h. (Kirovobad, Lenkoran, near Erevan, Goris, Nakhichevan, Huancayo, and near Bogota), 6h. (Strasbourg, near Garm, and near Apia), 7h. (Strasbourg, Collmberg, and near Garm), 8h. (Apia), 9h. (near Almata, Chilisk, Ili, near Garm, near Athens, and Istanbul), 10h. (Santa Lucia and near Athens), 11h. (Harvard, Weston, and Athens), 12h. (Palomar, China Lake, Tinemaha, Tamanrasset, near Istanbul, and near New Delhi), 13h. (Collmberg and Kiruna), 14h. (Manila, Nanking, Grahamstown (2), Kimberley (3), Pietermaritzburg, Pretoria, Collmberg, Kiruna, Stuttgart, Tamanrasset (2), and near Victoria), 15h. (Copenhagen, Potsdam, Kew, and Paris), 16h. (near Fort de France), 17h. (Manila (3) and near Alicante), 18h. (Kiruna, Collmberg, and near Huancayo), 19h. (Santa Lucia, Bombay, and near Ashkabad), 21h. (Almata II, Dzhergetal, Fergana, Frunse, Przhevalsk, Stalinabad, Tchimkent, near Andijan, Khorog, Murgab, and Naryn), 23h. (Apia).

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Nov. 14d. 8h. 39m. 51s. Epicentre 40°·4N. 124°·2W. (as on 1951, March 10d.).

Intensity VI at Eureka (with slight damage), Ferndale, Fortuna, and Scotia ; V at Alton, Arcata, Bridgeville, Ettersburg, and Kneeland ; IV at Alderpoint, Benbow, and Denny. Epicentre 40°26′N. 124°03′W. Macroseismic area 3000 sq. miles.

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial No. 762, Washington, 1953, p. 15.

A = −·4293, B = −·6316, C = +·6456 ; δ = +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.
Shasta Dam		1·4	78	i 0 26	− 1	—	—	—	—	—
Santa Clara		3·5	150	e 1 2	P*	i 1 52	S*	—	—	—
Tinemaha		5·7	124	e 1 28	0	i 2 52	S*	—	—	—
Haiwee		6·5	129	i 1 43	+ 4	i 3 36	S_g	—	—	—
China Lake	Z.	6·9	129	e 1 48	+ 3	i 3 33	S*	i 1 53	?	—
Seattle		7·4	10	e 1 57	+ 5	e 3 11	− 7	i 2 20	P_g	—
Pasadena		7·9	140	e 1 58	− 1	e 3 28	− 2	i 2 2	?	—
Victoria		8·1	4	1 59	− 3	3 22	−13	—	—	—
Riverside	Z.	8·4	137	e 2 5	− 1	—	—	—	—	—
Boulder City		8·6	118	e 2 10	+ 1	—	—	—	—	i 5·8
Palomar	Z.	9·2	138	e 2 16	0	—	—	—	—	—
Butte		10·2	53	e 2 28	− 3	—	—	—	—	—
Hungry Horse		10·8	39	i 2 39	0	—	—	—	—	—
Tucson		13·5	123	e 3 17	+ 2	—	—	—	—	e 7·6
Fayetteville		23·9	91	e 5 12	− 4	—	—	—	—	—
College		28·0	339	e 5 54	− 1	—	—	—	—	—
Ottawa		35·4	66	e 6 56	− 4	—	—	—	—	17·6
Resolute Bay		36·9	12	e 7 18a	+ 6	—	—	—	—	—

Seattle gives also e = 3m.29s.
Long waves were also recorded at Weston and Palisades.

Nov. 14d. 10h. 16m. 35s. Epicentre 35°·3N. 135°·6E. (as on 1949, August 9d.).

Intensity IV at Kyoto, Nishiwaki, Kaibara, and Obama ; II-III at Osaka, Kobe, Kashiwara, Hikone, Sumoto, Kameyama, Okayama, Minakuchi, and Setagawa.
Tokyo suggests epicentre 35°·3N. 135°·2E. Depth 20km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for November, 1951, Tokyo, 1951, pp. 302-3, with macroseismic chart on page 302.

A = −·5844, B = +·5723, C = +·5752 ; δ = −9 ; h = 0 ;
D = +·700, E = +·714 ; G = −·411, H = +·403, K = −·818.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Kyoto	0·3	159	0 9a	− 2	0 15	− 3
Tsuruga	0·5	47	0 15k	+ 1	0 29	+ 6
Hikone	0·5	94	0 18k	+ 4	0 28	+ 5
Osaka	0·7	185	0 14a	P_g	0 23	S_g
Kobe	0·7	209	0 13a	P_g	0 21	S_g
Kashiwara	0·8	168	0 17	− 1	0 28	− 3
Hukui	0·9	36	0 23	+ 3	0 37	+ 3
Tu	0·9	127	0 24	+ 4	0 41	+ 7
Kameyama	0·9	122	0 24	+ 4	0 34	0
Nagoya	1·1	97	0 27	+ 5	0 45	+ 6
Tottori	1·1	280	0 19	− 3	0 29	−10
Wakayama	1·1	198	0 18	− 4	0 32	− 7
Sumoto	1·1	212	0 20	− 2	0 32	− 7
Himeji	1·3	231	0 16k	− 9	0 23	−21
Owase	1·3	158	0 27a	+ 2	0 45	+ 1
Okayama	1·5	245	0 25a	− 3	0 42	− 7
Kanazawa	1·5	35	0 35	+ 7	0 55	+ 6
Takamatu	1·6	232	0 25	− 5	0 43	− 8
Takayama	1·6	58	0 33	+ 3	0 58	+ 7
Siomisaki	1·8	176	0 37	+ 5	1 1	+ 5
Hamamatu	1·8	109	0 40	+ 8	1 6	+10
Iida	1·8	83	0 40	+ 8	1 10	+14
Yonago	1·8	274	0 37	+ 5	—	—
Saigo	2·0	296	0 55	+20	1 19	+17
Matsue	2·1	274	0 38	+ 1	0 59	− 5

Continued on next page.

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	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Omaesaki	2·2	108	0 54	+16	1 22	+16
Muroto	2·3	210	0 41	+ 1	1 10	+ 1
Wazima	2·3	27	0 51	+11	1 28	+19
Shizuoka	2·3	98	0 40	0	1 24	+15
Matusiro	2·4	59	0 52	P_g	1 32	+20
Kohu	2·4	82	0 51	P_g	1 28	+16
Koti	2·4	224	0 40	− 1	1 5	− 7
Nagano	2·5	57	0 56	P_g	1 34	S_g
Oiwake	2·6	67	0 56	P_g	—	—
Misima	2·8	94	0 44	− 3	1 31	S_g
Hirosima	2·8	250	0 50 a	+ 3	1 24	+ 2
Matuyama	2·8	238	0 35	−12	1 12	−10
Titibu	2·9	76	1 3	P_g	1 42	+18
Maebasi	3·0	69	1 1	P_g	1 49	+22
Osima	3·2	100	0 51	− 1	1 47	S_g
Kumagaya	3·2	75	1 1	P_g	1 46	S_g
Simidu	3·3	221	0 59	P*	1 38	+ 3
Yokohama	3·3	88	1 27	S	(1 27)	− 8
Tokyo	3·4	83	1 24	S	(1 24)	−13
Ooita	3·9	239	1 2	0	1 59	S*
Mito	4·1	74	1 50	S	(1 50)	− 5
Hukuoka	4·6	249	1 20	+ 8	2 16	+ 7
Saga	4·8	246	1 40	P_g	—	—

Nov. 14d. Readings also at 1h. (near Athens and near Ashkabad), 2h. (Apia), 3h. (near Almata II, Naryn, Przhevalsk, and near Athens), 5h. (Santa Lucia, Apia, and near Ashkabad (2)), 6h. (Palisades, Bermuda, Tamanrasset, near Algiers Univeristy, and near Garm), 7h. (Kew), 8h. (near Ashkabad and near Garm), 9h. (Ashkabad), 10h. (Pretoria and Weston), 12h. (Apia), 13h. (near Garm), 14h. (Palisades and Stuttgart), 15h. (New Plymouth, near Karapiro, Tuai, Wellington, Cobb River, Kaimata, Christchurch, near Istanbul, and near Huancayo), 16h. (Tacubaya, Santa Lucia, and near Alicante), 17h. (near Istanbul), 18h. (Collmberg, Pretoria, and Antofagasta), 19h. (Apia, Dzhergetal, Fergana, Garm, Stalinabad, near Andijan, Khorog, Naryn, Obi-garm, and near Victoria), 20h. (Apia, Ashkabad, Fergana, Obi-garm, near Dzhergetal, Garm, and Khorog), 22h. (Taranto, Victoria, and near Almata II), 23h. (Tamanrasset, Palomar, near Big Bear, La Jolla, Pasadena, and Riverside).

Nov. 15d. 6h.

New Delhi ePEN =39m.46s., PPPE =40m.1s., iSEN =41m.28s., SS =41m.41s., S*E = 42m.1s., S_gEN =42m.30s.
Przhevalsk eP =40m.15s.
Almata eP =40m.38s., eS =43m.27s.
Frunse eP =40m.52s.?, eS =43m.44s.?
Calcutta ePN =40m.58s., iSN =43m.18s., SSN =43m.33s., SSSN =43m.50s.
Garm eP =40m.59s.
Fergana eP =41m.4s.
Obi-garm eP =41m.4s., eS =43m.54s.
Stalinabad iP =41m.13s., eS =44m.8s.
Tchimkent iP =41m.21s.
Poona ePZ =41m.21s., eSE =44m.48s., SS =45m.8s., SSS =45m.18s., L =45m.40s., PcP =45m.52s.
Samarkand P =41m.32s., S =44m.45s.
Mary eP =42m.15s.
Dehra Dun i?N =42m.42s.
Irkutsk P =42m.45s., eS =47m.7s.?
Ashkabad eP =42m.47s.
Naryn iS =43m.12s.
Andijan S =43m.17s.
Hyderabad ePE =43m.42s., SE =45m.31s.
Borzhomi eP =44m.32s.
Bombay eSEN =45m.24s., eSSE =45m.42s., L =46m.9s.
Collmberg eZ =47m.12s.
Baku eS =48m.0s.
Sverdlovsk eS =48m.45s.
Tamanrasset ePZ =48m.52s.
Kodaikanal eSS?E =49m.17s.
Vladivostok eS =50m.47s.
Istanbul eN =51m.36s. and 56m.24s., eLN =59·8m.
Long waves were also recorded at Paris, Potsdam, and De Bilt.

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Nov. 15d. 8h. 25m. 54s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.

A = −·5742, B = +·2056, C = +·7924 ; δ = −13 ; h = −6 ;
D = +·337, E = +·941 ; G = −·746, H = +·267, K = −·610.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		12·7	250	2 58	− 2	—	—	—	—	—
Urakawa		15·8	235	e 3 22	−18	—	—	e 7 25	Q	e 9·1
Sapporo		15·9	241	e 3 39	− 2	—	—	—	—	e 8·4
Miyako		18·1	232	e 4 3	− 5	—	—	—	—	—
Morioka		18·4	233	e 4 8	− 4	—	—	—	—	—
Mizusawa		18·9	233	4 16	− 2	7 51	+ 8	—	—	—
Sendai		19·7	231	4 22	− 5	e 8 1	+ 1	—	—	e 10·6
Hukusima		20·3	232	e 4 30	− 3	—	—	—	—	—
Inawasiro		20·6	232	4 29	− 7	—	—	—	—	—
Vladivostok		21·2	255	e 4 34	− 8	—	—	—	—	—
Kumagaya		22·1	232	e 4 55	+ 4	e 9 3	+18	—	—	—
Maebasi		22·1	231	e 4 48	− 3	e 9 0	+15	e 4 49	pP	—
Matusiro		22·3	235	4 43	−10	8 48	− 1	e 10 15	?	11·7
Nagano	E.	22·3	233	e 4 54	+ 1	e 9 37	SS	—	—	e 12·6
Oiwake		22·4	232	e 4 58	+ 4	—	—	—	—	—
Titibu		22·4	231	e 4 57	+ 3	—	—	—	—	—
Matumoto		22·7	234	e 4 56	− 1	e 9 19	sS	—	—	—
Toyama	Z.	22·7	235	e 5 4	+ 7	—	—	—	—	—
Kohu		22·9	231	e 5 0	+ 1	—	—	—	—	—
Misima		23·1	230	e 5 7	+ 6	e 9 18	+15	—	—	—
Omaesaki		23·9	231	e 5 17	+ 8	—	—	—	—	—
Nagoya		24·0	233	e 5 7	− 3	—	—	—	—	—
Kyoto		24·8	235	e 5 26	+ 9	e 9 46	+14	—	—	e 14·8
Osaka		25·2	235	e 5 26	+ 5	—	—	—	—	—
Kobe		25·3	235	e 5 27	+ 5	e 8 27	?	—	—	e 13·6
Koti		27·0	236	e 5 29	− 9	e 10 20	+11	16 19	ScS	—
Muroto		27·0	235	e 5 31	− 7	—	—	—	—	—
Hukuoka		28·6	241	5 52	0	—	—	—	—	15·8
College		28·7	44	5 53	0	10 41	+ 5	—	—	—
Irkutsk		33·4	293	6 32?	− 2	—	—	—	—	—
Nanking		36·3	253	e 7 0	+ 1	(e 12 26)	− 9	—	—	e 12·4
Resolute Bay		43·7	22	e 8 1	+ 1	e 14 35	+10	e 8 15	pP	e 28·1
Victoria		46·5	63	8 21	− 2	—	—	—	—	—
Seattle		47·6	63	e 8 55	sP	—	—	—	—	e 28·1
Manila		49·1	235	e 8 36	− 7	—	—	—	—	—
Hungry Horse		51·6	58	e 9 2	0	—	—	—	—	—
Shasta Dam		51·9	70	e 9 5	+ 1	—	—	i 9 8	P	—
Sverdlovsk		52·7	317	i 9 13	+ 3	e 16 53	PPS	—	—	—
Przhevalsk		53·4	294	e 9 14	− 1	—	—	—	—	—
Almata		53·6	296	e 9 14	− 3	e 17 6	PPS	—	—	—
Berkeley		53·9	73	i 9 26a	+ 7	e 16 51	+ 3	e 22 48	SSS	e 26·0
Butte		53·9	59	e 9 18	− 1	—	—	—	—	—
Reno	Z.	54·2	69	e 9 23a	+ 2	—	—	—	—	—
Lick	Z.	54·6	73	i 9 29a	+ 5	—	—	—	—	—
Frunse		55·2	297	e 9 26	− 2	—	—	—	—	—
Naryn		55·4	295	e 9 32	+ 2	—	—	—	—	—
Fresno	Z.	56·1	72	e 9 38a	+ 3	—	—	—	—	—
Kiruna	Z.	56·2	344	i 9 35k	− 1	—	—	i 10 33	PcP	—
Tinemaha	Z.	56·8	71	i 9 50	+10	—	—	—	—	—
Scoresby Sund		57·2	2	e 9 44	+ 1	17 48	SP	—	—	27·1
Andijan		57·9	296	9 44	− 4	—	—	—	—	—
China Lake		58·0	71	e 9 49	+ 1	e 18 11	sS	i 9 56	pP	—
Tchimkent		58·3	300	e 9 47	− 3	—	—	—	—	—
Fergana		58·4	296	e 9 50	− 1	—	—	—	—	—
Pasadena	Z.	58·8	73	i 10 1	+ 7	—	—	i 10 11	pP	e 28·0
Tashkent		59·1	299	e 9 52	− 4	e 18 17	PS	—	—	—
Riverside	Z.	59·4	73	e 10 5	+ 7	—	—	—	—	—
Boulder City		59·5	69	i 10 1	+ 2	e 14 12	?	—	—	—
Garm		60·2	297	i 10 0?	− 4	—	—	—	—	—
Palomar	Z.	60·2	73	e 10 7	+ 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.
Pulkovo		61·0	334	i 10 9?	0	—	—	—	—	—
Stalinabad		61·4	297	i 10 10	− 2	e 18 47	SP	—	—	—
Samarkand		61·5	299	e 10 11	− 1	—	—	—	—	—
Moscow		62·1	328	e 10 16	0	—	—	—	—	—
Upsala		63·9	340	i 10 27	− 1	i 19 12	+15	i 19 24	PS	e 35·1
Tucson		64·5	70	e 10 33	+ 1	—	—	—	—	—
Mary		65·8	301	e 10 26	−15	—	—	—	—	—
Ashkabad		67·3	303	e 10 50	0	—	—	—	—	—
Kirkland Lake	Z.	67·3	39	e 10 54	+ 4	—	—	—	—	—
Kizyl-Arvat		67·6	305	e 11 4	+12	—	—	—	—	—
Copenhagen		68·9	342	i 11 1	+ 1	e 20 25	SP	—	—	36·1
Baku		69·6	311	e 11 1	− 3	—	—	—	—	—
Piatigorsk		69·7	317	11 4	− 1	20 22	+15	—	—	—
Shemakla		70·0	312	11 9	+ 2	21 26	sSKS	—	—	—
Fayetteville		70·6	56	i 11 10	0	—	—	i 11 13	P	—
Tiflis		70·8	315	11 10	− 2	—	—	—	—	—
Kirovobad		70·9	313	11 11	− 1	—	—	—	—	—
Ottawa		71·2	38	e 11 13	− 1	20 12	−13	25 13	SS	31·6
Borzhomi		71·3	315	e 11 18	+ 3	—	—	—	—	—
Lenkoran		71·4	310	11 8?	− 7	20 55?	SP	—	—	—
Lwow		71·4	332	i 11 17?	+ 2	—	—	—	—	—
Tsikhlis-Dzhvari		71·4	315	e 11 18	+ 3	—	—	—	—	—
Potsdam		71·8	340	e 11 18	0	i 20 41	+ 9	i 11 34	pP	e 35·1
Cleveland		72·1	44	i 11 19k	0	e 20 42	+ 7	—	—	—
Erevan		72·2	313	e 11 20	0	—	—	—	—	—
Simferopol		72·4	323	e 11 22	+ 1	—	—	—	—	—
Witteveen	Z.	72·7	344	e 11 25	+ 2	—	—	—	—	—
Raciborzu		72·8	336	e 11 24	+ 1	e 15 53	PPP	e 11 31	P	—
Yalta		72·8	323	11 23	0	e 20 55	+12	—	—	—
Collmberg		72·9	339	e 11 24	0	e 21 11	SP	—	—	—
Uzhgorod		73·0	333	e 11 28	+ 3	—	—	—	—	—
Prague		73·1	338	e 11 34	+ 9	e 20 42	− 4	e 11 49	pP	e 38·1
Skalnate Pleso		73·1	334	e 14 30	pPP	—	—	—	—	—
Poona	Z.	73·4	279	i 11 24	− 3	—	—	—	—	—
Jena		73·5	340	e 11 28	0	e 20 52	+ 1	e 11 43	pP	—
Bombay		73·7	280	e 11 6?	−23	—	—	—	—	—
Pittsburgh	Z.	73·7	44	e 11 27	− 2	—	—	—	—	—
Cheb	E.	74·2	340	—	—	e 21 8	+ 9	—	—	—
Morgantown		74·4	45	i 11 32	− 1	—	—	e 12 19	?	—
Budapest		74·9	334	11 37	+ 1	—	—	11 34	P	—
Harvard		75·2	37	i 11 37	0	—	—	—	—	e 35·5
Weston		75·4	37	i 11 37	− 1	e 21 16	+ 4	—	—	—
Bucharest		75·6	328	e 19 36	?	—	—	—	—	—
Palisades		75·6	39	e 11 39	− 1	e 21 18	+ 4	e 26 14	SS	e 37·7
Karlsruhe	Z.	76·0	341	e 11 40	− 2	—	—	—	—	—
Stuttgart		76·1	341	e 11 42	0	e 21 45	ScS	e 11 49	PcP	e 39·1
Strasbourg		76·5	342	i 11 47a	+ 2	e 12 15	sP	—	—	e 39·1
Belgrade	Z.	77·0	332	11 49a	+ 1	—	—	e 12 23	sPcP	—
Paris		77·2	345	e 11 47	− 2	i 22 35	pSP	i 14 48	PP	37·1
Basle		77·5	342	e 11 52	+ 2	—	—	—	—	—
Zürich		77·5	342	e 11 50	0	e 21 59	ScS	—	—	—
Istanbul		77·6	325	e 11 50	− 1	e 21 40	+ 4	e 22 0	SKS	e 35·1
Chur		77·8	341	e 11 53	+ 1	—	—	—	—	—
Triest		78·0	337	e 12 5	+12	21 56	+16	e 22 48	PS	e 43·2
Neuchatel		78·2	342	e 11 56	+ 2	—	—	—	—	—
Clermont-Ferrand		80·1	344	i 12 6	+ 2	—	—	—	—	—
Florence		80·4	338	e 12 8	+ 2	—	—	—	—	—
Tacubaya		81·0	70	e 12 35	sP	—	—	—	—	—
Ksara		81·3	316	i 12 9a	− 2	e 23 5	SP	—	—	—
Helwan	Z.	86·6	318	12 38	+ 1	—	—	e 12 54	pP	—
Wellington		94·3	170	e 18 1	?	—	—	—	—	e 44·6
Christchurch		96·3	171	—	—	e 24 31	− 3	e 31 6	SS	e 45·4
Tamanrasset	Z.	101·8	336	e 13 47	0	—	—	e 18 0	PP	—
Pretoria	Z.	135·3	289	i 19 26	[+13]	—	—	i 23 32	?	—
Kimberley	Z.	139·6	289	i 19 20	[0]	—	—	—	—	—

For Notes see next page.

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NOTES TO NOVEMBER 15d. 8h. 25m. 54s.

Additional readings :—
Resolute Bay eEN =18m.4s.
Seattle i =9m.5s., e =9m.22s. and 9m.45s.
China Lake iZ =10m.50s.
Upsala eN =18m.58s., iSSN =23m.49s., eN =26m.58s.
Ottawa e =28m.54s.
Potsdam iPZ =11m.23s., isSE =21m.0s.?.
Prague e =12m.2s., 13m.23s., and 13m.40s., ePP =14m.22s., eS =21m.18s. and 21m.34s.
Jena ePE =11m.31s., eE =11m.57s. and 12m.19s., eN =13m.12s., ePP?E =14m.12s., eSN =21m.11s., eSE =21m.20s.
Palisades iP =11m.48s., eSSS =29m.26s.
Paris i =11m.51s., 12m.9s., 12m.33s., and 13m.5s., e =22m.23s.
Christchurch ePSN =25m.46s., eQE =40m.36s.
Tamanrasset eZ =17m.39s., iZ =18m.27s.
Long waves were also recorded at Ivigtut, Helsinki, Granada, Messina, De Bilt, Taranto, Kew, Alicante, Bermuda, and Auckland.

Nov. 15d. 8h. 39m. 16s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 8h. 25m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	18·9	233	4 15	– 3	e 7 1	–42	—	—	—
Resolute Bay	Z.	43·7	22	e 8 0	0	—	—	—	—	—
Victoria		46·5	63	8 21	– 2	—	—	—	—	—
Kiruna	Z.	56·2	344	i 9 33k	– 3	—	—	i 10 29	PcP	—
Scoresby Sund		57·2	2	9 44	+ 1	—	—	—	—	—
China Lake	Z.	58·0	71	i 9 48	0	—	—	i 10 9	pP	—
Pasadena	Z.	58·8	73	e 10 5	+11	—	—	—	—	—
Calcutta	E.	61·5	271	e 14 59	PcS	i 22 12	SS	—	—	—
Copenhagen		68·9	342	i 11 0	0	—	—	—	—	—
Potsdam	Z.	71·8	340	i 10 58k	–20	—	—	—	—	—
Witteveen	Z.	72·7	344	e 11 22	– 1	—	—	—	—	—
Raciborzu		72·8	336	e 11 24	+ 1	e 13 56	?	e 14 5	PP	—
Collmberg	Z.	72·9	339	e 11 32	+ 8	e 12 23	?	e 17 54	?	—
Prague		73·1	338	11 26	+ 1	—	—	e 12 1	sP	—
Jena		73·5	340	e 11 27	– 1	—	—	e 11 34	?	—
Budapest		74·9	334	e 11 44	+ 8	—	—	11 47	P	e 29·7
Stuttgart	Z.	76·1	341	e 11 42	0	—	—	—	—	—
Strasbourg		76·5	342	i 11 45	0	—	—	e 12 19	sP	—
Belgrade		77·0	332	e 15 47a	PcS	e 29 33	SSS	—	—	e 34·3
Paris		77·2	345	i 11 49	0	—	—	i 11 57	PcP	—
Basle	Z.	77·5	342	e 11 50	0	—	—	—	—	—
Zürich	Z.	77·5	342	e 11 50	0	—	—	—	—	—
Istanbul	Z.	77·6	325	e 11 49	– 2	—	—	—	—	—
Triest		78·0	337	e 11 56	+ 3	—	—	—	—	—
Neuchatel	Z.	78·2	342	e 11 54	0	—	—	—	—	—
Clermont-Ferrand		80·1	344	i 12 9	+ 5	—	—	—	—	e 30·0
Tacubaya		81·0	70	e 17 46	pPP	—	—	—	—	—
Ksara		81·3	316	i 12 11	0	—	—	—	—	—
Helwan	Z.	86·6	318	12 36	– 1	—	—	e 13 19	?	—
Tamanrasset	Z.	101·8	336	e 13 45	– 2	—	—	e 17 36	?	—

Additional readings :—
Belgrade eNW =23m.41s., eNE =23m.53s.
Paris i =12m.14s. and 14m.7s.

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Nov. 15d. 9h. 26m. 40s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 8h. 39m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		28·7	44	e 5 51	– 2	—	—	—	—	—
Resolute Bay		43·7	22	e 8 1a	+ 1	—	—	—	—	—
Hungry Horse		51·6	58	e 9 6	+ 4	—	—	—	—	—
Shasta Dam		51·9	70	e 9 3	– 1	—	—	e 8 53	?	—
Mineral	Z.	52·6	70	e 9 13a	+ 4	—	—	—	—	—
Reno	Z.	54·2	69	e 9 23a	+ 2	—	—	—	—	—
Lick	Z.	54·6	73	e 9 25a	+ 1	—	—	—	—	—
Kiruna	Z.	56·2	344	i 9 34a	– 2	—	—	i 9 44	pP	—
China Lake	Z.	58·0	71	e 9 47	– 1	—	—	—	—	—
Boulder City		59·5	69	e 9 58	– 1	—	—	—	—	—
Fayetteville		70·6	56	i 11 4	– 6	—	—	—	—	—
Collmberg	Z.	72·9	339	e 16 54	?	—	—	—	—	—
Jena	Z.	73·5	340	e 11 27	– 1	—	—	—	—	—
Morgantown		74·4	45	i 11 31	– 2	—	—	—	—	—
Weston		75·4	37	i 11 50	+12	—	—	—	—	—
Stuttgart	Z.	76·1	341	e 11 41	– 1	—	—	—	—	—
Strasbourg		76·5	342	e 11 45	0	—	—	—	—	—
Paris		77·2	345	i 11 50	+ 1	—	—	—	—	—
Zürich	Z.	77·5	342	e 11 50	0	—	—	—	—	—
Neuchatel	Z.	78·2	342	e 11 55	+ 1	—	—	—	—	—
Ksara		81·3	316	e 12 9	– 2	—	—	—	—	—
Helwan	Z.	86·6	318	e 12 38	+ 1	—	—	—	—	—
Tamanrasset	Z.	101·8	336	13 22	–25	—	—	17 25	PP	—

Long waves were recorded at Triest and Kew.

Nov. 15d. 10h. 2m. 44s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005. (as at 9h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		12·7	250	2 56	– 4	5 30	+10	—	—	—
Urakawa		15·8	235	e 3 27	–13	—	—	—	—	e 9·3
Sapporo	E.	15·9	241	e 3 38	– 3	—	—	—	—	—
Miyako		18·1	232	e 4 3	– 5	—	—	—	—	—
Mizusawa	E.	18·9	233	4 17	– 1	8 0	+17	—	—	—
Sendai		19·7	231	e 4 25	– 2	e 8 5	+ 5	—	—	—
Hukusima		20·3	232	e 4 28	– 5	—	—	—	—	—
Shirakawa	Z.	20·9	230	e 4 44	+ 5	—	—	—	—	—
Vladivostok		21·2	255	e 4 24	–18	8 27	– 2	—	—	—
Kumagaya		22·1	232	e 4 54	+ 3	e 8 59	+14	—	—	—
Maebasi		22·1	231	e 4 48	– 3	e 8 48	+ 3	—	—	—
Matusiro		22·3	235	e 4 48	– 5	8 58	+ 9	10 28	SSS	11·6
Nagano	N.	22·3	233	e 4 56	+ 3	—	—	—	—	—
Oiwake		22·4	232	e 5 2	+ 8	—	—	—	—	—
Matumoto	N.	22·7	234	e 4 51	– 6	—	—	—	—	—
Misima		23·1	230	e 5 2	+ 1	—	—	e 6 20	?	—
Nagoya		24·0	233	e 5 17	+ 7	—	—	—	—	—
Hikone		24·3	235	e 5 18	+ 6	—	—	—	—	—
Takamatu		26·2	236	e 5 27	– 3	e 10 7	+11	—	—	—
Hamada		26·7	240	e 5 54	+19	e 14 0	L	—	—	(14·0)
Muroto		27·0	235	e 5 37	– 1	—	—	—	—	—
College		28·7	44	e 5 53	0	10 35	– 1	—	—	—
Irkutsk		33·4	293	—	—	e 12 26	+36	—	—	—
Resolute Bay		43·7	22	e 8 1	+ 1	14 35	+10	e 8 14	pP	17·9
Victoria		46·5	63	8 28	+ 5	—	—	—	—	—
Hungry Horse		51·6	58	e 9 2	0	—	—	—	—	—
Shasta Dam		51·9	70	e 9 5	+ 1	—	—	—	—	—
Mineral	Z.	52·6	70	i 9 9a	0	—	—	—	—	—
Sverdlovsk		52·7	317	9 11	+ 1	17 2	PPS	i 9 25	pP	—
Berkeley		53·9	73	e 9 26k	+ 7	e 16 58	+10	e 11 22	PP	e 25·3

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.
Butte		53·9	59	i 9 19	0	—	—	—	—	—
Reno	Z.	54·2	69	e 9 22a	+ 1	—	—	—	—	—
Lick	Z.	54·6	73	i 9 30k	+ 6	—	—	—	—	—
Frunse		55·2	297	e 9 28	0	—	—	—	—	—
Fresno	Z.	56·1	72	9 41a	+ 6	—	—	e 11 35	PP	—
Kiruna	Z.	56·2	344	i 9 35a	− 1	—	—	—	—	—
Tinemaha	Z.	56·8	71	i 10 9	sP	—	—	—	—	—
Scoresby Sund		57·2	2	e 9 41	− 2	—	—	—	—	30·3
Andijan		57·9	296	9 45	− 3	—	—	—	—	—
China Lake	Z.	58·0	71	e 9 47	− 1	—	—	i 9 56	pP	—
Tchimkent		58·3	300	e 9 46	− 4	—	—	—	—	—
Pasadena	Z.	58·8	73	i 10 2	+ 8	—	—	—	—	—
Riverside	Z.	59·4	73	e 10 3	+ 5	—	—	—	—	—
Boulder City		59·5	69	i 9 58	− 1	—	—	—	—	—
Garm		60·2	297	e 10 1	− 3	—	—	—	—	—
Palomar	Z.	60·2	73	i 10 10	+ 6	—	—	—	—	—
Pulkovo		61·0	334	i 10 7	− 2	—	—	—	—	—
Stalinabad		61·4	297	i 10 7	− 5	—	—	—	—	—
Tucson		64·5	70	e 10 31	− 1	—	—	—	—	—
Ashkabad		67·3	303	e 10 48	− 2	—	—	—	—	—
Copenhagen		68·9	342	i 11 1	+ 1	e 20 26	SP	—	—	36·3
Fayetteville		70·6	56	i 11 9	− 1	—	—	—	—	—
Tiflis		70·8	315	11 10	− 2	e 20 46	SP	—	—	—
Kirovobad		70·9	313	e 11 13?	+ 1	—	—	—	—	—
Potsdam		71·8	340	i 11 19k	+ 1	—	—	—	—	e 39·3
Erevan		72·2	313	e 11 21	+ 1	21 4	SP	—	—	—
Witteveen	Z.	72·7	344	e 11 25	+ 2	—	—	—	—	—
Raciborzu	Z.	72·8	336	e 11 12?	−11	—	—	e 11 37	PcP	—
Yalta		72·8	323	e 11 25	+ 2	—	—	—	—	—
Collmberg	Z.	72·9	339	e 11 24	0	—	—	—	—	—
Prague		73·1	338	(11 29)	+ 4	(e 21 35)	PS	(12 38)	?	(39·3)
Poona	Z.	73·4	279	i 11 30	+ 3	—	—	—	—	—
Jena		73·5	340	(e 11 28)	0	(e 12 2)	sP	(e 11 50)	PcP	—
Cheb		74·2	340	12 30	+58	e 21 24	SP	—	—	e 40·8
Morgantown		74·4	45	i 10 32	−61	—	—	i 11 56	pP	—
Kew		75·0	348	e 17 2	PP	—	—	—	—	e 42·3
Harvard		75·2	37	e 11 37	0	—	—	—	—	e 41·8
Weston		75·4	37	i 11 40	+ 2	—	—	—	—	—
Stuttgart		76·1	341	e 11 42	0	—	—	—	—	e 41·3
Strasbourg		76·5	342	i 11 46	+ 1	—	—	e 12 24	sPcP	e 40·3
Paris		77·2	345	i 11 51	+ 2	i 12 0	PcP	i 12 6	pP	e42·3
Basle		77·5	342	e 11 53	+ 3	—	—	—	—	—
Zürich		77·5	342	e 11 50a	0	—	—	—	—	—
Istanbul		77·6	325	e 11 50	− 1	e 21 40	+ 4	e 22 10	ScS	e 41·7
Triest		78·0	337	e 12 1	+ 8	e 21 54	+14	—	—	e 37·6
Neuchatel		78·2	342	e 11 51	− 3	—	—	—	—	—
Clermont-Ferrand		80·1	344	12 16?	+12	—	—	—	—	—
Florence		80·4	338	e 12 11	+ 5	e 22 33	ScS	—	—	—
Tacubaya		81·0	70	e 13 23	?	—	—	—	—	—
Ksara		81·3	316	i 12 13	+ 2	—	—	—	—	—
Rome	Z.	81·8	336	e 12 12	− 1	—	—	—	—	—
Taranto		81·9	333	11 16	−58	e 21 46	−35	—	—	—
Messina	E.	84·5	333	e 15 20	PP	—	—	—	—	—
Helwan	Z.	86·6	318	e 12 35	− 2	—	—	—	—	—
Bermuda		86·7	37	—	—	e 23 19	+11	—	—	—
Tamanrasset	Z.	101·8	336	e 13 48	+ 1	—	—	e 17 35	PP	—
Pretoria	Z.	135·3	289	19 14	[+ 1]	e 23 9	PKS	—	—	—

Additional readings and notes :—
Resolute Bay e = 17m.19s.
Prague and Jena readings have been decreased by 1m.
Paris e = 13m.11s. and 14m.22s., iPP = 14m.57s., iPPP = 16m.35s., i = 18m.45s., iSP = 22m.42s.
Long waves were also recorded at Seattle, Palisades, Calcutta, Upsala, De Bilt, Rathfarnham Castle, Skalnate Pleso, Christchurch, and Wellington.

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Nov. 15d. 10h. 31m. 36s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 10h. 2m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mitchell Field		14·2	83	i 3 12	– 7	—	—	—	—	—
Sapporo		15·9	241	e 3 37	– 4	—	—	e 3 58	PPP	e 8·6
Mori	E.	17·0	239	e 3 49	– 6	—	—	—	—	—
Morioka		18·4	233	i 4 8	– 4	—	—	—	—	—
Mizusawa		18·9	233	4 21	+ 3	e 8 33	SSS	e 8 38	SSS	—
Sendai		19·7	231	e 4 23	– 4	e 8 16	+16	—	—	e 10·1
Hukusima		20·3	232	e 4 26	– 7	—	—	—	—	—
Shirakawa		20·9	230	e 4 42	+ 3	—	—	—	—	—
Vladivostok		21·2	255	e 4 36	– 6	8 38	+ 9	—	—	—
Kumagaya		22·1	232	e 4 57	+ 6	e 8 48	+ 3	—	—	—
Maebasi		22·1	231	e 4 53	+ 2	e 8 50	+ 5	—	—	—
Matusiro		22·3	235	4 54	+ 1	8 50	+ 1	10 7	SSS	11·3
Nagano	N.	22·3	233	e 4 55	+ 2	e 8 55	+ 6	—	—	—
Wazima		22·3	237	e 5 1	+ 8	—	—	—	—	—
Oiwake		22·4	232	e 4 55	+ 1	—	—	—	—	—
Toyama		22·7	235	e 5 6	+ 9	—	—	—	—	—
Kohu		22·9	231	e 4 59	0	—	—	—	—	—
Misima		23·1	230	e 5 0	– 1	e 7 33	?	e 6 7	?	—
Osima		23·2	229	e 5 12	+10	—	—	—	—	—
Omaesaki		23·9	231	e 5 18	+ 9	—	—	—	—	—
Nagoya		24·0	233	e 5 6	– 4	—	—	—	—	—
Hikone		24·3	235	e 5 19	+ 7	—	—	—	—	—
Osaka		25·2	235	e 5 22	+ 1	—	—	—	—	—
Takamatu		26·2	236	e 5 24	– 6	e 9 59	+ 3	—	—	—
Koti		27·0	236	e 5 42	+ 4	e 10 43	+34	—	—	15·9
Muroto		27·0	235	e 5 32	– 6	—	—	—	—	—
Hukuoka		28·6	241	5 57	+ 5	e 10 40	+ 6	—	—	e 13·0
College		28·7	44	e 5 51	– 2	10 38	+ 2	—	—	—
Resolute Bay		43·7	22	e 8 0	0	e 14 32	+ 7	e 8 13	pP	—
Victoria		46·5	63	8 43	pP	—	—	—	—	—
Manila		49·1	235	e 8 36	– 7	—	—	—	—	—
Hungry Horse		51·6	58	e 9 4	+ 2	—	—	—	—	—
Shasta Dam		51·9	70	i 9 6	+ 2	—	—	—	—	—
Mineral	Z.	52·6	70	e 9 15	+ 6	—	—	—	—	—
Sverdlovsk		52·7	317	9 11	+ 1	—	—	—	—	—
Przhevalsk		53·4	294	e 9 13	– 2	—	—	—	—	—
Berkeley		53·9	73	i 9 31k	+12	e 16 55	+ 7	—	—	e 25·9
Butte		53·9	59	e 9 19	0	—	—	—	—	—
Reno	Z.	54·2	69	e 9 21a	0	—	—	—	—	—
Lick	Z.	54·6	73	i 9 26k	+ 2	—	—	—	—	—
Frunse		55·2	297	i 9 26	– 2	—	—	—	—	—
Fresno	Z.	56·1	72	e 9 39a	+ 4	—	—	—	—	—
Kiruna		56·2	344	9 34k	– 2	—	—	i 9 44	pP	—
Scoresby Sund		57·2	2	e 9 42	– 1	e 17 58	PS	18 52	?	27·4
China Lake		58·0	71	e 9 49	+ 1	e 17 49	+ 7	i 9 55	P	—
Tchimkent		58·3	300	e 9 49	– 1	—	—	—	—	—
Pasadena		58·8	73	e 9 54	0	—	—	i 10 8	pP	e 27·8
Boulder City		59·5	69	e 9 54	– 5	—	—	i 10 1	P	—
Garm		60·2	297	e 10 1	– 3	—	—	—	—	—
Obi-garm		60·8	297	i 10 5	– 3	—	—	—	—	—
Stalinabad		61·4	297	e 10 9	– 3	—	—	—	—	—
Samarkand		61·5	299	e 10 9	– 3	—	—	—	—	—
Moscow		62·1	328	e 10 15	– 1	—	—	—	—	—
Upsala	N.	63·9	340	i 10 36	+ 8	e 18 58	+ 1	e 20 24	ScS	e 34·4
Ashkabad		67·3	303	e 10 48	– 2	—	—	—	—	—
Kirkland Lake	Z.	67·3	39	e 11 6	pP	—	—	—	—	—
Copenhagen		68·9	342	e 10 59	– 1	e 20 6	+ 8	—	—	36·4
Piatigorsk		69·7	317	10 52	–13	—	—	—	—	—
Fayetteville		70·6	56	i 11 9	– 1	—	—	—	—	—
Tiflis		70·8	315	11 10	– 2	e 20 49	sS	—	—	—

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.
Kirovobad		70·9	313	e 11 11	– 1	—	—	—	—	—
Ottawa		71·2	38	11 14	0	—	—	—	—	—
Lenkoran		71·4	310	11 17	+ 2	—	—	—	—	—
Lwow		71·4	332	e 11 17	+ 2	—	—	—	—	—
Sotchi		71·4	319	e 11 34	PcP	—	—	—	—	—
Potsdam		71·8	340	i 11 18k	0	i 20 40	+ 8	i 11 32	pP	e 37·4
Cleveland	Z.	72·1	44	i 11 18a	– 1	i 20 38	+ 3	i 11 30	pP	—
Erevan		72·2	313	e 11 20	0	—	—	—	—	—
Witteveen	Z.	72·7	344	e 11 16	– 7	—	—	—	—	—
Raciborzu		72·8	336	e 11 20?	– 3	e 25 5	SS	e 11 36	pP	—
Yalta		72·8	323	i 11 22	– 1	—	—	—	—	—
Collmberg	Z.	72·9	339	e 11 24	0	—	—	—	—	—
Uzhgorod		73·0	333	e 11 24	– 1	—	—	—	—	—
Prague		73·1	338	e 11 29	+ 4	e 11 57	sP	e 11 41	pP	e 35·4
Skalnate Pleso		73·1	334	e 11 42	pP	—	—	e 19 36	?	—
Poona	Z.	73·4	279	i 11 25	– 2	—	—	—	—	—
Jena	E.	73·5	340	e 11 27	– 1	e 20 57	+ 6	e 11 41	pP	—
Cheb		74·2	340	e 14 30	PP	—	—	—	—	e 35·9
Morgantown		74·4	45	i 11 31	– 2	—	—	—	—	—
Budapest	E.	74·9	334	11 42	+ 6	—	—	e 14 24?	PP	—
Harvard		75·2	37	e 11 37	0	—	—	—	—	e 37·9
Weston		75·4	37	e 11 39	+ 1	—	—	—	—	—
Bucharest		75·6	328	e 11 42	+ 2	20 12	?	—	—	—
Palisades		75·6	39	i 11 39	– 1	—	—	—	—	e 37·7
Timisoara		75·9	332	11 48	+ 7	—	—	—	—	—
Karlsruhe	Z.	76·0	341	e 11 41	– 1	—	—	—	—	—
Stuttgart		76·1	341	e 11 42	0	—	—	—	—	e 41·4
Strasbourg		76·5	342	i 11 45k	0	e 21 44	+20	i 12 8	PcP	e 40·4
Belgrade		77·0	332	e 11 48a	0	e 21 42	+13	e 15 4	PP	e 46·5
Paris		77·2	345	i 11 48	– 1	i 25 59	SS	i 11 59	PcP	e 40·4
Basle		77·5	342	e 11 54a	+ 4	—	—	—	—	—
Zürich		77·5	342	e 11 50a	0	—	—	—	—	—
Istanbul		77·6	325	e 11 50	– 1	e 21 40	+ 4	—	—	e 40·4
Triest		78·0	337	—	—	e 21 51	+11	—	—	e 44·3
Neuchatel		78·2	342	e 11 55	+ 1	—	—	—	—	—
Pavia		79·5	340	e 15 10	PP	—	—	—	—	e 41·0
Clermont-Ferrand		80·1	344	i 12 4	0	(e 22 24)	ScS	—	—	e 22·4
Florence		80·4	338	e 12 5	– 1	e 22 32	ScS	—	—	—
Tacubaya		81·0	70	e 12 32	sP	—	—	—	—	—
Ksara		81·3	316	i 12 10	– 1	—	—	—	—	—
Rome		81·8	336	12 14	+ 1	—	—	—	—	—
Taranto		81·9	333	e 15 32	PP	—	—	—	—	e 42·7
Messina	E.	84·5	333	e 12 18	– 9	e 22 37	–10	e 17 24	PPP	—
Helwan		86·6	318	12 37	0	e 23 36	sS	—	—	—
Bermuda		86·7	37	—	—	e 23 12	+ 5	—	—	—
Toledo		86·9	348	e 12 38	– 1	—	—	e 12 51	pP	49·9
Alicante		87·9	346	12 44	0	23 20	0	16 22	PP	41·8
Auckland	N.	90·0	168	—	—	e 23 45	+ 6	30 25	SSS	—
Christchurch		96·3	171	e 26 4	PS	e 24 9	[+17]	e 24 54	sS	e 45·4
Tamanrasset	Z.	101·8	336	e 13 47	0	e 17 13	?	e 17 47	PP	—
Pretoria	Z.	135·3	289	i 19 21	[+ 8]	i 23 5	PKS	—	—	—

Additional readings :—
Upsala eSS = 23m.24s.
Potsdam isSEN = 20m.54s.
Raciborzu eZ = 14m.52s.
Prague e = 12m.18s. and 12m.27s., ePP = 14m.18s.
Jena eEN = 11m.31s., eN = 11m.50s., eE = 12m.19s. and 13m.19s.
Strasbourg i = 11m.54s.
Paris ePcP = 11m.55s., i = 12m.5s., i = 13m.20s., e = 16m.5s., i = 23m.54s. and 27m.35s.
Alicante SSS = 32m.46s., Q = 36m.30s.
Long waves were also recorded at Seattle, Calcutta, Helsinki, Ivigtut, Granada, Wellington, and La Paz.

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. 15d. 11h. 1m. 23s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005. (as at 10h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	18·9	233	4 13	– 5	7 49	–6	—	—	—
College		28·7	44	e 5 50	– 3	—	—	—	—	—
Resolute Bay		43·7	22	e 8 0	0	e 14 30	+ 5	e 16 31	?	—
Victoria		46·5	63	8 26	+ 3	—	—	—	—	—
Hungry Horse		51·6	58	e 9 7	+ 5	—	—	—	—	—
Shasta Dam		51·9	70	e 9 3	– 1	—	—	—	—	—
Mineral	Z.	52·6	70	e 9 7k	– 2	—	—	—	—	—
Berkeley	Z.	53·9	73	e 9 19	0	—	—	—	—	—
Butte		53·9	59	e 9 20	+ 1	—	—	—	—	—
Reno	Z.	54·2	69	e 9 19	– 2	—	—	—	—	—
Lick	Z.	54·6	73	e 9 22	– 2	—	—	—	—	—
Fresno	Z.	56·1	72	e 9 35	0	—	—	—	—	—
Kiruna	Z.	56·2	344	i 9 34	– 2	—	—	i 9 46	pP	—
Scoresby Sund		57·2	2	e 9 40	– 3	e 17 47	+15	—	—	28·6
China Lake	Z.	58·0	71	e 9 47	– 1	i 9 52	P	i 10 2	pP	—
Pasadena	Z.	58·8	73	i 9 57	+ 3	—	—	—	—	—
Boulder City		59·5	69	i 9 57	– 2	—	—	i 10 5	pP	—
Tucson		64·5	70	e 10 29	– 3	—	—	—	—	—
Fayetteville		70·6	56	i 11 11	+ 1	—	—	—	—	—
Potsdam	Z.	71·8	340	e 11 19	+ 1	—	—	—	—	—
Collmberg		72·9	339	e 11 23	– 1	—	—	—	—	—
Prague		73·1	338	e 11 28	+ 3	e 12 6	?	e 11 47	PcP	e 38·6
Jena		73·5	340	e 11 27	– 1	e 11 42	sP	e 11 38	pP	—
Morgantown		74·4	45	e 11 30	– 3	—	—	—	—	—
Budapest		74·9	334	e 11 50	pP	e 12 21	?	15 31	?	—
Weston		75·4	37	e 11 45	+ 7	—	—	—	—	—
Stuttgart	Z.	76·1	341	e 11 42	0	—	—	—	—	—
Strasbourg		76·5	342	i 11 45k	0	—	—	—	—	—
Zürich	Z.	77·5	342	e 11 54	+ 4	—	—	—	—	—
Istanbul		77·6	325	e 11 49	– 2	—	—	—	—	—
Neuchatel	Z.	78·2	342	e 11 50a	– 4	—	—	—	—	—
Ksara		81·3	316	i 12 9	– 2	—	—	—	—	—
Helwan	Z.	86·6	318	e 12 37	0	—	—	—	—	—
Bermuda		86·7	37	—	—	—	—	e 34 37	?	e 43·4
Tamanrasset	Z.	101·8	336	17 38	PP	—	—	—	—	—

Nov. 15d. 15h. 2m. 56s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005. (as at 11h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		12·7	250	3 0	0	—	—	—	—	—
Mizusawa	E.	18·9	233	4 11	– 7	—	—	—	—	—
Vladivostok		21·2	255	e 4 27	–15	8 38	+ 9	—	—	—
Nanking		36·3	253	e 7 2	+ 3	—	—	—	—	—
Resolute Bay		43·7	22	e 8 6a	+ 6	e 14 30	+ 5	e 8 18	pP	e 26·4
Victoria		46·5	63	8 27	+ 4	—	—	—	—	—
Manila		49·1	235	e 8 34?	– 9	—	—	—	—	—
Sverdlovsk		52·7	317	i 9 6	– 4	e 17 1	sS	—	—	—
Almata II		53·4	296	e 9 17	+ 2	—	—	—	—	—
Przhevalsk		53·4	294	e 9 18	+ 3	—	—	—	—	—
Frunse		55·2	297	i 9 32	+ 4	—	—	—	—	—
Naryn		55·4	295	e 9 32	+ 2	—	—	—	—	—
Kiruna		56·2	344	i 9 29	– 7	e 18 25	?	i 9 37	P	e 30·1
Scoresby Sund		57·2	2	e 9 42	– 1	—	—	e 9 47	P	37·1
China Lake	Z.	58·0	71	e 9 47	– 1	i 9 53	?	i 10 2	pP	—
Mount Wilson	Z.	58·9	73	i 9 58	+ 3	—	—	i 10 8	pP	—
Tashkent		59·1	299	e 9 51	– 5	—	—	—	—	—
Obi-garm		60·8	297	e 10 9	+ 1	—	—	—	—	—
Pulkovo		61·0	334	i 10 14	+ 5	—	—	—	—	—
Ashkabad		67·3	303	e 10 55	+ 5	—	—	—	—	—

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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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kirkland Lake	Z.	67·3	39	e 10 58	+ 8	—	—	e 11 5	pP	—
Kizyl-Arvat		67·6	305	e 10 58	+ 6	—	—	—	—	—
Copenhagen		68·9	342	i 11 6	+ 6	e 20 21	SP	—	—	40·1
Piatigorsk		69·7	317	e 11 1	− 4	—	—	—	—	—
Tiflis		70·8	315	11 8	− 4	—	—	—	—	—
Kirovobad		70·9	313	e 11 17	+ 5	—	—	—	—	—
Ottawa		71·2	38	e 11 18	+ 4	e 20 29	+ 4	—	—	—
Borzhomi		71·3	315	e 11 17	+ 2	—	—	—	—	—
Lwow		71·4	332	e 11 17	+ 2	—	—	—	—	—
Tsikhlis-Dzhvari		71·4	315	e 11 17	+ 2	—	—	—	—	—
Potsdam		71·8	340	e 11 21?	+ 3	—	—	—	—	e 41·1
Witteveen	Z.	72·7	344	e 11 27	+ 4	—	—	—	—	—
Raciborzu		72·8	336	e 11 29	+ 6	—	—	e 12 20	?	—
Yalta		72·8	323	e 11 19	− 4	—	—	—	—	—
Collmberg		72·9	339	e 11 30	+ 6	—	—	—	—	—
Prague		73·1	338	e 11 36	+11	e 20 58	+12	—	—	—
Poona	Z.	73·4	279	e 11 21	− 6	—	—	—	—	—
Jena		73·5	340	e 11 23	− 5	—	—	e 11 26?	P	—
Harvard		75·2	37	i 11 42	+ 5	—	—	—	—	—
Weston		75·4	37	i 11 44	+ 6	—	—	—	—	—
Palisades		75·6	39	i 11 44	+ 4	—	—	—	—	—
Stuttgart	Z.	76·1	341	e 11 39?	− 3	e 11 47	PcP	e 12 32	?	—
Strasbourg		76·5	342	e 11 49	+ 4	—	—	e 12 19	?	—
Paris		77·2	345	e 11 47	− 2	i 11 56	P	i 12 7	pP	e 40·1
Basle	Z.	77·5	342	e 11 57	+ 7	—	—	—	—	—
Zürich	Z.	77·5	342	e 11 48	− 2	—	—	—	—	—
Istanbul		77·6	325	e 11 47	− 4	e 21 38	+ 2	e 11 56	?	—
Clermont-Ferrand		80·1	344	12 4?	0	—	—	—	—	—
Florence		80·4	338	e 12 6	0	22 28	ScS	—	—	—
Rome		81·8	336	e 11 46?	−27	e 21 56	−24	—	—	e 43·1
Taranto		81·9	333	—	—	e 22 23	+ 2	—	—	—
Helwan	Z.	86·6	318	12 33	− 4	—	—	e 12 48	pP	—
Tamanrasset	Z.	101·8	336	15 54	?	—	—	e 17 37	PP	—
Pretoria	Z.	135·3	289	i 18 49	[−24]	i 22 31	SKP	—	—	—

Additional readings :—
Prague eN = 11m.59s., i = 12m.11s., e = 12m.34s.
Jena eN = 11m.32s., eE = 11m.41s., eN = 11m.44s.

Nov. 15d. 16h. 12m. 13s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005. (as at 15h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	18·9	233	4 25	+ 7	8 32	SSS	—	—	—
Resolute Bay		43·7	22	e 8 0a	0	e 14 34	+ 9	e 17 19	SS	e 27·1
Manila		49·1	235	e 8 47	+ 4	—	—	—	—	—
Kiruna		56·2	344	i 9 31	− 5	e 18 0	+42	—	—	e 31·1
Scoresby Sund		57·2	2	e 9 42	− 1	—	—	—	—	—
China Lake	Z.	58·0	71	e 9 46	− 2	—	—	i 9 52	pP	—
Potsdam	Z.	71·8	340	e 11 29	+11	—	—	—	—	—
Witteveen	Z.	72·7	344	e 11 23	0	—	—	—	—	—
Raciborzu	Z.	72·8	336	e 11 24	+ 1	—	—	—	—	—
Collmberg	Z.	72·9	339	e 11 23	− 1	—	—	—	—	—
Prague		73·1	338	e 11 17	− 8	e 11 52	sP	—	—	—
Jena		73·5	340	e 11 27	− 1	—	—	e 11 37	pP	—
Stuttgart	Z.	76·1	341	e 11 41	− 1	—	—	—	—	—
Strasbourg		76·5	342	e 11 45	0	12 53	?	e 11 56	pP	—
Paris		77·2	345	e 11 49	0	—	—	—	—	—
Istanbul		77·6	325	e 11 50	− 1	e 21 41	+ 5	e 12 0	pP	—
Tamanrasset	Z.	101·8	336	e 17 29	?	—	—	e 17 54	PP	—

Resolute Bay also gives eZ = 8m.11s.

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Nov. 15d. 17h. 45m. 22s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 16h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		12·7	250	2 57	– 3	—	—	—	—	—
Mizusawa	E.	18·9	233	4 3	–15	8 30	?	—	—	—
Vladivostok		21·2	255	—	—	e 8 51	+22	—	—	—
College		28·7	44	i 5 52	– 1	—	—	—	—	—
Irkutsk		33·4	293	—	—	e 11 46	– 4	—	—	—
Resolute Bay	Z.	43·7	22	e 7 59a	– 1	—	—	—	—	—
Manila		49·1	235	e 8 38	– 5	—	—	—	—	—
Hungry Horse		51·6	58	e 9 11	+ 9	—	—	—	—	—
Shasta Dam		51·9	70	e 9 6	+ 2	—	—	—	—	—
Sverdlovsk		52·7	317	e 8 51	–19	—	—	—	—	—
Almata II		53·4	296	e 9 14	– 1	—	—	—	—	—
Przhevalsk		53·4	294	e 9 13	– 2	—	—	—	—	—
Butte		53·9	59	e 9 26	+ 7	—	—	—	—	—
Frunse		55·2	297	i 9 27	– 1	—	—	—	—	—
Kiruna		56·2	344	i 9 32a	– 4	e 17 38?	PS	i 10 14	?	e 29·2
Scoresby Sund		57·2	2	e 9 43	0	—	—	—	—	—
China Lake	Z.	58·0	71	e 9 47	– 1	—	—	i 9 58	pP	—
Mount Wilson	Z.	58·9	73	i 9 54	– 1	—	—	—	—	—
Boulder City		59·5	69	e 10 8	+ 9	—	—	—	—	—
Obi-garm		60·8	297	i 10 7	– 1	—	—	—	—	—
Stalinabad		61·4	297	i 10 9	– 3	—	—	—	—	—
Ashkabad		67·3	303	e 10 50	0	—	—	—	—	—
Piatigorsk		69·7	317	11 5	0	—	—	—	—	—
Fayetteville		70·6	56	i 11 9	– 1	—	—	—	—	—
Borzhomi		71·3	315	11 15	0	—	—	—	—	—
Sotchi		71·4	319	e 11 41	PcP	—	—	—	—	—
Tsikhlis-Dzhvari		71·4	315	11 16	+ 1	—	—	—	—	—
Witteveen	Z.	72·7	344	i 11 24	+ 1	—	—	—	—	—
Raciborzu		72·8	336	e 11 22	– 1	e 13 27	?	e 11 32	pP	—
Yalta		72·8	323	10 23	–60	—	—	—	—	—
Collmberg		72·9	339	e 11 24	0	—	—	—	—	—
Prague		73·1	338	e 11 20	– 5	—	—	e 14 3	PP	—
Poona	Z.	73·4	279	i 11 26	– 1	—	—	—	—	—
Jena		73·5	340	11 30	+ 2	—	—	e 11 41	PcP	—
Morgantown		74·4	45	i 11 32	– 1	—	—	—	—	—
Harvard		75·2	37	i 11 42	+ 5	—	—	—	—	—
Weston		75·4	37	i 11 42	+ 4	—	—	—	—	—
Stuttgart	Z.	76·1	341	e 11 43	+ 1	—	—	—	—	—
Strasbourg		76·5	342	i 11 45k	0	e 12 58	?	e 12 4	pP	—
Paris		77·2	345	i 11 51	+ 2	—	—	i 12 10	pP	—
Basle		77·5	342	e 11 52k	+ 2	—	—	—	—	—
Zürich		77·5	342	e 11 51a	+ 1	—	—	—	—	—
Istanbul		77·6	325	e 11 51	0	e 21 42	+ 6	—	—	—
Helwan	Z.	86·6	318	e 12 38	+ 1	—	—	e 12 50	PcP	—
Tamanrasset	Z.	101·8	336	e 13 47	0	—	—	e 17 33	PP	—

Prague gives also e = 12m.4s., 12m.31s., 13m.23s., and 16m.10s.
Long waves were also recorded at Rome and Florence.

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Nov. 15d. 19h. 42m. 13s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 17h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		12·7	250	2 59	– 1	—	—	—	—	—
Abasiri		13·7	237	e 3 25	PP	—	—	—	—	e 8·8
Mitchell Field		14·2	83	i 3 12	– 7	—	—	—	—	—
Urakawa		15·8	235	e 3 38	– 2	e 6 56	SS	e 3 53	PP	e 8·0
Sapporo		15·9	241	e 3 49	+ 8	e 6 59	SS	e 4 11	PPP	e 7·8
Miyako		18·1	232	4 4	– 4	—	—	—	—	—
Morioka		18·4	233	i 4 10	– 2	—	—	—	—	—
Mizusawa		18·9	233	4 15	– 3	7 42	– 1	7 47	S	—
Akita		19·0	234	e 4 25	+ 6	e 8 30	SSS	—	—	—
Sakata		19·7	234	e 4 23	– 4	—	—	—	—	—
Sendai		19·7	231	e 4 20	– 7	e 8 1	+ 1	e 4 51	PP	11·0
Yamagata		20·0	232	e 4 28	– 2	—	—	—	—	—
Hukusima		20·3	232	e 4 36	+ 3	—	—	—	—	—
Onahama		20·9	229	e 4 15	–24	e 8 32	+ 9	—	—	—
Shirakawa		20·9	230	e 4 29	–10	e 7 38	?	e 5 16	PPP	—
Aikawa		21·2	235	e 4 42	0	8 48	SS	—	—	10·9
Vladivostok		21·2	255	e 4 34	– 8	i 9 13	SS	i 5 0	PP	—
Utunomiya		21·6	232	e 4 43	– 3	—	—	—	—	—
Kumagaya		22·1	232	e 5 2	+11	e 8 51	+ 6	—	—	—
Maebasi		22·1	231	e 4 57	+ 6	i 9 2	sS	—	—	—
Matusiro		22·3	235	4 52	– 1	8 52	+ 3	—	—	11·1
Nagano	N.	22·3	233	e 4 52	– 1	e 9 21	SS	—	—	—
Tokyo	N.	22·3	230	4 47	– 6	9 0	+11	5 12	PP	—
Oiwake		22·4	232	e 4 56	+ 2	e 9 2	+11	—	—	—
Matumoto	E.	22·7	234	e 4 55	– 2	e 9 4	+ 8	—	—	—
Toyama		22·7	235	e 4 55	– 2	e 9 5	+ 9	e 5 35	PP	e 15·0
Kohu		22·9	231	e 5 1	+ 2	—	—	—	—	—
Misima		23·1	230	e 5 3	+ 2	e 9 29	sS	e 7 31	?	—
Nagoya		24·0	233	e 5 12	+ 2	—	—	e 5 55	PPP	—
Hikone		24·3	235	e 5 3	– 9	9 46	sS	—	—	e 13·6
Kyoto		24·8	235	e 5 22	+ 5	—	—	—	—	—
Kobe		25·3	235	e 5 24	+ 2	—	—	i 7 26	?	e 17·0
Sumoto		25·7	235	e 5 37	pP	i 10 13	sS	—	—	13·8
Koti		27·0	236	e 5 35	– 3	e 10 37	sS	—	—	14·3
Hirosima		27·0	238	e 5 41	+ 3	—	—	—	—	—
Muroto		27·0	235	e 5 43	+ 5	—	—	—	—	—
Matuyama		27·2	237	e 5 34	– 6	—	—	—	—	e 16·0
Hukuoka		28·6	241	5 50	– 2	e 12 45	PcS	—	—	i 15·4
College		28·7	44	e 5 53	0	—	—	—	—	—
Irkutsk		33·4	293	6 33	– 1	12 6	+16	e 7 45	PP	—
Zi-ka-wei	Z.	35·4	249	i 6 50a	– 2	e 12 23	+ 2	—	—	—
Nanking		36·3	253	6 57a	– 2	e 12 29	– 6	—	—	—
Resolute Bay		43·7	22	e 8 3a	+ 3	e 14 35	SPP	e 8 13	pP	e 24·2
Victoria		46·5	63	8 24	+ 1	—	—	—	—	—
Seattle		47·6	63	e 9 1	+30	e 15 30	+ 9	e 9 15	pP	e 24·8
Manila		49·1	235	i 8 38	– 5	—	—	e 11 11	sPPP	—
Hungry Horse		51·6	58	e 9 2	0	—	—	—	—	—
Shasta Dam		51·9	70	e 9 5	+ 1	—	—	—	—	—
Mineral	Z.	52·6	70	e 9 16k	+ 7	—	—	—	—	—
Saskatoon		52·9	51	—	—	e 16 37	+ 3	—	—	28·8
Przhevalsk		53·4	294	e 9 18	+ 3	—	—	—	—	—
Almata		53·6	296	i 9 17	0	—	—	—	—	—
Berkeley		53·9	73	i 9 19a	0	e 16 54	+ 6	e 19 2	ScS	—
Butte		53·9	59	e 9 20	+ 1	—	—	—	—	—
Reno	Z.	54·2	69	e 9 23k	+ 2	—	—	—	—	—
Lick	Z.	54·6	73	e 9 23a	– 1	—	—	—	—	—
Bozeman		54·9	58	e 10 27	+61	e 17 3	+ 2	—	—	—
Frunse		55·2	297	i 9 28	0	i 17 19	+14	i 10 28	PcP	—
Fresno	Z.	56·1	72	e 9 35	0	—	—	—	—	—
Kiruna		56·2	344	i 9 33k	– 3	e 17 26	+ 8	e 17 49?	PPS	e 25·0

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha		56·8	71	i 9 42	+ 2	i 17 37	+11	i 9 53	pP	—
Scoresby Sund		57·2	2	i 9 45	+ 2	—	—	—	—	29·8
China Lake		58·0	71	e 9 48	0	i 17 50	+ 8	i 10 1	pP	—
Tchimkent		58·3	300	e 9 50	0	19 31	ScS	11 54	PP	—
Fergana		58·4	296	e 9 51	0	e 18 6	SP	e 13 36	PPP	—
Pasadena		58·8	73	i 9 56	+ 2	i 18 2	+ 9	i 10 7	pP	e 25·3
Tashkent		59·1	299	e 9 54	− 2	e 18 5	+ 9	—	—	—
Riverside	Z.	59·4	73	e 9 59	+ 1	—	—	e 10 10	pP	—
Boulder City		59·5	69	i 10 0	+ 1	e 18 11	+ 9	—	—	—
Garm		60·2	297	e 10 3	− 1	—	—	—	—	—
Palomar	Z.	60·2	73	e 10 5	+ 1	—	—	—	—	—
Pulkovo		61·0	334	i 10 10	+ 1	i 18 39	SP	—	—	—
Stalinabad		61·4	297	i 10 9	− 3	i 18 36	+10	—	—	—
Calcutta	E.	61·5	271	e 10 13	+ 1	e 18 36	+ 9	14 8	PPP	—
Samarkand		61·5	299	10 11	− 1	—	—	—	—	—
Helsinki	E.	62·0	337	—	—	e 18 54	SP	—	—	e 31·8
Moscow		62·1	328	i 10 17	+ 1	18 54	SP	e 20 20	ScS	—
Upsala		63·9	340	e 10 28	0	e 19 5	+ 8	e 19 35	PPS	e 32·8
Ivigtut		64·3	16	—	—	e 19 14	+12	—	—	32·8
Tucson		64·5	70	e 10 33	+ 1	e 19 25	+20	—	—	—
Mary		65·8	301	i 10 39	− 2	e 20 35	ScS	—	—	—
Ashkabad		67·3	303	e 10 52	+ 2	—	—	—	—	—
Kirkland Lake		67·3	39	e 10 59	+ 9	—	—	—	—	—
Kizyl-Arvat		67·6	305	11 6	pP	—	—	—	—	—
Copenhagen		68·9	342	e 11 1k	+ 1	i 20 23	SP	i 11 11	pP	33·8
Piatigorsk		69·7	317	11 5	0	20 25	SP	11 26	PcP	—
Tiflis		70·8	315	i 11 3	− 9	e 21 30	PPS	e 15 49	PPP	—
Gori		70·9	315	e 11 7	− 5	—	—	—	—	—
Ottawa		71·2	38	11 25	+11	20 27	+ 2	14 7	PP	—
Borzhomi		71·3	315	e 11 18	+ 3	—	—	—	—	—
Hyderabad	E.	71·4	275	e 11 16	+ 1	20 32	+ 5	—	—	—
Lenkoran		71·4	310	i 11 17	+ 2	20 47	SP	—	—	—
Lwow		71·4	332	i 11 16	+ 1	i 20 46	SP	—	—	—
Tsikhlis-Dzhvari		71·4	315	11 18	+ 3	—	—	—	—	—
Potsdam		71·8	340	i 11 20a	+ 2	i 20 45?	+13	i 11 31	pP	e 36·8
Goris		71·9	312	i 11 20	+ 2	20 46	+13	—	—	—
Leninakan		72·0	314	e 11 23	+ 4	—	—	—	—	—
Cleveland		72·1	44	i 11 21k	+ 2	e 20 41	+ 6	e 20 55	sS	—
Erevan		72·2	313	e 11 22	+ 2	—	—	—	—	—
Simferopol		72·4	323	e 11 22	+ 1	—	—	—	—	—
Witteveen	Z.	72·7	344	i 11 28	+ 5	—	—	—	—	—
Raciborzu		72·8	336	e 11 25	+ 2	e 21 38	PPS	e 11 35	pP	—
Yalta		72·8	323	11 25	+ 2	21 2	+19	11 39	PcP	—
Collmberg		72·9	339	e 11 19	− 5	21 6	+22	—	—	e 40·8
Uzhgorod		73·0	333	i 11 27	+ 2	21 10	SP	—	—	—
Prague		73·1	338	e 11 33	+ 8	21 2?	+16	11 43	pP	e 34·8
Skalnate Pleso		73·1	334	e 11 31	+ 6	e 21 10	SP	e 11 41	pP	—
Poona		73·4	279	i 11 27	0	20 53	+ 3	11 41	PcP	34·5
Jena		73·5	340	e 11 29	+ 1	e 20 58	+ 7	e 11 41	PcP	—
Bombay		73·7	280	i 11 30	+ 1	e 20 59	+ 6	e 14 16	PP	—
Rathfarnham Castle		73·9	352	e 11 40	+10	e 22 1	PPS	e 16 35	PPP	e 39·3
Djakarta		74·0	236	e 11 29	− 1	e 21 0	+ 4	—	—	—
Cheb		74·2	340	—	—	e 21 16	+17	e 22 2	PPS	e 34·8
Pennsylvania		74·2	42	e 11 34	+ 2	e 21 32	ScS	e 11 59	sP	—
Morgantown		74·4	45	i 11 33	0	—	—	e 18 35	?	—
Budapest		74·9	334	11 39	+ 3	—	—	e 11 50	PcP	41·8
Kew		75·0	348	i 11 39	+ 3	e 21 56	PS	—	—	e 32·8
Harvard		75·2	37	e 11 38	+ 1	e 21 29	+19	—	—	e 37·5
Weston		75·4	37	i 11 39	+ 1	—	—	—	—	—
Bucharest		75·6	328	11 41	+ 1	22 5	SPP	—	—	—
Palisades		75·6	39	i 11 40a	0	e 21 15	+ 1	i 11 52	pP	e 39·3
City College, N.Y.		75·8	39	e 11 42	+ 1	e 21 17	+ 1	—	—	—
Fordham		75·8	39	e 11 39	− 2	e 21 21	+ 5	—	—	—
Timisoara		75·9	332	e 11 47?	+ 6	e 21 47?	ScS	—	—	—
Karlsruhe	Z.	76·0	341	e 11 42	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stuttgart		76·1	341	e 11 44	+ 2	e 21 42	ScS	e 12 5	pP	e 40·8
Washington		76·2	42	e 11 42	– 1	—	—	—	—	—
Strasbourg		76·5	342	i 11 48k	+ 3	e 21 51	ScS	i 12 1	pP	e 38·8
Belgrade		77·0	332	e 11 50a	+ 2	e 21 52	ScS	e 14 47	PP	e 45·3
Paris		77·2	345	i 11 51	+ 2	e 21 55?	ScS	e 22 34?	SPP	e 39·8
Basle		77·5	342	e 11 53	+ 3	—	—	—	—	—
Zürich		77·5	342	e 11 52a	+ 2	e 21 53	+18	—	—	—
Istanbul		77·6	325	e 11 52	+ 1	21 42	+ 6	e 21 59	ScS	e 42·2
Triest		78·0	337	i 11 55a	+ 2	i 21 49	+ 9	i 12 6	PcP	e 41·1
Pavia		79·5	340	—	—	e 22 20	ScS	—	—	e 43·4
Clermont-Ferrand		80·1	344	i 12 9	+ 5	—	—	—	—	—
Florence		80·4	338	i 12 9	+ 3	e 22 30	ScS	—	—	—
Tacubaya		81·0	70	e 12 14	+ 5	—	—	—	—	—
Rome		81·8	336	i 12 15a	+ 2	e 22 28	+ 8	e 15 37	PP	e 40·8
Taranto		81·9	333	e 12 32	pP	22 31	+10	e 15 37	PP	41·1
Messina	E.	84·5	333	—	—	e 23 16	ScS	e 32 46	Q	e 46·1
Helwan		86·6	318	i 12 39a	+ 2	e 23 17	+10	16 1	PP	—
Bermuda		86·7	37	i 12 42	+ 4	i 23 19	+11	—	—	e 41·1
Toledo		86·9	348	e 12 42	+ 3	e 23 7	– 3	—	—	50·3
Alicante		87·9	346	12 43	– 1	e 23 27	+ 7	24 25	SP	e 42·8
Granada		89·5	348	16 5k	PP	24 32	SP	e 29 14	SS	48·6
Almeria		89·7	347	e 13 3	+11	e 23 51	+15	18 39	PPP	51·7
Auckland	N.	90·0	168	—	—	e 23 47	+ 8	e 25 0	PS	e 42·3
Wellington		94·3	170	—	—	e 24 25	+ 8	—	—	e 43·4
Tamanrasset	Z.	101·8	336	e 13 50	+ 3	i 17 56	PP	e 14 32	?	—
Huancayo		120·1	69	—	—	e 25 36	[+ 2]	e 36 52	SSP	e 62·0
La Paz		127·7	65	e 19 12	[+14]	i 38 27	SS	i 21 12	PP	65·8
Pretoria	Z.	135·3	289	i 21 54	PP	—	—	—	—	—

Additional readings :—
Sendai eE = 5m.2s., e = 8m.56s., eN = 10m.39s.
Vladivostok PcP = 8m.39s.
Irkutsk eSS = 14m.13s.
Resolute Bay eZ = 9m.26s., eN = 17m.47s., eE = 18m.11s.
Seattle e = 9m.33s., eSS = 18m.57s., eSSS = 20m.37s.
Berkeley eSSN = 22m.59s.
Frunse iScS = 19m.20s.
Kiruna eZ = 11m.29s., eN = 11m.59s., iPPPN = 12m.56s., eE = 17m.10s., eScSE = 19m.16s., eScSN = 19m.21s., eSSSN = 22m.54s.
China Lake iE = 18m.5s.
Tchimkent PcP = 10m.26s., PPP = 13m.33s., eS = 18m.3s., PS = 18m.21s., SS = 22m.31s.
Fergana ePcP = 10m.33s., iScS = 19m.52s.
Upsala iPcPN = 10m.54s., eSN = 19m.10s., i = 19m.18s., eScS?N = 20m.29s., eSS?N = 23m.47s.
Piatigorsk PPP = 15m.34s., PS = 20m.55s., SS = 25m.6s., SSS = 28m.17s.
Tiflis eSSS = 28m.59s.
Ottawa PPP = 15m.47s., SSS = 28m.39s.
Potsdam iPN = 11m.25s., isSEN = 20m.57s., iSKSN = 21m.19s.
Cleveland iZ = 12m.45s., isPSEN = 21m.24s.
Raciborzu ePcPE = 11m.41s., ePPN = 13m.59s., eN = 20m.29s.
Yalta PP = 14m.8s.
Prague ePcP? = 11m.51s., e = 12m.6s., 12m.16s., and 12m.31s., ePP = 14m.20s., eE = 21m.17s.
Skalnate Pleso e = 12m.5s., ePP?E = 13m.54s.
Poona PSEN = 21m.35s., PPSEN = 21m.46s., SSEN = 25m.45s., Q = 30m.51s.
Jena eE = 11m.56s., and 12m.0s., eN = 12m.34s., eE = 12m.39s., eN = 12m.51s., ePS?N = 21m.15s., ePS?E = 21m.32s.
Palisades ePP = 14m.40s., ePPP = 16m.25s., ePPS = 22m.21s., iSS = 26m.13s., eQ = 37m.17s.
Belgrade eZ = 13m.20s., eNE = 17m.55s., eSNW = 21m.46s., eSSSNE = 31m.1s.
Paris i = 12m.2s., 12m.10s., and 12m.31s., ePP = 15m.0s.
Triest ePPZ = 15m.4s., iScS = 22m.2s., eSPZ = 22m.39s.
Rome i = 29m.47s., SSS = 32m.4s.
Helwan eZ = 13m.7s.
Alicante SS = 29n.15s., Q = 36m.13s.
Almeria PP = 16m.43s.
Long waves were also recorded at De Bilt, Tortosa, Santa Clara, Christchurch, and Galerazamba.

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Nov. 15d. 20h. 20m. 33s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005. (as at 19h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	18·9	233	4 8	–10	—	—	—	—	—
Resolute Bay		43·7	22	e 8 2a	+ 2	—	—	e 8 9	pP	—
Victoria		46·5	63	8 21	– 2	—	—	—	—	—
Manila		49·1	235	e 8 42	– 1	—	—	—	—	—
Kiruna	Z.	56·2	344	i 9 32k	– 4	—	—	i 10 10	?	—
Scoresby Sund		57·2	2	e 9 43	0	—	—	—	—	—
China Lake	Z.	58·0	71	i 9 47	– 1	—	—	i 9 54	?	—
Pasadena	Z.	58·8	73	i 9 53	– 1	—	—	i 10 0	pP	—
Riverside	Z.	59·4	73	e 9 56	– 2	—	—	—	—	—
Palomar	Z.	60·2	73	e 10 3	– 1	—	—	—	—	—
Cleveland	Z.	72·1	44	i 10 53k	–26	—	—	—	—	—
Raciborzu		72·8	336	e 11 36	PcP	e 12 14	?	e 15 11	?	—
Collmberg		72·9	339	11 25	+ 1	e 27 4	?	—	—	—
Poona	Z.	73·4	279	i 11 25	– 2	—	—	—	—	—
Jena		73·5	340	e 11 27	– 1	—	—	e 11 48	sP	—
Stuttgart	Z.	76·1	341	e 11 42	0	—	—	—	—	—
Strasbourg		76·5	342	e 11 46	+ 1	—	—	e 12 7	sP	—
Paris		77·2	345	i 11 50	+ 1	—	—	e 12 1	pP	—
Istanbul	Z.	77·6	325	e 11 50	– 1	—	—	—	—	—
Triest	Z.	78·0	337	e 11 53	0	—	—	e 12 4	pP	—
Helwan	Z.	86·6	318	12 38	+ 1	—	—	e 13 6	sP	—
Tamanrasset	Z.	101·8	336	e 13 48	+ 1	—	—	e 17 18	?	—

Long waves were also recorded at Bogota.

Nov. 15d. 20h. 38m. 0s. Epicentre 33°·5N. 138°·2E. Depth of focus 0·040.
(as on 1948, Nov. 28d.).

Intensity II-III at Tokyo, Utunomiya, and Tochigi,
Epicentre 33°·4N. 138°·5E. Depth 270km.
Seismo. Bull. Cent. Met. Obs., Japan, for Nov., 1951, Tokyo, 1951, pp.304-305, with macroseismic chart.

A = –·6229, B = +·5570, C = +·5493 ; δ = –2 ; h = +1 ;
D = +·667, E = +·745 ; G = –·409, H = +·366, K = –·836.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Omaesaki	1·1	1	0 43	+ 3	1 14	+ 3
Hatidyozima	1·4	106	0 44	+ 2	1 15	+ 1
Shizuoka	1·5	8	0 44	+ 2	1 18	+ 3
Osima	1·6	38	0 44k	+ 1	1 16	0
Ajiro	1·7	26	0 44	0	1 17	– 1
Misima	1·7	21	0 44	0	1 18	0
Owase	1·8	289	0 45a	+ 1	1 20	+ 1
Nagoya	1·9	329	0 48	+ 3	1 24	+ 4
Kameyama	2·0	313	0 46	0	1 22	0
Mera	2·0	44	0 44	– 2	1 19	– 3
Kohu	2·1	8	0 48	+ 1	1 26	+ 3
Yokohama	2·3	32	0 46	– 2	1 25	– 1
Hikone	2·4	318	0 52	+ 3	1 31	+ 3
Kyoto	2·5	307	0 53	+ 3	1 35	+ 5
Tokyo	2·5	30	0 50	0	1 28	– 2
Titibu	2·6	16	0 51	0	1 30	– 1
Wakayama	2·6	286	0 53	+ 2	—	—
Matumoto	2·7	356	0 52	0	1 35	+ 2
Kobe	2·8	295	0 54k	+ 1	1 37	+ 2
Kumagaya	2·8	20	0 52	– 1	1 34	– 1
Oiwake	2·8	6	0 54	+ 1	1 38	+ 3
Tsuruga	2·8	320	0 49	– 4	1 36	+ 1
Sumoto	2·9	287	0 52	– 2	1 38	+ 2
Maebasi	3·0	14	1 4	+ 9	1 44	+ 6
Matusiro	3·0	0	0 56	+ 1	1 40	+ 2

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Tyosi		3·1	44	0 56	0	1 38	– 3
Nagano		3·2	0	0 58	+ 1	1 43	+ 1
Toyama		3·3	346	0 59a	+ 1	1 45	+ 1
Utunomiya		3·3	24	0 57	– 1	1 41	– 3
Mito		3·4	31	0 59	0	1 43	– 3
Muroto		3·4	267	0 59	0	1 46	0
Takamatu		3·6	285	1 2	0	1 50	0
Shirakawa		4·0	24	1 4	– 2	1 51	– 7
Wazima		4·0	346	1 11	+ 5	1 59	+ 1
Onahama		4·1	32	1 6	– 1	1 54	– 6
Inawasiro		4·4	21	1 10	– 1	2 1	– 5
Aikawa		4·5	1	1 9	– 3	2 4	– 4
Hukusima		4·6	21	1 10	– 3	2 7	– 3
Matuyama		4·6	276	1 13	0	2 13	+ 2
Hirosima		4·9	282	1 15	– 1	2 16	0
Sendai		5·2	24	1 13	– 7	2 12	–10
Isinomaki		5·5	27	1 19	– 5	2 22	– 7
Mizusawa	E.	6·1	22	1 30	– 1	2 53	+11
Akita		6·4	13	1 34	0	—	—
Hukuoka		6·5	273	1 35k	– 1	2 54	+ 3
Morioka		6·6	20	1 34	– 3	2 51	– 2
Miyako		6·8	26	1 35	– 4	2 49	– 8
Aomori		7·6	12	1 54	+ 5	3 22	+ 7
Urakawa		9·4	22	2 9	– 3	3 52	– 3
Nanking		16·4	273	i 3 32	– 4	—	—
Manila		24·5	223	e 5 40	pP	—	—
Resolute Bay		66·7	13	e 10 18a	– 4	—	—
Victoria		71·0	43	10 44	– 4	—	—
Haiwee	Z.	80·8	52	i 11 40	– 3	—	—
China Lake		81·2	52	i 11 42	– 3	—	—
Mount Wilson	Z.	81·8	54	i 11 46	– 2	—	—
Riverside	Z.	82·4	54	i 11 48	– 3	—	—
Collmberg		82·8	328	11 50	– 3	—	—
Palomar	Z.	83·1	54	i 11 52	– 3	—	—

Nov. 15d. 21h. 59m. 20s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 20h. 20m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		12·7	250	2 58	– 2	—	—	—	—	—
Mitchell Field		14·2	83	i 3 9	–10	—	—	—	—	—
Mizusawa	E.	18·9	233	4 18	0	8 3	+20	—	—	—
	N.	18·9	233	4 24	+ 6	7 59	+16	—	—	—
Vladivostok		21·2	255	—	—	e 8 23	– 6	—	—	—
College		28·7	44	e 5 52	– 1	i 9 13	–23	—	—	—
Irkutsk		33·4	293	e 6 31	– 3	e 12 3	+13	—	—	—
Zi-ka-wei	Z.	35·4	249	e 6 49	– 3	—	—	—	—	—
Nanking		36·3	253	e 6 55	– 4	—	—	—	—	—
Resolute Bay		43·7	22	e 8 0	0	e 14 34	+ 9	—	—	e 25·1
Victoria		46·5	63	8 23	0	—	—	—	—	—
Seattle		47·6	63	e 10 1	PcP	e 18 40	SS	—	—	e 31·7
Manila		49·1	235	e 8 40	– 3	—	—	—	—	—
Hungry Horse		51·6	58	e 9 1	– 1	—	—	—	—	—
Shasta Dam		51·9	70	e 9 4	0	—	—	—	—	—
Mineral	Z.	52·6	70	i 9 16k	+ 7	—	—	—	—	—
Sverdlovsk		52·7	317	i 9 9	– 1	e 16 40	+ 9	—	—	—
Reno	Z.	54·2	69	e 9 21a	0	—	—	—	—	—
Lick	Z.	54·6	73	i 9 23a	– 1	—	—	—	—	—
Frunse		55·2	297	i 9 29	+ 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fresno	Z.	56·1	72	e 9 33k	– 2	—	—	—	—	—
Kiruna		56·2	344	i 9 32k	– 4	e 17 23	+ 5	i 9 44	pP	e 27·7
Tinemaha	Z.	56·8	71	e 9 45	+ 5	—	—	—	—	—
Scoresby Sund		57·2	2	e 9 42	– 1	—	—	—	—	30·7
Andijan		57·9	296	e 9 46	– 2	—	—	—	—	—
China Lake		58·0	71	i 9 47	– 1	e 17 50	+ 8	i 9 58	pP	—
Tchimkent		58·3	300	e 9 47	– 3	—	—	—	—	—
Fergana		58·4	296	e 9 49	– 2	e 18 2?	SP	—	—	—
Pasadena	Z.	58·8	73	e 9 52	– 2	—	—	—	—	—
Riverside	Z.	59·4	73	e 9 54	– 4	—	—	—	—	—
Boulder City		59·5	69	e 9 58	– 1	e 18 10	+ 8	—	—	—
Palomar	Z.	60·2	73	e 10 2	– 2	—	—	—	—	—
Obi-garm		60·8	297	i 10 6	– 2	i 18 26	+ 8	—	—	—
Stalinabad		61·4	297	i 10 10	– 2	i 18 35	+ 9	—	—	—
Calcutta	E.	61·5	271	—	—	e 18 47	PS	—	—	e 29·1
Samarkand		61·5	299	10 19	+ 7	—	—	—	—	—
Helsinki	E.	62·0	337	—	—	e 18 55	PS	—	—	34·7
Moscow		62·1	328	10 15	– 1	e 18 45	+10	—	—	—
Upsala		63·9	340	—	—	e 19 17	SP	—	—	e 34·7
Mary		65·8	301	10 41	0	—	—	—	—	—
Ashkabad		67·3	303	i 10 51	+ 1	—	—	—	—	—
Copenhagen		68·9	342	e 11 1	+ 1	e 20 19	SP	—	—	36·7
Baku		69·6	311	e 11 7	+ 3	e 20 23	+17	—	—	—
Piatigorsk		69·7	317	11 3	– 2	—	—	—	—	—
Shemakla		70·0	312	11 17?	+10	—	—	—	—	—
Fayetteville		70·6	56	i 11 9	– 1	—	—	—	—	—
Tiflis		70·8	315	11 13	+ 1	e 20 31?	+11	—	—	—
Kirovobad		70·9	313	e 11 10	– 2	—	—	—	—	—
Ottawa		71·2	38	11 14	0	—	—	—	—	—
Borzhomi		71·3	315	e 11 17	+ 2	—	—	—	—	—
Hyderabad	E.	71·4	275	—	—	e 20 32	+ 5	—	—	—
Lwow		71·4	332	i 11 16	+ 1	e 20 40	+13	—	—	—
Sotchi		71·4	319	11 23?	+ 8	20 46?	+19	—	—	—
Tsikhlis-Dzhvari		71·4	315	11 18	+ 3	—	—	—	—	—
Potsdam		71·8	340	i 11 19k	+ 1	i 20 56?	SP	—	—	e 39·7
Goris		71·9	312	e 11 19	+ 1	20 46	+13	—	—	—
Cleveland		72·1	44	i 11 21a	+ 2	20 46	+11	e 11 29	pP	—
Erevan		72·2	313	e 11 23	+ 3	20 50	+14	—	—	—
Simferopol		72·4	323	11 23	+ 2	—	—	—	—	—
Witteveen	Z.	72·7	344	e 11 25	+ 2	—	—	—	—	—
Raciborzu	Z.	72·8	336	e 11 26	+ 3	—	—	e 11 43	PcP	—
Yalta		72·8	323	11 24	+ 1	20 54	+11	—	—	—
Collmberg		72·9	339	e 11 24	0	—	—	e 7 33	?	—
Prague		73·1	338	e 11 30	+ 5	e 20 58	+12	e 11 42	pP	e 37·7
Skalnate Pleso		73·1	334	e 24 40	?	—	—	—	—	—
Poona		73·4	279	i 11 26	– 1	e 20 54	+ 4	11 38	PcP	—
Jena		73·5	340	e 11 27	– 1	e 20 54?	+ 3	e 11 41	pP	—
Bombay		73·7	280	e 11 41	PcP	i 20 56	+ 3	i 21 13	pS	—
Cheb		74·2	340	—	—	e 21 6	+ 7	e 21 22	pS	e 37·7
Morgantown		74·4	45	i 11 33	0	—	—	e 12 20	?	—
Budapest		74·9	334	11 48	pP	e 25 40	SS	—	—	e 42·2
Harvard		75·2	37	i 11 38	+ 1	—	—	—	—	e 40·0
Weston		75·4	37	i 11 38	0	—	—	—	—	—
Palisades		75·6	39	i 11 44a	+ 4	i 22 10	SPP	i 16 28	PPP	e 38·2
Stuttgart		76·1	341	e 11 43	+ 1	—	—	—	—	e 42·7
Strasbourg		76·5	342	i 11 46	+ 1	e 12 24	sP	e 11 53	pP	e 39·7
Belgrade		77·0	332	e 12 1k	pP	e 21 52	sS	—	—	e 46·2
Paris		77·2	345	i 11 50	+ 1	i 14 50	PP	i 12 1	pP	e 45·7
Basle	Z.	77·5	342	e 11 52	+ 2	—	—	—	—	—
Istanbul		77·6	325	e 11 51	0	e 21 41	+ 5	—	—	e 38·7
Triest		78·0	337	i 11 53a	0	—	—	i 12 5	PcP	e 44·4
Clermont-Ferrand		80·1	344	i 12 7	+ 3	—	—	i 12 19	pP	—
Florence		80·4	338	e 11 51?	–15	e 22 19	+14	—	—	—
Rome		81·8	336	e 12 16	+ 3	e 22 21	+ 1	e 22 39	sS	—
Taranto		81·9	333	e 21 30	?	—	—	—	—	—

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.
Messina	E.	84·5	333	e 12 48	sP	e 22 46	– 1	e 16 58	?	—
Helwan		86·6	318	i 12 39	+ 2	e 23 14	+ 7	i 12 49	pP	—
Bermuda		86·7	37	—	—	i 23 16	+ 8	—	—	e 44·0
Granada		89·5	348	13 22k	sP	24 4	+30	—	—	50·7
Tamanrasset	Z.	101·8	336	e 13 49	+ 2	—	—	e 17 31	?	—
Pretoria	Z.	135·3	289	i 19 13	[0]	i 23 14	?	—	—	—

Additional readings :—
Kiruna iZ = 11m.5s., ePPP?N = 13m.12s., eEN = 18m.47s., eQN = 24·1m.
Cleveland ePPN = 13m.51s., esSN = 21m.27s.
Prague ePcP? = 11m.50s., e = 12m.14s., 13m.52s., and 14m.4s.
Jena eE = 11m.58s. and 21m.12s.
Palisades e = 20m.31s.
Long waves were also recorded at De Bilt, Kew, Alicante, Almeria, and Malaga.

Nov. 15d. Readings also at 0h. (Pasadena, Riverside, China Lake, Tinemaha, Resolute Bay, Collmberg, Kiruna, Tchimkent, Tashkent, Andijan, Baku, Samarkand, Shemakla, Mary, near Ashkabad, Kizyl-Arvat, and near Garm), 1h. (Tamanrasset), 5h. (near Huancayo), 6h. (Ksara), 8h. (China Lake, Manila, Pavia, Florence, Kiruna, Collmberg, and near Ashkabad), 9h. (Kiruna (3), Collmberg (2), and near Mizusawa), 10h. (China Lake (4), Resolute Bay (2), Kiruna (8), Clermont-Ferrand, Strasbourg (3), Collmberg (4), Jena, Stuttgart (3), Neuchatel, and Zürich), 11h. (China Lake, Kiruna (2), Collmberg, and near Istanbul), 12h. (China Lake, Tacubaya, Collmberg, and near Istanbul (3)), 13h. (Pasadena, Palomar, China Lake, Riverside, Resolute Bay, Collmberg, and Kiruna), 14h. (Kiruna and Pretoria), 15h. (Mount Wilson, China Lake, Resolute Bay, Kiruna, Jena, and Strasbourg), 16h. (Apia, Poona, Kiruna, near Alicante, and near Istanbul), 17h. (near Alicante), 18h. (Apia, China Lake, Murgab, near Garm, Samarkand, Dzhergetal (2), Khorog (2), Obi-garm (2), near Chilisk, and near Istanbul), 19h. (China Lake, Kiruna, and Collmberg), 20h. (Apia), 21h. (Palisades and near La Paz), 22h. (Kiruna), 23h. (Poona, Dzhergetal, Murgab, Obi-garm, Stalinabad, and near Khorog).

Nov. 16d. 1h. 39m. 9s. Epicentre 47°·5N. 153°·9E. (as on 12d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	12·5	232	e 4 31	?	e 5 32	+ 9	—	—	—
College		35·2	39	i 7 0	+ 2	—	—	—	—	—
Resolute Bay		50·0	19	e 8 59a	+ 1	e 16 15	+ 6	e 9 12	?	—
Victoria		52·7	57	9 17	– 1	—	—	—	—	—
Shasta Dam		57·7	64	e 9 55	0	—	—	—	—	—
Hungry Horse		57·9	53	i 9 56	0	—	—	—	—	—
Kiruna		59·8	342	i 10 7	– 2	—	—	i 10 10	P	e 35·8
Butte		60·1	53	e 10 11	0	—	—	—	—	—
Scoresby Sund		62·3	359	e 10 25	– 1	—	—	—	—	—
China Lake	Z.	63·7	65	i 10 34	– 2	—	—	i 10 45	?	—
Pasadena	Z.	64·5	67	e 10 40	– 1	—	—	—	—	—
Riverside	Z.	65·1	67	e 10 43	– 2	—	—	—	—	—
Boulder City		65·3	63	i 10 46	0	—	—	i 10 57	?	—
Palomar	Z.	65·8	67	e 10 52	+ 3	—	—	—	—	—
Poona	Z.	69·9	276	i 11 11	– 4	—	—	—	—	—
Tucson		70·3	63	e 11 17	0	—	—	—	—	—
Copenhagen		72·2	339	i 11 29	0	—	—	—	—	—
Collmberg		76·0	336	e 11 51	0	—	—	—	—	—
Witteveen	Z.	76·2	341	(i 11 58)	+ 6	—	—	—	—	—
Jena		76·7	337	e 11 55	0	e 12 7	PcP	e 12 28	?	—
Prague		76·7	335	e 11 53	– 2	e 14 14	PP	e 11 56	P	—
Fayetteville		76·9	50	i 11 57	+ 1	—	—	—	—	—
Istanbul	Z.	79·2	321	e 12 9	+ 1	—	—	—	—	—
Stuttgart	Z.	79·3	337	e 12 9	0	—	—	—	—	—
Strasbourg		79·9	338	e 12 13k	+ 1	—	—	e 12 37	?	—
Morgantown		80·9	40	i 12 18	+ 1	—	—	—	—	—
Paris		80·9	342	i 12 19	+ 2	—	—	—	—	—
Triest	Z.	80·9	334	e 12 17	0	—	—	e 12 31	?	—
Harvard		81·8	32	i 12 21	– 1	—	—	—	—	—
Weston		82·0	32	i 12 23	0	—	—	—	—	—
Tamanrasset	Z.	104·5	330	e 17 56	?	—	—	—	—	—

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Nov. 16d. 15h. 3m. 26s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as on 15d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		3·7	4	1 21	+25	—	—	—	—	—
Yuzno-Sakhlinsk		12·7	250	2 55	− 5	5 58	SSS	—	—	—
Mitchell Field		14·2	83	i 3 16	− 3	—	—	—	—	—
Mizusawa	E.	18·9	233	4 14	− 4	—	—	5 2	?	—
Vladivostok		21·2	255	e 4 18?	−24	e 8 35	+ 6	—	—	—
College		28·7	44	i 5 53	0	—	—	i 6 19	sP	—
Irkutsk		33·4	293	e 6 33	− 1	—	—	—	—	—
Zi-ka-wei	Z.	35·4	249	6 48a	− 4	—	—	—	—	—
Nanking		36·3	253	e 6 57k	− 2	e 12 35	0	—	—	—
Resolute Bay		43·7	22	e 8 2	+ 2	e 14 37	+12	—	—	e 24·1
Victoria		46·5	63	8 21	− 2	—	—	—	—	—
Manila		49·1	235	i 8 38	− 5	—	—	—	—	—
Hungry Horse		51·6	58	e 9 4	+ 2	—	—	—	—	—
Sverdlovsk		52·7	317	i 9 10	0	e 16 39	+ 8	—	—	—
Almata II		53·4	296	e 9 14	− 1	—	—	—	—	—
Almata		53·6	296	e 9 16	− 1	—	—	—	—	—
Reno	Z.	54·2	69	8 31a	−50	—	—	—	—	—
Santa Clara	E.	54·4	73	—	—	14 54	sScP	—	—	—
Lick	Z.	54·6	73	i 8 25a	−59	—	—	—	—	—
Frunse		55·2	297	i 9 27	− 1	—	—	—	—	—
Kiruna		56·2	344	9 35k	− 1	e 17 19	+ 1	e 19 14	ScS	30·6
China Lake		58·0	71	i 9 50	+ 2	—	—	i 10 7	pP	—
Tchimkent		58·3	300	e 9 44	− 6	—	—	—	—	—
Fergana		58·4	296	e 9 49	− 2	—	—	—	—	—
Pasadena	Z.	58·8	73	9 56	+ 2	i 10 0	?	i 10 13	pP	e 28·0
Tashkent		59·1	299	—	—	e 18 22	SPP	—	—	—
Boulder City		59·5	69	i 10 1	+ 2	—	—	i 10 10	pP	—
Dzhergetal		59·6	297	9 58	− 1	—	—	—	—	—
Garm		60·2	297	i 10 11?	+ 7	—	—	—	—	—
Palomar	Z.	60·2	73	e 10 13	+ 9	—	—	i 10 31	pP	—
Pulkovo		61·0	334	i 10 10?	+ 1	—	—	—	—	—
Stalinabad		61·4	297	10 10	− 2	—	—	—	—	—
Samarkand		61·5	299	e 10 11	− 1	—	—	—	—	—
Moscow		62·1	328	10 18	+ 2	—	—	—	—	—
New Delhi		63·8	284	e 10 23	− 5	e 19 2	+ 6	19 32	PPS	—
Tucson		64·5	70	e 10 34	+ 2	—	—	—	—	—
Mary		65·8	301	i 10 39	− 2	19 34	+13	—	—	—
Kirkland Lake	Z.	67·3	39	e 10 49	− 1	—	—	—	—	—
Copenhagen		68·9	342	i 11 1	+ 1	20 22	SP	—	—	36·6
Piatigorsk		69·7	317	11 4	− 1	—	—	—	—	—
Shemakla		70·0	312	10 46?	−21	19 49?	−22	—	—	—
Fayetteville		70·6	56	i 11 15	+ 5	—	—	e 7 51	?	—
Tiflis		70·8	315	11 12	0	e 20 34?	+14	—	—	—
Kirovobad		70·9	313	i 11 12	0	20 30	+ 9	—	—	—
Ottawa		71·2	38	11 14	0	—	—	—	—	—
Hyderabad	E.	71·4	275	—	—	e 20 29	+ 2	—	—	—
Potsdam		71·8	340	e 11 20?	+ 2	i 21 1	SP	—	—	e 39·6
Cleveland		72·1	44	i 11 48a	PcP	e 20 48	+13	e 20 56	SP	—
Witteveen	Z.	72·7	344	i 11 26a	+ 3	—	—	—	—	—
Raciborzu		72·8	336	e 11 25	+ 2	e 11 40	PcP	e 15 48	PPP	—
Yalta		72·8	323	11 23	0	—	—	—	—	—
Collmberg	Z.	72·9	339	11 25	+ 1	—	—	—	—	—
Prague		73·1	338	e 11 30	+ 5	e 21 4	+18	e 11 57	sP	—
Skalnate Pleso		73·1	334	e 11 46	pP	—	—	—	—	—
Poona		73·4	279	i 11 25	− 2	i 22 5	PPS	—	—	—
Jena		73·5	340	e 11 29	+ 1	e 21 14	SP	e 11 45	pP	—
Morgantown		74·4	45	i 11 35	+ 2	—	—	e 12 32	?	—
Harvard		75·2	37	i 11 40	+ 3	—	—	—	—	e 50·5
Weston		75·4	37	i 11 40	+ 2	—	—	—	—	—
Palisades		75·6	39	i 11 41a	+ 1	—	—	—	—	e 38·1

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fordham		75·8	39	i 11 41	0	e 29 0	SSS	—	—	—
Stuttgart		76·1	341	e 11 44a	+ 2	e 21 44	ScS	—	—	—
Strasbourg		76·5	342	11 46a	+ 1	—	—	e 14 3	?	e 40·6
Paris		77·2	345	i 11 51	+ 2	12 19	isP	i 12 9	pP	e 40·6
Zürich		77·5	342	e 11 52a	+ 2	—	—	—	—	—
Istanbul	N.	77·6	325	e 11 56	+ 5	e 21 46	+10	—	—	—
Chur		77·8	341	e 11 54a	+ 2	—	—	—	—	—
Triest	Z.	78·0	337	i 11 53a	0	e 14 50	PP	e 12 5	PcP	—
Clermont-Ferrand		80·1	344	i 12 8	+ 4	—	—	—	—	—
Florence		80·4	338	e 12 8	+ 2	—	—	—	—	—
Ksara		81·3	316	i 12 12	+ 1	—	—	—	—	—
Helwan	N.	86·6	318	—	—	e 23 28	sS	—	—	e 40·6
Bermuda		86·7	37	i 12 40	+ 2	e 23 19	+11	—	—	e 44·6
Tamanrasset	Z.	101·8	336	e 13 48	+ 1	e 17 18	?	e 17 46	PP	—
La Paz		127·7	65	e 19 4	[+ 6]	21 48	PKS	—	—	—
Pretoria	Z.	135·3	289	e 19 14	[+ 1]	e 23 4	pPKS	—	—	—

Additional readings :—
Kiruna iZ =9m.45s. and 9m.55s., eE =17m.3s., and 17m.41s., eN =22m.20s., eQE = 23·1m.
China Lake iZ =9m.56s. and 10m.17s.
Cleveland iPSN =21m.27s.
Raciborzu eE =12m.0s.
Prague e =11m.39s. and 12m.14s., eN =13m.18s., e =16m.34s.
Jena eN =11m.41s. and 12m.1s.
Paris iPcP =11m.59s., e =14m.0s., ePP =14m.59s., eSP? =22m.44s.
Long waves were also recorded at Kew, De Bilt, Scoresby Sund, Calcutta, and Wellington.

Nov. 16d. 15h. 20m. 45s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 15h. 3m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		12·7	250	3 34	+34	6 37	?	—	—	—
Mitchell Field		14·2	83	i 3 20	+ 1	—	—	e 3 14	P	—
Mizusawa		18·9	233	e 4 19	+ 1	—	—	9 29	Q	12·5
College		28·7	44	e 5 50	– 3	—	—	i 6 12	sP	—
Irkutsk		33·4	293	—	—	e 12 31	+41	—	—	—
Resolute Bay		43·7	22	e 8 1a	+ 1	—	—	—	—	—
Victoria		46·5	63	8 36	pP	—	—	—	—	—
Manila		49·1	235	e 8 36	– 7	—	—	—	—	—
Hungry Horse		51·6	58	e 9 3	+ 1	—	—	—	—	—
Shasta Dam		51·9	70	e 9 2	– 2	—	—	—	—	—
Sverdlovsk		52·7	317	e 9 9	– 1	—	—	—	—	—
Almata II		53·4	296	i 9 10	– 5	—	—	—	—	—
Naryn		55·4	295	e 9 38	+ 8	—	—	—	—	—
Kiruna		56·2	344	9 32k	– 4	—	—	e 10 31	PcP	e 30·0
Andijan		57·9	296	9 44	– 4	—	—	—	—	—
China Lake	Z.	58·0	71	i 9 49	+ 1	i 10 13	sP	i 9 54	?	—
Fergana		58·4	296	e 9 47	– 4	—	—	—	—	—
Pasadena	Z.	58·8	73	9 53	– 1	i 10 18	sP	e 10 0	pP	e 27·8
Tashkent		59·1	299	9 53	– 3	—	—	—	—	—
Boulder City		59·5	69	10 0	+ 1	—	—	i 10 8	pP	—
Pulkovo		61·0	334	10 8?	– 1	—	—	—	—	—
Stalinabad		61·4	297	i 10 8?	– 4	—	—	—	—	—
Moscow		62·1	328	10 16	0	—	—	—	—	—
Upsala		63·9	340	i 10 33a	+ 5	i 19 3	+ 6	e 19 45	PPS	e 36·2
Kirkland Lake	Z.	67·3	39	e 10 51	+ 1	—	—	—	—	—
Kizyl-Arvat		67·6	305	e 11 6	pP	—	—	—	—	—
Copenhagen		68·9	342	i 11 0	0	—	—	—	—	—
Baku		69·6	311	e 11 5	+ 1	—	—	—	—	—
Fayetteville		70·6	56	i 11 13	+ 3	—	—	i 11 16	P	—
Tiflis		70·8	315	11 10	– 2	e 20 26	+ 6	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kirovobad		70·9	313	i 11 10	– 2	—	—	—	—	—
Ottawa		71·2	38	e 11 20	+ 6	—	—	—	—	—
Lwow		71·4	332	i 11 14	– 1	—	—	—	—	—
Potsdam		71·8	340	i 11 21k	+ 3	—	—	—	—	e 38·2
Cleveland	Z.	72·1	44	i 11 20k	+ 1	—	—	—	—	—
Witteveen	Z.	72·7	344	11 23	0	—	—	—	—	—
Raciborzu		72·8	336	e 11 23	0	e 20 37	– 6	e 11 31	pP	—
Yalta		72·8	323	11 22	– 1	—	—	—	—	—
Collmberg		72·9	339	e 11 23	– 1	—	—	—	—	—
Prague		73·1	338	e 11 32	+ 7	e 21 3	SP	e11 50	pP	e 37·2
Poona		73·4	279	i 11 24	– 3	—	—	—	—	—
Jena		73·5	340	e 11 27	– 1	e 20 56	+ 5	e 11 47	pP	—
Morgantown		74·4	45	i 11 34	+ 1	—	—	—	—	—
Budapest		74·9	334	e 11 44	+ 8	—	—	—	—	e 28·2
Kew		75·0	348	13 28	?	—	—	—	—	—
Harvard		75·2	37	e 11 37	0	—	—	—	—	—
Weston		75·4	37	i 11 39	+ 1	—	—	—	—	—
Palisades		75·6	39	i 11 40	0	—	—	—	—	—
Stuttgart		76·1	341	e 11 41	– 1	e 21 21	+ 1	e 13 15	?	e 24·2
Strasbourg		76·5	342	i 11 45	0	e 11 52	PcP	i 12 9	sP	40·2
Paris		77·2	345	i 11 48	– 1	i 22 1	SP	i 11 58	PcP	e 40·2
Zürich		77·5	342	e 11 50a	0	—	—	—	—	—
Istanbul		77·6	325	e 11 49	– 2	e 21 41	+ 5	—	—	—
Triest		78·0	337	i 11 52	– 1	e 14 50	PP	e 12 0	PcP	e 37·0
Clermont-Ferrand		80·1	344	i 12 5	+ 1	i 12 15	PcP	i 12 38	?	—
Florence		80·4	338	12 6	0	22 31	ScS	—	—	—
Ksara		81·3	316	e 12 9	– 2	—	—	—	—	—
Rome		81·8	336	12 11	– 2	22 36	+16	28 5?	SS	39·4
Messina	E.	84·5	333	e 12 36	+ 9	e 23 6	sS	e 28 49	SS	e 40·8
Tortosa		85·3	345	i 13 37	+66	—	—	—	—	e 48·2
Bermuda		86·7	37	i 12 45	+ 7	e 23 19	+11	—	—	—
Algiers Univ.	Z.	88·8	342	e 12 47	– 1	—	—	e 13 32	?	—
Wellington		94·3	170	19 41	PPP	—	—	—	—	—
Tamanrasset	Z.	101·8	336	i 13 46a	– 1	e 17 7	?	e 17 48	PP	—
La Paz		127·7	65	e 19 9	[+11]	—	—	—	—	—
Pretoria	Z.	135·3	289	e 22 49	PKS	—	—	—	—	—

Additional readings :—
Upsala iS?N = 18m.49s., eN = 21m.15s., eE = 22m.15s., eN = 24m.3s., eSSS?E = 24m.47s.
Raciborzu ePcPZ = 11m.43s., ePPZ = 13m.56s., eZ = 19m.45s.
Prague e = 12m.5s. and 21m.18s.
Jena eE = 12m.9s., eN = 12m.23s., eS?E = 20m.43s., eSE = 21m.0s.
Strasbourg i = 12m.47s., e = 13m.8s. and 13m.43s.
Paris i = 11m.51s., 11m.55s., 12m.23m., and 14m.45s., iSP = 22m.38s., i = 26m.18s.
Clermont-Ferrand i = 13m.27s.
Long waves were also recorded at Granada, Belgrade, Helsinki, Scoresby Sund, and Calcutta.

Nov. 16d. 15h. 29m. 7s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 15h. 20m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		28·7	44	i 5 53	0	—	—	—	—	—
Resolute Bay		43·7	22	e 8 1	+ 1	—	—	—	—	—
Manila		49·1	235	e 8 36	– 7	—	—	—	—	—
Kiruna	Z.	56·2	344	i 9 33k	– 3	—	—	i 9 43	pP	—
China Lake	Z.	58·0	71	e 9 49	+ 1	—	—	—	—	—
Pasadena	Z.	58·8	73	e 9 54	0	—	—	—	—	—
Boulder City		59·5	69	i 9 59	0	—	—	—	—	—
Copenhagen		68·9	342	i 11 0	0	—	—	—	—	—
Fayetteville		70·6	56	i 11 13	+ 3	—	—	—	—	—
Potsdam	Z.	71·8	340	e 11 17	– 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Witteveen	Z.	72·7	344	e 11 23	0	—	—	—	—	—
Collmberg		72·9	339	e 11 23	− 1	—	—	—	—	—
Prague		73·1	338	e 11 30	+ 3	e 20 59	+13	e 12 0	sP	—
Poona		73·4	279	i 11 24	− 3	—	—	—	—	—
Jena		73·5	340	e 11 26	− 2	e 20 57	+ 6	—	—	—
Morgantown		74·4	45	i 11 33	0	—	—	—	—	—
Harvard		75·2	37	i 11 37	0	—	—	—	—	—
Weston		75·4	37	i 11 38	0	—	—	—	—	—
Bucharest		75·6	328	e 13 5	?	e 23 29	PPS	—	—	—
Palisades		75·6	39	i 11 38	− 2	—	—	—	—	—
Stuttgart	Z.	76·1	341	e 11 41	− 1	—	—	—	—	—
Strasbourg		76·5	342	i 11 45a	0	—	—	e 12 1	pP	—
Paris		77·2	345	i 11 49	0	i 22 9	PS	i 11 57	PcP	—
Zürich		77·5	342	e 11 51a	+ 1	—	—	—	—	—
Istanbul	E.	77·6	325	e 12 11	PcP	—	—	—	—	—
Triest	Z.	78·0	337	i 11 52	− 1	e 12 4	PcP	e 13 14	?	—
Pavia		79·5	340	e 19 18	?	e 22 38	PS	—	—	e 36·8
Clermont-Ferrand		80·1	344	i 12 5	+ 1	i 12 13	?	e 34 53	Q	e 41·9
Florence		80·4	338	e 12 4	− 2	22 23	ScS	—	—	—
Ksara		81·3	316	i 12 9	− 2	—	—	—	—	—
Rome		81·8	336	e 11 37	−36	—	—	e 13 0	?	—
Bermuda		86·7	37	i 12 39	+ 1	—	—	—	—	—
Christchurch		96·3	171	—	—	e 23 53? [+ 1]		—	—	—
Tamanrasset	Z.	101·8	336	e 13 46	− 1	—	—	e 17 44	PP	—

Additional readings :—
Prague eN = 18m.47s., e = 19m.29s.
Jena eZ = 11m.36s., eN = 12m.6s.
Long waves were also recorded at Alicante, Almeria, Malaga, Bergen, Skalnate Pleso, Timisoara, and Auckland.

Nov. 16d. 17h. 33m. 20s. Epicentre 29°·3S. 178°·2W. Focus at Base of the Superficial Layers. (as on 1951, Sept. 21d.).

A = −·8730, B = −·0274, C = −·4869 ; δ = −5 ; h = +2 ;
D = −·031, E = +1·000 ; G = +·487, H = +·015, K = −·873.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	9·6	216	i 2 15	− 4	i 3 59	− 8	e 1 53	?	—
Karapiro	N.	10·0	210	1 40?	−44	—	—	—	—	—
Tuai	N.	10·2	200	2 13	−14	3 58	−24	—	—	—
New Plymouth	E.	11·7	211	—	—	i 4 51	− 7	e 5 12	SS	—
Wellington		13·3	203	i 3 10	+ 1	5 35	− 2	e 2 51	?	6·0
Cobb River	E.	13·9	210	e 3 18	+ 1	e 5 23	−28	—	—	—
Kaimata	N.E.	15·6	210	e 3 30	− 9	e 6 6	−25	—	—	—
Christchurch		16·0	207	e 3 40	− 4	e 6 1	−39	—	—	—
Apia		16·5	23	e 3 56?	+ 6	e 6 49	− 3	—	—	8·3
Brisbane		25·4	267	i 5 29a	+ 3	i 9 50	+ 2	i 5 46	pP	e 12·1
Riverview		26·4	251	e 5 40	+ 5	i 10 9	+ 5	i 5 53	pP	e 12·0
Terre Adélie		44·7	201	i 8 4	− 8	e 14 33	−12	8 16	pP	20·7
Manila		73·1	298	e 11 24	− 5	—	—	—	—	—
Mitchell Field		80·9	2	i 12 15	+ 3	—	—	—	—	—
Zi-ka-wei	Z.	83·2	311	i 12 24	0	e 22 54	+13	—	—	—
Pasadena		84·8	47	i 12 34	+ 2	—	—	i 12 50	pP	e 38·7
Berkeley		84·9	42	e 12 34k	+ 1	e 23 11	+13	—	—	e 38·8
Lick	Z.	84·9	42	i 12 34a	+ 1	—	—	—	—	—
Palomar	Z.	85·2	48	i 12 36a	+ 2	—	—	i 12 52	pP	—
Riverside	Z.	85·3	47	i 12 35	0	—	—	i 12 52	pP	—
Nanking		85·4	311	12 38a	+ 3	e 23 8	+ 6	—	—	—
Vladivostok		85·4	326	e 12 35	0	e 23 10	+ 8	—	—	—
Fresno	Z.	85·6	43	e 12 38a	+ 2	—	—	—	—	—
China Lake		86·3	45	i 12 41a	+ 1	—	—	i 12 58	pP	—
Tinemaha	Z.	86·7	44	i 12 43	+ 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mineral	Z.	86·9	40	i 12 43a	0	—	—	—	—	—
Reno	Z.	87·4	42	e 12 43a	– 2	—	—	—	—	—
Boulder City		88·1	46	i 12 51	+ 5	—	—	i 13 8	pP	—
Tucson		88·5	51	i 12 52	+ 2	—	—	i 13 8	pP	—
Huancayo		95·1	107	i 13 21	0	i 23 57	[+ 5]	e 26 3	PS	e 42·9
College		96·8	13	e 13 28	– 1	—	—	—	—	—
La Paz		98·6	115	13 40	+ 3	i 24 12	[+ 1]	17 43	PP	46·7
Ottawa		118·6	51	18 43	[– 2]	—	—	—	—	—
Pretoria	Z.	119·7	208	e 18 15	[–32]	—	—	—	—	—
Harvard		120·9	55	e 18 47	[– 2]	—	—	—	—	e 62·5
Bermuda		123·5	68	—	—	e 30 40	PS	—	—	e 58·2
Obi-garm		124·1	299	i 18 59	[+ 4]	—	—	—	—	—
Sverdlovsk		130·9	322	—	—	i 22 32?	PKS	—	—	—
Scoresby Sund		136·7	12	e 19 20	[+ 1]	—	—	e 19 39	pPKP	—
Kiruna		139·9	348	e 19 11	[–14]	e 22 58	PKS	e 25 9	PPP	e 69·2
Kirovobad		142·1	301	e 19 25	[– 4]	—	—	—	—	—
Tiflis		143·2	302	19 28	[– 3]	—	—	—	—	—
Leninakan		144·0	300	e 19 44	pPKP	—	—	—	—	—
Akhalkalaki		144·2	303	e 19 33	[+ 1]	—	—	—	—	—
Piatigorsk		144·2	306	19 31	[– 1]	e 26 37	[+ 1]	—	—	—
Borzhomi		144·3	303	e 19 33	[0]	—	—	—	—	—
Zugdidi		145·3	304	e 19 37	[+ 2]	—	—	—	—	—
Sotchi		146·6	306	19 36	[– 1]	—	—	—	—	—
Simferopol		150·1	311	e 19 48	[+ 6]	—	—	—	—	—
Yalta		150·2	309	19 48	[+ 6]	—	—	—	—	—
Ksara		150·7	287	e 19 43?	[0]	—	—	e 21 24	?	—
Copenhagen		152·6	347	i 19 54	[+ 8]	—	—	—	—	74·7
Helwan	Z.	154·3	278	19 46	[– 2]	e 23 22	PKS	e 22 25	?	—
Istanbul	E.	154·9	306	e 19 56	[+ 7]	—	—	e 23 56	PP	—
Witteveen	Z.	156·2	353	e 20 23a	PKP_2	—	—	—	—	—
Collmberg		156·5	342	e 19 50	[– 1]	—	—	e 20 22	PKP_2	—
Jena		157·2	342	e 19 51	[– 1]	—	—	e 20 25	PKP_2	—
Stuttgart	Z.	159·7	346	e 19 54	[– 1]	—	—	e 20 36	PKP_2	—
Strasbourg		160·2	348	i 20 40a	PKP_2	—	—	e 20 54	$pPKP_2$	e 82·7
Paris		160·5	359	i 20 40	PKP_2	e 24 22	PP	i 21 0	$pPKP_2$	e 79·7
Triest	Z.	161·2	334	e 19 55	[– 2]	e 24 28	PP	e 20 13	pPKP	—
Granada		170·9	29	20 1a	[– 3]	i 25 17	PP	21 26	PKP_2	94·2
Almeria		171·7	24	20 10	[+ 5]	—	—	21 57	?	94·4
Tamanrasset	Z.	172·7	208	i 20 6k	[+ 1]	i 25 16	PP	i 21 30	PKP_2	—

Additional readings :—
Auckland ipP?N = 2m.31s.
Wellington S = 5m.2s., i = 5m.5s.
Apia eZ = 4m.20s., iZ = 5m.0s.
Brisbane isPN = 5m.59s., iPPE = 6m.10s., isSE = 10m.15s., iN = 10m.28s., iSSN = 10m.48s.
Riverview iPPPE = 6m.33s., iE = 10m.30s., iN = 10m.51s. and 11m.28s.
Terre Adélie e = 9m.25s., ePP = 9m.40s., e = 13m.39s., PcS = 13m.43s., e = 14m.25s., SS = 17m.55s., SSS = 19m.10s.
China Lake iZ = 12m.48s. and 12m.53s.
Huancayo e = 26m.40s., eSS = 30m.51s., e = 34m.46s.
La Paz iPPS = 27m.2s.
Kiruna eZ = 20m.15s., ePKSZ = 22m.47s., eE = 26m.58s., eZ = 28m.3s., ePSE = 32m.40s.?, eZ = 36m.46s., eSSE = 41m.14s., eN = 42m.20s. and 44m.40s.?, eSSSN = 47m.6s.
Paris i = 21m.22s.
Triest $ePKP_2Z$ = 20m.59s.
Granada $pPKP_2$ = 21m.44s.
Tamanrasset ePPPZ = 29m.44s.
Long waves were also recorded at Santa Clara, Bogota, Palisades, Weston, Potsdam, Kew, Florence, and Alicante.

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Nov. 16d. 19h. 6m. 55s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 15h. 29m.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Resolute Bay		43·7	22	e 8 5	+ 5	—	—	—	—	—
Mineral	Z.	52·6	70	i 9 4k	− 5	—	—	—	—	—
Reno	Z.	54·2	69	e 9 23a	+ 2	—	—	—	—	—
Lick	Z.	54·6	73	e 9 20k	− 4	—	—	—	—	—
Fresno	Z.	56·1	72	e 9 54	pP	—	—	—	—	—
Kiruna		56·2	344	i 9 30k	− 6	e 17 20	+ 2	e 19 13	ScS	e 26·8
China Lake	Z.	58·0	71	e 9 44	− 4	—	—	e 9 53	?	—
Copenhagen		68·9	342	e 11 2	+ 2	—	—	—	—	38·1
Witteveen	Z.	72·7	344	i 11 22	− 1	—	—	—	—	—
Prague		73·1	338	e 11 32?	+ 7	—	—	—	—	—
Poona	Z.	73·4	279	11 20	− 7	—	—	—	—	—
Jena		73·5	340	e 11 24	− 4	e 11 29	P	e 11 33	?	—
Stuttgart	Z.	76·1	341	e 11 41?	− 1	—	—	—	—	—
Strasbourg		76·5	342	e 11 43	− 2	—	—	e 11 52	P	—
Paris		77·2	345	11 46	− 3	—	—	i 11 54	P	e 43·1
Pavia		79·5	340	e 16 56	PPP	—	—	—	—	e 44·7
Ksara		81·3	316	12 18	+ 7	23 41	PPS	—	—	—
Rome		81·8	336	—	—	e 25 45	?	—	—	—
Tamanrasset	Z.	101·8	336	e 17 49	PP	—	—	—	—	—

Kiruna also gives iZ = 9m.39s., eN = 10m.40s., ePPZ = 11m.30s., ePcSE = 14m.20s., eN = 18m.41s., eE = 20m.39s., eN = 22m.20s., eQE = 23·5m.
Long waves were also recorded at Florence, Potsdam, Bombay, and Calcutta.

Nov. 16d. Readings also at 1h. (near Almata, Almata II, Chilisk, Ili, and Przhevalsk), 3h. (Apia), 4h. (Gori, Kirovobad, Tiflis, near Akhalkalaki, Leninakan, Tsikhlis-Dzhvari, and near Manila), 5h. (Scoresby Sund, Mount Wilson, Riverside, Palomar, China Lake, Kiruna, Collmberg, Jena, Stuttgart, Tchimkent, Samarkand, Stalinabad, near Dzhergetal, Fergana, Garm, and Obi-garm), 6h. (Kiruna (2), Collmberg, Tamanrasset, Ksara, and near Obi-garm), 7h. (Tamanrasset and near Apia), 8h. Terre Adélie, Wellington, Christchurch, Puebla, Vera Cruz, and near Tacubaya), 12h. (Santa Lucia), 13h. (near Huancayo and near Lwow), 14h. (near Algiers Univ.), 15h. (Apia, Tamanrasset, Antofagasta, Pasadena, near La Paz, and near Garm), 17h. (near Alicante, near Akhalkalaki, and near Ottawa), 18h. (Terre Adélie and near Garm), 19h. (Przhevalsk, Obi-garm (2), near Almata (2), Almata II (2), Frunse (2), Naryn (2), Andijan (2), Dzhergetal (2), Fergana (2), Garm (2), Khorog (2), Mary (2), Samarkand (2), Stalinabad (2), Tashkent (2), and Tchimkent (2)), 20h. (Tashkent, near Andijan, Dzhergetal, Fergana, Garm, Khorog, and Stalinabad), 21h. (Fergana, near Dzhergetal, Khorog, Obi-garm, and Garm).

Nov. 17d. 4h. 45m. 58s. Epicentre 31°·0N. 91°·6E.

A = − ·0240, B = + ·8584, C = + ·5125 ; δ = +8 ; h = +2 ;
D = +1·000, E = + ·028 ; G = − ·014, H = + ·512, K = − ·859.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	8·9	200	i 2 14k	+ 2	i 3 52	− 3	4 27	S*	—
Dehra Dun	N.	11·7	270	(e 2 40?)	−11	—	—	—	—	(e 7·8)
New Delhi		12·7	263	2 59	− 6	i 5 22	− 6	3 8	PP	—
Przhevalsk		15·6	321	—	—	6 45	+ 8	—	—	—
Naryn		16·3	314	i 3 50	− 2	i 7 0	+ 7	—	—	—
Almata II		16·7	321	i 3 57	0	7 17	SS	—	—	—
Almata		16·9	321	i 3 59	0	i 7 13	+ 6	—	—	—
Hyderabad	E.	18·0	226	i 4 9	− 4	7 14	−18	—	—	8·7
Frunse		18·0	315	i 4 14	+ 1	7 36	+ 4	—	—	—
Andijan		18·3	307	i 4 17	0	7 45	+ 6	—	—	—
Fergana		18·7	306	i 4 19	− 3	i 7 48	0	—	—	—
Obi-garm		19·5	300	i 4 30?	− 1	7 56?	−10	—	—	—
Stalinabad		20·2	300	i 4 38	− 1	i 8 11	−10	—	—	—
Poona		20·3	236	i 4 38	− 2	i 8 22	− 1	8 53	PcP	9·5
Tashkent		20·7	306	i 4 44	0	i 8 36	+ 5	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bombay	E.	20·8	239	i 4 46	+ 1	i 8 33	0	e 5 9	PP	—
Samarkand		21·8	300	i 4 55	– 1	—	—	—	—	—
Nanking		23·2	80	i 5 12k	+ 3	i 9 33	+15	e 9 4	PcP	—
Irkutsk		23·2	19	i 5 14	+ 5	9 18	0	—	—	—
Kodaikanal	E.	24·5	217	5 24	+ 2	9 51	+11	6 15	PP	12·2
Mary		25·4	294	i 5 31	0	—	—	—	—	—
Zi-ka-wei	Z.	25·5	81	5 34k	+ 2	i 10 3	+ 6	e 10 10	S	—
Colombo	E.	26·4	207	5 52	+12	11 32	SS	—	—	—
Kizyl-Arvat		29·9	296	6 14	+ 2	—	—	—	—	—
Manila		31·5	114	i 6 25	– 1	e 7 8	PP	e 9 4	?	—
Sverdlovsk		33·6	330	i 6 46	+ 2	12 9	+ 3	—	—	—
Vladivostok		34·0	58	i 6 49	+ 1	—	—	—	—	—
Baku		34·9	298	6 56	+ 1	12 30	+ 3	—	—	—
Lenkoran		35·7	295	6 59	– 3	—	—	—	—	—
Shemakla		35·8	299	7 8	+ 5	—	—	—	—	—
Goris		37·6	296	i 7 17	– 1	—	—	—	—	—
Kirovobad		37·6	299	i 7 17	– 1	13 2	– 6	—	—	—
Tiflis		38·8	300	7 30	+ 2	e 13 28	+ 2	—	—	—
Erevan		39·0	298	e 7 32	+ 2	13 46	+17	—	—	—
Leninakan		39·5	299	e 7 37?	+ 3	—	—	—	—	—
Djakarta		39·7	155	e 7 29	– 7	e 13 29	–11	—	—	—
Tsikhlis-Dzhvari		39·8	300	e 7 45?	+ 9	—	—	—	—	—
Borzhomi		39·8	300	e 7 36?	0	13 43?	+ 1	—	—	—
Piatigorsk		40·1	304	e 7 37	– 2	13 45	– 1	—	—	—
Moscow		44·9	320	8 18	0	14 56	0	—	—	—
Simferopol		46·5	305	e 8 31	0	e 15 20	+ 1	—	—	—
Yalta		46·5	304	8 30	– 1	15 20	+ 1	—	—	—
Ksara		46·6	289	i 8 33	+ 1	15 24	+ 3	—	—	—
Pulkovo		49·4	325	8 54	+ 1	16 1	+ 1	—	—	—
Istanbul		50·6	300	e 9 2	0	e 16 9	– 8	e 11 0	PP	—
Helwan		51·4	285	9 7	– 2	16 26	– 2	11 8	PP	—
Helsinki		52·1	325	e 9 14	0	e 16 39	+ 1	e 16 32	S	e 25·0
Lwow		52·9	312	9 19	– 1	e 16 39	– 9	—	—	—
Uzhgorod		54·2	310	e 9 30	+ 1	17 9	+ 3	—	—	—
Kiruna		54·6	334	i 9 31k	– 1	i 17 12	+ 1	i 11 32	PP	e25·5
Skalnate Pleso		55·5	312	e 9 41	+ 2	e 17 29	+ 5	—	—	—
Upsala		55·8	325	i 9 41	0	i 17 28	0	e 22 26	?	e24·6
Belgrade		56·1	306	e 9 43k	0	e 17 32	0	—	—	e 40·1
Raciborzu		56·6	313	9 48	+ 1	e 14 43	PcS	e 10 43	PcP	—
Prague		59·0	314	i 10 4	0	e 18 11	+ 1	e 13 52	PPP	e 30·0
Copenhagen		59·1	320	e 10 4	0	e 18 8	– 3	21 50	SS	27·0
Potsdam		59·4	317	i 10 7	+ 1	i 18 14	– 1	e 18 20	S	e 29·0
Collmberg		59·6	315	e 10 7	– 1	e 18 17	0	—	—	—
Triest		60·5	308	i 10 13k	– 1	i 18 28	– 1	e 12 19	PP	—
Jena		60·6	315	e 10 13	– 2	e 18 29	– 1	e 12 24	PP	—
Messina		61·4	300	i 10 18a	– 2	i 18 37	– 3	i 10 40	?	—
Rome		62·5	305	10 24	– 4	i 18 51	– 3	19 21	PPS	—
Stuttgart		62·7	313	i 10 27k	– 2	e 18 56	– 1	e 23 2	SS	e 34·0
Florence		62·8	307	e 10 23	– 7	i 18 50	– 8	—	—	—
Witteveen	Z.	63·0	319	e 10 32	+ 1	—	—	—	—	—
Karlsruhe	Z.	63·1	314	e 10 30	– 2	—	—	—	—	—
Zürich		63·5	312	e 10 33a	– 1	—	—	e 10 53	?	—
Strasbourg		63·6	313	e 10 34	– 1	e 23 24	SS	e 11 17	PcP	e 33·5
Pavia		63·7	309	e 19 10	PS	e 26 18	SSS	—	—	e 36·0
Basle		64·1	312	e 10 38	0	e 11 29	?	e 11 16	PcP	—
De Bilt		64·1	317	—	—	e 26 2?	SSS	—	—	—
Paris		66·8	315	e 10 54	– 2	e 19 44	– 4	e 13 29	PP	e 35·0
Kew		67·5	318	—	—	e 19 39	–17	e 27 51	SSS	e 34·0
Scoresby Sund		68·4	341	i 11 7k	+ 1	—	—	—	—	—
Algiers Univ.	Z.	71·2	302	i 11 20k	– 3	e 12 34	?	i 11 23	P	—

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.
Tortosa		71·3	307	i 11 27	+ 4	—	—	—	—	—
Alicante		73·0	305	11 32	− 1	20 59	− 1	16 5	PPP	e 33·6
College		73·9	23	i 11 39	0	—	—	e 14 23	PP	—
Resolute Bay		74·5	3	i 11 42a	0	—	—	—	—	—
Toledo		74·8	308	i 11 44	0	—	—	i 11 47	P	—
Almeria		75·1	304	i 11 44	− 2	i 21 22	− 2	14 38	PP	39·9
Tamanrasset	Z.	75·4	288	i 11 46a	− 1	e 21 21	− 6	i 14 35	PP	—
Granada		75·7	305	11 54a	+ 5	21 36	+ 6	14 42	PP	37·2
Malaga		76·5	305	11 49	− 5	19 9	?	14 28	PP	e 41·7
Pretoria	Z.	82·8	234	i 12 26	− 1	—	—	—	—	—
Pietermaritzburg	Z.	83·8	230	i 12 32	0	—	—	—	—	—
Kimberley	Z.	87·0	234	i 12 51	+ 3	—	—	—	—	—
Hungry Horse		97·7	17	e 13 37	− 1	—	—	—	—	—
China Lake	Z.	108·1	24	18 56	PP	—	—	—	—	—
Pasadena		109·4	25	e 19 2	PP	—	—	—	—	—
La Paz		156·5	304	i 20 2a	[+ 5]	i 30 52	{− 2}	20 30	PKP_2	—
Huancayo		157·6	324	e 20 5	[+ 7]	—	—	i 20 35	PKP_2	e 97·8

Additional readings and note :—
Calcutta SSE = 4m.4s., SSSE = 4m.16s., S_gE = 4m.50s.
Dehra Dun readings have been increased by 7m.
New Delhi SSN = 5m.27s.
Poona PP = 4m.56s., PPP = 5m.6s., QE = 8m.35s., SSEN = 8m.58s., SSSEN = 9m.8s., PcSEN = 12m.32s., ScSEN = 16m.6s.
Bombay PPPE = 5m.20s.
Kodaikanal QE = 10m.54s.
Helwan eEZ = 20m.38s.
Kiruna iZ = 10m.27s., ePcPZ = 10m.34s., ePSZ = 17m.23s., eScSEN = 19m.19s., eSSEZ = 21m.19s., eSSSN = 23m.2s.
Skalnate Pleso e = 17m.11s. and 17m.51s., eSS = 21m.50s., eSSS = 23m.38s.
Raciborzu eP?E = 9m.54s., eZ = 11m.24s., ePPZ = 11m.44s., ePSE = 17m.41s.
Prague e = 10m.21s. and 10m.45s.
Jena iPEN = 10m.17s., eN = 10m.24s., eE = 10m.30s., eEN = 10m.54s., eSN = 18m.23s.
Rome eSS = 23m.5s.
Stuttgart ePP = 12m.44s.
Strasbourg i = 10m.37s. and 10m.58s., e = 12m.10s.
Paris e = 19m.52s., eSS? = 24m.56s., eSSS? = 27m.36s.
Alicante SS = 24m.27s., SSS = 27m.27s., Q = 29m.3s.
Almeria PPP = 16m.20s.
Tamanrasset iZ = 12m.6s., ePPPZ = 16m.25s.
Granada PcP = 12m.27s., SS = 26m.54s., SSS = 30m.39s.
La Paz iPPZ = 24m.9s.
Long waves were also recorded at Bermuda, Palisades, Aberdeen, Budapest, and Bergen.

Nov. 17d. 13h. 17m. 57s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005. (as on 16d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kiruna		56·2	344	i 9 35k	− 1	—	—	i 9 47	pP	e 31·0
China Lake	Z.	58·0	71	i 9 46	− 2	—	—	i 9 59	pP	—
Mount Wilson	Z.	58·9	73	e 9 52	− 3	—	—	i 10 4	pP	—
Witteveen	Z.	72·7	344	e 11 25	+ 2	—	—	—	—	—
Collmberg	Z.	72·9	339	e 11 24	0	—	—	—	—	—
Prague		73·1	338	e 11 25	0	—	—	e 12 9	—	—
Poona	Z.	73·4	279	i 11 27	0	—	—	—	—	—
Jena		73·5	340	e 11 29	+ 1	e 11 51	sP	e 11 39	pP	—
Stuttgart	Z.	76·1	341	e 11 43	+ 1	—	—	—	—	—
Strasbourg		76·5	342	e 11 47k	+ 2	—	—	e 12 33	?	—
Paris		77·2	345	e 11 48	− 1	—	—	—	—	—
Triest		78·0	337	e 11 54	+ 1	—	—	e 12 4?	PcP	—
Ksara		81·3	316	i 12 25	pP	—	—	—	—	—
Tamanrasset	Z.	101·8	336	e 17 45	PKP	—	—	e 18 2	PP	—

Triest gives also eZ = 12m.54s. and 13m.8s.
Long waves were also recorded at Pavia and Messina.

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Nov. 17d. 17h. 0m. 5s. Epicentre 36°·8N. 69°·4E. Depth of focus 0·020.
(as on 1949, December 18d.).

A = +·2824, B = +·7513, C = +·5964 ; δ = −11 ; h = 0 ;
D = +·936, E = −·352 ; G = +·210, H = +·558, K = −·803.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Stalinabad		1·8	344	0 33	− 1	i 1 1	+ 1
Khorog		1·9	69	i 0 20	− 5	i 0 58	− 4
Obi-garm		1·9	7	i 0 35	0	i 1 5	+ 3
Garm		2·3	18	e 0 40	0	i 1 13	+ 3
Dzhergetal		2·8	31	0 47	+ 1	i 1 23	+ 2
Samarkand		3·5	327	i 0 54	− 1	—	—
Fergana		4·0	26	e 1 2	+ 1	e 1 49	0
Tashkent		4·5	359	—	—	e 2 23	+23
Mary		6·1	280	—	—	2 35	− 3
Naryn		6·9	46	1 44	+ 4	e 2 57	0
Frunse		7·3	32	—	—	e 3 5	− 2
New Delhi		10·5	139	e 2 7	−20	e 3 54	−29
Kizyl-Arvat		10·6	286	—	—	e 4 22	− 3

Nov. 17d. 17h. 54m. 19s. Epicentre 5°·7N. 121°·4E.

A = −·5185, B = +·8494, C = +·0987 ; δ = +6 ; h = +7 ;
D = +·854, E = +·521 ; G = −·051, H = +·084, K = −·995.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Manila		8·8	357	e 2 20	+ 9	—	—	—	—
Djakarta		18·7	231	e 4 26	+ 4	e 8 2	+14	—	—
Nanking		26·3	254	5 38k	− 1	e 10 8	− 3	—	—
Calcutta	E.	36·0	301	e 7 6	+ 1	e 15 43	SSS	—	—
Vladivostok		38·4	13	i 7 21	− 4	i 13 15	− 5	—	—
Brisbane	Z.	45·0	139	i 8 13a	− 6	—	—	i 8 21	P
Poona	Z.	48·0	290	e 8 41	− 2	—	—	—	—
Riverview		48·4	146	i 8 57k	+11	e 15 46	0	e 18 58	SSS
Irkutsk		48·5	346	e 8 45	− 1	—	—	—	—
Przhevalsk		52·8	321	e 9 18	− 1	—	—	—	—
Naryn		53·8	318	i 9 27	+ 1	e 17 10	+ 9	—	—
Almata II		53·8	322	e 9 28	+ 2	—	—	—	—
Frunse		55·4	319	i 9 39	+ 1	—	—	—	—
Andijan		56·0	316	9 43	0	—	—	—	—
Obi-garm		57·0	313	9 49	− 1	17 50	+ 7	—	—
Stalinabad		57·7	313	i 9 54	− 1	17 59	+ 6	—	—
Tashkent		58·3	316	e 9 57	− 2	—	—	—	—
Samarkand		59·4	313	e 10 5	− 1	—	—	—	—
Ashkabad		65·4	309	i 10 49	+ 2	—	—	—	—
Kizyl-Arvat		67·2	310	e 11 0	+ 2	—	—	—	—
Sverdlovsk		69 5	330	e 11 11	− 1	—	—	—	—
Baku		72·2	311	e 11 31	+ 2	—	—	—	—
Shemakla		73·2	311	11 33	− 2	—	—	—	—
Terre Adélie		73·8	172	e 11 33	− 5	—	—	—	—
Kirovobad		75·0	311	11 45	0	—	—	—	—
Tiflis		76·4	312	11 52	− 1	e 21 40	+ 2	—	—
Tsikhlis-Dzhvari		77·2	311	e 11 59	+ 2	—	—	—	—
Borzhomi		77·3	311	e 11 58	0	—	—	—	—
Piatigorsk		77·7	314	12 0	0	—	—	—	—
Zugdidi		78·4	312	e 12 9	+ 5	—	—	—	—
Ksara		83·1	303	i 12 31	+ 2	e 23 12	+24	—	—
Helwan	Z.	87·2	300	12 51	+ 2	—	—	e 15 8	?
Kiruna	Z.	88·9	338	e 12 54	− 4	—	—	—	—
Tamanrasset	Z.	111·3	298	e 18 42	[+ 6]	—	—	e 19 23	PP
Kirkland Lake	Z.	123·2	17	e 18 55	[− 4]	—	—	—	—

Long waves were recorded at Paris and Potsdam.

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Nov. 17d. 20h. 24m. 51s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as at 13h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yuzno-Sakhlinsk		12·7	250	2 57	– 3	—	—	—	—	—
Mizusawa	E.	18·9	233	e 4 18	0	—	—	—	—	—
Vladivostok		21·2	255	e 4 39	– 3	e 8 58	sS	—	—	—
College		28·7	44	e 5 50	– 3	—	—	—	—	—
Irkutsk		33·4	293	e 6 33	– 1	—	—	—	—	—
Resolute Bay		43·7	22	e 8 1a	+ 1	—	—	e 8 16	pP	—
Hungry Horse		51·6	58	e 8 59	– 3	—	—	—	—	—
Shasta Dam		51·9	70	e 9 3	– 1	—	—	—	—	—
Mineral	Z.	52·6	70	e 9 8a	– 1	—	—	—	—	—
Sverdlovsk		52·7	317	e 9 11	+ 1	e 17 7	sS	—	—	—
Berkeley	Z.	53·9	73	e 9 17	– 2	—	—	—	—	—
Lick	Z.	54·6	73	i 9 22a	– 2	—	—	—	—	—
Frunse		55·2	297	i 9 27	– 1	—	—	—	—	—
Naryn		55·4	295	e 9 28	– 2	—	—	—	—	—
Fresno	Z.	56·1	72	e 9 35a	0	—	—	—	—	—
Kiruna	Z.	56·2	344	i 9 36k	0	—	—	i 9 45	pP	—
Tinemaha	Z.	56·8	71	e 9 40	0	—	—	—	—	—
Scoresby Sund		57·2	2	e 9 43	0	—	—	—	—	32·2
Andijan		57·9	296	9 47	– 1	—	—	—	—	—
China Lake	Z.	58·0	71	e 9 48	0	—	—	i 9 59	pP	—
Fergana		58·4	296	e 9 49	– 2	—	—	—	—	—
Pasadena	Z.	58·8	73	e 9 52	– 2	—	—	e 10 3	pP	—
Boulder City		59·5	69	e 10 6	+ 7	—	—	i 10 10	pP	—
Palomar	Z.	60·2	73	e 10 2	– 2	—	—	e 10 12	pP	—
Obi-garm		60·8	297	i 10 10	+ 2	—	—	—	—	—
Stalinabad		61·4	297	i 10 10	– 2	—	—	—	—	—
Samarkand		61·5	299	e 10 11	– 1	—	—	—	—	—
Ashkabad		67·3	303	i 10 51	+ 1	—	—	—	—	—
Copenhagen		68·9	342	e 11 1	+ 1	—	—	—	—	41·2
Piatigorsk		69·7	317	11 5	0	—	—	—	—	—
Tiflis		70·8	315	11 12	0	—	—	—	—	—
Kirovobad		70·9	313	11 13	+ 1	—	—	—	—	—
Potsdam		71·8	340	i 11 29k	pP	—	—	—	—	e 43·2
Witteveen	Z.	72·7	344	e 11 25	+ 2	—	—	—	—	—
Yalta		72·8	323	11 23	0	—	—	—	—	—
Collmberg	Z.	72·9	339	e 11 25	+ 1	—	—	e 11 36	pP	—
Uzhgorod		73·0	333	e 11 30	+ 5	—	—	—	—	—
Prague		73·1	338	e 11 41	pP	—	—	—	—	—
Poona	Z.	73·4	279	i 11 27	0	—	—	—	—	—
Jena	Z.	73·5	340	e 11 28	0	—	—	e 11 38	pP	—
Morgantown		74·4	45	e 11 32	– 1	—	—	—	—	—
Palisades		75·6	39	e 11 48	+ 8	—	—	—	—	—
Stuttgart		76·1	341	e 11 42	0	—	—	e 11 53	pP	e 41·2
Strasbourg		76·5	342	e 11 46	+ 1	e 12 8	sP	e 11 56	pP	—
Belgrade	Z.	77·0	332	e 11 48k	0	—	—	—	—	—
Paris		77·2	345	e 11 49	0	e 14 38	PP	e 12 0	pP	e 47·2
Triest	Z.	78·0	337	e 11 53	0	—	—	e 12 4	pP	—
Florence		80·4	338	e 12 15	pP	e 22 36	sS	—	—	—
Ksara		81·3	316	i 12 14	+ 3	—	—	—	—	—
Rome		81·8	336	e 12 14	+ 1	e 22 32	+12	e 31 54	SSS	—
Helwan	Z.	86·6	318	12 36	– 1	—	—	i 12 49	pP	—
Alicante		87·9	346	12 59	pP	22 43	[–21]	15 59	PP	e 42·2
Tamanrasset	Z.	101·8	336	13 58	pP	—	—	e 17 53	PP	—

Additional readings :—
Prague ePcP? = 12m.5s., e = 13m.46s.
Jena eZ = 11m.48s., eE = 11m.51s.
Strasbourg e = 12m.15s.
Alicante SS = 28m.42s., Q = 36m.17s.
Long waves were also recorded at Cheb, Pavia, and Messina.

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Nov. 17d. Readings also at 0h. (La Paz, Bermuda, and near Apia), 1h. (near Dzhergetal, Fergana, Obi-garm, Samarkand, and Stalinabad), 3h. (La Paz, Merida, Puebla, Tacubaya, Andijan, Garm, Samarkand, near Almata II, Dzhergetal, Fergana, Frunse, Naryn, Przhevalsk, and Tashkent), 4h. (Brisbane and Tamanrasset), 5h. (Brisbane), 7h. (Mizusawa and China Lake), 8h. (Mizusawa), 9h. (Stuttgart, Apia, Frunse, near Andijan, Dzhergetal (2), Fergana (2), Garm (3), Khorog, Obi-garm (3), Samarkand, and Stalinabad (2)), 10h. (Almata II, Przhevalsk, near Samarkand, Stalinabad, Andijan, Dzhergetal, Fergana, Obi-garm, Frunse, and near Prague), 11h. (Naryn and Scoresby Sund), 12h. (Apia, Tamanrasset, and near Manila), 13h. (Kiruna and Collmberg), 14h. (Apia, near Huancayo, and near Shemakla), 16h. (Stuttgart and near Alicante (6)), 17h. (China Lake, Mount Wilson, Copiapo, Kiruna, Collmberg, and near Alicante), 18h. (China Lake, Mount Wilson, Tinemaha, and near Apia), 19h. (Paris, Strasbourg, Stuttgart, Jena, Collmberg, Triest, Kiruna, China Lake, and Mount Wilson), 21h. (Calcutta), 22h. (Strasbourg, Jena, Collmberg, Prague, near Zürich, near Stuttgart, and near Triest), 23h. (Andijan, Naryn, near Dzhergetal, Fergana, Garm, Khorog, Obi-garm, and near Mizusawa).

Nov. 18d. 4h. 38m. 34s. Epicentre 52°·6N. 160°·3E. Depth of focus 0·005.
(as on 17d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	18·9	233	(4 14)	– 4	4 14	P	—	—	—
College		28·7	44	5 52	– 1	—	—	—	—	—
Resolute Bay		43·7	22	e 8 1	+ 1	e 14 37	+12	e 8 7	?	e 26·4
Manila		49·1	235	e 8 36	– 7	—	—	—	—	—
Hungry Horse		51·6	58	e 9 6	+ 4	—	—	—	—	—
Shasta Dam		51·9	70	e 9 2	– 2	—	—	—	—	—
Mineral	Z.	52·6	70	e 9 8k	– 1	i 11 2	PP	i 9 29	pP	—
Berkeley	Z.	53·9	73	i 9 20k	+ 1	i 10 36	PcP	i 9 29	pP	—
Butte		53·9	59	e 9 26	+ 7	—	—	—	—	—
Lick	Z.	54·6	73	i 9 19a	– 5	i 9 45	sP	i 10 47	PcP	—
Fresno	Z.	56·1	72	e 9 34	– 1	—	—	—	—	—
Kiruna	Z.	56·2	344	i 9 37k	+ 1	—	—	i 9 46	pP	—
Tinemaha	Z.	56·8	71	e 9 42	+ 2	—	—	—	—	—
Scoresby Sund		57·2	2	e 9 43	0	—	—	—	—	27·4
China Lake		58·0	71	e 9 47	– 1	e 17 52	+10	i 10 5	pP	—
Pasadena	Z.	58·8	73	e 9 51	– 3	i 10 22	sP	i 10 11	pP	—
Riverside	Z.	59·4	73	e 9 58	0	e 10 25	sP	e 10 13	pP	—
Boulder City		59·5	69	e 9 59	0	—	—	i 10 7	pP	—
Palomar		60·2	73	e 10 9	+ 5	i 10 31	sP	i 10 19	pP	—
Tucson		64·5	70	e 10 32	0	—	—	—	—	—
Copenhagen		68·9	342	i 11 1	+ 1	—	—	—	—	35·4
Apia		70·4	151	—	—	20 52	PS	—	—	—
Fayetteville		70·6	56	e 11 9	– 1	—	—	—	—	—
Potsdam		71·8	340	e 11 19	+ 1	—	—	—	—	e 41·4
Witteveen	Z.	72·7	344	i 11 24	+ 1	—	—	i 11 39	pP	—
Raciborzu	Z.	72·8	336	e 11 22?	– 1	—	—	e 11 36	pP	—
Collmberg		72·9	339	e 11 24	0	—	—	—	—	—
Prague		73·1	338	e 11 28	+ 3	—	—	e 11 41	pP	(e 37·4)
Poona	Z.	73·4	279	i 11 25	– 2	—	—	—	—	—
Jena		73·5	340	e 11 27?	– 1	—	—	e 11 43	pP	—
Morgantown		74·4	45	i 11 32	– 1	—	—	—	—	—
Palisades		75·6	39	i 11 40	0	—	—	—	—	e 39·4
Stuttgart		76·1	341	e 11 42	0	—	—	e 11 53	pP	e 41·4
Strasbourg		76·5	342	i 11 46	+ 1	—	—	i 11 56	PcP	e 41·4
Belgrade		77·0	332	e 11 47k	– 1	e 22 34	PS	e 29 1	?	e 51·1
Paris		77·2	345	i 11 51	+ 2	i 12 14	sP	e 12 2	PcP	e 49·4
Zürich		77·5	342	e 11 51a	+ 1	—	—	e 12 4	PcP	—
Istanbul		77·6	325	e 11 47	– 4	—	—	—	—	e 48·8
Neuchatel		78·2	342	e 11 56	+ 2	—	—	—	—	—
Clermont-Ferrand		80·1	344	i 12 14	+10	—	—	i 12 30	pP	—
Florence		80·4	338	e 12 7	+ 1	—	—	—	—	—
Ksara		81·3	316	i 12 11	0	—	—	—	—	—
Rome		81·8	336	e 12 14a	+ 1	e 22 10	–10	—	—	—
Messina		84·5	333	e 12 26	– 1	e 22 57	+10	—	—	e 46·3
Tortosa		85·3	345	i 16 0	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.
Helwan	Z.	86·6	318	i 12 38k	+ 1	—	—	e 12 49	pP	—
Tamanrasset	Z.	101·8	336	e 13 48	+ 1	e 17 57	PP	e 17 35	?	—
La Paz		127·7	65	e 18 58	[0]	i 27 26	SKKS	i 37 56	SS	—

Additional readings :—
China Lake iZ = 9m.56s. and 10m.16s.
Pasadena eZ = 10m.0s.
Riverside eZ = 10m.5s.
Prague e = 11m.56s., 12m.4s., and 13m.58s.
Jena eE = 11m.30s., eN = 11m.40s., eE = 12m.11s.
Strasbourg i = 12m.16s., e = 12m.39s.
Paris e = 11m.56s.
Rome eS = 22m.42s., e = 24m.24s.
La Paz iZ = 31m.34s.
Long waves were also recorded at Bombay, Kew, De Bilt, Triest, Pavia, Cheb, Alicante, Almeria, and Granada.

Nov. 18d. 5h. 46m. 39s. Epicentre 37°·3N. 141°·3E. Focus at Base of the Superficial Layers. (as on 1951, June 23d.).

Intensity VI at Sioyasaki ; V at Wakamatu and Kakuda ; IV at Onahama, Shirakawa, Hukusima, Sendai, Katono, Miyamoto, Tomioka, and Katakura ; II-III at Mito, Inawasiro, Hirano, Hokota, Kogota, etc. Epicentre 37°·1N. 141°·3E. Depth 50km.
Seismological Bulletin of the C.M.O., Japan, for Nov., 1951, Tokyo, 1951, pp.305-306, with macroseismic chart.

A = – ·6223, B = + ·4986, C = + ·6034 ; δ = – 5 ; h = – 1 ;
D = + ·625, E = + ·780 ; G = – ·471, H = + ·377, K = – ·797.

		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Onahama		0·5	221	0 10a	0	0 16	– 2
Hukusima		0·8	304	0 18a	+ 3	0 29	+ 3
Shirakawa		0·9	258	0 15	– 1	0 25	– 3
Inawasiro		1·0	286	0 18a	0	0 30	– 1
Sendai		1·0	342	0 20a	+ 2	0 35	+ 4
Isinomaki		1·1	1	0 21	+ 2	0 37	+ 4
Mito		1·1	216	0 16k	– 3	0 27	– 6
Yamagata		1·2	322	0 22	+ 2	0 40	+ 4
Tukubasan		1·4	222	0 26	+ 3	0 41	0
Utunomiya		1·4	237	0 20	– 3	0 36	– 5
Mizusawa	E.	1·8	356	0 33	+ 4	0 56	+ 5
Kumagaya		1·9	233	0 28k	– 3	0 48	– 6
Niigata		1·9	290	0 39	+ 8	1 2	+ 8
Maebasi		2·0	243	0 30	– 2	0 53	– 3
Sakata		2·0	234	0 52	+20	1 15	+19
Tokyo		2·0	218	0 30	– 2	0 49	– 7
Titibu		2·2	234	0 33	– 2	0 55	– 6
Yokohama		2·3	215	0 36	0	1 0	– 4
Miyako		2·4	13	0 41	+ 3	1 9	+ 3
Morioka		2·4	358	0 41	+ 3	1 14	+ 8
Oiwake		2·4	246	0 37	– 1	1 9	+ 3
Takada		2·4	265	0 39	+ 1	1 5	– 1
Aikawa		2·5	287	0 37	– 2	—	—
Akita		2·6	339	0 45	+ 4	1 19	+ 8
Matusiro		2·6	253	0 37	– 4	1 6	– 5
Mera		2·6	206	0 41	0	1 8	– 3
Kohu		2·8	233	0 42	– 1	1 12	– 4
Ajiro		2·9	219	0 42	– 3	1 13	– 6
Matumoto		2·9	248	0 49	+ 4	1 19	0
Misima		2·9	221	0 42	– 3	1 12	– 7
Osima		3·0	211	0 43	– 3	1 15	– 7
Hatinohe		3·2	3	0 54	+ 5	1 32	+ 5
Iida		3·3	238	0 39	–12	—	—
Shizuoka		3·3	225	0 47	– 4	1 24	– 5
Toyama		3·3	259	0 55	+ 4	1 29	0

Continued on next page.

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	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Wazima	3·5	272	0 59	+ 6	—	—
Aomori	3·6	353	1 3	+ 8	1 51	+14
Hamamatu	3·9	229	1 21	+22	—	—
Nagoya	4·1	240	1 4	+ 2	1 48	− 1
Hikone	4·5	245	1 27	+19	—	—
Kameyama	4·6	239	1 6	− 3	1 56	− 6
Tu	4·6	238	1 18	+ 9	2 18	+16
Mori	4·8	353	1 22	+10	2 21	+14
Kyoto	5·0	245	1 34	+19	2 25	+13
Urakawa	5·0	13	1 12	− 3	2 14	+ 2
Owase	5·3	233	1 40	+21	—	—
Osaka	5·4	242	1 32	+12	—	—
Kobe	5·6	244	2 31	S	(2 31)	+ 4
Sapporo	5·8	0	2 36	S	(2 36)	+ 4
Sumoto	6·0	242	1 53	+24	2 50	+13

Mizusawa gives also ePN = 36s.

Nov. 18d. 9h. 26m. 32s. Epicentre 30°·5N. 91°·5E.
(as on 1940, Oct. 4d., and foreshock of 9h. 35m.).

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.	s.	m. s.		m.
Calcutta	E.	8·4	200	i 2 19	+13	4 14	S*	4 1	?	5·0
Dehra Dun	N.	11·6	272	e 0 40?	?	e 4 10?	?	—	—	—
New Delhi		12·6	265	i 3 1	− 2	5 22	− 4	3 12	PP	—
Przhevalsk		15·9	322	3 46	− 1	—	—	—	—	—
Naryn		16·6	315	i 3 55	− 1	i 6 59	−1	—	—	—
Almata II		17·0	322	e 4 0	− 1	—	—	—	—	—
Almata		17·2	322	i 4 1	− 2	i 7 12	− 2	—	—	—
Hyderabad	E.	17·6	225	i 4 12	+ 4	i 7 42	+19	—	—	—
Frunse		18·3	318	i 4 16?	− 1	—	—	—	—	—
Andijan		18·6	308	i 4 20	− 1	—	—	—	—	—
Fergana		18·8	307	i 4 21	− 2	e 7 48	− 2	—	—	—
Garm		19·3	303	i 4 27	− 2	—	—	—	—	—
Obi-garm		19·7	301	i 4 30?	− 4	i 8 8?	− 2	—	—	—
Poona		20·0	236	e 4 39	+ 2	8 25	+ 8	4 59	PP	9·0
Stalinabad		20·4	301	i 4 38	− 3	i 8 21	− 4	—	—	—
Bombay		20·5	240	i 4 45	+ 3	i 8 35	+ 8	—	—	—
Tashkent		20·9	308	i 4 45	− 1	—	—	—	—	—
Samarkand		22·0	302	i 4 37	−21	—	—	—	—	—
Nanking		23·4	79	i 5 14k	+ 3	i 9 19	− 2	i 9 35	?	—
Irkutsk		23·7	20	i 5 14	0	9 31	+ 4	—	—	—
Kodaikanal	E.	24·0	219	—	—	9 54	+22	—	—	—
Mary		25·5	294	i 5 31	− 1	i 6 3	PP	i 9 0	PcP	—
Zi-ka-wei		25·7	82	i 5 37k	+ 4	10 5	+ 4	—	—	—
Colombo	E.	25·9	208	5 45	+10	9 50	−14	—	—	16·5
Ashkabad		28·3	295	i 5 59	+ 2	—	—	—	—	—
Kizyl-Arvat		30·0	296	6 18	+ 6	—	—	—	—	—
Manila		31·4	115	i 6 27	+ 2	—	—	e 7 29	PP	—
Sverdlovsk		34·0	331	i 6 47	− 1	12 4?	− 9	i 8 0	PP	—
Vladivostok		34·4	59	i 6 50	− 1	i 12 19	0	i 8 11	PP	—
Baku		35·0	299	i 7 1?	+ 5	—	—	—	—	—
Lenkoran		35·8	295	6 56	− 7	—	—	—	—	—
Shemakla		36·0	299	6 55	−10	—	—	—	—	—
Goris		37·7	296	i 7 0	−19	i 12 43	−27	—	—	—
Kirovobad		37·7	299	i 7 19?	0	13 0?	−10	—	—	—
Tiflis		38·9	300	e 7 30	+ 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Erevan		39·1	298	i 7 33	+ 2	e 16 46	SSS	—	—	—
Djakarta		39·3	155	e 7 33	+ 1	e 13 36	+ 2	—	—	—
Leninakan		39·6	299	7 44?	+ 9	e 16 52	SSS	—	—	—
Tsikhlis-Dzhvari		39·9	300	i 7 40	+ 3	—	—	—	—	—
Borzhomi		40·0	300	7 38	0	—	—	—	—	—
Piatigorsk		40·3	305	7 39	− 1	13 42	− 7	9 48	PcP	—
Zugdidi		41·1	301	7 49	+ 2	—	—	—	—	—
Mizusawa	E.	41·2	65	7 49	+ 1	13 48	−14	—	—	—
Yuzno-Sakhlinsk		42·4	52	7 57	− 1	—	—	—	—	—
Moscow		45·3	321	i 8 19	− 2	i 14 56	− 6	10 6?	PP	—
Ksara		46·6	290	i 8 33	+ 1	i 15 6	−15	—	—	—
Simferopol		46·7	305	8 32	0	e 15 21?	−1	10 21	PP	—
Yalta		46·7	304	8 30	− 2	18 25	ScS	10 25	PP	—
Pulkovo		49·7	325	i 8 55	− 1	i 16 2	− 2	i 10 52	PP	—
Istanbul		50·8	301	i 9 2	− 2	i 16 12	− 8	e 10 58	PP	—
Helwan		51·4	286	i 9 8k	− 1	16 26	− 2	11 6	PP	—
Bucharest		52·4	306	e 9 19	+ 3	e 16 41	− 1	—	—	—
Helsinki		52·5	325	e 9 14	− 3	e 16 39	− 4	e 11 14	PP	e 26·5
Lwow		53·2	312	i 9 21	− 1	e 15 48	−64	i 11 20	PP	—
Uzhgorod		54·5	310	9 30	− 2	e 17 10?	0	11 41	PP	—
Sofia		54·7	303	i 9 36	+ 3	e 17 15	+ 2	—	—	—
Kiruna	Z.	55·0	334	i 9 35	0	—	—	—	—	—
Athens		55·4	297	e 9 38	0	—	—	—	—	—
Timisoara		55·6	307	e 9 44	+ 4	e 17 28	+ 3	—	—	—
Skalnate Pleso		55·7	312	e 9 44?	+ 4	e 17 14?	−12	—	—	—
Upsala		56·2	325	i 9 40k	− 4	i 17 29?	− 4	i 11 50	PP	—
Belgrade		56·3	306	e 9 44k	− 1	e 17 34	0	e 13 2	PPP	—
Budapest	E.	56·8	310	9 48	0	i 17 40	− 1	12 57	PPP	—
Raciborzu		56·9	313	e 9 45	− 4	e 17 45	+ 3	e 11 43	PP	e 30·5
Kalossa	N.	57·0	309	9 58	+ 8	e 19 36	ScS	—	—	—
Ogyalla		57·3	310	e 9 56	+ 4	e 17 47	0	e 12 58	PPP	—
Prague		59·3	315	e 10 5	− 1	e 18 19	+ 5	e 12 6	PP	—
Copenhagen		59·4	321	i 10 6	0	i 18 11	− 4	—	—	—
Taranto		59·6	302	10 8	0	18 11	− 6	—	—	—
Potsdam		59·7	317	i 10 7k	− 2	i 18 19	0	i 12 22	PP	—
Collmberg		59·9	313	e 10 9	− 1	e 18 28	+ 7	—	—	—
Cheb		60·6	315	e 10 12	− 3	e 18 26	− 4	e 12 32	PP	—
Triest		60·8	310	i 10 13k	− 3	i 18 25	− 8	e 12 32	PP	e 32·4
Jena		60·9	315	e 10 14	− 3	e 18 32	− 2	e 12 31	PP	—
Messina		61·6	300	i 10 21k	− 1	i 18 40	− 3	e 12 32	PP	—
Bologna		62·7	308	e 10 28k	− 1	e 18 59	+ 2	e 10 36	?	—
Rome		62·7	304	i 10 26k	− 3	i 18 54	− 3	12 46	PP	—
Stuttgart		62·9	314	i 10 30k	0	e 18 58	− 2	e 12 48	PP	—
Florence		63·0	307	i 10 30	− 1	i 18 59	− 2	i 12 46	PP	—
Chur		63·2	312	e 10 30k	− 2	—	—	—	—	—
Witteveen	Z.	63·3	319	i 10 43a	+10	—	—	—	—	—
Karlsruhe		63·4	314	10 34	0	i 19 5	− 1	—	—	—
Zürich		63·7	312	e 10 36k	0	e 18 56	−14	e 13 0	PP	—
Strasbourg		63·9	313	i 10 36k	− 1	i 19 12	0	e 12 53	PP	i 32·2
Pavia		64·0	309	e 10 37	− 1	i 19 11	− 2	e 26 18	SSS	—
Basle		64·3	313	e 10 38	− 1	—	—	—	—	—
Heerlen		64·3	317	e 10 48?	+ 9	—	—	—	—	—
De Bilt		64·4	318	i 10 41	+ 1	i 19 20	+ 2	—	—	e 32·5
Tunis		66·1	300	e 10 59	+ 8	—	—	e 12 26	?	—
Paris		67·1	315	i 10 57	0	i 19 48	− 3	i 13 31	PP	e 33·5
Durham	E.	67·4	321	—	—	i 19 53	− 2	—	—	—
Edinburgh		67·8	324	—	—	19 56	− 4	—	—	—
Clermont-Ferrand		67·8	311	i 11 6	+ 4	—	—	—	—	—
Kew		67·9	319	i 11 1k	− 1	i 20 15	+14	i 20 21	PS	e 35·5
Scoresby Sund		68·9	342	i 11 8	− 1	i 20 14	+ 1	13 38	PP	33·5
Rathfarnham Castle		70·5	321	i 11 17	− 1	e 20 23?	− 9	e 13 48	PP	e 35·0
Algiers Univ.	Z.	71·4	302	i 11 22k	− 2	e 20 31	−11	e 14 0	PP	—
Alicante		73·2	305	11 30	− 5	11 58	PcP	14 16	PP	—
College		74·4	24	11 37	− 5	—	—	—	—	—
Resolute Bay		75·0	3	e 11 44k	− 1	e 16 21	PPP	e 11 54	PcP	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Toledo		75·0	308	i 11 46	+ 1	—	—	e 14 28?	PP	—
Almeria		75·3	305	e 11 54	+ 7	—	—	14 50	PP	—
Granada		76·0	306	i 11 55a	+ 4	14 49	PP	12 28	?	—
Malaga		76·7	305	i 11 53	− 2	—	—	14 44	PP	39·7
Brisbane	Z.	82·3	128	i 12 30a	+ 5	—	—	i 12 34	PcP	—
Pretoria	Z.	82·5	234	i 12 28	+ 2	—	—	—	—	i 40·9
Pietermaritzburg	Z.	83·4	230	i 12 34	+ 4	—	—	—	—	—
Riverview		85·2	134	i 12 43k	+ 4	i 23 11	+ 2	—	—	—
Kimberley	Z.	86·7	234	i 12 56	+ 9	—	—	—	—	—
Seattle		96·5	22	e 13 42	+10	—	—	—	—	—
Hungry Horse		98·2	17	e 13 32	− 8	—	—	e 16 29	?	—
Butte		100·2	16	e 17 16	?	—	—	—	—	—
Mineral	Z.	103·1	25	e 14 6	+ 4	—	—	i 18 16	PP	—
Ottawa		103·6	351	e 18 25	PP	—	—	—	—	—
Berkeley	Z.	105·0	27	e 18 24	[+ 1]	—	—	—	—	—
Lick	Z.	105·7	27	e 18 23	[− 2]	—	—	—	—	—
Fresno	Z.	107·0	25	e 18 30	[+ 3]	—	—	—	—	—
Tinemaha	Z.	107·2	24	e 18 49	PP	—	—	e 21 7	PPP	—
Palisades		107·6	348	i 18 51	PP	—	—	—	—	—
Fordham		107·7	348	e 18 55	PP	—	—	—	—	—
Cleveland	Z.	108·1	354	i 19 0k	PP	—	—	—	—	—
China Lake	Z.	108·6	24	e 18 21	[− 9]	—	—	i 18 54	PP	—
Boulder City		109·4	22	e 18 47	[+15]	—	—	e 18 55	PP	—
Pasadena	Z.	109·9	25	e 18 52	[+19]	—	—	i 19 13	PP	—
Washington		110·1	350	i 19 7	PP	—	—	—	—	—
Palomar	Z.	111·1	25	i 19 21	PP	—	—	—	—	—
Bermuda		113·5	338	e 19 44	PP	—	—	—	—	—
Fayetteville		113·5	5	i 17 2	?	—	—	—	—	—
Tucson		114·1	21	e 19 26	PP	—	—	i 19 43	?	—
San Juan		126·5	333	e 18 48	[−17]	—	—	—	—	—
Bogota	E.	142·4	337	i 19 31	[− 4]	i 28 41	{−55}	—	—	—
La Paz		156·7	305	i 19 59k	[+ 2]	i 43 55	SS	i 24 9	PP	73·8
Huancayo		158·0	324	e 20 6	[+ 8]	e 24 12	PP	i 20 37	PKP_2	—

Additional readings :—

(Where a station has given readings for this and the next earthquake together, unidentified readings have been taken as belonging to the second and larger, unless it is obvious that they belong here.)

New Delhi PPPEN = 3m.19s., iSN = 5m.9s., SSSEN = 5m.33s.
Poona PPPNZ = 5m.12s., S?E = 8m.3s., SSSN = 8m.43s., PcSN = 12m.54s.
Piatigorsk SSS = 17m.22s.
Moscow iPS = 15m.6s.
Yalta PcP = 10m.0s., SS = 18m.53s.
Pulkovo iPS = 16m.10s.
Helwan iEZ = 16m.49s.
Helsinki eSE = 16m.34s.
Lwow iPPP = 12m.37s., iSS = 20m.9s.
Uzhgorod PcP = 10m.31s., PPP = 12m.52s., ScS = 18m.44s.
Budapest iE = 9m.55s.
Raciborzu ePE = 9m.51s., eZ = 17m.6s., eE = 18m.14s., ScSZ = 19m.24s.?, iScSN = 19m.33s., iSSZ = 21m.17s., iSSSEN = 23m.15s.
Ogyalla eS? = 17m.50s.
Prague e = 10m.12s., 11m.55s., and 12m.38s., ePPP = 13m.3s., e = 13m.33s., eS = 18m.5s.
Potsdam ePN = 10m.11s., ePPPN = 13m.32s., iPPPZ = 13m.36s.
Cheb e = 10m.47s. and 13m.9s., eSSS?N = 24m.46s.
Triest iZ = 10m.20s., ePPPZ = 13m.42s., eScPZ = 15m.1s., eSPZ = 18m.49s., iSS? = 22m.37s.
Jena iPE = 10m.20s., iPN = 10m.23s., eE = 11m.0s., ePPZ = 12m.28s.
Rome PPP = 13m.52s.
Stuttgart i = 10m.36s., iS = 19m.8s.
Strasbourg ePPP = 14m.31s., e = 14m.39s., eSS = 23m.26s., iSSS = 26m.5s., i = 26m.23s.
Pavia e = 18m.54s. and 19m.56s.
Basle e = 10m.46s. and 11m.39s.
Paris iPcP? = 11m.41s.?, iPPP = 15m.0s., iPS = 20m.12s., iPPS = 20m.18s., iScS = 20m.44s., iSSS = 27m.2s., and numerous unidentified i readings.
Kew eSS = 24m.54s.
Scoresby Sund 15m.22s.
Algiers Univ. eZ = 11m.31s., ePPPZ = 15m.35s.
Alicante PPP = 15m.58s.
La Paz iPKP₂Z = 20m.28s., i = 32m.10s., iPPS = 37m.19s., iSSP = 44m.55s., iSSS = 49m.44s.
Huancayo e = 26m.21s.
Long waves were also recorded at Ponta Delgada, Manzanillo, and Puebla.

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Nov. 18d. 9h. 35m. 45s. Epicentre 30°·5N. 91°·5E. (as at 9h. 26m.).

Intensity IV at Gauhati, Lhasa, and on the island of Sangor.
Epicentre 31°·5N. 89°·5E. (Poona).
Seismological Bulletin Government of India Meteorological Department, November, 1951, pp. 15 and 30.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·4	200	i 2 26	P*	—	—	—	—	—
New Delhi		12·6	265	i 2 58	− 5	i 5 6	−20	—	—	—
Almata II		17·0	322	e 3 53	− 8	—	—	—	—	—
Andijan		18·6	308	4 18	− 3	i 7 46	0	—	—	—
Fergana		18·8	307	e 4 29	+ 6	—	—	—	—	—
Obi-garm		19·7	301	i 4 38	+ 4	e 8 20	+10	—	—	—
Poona		20·0	236	i 4 38	+ 1	8 22	+ 5	i 7 57	?	—
Bombay	N.	20·5	240	i 4 32	−10	i 8 15	−12	—	—	—
Tashkent		20·9	308	i 4 51	+ 5	—	—	—	—	—
Samarkand		22·0	302	4 55	− 3	8 47?	− 9	—	—	—
Zi-ka-wei		25·7	82	i 5 35	+ 2	i 10 3	+ 2	—	—	—
Manila		31·4	115	i 6 27	+ 2	e 12 28	+56	e 7 44	PPP	e 20·7
Ituhara		32·0	71	e 6 38	+ 8	e 12 20	+38	—	—	—
Nagasaki		32·6	75	e 6 27	− 8	e 11 11	−40	—	—	—
Hukuoka		33·0	74	6 39	0	i 11 53	− 4	7 43	PP	18·4
Unzendake		33·0	75	6 38	− 1	11 40	−17	e 8 49	?	—
Kumamoto		33·3	74	e 6 38	− 3	e 12 6	+ 4	—	—	15·7
Kagosima		33·4	78	6 41	− 1	12 7	+ 4	17 32	Q	18·6
Simonoseki		33·4	73	i 6 50	+ 8	—	—	—	—	—
Ooita		34·0	74	e 6 48	0	12 12	− 1	6 18	?	17·8
Sverdlovsk		34·0	331	e 6 44	− 4	i 12 0	−13	—	—	—
Miyazaki		34·1	76	e 6 49	+ 1	—	—	e 9 52	?	19·2
Hirosima		34·6	72	e 7 1	+ 8	e 13 0	PcS	e 8 1	PP	17·1
Matuyama		34·9	73	e 6 54	− 1	e 12 7	−20	e 8 8	PP	i 19·4
Saigo		35·2	70	7 2	+ 4	—	—	—	—	—
Simidu		35·2	74	e 7 0	+ 2	11 48	−43	e 9 48	PcP	—
Okayama		35·8	72	6 59	− 4	12 37	− 4	13 58	?	20·0
Takamatu		35·9	73	e 7 9	+ 5	e 12 50	+ 8	8 34	PP	20·0
Muroto		36·2	74	e 7 6	0	e 12 33	−14	—	—	e 15·4
Sumoto		36·6	71	7 10	0	12 54	+ 1	—	—	20·3
Kobe		36·8	72	e 7 14	+ 3	e 12 56	0	e 8 42	PP	20·6
Tsuruga		37·5	70	7 20	+ 3	12 54	−13	i 8 50	PP	18·6
Hikone		37·6	70	7 17	− 1	e 11 20	?	e 8 50	PP	—
Owase		37·7	72	7 18	− 1	13 15	+ 5	i 8 52	PP	18·5
Kanazawa		37·9	68	e 7 23	+ 3	i 13 14	+ 1	i 8 53	PP	—
Kameyama		37·9	71	7 23	+ 3	e 13 17	+ 4	8 53	PP	21·1
Tu		37·9	71	7 23	+ 3	13 5	− 8	e 10 40	?	—
Gihu		38·0	70	e 7 29	+ 8	—	—	—	—	—
Wazima		38·0	66	e 7 29	+ 8	—	—	—	—	—
Nagoya		38·2	70	e 7 23	0	e 13 23	+ 6	(e 15 52)	SS	e 15·9
Toyama		38·3	67	e 7 27	+ 3	e 13 9	−10	e 9 4	PP	e 18·9
Hamamatu		38·9	70	e 7 32	+ 3	—	—	—	—	i 21·4
Iida		38·9	69	e 7 29	0	e 13 34	+ 6	e 16 15	SS	e 21·2
Matumoto		38·9	68	e 7 34	+ 5	e 13 32	+ 4	e 10 52	?	21·4
Tiflis		38·9	300	i 7 33	+ 4	13 27	− 1	—	—	—
Aikawa		39·0	65	7 24	− 6	—	—	e 11 56	?	19·8
Nagano	E.	39·1	67	e 7 32	+ 1	—	—	—	—	21·8
Djakarta		39·3	155	e 7 38	+ 6	i 13 47	+13	i 17 43	ScS	—
Omaesaki		39·3	71	7 29	− 3	e 12 27	−67	—	—	e 21·8
Gori		39·4	300	7 35	+ 2	13 37	+ 2	—	—	—
Oiwake		39·4	68	e 7 31	− 2	e 16 46	SSS	e 9 16	PP	e 21·2
Shizuoka		39·4	69	e 7 34	+ 1	e 13 36	+ 1	e 9 7	PP	e 19·7
Niigata		39·7	65	e 7 44	+ 8	—	—	—	—	—
Maebasi		39·8	68	i 7 38	+ 2	i 13 44	+ 2	e 11 34	?	21·6
Misima		39·9	70	e 7 25	−12	12 47	−56	i 7 50	?	e 16·2

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Titibu		39·9	68	i 7 37	0	—	—	—	—	—
Tsikhlis-Dzhvari		39·9	300	i 7 38	+ 1	—	—	—	—	—
Ajiro		40·0	70	7 39	+ 1	—	—	—	—	e 22·2
Borzhomi		40·0	300	7 35	− 3	13 39	− 5	—	—	—
Kumagaya		40·1	68	e 7 41	+ 2	e 16 53	SS	e 10 39	?	e 21·8
Osima		40·3	70	e 7 39	− 1	e 13 41	− 8	9 16	PP	20·6
Akita		40·4	63	e 7 33	− 8	i 13 43	− 7	e 9 23	PP	e 18·2
Tokyo		40·4	69	7 42	+ 1	13 48	− 2	9 18	PP	18·2
Utunomiya		40·4	68	e 7 41	0	e 17 4	SSS	—	—	e 24·3
Yokohama		40·4	70	7 43	+ 2	—	—	—	—	—
Inawasiro		40·5	65	e 7 50	+ 8	—	—	—	—	21·2
Mera		40·6	71	e 7 43	0	e 13 53	− 1	—	—	19·3
Mori		40·7	58	e 7 43	− 1	e 17 2	SS	—	—	22·0
Shirakawa		40·7	67	e 7 45	+ 1	16 14	?	—	—	—
Tukubasan		40·7	68	e 7 49	+ 5	e 12 48	−67	—	—	21·5
Hukusima		40·8	65	e 7 45	0	—	—	—	—	—
Yamagata		40·8	64	7 30	−15	e 13 38	−18	e 18 31	Q	e 21·8
Aomori		40·9	61	e 7 48	+ 2	14 1	+ 3	17 27	ScS	e 19·5
Mito		40·9	68	e 7 47	+ 1	e 13 57	− 1	e 9 33	PP	17·3
Sendai		41·1	65	7 47	0	e 14 8	+ 7	9 23	PP	19·1
Zugdidi		41·1	301	i 7 51	+ 4	i 14 0	− 1	—	—	—
Mizusawa	E.	41·2	65	7 50	+ 2	e 13 25	−37	—	—	e 18·0
	N.	41·2	65	7 54	+ 6	13 0	−62	—	—	17·2
Morioka		41·2	62	e 7 51	+ 3	e 13 20	−42	—	—	i 19·6
Onahama		41·2	67	e 7 50	+ 2	e 14 2	0	—	—	e 22·6
Sapporo		41·3	57	e 7 47	− 2	e 13 58	− 6	e 9 33	PP	e 20·0
Hatinohe		41·5	61	7 52	+ 2	14 7	0	e 17 39	SSS	e 21·1
Miyako		41·9	62	e 7 49	− 5	e 13 58?	−15	18 22	Q	22·4
Urakawa		42·3	58	e 7 56	− 1	i 14 9	−10	i 14 22	S	e 17·9
Kusiro		43·5	58	e 8 16	+ 9	e 14 25	−11	—	—	e 17·0
Nemuro		44·4	57	e 8 28	+14	15 45	+56	18 14	SS	e 22·8
Moscow		45·3	321	i 8 21	0	i 14 53	− 9	—	—	—
Ksara		46·6	290	i 8 31?	− 1	—	—	—	—	—
Simferopol		46·7	305	i 8 28	− 4	i 15 16	− 6	—	—	—
Yalta		46·7	304	8 29	− 3	15 15	− 7	—	—	—
Pulkovo		49·7	325	i 8 55	− 1	i 15 56	− 8	—	—	—
Istanbul		50·8	301	i 9 1	− 3	i 16 11	− 9	i 10 56	PP	e 24·2
Helwan		51·4	286	i 9 6k	− 3	i 16 24	− 4	—	—	—
Bucharest		52·4	306	i 9 18	+ 2	i 16 39	− 3	i 11 11	PP	25·2
Helsinki		52·5	325	e 9 16	− 1	i 16 35	− 8	e 11 13	PP	e 23·2
Campulung		53·1	307	e 9 20	− 1	e 16 22	−29	—	—	25·2
Lwow		53·2	312	i 9 18	− 4	e 16 39	−13	—	—	—
Klyuchi		53·9	334	9 31	+ 4	17 3	+ 1	—	—	—
Sofia		54·7	303	i 9 34	+ 1	i 17 11	− 2	i 11 25	PP	25·2
Kiruna	Z.	55·0	334	i 9 30	− 5	—	—	—	—	e 21·6
Athens		55·4	297	e 9 35k	− 3	i 17 21	− 1	i 21 3	SS	—
Timisoara		55·6	307	e 9 42	+ 2	i 17 28	+ 3	e 11 42	PP	e 27·2
Skalnate Pleso		55·7	312	e 9 31?	− 9	e 17 6?	−20	—	—	—
Upsala		56·2	325	i 9 42k	− 2	i 17 19	−14	i 12 0	PP	e 24·2
Belgrade		56·3	306	i 9 45a	0	i 17 29	− 5	—	—	e 26·9
Kecskemet		56·5	310	e 9 52	+ 6	e 17 37	0	e 22 30	?	—
Budapest		56·8	310	9 47	− 1	17 36	− 5	11 51	PP	25·2
Raciborzu		56·9	313	i 9 49	0	i 17 42	0	i 11 50	PP	—
Kalossa	N.	57·0	309	9 53	+ 3	17 42	− 1	e 21 29	SS	25·2
Ogyalla		57·3	310	e 9 53	+ 1	e 17 44	− 3	e 12 15	PP	—
Vienna		58·4	311	e 9 56	− 4	e 17 49	−13	e 12 3	PP	—
Prague		59·3	315	i 10 5k	− 1	18 7	− 7	e 12 2	PP	e 25·2
Copenhagen		59·4	321	i 10 5	− 1	i 18 7	− 8	—	—	—
Taranto		59·6	302	10 8	0	18 20?	+ 3	—	—	29·0
Potsdam		59·7	317	i 10 9k	0	i 18 16	− 3	i 12 22	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.
Collmberg		59·9	313	i 9 56	–14	i 18 17	– 4	i 22 15	SS	e 28·2
Cheb		60·6	315	e 10 12	– 3	e 18 25	– 5	e 12 27	PP	—
Triest		60·8	310	i 10 10k	– 6	i 18 25	– 8	i 10 26	pP	e 28·6
Jena		60·9	315	e 10 9	– 8	i 18 32	– 2	e 12 33	PP	e 29·2
Sonneberg		61·3	315	—	—	18 35	– 4	e 22 30	SS	e 29·2
Messina		61·6	300	i 10 16k	– 6	i 18 39	– 4	i 12 26	PP	—
Bergen		62·2	327	i 10 25	– 1	i 18 48	– 3	11 0	PcP	i 27·2
Bologna		62·7	308	i 10 30	+ 1	i 19 19	PS	e 13 0	PP	e 30·0
Rome		62·7	304	i 10 27k	– 2	i 18 52	– 5	14 11	PPP	30·0
Stuttgart		62·9	314	e 10 24	– 6	i 19 0	0	i 12 49	PP	32·2
Florence		63·0	307	i 10 26	– 5	i 18 57	– 4	19 38	PPS	—
Chur		63·2	321	e 10 25k	– 7	e 18 54	– 9	e 12 33	PP	e 34·2
Witteveen	Z.	63·3	319	i 10 32	– 1	—	—	—	—	e 30·9
Karlsruhe		63·4	314	i 10 33	– 1	i 19 3	– 3	e 12 47	PP	e 31·2
Zürich		63·7	312	e 10 34k	– 2	e 19 3	– 7	e 12 55	PP	—
Strasbourg		63·9	313	i 10 35k	– 2	i 19 5	– 7	i 12 45	PP	e 30·2
Pavia		64·0	309	i 10 37k	– 1	i 18 56	–17	i 14 12	PPP	e 33·6
Basle		64·3	313	e 10 36k	– 3	e 19 9	– 8	e 12 35	PP	—
Heerlen		64·3	317	i 10 44	+ 5	—	—	—	—	e 31·2
De Bilt		64·4	318	i 10 40	0	i 19 12	– 6	i 13 7	PP	e 31·2
Tananarive		64·8	227	10 49	+ 6	e 19 31	+ 8	11 13	PcP	30·2
Neuchatel		64·9	311	e 10 42	– 1	e 19 24	0	—	—	—
Tunis		66·1	300	i 10 54	+ 3	e 19 36	– 3	i 13 20	PP	e 31·2
Perth		66·3	157	i 11 0	+ 8	19 55	+13	13 28	PP	32·8
Aberdeen		66·8	325	i 10 35	–21	i 19 37	–11	i 12 56	PP	30·2
Paris		67·1	315	i 10 54	– 3	i 19 46	– 5	i 13 25	PP	e 30·2
Marseilles		67·2	308	e 10 34?	–24	e 19 24?	–28	—	—	e 30·2
Durham		67·4	321	i 10 58	– 1	i 19 43	–12	i 13 34	PP	—
Clermont-Ferrand		67·8	311	i 11 1	– 1	—	—	e 11 39	PcP	—
Kew		67·9	319	i 10 53	– 9	i 19 53	– 8	i 13 39	PP	—
Scoresby Sund		68·9	342	i 11 7	– 2	i 20 8	– 5	e 15 10	PPP	—
Barcelona		70·1	307	i 11 20	+ 4	i 20 21	– 6	14 1	PP	e 33·0
Rathfarnham Castle		70·5	321	i 11 9	– 9	i 20 4	–28	e 15 18	PPP	e 36·8
Algiers Univ.	Z.	71·4	302	e 11 20	– 4	e 20 35	– 7	e 13 53	PP	—
Tortosa		71·5	307	i 11 24	0	i 20 36	– 7	—	—	—
Reykjavik		72·3	336	e 11 27	– 2	e 20 59	+ 7	e 21 46	PPS	e 33·8
Alicante		73·2	305	11 29	– 6	20 56	– 6	14 26	PP	30·3
College		74·4	24	11 38	– 4	21 11	– 5	—	—	—
Resolute Bay		75·0	3	e 11 39	– 6	21 19	– 4	i 14 18	PP	e 33·2
Toledo		75·0	308	i 11 43	– 2	i 21 17	– 6	14 29	PP	35·2
Almeria		75·3	305	i 11 49	+ 2	i 21 18	– 8	14 39	PP	35·6
Granada		76·0	306	i 11 52a	+ 1	i 21 24	–10	i 14 42	PP	i 39·4
Malaga		76·7	305	i 11 49	– 6	i 21 30	–11	14 28	PP	e 30·8
Coimbra		77·8	310	12 3	+ 2	21 51	– 2	26 41	SS	36·8
Lisbon		79·1	309	i 12 8k	0	i 22 10	+ 3	15 7	PP	37·4
Brisbane		82·3	128	i 12 30a	+ 5	i 22 44	+ 4	—	—	—
Pretoria	Z.	82·5	234	i 12 30	+ 4	—	—	—	—	—
Sitka		84·2	24	e 12 43	+ 9	i 22 59	0	—	—	—
Riverview		85·2	134	i 12 49a	+10	i 23 18	+ 9	i 24 44	PPS	e 37·2
Kimberley	Z.	86·7	234	i 12 53	+ 6	—	—	—	—	—
Lome		87·2	277	e 12 53	+ 4	i 23 35	+ 7	e 16 21	PP	e 38·2
Grahamstown	Z.	88·3	229	i 12 58	+ 3	—	—	—	—	—
Victoria		95·4	22	13 31	+ 3	24 40	– 2	17 15	PP	40·0
Saskatoon		96·2	11	13 37	+ 6	24 47	– 1	24 14	SKS	42·2
Seattle		96·5	22	e 13 37	+ 5	i 24 54	+ 3	e 17 40	PP	e 46·2
Hungry Horse		98·2	17	i 13 40	0	—	—	i 17 28	PP	—
Butte		100·2	16	e 13 53	+ 4	—	—	e 18 1	PP	—
Seven Falls	E.	101·1	348	e 14 8	+15	—	—	—	—	—
Kirkland Lake	Z.	101·3	354	e 13 56	+ 2	i 18 4	PP	e 17 48	?	—
Bozeman		101·5	15	—	—	e 25 32	– 1	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Halifax		101·8	342	18 11	PP	24 37	[+ 1]	27 8	PS	40·6
Shawinigan Falls	N.	102·0	348	14 5	+ 8	24 39	[+ 2]	18 10	PP	—
Apia		102·6	98	—	—	(e 24 15?)	[−25]	—	—	e 24·2
Auckland	N.	102·8	126	e 16 49	?	i 25 55	+11	i 27 31	PS	e 44·6
Mineral	Z.	103·1	25	i 14 5a	+ 3	e 24 47	[+ 5]	i 17 31	?	—
Ottawa		103·6	351	14 8	+ 4	24 45	[+ 1]	18 18	PP	41·8
Karapiro	N.	103·8	126	(14 15?)	+10	—	—	—	—	14·2
Christchurch		104·5	132	e 18 47	PP	e 25 55	− 3	27 55	PS	e 50·8
Rapid City		104·6	11	e 18 47	PP	e 24 57	[+ 8]	—	—	—
Wellington		104·8	129	e 18 45	PP	i 24 56	[+ 6]	e 26 5	S	e 42·8
Berkeley		105·0	27	e 14 14	+ 3	e 25 6	[+15]	e 18 27	PP	e 43·8
Santa Clara		105·6	27	e 18 38k	PP	e 32 47	?	—	—	e 57·0
Harvard		105·7	347	e 14 14	0	i 27 49	PS	e 18 40	PP	—
Lick	Z.	105·7	27	e 14 24k	+10	i 18 39	PP	e 20 37	PPP	—
Weston		105·8	347	e 18 33	PP	i 27 49	PS	i 33 22	SS	—
Fresno	Z.	107·0	25	e 14 19a	P	e 18 43	PP	e 18 0	?	—
Tinemaha		107·2	24	e 14 24	P	e 25 10	[+10]	e 28 36	PP	—
Palisades		107·6	348	e 14 31	P	i 25 7	[+ 5]	e 18 51	PP	e 50·8
Fordham		107·7	348	e 18 50	PP	—	—	—	—	—
City College, N.Y.		107·8	348	e 18 39	PP	i 25 1	[− 2]	—	—	—
Chicago		108·1	0	e 18 57	PP	e 26 35	S	—	—	—
Cleveland		108·1	354	e 18 49	PP	e 25 6	[+ 2]	e 21 9	PPP	—
Pennsylvania		108·4	352	i 18 50	PP	e 28 9	PS	i 21 21	PPP	—
China Lake		108·6	24	e 18 26	[− 4]	e 25 8	[+ 2]	e 14 29	P	—
Lincoln		108·6	7	e 20 6	?	e 26 29	{+34}	—	—	—
Boulder City		109·4	22	e 18 5	?	—	—	i 19 10	PP	—
Morgantown		109·8	353	i 19 0	PP	e 28 25	PS	—	—	—
Pasadena		109·9	26	e 14 45	P	i 26 45	S	i 19 16	PP	i 45·4
Washington		110·1	350	e 18 59	PP	—	—	—	—	—
Riverside	Z.	110·3	26	i 18 45	[+11]	e 19 22	PP	e 29 41	PKKP	—
Palomar	Z.	111·1	25	e 18 33	[− 2]	e 19 17	PP	i 29 47	PKKP	—
Bermuda		113·5	338	i 19 38	PP	i 29 4	PS	i 35 15	SS	—
Fayetteville		113·5	5	e 18 36	[− 4]	—	—	—	—	—
Tucson		114·1	21	e 18 40	[− 1]	e 27 29	S	—	—	—
Columbia		115·5	353	e 19 12	?	e 29 15	PS	—	—	—
San Juan		126·5	333	i 19 8	[+ 3]	—	—	i 22 0	?	—
Fort de France		127·9	325	e 21 7	PP	e 38 17	SS	—	—	—
Guadalajara		127·9	18	—	—	e 44 15	?	e 58 21	Q	e 59·4
Merida		128·8	1	e 19 44	[+34]	e 39 21	SSP	e 45 48	Q	e 53·4
Tacubaya		129·3	13	e 19 9	[− 2]	e 28 23	{+ 8}	e 21 5	PP	e 59·6
Vera Cruz		130·0	9	—	—	e 49 21	?	e 53 31	Q	e 62·3
La Plata		154·0	254	20 9	[+16]	29 57	{−43}	23 51	PP	67·2
Punta Arenas	N.	154·0	205	e 25 26	?	e 31 53	?	e 33 40	?	—
Buenos Aires		154·4	254	e 20 21	?	—	—	e 23 15	PKS	—
La Paz		156·7	303	i 20 0k	[+ 3]	i 43 59	SS	i 24 15	PP	—
Huancayo		158·0	324	i 20 5	[+ 6]	e 31 0	{− 2}	i 24 5	PP	e 58·6
Santa Lucia	N.	164·6	255	e 20 35	[+30]	45 13	SS	e 24 53	PP	60·2
Concepción	N.	165·7	245	e 22 59	?	e 45 30	SS	e 28 21	PPP	68·2

Additional readings :—
Manila eSS = 14m.57s., eSSS = 15m.20s.
Hukuoka PPP = 8m.28s., iZ = 10m.27s. and 11m.5s., S = 12m.25s., iN = 13m.9s. and 14m.28s., SSS = 14m.53s., iN = 16m.23s.
Ooita Q = 14m.19s.
Matuyama e = 9m.6s., 14m.57s., and 17m.37s.
Simidu e = 7m.48s.
Takamatu i = 12m.13s. and 14m.48s., SS = 15m.31s.
Kobe eE = 7m.26s. and 10m.5s., eN = 10m.55s.
Tsuruga PP = 7m.44s.
Owase iNZ = 16m.4s.
Kameyama e = 9m.14s., Q = 14m.30s.
Toyama eSS = 15m.50s.
Nagano eE = 10m.57s. and 12m.32s., QE = 15m.26s.
Djakarta iPP = 10m.35s., iP_cPEN = 11m.11s., iS_cSEN = 19m.17s.
Oiwake e = 8m.33s., 9m.52s., 12m.28s., and 15m.2s.
Shizuoka eSS? = 16m.37s.

Continued on next page.

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Niigata e =11m.51s. and 12m.40s., iN =15m.39s.
Osima PP =8m.39s., SS =16m.54s., SSS =19m.9s.
Tokyo PPE =8m.51s., i =11m.9s., eSS =15m.40s., e =17m.49s.
Aomori PP =8m.37s., PcP =10m.21s., e =12m.31s., SS =15m.4s.
Sendai eE =9m.3s., PPPE =9m.49s., PcP?E =10m.33s., eE =12m.27s., SE =13m.41s., Q =16m.54s., ScS =18m.22s.
Sapporo e =8m.45s., eSS =17m.15s.
Nemuro Q =20m.43s.
Istanbul iEZ =11m.1s., eSSEN =19m.46s.
Bucharest ePcPN =10m.23s., iScSEN =18m.52s., iSSN =19m.49s., iSS?E =20m.22s.
Helsinki ePPPE =12m.12s.
Sofia iSSEN =20m.54s., iSSSEN =22m.54s.
Athens iS =17m.16s.
Timisoara eScSN =19m.31s., iSSN =21m.15s.
Upsala iN =10m.0s., iPPPE =12m.42s., iN =14m.57s., iE =18m.40s., iScS =19m.30s., iSSN =21m.9s., eQN =23·2m.
Belgrade iNE =11m.44s. and 13m.23s., iSNE =17m.38s., iNE =22m.13s., iNW =22m.24s.
Budapest PPPN =12m.31s.. eN =12m.52s., PPPE =13m.16s., ePcSE =14m.39s., PcSN =15m.0s., iPSN =17m.44s., PPSN =18m.1s., PPSE =18m.6s., iE =18m.38s., iScSE =19m.12s., eSSE =21m.15s., iSSN =21m.28s., eSSSN =23m.0s., eSSSE =23m.15s.
Raciborzu iP =9m.53s., iPcPEN =10m.44s., iZ =11m.4s., iN =11m.17s., iPPPZ =12m.55s., iE =13m.16s., iPcSE =13m.36s., iE =14m.16s., iPcSN =14m.42s., iN =19m.41s.
Kalossa ePPPN =12m.51s., eN =13m.27s., eSSSN =22m.55s.
Ogyalla e =10m.37s., ePcP? =10m.47s., eE =11m.28s., eN =11m.49s., ePPP =13m.23s.?, eSE =17m.47s., ePS? =18m.13s., eSS =21m.33s., eSSS? =24m.15s.
Vienna ePcP =10m.49s., eScS =20m.1s., eSS =21m.40s.
Prague e =10m.15s. and 10m.25s., ePPP =13m.31s., e =17m.53s., eSS =21m.37s., eSSS? =23m.52s.
Potsdam iSN =18m.13s.?
Collmberg iSSSEN =24m.3s.
Cheb eN =10m.33s., ePcP?E =11m.8s., ePPN =12m.6s., ePPPE =13m.47s., eE =18m.43s. and 19m.0s., e =21m.52s., eSSN =22m.25s., eSSSN =24m.32s.
Triest iPcPZ =10m.58s., iPPZ =12m.30s., iPPPZ =13m.37s., iScPZ =14m.50s., iSPZ =18m.43s., iPS =18m.48s., iScS =20m.5s., iSS =22m.31s., iSSS =24m.57s.
Jena ePN =10m.13s.?, iP =10m.17s., iPPZ =12m.27s., iPPPZ =13m.51s., iPPPE =13m.57s., iSZ =18m.27s.?, iPSE =18m.57s., iSSE =22m.30s., iE =24m.51s., iZ =24m.57s.
Sonneberg eSS?E =22m.33s., iE =24m.51s., iN =25m.12s.
Messina iZ =10m.20s.
Bergen iPPP?E =14m.2s., iN =21m.22s., iE =21m.55s., iN =22m.28s., iQE =25m.41s.
Rome SS =23m.1s.
Stuttgart iP =10m.27s., i =10m.35s., iSS =23m.15s., i =25m.5s., iSSS =25m.55s., eQ =26·2m.
Karlsruhe iSSSEN =26m.0s.
Zürich eSS =23m.14s.
Strasbourg iPcP =11m.19s., iPPP =14m.26s., iPS =19m.18s., iPPS =19m.39s., iSS =23m.15s., iSSS =26m.11s. and other unidentified i readings.
Pavia i =12m.27s. and 15m.45s.
De Bilt ePPP =14m.36s., iEN =23m.9s.
Tananarive PS =19m.48s., ScS =20m.47s., SS =23m.44s., Q =27m.5s.
Tunis i =11m.38s., eSKS =19m.8s., e =19m.40s., eSSS =23m.39s., eQ =27m.16s.
Perth PPP =14m.55s., PS =20m.17s., i =21m.37s., SS =24m.15s., i =28m.31s.
Aberdeen iEN =11m.4s., iPPPE =15m.0s., iN =22m.30s., iSSEN =23m.30s., iE =26m.50s., iN =27m.8s.
Paris iPcP =11m.19s., iPP =13m.29s., iPPP =15m.18s., iPS =19m.53s., iPPS =20m.8s., iScS =20m.49s., iSS =23m.57s., iSSS =26m.50s. and 26m.59s., iQ =27m.30s. and other unidentified i readings.
Marseilles e =11m.3s.? and 19m.15s.?, eSS? =23m.11s.?, eSSS =26m.39s.
Durham iPcPE =11m.32s., iPPPE =15m.3s., iPSN =20m.10s., iScSN =21m.3s.
Clermont-Ferrand e =12m.45s., 15m.57s., and 18m.15s.
Kew ePPPEN =15m.11s., ePS =20m.31s., iSS =25m.25s.
Scoresby Sund e =13m.12s., iE =16m.9s.
Barcelona PPP =15m.36s., SS =24m.58s., i =28m.4s.
Rathfarnham Castle iPPEZ =13m.45s., eScS =21m.25s., eSSEN =24m.38s., eEN =26m.12s., eSSSEN =27m.44s., eEN =29m.55s., eQEN =33m.
Algiers Univ. ePcPZ =11m.29s., iZ =13m.19s.
Reykjavik iP =11m.31s., iZ =12m.11s., iPPP?Z =15m.17s., eEN =25m.57s., eSSS? =28m.58s.
Alicante PcP =11m.57s., PPP =16m.21s., PS =21m.30s., PPS =21m.53s., SS =25m.29s., SSS =28m.31s.
Resolute Bay i =11m.44s., iZ =12m.51s., eZ =29m.57s.
Toledo i =11m.46s., PcP =12m.4s., PPP =16m.23s., SKS =21m.39s., i =23m.56s., SS =26m.4s., SSS =29m.28s., Q =31m.45s.
Almeria PPP =16m.21s., Q =33m.33s.

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Granada PcP =12m.0s., PPP =17m.0s., PS =22m.11s., ScS =22m.30s., iSS =26m.22s., SSS =30m.42s., Q =34m.21s.
Coimbra P =12m.7s., iSEN =21m.54s., SSSEN =31m.57s.
Lisbon pP?E =12m.24s., 14m.24s., iSEN =22m.1s., iPS =22m.37s., PPSEZ =22m.56s., iSSEN =27m.9s. and 31m.46s., QEN =32m.48s.
Brisbane iN =13m.39s. and 24m.44s.
Riverview iPcPZ =12m.55s., isSEN =23m.37s., SSE =28m.54s., eQN =36·0m. and other unidentified i readings.
Lome i =12m.59s., 13m.17s., and 13m.45s., iPPP? =18m.40s., iPS =24m.44s., iPPS = 25m.8s., e =26m.18s., eSS =29m.35s., eSSS? =33m.33s.
Victoria SKS =24m.15s.
Saskatoon PS =26m.5s., SS =30m.0s.
Seattle ePPP =19m.48s., ePPS =27m.25s. and other unidentified readings.
Halifax SS =32m.39s.
Shawinigan Falls PSN =27m.11s., SSN =32m.38s., SSSN =36m.3s.
Auckland iN =23m.54s., iSSN =33m.5s.
Ottawa PPP =20m.22s., PS =27m.15s., PPS =28m.10s., SS =33m.5s., SSS =36m.51s.
Christchurch ePPPEN =21m.40s., eSKSEN =24m.15s., SSEN =33m.20s., eSSSE = 37m.55s., eQEN =43m.45s.
Wellington e =23m.53s., iSS =33m.17s., SSS? =37m.27s.
Berkeley eZ =20m.37s., eEN =33m.21s.
Harvard iPPS =28m.32s., e =32m.55s., iSS =33m.32s.
Tinemaha ePKPZ =17m.54s., iZ =18m.47s.
Palisades iPS =28m.8s., iPPS =29m.10s., iSS =34m.3s.
Cleveland ePSN =28m.11s.
China Lake iZ =14m.36s., iPPNZ =19m.0s., eSN =26m.10s., ePSN =28m.40s., ePKKPZ =29m.43s.
Pasadena eZ =15m.4s., ePKPZ =17m.58s., eZ =18m.44s., ePPPZ =21m.23s., iPS = 28m.33s., ePPSZ =29m.33s., iPKKPZ =29m.39s., iSSEN =34m.27s., iSSSN = 38m.45s.
Riverside eZ =29m.58s.
Palomar iZ =18m.46s. and 19m.28s.
Bermuda i =27m.53s. and 40m.14s.
Merida e =34m.13s.
Tacubaya iPKPE =19m.21s., eN =21m.29s., eE =23m.23s., eSSE =38m.41s., eN = 43m.28s. and 44m.4s., eQE =53·0m.
La Plata PKPN =20m.15s., PKPE =20m.21s., PPN =23m.39s., PPE =23m.45s., PPPE = 27m.9s., PPPN =28m.21s., SKSE =30m.39s., PPPN(△ >180°) =33m.3s., PPSE = 36m.45s., PPSN =37m.3s., SSE =43m.9s., SSSN =49m.27s., SSSE =50m.15s., QN =61·0m., and many other unidentified readings.
La Paz iPKP₂Z =20m.45s., iSKKS =28m.6s., iPPS =37m.9s., i =39m.19s., SSS = 49m.15s.
Huancayo i =23m.1s. and 24m.52s., e =28m.52s., i =33m.30s., iSKSP =34m.35s., ePPS =37m.32s., iSS =44m.7s., eSSS? =50m.25s.
Santa Lucia eN =21m.32s., N =25m.46s.
Long waves were also recorded at Angra do Heroismo, Ponta Delgada, Manzanillo, Oaxaca, and Puebla.

Nov. 18d. 11h. 22m. 56s. Epicentre 30°·5N. 91°·5E. (as at 9h. 35m.).

		△	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·4	200	e 3 2	P_g	e 4 29	S_g	—	—	i 4·7
New Delhi	E.	12·6	265	3 7	+ 4	e 5 12	−14	—	—	—
Poona	Z.	20·0	236	i 4 40	+ 3	—	—	—	—	—
Copenhagen		59·4	321	e 10 0	+ 3	—	—	—	—	—
Collmberg	Z.	59·9	313	e 10 8	− 2	—	—	—	—	—
Triest	Z.	60·8	310	e 10 13	− 3	—	—	e 12 35	PP	—
Stuttgart	Z.	62·9	314	e 10 28	− 2	—	—	—	—	—
Strasbourg		63·9	313	e 10 34	− 3	—	—	—	—	—
Paris		67·1	315	i 10 32	−25	—	—	i 11 37	PcP	—
Scoresby Sund		68·9	342	e 11 11	+ 2	—	—	—	—	—
Rathfarnham C.	Z.	70·5	321	e 11 7	−11	—	—	—	—	—
Resolute Bay		75·0	3	e 11 42	− 3	—	—	—	—	—

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1951 1008

Nov. 18d. 12h. 6m. 57s. Epicentre 30°·5N. 91°·5E. (as at 11h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·4	200	e 2 29	P*	i 4 14	S*	—	—	—
Dehra Dun	N.	11·6	272	e 3 42	?	—	—	—	—	—
New Delhi		12·6	265	e 3 1	− 2	i 5 14	−12	—	—	—
Przhevalsk		15·9	322	3 46	− 1	6 43	− 1	—	—	—
Naryn		16·6	315	i 3 56	0	i 7 3	+ 3	—	—	—
Almata		17·2	322	i 4 1	− 2	i 7 10	− 4	—	—	—
Andijan		18·6	308	i 4 21	0	i 7 52	+ 6	—	—	—
Poona		20·0	236	i 4 38	+ 1	i 8 14	− 3	16 8	ScS	9·5
Nanking		23·4	79	i 5 16a	+ 5	i 9 36	+15	—	—	—
Irkutsk		23·7	20	5 15	+ 1	9 41	+14	—	—	—
Zi-ka-wei	E.	25·7	82	e 5 38	+ 5	10 6	+ 5	—	—	—
Sverdlovsk		34·0	331	i 6 48	0	i 12 17	+ 4	—	—	—
Moscow		45·3	321	8 22	+ 1	—	—	—	—	—
Ksara		46·6	290	i 4 3	?	—	—	—	—	—
Yalta		46·7	304	8 31	− 1	—	—	—	—	—
Prague		59·3	315	e 10 5	− 1	e 17 9	−65	e 10 12	P	—
Copenhagen		59·4	321	e 10 6	0	—	—	—	—	—
Potsdam		59·7	317	i 10 11	+ 2	—	—	—	—	e 33·0
Collmberg	Z.	59·9	313	e 10 8	− 2	—	—	—	—	—
Triest		60·8	310	i 10 12	− 4	i 18 26	− 7	e 12 32	PP	—
Jena	N.	60·9	315	e 10 16?	− 1	—	—	—	—	—
Stuttgart	Z.	62·9	314	e 10 29	− 1	—	—	e 10 33	P	—
Florence		63·0	307	e 10 14	−17	e 17 47	?	—	—	—
Strasbourg		63·9	313	e 10 35	− 2	—	—	—	—	—
Paris		67·1	315	i 10 56	− 1	—	—	—	—	—
Algiers Univ.	Z.	71·4	302	e 11 20	− 4	—	—	—	—	—
College		74·4	24	11 43	+ 1	—	—	—	—	—
Resolute Bay		75·0	3	e 11 43	− 2	—	—	—	—	—
Pretoria	Z.	82·5	234	—	—	i 23 30	PS	—	—	—
Pietermaritzburg	Z.	83·4	230	i 12 33	+ 3	—	—	—	—	—
Kimberley	Z.	86·7	234	12 55	PcP	—	—	—	—	—
Huancayo		158·0	324	e 20 36	PKP$_2$	—	—	—	—	—

Additional readings :—
Calcutta PPN = 2m.37s., SSN = 4m.26s.
Poona iPN = 4m.42s., PPPN = 5m.12s., iN = 8m.4s., iSN = 8m.27s., PcSN = 12m.33s.
Strasbourg i = 10m.39s. and 10m.45s.
Long waves were also recorded at Helsinki and Upsala.

Nov. 18d. 17h. 46m. 35s. Epicentre 30°·5N. 91°·5E. (as at 12h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·4	200	e 2 28	P*	i 4 14	S*	—	—	i 5·1
Przhevalsk		15·9	322	e 3 49	+ 2	—	—	—	—	—
Almata II		17·0	322	e 3 59	− 2	—	—	—	—	—
Almata		17·2	322	i 4 2	− 1	e 7 17	+ 3	—	—	—
Frunse		18·3	318	i 4 15	− 2	e 7 43	+ 4	—	—	—
Fergana		18·8	307	e 4 21	− 2	e 7 49	− 1	—	—	—
Obi-garm		19·7	301	i 4 32	− 2	e 8 13	+ 3	—	—	—
Poona	Z.	20·0	236	e 4 45	+ 8	—	—	—	—	—
Stalinabad		20·4	301	i 4 37	− 4	—	—	—	—	—
Bombay	E.	20·5	240	e 4 53	+11	e 8 27	0	—	—	—
Samarkand		22·0	302	e 4 56	− 2	—	—	—	—	—
Ashkabad		28·3	295	e 5 59	+ 2	—	—	—	—	—
Kiruna		55·0	334	i 9 36k	+ 1	—	—	e 29 38	Q	e 32·5
Collmberg	Z.	59·9	313	e 10 9	− 1	—	—	—	—	—
Triest	Z.	60·8	310	e 10 16	0	—	—	e 10 41	PcP	—
Stuttgart	Z.	62·9	314	e 10 31	+ 1	—	—	—	—	—
Strasbourg		63·9	313	e 10 41	+ 4	—	—	—	—	—

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Nov. 18d. 18h. 41m. 26s. Epicentre 30°·5N. 91°·5E. (as at 17h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·4	200	e 2 19	P*	i 4 0	+17	4 14	S*	—
New Delhi		12·6	265	e 3 1	− 2	i 5 19	− 7	5 33	SS	—
Przhevalsk		15·9	322	3 46	− 1	—	—	—	—	—
Naryn		16·6	315	i 3 54	− 2	i 8 8	+68	—	—	—
Almata II		17·0	322	e 4 0	− 1	—	—	—	—	—
Hyderabad	E.	17·6	225	e 4 1	− 7	7 17	− 6	—	—	9·5
Frunse		18·3	318	i 4 17	0	i 7 45	+ 6	—	—	—
Andijan		18·6	308	i 4 20	− 1	i 7 54	+ 8	—	—	—
Fergana		18·8	307	e 4 22	− 1	—	—	—	—	—
Garm		19·3	303	e 4 27	− 2	i 8 10	+ 8	—	—	—
Obi-garm		19·7	301	i 4 31?	− 3	i 8 15?	+ 5	—	—	—
Poona	Z.	20·0	236	i 4 41	+ 4	i 8 25	+ 8	4 57	PP	9·6
Stalinabad		20·4	301	i 4 39	− 2	i 8 29	+ 4	—	—	—
Bombay	E.	20·5	240	i 4 50	+ 8	e 8 26	− 1	e 5 8	PP	9·6
Tashkent		20·9	308	e 4 47	+ 1	i 8 39	+ 4	—	—	—
Samarkand		22·0	302	i 5 12	+14	—	—	—	—	—
Nanking		23·4	79	i 5 10k	− 1	i 9 30	+ 9	—	—	—
Irkutsk		23·7	20	4 44	−30	—	—	—	—	—
Mary		25·5	294	e 5 35	+ 3	—	—	—	—	—
Zi-ka-wei	Z.	25·7	82	e 5 33k	0	e 10 3	+ 2	—	—	—
Ashkabad		28·3	295	e 6 0	+ 3	e 10 49	+ 6	—	—	—
Sverdlovsk		34·0	331	i 6 50	+ 2	12 13	0	—	—	—
Baku		35·0	299	—	—	e 12 32	+ 4	—	—	—
Kirovobad		37·7	299	i 7 21	+ 2	—	—	—	—	—
Tiflis		38·9	300	7 31	+ 2	e 13 31	+ 3	—	—	—
Erevan		39·1	298	e 7 47	+16	—	—	—	—	—
Borzhomi		40·0	300	e 7 42?	+ 4	—	—	—	—	—
Zugdidi		41·1	301	e 7 52	+ 5	—	—	—	—	—
Sotchi		42·7	303	e 7 41?	−19	—	—	—	—	—
Moscow		45·3	321	8 21	0	—	—	—	—	—
Ksara		46·6	290	(e 8 35)	+ 3	(e 15 6)	−15	—	—	—
Yalta		46·7	304	8 33	+ 1	15 21	− 1	—	—	—
Pulkovo		49·7	325	e 8 57	+ 1	e 16 5	+ 1	—	—	—
Lwow		53·2	312	i 9 22	0	e 16 53	+ 1	—	—	—
Kiruna		55·0	334	i 9 35	0	—	—	—	—	e 23·6
Prague		59·3	315	i 10 10	+ 4	e 18 10	− 4	—	—	—
Collmberg	Z.	59·9	313	e 10 8	− 2	—	—	—	—	—
Triest		60·8	310	i 10 14k	− 2	e 18 31	− 2	i 10 25	?	—
Jena	E.	60·9	315	e 10 17	0	—	—	—	—	—
Messina	E.	61·6	300	—	—	e 18 42	− 1	—	—	e 36·6
Stuttgart	Z.	62·9	314	e 10 29	− 1	—	—	e 12 49	PP	—
Strasbourg		63·9	313	e 10 35	− 2	—	—	—	—	—
Paris		67·1	315	i 10 58	+ 1	i 23 13	?	e 11 18	PcP	e 37·6
Kew		67·9	319	e 18 34	?	—	—	—	—	—
Scoresby Sund		68·9	342	e 11 8	− 1	—	—	—	—	—
Algiers Univ.	Z.	71·4	302	e 11 21	− 3	—	—	—	—	—
Resolute Bay		75·0	3	e 11 44k	− 1	—	—	—	—	—
Brisbane	Z.	82·3	128	i 12 27a	+ 2	—	—	—	—	—
China Lake	Z.	108·6	24	e 18 57	PP	—	—	—	—	—

Additional readings and note :—
Poona PPPEN = 5m.13s., QEN = 8m.41s., SSEN = 8m.58s., SSSEN = 9m.14s.
Bombay QE = 8m.40s., iSSE = 8m.57s.
Ksara readings have been reduced by 2m.
Long waves were also recorded at Upsala, Copenhagen, De Bilt, and Potsdam.

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Nov. 18d. 23h. 15m. 8s. Epicentre 37°·3N. 141°·3E. (as at 5h.).
(Focus at Base of the Superficial Layers.).

Intensity IV at Kawamae and Yanagawa; II-III at Onahama, Hukusima, Shirakawa, Mito, Utunomiya, Tukubasan, Hunahiki, Nakahata, Asino, etc.
Epicentre 37°·2N. 141°·3E. Depth 50km.
Seismological Bulletin of the C.M.O., Japan, for Nov., 1951, Tokyo, 1951, pp.306-307, with macroseismic chart.

		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Onahama		0·5	221	0 12a	+ 2	0 21	+ 3
Hukusima		0·8	304	0 14	– 1	0 25	– 1
Shirakawa		0·9	258	0 16	0	0 27	– 1
Inawasiro		1·0	286	0 20	+ 2	0 32	+ 1
Sendai		1·0	342	0 17	– 1	0 30	– 1
Isinomaki		1·1	1	0 20	+ 1	—	—
Mito		1·1	216	0 19k	0	0 34	+ 1
Tukubasan		1·4	222	0 15	– 8	—	—
Utunomiya		1·4	237	0 22	– 1	0 37	– 4
Mizusawa	E.	1·8	356	0 33	+ 4	0 48	– 3
Kumagaya		1·9	233	0 29	– 2	0 53	– 1
Niigata		1·9	290	0 47	S	(0 47)	– 7
Maebasi		2·0	243	0 32	0	0 56	0
Tokyo		2·0	218	0 32	0	0 56	0
Miyako		2·4	13	0 36	– 2	1 2	– 4
Morioka		2·4	358	0 36	– 2	1 3	– 3
Oiwake		2·4	246	0 38	0	1 12	+ 6
Akita		2·6	339	1 8	S	(1 8)	– 3
Mera		2·6	206	1 1	S	(1 1)	–10
Ajiro		2·9	219	1 10	S	(1 10)	– 9
Matumoto		2·9	248	1 10	S	(1 10)	– 9
Misima		2·9	221	0 32	–13	—	—
Nagano		3·0	256	0 47	+ 1	—	—
Osima		3·0	211	0 45	– 1	1 21	– 1
Aomori		3·6	353	1 22	S	(1 22)	–15

Nov. 18d. Readings also at 0h. (near Ashkabad, near Tsikhlis-Dzhvari, Akhalkalaki, Kirovobad, and Zugdidi), 1h. (Samarkand, near Khorog, Obi-garm, and Dzhergetal), 2h. (Mount Wilson, Palomar, and China Lake), 5h. (Apia (2), and near Istanbul), 6h. (Apia), 7h. (near Alicante (2), near Garm, near Granada, and Malaga). 8h. (Copenhagen and near Alicante), 10h. (Calcutta, Poona (2), Collmberg (4), Triest (2), Stuttgart, (2) Strasbourg (2), Paris, Algiers Univ., Tamanrasset, and Pietermaritzburg), 11h. (Upsala and near Bogota), 12h. (Calcutta, Poona, Stuttgart, and Triest (2)), 13h. (Mount Wilson, China Lake, Calcutta, Poona, Collmberg, Jena, Stuttgart, and Resolute Bay), 14h. (Calcutta, Poona (2), Bombay (2), Kodaikanal, and Tamanrasset), 15h. (Apia, Calcutta (3), Poona (3), Triest, Potsdam, Stuttgart (2), and Strasbourg), 16h. (Calcutta and Bombay (2)), 18h. (Apia and near New Delhi), 20h. (Huancayo, La Paz, Messina, Rome, Triest, Collmberg Stuttgart, Granada, Alicante, Tamanrasset, and near Athens), 21h. (Poona, Almata, near Krasnogorka, Almata II, Frunse, Ili, Przhevalsk, and Chilisk), 22h. (Huancayo).

Nov. 19d. 0h. 26m. 43s. Epicentre 31°·0N. 91°·6E. (as on 17d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·9	200	i 2 56	P_g	i 4 41	S_g	—	—	—
New Delhi		12·7	263	e 3 0	– 5	i 5 15	–13	3 18	PP	—
Przhevalsk		15·6	321	e 3 35	– 8	—	—	—	—	—
Almata II		16·7	321	e 4 0	+ 3	—	—	—	—	—
Almata		16·9	321	e 4 0	+ 1	7 14	+ 7	—	—	—
Frunse		18·0	315	i 4 29?	+16	—	—	—	—	—
Andijan		18·3	307	4 19	+ 2	—	—	—	—	—
Fergana		18·7	306	e 4 21	– 1	e 7 50	+ 2	—	—	—
Obi-garm		19·5	300	i 4 31	0	—	—	—	—	—
Stalinabad		20·2	300	i 4 37	– 2	e 8 20	– 1	—	—	—
Poona		20·3	236	i 4 40	0	e 8 24	+ 1	5 13	PPP	—
Tashkent		20·7	306	i 4 46	+ 2	i 8 40?	+ 9	—	—	—
Bombay	E.	20·8	239	i 4 47	+ 2	e 8 23	–10	e 5 5	PP	9·6
Samarkand		21·8	300	i 4 54	– 2	—	—	—	—	—
Mary		25·4	294	—	—	e 10 11	+15	—	—	—

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.
Ashkabad		28·2	294	e 5 58	+ 2	—	—	—	—	—
Kiruna	Z.	54·6	334	i 9 33	+ 1	—	—	—	—	—
Collmberg	Z.	59·6	315	e 10 7	− 1	—	—	—	—	—
Triest	Z.	60·5	308	e 10 4	−10	—	—	e 10 32	i	—
Stuttgart	Z.	62·7	313	e 10 27	− 2	—	—	—	—	—
Strasbourg		63·6	313	e 10 35	0	—	—	—	—	—
Resolute Bay		74·5	3	e 11 46	+ 4	—	—	—	—	—

Additional readings :—
New Delhi SSEN = 5m.29s., SSSN = 5m.41s.
Poona iZ = 8m.13s., SSE = 8m.57s.
Bombay QE = 8m.37s., SSE = 8m.49s.
Stuttgart eZ = 10m.33s.

Nov. 19d. 10h. 39m. 19s. Epicentre 19°·0S. 169°·5E. (as on 1951, May 28d.).

A = −·9304, B = +·1724, C = −·3236 ; δ = +8 ; h = +5 ;
D = +·182, E = +·983 ; G = +·318, H = −·059, K = −·946.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		17·3	238	i 4 8a	+ 4	i 7 32	+16	i 4 14	PP	—
Auckland	N.	18·4	168	e 4 7	−11	—	—	—	—	—
Riverview		22·0	225	i 5 2a	+ 4	i 9 6	+10	e 5 42	PPP	e 10·9
Wellington		22·7	171	e 5 2	− 2	—	—	—	—	e 11·7
Christchurch		24·6	175	—	—	e 10 6	+24	e 11 1		e 14·4
Riverside	Z.	87·2	53	e 12 47	− 2	—	—	—	—	—
Palomar	Z.	87·4	55	e 12 47	− 3	—	—	—	—	—
China Lake	Z.	87·8	52	e 12 48	− 4	—	—	—	—	—
Stuttgart	Z.	146·3	336	e 19 39	[− 2]	—	—	—	—	—
Strasbourg		147·0	337	e 19 46	[+ 3]	—	—	—	—	—

Additional readings :—
Brisbane iPPPN = 4m.25s., iN = 4m.38s., iSSN = 7m.52s.
Riverview iZ = 9m.16s., isSEN = 9m.19s., SSSN = 10m.9s.

Nov. 19d. 19h. 47m. 55s. Epicentre 46°·4N. 12°·9E. (as on 1943, June 12d.).

Intensity IV at Tolmezzo. Epicentre 46°27′N. 12°54′E. Macroseismic area 3500 sq. km.

Makroseismische Beobachtungen, 1951, Jahrbücher der Zentralanstalt für Meteorologie und Geodynamik, Jahrgang, 1951, Neue Folge 88, Band, Vienna, 1952, p. E1. Macroseismic chart p. E2.

A = +·6746, B = +·1545, C = +·7218 ; δ = −5 ; h = −4 ;
D = +·223, E = −·975 ; G = +·704, H = +·161, K = −·692.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Tolmezzo		0·1	90	i 0 5k	− 3	i 0 6	− 7	—	—
Pieve di Cadore		0·4	275	0 9k	− 4	i 0 15	− 6	—	—
Triest		1·0	142	i 0 19	− 2	i 0 31	− 5	—	—
Chur		2·4	281	e 0 43	+ 2	e 1 15	+ 3	—	—
Ravensburg		2·6	302	—	—	e 1 25	S_g	e 1 27	S_g
Zürich		3·1	288	e 0 53	+ 2	e 1 41	S_g	e 1 1	P_g
Stuttgart	Z.	3·4	316	e 0 55	0	i 1 55	S_g	e 1 8	P_g
Basle		3·8	290	e 1 4	+ 3	e 2 9	S_g	—	—
Prague		3·8	15	e 1 15	P_g	i 1 43	− 4	i 2 0	S*
Karlsruhe	Z.	4·0	312	e 1 18	P_g	—	—	—	—
Strasbourg		4·1	305	—	—	e 1 51	− 4	e 2 19	S_g
Jena		4·6	349	e 1 10?	− 2	e 2 3	− 4	1 22	P*
Collmberg	Z.	4·9	0	e 1 14	− 3	e 2 35	S_g	e 1 38	P_g
Palisades		59·9	299	i 19 29	S	(i 19 29)	+68	—	—
Calcutta	E.	64·2	84	e 12 9	PP	—	—	—	—

Additional readings :—
Stuttgart eZ = 1m.11s., 1m.21s., and 1m.51s., iZ = 2m.0s.
Prague e = 1m.24s.
Strasbourg e = 2m.2s.
Jena eN = 1m.37s., eEN = 2m.15s., eS_gE = 2m.27s. and 2m.32s., eS_gN = 2m.35s.
Collmberg eSZ = 2m.52s.

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Nov. 19d. 21h. 3m. 33s. Epicentre 17°·5S. 172°·2W. (as on 1951, September 17d.).

A = −·9455, B = −·1295, C = −·2989 ; δ = +8 ; h = +5 ;
D = −·136, E = +·991 ; G = +·296, H = +·041, K = −·954.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland		22·4	208	e 6 7?	+65	i 9 30	+26	—	—	—
Christchurch		29·0	203	—	—	e 11 2	+ 8	e 13 7	SSS	e 14·1
Brisbane		33·5	246	e 6 48	+ 5	e 12 15	+10	i 6 53	P	—
Riverview		36·6	236	e 7 16	+ 6	e 12 47	− 6	—	—	e 15·8
Berkeley		72·3	40	—	—	e 20 51	− 1	—	—	e 38·4
Lick	Z.	72·4	40	i 11 29a	− 1	—	—	—	—	—
Pasadena		72·7	45	e 11 29	− 3	—	—	i 11 38	?	e 50·4
Palomar	Z.	73·1	46	i 11 37	+ 3	—	—	e 12 25	?	—
Riverside	Z.	73·1	45	e 11 34	0	—	—	e 12 22	?	—
Fresno	Z.	73·2	41	e 11 35a	0	—	—	—	—	—
China Lake	Z.	74·0	43	e 11 37	− 2	—	—	i 11 45	?	—
Shasta Dam		74·1	37	e 11 38	− 2	—	—	—	—	—
Mineral	Z.	74·3	38	e 11 40a	− 1	—	—	—	—	—
Boulder City		76·0	45	e 11 49	− 2	—	—	i 11 58	PcP	—
Tucson		76·8	49	e 11 55	0	—	—	e 12 45	?	—
Butte		83·0	37	e 12 25	− 3	—	—	—	—	—
Hungry Horse		83·5	35	e 12 29	− 2	—	—	—	—	—
College		84·2	10	i 12 29	− 5	—	—	—	—	—
Santa Lucia	E.	89·7	125	16 54	PP	—	—	i 17 15	?	—
Huancayo		92·8	103	—	—	e 24 3	{+ 1}	e 24 46	S	e 52·0
La Paz		97·9	110	e 13 34	− 5	24 27	[+11]	i 17 43	PP	47·0
La Plata	E.	98·7	131	—	—	21 45	PKS	22 21	?	50·0
Kew		145·5	9	—	—	e 32 4	PS	—	—	e 76·4
Collmberg	Z.	146·0	354	e 19 43	[+ 2]	—	—	—	—	—
Jena	E.	146·5	355	e 19 43?	[+ 1]	—	—	—	—	—
Prague		147·1	352	e 19 40	[− 3]	—	—	—	—	—
Paris		148·5	7	e 19 53	[+ 8]	e 29 3	{−67}	—	—	e 79·4
Stuttgart	Z.	148·8	358	e 19 49	[+ 4]	—	—	e 20 17	?	—
Strasbourg		149·0	359	e 19 53	[+ 7]	—	—	—	—	—
Ksara		150·1	308	e 19 53	[+ 5]	36 41?	PPS	—	—	—
Istanbul	Z.	150·2	327	e 19 52	[+ 4]	—	—	—	—	—
Belgrade	Z.	150·8	341	e 19 55a	[+ 6]	—	—	—	—	—
Triest		151·5	352	e 19 54	[+ 4]	e 29 48	{−38}	e 20 6	PKPa	—
Helwan	Z.	155·2	304	e 19 51	[− 4]	—	—	e 24 0	PP	—

Additional readings :—
Huancayo eSS = 30m.55s.
La Paz i = 20m.44s., SKKS = 24m.47s., S = 25m.3s., ePS = 26m.27s., SS = 31m.51s., SSS = 35m.44s.
Jena eEN = 19m.50s. and 20m.45s.
Prague e = 20m.5s., 20m.27s., 20m.44s., and 21m.11s.
Paris i = 19m.57s., 20m.23s., and 20m.28s.
Strasbourg e = 19m.58s. and 21m.31s.
Belgrade eZ = 20m.4s. and 21m.54s.
Triest e = 28m.43s.
Long waves were also recorded at Wellington, Palisades, Weston, Bogota, De Bilt, Messina, and Pavia.

Nov. 19d. Readings also at 0h. (near Apia), 1h. (Apia, Bombay, Poona, Mount Wilson, China Lake, Kiruna, Strasbourg, and Stuttgart), 2h. (Antofagasta), 3h. (Apia and near Obi-garm), 4h. (Bombay, Poona, Kiruna, Stuttgart, Tamanrasset, and near Apia), 5h. (Puebla and near Tacubaya), 6h. (near Dzhergetal, Garm, Khorog, and Obi-garm), 7h. (Tortosa, Andijan, near Dzhergetal, Fergana, Garm, Khorog, Murgab, Obi-garm, Stalinabad, and near Apia), 9h. (Bombay, Poona, and Calcutta), 12h. (Apia, Calcutta, Poona, Andijan, Obi-garm, Stalinabad, and Tashkent), 13h. (Apia, near Dzhergetal, Garm, Khorog, and Obi-garm), 14h. (Wellington, Christchurch, and Brisbane), 15h. (Brisbane, Pasadena, China Lake, Strasbourg, and near Bogota), 17h. (Bombay (2), Calcutta, and Poona), 19h. (Triest, near Dzhergetal, Garm, Khorog, and Obi-garm), 20h. (Pretoria and near Garm), 22h. (near Prague).

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Nov. 20d. Readings at 0h. (Antofagasta and near La Paz), 1h. (Santa Lucia, Apia (3), and near Manila), 2h. (near Garm), 7h. (Santa Lucia, near Dzhergetal, Garm, Khorog, and Obi-garm), 8h. (Collmberg), 9h. (Apia (2), Helwan, Ksara, Istanbul, Bucharest, Sofia, Triest, Prague, Potsdam, Collmberg, Jena, Stuttgart, Paris, Strasbourg, Kiruna, near Yalta, and near Athens (2), 10h. (near Apia), 12h. (Calcutta, New Delhi, near Dzhergetal, Garm, Khorog, and Obi-garm), 13h. (Bombay, Poona, Pretoria, Stuttgart, near Erevan, and near Apia), 14h. (near Huancayo), 15h. (La Paz and near Horseshoe Bay), 16h. (New Delhi, Calcutta, Bombay, Poona, Hyderabad, Nanking, Apia (2), Kiruna, Stuttgart, Potsdam, near Triest, and near Mizusawa), 17h. (near Apia), 18h. (Apia (2) and near Garm), 19h. (Apia (3)), 20h. (Apia and near Huancayo), 21h. (near Huancayo (2)), 22h. (Samarkand, near Andijan, Dzhergetal, Garm, and Obi-garm).

Nov. 21d. 7h. Indian Ocean.

Tananarive P =53m.53s., PP =54m.6s., e =57m.17s.?, S =57m.20s., e =57m.50s. and 58m.30s.
Djakarta P =57m.13s.
Ashkabad eP =59m.21s., S =67m.11s.
Fergana eP =59m.33s.
Tashkent eP =59m.36s., eS =67m.38s.
Lunacharskoe eP =59m.41s., S =67m.5s.
Kodaikanal eE =59m.54s.
Helwan ePZ =59m.57s., eZ =61m.14s., eS?EN =67m.42s.
Ksara e =60m.15s., eS? =68m.39s.
Terre Adelie eP? =61m.3s.
Tamanrasset eZ =61m.4s., 61m.16s., and 61m.51s.
Collmberg eZ =62m.14s.
Stuttgart ePZ =62m.17s.
Hyderabad S?E =62m.32s., LE =65·3m.
Bombay eEN =62m.38s.
Kizyl-Arvat eS =67m.29s.
La Paz e =68m.16s., L =105·3m.
Victoria P =69m.28s.
Seattle eP? =69m.34s.
China Lake iPKP, ?Z =72m.4s.
Kiruna eN =80m.0s., eLN =87·0m.
Long waves were also recorded at Messina, Palisades, La Plata, and Colombo.

Nov. 21d. 16h. 42m. 43s. Epicentre 30°·0N. 92°·0E. (as on 1946, July 2d.).

A = −·0303, B = +·8670, C = +·4975 ; δ = +11 ; h = +2 ;
D = +·999, E = +·035 ; G = −·017, H = +·497, K = −·868.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·1	205	(e 2 4)	+ 2	(3 42)	+ 7	(4 4)	S*	—
New Delhi		13·0	268	e 3 9	0	e 5 24	−11	—	—	—
Rybach'e		17·8	317	e 4 9	− 2	—	—	—	—	—
Almata		17·9	323	e 4 7	− 5	—	—	—	—	—
Frunse		19·0	318	e 4 23	− 3	e 8 1	+ 6	—	—	—
Andijan		19·2	309	e 4 26	− 2	i 8 5	+ 6	—	—	—
Fergana		19·4	307	e 4 27	− 3	—	—	—	—	—
Poona		20·1	238	i 4 47	+ 9	e 8 23	+ 4	5 8	PPP	9·6
Obi-garm		20·3	301	i 4 41?	+ 1	i 8 22?	− 1	—	—	—
Bombay	E.	20·6	242	e 4 51	+ 8	e 8 27	− 2	e 5 12	PPP	—
Stalinabad		21·0	302	e 4 40	− 7	e 8 30	− 7	—	—	—
Tashkent		21·5	308	i 4 53	+ 1	i 8 51	+ 4	—	—	—
Lunacharskoe		21·5	308	i 4 53	+ 1	i 8 54	+ 7	—	—	—
Samarkand		22·6	302	i 5 7	+ 4	—	—	—	—	—
Mary		26·1	294	e 10 11	S	(e 10 11)	+ 4	—	—	—

Additional readings and note :—
Calcutta iSN =(3m.51s.) ; readings have been reduced by 1 minute.
Poona PPPE =5m.22s., QEN =8m.38s., SSSE =9m.4s., PcSEN =12m.24s.
Bombay SSE =8m.54s.

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Nov. 21d. 19h. 4m. 0s. Epicentre 50°·8N. 154°·2E. Depth of focus 0·050.
(as on 1950, August 11d.).

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
College		32·6	42	i 6 1	− 1	—	—	—	—
Resolute Bay		46·8	20	e 8 1a	+ 4	—	—	—	—
Hungry Horse		55·8	53	e 9 3	− 1	—	—	—	—
Shasta Dam		56·1	65	e 9 7	+ 1	—	—	—	—
Kiruna	Z.	56·7	341	i 9 12k	+ 2	—	—	—	—
Butte		58·0	54	e 9 22	+ 3	—	—	—	—
China Lake	Z.	62·2	66	e 9 48	+ 1	—	—	—	—
Riverside	Z.	63·6	68	e 9 56	0	—	—	—	—
Boulder City		63·7	64	i 9 59	+ 2	—	—	—	—
Tucson		68·7	65	e 10 30	+ 2	—	—	—	—
Copenhagen		69·2	338	i 10 29	− 2	—	—	—	—
Poona	Z.	69·8	274	i 10 18	−17	—	i 10 57	?	—
Stuttgart	Z.	76·4	337	e 11 13	0	—	—	—	—
Istanbul	Z.	76·7	320	e 12 12	+57	—	—	—	—
Strasbourg		76·9	338	i 11 18	+ 2	—	—	—	—
Paris		77·8	341	i 11 15?	− 6	—	i 11 22	P	—
Triest	Z.	78·0	333	i 11 20a	− 2	—	e 12 39	pP	—
Ksara		79·8	312	e 11 29	− 2	—	e 23 11	PPS	—

Paris gives also i = 11m.27s., iP = 11m.30s.

Nov. 21d. Readings also at 1h. (Apia), 2h. (near Mizusawa), 3h. (Wellington, Auckland, and Bombay), 4h. (Ksara and Helwan), 5h. (Santa Lucia, near Andijan, Dzhergetal, Garm, Khorog, Obi-garm, Samarkand, Stalinabad, and near Apia), 6h. (Antofagasta), 7h. (Poona, Stuttgart, and China Lake), 8h. (Huancayo and near Apia), 9h. (near Athens). 10h. (Jena, Erevan, Gori, Kirovobad, near Borzhomi, Tsikhlis-Dzhvari, Akhalkalaki, Tiflis, and near Athens), 11h. (Stuttgart, Borzhomi, near Tsikhlis-Dzhvari, Akhalkalaki (3), and near Collmberg), 12h. (near Alicante), 13h. (La Paz, Huancayo (2)), 14h. (Tiflis, Borzhomi (2), near Akhalkalaki (2), and Tsikhlis-Dzhvari (2)), 15h. (Tacubaya), 16h. (Apia, Antofagasta, Tacubaya, Puebla, near Vera Cruz, and near La Paz), 17h. (Apia), 18h. (near Istanbul, Apia (2)), 19h. (near Stuttgart and near Mizusawa), 20h. (near Ashkabad), 21h. (Apia, Bombay, Calcutta, New Delhi, and Poona), 22h. (Bombay, Almata II, Fergana, Frunse, Samarkand, Stalinabad, near Andijan, Dzhergetal. Garm, Obi-garm, and Kulyab), 23h. (near New Delhi and near Ashkabad).

Nov. 22d. 2h. 4m. 50s. Epicentre 5°·2S. 152°·4E. (as on 1948, March 8d.).

A = −·8826, B = +·4614, C = −·0901 ; δ = −1 ; h = +7 ;
D = +·463, E = +·886 ; G = +·080, H = −·042, K = −·996.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·2	179	i 5 3	+ 3	i 9 4	+ 4	i 5 15	pP	e 11·4
Riverview		28·5	183	e 6 7	+ 8	i 10 48	+ 2	i 6 59	PP	e 14·2
Auckland	N.	37·6	150	—	—	e 13 2	− 6	17 29	ScS	18·2
Wellington		41·1	155	e 8 15	+28	e 13 55	− 6	i 8 23	pP	e 20·0
Christchurch		42·1	158	e 8 15	+20	14 14	− 2	e 9 42	PP	e 20·7
Perth		43·3	228	i 13 22	?	i 14 5	−28	i 18 10	Q	i 24·1
Djakarta		45·3	267	(8 25)	+ 4	—	—	—	—	—
Zi-ka-wei	Z.	46·7	323	i 8 32a	0	15 26	+ 4	—	—	—
Nanking		48·9	321	i 8 48a	− 2	i 15 48	− 5	—	—	—
Vladivostok		51·6	314	e 9 3	− 7	i 16 21	−10	—	—	—
Yuzno-Sakhlinsk		52·6	352	e 9 9	− 9	—	—	e 12 20	PPP	—
Terre Adelie		62·0	184	e 10 26	+ 2	i 18 47	− 1	e 22 46	SS	31·2
Calcutta	E.	68·4	297	e 16 59	?	e 19 59	− 8	—	—	—
Irkutsk		70·3	331	11 15	− 2	e 20 23	− 6	—	—	—
Poona		80·8	289	i 12 16	− 1	e 22 15	−10	15 15	PP	—
Bombay	E.	81·9	290	i 12 21	− 2	e 22 25	−11	e 15 32	PP	40·5
College		82·4	22	i 12 23	− 2	—	—	—	—	—
Almata II		82·7	315	e 12 29	+ 2	—	—	—	—	—
Rybach'e		83·5	314	i 12 31	0	i 22 46	− 6	13 5	pP	
Frunse		84·6	313	i 12 36	0	i 22 54	− 9	i 13 12	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.
Sitka		85·0	32	e 12 38	0	e 22 58	[– 3]	—	—	—
Andijan		85·9	311	12 43	0	23 1	[– 6]	13 23	pP	—
Fergana		86·2	311	i 12 43	– 1	e 23 2	[– 7]	—	—	—
Obi-garm		87·5	309	12 50	– 1	—	—	—	—	—
Lunacharskoe		88·2	311	i 12 53	– 1	—	—	—	—	—
Stalinabad		88·2	309	e 12 54	0	—	—	—	—	—
Tashkent		88·2	311	i 12 54	0	i 23 29?	[+ 7]	—	—	—
Berkeley		89·5	53	e 12 56a	– 4	e 23 49	– 1	e 13 14	pP	e 40·8
Shasta Dam		89·7	49	i 13 2	+ 1	—	—	—	—	—
Victoria		90·0	41	13 2	– 1	—	—	—	—	—
Mineral	Z.	90·3	50	e 13 5a	+ 1	—	—	—	—	—
Seattle		90·6	43	e 13 8	+ 3	e 24 13	+13	e 13 25	pP	e 42·2
Fresno	Z.	91·3	53	e 13 8k	– 1	—	—	—	—	—
Pasadena		92·4	56	i 13 16a	+ 2	—	—	—	—	e 42·3
Tinemaha		92·6	53	i 13 16a	+ 1	—	—	—	—	—
China Lake		93·0	54	i 13 18a	+ 1	—	—	i 17 2	PP	—
Riverside	Z.	93·1	56	i 13 17a	0	—	—	—	—	—
Palomar	Z.	93·4	57	i 13 21	+ 3	—	—	—	—	—
Mary		93·6	308	i 13 20	+ 1	15 10	?	—	—	—
Boulder City		95·3	54	i 13 29	+ 2	—	—	i 17 19	PP	—
Hungry Horse		96·2	42	i 13 32	+ 1	—	—	—	—	—
Ashkabad		96·4	307	i 13 32	0	—	—	e 17 25	PP	—
Butte		97·2	43	e 13 36	0	—	—	e 17 32	PP	—
Kizyl-Arvat		98·0	309	—	—	e 24 10	[– 7]	—	—	—
Tucson		98·5	58	e 13 44	+ 2	—	—	—	—	—
Resolute Bay		100·9	15	e 13 52a	0	e 24 25	[– 6]	e 24 47	SKKS	e 41·9
Grozny		105·7	313	e 18 28	PP	—	—	—	—	—
Gori		107·0	312	e 18 57?	PP	—	—	—	—	—
Piatigorsk		107·5	315	18 43	PP	—	—	—	—	—
Borzhomi		107·6	312	e 18 59	PP	—	—	—	—	—
Moscow		108·1	327	e 19 7	PP	e 25 2	[– 2]	e 28 14	PS	—
Kiruna	Z.	109·6	343	i 18 31	[– 1]	—	—	—	—	—
Scoresby Sund		114·7	358	—	—	e 29 36	PS	e 36 4	SS	55·2
Ksara		114·8	304	i 19 45a	PP	31 53	?	—	—	—
Helwan	Z.	119·4	301	e 20 16	PP	—	—	—	—	—
Ottawa		122·2	38	18 58	[+ 1]	27 46	{+18}	30 20	PS	—
Collmberg	Z.	123·0	331	e 19 0	[+ 1]	—	—	—	—	—
Jena	N.	123·9	331	e 19 2	[+ 2]	—	—	—	—	—
Cheb		124·1	330	—	—	e 30 34	PS	e 37 52	SSP	—
Palisades		125·4	42	i 19 6	[+ 3]	—	—	—	—	e 58·5
Harvard		126·2	39	i 19 6	[+ 1]	—	—	—	—	e 60·2
Weston		126·4	39	e 19 7	[+ 2]	—	—	—	—	e 59·1
Stuttgart		126·5	330	e 19 5	[0]	e 24 4	PPP	e 19 37	pPKP	e 65·2
Karlsruhe	Z.	126·8	332	e 19 2	[– 4]	—	—	—	—	—
Strasbourg		127·3	331	e 19 8	[+ 1]	—	—	—	—	e 64·2
Florence		128·6	325	—	—	e 45 0	?	—	—	—
Messina		128·9	317	e 19 7	[– 3]	e 33 21	PPS	e 43 27	SSS	—
Rome		129·0	322	e 19 7	[– 3]	e 22 29	SKP	e 32 34	PPS	e 63·8
Huancayo		129·5	110	—	—	e 22 43	SKP	e 31 35	PS	e 56·8
Paris		129·6	334	i 19 13	[+ 2]	—	—	—	—	e 62·2
La Plata	E.	130·9	147	22 40	PKS	28 16	{– 9}	25 52	?	—
Bogota		133·7	88	i 19 27	[+ 8]	i 22 56	SKP	i 35 10	PPS	—
La Paz		134·5	119	i 19 28a	[+ 8]	e 40 4	SS	i 22 2	PP	64·8
San Juan		140·2	67	e 19 25	[– 6]	—	—	—	—	—
Tamanrasset	Z.	143·6	303	e 19 35	[– 2]	—	—	e 23 5	PP	—
Fort de France		145·7	72	i 19 43	[+ 3]	—	—	—	—	—

Additional readings :—
Brisbane iPPN = 5m.36s., iPPPZ = 5m.50s., isSEN = 9m.27s., iEN = 9m.34s.
Riverview iZ = 10m.51s., iN = 11m.5s., iE = 11m.14s., eE = 11m.22s., iSSN = 22m.20s.
Wellington epP = 9m.40s., iPP = 9m.54s.?, iS = 14m.2s., ScS? = 17m.26s.
Christchurch eZ = 8m.36s, and 8m.51s., iEN = 14m.36s., SS = 17m.40s.
Djakarta reading has been increased by 2m.
Poona iZ = 12m.51s., PPPE = 17m.2s., SSE = 27m.12s.
Bombay PPSE = 23m.38s., SSE = 27m.47s.
Resolute Bay eE = 27m.57s. and 32m.27s.

Continued on next page.

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Ottawa SS = 36m.58s.
Strasbourg e = 19m.49s., 56m.10s.?, and 58m.10s.?.
Rome eSS = 39m.5s.?, eSSS = 43m.25s.?.
Huancayo e = 39m.23s. and 45m.46s.
La Plata SSS?N = 25m.58s., LN = 29m.34s.
Tamanrasset iZ = 20m.25s., eZ = 20m.48s., iZ = 23m.28s.
Long waves were also recorded at Santa Clara, Bermuda, and other European stations.

Nov. 22d. 9h. Eastern Equatorial Pacific.

Huancayo e = 41m.4s., eS = 45m.45s., eL = 46m.48s.
Tucson eP = 41m.45s.
La Paz PZ = 42m.5s., S = 47m.47s., L = 50m.28s.
Palomar ePZ = 42m.7s.
Riverside ePZ = 42m.11s.
Pasadena ePZ = 42m.12s., eQE = 51m.30s., eLNZ = 54m.0s.
Boulder City eP = 42m.21s., i = 42m.35s.
China Lake ePZ = 42m.24s.
Shasta Dam e = 43m.4s.
Butte eP = 43m.36s.
Hungry Horse eP = 43m.54s.
Puebla e = 44m.44s. and 46m.10s.
Vera Cruz e = 44m.58s. and 48m.20s.
Manzanillo e = 45m.3s.
College eP = 46m.24s.
Resolute Bay ePZ = 46m.36s.
Guadalajara e = 47m.0s., and 47m.36s.
Buenos Aires e = 47m.13s.

Nov. 22d. 9h. 43m. 38s. Epicentre 56°·5S. 26°·3W. (as on 1950, Sept. 20d.).

A = +·4971, B = −·2457, C = −·8322 ; δ = +3 ; h = −8 ;
D = −·443, E = −·896 ; G = −·746, H = +·369, K = −·554.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata		30·4	302	6 16	0	11 22	+ 6	6 22	?	12·9
Grahamstown	Z.	42·7	80	i 8 2	+ 2	—	—	—	—	—
Kimberley	Z.	44·8	74	i 8 30	+13	—	—	—	—	—
Pretoria	Z.	49·4	75	i 8 55	+ 2	—	—	—	—	—
La Paz		50·9	304	i 8 57a	− 8	i 16 5	−16	19 16	SS	23·0
Terre Adelie		56·7	174	i 9 46	− 2	e 17 33	− 7	i 11 44	PP	—
Fort de France		76·7	326	e 12 3	+ 8	—	—	—	—	—
Christchurch		79·1	194	—	—	e 22 47	+40	e 27 42	SS	e 31·6
Tamanrasset	Z.	83·4	30	i 12 29a	− 1	—	—	e 15 0	PP	—
Brisbane	Z.	96·4	179	i 13 31k	− 1	—	—	i 17 23	PP	—
Helwan		98·9	48	e 17 40	PP	e 25 22	+11	i 24 10	SKS	—
Ksara		104·2	49	i 18 22	PP	e 28 13	PPS	—	—	—
Triest		107·2	28	i 12 26a	?	—	—	e 22 25	SKP	—
Paris		107·6	19	—	—	i 40 18	?	e 41 30	?	e 51·4
Strasbourg		108·5	23	—	—	e 31 10	?	—	—	e 52·4
Palomar	Z.	117·4	289	e 18 43	[− 5]	—	—	e 20 7	PP	—
Riverside	Z.	118·1	289	e 18 45	[− 4]	—	—	e 22 10	SKP	—
Pasadena	Z.	118·7	289	e 18 46	[− 4]	e 22 14	SKP	e 20 23	PP	—
China Lake	Z.	119·7	291	e 18 47	[− 5]	i 22 13	SKP	i 20 26	PP	—
Fresno	Z.	121·5	290	e 19 12a	[+16]	—	—	e 22 20	SKP	—
Berkeley	Z.	123·7	288	i 18 55	[− 5]	—	—	e 22 21	SKP	—
Mineral	Z.	125·2	292	i 18 58k	[− 5]	—	—	e 22 13	SKP	—
Kiruna	Z.	128·7	21	i 19 4	[− 6]	—	—	i 22 15	SKP	—
Victoria		131·9	297	19 9	[− 7]	—	—	—	—	—
Resolute Bay		138·5	337	e 19 22k	[− 6]	(e 29 52)	(+40)	e 22 46	SKP	e 29·9
Nanking	Z.	145·7	121	i 19 40a	[0]	—	—	—	—	—

Additional readings :—
La Paz iZ = 9m.14s. and 9m.25s.
Tamanrasset iZ = 12m.52s., eZ = 13m.54s.
Brisbane iZ = 13m.43s. and 16m.34s.
Helwan eZ = 19m.40s., eEN = 25m.56s.
China Lake ePKKPZ = 29m.3s.
Kiruna iZ = 19m.10s. and 20m.46s.
Resolute Bay e = 19m.44s., eN = 23m.46s.
Long waves were also recorded at Granada, De Bilt, Seattle, and Bombay.

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Nov. 22d. 12h. 52m. 25s. Epicentre 27°·0S. 177°·0W. (as on 1949, Dec. 30d.).

A = −·8910, B = −·0467, C = −·4516 ; δ = 0 ; h = +3 ;
D = −·052, E = +·999 ; G = +·451, H = +·024, K = −·892.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	12·1	213	—	—	i 5 12	− 2	—	—	e 5·4
Karapiro	N.	12·6	208	(3 35)	+32	—	—	—	—	3·6
Tuai	N.	12·8	201	—	—	e 5 9	−21	—	—	—
Apia		14·0	21	e 3 15	− 7	5 41	−18	—	—	6·7
Wellington		15·8	203	e 3 39	− 6	e 6 20	−22	—	—	e 7·2
Cobb River	E.	16·4	208	—	—	6 35?	−21	—	—	—
Kaimata	N.E.	18·2	208	e 4 17	+ 1	e 7 23	−14	—	—	—
Christchurch		18·5	204	—	—	e 6 35	−69	e 8 15	SSS	e 9·6
Brisbane		26·6	261	i 5 47	+ 5	e 10 27	+11	i 11 30	SS	—
Riverview		28·2	247	e 6 6	+10	e 10 38	− 3	e 6 53	PP	e 13·4
Terre Adelie		47·2	202	e 8 34	− 2	—	—	—	—	—
Pasadena	Z.	82·5	46	e 12 26	0	—	—	—	—	—
Palomar	Z.	82·8	47	e 12 27	0	—	—	—	—	—
Riverside	Z.	82·9	46	e 12 32	+ 4	—	—	—	—	—
Fresno	Z.	83·2	43	e 12 29k	0	—	—	—	—	—
China Lake	Z.	83·9	44	i 12 32	− 1	—	—	—	—	—
Shasta Dam		84·3	38	i 12 36	+ 1	—	—	i 13 1	?	—
Tinemaha	Z.	84·3	43	e 12 39	+ 4	—	—	—	—	—
Mineral	Z.	84·5	39	e 12 31k	− 5	—	—	—	—	—
Boulder City		85·8	45	i 12 43	+ 1	—	—	—	—	—
Tucson		86·2	50	i 12 44	0	—	—	e 17 47	PP	—
Victoria		89·1	32	12 58	0	—	—	—	—	—
Butte		93·2	39	e 13 18	+ 1	—	—	—	—	—
College		94·3	11	i 13 22	− 1	—	—	—	—	—
Huancayo		94·8	105	—	—	e 24 7	[+ 7]	e 31 9	SS	e 44·3
La Paz		98·6	113	e 13 55	+13	24 15	[− 5]	26 55	PS	47·6
Ksara		150·9	291	e 19 51	[+ 2]	36 58	PPS	—	—	—
Collmberg	Z.	154·6	345	e 20 12	[+18]	—	—	—	—	—
Helwan	Z.	154·9	283	e 20 17	[+23]	—	—	i 23 56	PP	—
Tamanrasset	Z.	175·2	209	i 20 12	[0]	e 25 36	PP	e 21 46	PKP_2	—

Additional readings :—
Riverview eSSE = 12m.8s.
La Paz SSS = 36m.3s.
Long waves were also recorded at Bombay and Palisades.

Nov. 22d. 19h. 35m. 37s. Epicentre 30°·5N. 91°·5E. (as on 18d.).

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	Z.	8·4	200	e 2 34	P*	i 4 14	S*	—	—	—
New Delhi		12·6	265	e 3 8	+ 5	e 5 14	−12	—	—	—
Naryn		16·6	315	e 3 38	−18	—	—	—	—	—
Rybach'e		17·2	317	e 4 5	+ 2	—	—	—	—	—
Andijan		18·6	308	e 4 22	+ 1	i 7 44	− 2	—	—	—
Fergana		18·8	307	e 4 20	− 3	—	—	—	—	—
Obi-garm		19·7	301	2 43?	?	e 6 10?	?	—	—	—
Poona		20·0	236	i 4 44	+ 7	e 8 23	+ 6	5 3	PP	8·5
Stalinabad		20·4	301	e 4 37	− 4	e 8 19	− 6	—	—	—
Bombay		20·5	240	e 4 51	+ 9	e 8 35	+ 8	e 8 43	S	—
Lunacharskoe		20·9	308	e 4 47	+ 1	i 8 31	− 4	—	—	—
Tashkent		20·9	308	i 4 48	+ 2	i 8 31	− 4	—	—	—
Samarkand		22·0	302	4 49	− 9	—	—	—	—	—
Mary		25·5	294	—	—	e 10 3	+ 6	—	—	—
Tamanrasset	Z.	75·5	289	e 11 49	+ 1	—	—	—	—	—

Additional readings :—
Poona PPPZ = 5m.13s., SSSE = 9m.12s., SSSN = 9m.16s., PcSEN = 12m.30s., ScSN = 16m.11s.

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Nov. 22d. Readings also at 0h. (Apia and Poona), 1h. (Apia (2), Belgrade, Timisoara, Istanbul, and near Sofia), 2h. (Apia), 4h. (Pasadena, Riverside, China Lake, Victoria (2), Harvard, and near Antofagasta), 6h. (Apia, Bombay, Poona, Lunacharskoe, Samarkand, Stalinabad, Tashkent, Tchimkent, and La Plata), 7h. (Apia (2), Palomar (2), Pasadena (2), Riverside (2), China Lake (2), Tinemaha (2), Victoria, Harvard, Tamanrasset, Antofagasta, Huancayo, near La Paz, near Oaxaca, Puebla (2), Tacubaya (2), and Vera Cruz (2), 9h. (near Alicante), 10h. (near Athens), 12h. (near Alicante), 14h. (Stuttgart), 15h. (Ashkabad), 16h. (Manila, Almata II, Frunse, Lunacharskoe, Kulyab, Naryn, Samarkand, Tchimkent, near Andijan, Dzhergetal, Fergana, Khorog, Obi-garm, and Stalinabad), 17h. (near Alicante), 18h. (Poona and near Apia (2)), 19h. (near Mizusawa), 20h. (Samarkand, Tamanrasset, Puebla, Vera Cruz, near Tacubaya, near Ashkabad, Kizyl-Arvat, and Mary), 21h. (Apia (2), Kimberley, Pietermaritzburg, and Pretoria), 22h. (Apia and near Ashkabad), 23h. (near Copiapo).

Nov. 23d. 4h. 11m. 46s. Epicentre 30°·5N. 91°·5E. (as on 22d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·4	200	e 2 39	P_g	i 4 39	S_g	4 27	S*	—
New Delhi		12·6	265	e 3 1	− 2	e 5 18	− 8	5 32	SS	—
Przhevalsk		15·9	322	e 3 46	− 1	—	—	—	—	—
Naryn		16·6	315	i 4 7	+11	i 7 17	+17	—	—	—
Rybach'e		17·2	317	e 4 2	− 1	e 7 17	+ 3	—	—	—
Frunse		18·3	318	e 4 18	+ 1	e 7 49	+10	—	—	—
Fergana		18·8	307	e 4 22	− 1	e 7 56	+ 6	—	—	—
Obi-garm		19·7	301	i 4 32	− 2	e 8 16	+ 6	—	—	—
Poona		20·0	236	i 4 40	+ 3	e 8 15	− 2	4 56	PP	9·4
Bombay	E.	20·5	240	i 4 48	+ 6	e 8 33	+ 6	9 32	SS	11·2
Lunacharskoe		20·9	308	i 4 46	0	e 8 40	+ 5	—	—	—
Tashkent		20·9	308	e 4 48	+ 2	i 8 39	+ 4	—	—	—
Tchimkent		21·2	310	i 4 48	− 1	e 8 47	+ 6	—	—	—
Samarkand		22·0	302	i 4 57	− 1	9 2	+ 6	—	—	—
Irkutsk		23·7	20	e 5 14?	0	e 9 14	−13	—	—	—
Ashkabad		28·3	295	e 6 13	+16	—	—	—	—	—
Kiruna	Z.	55·0	334	i 9 35a	0	—	—	—	—	—
Stuttgart		62·9	314	e 10 29	− 1	—	—	—	—	e 35·2
Tamanrasset	Z.	75·5	289	e 11 49	+ 1	—	—	—	—	—

Additional readings :—
Poona PPN = 5m.0s., PPPN = 5m.15s., eSE = 8m.18s., SSE = 8m.44s.
Long waves were also recorded at De Bilt and Potsdam.

Nov. 23d. Readings also at 0h. (near Manila), 1h. (Apia and near Akhalkalaki), 2h. (Apia), 5h. (Pasadena, China Lake, Bogota, La Paz, near Huancayo, and near Piatigorsk), 6h. (Obi-garm and near Palisades) 7h. (Andijan Dzhergetal Naryn Samarkand, near Fergana Khorog Obi-garm, Stalinabad, and Tchimkent), 9h. (near Ashkabad), 10h. (Mount Wilson, Palomar, China Lake, and La Plata), 11h. (near Athens), 13h. (La Paz and near Erevan), 14h. (near Przhevalsk), 15h. (Samarkand Stalinabad, near Dzhergetal, Khorog, and Obi-garm), 16h. (Almata II, Khorog, Samarkand, near Dzhergetal, Fergana, Obi-garm, and Stalinabad), 18h. (Apia, Puebla, Vera Cruz, and near Tacubaya), 19h. (near Istanbul), 20h. (3) 21h., 22h., and 23h. (Apia).

Nov. 24d. 4h. 30m. 21s. Epicentre 51°·4N. 176°·0W. (as on 1950, November 22d.).

A = −·6249, B = −·0437, C = +·7795 ; δ = +3 ; h = −6 ;
D = −·070, E = +·998 ; G = −·778, H = −·054, K = −·626.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Finger Bay		0·6	321	i 0 17	+ 2	—	—	—	—	—
Mitchell Field		0·7	325	0 18	+ 1	—	—	—	—	—
College		19·8	36	e 4 33	− 2	—	—	i 4 36	P	—
Victoria		33·4	74	i 6 42k	0	—	—	—	—	—
Seattle		34·4	74	e 7 0	+ 9	—	—	—	—	—
Shasta Dam		37·9	84	i 7 22	+ 2	—	—	—	—	—
Mineral	Z.	38·6	84	i 7 27k	+ 1	—	—	—	—	—
Hungry Horse		39·0	69	i 7 30	0	—	—	—	—	—
Resolute Bay		39·0	24	e 7 15	−15	e 13 22	− 7	—	—	e 23·8
Berkeley	Z.	39·7	89	i 7 36k	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Branner	z.	40·0	89	e 7 39k	+ 1	—	—	—	—	—
Fresno	z.	41·9	87	e 7 53k	– 1	—	—	—	—	—
Tinemaha	z.	42·7	86	i 8 2	+ 2	—	—	—	—	—
China Lake		43·9	86	i 8 10k	0	e 14 42	0	i 9 55	PcP	—
Pasadena	z.	44·6	89	i 8 15k	– 1	—	—	i 9 57	PcP	—
Riverside	z.	45·2	89	i 8 20k	0	—	—	i 9 59	PcP	—
Boulder City		45·5	85	i 8 23	0	—	—	—	—	—
Palomar		45·9	89	i 8 27	+ 1	—	—	—	—	—
Tucson		50·4	86	i 9 1	0	—	—	—	—	—
Kiruna	z.	60·4	8	i 10 11	– 2	—	—	—	—	—
Palisades		65·8	54	i 10 47	– 2	—	—	—	—	e 37·4
Harvard		65·8	51	i 10 47	– 2	—	—	—	—	—
Weston		66·1	51	e 10 50	– 1	—	—	—	—	—
Poona	z.	87·6	297	i 12 49	– 2	—	—	i 13 17	PcP	—
Ksara		90·6	333	e 16 58	PP	e 18 54	PPP	—	—	—
Pretoria	z.	148·5	315	i 19 48	[+ 3]	—	—	—	—	—
Kimberley	z.	152·5	318	i 20 4	[+13]	—	—	—	—	—

Additional readings :—
China Lake, iZ = 8m.18s. and 8m.25s., eScPZ = 13m.42s., i = 13m.49s., eScSN = 18m.5s.
Pasadena iZ = 8m.33s. and 8m.42s.
Riverside eZ = 10m.34s.
Long waves were also recorded at Scoresby Sund.

Nov. 24d. 18h. 47m. 13s. Epicentre 22°·9N. 121°·5E. (as on 1950, September 28d.).

Many casualties and great damage to buildings in the region between Hualien and Taitung. See " Seismo. Notes," Bull. Seismo. Soc. of America, Vol. 42, No. 1, January, 1952, p. 105.

A = – ·4818, B = + ·7862, C = + ·3869 ; δ = – 7 ; h = + 4 ;
D = + ·853, E = + ·522 ; G = – ·202, H = + ·330, K = – ·922.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		8·3	183	i 2 4	0	—	—	—	—	—
Zi-ka-wei	z.	8·3	356	i 2 0	– 4	i 3 31	– 9	—	—	—
Nanking		9·4	346	2 15	– 3	4 0	– 7	—	—	—
Yakusima		11·0	45	e 2 46	+ 4	—	—	—	—	8·8
Tomie		11·6	32	i 2 47	– 3	—	—	—	—	9·6
Kagosima		11·8	41	2 56	+ 3	—	—	—	—	—
Nagasaki		12·3	35	i 2 59	0	—	—	—	—	e 8·9
Unzendake		12·5	38	3 12	+10	—	—	—	—	—
Miyazaki		12·6	43	3 10	+ 7	—	—	—	—	10·8
Kumamoto		12·8	38	3 7	+ 1	—	—	—	—	9·0
Saga		12·9	35	3 12	+ 5	—	—	—	—	—
Hukuoka		13·2	33	i 3 13	+ 2	5 43	+ 3	—	—	i 7·1
Ituhara		13·2	30	3 12	+ 1	—	—	—	—	—
Ooita		13·6	39	3 28	+11	—	—	—	—	9·1
Simonoseki		13·8	35	3 20	+ 1	e 5 19	–35	—	—	—
Simidu		14·1	43	3 34	+11	—	—	—	—	9·8
Uwazima		14·2	41	e 3 31	+ 7	—	—	—	—	—
Matuyama		14·7	40	e 3 37	+ 6	e 6 38	+22	e 4 22	PPP	e 8·0
Hirosima		14·9	38	e 3 34	0	e 6 27	+ 7	e 3 43	PP	—
Kôti		15·0	42	e 3 26	– 9	e 6 24	+ 1	—	—	—
Hamada		15·1	36	3 35	– 1	6 42	+17	4 20	PP	e 8·1
Muroto		15·2	45	e 3 47	+ 9	e 6 40	+12	—	—	e 7·7
Takamatu		15·8	41	e 3 53	+ 8	e 6 47	+ 5	—	—	e 10·2
Matsue		16·1	36	e 3 33	–16	6 7	–42	—	—	—
Yonago		16·2	37	e 3 32	–18	i 5 57	–54	—	—	i 9·2
Sumoto		16·4	43	4 1	+ 8	6 58	+ 2	—	—	e 9·0
Kobe		16·8	43	e 4 5	+ 7	e 7 9	+ 4	e 4 33	PP	9·1
Kasiwara		17·0	43	e 4 17	+16	e 7 19	+ 9	—	—	e 11·9
Osaka		17·0	43	e 3 59	– 2	e 7 12	+ 2	—	—	e 7·9
Owase		17·0	45	e 4 9	+ 8	7 46	+36	9 15	Q	12·0

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kyoto		17·3	43	e 4 8	+ 4	e 7 6	−10	—	—	e 9·6
Kameyama		17·7	44	i 4 15	+ 5	e 7 22	− 4	—	—	—
Tu		17·7	45	4 26	+16	8 15	+49	—	—	9·6
Hikone		17·8	43	4 17	+ 6	7 22	− 6	—	—	12·2
Tsuruga		18·0	41	e 4 3	−10	7 33	+ 1	4 22	PP	11·0
Gihu		18·2	45	e 4 24	+ 8	7 31	− 6	—	—	10·4
Nagoya		18·2	45	e 4 19	+ 3	e 7 43	+ 6	—	—	—
Hukui		18·3	41	e 4 26	+ 9	e 7 35	− 4	—	—	—
Shizuoka		19·0	47	e 4 18	− 8	e 7 27	−28	e 4 57	PP	e 11·1
Hatidyozima		19·1	52	e 4 32	+ 5	7 44	−13	—	—	—
Toyama		19·3	42	e 4 29	0	e 7 34	−28	—	—	e 8·4
Ajiro		19·5	47	e 4 34	+ 3	e 8 31	+25	—	—	—
Kohu		19·5	45	e 4 49	+18	e 8 15	+ 9	—	—	e 11·4
Matumoto		19·5	44	e 4 31	0	e 8 28	+22	—	—	16·1
Misima		19·5	46	e 4 29	− 2	e 8 17	+11	—	—	—
Wazima		19·6	39	e 4 45	+13	e 8 51	+43	—	—	e 11·1
Matusiro		19·9	42	i 4 31	− 5	—	—	i 5 9	PP	—
Nagano	E.	19·9	42	e 4 42	+ 6	e 7 54	−21	—	—	e 11·6
Oiwake		19·9	43	e 4 27	− 9	—	—	—	—	e 9·1
Mera		20·0	49	e 4 30	− 7	8 9	− 8	—	—	12·1
Titibu		20·1	44	i 4 47	+ 9	—	—	—	—	—
Utunomiya		20·1	45	4 50	+12	—	—	—	—	e 11·8
Yokohama		20·1	48	4 30	− 8	e 8 46	+27	—	—	—
Maebasi		20·3	43	e 4 39	− 1	e 8 36	+13	—	—	14·0
Kumagaya		20·4	44	e 4 40	− 1	e 8 31	+ 6	—	—	e 12·4
Tokyo		20·4	46	e 4 33	− 8	e 9 6	+41	5 14	PPP	—
Tukubasan		20·9	45	e 4 47	+ 1	—	—	—	—	—
Mito		21·2	45	e 4 50	+ 1	e 8 50	+ 9	—	—	—
Shirakawa		21·5	42	e 4 57	+ 5	e 8 46	− 1	—	—	—
Inawasiro		21·7	41	e 5 3	+ 8	e 8 52	+ 1	—	—	12·2
Vladivostok		21·9	22	—	—	—	—	9 13	PcP	—
Hukusima		22·0	44	e 5 3	+ 5	e 8 9	?	—	—	i 12·1
Yamagata		22·2	43	5 11	+11	e 9 9	+ 9	—	—	e 12·1
Sendai		22·6	43	5 3	0	e 9 10	+ 3	—	—	e 10·9
Akita		23·0	41	e 5 10	+ 3	e 9 24	+10	e 5 33	PP	—
Mizusawa		23·3	42	5 10	0	—	—	e 5 13	P	12·4
Morioka		23·6	42	i 5 14	+ 1	—	—	—	—	—
Aomori		24·1	38	i 5 19	+ 1	i 9 17	−17	—	—	i 15·8
Miyako		24·1	42	e 5 16	− 2	e 9 36	+ 2	—	—	e 12·0
Hatinohe		24·4	40	i 5 23	+ 2	e 9 34	− 5	—	—	12·6
Mori	E.	24·9	34	e 5 27	+ 1	—	—	—	—	e 13·4
Muroran		25·3	33	e 5 27	− 3	—	—	—	—	—
Sapporo		26·0	34	e 5 33	− 3	e 10 6	0	—	—	e 13·6
Urakawa		26·2	36	e 5 34	− 4	—	—	—	—	—
Asahigawa		27·0	31	e 5 33	−12	—	—	—	—	e 16·8
Kusiro		27·6	37	e 5 45	− 6	e 10 13	−19	—	—	—
Wakkanai		27·8	29	5 58	+ 5	—	—	—	—	18·4
Abasiri		28·2	35	e 5 33	−23	—	—	—	—	18·6
Calcutta	E.	30·6	276	i 6 19	+ 1	i 11 15	− 5	9 12	PcP	12·6
Irkutsk		32·2	340	6 27	− 5	—	—	—	—	—
Djakarta		32·3	208	e 6 35	+ 2	—	—	—	—	—
New Delhi		40·1	288	e 7 35	− 4	i 13 40	− 6	i 9 23	PP	18·3
Hyderabad	E.	40·7	271	i 7 47	+ 3	13 51	− 4	9 9	PP	19·6
	N.	40·7	271	i 7 44	0	i 13 47	− 8	9 26	PcP	—
Przhevalsk		40·7	311	7 43	− 1	—	—	—	—	—
Almata II		41·6	311	e 7 51	0	—	—	—	—	—
Almata		41·9	311	i 7 56	+ 2	—	—	—	—	—
Naryn		42·2	308	i 7 55	− 1	—	—	—	—	—
Rybach'e		42·3	309	i 7 56	− 1	—	—	—	—	—
Colombo	E.	43·1	254	8 8	+ 4	14 33	+ 3	—	—	22·3

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		43·5	308	i 8 5	– 2	—	—	—	—	—
Kodaikanal	E.	43·9	261	i 8 17	+ 7	i 14 47	+ 5	10 2	PP	20·4
Poona		44·6	273	i 8 14	– 2	i 14 50	– 2	9 54	PP	21·2
Andijan		44·8	305	i 8 16	– 1	15 3	+ 8	—	—	—
Fergana		45·2	305	8 17	– 3	—	—	—	—	—
Bombay		45·5	274	i 8 25	+ 2	i 15 8	+ 3	10 13	PP	20·8
Obi-garm		46·6	303	i 8 30	– 2	—	—	—	—	—
Lunacharskoe		47·2	306	e 8 31	– 5	—	—	—	—	—
Tashkent		47·2	306	e 8 34?	– 2	i 15 30?	+ 1	—	—	—
Stalinabad		47·3	302	i 8 33	– 4	—	—	—	—	—
Samarkand		48·8	303	i 8 47	– 2	—	—	—	—	—
Mary		52·7	302	i 9 18	0	—	—	—	—	—
Perth		54·8	186	9 42	+ 8	i 17 17	+ 3	20 51	SS	—
Mitchell Field		55·1	42	i 9 34	– 2	—	—	—	—	—
Sverdlovsk		55·2	324	9 35	– 2	17 18	– 2	—	—	—
Ashkabad		55·5	301	i 9 42	+ 3	i 17 36	+12	—	—	—
Kizyl-Arvat		57·1	303	9 49	– 1	—	—	—	—	—
Brisbane		58·6	147	i 10 5a	+ 4	e 18 4	0	—	—	—
Baku		61·8	305	e 10 28	+ 5	—	—	—	—	—
Lenkoran		62·9	303	10 28	– 2	19 4	+ 4	—	—	—
Riverview		63·1	152	i 10 31a	– 1	i 19 6	+ 4	i 11 3	PcP	—
Grozny		64·5	308	i 10 39	– 2	—	—	—	—	—
Kirovobad		64·5	306	i 10 38	– 3	—	—	—	—	—
Goris		64·7	303	i 10 40	– 2	—	—	—	—	—
Erevan		65·9	306	i 10 51	+ 1	—	—	—	—	—
Gori		65·9	307	10 53	+ 3	—	—	—	—	—
Leninakan		66·3	306	10 52	0	—	—	—	—	—
Piatigorsk		66·3	310	10 49	– 3	19 39	– 3	—	—	—
Akhalkalaki		66·5	307	e 10 53	– 1	19 49	+ 5	—	—	—
Borzhomi		66·5	307	i 10 53	– 1	i 19 49	+ 5	—	—	—
Abastumanj		66·9	307	10 59	+ 3	19 57	+ 8	—	—	—
Moscow		68·0	323	i 11 0	– 3	i 19 57	– 5	—	—	—
Sotchi		68·8	310	i 11 5	– 3	20 11	0	—	—	—
College		69·8	27	e 11 10	– 4	—	—	—	—	—
Pulkovo		71·1	328	i 11 19	– 3	i 20 32	– 6	—	—	—
Yalta		72·2	312	i 11 27	– 2	20 51?	0	—	—	—
Simferopol		72·4	312	11 27	– 3	e 20 53	0	—	—	—
Kiruna		73·1	337	i 11 30	– 4	20 52	– 9	e 28 8	SSS	e 36·4
Helsinki		73·6	330	e 11 34	– 3	e 21 1	– 6	e 26 3	SS	—
Ksara		74·2	300	i 11 38	– 2	—	—	—	—	—
Apia		74·8	112	e 11 54	+10	(e 21 47?)	+27	e 14 3?	PP	e 21·8
Kishinev		75·4	315	11 44	– 3	21 27	0	—	—	—
Istanbul		77·1	310	i 11 56	– 1	i 21 46	0	—	—	—
Upsala		77·2	330	i 11 55	– 2	i 21 40	– 7	e 14 55	PP	e 37·1
Lwow		77·5	319	i 11 56	– 3	21 48	– 2	—	—	—
Auckland	N.	77·8	139	—	—	e 22 2	+ 9	—	—	—
Bucharest		78·0	313	e 12 2	0	i 21 57	+ 2	i 14 56	PP	38·8
Campulung		78·4	314	e 12 10	+ 6	e 22 2	+ 2	—	—	38·8
Uzhgorod		78·9	318	i 12 5	– 2	—	—	—	—	—
Helwan		79·1	297	i 12 5a	– 3	i 22 7	0	—	—	—
Resolute Bay		79·9	9	e 12 9a	– 3	—	—	e 13 29	?	—
Skalnate Pleso		80·0	320	e 12 11	– 2	e 22 14	– 3	—	—	—
Sofia		80·5	313	i 12 15	0	i 22 24	+ 2	i 27 58	SS	—
Timisoara		80·7	316	e 12 20?	+ 4	e 22 27?	+ 3	e 15 14	PP	e 34·8
Wellington		80·7	142	—	—	e 22 18	– 6	—	—	—
Raciborzu		80·8	321	e 12 14	– 3	i 22 37	+12	e 12 25	PcP	e 40·8
Christchurch		81·1	145	e 12 18	0	e 22 32	+ 4	e 23 47	PS	e 39·1
Budapest		81·4	317	12 17	– 3	e 22 31	0	i 12 29	PcP	34·8
Copenhagen		81·5	327	i 12 17	– 4	e 22 27	– 5	—	—	40·8
Belgrade	Z.	81·6	314	e 12 19k	– 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.
Kalossa	N.	81·8	318	e 12 24	+ 2	e 22 59	+24	e 14 38	PP	e 34·8
Ogyalla		81·8	318	e 12 21	− 1	e 22 35	0	e 12 54	PcP	e 31·5
Athens		82·0	307	e 12 21	− 2	i 22 34	− 3	—	—	—
Bergen		82·3	334	i 15 35	PP	e 22 29	−11	i 31 6	SSS	36·8
Potsdam		82·7	325	i 12 25a	− 2	i 22 45?	+ 1	i 12 34	PcP	35·8
Prague		83·0	322	i 12 27a	− 1	e 22 44	− 3	e 23 38	PS	e 34·8
Collmberg		83·3	323	e 12 27	− 3	e 22 47	− 3	e 31 23	SSS	e 42·8
Tananarive		83·3	247	i 12 36	+ 6	e 22 58	+ 8	—	—	—
Scoresby Sund		83·4	349	i 12 28	− 2	e 22 58	+ 7	—	—	36·8
Cheb		84·2	323	12 31	− 3	e 23 0	+ 1	e 15 27	PP	—
Jena		84·2	323	e 12 31	− 3	e 22 54	− 5	e 12 47	PcP	e 41·8
Triest		84·5	318	i 12 39a	+ 3	i 23 11	+ 9	e 16 9	PP	—
Sonneberg		84·7	323	e 12 35	− 2	e 23 2	− 2	15 59	PP	e 43·8
Taranto		85·6	312	12 39	− 2	23 14	+ 1	—	—	—
Witteveen	Z.	85·8	327	i 12 42	0	—	—	—	—	—
Stuttgart		86·6	322	e 12 44a	− 2	e 23 17	− 6	e 12 57	PcP	e 45·8
De Bilt		87·0	327	i 12 49	+ 1	i 23 25	− 2	i 22 56	SKS	e 36·8
Karlsruhe		87·0	323	i 12 46	− 2	e 23 21	− 6	—	—	e 45·8
Aberdeen		87·3	333	i 18 49	PPP	i 23 29	0	—	—	i 44·2
Chur		87·4	322	e 12 44	− 6	e 23 26	− 4	e 15 57	PP	—
Bologna		87·6	318	e 12 51	0	e 23 28	− 4	e 23 13	SKS	—
Strasbourg		87·6	323	i 12 49k	− 2	i 23 30	− 2	i 16 14	PP	e 43·4
Zürich		87·7	322	e 12 49a	− 3	e 23 7	[−12]	—	—	—
Messina		87·8	311	i 12 49a	− 3	i 23 25	− 9	i 16 18	PP	—
Florence		88·0	318	i 12 49?	− 4	i 23 28?	− 8	i 16 8	PP	—
Rome		88·1	315	i 12 50a	− 4	i 23 35	− 2	i 16 24	PP	—
Basle		88·2	321	e 12 52k	− 2	e 23 34	− 4	e 16 1	PP	—
Victoria		88·4	37	12 53	− 2	—	—	—	—	—
Pavia		88·5	320	e 13 1	+ 5	i 23 31	[+ 7]	i 16 3	PP	—
Durham		88·6	331	—	—	i 23 39	[+15]	—	—	—
Edinburgh	E.	88·6	333	—	—	e 36 47	Q	—	—	e 48·0
Reykjavik	Z.	88·8	345	i 12 53	− 4	—	—	—	—	—
Seattle		89·4	38	i 13 2k	+ 2	e 23 50	+ 1	—	—	e 42·8
Kew		90·1	328	i 13 1	− 2	i 23 53	− 2	i 16 26	PP	e 37·8
Paris		90·3	325	i 13 1	− 3	i 23 49	− 8	i 16 34	PP	—
Terre Adelie		90·7	172	e 13 4	− 2	i 24 4	+ 3	i 16 47	PP	—
Rathfarnham Castle		91·7	332	i 13 13	+ 3	e 24 10	0	i 16 29	PP	e 39·0
Clermont-Ferrand		91·8	323	i 13 9	− 2	—	—	i 16 48	PP	e 36·2
Shasta Dam		93·3	43	i 13 17	− 1	—	—	—	—	—
Hungry Horse		93·4	34	i 13 19	+ 1	—	—	—	—	—
Mineral	Z.	94·0	43	i 13 22a	+ 1	—	—	—	—	—
Berkeley	Z.	94·9	46	i 13 27a	+ 2	—	—	—	—	—
Branner	Z.	95·2	46	e 13 22	− 5	—	—	—	—	—
Lick	N.	95·6	46	e 13 37	+ 9	—	—	—	—	—
Ivigtut		95·8	355	—	—	24 52	+ 7	25 59	PS	—
Algiers Univ.	Z.	97·0	314	e 13 31	− 4	—	—	e 17 32	PP	—
Fresno	Z.	97·2	46	e 13 37	+ 1	—	—	—	—	—
Tinemaha	Z.	98·0	44	e 13 45	+ 6	—	—	—	—	—
Haiwee	Z.	98·7	44	e 13 42	0	—	—	—	—	—
Pasadena		99·8	47	e 13 45	− 2	e 25 34	+15	e 17 47	PP	—
Boulder City		100·9	44	e 13 42	−10	—	—	i 13 55	PcP	—
Coimbra		101·8	323	e 18 10?	PP	—	—	e 20 41	PPP	49·8
Rapid City		101·8	31	e 18 13	PP	—	—	e 20 6	PPP	—
Pretoria	Z.	102·4	248	i 14 3	+ 4	—	—	—	—	—
Tamanrasset	Z.	102·9	303	i 13 59	− 2	e 25 44	− 1	i 18 9	PP	—
Tucson		105·8	44	e 14 5	−10	e 24 59	[+ 5]	—	—	—
Kimberley		106·2	245	i 18 28	[+ 3]	—	—	—	—	—
Lincoln		107·3	30	e 18 43	PP	—	—	—	—	—
Lubbock		110·3	38	17 52	PKP	—	—	e 20 10	?	—
Ottawa		110·3	12	17 42	PKP	—	—	e 19 13	PP	—
Fayetteville		112·3	31	e 18 3	PKP	—	—	e 19 7	PP	—
Cleveland	N.	112·5	19	e 19 24	PP	e 28 53	PS	—	—	—
Harvard		113·8	10	i 19 39	PP	—	—	—	—	—
Weston		114·0	10	e 17 57	PKP	—	—	—	—	—
Pennsylvania		114·1	17	i 19 33	PP	26 36	{+ 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.
Palisades	114·8	12	i 19 45	PP	—	—	i 22 10	PPP	e 60·8
City College N.Y.	115·0	12	e 19 45	PP	e 27 28	{+48}	—	—	—
Fordham	115·0	12	e 19 46	PP	—	—	—	—	—
Washington	116·1	16	e 19 47	PP	e 27 11	{+23}	—	—	—
Bermuda	124·7	7	i 19 2	[0]	i 20 51	PP	i 23 34	PPP	—
Merida	126·9	38	e 18 57	[− 9]	—	—	—	—	—
Fort de France	142·5	3	e 19 40	[+ 5]	—	—	—	—	—
Galerazamba	142·7	28	i 19 49	[+14]	i 26 3	[−40]	—	—	62·8
Bogota	148·7	31	i 19 54	[+ 9]	i 26 8	[−44]	—	—	88·8
Huancayo	160·7	59	e 20 6	[+ 4]	—	—	—	—	—
La Plata	168·0	182	18 11	?	26 41	[−29]	24 11	PP	76·7
La Paz	168·9	56	i 20 13a	[+ 4]	i 31 47	{−10}	i 21 23	PKP_2	80·7

Additional readings :—
Hukuoka eN = 3m.22s., i = 4m.6s. and 5m.57s.
Kôti e = 3m.39s. and 6m.30s.
Kobe eN = 5m.3s.
Calcutta ScSE = 16m.57s.
New Delhi SSN = 16m.20s.
Kodaikanal SSE = 17m.53s.
Poona PPPE = 10m.44s., SSE = 18m.6s., SSN = 18m.10s., SSSN = 19m.9s.
Riverview iZ = 10m.39s., iPPPZ = 14m.30s., iE = 19m.18s., iPSN = 19m.31s.
Kiruna iN = 15m.2s. and 15m.43s., iZ = 19m.9s., iN = 19m.47s., eZ = 22m.21s., iN = 24m.44s., eZ = 24m.47s.?, iN = 26m.15s.
Upsala eN = 17m.55s.
Bucharest ePPPE = 16m.54s., iPSE = 22m.42s.
Skalnate Pleso e = 12m.35s. and 13m.22s., eS = 22m.19s.
Timisoara eScSN = 22m.52s.?.
Raciborzu ePN = 12m.18s., iPSN = 23m.14s.
Christchurch eQ?E = 33m.17s.
Budapest eN = 15m.27s., ePPPN = 17m.47s., eE = 22m.5s., SN = 22m.17s., SKSN = 22m.34s., PSN = 22m.57s., PPSN = 23m.19s., iN = 25m.30s., eN = 25m.57s.
Kalossa eN = 23m.23s.
Bergen iSZ = 22m.19s.
Potsdam iPSZ = 26m.52s.
Prague e = 12m.36s., eN = 12m.49s., e = 22m.18s. and 27m.23s.
Cheb e = 14m.12s., 16m.48s., and 18m.0s.
Jena ePPEN = 15m.57s., eSN = 22m.57s. and 23m.1s., also many other unidentified readings.
Triest eSKS = 22m.57s., iSKKS? = 23m.32s., iPS = 24m.0s., iPPS = 24m.53s., iSS = 28m.46s.
Stuttgart ePP = 16m.6s., eSKS = 22m.47s., eSSS = 31m.57s.
Strasbourg iPPP = 18m.1s., eSKS = 22m.52s. and 22m.56s., ePS = 24m.20s., iPPS = 24m.45s., iSS = 29m.23s., eSSS = 32m.47s., and many other unidentified readings.
Rome iSN = 23m.38s., ePS = 24m.38s.
Pavia e = 23m.2s.
Seattle i = 13m.20s. and 13m.31s.; also other unidentified readings.
Kew ePS = 24m.33s.
Paris i = 13m.11s. and 16m.52s., iSKS = 23m.19s., iScS = 24m.1s., iSP = 25m.17s., iSPP = 25m.45s.
Terre Adélie eSKS = 23m.38s., eSS = 29m.46s., iPKKP = 30m.39s.
Clermont-Ferrand i = 17m.28s. and 20m.22s.
Pasadena ePZ = 13m.49s., iSKSE = 24m.22s.
Tamanrasset iZ = 18m.59s., iPPPZ = 20m.27s.
La Plata N = 21m.17s.
La Paz iPPZ = 25m.25s.
Long waves to this or the following shock were also recorded at Angra do Hirosimo, Ponta Delgada, Bagnères, Guadalajara, Oaxaca, and Manzanillo.

Nov. 24d. 18h. 50m. 18s. Epicentre 22°·9N. 121°·5E. (as at 18h. 47m.).

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yakusima	11·0	45	2 46	+ 4	—	—	—	—	—
Tomie	11·6	32	i 2 37	−13	—	—	—	—	—
Kagosima	11·8	41	e 2 54	+ 1	e 4 38	−28	—	—	—
Nagasaki	12·3	35	2 56	− 3	—	—	—	—	—
Unzendake	12·5	38	3 6	+ 4	—	—	—	—	—
Miyazaki	12·6	43	3 36	+33	—	—	—	—	—
Kumamoto	12·8	38	3 13	+ 7	—	—	—	—	—
Saga	12·9	35	3 16	+ 9	—	—	—	—	—
Asosan	13·1	38	3 1	− 9	5 55	+17	—	—	6·9
Hukuoka	13·2	33	—	—	i 5 33	− 7	—	—	i 7·0

Continued on next page.

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		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Itubara		13·2	30	e 3 11	0	—	—	—	—	—
Ooita		13·6	39	3 24	+ 7	—	—	—	—	—
Simidu		14·1	43	3 29	+ 6	—	—	—	—	—
Uwazima		14·2	41	3 33	+ 9	—	—	—	—	—
Matuyama		14·7	40	e 3 45	+14	i 6 36	+20	—	—	8·0
Hirosima		14·9	38	i 3 41	+ 7	i 6 31	+11	i 6 55	SS	7·1
Kôti		15·0	42	e 3 48	+13	e 6 42	+19	i 5 42	?	—
Hamada		15·1	36	3 37	+ 1	e 5 3	?	—	—	7·9
Kobe		16·8	43	e 4 4	+ 6	i 6 23	?	—	—	9·1
Owase		17·0	45	3 58	− 3	7 22	+12	10 51	Q	11·8
Kameyama		17·7	44	e 3 31	−39	e 6 26	−60	—	—	e 7·9
Nagoya		18·2	45	e 4 18	+ 2	e 6 49	−48	—	—	—
Toyama		19·3	42	—	—	e 7 44	−18	—	—	e 12·2
Kohu		19·5	45	—	—	e 8 22	+16	—	—	10·8
Misima		19·5	46	e 4 32	+ 1	—	—	—	—	—
Wazima		19·6	39	e 4 33	+ 1	e 8 21	+13	—	—	—
Osima		19·6	49	e 4 32	0	e 8 57	+49	—	—	12·4
Matusiro		19·9	42	i 4 31	− 5	(8 42)	+27	i 5 7	PP	8·7
Oiwake		19·9	43	4 25	−11	—	—	—	—	e 13·0
Mera		20·0	49	e 4 38	+ 1	8 18	+ 1	—	—	11·9
Titibu		20·1	44	e 4 46	+ 8	—	—	—	—	—
Aikawa		20·8	39	e 5 18	+33	9 30	+57	—	—	—
Tukubasan		20·9	45	—	—	e 8 35	0	—	—	11·7
Mito		21·2	45	i 4 46	− 3	—	—	—	—	—
Niigata		21·3	39	e 4 38	−12	e 8 16	−27	—	—	e 8·8
Onahama		21·8	47	e 5 8	+12	8 38	−14	—	—	e 10·8
Vladivostok		21·9	22	4 53	− 4	—	—	—	—	—
Hukusima		22·0	44	e 4 56	− 2	e 9 3	+ 7	—	—	12·0
Yamagata		22·2	43	e 5 5	+ 5	e 9 4	+ 4	—	—	e 11·8
Sendai		22·6	43	5 5	+ 2	9 8	+ 1	—	—	10·9
Mizusawa	N.	23·3	42	5 5	− 5	—	—	—	—	—
Morioka		23·6	42	e 5 12	− 1	e 9 23	− 2	—	—	e 11·8
Miyako		24·1	42	e 5 8	−10	—	—	—	—	—
Hatinohe		24·4	40	e 5 21	0	—	—	—	—	—
Mori		24·9	34	e 5 42	+16	e 10 16	+29	e 4 47	?	e 13·9
Sapporo		26·0	34	e 5 32	− 4	e 10 8	+ 2	e 9 29	?	e 13·6
Urakawa		26·2	36	e 5 36	− 2	e 10 16	+ 7	e 6 21	SS	e 12·2
Kusiro		27·6	37	e 5 48	− 3	e 10 22	−10	—	—	—
Wakkanai		27·8	29	e 5 54	+ 1	—	—	—	—	—
Nemuro		28·5	37	e 5 53	− 6	e 11 55	+69	14 13	Q	15·6
Djakarta		32·3	208	—	—	i 11 51	+ 5	—	—	—
Dehra Dun	N.	39·4	291	e 7 0	−33	e 12 54	−41	e 17 30	SSS	—
New Delhi		40·1	288	e 7 34	− 5	i 13 40	− 6	8 33	PP	18·4
Poona		44·6	273	i 8 13	− 3	i 14 42	−10	18 26	SS	18·7
Bombay		45·5	274	i 8 26	+ 3	i 15 8	+ 3	10 12	PP	—
Mitchell Field		55·1	42	i 9 33	− 3	i 17 21	+ 3	—	—	—
Sverdlovsk		55·2	324	i 9 32	− 5	i 17 14	− 6	—	—	—
Brisbane		58·6	147	i 10 6	+ 5	i 18 5	+ 1	—	—	—
Riverview		63·1	152	i 10 32a	0	i 19 5	+ 3	i 19 28	PS	e 29·4
Borzhomi		66·5	307	10 54	0	19 47	+ 3	—	—	—
Tsikhlis-Dzhvari		66·5	307	10 52	− 2	—	—	—	—	—
Abastumanj		66·9	307	10 58	+ 2	19 54	+ 5	—	—	—
College		69·8	27	i 11 13	− 1	i 20 25	+ 2	—	—	—
Pulkovo		71·1	328	i 11 21	− 1	i 20 29	− 9	—	—	—
Yalta		72·2	312	11 26	− 3	20 50	− 1	—	—	—
Kiruna		73·1	337	i 11 28	− 6	i 20 50	−11	i 15 52	PPP	e 36·0
Helsinki		73·6	300	e 11 33	− 4	e 20 57	−10	e 25 51	SS	—
Honolulu		73·8	73	e 11 32	− 6	e 20 50	−19	—	—	—
Apia		74·8	112	e 11 50	+ 6	—	—	e 14 13?	PP	—
Istanbul		77·1	310	i 11 56	− 1	i 21 42	− 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.
Upsala		77·2	330	i 11 58	+ 1	i 21 42?	− 5	i 12 6	PcP	e 37·5
Lwow		77·5	319	i 11 54	− 5	e 21 44	− 6	—	—	—
Auckland	N.	77·8	139	e 12 32	+31	e 22 12	+19	27 18	SS	36·3
Sitka		77·9	33	e 12 2	+ 1	i 21 57	+ 3	—	—	—
Bucharest		78·0	313	e 12 5	+ 3	i 21 58	+ 3	i 27 32	SS	—
Campulung		78·4	314	e 12 11	+ 7	—	—	—	—	—
Helwan	E.	79·1	297	12 0	− 8	i 22 2	− 5	—	—	—
Resolute Bay		79·9	9	e 12 8	− 4	e 22 14	− 2	e 15 11	PP	e 42·7
Skalnate Pleso		80·0	320	e 12 12	− 1	e 22 17	0	e 15 15	PP	—
Sofia		80·5	313	i 12 18	+ 3	i 27 51	SS	i 31 15	SSS	—
Wellington		80·7	142	e 12 2	−14	22 16	− 8	i 23 15	PS	43·4
Raciborzu		80·8	321	i 12 19	+ 2	i 22 28	+ 3	e 12 25	PcP	—
Christchurch		81·1	145	e 12 16	− 2	e 22 32	+ 4	15 50	PP	e 36·0
Kecskemet		81·2	318	e 12 22	+ 3	—	—	—	—	—
Budapest		81·4	317	i 12 17	− 3	e 22 32	+ 1	e 15 7	PP	—
Copenhagen		81·5	327	e 12 16	− 5	i 22 26	− 6	19 3	?	—
Belgrade		81 6	314	i 12 24k	+ 3	i 22 31	− 2	e 15 30	PP	e 43·9
Kalossa	N.	81·8	318	e 14 51	PP	—	—	—	—	—
Ogyalla		81·8	318	e 12 21	− 1	e 22 30	− 5	e 15 20	PP	e 32·3
Athens		82·0	307	e 12 22	− 1	e 22 33	− 4	—	—	—
Bergen		82·3	334	i 12 30	+ 5	i 22 43	+ 3	i 27 38	SS	—
Potsdam		82·7	325	i 12 30	+ 3	i 22 47	+ 3	—	—	36·7
Vienna		82·7	319	e 12 25	− 2	e 22 56	+12	e 15 43?	PP	—
Prague		83·0	322	e 12 27	− 1	e 22 47	0	e 15 39	PP	e 34·7
Collmberg		83·3	323	e 12 30	0	e 22 49	− 1	e 15 41	PP	—
Tananarive		83·3	247	12 35	+ 5	e 23 0	+10	i 12 41	PcP	38·7
Scoresby Sund		83·4	349	i 12 27	− 3	i 22 53	+ 2	—	—	—
Cheb		84·2	323	e 12 32	− 2	e 22 59	0	e 15 44	PP	—
Jena		84·2	323	e 12 37	+ 3	e 22 54	− 5	e 15 10	PP	e 40·7
Triest		84·5	318	i 12 38	+ 2	i 23 11	+ 9	i 16 8	PP	e 42·9
Sonneberg		84·7	323	e 12 39	+ 2	e 23 3	− 1	e 28 32	SS	e 41·7
Taranto		85·6	312	12 39	− 2	22 59	[− 6]	33 39	SSS	—
Witteveen	Z.	85·8	327	i 12 42	0	—	—	—	—	—
Stuttgart		86·6	322	e 12 42	− 4	e 22 58	[−13]	e 16 7	PP	47·7
De Bilt		87·0	327	i 12 45	− 3	i 23 16	[+ 2]	e 28 2	SS	e 34·7
Karlsruhe		87·0	323	e 12 42	− 6	e 23 19	[+ 5]	—	—	—
Aberdeen		87·3	333	i 19 39	?	i 23 30	+ 1	i 24 16	PS	—
Chur		87·4	322	e 12 52	+ 2	—	—	—	—	—
Bologna		87·6	318	e 13 7	+16	e 23 38	+ 6	—	—	—
Strasbourg		87·6	323	e 12 48	− 3	i 23 33	+ 1	e 16 22	PP	—
Zürich		87·7	322	e 12 52	0	e 23 31	− 2	e 16 17	PP	—
Messina	Z.	87·8	311	i 12 49a	− 3	i 23 32	− 2	i 16 18	PP	—
Florence		88·0	318	i 13 3?	+10	i 23 43?	+ 7	—	—	—
Rome		88·1	315	i 12 49	− 5	i 23 31	− 6	i 16 23	PP	42·2
Basle		88·2	321	e 12 56k	+ 2	—	—	—	—	—
Victoria		88·4	37	12 55	0	23 38	− 2	23 22	SKS	37·2
Pavia		88·5	320	i 13 1	+ 5	i 22 53	−48	e 16 5	PP	—
Durham		88·6	331	—	—	i 23 39	[+15]	—	—	—
Reykjavik		88·8	345	i 13 0	+ 3	i 16 3	PP	i 18 4	PPP	e 39·7
Neuchatel		88·9	321	e 12 58	0	e 23 40	− 4	—	—	—
Seattle		89·4	38	i 13 5	+ 5	e 23 59	+10	i 13 16	pP	—
Kew		90·1	328	i 12 55	− 8	e 23 50	− 5	i 16 37	PP	e 39·7
Paris		90·3	325	i 13 0	− 4	i 23 58	+ 1	i 16 32	PP	e 41·7
Terre Adelie		90·7	172	e 13 6	0	i 24 0	− 1	i 23 36	SKS	—
Rathfarnham Castle		91·7	332	i 13 7	− 3	i 24 9	− 1	e 16 50	PP	e 43·5
Clermont-Ferrand		91·8	323	i 13 12	+ 1	e 24 18	+ 7	i 16 49	PP	—
Ferndale	E.	92·2	45	e 13 14	+ 1	e 24 26	+12	—	—	—
Hungry Horse		93·4	34	i 13 20	+ 2	e 20 42	?	—	—	—
Mineral	Z.	94·0	43	e 13 22	+ 1	—	—	—	—	—
Saskatoon		94·3	28	13 26	+ 3	—	—	17 6	PP	44·7

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.
Berkeley		94·9	46	e 13 22	– 3	e 24 17	{0}	e 17 13	PP	e 44·5
Barcelona		94·9	319	14 10	?	24 34	– 3	i 17 18	PP	i 47·2
Branner	Z.	95·2	46	e 13 26	– 1	—	—	—	—	—
Santa Clara		95·4	46	e 13 32a	+ 4	i 24 24	{+ 3}	—	—	e 45·3
Ivigtut		95·8	355	—	—	24 45	0	35 0	SSS	41·7
Tortosa		96·2	319	13 31	0	—	—	i 17 24	PP	—
Bozeman		96·7	34	e 13 28	– 5	e 24 22	{– 9}	—	—	—
Algiers Univ.	Z.	97·0	314	e 13 33	– 2	—	—	e 17 27	PP	—
Fresno		97·2	46	e 13 36	0	e 24 28	{– 6}	—	—	—
Tinemaha	Z.	98·0	44	e 13 43	+ 4	—	—	—	—	—
Alicante		98·3	318	e 13 40	– 1	e 25 14	+ 8	17 41	PP	e 46·9
Haiwee	Z.	98·7	44	e 13 46	+ 4	—	—	—	—	—
Toledo		99·5	320	e 13 50	+ 4	e 25 13	– 3	i 17 51	PP	49·2
Pasadena		99·8	47	i 13 49	+ 2	i 24 23	[– 3]	i 17 49	PP	—
Almeria		100·5	318	i 14 30	+39	25 18	– 7	i 17 54	PP	50·3
Boulder City		100·9	44	i 14 5	+13	—	—	i 18 1	PP	—
Granada		101·0	318	i 13 49k	– 4	24 31	[– 1]	14 16	pP	i 50·6
Palomar	Z.	101·1	47	e 14 4	+11	—	—	—	—	—
Coimbra		101·8	323	19 42?	?	24 35?	[– 1]	32 30	SS	—
Malaga		101·8	319	e 14 17	+21	25 36	+ 1	i 17 58	PP	45·5
Pretoria	Z.	102·4	248	i 13 59	0	—	—	i 16 5	?	—
Tamanrasset	Z.	102·9	303	i 14 0	– 1	i 18 15	PP	e 20 28	PPP	—
Lisbon		103·2	323	e 13 40	–23	24 47	[+ 5]	e 14 0	P	49·5
Tucson		105·8	44	e 14 14	0	—	—	i 18 31	PP	—
Grahamstown	Z.	106·1	241	i 18 49	PP	—	—	—	—	—
Kimberley	Z.	106·2	245	i 18 48	PP	—	—	—	—	—
Kirkland Lake	Z.	106·7	15	e 18 42	PP	—	—	—	—	—
Lincoln		107·3	30	e 18 43	PP	e 24 47	[–14]	—	—	—
Seven Falls	E.	109·4	8	e 16 59	?	26 33	S	29 46	PPS	47·7
Shawinigan Falls	N.	109·7	10	e 18 55	PP	24 32	[–39]	25 41	SKKS	—
Ottawa		110·3	12	19 12	PP	25 15	[+ 2]	25 52	SKKS	—
Fayetteville		112·3	31	e 19 20	PP	e 26 51	{+30}	—	—	—
Cleveland	N.	112·5	19	e 18 26	[–12]	i 26 21	{– 1}	e 19 19	PP	—
Halifax		112·6	4	21 44	PPP	25 11	[–12]	26 7	SKKS	45·3
Harvard		113·8	10	e 19 34	PP	i 25 18	[– 9]	26 25	SKKS	e 54·0
Weston		114·0	10	19 32	PP	29 36	PS	e 35 44	SS	—
Pennsylvania		114·1	17	i 19 36	PP	e 25 51	[+22]	e 28 56	PS	—
Palisades		114·8	12	e 14 48	P	i 26 32	{– 7}	i 19 42	PP	e 67·0
City College, N.Y.		115·0	12	e 19 40	PP	e 28 40	PS	—	—	—
Fordham		115·0	12	e 19 47	PP	—	—	—	—	—
Washington		116·1	16	i 19 50	PP	e 29 54	PS	—	—	—
Tacubaya		122·2	47	e 19 10	[+13]	e 30 30	PS	i 20 28	PP	—
Puebla		123·1	46	e 20 33	PP	e 26 2	[+ 2]	e 27 54	SKKS	e 57·4
Vera Cruz		124·3	45	e 20 32	PKP_2	e 26 10	[+ 6]	e 20 54	PP	—
Bermuda		124·7	7	i 19 2	[0]	i 22 0	PKS	i 23 15	PPP	—
Merida		126·9	38	e 19 12	[+ 6]	e 26 9	[– 3]	—	—	—
San Juan		138·3	11	e 20 29	PKP_2	—	—	e 22 55	PP	—
Galerazamba		142·7	28	—	—	i 40 59	SS	—	—	—
Bogota		148·7	31	i 20 7	PKP_2	i 42 3	SS	i 45 56	SSS	—
Huancayo		160·7	59	e 20 5	[+ 3]	e 35 5	SKSP	e 24 30	PP	e 64·8
Santa Lucia	N.	165·0	138	e 20 11	[+ 5]	e 29 46	PKKP	e 44 8	SS	86·7
La Plata		168·0	182	25 0	PP	27 12	[+ 2]	33 12	SKSP	73·6
La Paz		168·9	56	i 20 16k	[+ 7]	i 27 14	[+ 3]	i 22 0	PKP_2	81·6

Additional readings :—
Urakawa e = 11m.23s.
Dehra Dun eN = 9m.51s.
New Delhi QN = 16m.41s.
Poona SSSN = 19m.23s.
Riverview iZ = 10m.36s. and 10m.41s., iN = 19m.12s., eN = 19m.16s., iEN = 19m.41s., iN = 20m.6s., iSKSE = 20m.20s., iN = 21m.3s. and 23m.52s.
Helsinki iN = 22m.4s., eN = 23m.57s.
Upsala eN = 14m.50s., ePPE = 15m.0s., ePPPE = 16m.30s., i = 21m.30s., iPSN = 22m.21s., ePPSE = 22m.42s.?, i = 26m.26s., eN = 27m.16s., eSSSE = 30m.5s., eSSSN = 30m.15s.

Continued on next page.

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Auckland QN =33·3m.
Bucharest iN =23m.55s.
Resolute Bay ePE =11m.58s., iZ =12m.14s. and 12m.28s., eEN =13m.18s., 16m.58s., and 18m.10s.
Skalnate Pleso eSE =22m.12s., ePS? =22m.47s., eSS =27m.29s., eSSS =31m.6s., and other e readings.
Wellington ePPS =23m.39s., SS =27m.57s.
Raciborzu iPcPZ =12m.30s., iN =13m.52s., iZ =14m.19s., iPPN =15m.16s., iN = 15m.45s., eNZ =22m.36s.
Christchurch eZ =15m.7s., ePS =23m.52s., eSS =27m.57s., eSSSE =31m.42s., eQEN = 34m.17s.
Budapest eSSN =24m.10s., SSSN =27m.52s., SSSE =28m.21s.
Belgrade eNE =15m.50s., iNE =24m.9s., eNW =27m.53s., iSSSNE =31m.50s.
Ogyalla e =22m.48s., ePSN =23m.16s., ePSE =23m.22s., eSS? =28m.30s.
Bergen iEN =31m.56s.
Prague iPN =12m.35s., ePPP =17m.50s., ePSE =23m.40s., eSS =28m.5s., eSSSN = 31m.26s. and other unidentified readings.
Collmberg eEN =32m.36s.
Tananarive PP =15m.54s., PS =24m.2s., SS =28m.37s., Q =35·7m.
Cheb eE =17m.12s. and 19m.14s., ePS =23m.38s., eSSN =28m.9s., eSSSN =32m.12s.
Jena eS?N =23m.8s.?, eS?E =22m.14s., eS?N=22m.32s., eSS?N=28m.18s. and 28m.24s.?, eSS?E =28m.32s.
Triest ePPPZ =17m.56s., iSKS =22m.58s., iPS =23m.57s., iSS =28m.46s.
Sonneberg eS?N =23m.9s., eN =23m.37s.
De Bilt e =23m.5s.
Aberdeen iSSEN =29m.16s., iSSSEN =32m.47s.
Strasbourg iP =12m.53s., ePPP =18m.14s., e =18m.25s., eSKS =23m.6s., eS =23m.24s., iPS =24m.8s., iPPS =24m.36s., iSS =29m.16s., iSSS =32m.31s.
Zürich e =29m.14s.
Rome iSS =29m.27s., iSSS =33m.9s.
Victoria PP =16m.19s.
Pavia iSS =29m.24s.
Reyjavik iZ =13m.16s. and 16m.35s., eE =18m.16s.
Kew i =18m.21s., iPPP =19m.2s., ePS =24m.26s., eSS =30m.2s., eSSS =36m.18s.
Paris iPP =16m.38s., iPPP? =18m.28s., iPPP =18m.52s., iSKS =23m.20s., iSKKS = 23m.50s., iSP =24m.58s., iSPP =25m.26s., iSS =30m.4s., iSSS =34m.16s.?, and unidentified i readings.
Terre Adelie eSS =30m.8s.
Rathfarnham Castle ePPP =18m.56s., iEN =24m.52s., eEN =25m.34s., 25m.59s., and 27m.53s., eSSEN =30m.14s., eSSSEN =33m.37s.
Clermont-Ferrand iPPP =18m.54s., ePS =25m.24s.
Berkeley eSSN =31m.6s., eQE =41m.30s.
Barcelona eS? =25m.28s.
Ivigtut 26m.20s. and 31m.12s.
Alicante PPP =19m.58s., SKS =24m.12s., PS =26m.28s., SS =32m.2s., SSS =35m.16s., Q =40m.48s.
Toledo i =14m.39s., PPP =20m.3s., SKS =24m.25s., PS =26m.58s., SS =31m.53s., SSS =36m.13s., Q =41m.12s.
Pasadena iZ =16m.55s., ePS =26m.47s.
Almeria PPP =20m.2s., SKS =24m.26s., SS =32m.14s.
Granada sP =14m.55s., iPP =17m.47s., pPP =18m.25s., sPP =18m.46s., PPP = 20m.11s., pPPP =20m.34s., iSKKS =25m.13s., S =26m.15s., PS =27m.7s., ePPS = 28m.46s., iSS =32m.31s., SSS =36m.15s.
Coimbra SSSEN =36m.24s. and 37m.48s.
Malaga iPPP =20m.19s., iS =26m.17s., PS =28m.4s., SS =33m.36s.
Lisbon ipP?Z =15m.16s., E =17m.33s., PPEZ =18m.3s., Z =18m.20s., E =25m.8s., Z =28m.32s., E =29m.45s., QEN =42m.40s.
Seven Falls eE =27m.25s., SSE =34m.24s., SSSE =38m.35s., QE =44m.12s.
Shawinigan Falls PPSN =28m.23s.
Ottawa S =26m.18s., PS =28m.18s., PPS =29m.0s., SS =33m.42s.
Cleveland eZ =19m.30s., eN =19m.35s., ePSN =28m.51s.
Halifax PS =28m.58s., SS =35m.18s., SSS =39m.36s.
Harvard ePKS =21m.26s., iS =27m.21s., ePS =29m.0s., iPS =29m.13s., iPPS =30m.14s., eSS =35m.4s., ePSPS =35m.53s.
Pennsylvania ePPS?N =30m.7s., iSSEN =35m.18s.
Palisades iSS =35m.48s.
Tacubaya eSKP =21m.48s., ePPP =23m.6s., ePPS =31m.50s.
Puebla e =31m.32s. and 45m.54s.
Bermuda i =25m.12s.
Huancayo ePKP =20m.20s., e =21m.25s. and 31m.57s., eSS =44m.44s., e =50m.58s., and 58m.14s.
Santa Lucia eN =41m.32s., 46m.33s., and 49m.7s.
La Plata N =26m.18s., SKSPN =31m.30s., PPSN =35m.12s., PPSE =35m.18s., PPSN =44m.36s., SSSN =50m.48s., SSSE =52m.12s.
La Paz iPP =25m.9s., iSKKS =32m.0s., i =32m.36s., PPS =39m.26s., SS =46m.24s.

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Nov. 24d. Readings also at 0h. (Apia, Antofagasta, Copiapo, Santa Lucia, and near Istanbul), 1h. (Kiruna, Ksara, Paris, Strasbourg, Stuttgart, Jena, Collmberg, Resolute Bay, China Lake, Mount Wilson, and Riverside), 2h. (Apia (3), Bombay, Palisades, Scoresby Sund, De Bilt, Kew, Cheb, Potsdam, Copenhagen, Prague, Florence, Pavia, Rome, Messina, Belgrade, Istanbul, Helwan, Alicante (2), Toledo, near Almeria, Granada (2), Malaga, Borzhomi, Grozny, Sotchi, Yalta, Zugdidi, near Abastumanj, Akhalkalaki, Gori, Leninakan, Piatigorsk, Tiflis, and Tsikhlis-Dzhvari, Kulyab, Obi-garm, near Dzhergetal, Garm (2), and Khorog), 4h. (Victoria, Mizusawa, and near Apia), 5h. (Pietermaritzburg, New Delhi, Chilisk, Naryn, Przhevalsk, Samarkand, near Dzhergetal, Fergana, Garm, Khorog, Kulyab, Obi-garm, and Stalinabad), 6h. (Stalinabad, near Andijan, Dzhergetal, Fergana, Garm, Khorog, and Kulyab), 7h. (Resolute Bay, Victoria, Seattle, Fresno, Berkeley, Mineral, Mount Wilson, Palomar, Riverside, China Lake, Palisades, Harvard, Kiruna, and Tamanrasset), 8h. (Mount Wilson, China Lake, New Delhi, and Poona), 10h. (Pretoria and near Garm), 11h. (near Garm), 12h. (Alicante and Apia), 14h. (Manila, Bombay, Calcutta, Hyderabad, Poona, New Delhi, Stuttgart, Kiruna, Tamanrasset, Pretoria, Seattle, near Horseshoe Bay, and Victoria), 15h. (near Huancayo), 16h. (Alicante (2), Kiruna, and near Manila), 17h. (near Ashkabad), 18h. (Apia (2) and Paris), 20h. (Apia, Wellington, and Manila), 21h. (Poona, Istanbul, Triest, Collmberg, Jena, Strasbourg, Stuttgart, Paris, Kiruna, Tamanrasset, Haiwee, Palomar, Pasadena, Tinemaha, Victoria, Resolute Bay, and near Mizusawa).

Nov. 25d. 9h. 53m. 28s. Epicentre 21°·5N. 146°·0E. Depth of focus 0·020. (as on 1940, June 24d.).

A = −·7721, B = +·5208, C = +·3644 ; δ = +16 ; h = 4 ;
D = +·559, E = +·829 ; G = −·302, H = +·204, K = −·931.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa	E.	18·1	349	e 4 6	+ 4	7 39	+23	4 32	pP
College		60·7	27	i 9 56	− 1	—	—	—	—
Victoria		74·6	43	11 22	− 1	—	—	—	—
Resolute Bay	Z.	76·6	14	e 11 32	− 2	—	—	—	—
Shasta Dam		77·5	50	i 11 39	0	—	—	—	—
Mineral	Z.	78·2	51	i 11 43k	0	—	—	—	—
Berkeley	Z.	78·4	54	i 11 45k	+ 1	—	—	—	—
Branner	Z.	78·6	54	e 11 46k	+ 1	—	—	—	—
Hungry Horse		80·6	42	i 11 56	0	—	—	—	—
Fresno	Z.	80·7	54	e 11 56k	− 1	—	—	—	—
Tinemaha	Z.	81·7	54	i 12 2	0	—	—	—	—
Haiwee	Z.	82·3	54	i 12 4	− 1	—	—	—	—
Butte		82·4	43	i 12 5	0	—	—	—	—
Kiruna	Z.	82·4	342	i 11 58	− 7	—	—	—	—
Pasadena	Z.	82·8	56	i 12 7	0	—	—	—	—
Palomar	Z.	84·1	56	i 12 14	0	—	—	—	—
Boulder City		84·7	53	e 12 17	0	—	—	—	—
Tucson		89·2	55	i 12 39	0	—	—	—	—

Nov. 25d. 14h. 2m. 32s. Epicentre 31°·0N. 91°·6E. (as on 19d.).

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·9	200	i 2 24k	+12	i 4 12	+17	4 25	S*	—
Dehra Dun	N.	11·7	270	—	—	e 4 19	−45	—	—	—
New Delhi		12·7	263	e 3 0	− 5	e 5 14	−14	3 11	PP	—
Naryn		16·3	314	e 3 54	+ 2	i 6 56	+ 3	—	—	—
Rybach'e		16·8	315	i 3 59	+ 1	i 7 13	+ 8	—	—	—
Frunse		18·0	315	e 4 14?	+ 1	i 7 44?	+12	—	—	—
Hyderabad		18·0	266	e 4 17	+ 4	7 47	+15	—	—	10·0
Andijan		18·3	307	4 18	+ 1	7 41	+ 2	—	—	—
Fergana		18·7	306	e 4 17	− 5	i 7 51	+ 3	—	—	—
Garm		19·1	301	e 4 23	− 4	—	—	—	—	—
Obi-garm		19·5	300	i 4 26	− 5	e 8 10	+ 4	—	—	—
Stalinabad		20·2	300	e 4 36	− 3	i 8 19	− 2	—	—	—
Poona		20·3	236	i 4 43	+ 3	8 27	+ 4	4 59	PP	10·3
Tashkent		20·7	306	e 4 44	0	i 8 35	+ 4	—	—	—
Lunacharskoe		20·7	306	e 4 42	− 2	e 8 34	+ 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.
Bombay		20·8	239	i 5 2	+17	i 8 43	+10	9 10	SS	9·8
Tchimkent		20·9	309	i 4 44?	− 2	i 8 40?	+ 5	—	—	—
Samarkand		21·8	300	4 54?	− 2	8 46?	− 6	—	—	—
Irkutsk		23·2	19	5 15	+ 6	9 32	+14	—	—	—
Nanking		23·2	80	i 5 17k	+ 8	i 9 36	+18	—	—	—
Kodaikanal	E.	24·5	217	—	—	e 9 59	+19	—	—	e 12·5
Mary		25·4	294	e 5 32	+ 1	e 9 56	0	—	—	—
Ashkabad		28·2	294	e 5 58	+ 2	—	—	—	—	—
Sverdlovsk		33·6	330	—	—	12 8	+ 2	—	—	—
Shemakla		35·8	299	7 5	+ 2	—	—	—	—	—
Goris		37·6	296	e 7 22	+ 4	—	—	—	—	—
Kirovobad		37·6	299	7 18	0	—	—	—	—	—
Piatigorsk		40·1	304	9 11	PP	—	—	—	—	—
Ksara		46·6	289	e 7 34	−58	—	—	—	—	—
Collmberg	Z.	59·6	315	e 10 7	− 1	—	—	—	—	—
Jena	E.	60·6	315	e 10 15	0	—	—	—	—	—
Stuttgart		62·7	313	e 10 28	− 1	—	—	—	—	e 34·5
Strasbourg		63·6	313	e 10 35	0	—	—	—	—	—
Paris		66·8	315	e 10 55	− 1	—	—	e 10 58	P	e 35·5
Algiers Univ.	Z.	71·2	302	e 11 16	− 7	—	—	—	—	—
Resolute Bay	Z.	74·5	3	e 11 44	+ 2	—	—	—	—	—
Tamanrasset	Z.	75·4	288	i 11 47	0	—	—	—	—	—
Kimberley	Z.	87·0	234	i 13 1	+13	—	—	—	—	—

Additional readings :—
Calcutta PPN = 2m.32s.
New Delhi PPPE = 3m.18s., SSEN = 5m.28s.
Poona PPPZ = 5m.10s., PPPN = 5m.13s., iS = 7m.43s., QEN = 8m.30s., SSEZ = 8m.47s., PcPZ = 8m.55s., SSS = 8m.59s., PcSE = 12m.31s.
Bombay QEN = 8m.58s.
Long waves were also recorded at several European stations.

Nov. 25d. Readings also at 0h. (La Paz, La Plata, Ksara, Tamanrasset, and Istanbul), 1h. (Kiruna, Tamanrasset, Palomar, Pasadena, Resolute Bay, Santa Lucia, Nanking, and Poona), 2h. (near Belgrade), 3h. (Santa Lucia and Apia), 4h. (near Akhalkalaki), 5h. (Nanking, Tamanrasset, Resolute Bay, Scoresby Sund, Kew, Kiruna, near Huancayo, and La Paz), 6h. (Palomar, Pasadena, Tinemaha, Resolute Bay, Kiruna, Kulyab, Samarkand, near Andijan, Dzhergetal, Garm, Khorog, Obi-garm, and near Ashkabad), 9h. (Palomar, Mount Wilson, Resolute Bay, La Paz, Kiruna, Algiers Univ., and Tamanrasset), 10h. (Poona, Apia (2), Tchimkent, Andijan, near Dzhergetal, Fergana, Khorog, Kulyab, Obi-garm, Stalinabad, and near Ashkabad), 12h. (Apia, Goris, Leninakan, Piatigorsk, Andijan, Samarkand, Tchimkent, near Dzhergetal, Fergana, Garm, Khorog, Kulyab, Obi-garm, Stalinabad, near Borzhomi, Kirovobad, Shemakla, Tiflis, Tsikhlis-Dzhvari, and Akhalkalaki (4)), 13h. (near Akhalkalaki), 14h. (Apia (2) and near Istanbul), 16h. (Poona, Nanking, and near Przhevalsk), 17h. (Apia, Resolute Bay, and Collmberg), 18h. (near Athens), 21h. (near Istanbul), 22h. (Apia (2)).

Nov. 26d. 6h. 38m. 29s. Epicentre 22°·9N. 121°·5E. (as on 24d.).

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila	8·3	183	i 2 2	− 2	i 3 50	+10	—	—	—
Zi-ka-wei	8·3	356	e 2 4	0	3 41	+ 1	—	—	—
Nanking	9·4	346	i 2 18a	0	4 10	+ 3	—	—	—
Yakusima	11·0	45	e 2 51	+ 9	—	—	—	—	e 6·9
Tomie	11·6	32	i 2 55	+ 5	—	—	—	—	e 6·6
Nagasaki	12·3	35	i 3 4	+ 5	—	—	—	—	—
Unzendake	12·5	38	3 1	− 1	—	—	—	—	—
Miyazaki	12·6	43	e 3 14	+11	e 5 46	+20	—	—	8·6
Kumamoto	12·8	38	e 3 14	+ 8	—	—	—	—	e 9·4
Saga	12·9	35	e 3 21	+14	—	—	—	—	—
Hukuoka	13·2	33	3 13	+ 2	e 5 51	+11	e 5 2	?	e 6·9
Ooita	13·6	39	e 3 19	+ 2	e 5 56	+ 6	—	—	e 7·1
Simonoseki	13·8	35	3 20	+ 1	—	—	—	—	—
Simidu	14·1	43	e 3 31	+ 8	—	—	—	—	—
Matuyama	14·7	40	e 3 57	+26	e 7 3	Q	—	—	e 8·3

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.
Hirosima		14·9	38	e 3 41	+ 7	e 6 36	+16	8 43	PcP	—
Koti		15·0	42	e 3 46	+11	e 7 12	Q	—	—	e 8·6
Muroto		15·2	45	e 3 45	+ 7	—	—	—	—	—
Owase		17·0	45	4 11	+10	7 45	SSS	—	—	—
Kyoto		17·3	43	e 4 33	+29	—	—	e 6 3	?	e 9·3
Kameyama		17·7	44	e 4 28	+18	e 8 0	SSS	—	—	e 9·8
Hikone		17·8	43	e 4 27	+16	e 8 2	SSS	—	—	e 12·2
Gihu		18·2	45	e 4 31	+15	e 8 9	SSS	—	—	—
Nagoya		18·2	45	e 4 29	+13	e 8 6	SSS	—	—	—
Omaesaki		18·7	47	e 4 39	+17	—	—	—	—	e 13·6
Takayama		19·0	40	e 4 17	− 9	—	—	—	—	—
Shizuoka		19·0	47	e 4 31	+ 5	—	—	—	—	e 12·5
Matumoto	N.	19·5	44	e 4 36	+ 5	—	—	—	—	—
Misima		19·5	46	e 4 36	+ 5	8 28	+22	e 7 11	?	10·9
Kohu		19·5	45	e 4 28	− 3	e 8 29	+23	—	—	—
Osima		19·6	49	i 4 37	+ 5	—	—	—	—	—
Oiwake		19·9	43	e 4 31	− 5	e 7 34	−41	—	—	e 13·6
Matusiro		19·9	42	4 35	− 1	8 24	+ 9	—	—	11·0
Nagano		19·9	42	e 4 43	+ 7	e 8 29	+14	—	—	e 10·8
Titibu		20·1	44	e 4 43	+ 5	—	—	—	—	—
Utunomiya		20·1	45	e 4 47	+ 9	—	—	—	—	—
Maebasi		20·3	43	e 4 46	+ 6	e 8 54	+31	—	—	13·9
Kumagaya		20·4	44	e 4 37	− 4	e 8 38	+13	—	—	—
Tokyo		20·4	46	e 4 40	− 1	e 8 0	−25	e 8 41	SS	e 13·4
Vladivostok		21·9	22	i 4 58	+ 1	i 9 2?	+ 8	—	—	—
Hukusima		22·0	44	e 4 57	− 1	—	—	—	—	14·2
Sendai	E.	22·6	43	e 5 13	+10	e 9 26	+19	—	—	e 12·4
Mizusawa		23·3	42	e 5 14	+ 4	9 39	+19	—	—	13·1
Morioka		23·6	42	i 5 17	+ 4	e 9 47	+22	—	—	—
Miyako		24·1	42	5 19	+ 1	9 35?	+ 1	—	—	—
Sapporo		26·0	34	5 39	+ 3	e 10 32	+26	—	—	e 14·2
Calcutta	E.	30·6	276	i 6 19	+ 1	i 11 17	− 3	7 17	PP	14·0
Irkutsk		32·2	340	6 29	− 3	11 43	− 2	7 36	PP	—
Djakarta		32·3	208	i 6 31	− 2	e 11 46	0	i 7 43	PP	—
Dehra Dun	N.	39·4	291	(e 7 43)	+10	(e 13 3)	−32	—	—	(20·2)
New Delhi	N.	40·1	288	e 7 32	− 7	e 13 34	−12	9 34	PPP	16·7
Przhevalsk		40·7	311	7 45	+ 1	i 17 49	ScS	—	—	—
Hyderabad		40·7	271	i 7 48	+ 4	i 13 51	− 4	9 25	PP	19·0
Almata II		41·6	311	e 7 52	+ 1	—	—	—	—	—
Naryn		42·2	308	e 7 56	0	e 14 18	+ 1	—	—	—
Rybach'e		42·3	309	i 7 57	0	14 18	− 1	9 39	PP	—
Frunse		43·5	308	i 8 7	0	i 14 39	+ 3	—	—	—
Kodaikanal	E.	43·9	261	(8 16)	+ 6	(14 49)	+ 7	(10 4)	PP	(20·5)
Poona		44·6	273	i 8 24	+ 8	e 14 40	−12	10 0	PP	19·2
Andijan		44·8	305	8 16	− 1	i 14 58	+ 3	e 18 16	ScS	—
Fergana		45·2	305	e 8 18	− 2	i 14 58	− 3	e 9 58	PcP	—
Bombay	E.	45·5	274	7 31?	−52	—	—	—	—	—
Garm		46·2	303	e 8 30	+ 2	i 15 18	+ 3	—	—	—
Obi-garm		46·6	303	i 8 35?	+ 3	i 15 21?	0	—	—	—
Tchimkent		47·0	307	i 8 36	+ 1	—	—	—	—	—
Lunacharskoe		47·2	306	e 8 42?	+ 6	e 15 29?	0	—	—	—
Tashkent		47·2	306	i 8 36	0	i 15 30	+ 1	i 10 32	PP	—
Stalinabad		47·3	302	i 8 36	− 1	i 15 26	− 5	—	—	—
Samarkand		48·8	303	e 8 47	− 2	—	—	—	—	—
Mary		52·7	302	i 9 18	0	16 49	+ 3	—	—	—
Sverdlovsk		55·2	324	i 9 37	0	e 17 17	− 3	19 17	ScS	—
Ashkabad		55·5	301	i 9 31	− 8	i 17 18	− 6	11 44	PP	—
Kizyl-Arvat		57·1	303	10 0	+10	—	—	—	—	—
Brisbane		58·6	147	i 10 1k	0	i 18 3	− 1	—	—	—
Baku		61·8	305	i 10 25	+ 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.
Shemakla		62·8	305	10 28	– 2	—	—	—	—	—
Lenkoran		62·9	303	10 29	– 1	19 1	+ 1	12 54	PP	—
Riverview		63·1	152	e 10 36a	+ 4	i 19 5	+ 3	i 20 24	ScS	e 27·8
Kirovobad		64·5	306	i 10 39	– 2	19 16	– 3	—	—	—
Goris		64·7	303	i 10 40	– 2	i 19 25	+ 3	—	—	—
Erevan		65·9	306	i 10 48	– 2	19 35	– 2	—	—	—
Piatigorsk		66·3	310	10 51	– 1	19 43	+ 1	11 17	PcP	—
Leninakan		66·3	306	10 54	+ 2	—	—	—	—	—
Borzhomi		66·5	307	10 51	– 3	19 44	0	—	—	—
Tsikhlis-Dzhvari		66·5	307	10 54	0	19 46	+ 2	11 24	PcP	—
Moscow		68·0	323	i 11 1	– 2	i 20 1	– 1	—	—	—
Sotchi		68·8	310	i 11 9	+ 1	i 20 16	+ 5	—	—	—
College		69·8	27	e 11 12	– 2	—	—	i 11 17	P	—
Pulkovo		71·1	328	i 11 22	0	i 20 34	– 4	—	—	—
Yalta		72·2	312	11 29	0	20 54	+ 3	11 46	PcP	—
Simferopol		72·4	312	11 27	– 3	—	—	—	—	—
Kiruna	Z.	73·1	337	i 11 33?	– 1	—	—	i 14 15	PP	—
Ksara		74·2	300	i 11 40	0	21 21?	+ 7	—	—	—
Kishinev		75·4	315	11 43	– 4	21 24	– 3	—	—	—
Istanbul		77·1	310	i 11 57	0	i 21 47	+ 1	—	—	e 38·0
Lwow		77·5	319	i 11 59	0	21 48	– 2	—	—	—
Auckland	N.	77·8	139	—	—	e 21 49	– 4	e 33 13	Q	e 36·5
Uzhgorod		78·9	318	i 12 6	– 1	22 4	– 1	—	—	—
Helwan		79·1	297	i 12 7	– 1	22 3	– 4	e 16 55	PPP	—
Resolute Bay		79·9	9	e 12 9a	– 3	e 22 11	– 5	e 15 6	PP	e 35·1
Skalnate Pleso		80·0	320	e 12 12	– 1	—	—	e 12 45	?	e 31·5
Wellington		80·7	142	—	—	e 22 16	– 8	—	—	e 34·0
Raciborzu		80·8	321	e 12 16	– 1	e 22 31	+ 6	e 15 24?	PP	—
Christchurch		81·1	145	e 12 6	–12	e 22 21	– 7	e 27 51	SS	e 39·1
Budapest		81·4	317	12 23	+ 3	e 22 28	– 3	e 22 50	ScS	e 43·5
Copenhagen		81·5	327	i 12 20	– 1	e 22 35	+ 3	—	—	39·5
Belgrade		81·6	314	e 12 20a	– 1	e 22 31	– 2	e 15 30	PP	e 44·7
Kalossa		81·8	318	e 12 26	+ 4	e 22 33	– 2	e 22 41	S	—
Ogyalla	E.	81·8	318	—	—	e 20 4	?	—	—	—
Potsdam		82·7	325	i 12 27a	0	i 22 47	+ 3	i 15 39	PP	e 36·5
Prague		83·0	322	e 12 26	– 2	e 22 46	– 1	e 15 41	PP	e 39·5
Collmberg	Z.	83·3	323	e 15 41	PP	—	—	—	—	—
Tananarive		83·3	247	—	—	e 22 56	+ 6	39 46	Q	46·5
Scoresby Sund		83·4	349	i 12 30	0	—	—	—	—	42·5
Jena		84·2	323	e 12 33	– 1	e 22 54	– 5	e 15 56	PP	—
Cheb		84·2	323	e 12 34?	0	e 22 58	– 1	e 23 23	PS	—
Triest		84·5	318	i 12 39a	+ 3	i 23 0	– 2	i 23 13	ScS	e 43·3
Taranto		85·6	312	e 13 5	+24	e 22 21	[–44]	e 32 31	SSS	—
Witteveen	Z.	85·8	327	i 12 41	– 1	—	—	i 13 36	?	—
Stuttgart		86·6	322	e 12 45a	– 1	e 23 12	[+ 1]	e 16 9	PP	e 44·5
De Bilt		87·0	327	i 12 49	+ 1	e 23 31	+ 4	i 16 14	PP	e 42·5
Aberdeen	N.	87·3	333	—	—	i 23 30	+ 1	i 29 25	SS	e 46·0
Chur		87·4	322	e 12 50a	0	—	—	—	—	—
Bologna		87·6	318	e 12 52k	+ 1	e 23 37	+ 5	e 16 39	PP	—
Strasbourg		87·6	323	i 12 51k	0	e 23 34	+ 2	e 16 17	PP	42·5
Zürich		87·7	322	e 12 50a	– 2	e 23 15	[– 4]	e 16 15	PP	—
Messina		87·8	311	i 12 51a	– 1	i 23 32	– 2	e 24 39	PS	—
Florence		88·0	318	i 12 51	– 2	i 23 38	+ 2	—	—	—
Rome		88·1	315	i 12 49a	– 5	i 23 38	+ 1	i 12 55	PcP	42·5
Basle		88·2	321	e 12 53a	– 1	e 23 38	0	—	—	—
Victoria		88·4	37	12 56	+ 1	—	—	—	—	—
Pavia		88·5	320	i 12 55k	– 1	e 23 44	+ 3	—	—	e 45·2
Seattle		89·4	38	i 13 4k	+ 4	—	—	i 13 9	?	—
Kew		90·1	328	i 13 3	0	e 23 54	– 1	e 16 35	PP	e 41·5
Paris		90·3	325	e 13 3	– 1	i 23 56	– 1	i 16 38	PP	e 44·5

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rathfarnham Castle		91·7	332	e 13 8	– 2	e 24 31	+21	e 16 49	PP	e 42·5
Shasta Dam		93·3	43	i 13 19	+ 1	—	—	—	—	—
Hungry Horse		93·4	34	i 13 20	+ 2	—	—	—	—	—
Mineral	Z.	94·0	43	i 13 22k	+ 1	—	—	—	—	—
Barcelona		94·9	319	—	—	e 27 25	?	—	—	e 49·6
Berkeley		94·9	46	e 13 27	+ 2	—	—	—	—	e 46·1
Butte		95·7	34	i 13 33	+ 4	—	—	—	—	—
Algiers Univ.	Z.	97·0	314	i 13 34	– 1	e 16 51	?	i 17 30	PP	—
Fresno	Z.	97·2	46	e 13 37	+ 1	—	—	—	—	—
Alicante		98·3	318	17 46	PP	29 14	?	45 44	Q	e 51·8
China Lake	Z.	99·2	45	e 13 47	+ 2	—	—	—	—	—
Toledo		99·5	320	e 17 46	PP	e 25 49	+33	—	—	—
Pasadena		99·8	47	e 13 48	+ 1	—	—	e 17 56	PP	e 46·8
Almeria		100·5	318	i 13 48	– 3	25 16	– 9	17 56	PP	54·1
Boulder City		100·9	44	e 13 54	+ 2	—	—	e 17 7	?	—
Granada		101·0	318	(i 13 37)	–16	(25 49)	+20	(20 7)	PPP	(i 52·1)
Palomar	Z.	101·1	47	i 13 56	+ 3	—	—	—	—	—
Malaga		101·8	319	(i 14 38)	+42	(i 18 22)	PP	(i 20 26)	PPP	(e 46·6)
Tamanrasset	Z.	102·9	303	e 14 1	0	e 18 17	PP	e 20 31	PPP	—
Tucson		105·8	44	e 17 37	?	—	—	—	—	—
Seven Falls	E.	109·4	8	—	—	e 34 15	SS	—	—	45·2
Ottawa		110·3	12	28 1	PS	25 1	[–12]	37 1	?	—
Fayetteville		112·3	31	i 18 39	[+ 1]	—	—	—	—	—
Harvard		113·8	10	e 29 14	PS	—	—	—	—	e 59·2
Pennsylvania	N.	114·1	17	e 22 7	PPP	—	—	—	—	—
Palisades		114·8	12	—	—	e 29 19	PS	e 51 14	Q	e 57·2
Bermuda		124·7	7	i 19 2	[0]	—	—	e 51 37	Q	e 59·5
Bogota		148·7	31	i 19 52	[+ 7]	e 26 58	[+ 6]	(e 36 31)	PPS	(e 36·5)
Huancayo		160·7	59	i 20 4	[+ 2]	30 54	{–22}	e 51 7	SSS	e 68·0
La Paz		168·9	56	i 20 11a	[+ 2]	i 32 5	{+ 8}	i 21 24	PKP_2	79·8

Additional reading and note :—
Tokyo e =5m.56s.
Calcutta PcPE =9m.17s., SSE =12m.55s.
Irkutsk SS =13m.32s.
Dehra Dun readings have been reduced by 3m.
New Delhi SSN =16m.19s.
Hyderabad SSN =17m.19s.
Kodaikanal PPPE =(10m.43s.), readings have been increased by 1m.
Poona PPN =10m.3s., PPPE =10m.39s., PPPN =10m.42s., PcSE =13m.41s., PPSN = 14m.52s., QE =18m.17s., QN =18m.22s., SSSE =18m.44s., SSSN =18m.50s.
Fergana ePP =10m.18s., ePPP =10m.58s., eScS =18m.15s.
Ashkabad PcP =10m.34s., PPP =12m.56s., ScS =19m.13s.
Riverview iPZ =10m.39s., eSSSE =25m.57s.
Paitigorsk PPP =15m.1s., PS =20m.9s., SS =24m.7s., SSS =27m.1s.
Tsikhlis-Dzhvari PP =13m.24s.
Kiruna iZ =12m.22s. and 13m.11s.
Helwan eZ =13m.16s. and 15m.16s., eE =22m.59s.
Resolute Bay iZ =12m.11s., eZ =13m.6s., eN =24m.23s.
Raciborzu eN =16m.52s.
Christchurch ePPZ =15m.46s., eSSSEN =31m.26s., eQEN =34m.31s.
Budapest eE =12m.58s., eN =15m.14s., eE =22m.31s.
Belgrade eZ =13m.27s., eNE =18m.21s. and 23m.51s.
Prague iP =12m.29s., e =12m.45s., 12m.53s., and 23m.19s., ePSN =23m.38s.
Tananarive e =32m.58s.
Jena eE =13m.8s., 14m.1s., and 15m.27s., eN =23m.40s.?.
Cheb e =27m.8s., eSS =27m.44s., eSSS =31m.49s.
Triest iPPZ =16m.0s., ePPPZ =17m.56s., iPS =24m.1s., iSS =28m.53s.
Stuttgart eZ =13m.5s., eSS =29m.0s.
De Bilt eSS =29m.11s.
Aberdeen iN =23m.53s., iSSSN =34m.21s.
Strasbourg e =13m.22s., ePP =16m.11s., eSS =29m.25s., eSSS =33m.31s.
Rome e =13m.45s., PP =16m.15s., PS =24m.37s., SS =29m.31s., SSS =33m.21s.?.
Kew eSKS?EN =24m.32s., eScS?EN =25m.4s., eSSEN =29m.50s., eSSSEN =36m.24s.
Paris ePPP =18m.39s., iSKKS =23m.43s., eSP =25m.1s., iSS =30m.3s., eSSS =33m.23s., iPKKS =34m.7s., iQ =36m.44s., iSKKS(Δ >180°) =37m.19s. and other unidentified readings.
Alicante PP =21m.34s., SSS =40m.30s.

Continued on next page.

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Toledo eP? =17m.28s., ePP? =22m.36s.
Almeria PPP =20m.4s.
Granada pP =(14m.7s.), sP =(15m.7s.), PP =(17m.46s.), iSS =(32m.31s.), SSS = (33 n.31s.), Q =(43·3 n.), readings have been reduced by 4m.
Malaga readings have been reduced by 3m.
Tamanrasset eZ =17m.19s.
Bogota eE =22m.16s.
Huancayo ePP =23m.42s., eSKSP =34m.46s., eSS =44m.19s.
La Paz iPPZ =25m.11s., iSS =46m.33s., iSSS =52m.55s.
Long waves were also recorded at Ivigtut, Weston, Colombo, and several European stations.

Nov. 26d. Readings also at 0h. (Kimberley and Pietermaritzburg), 2h. (near Khorog, Kulyab, and Obi-garm), 6h. (near Akhalkalaki and near Istanbul), 7h. (near Santa Clara), 8h. (near Copiapo), 11h. (Mizusawa, La Paz, and near Antofagasta), 12h. (Tamanrasset and near Algiers Univ.), 14h. (Stuttgart and near Erevan), 15h. (Djakarta), 16h. (Samarkand, near Andijan, Dzhergetal, Khorog, Obi-garm, Stalinabad, and near Alicante), 17h. (Ksara), 18h. (Auckland, Christchurch, Wellington, China Lake, Palomar, Pasadena, Tinemaha, Tamanrasset, near Alicante, and near Garm), 19h. (Poona), 21h. (Garm, near Dzhergetal, Khorog, and Obi-garm), 22h. (Nanking and near Apia), 23h. (Tortosa).

Nov. 27d. 4h. 51m. 31s. Epicentre 36°·4N. 140°·6E. Depth of focus 0·005.
(as on 1951, Sept. 15d.).

Intensity IV at Mito ; II-III at Inawasiro, Manahe, Batto, and Kururi
Epicentre 36°·2N. 140°·8E. Depth 50km.
Seismo. Bull. Cent. Met. Obs., Japan, for Nov., 1951, Tokyo, 1951, pp.307-308, with macroseismic chart.

A = −·6235, B = +·5121, C = +·5908 ; δ = +4 ; h = 0 ;
D = +·635, E = +·773 ; G = −·457, H = +·375, K = −·807.

	Δ	Az.	P.	O − C.	S.	O − C.
	°	°	m. s.	s.	m. s.	s.
Mito	0·1	261	0 11	+ 1	0 19	+ 1
Tukubasan	0·5	246	0 14	+ 1	0 23	0
Onahama	0·6	24	0 14	0	0 25	0
Utunomiya	0·6	284	0 13	− 1	0 24	− 1
Tyosi	0·7	162	0 10	− 5	0 18	− 9
Shirakawa	0·8	337	0 16	− 1	0 28	− 1
Kumagaya	1·0	256	0 18	− 1	0 35	+ 2
Tokyo	1·0	224	0 20	+ 1	0 33	0
Inawasiro	1·2	342	0 25	+ 3	0 40	+ 2
Maebasi	1·3	270	0 22	− 1	0 38	− 2
Hukusima	1·4	356	0 24	0	0 41	− 2
Mera	1·6	203	0 44	S	(0 44)	− 3
Oiwake	1·6	268	0 32	+ 5	—	—
Kohu	1·8	245	0 32	+ 2	0 50?	− 2
Osima	1·9	211	0 48	S	(0 48)	− 6
Sendai	1·9	7	0 29	− 2	0 50	− 4
Matumoto	2·1	266	1 1	S	(1 1)	+ 2
Nagoya	3·2	247	1 10	?	—	—
Morioka	3·3	8	0 52	+ 1	—	—

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Nov. 27d. 16h. 16m. 37s. Epicentre 35°·0S. 179°·9W. Depth of focus 0·020.

Epicentre given by New Zealand stations.

A = −·8210, B = −·0014, C = −·5710 ; δ = +8 ; h = 0 ;
D = −·002, E = +1·000 ; G = +·571, H = +·001, K = −·821.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tuai	N.	4·5	211	i 1 9	+ 1	2 3	+ 3	—	—	—
Auckland	N.	4·7	245	i 1 9	− 1	2 4	− 1	—	—	—
Karapiro	N.	4·7	230	e 1 13?	+ 3	2 13?	+ 8	—	—	—
New Plymouth	E.	6·3	228	e 1 35	+ 3	e 2 59	+16	—	—	—
Wellington		7·6	212	1 46	− 3	i 3 10	− 4	e 15 9	ScS	—
Cobb River	E.	8·4	222	e 1 55	− 5	i 3 29	− 4	—	—	—
Kaimata	N.E.	10·1	220	e 2 19	− 3	e 4 10	− 3	—	—	—
Christchurch		10·3	212	e 2 24	0	i 4 15	− 3	—	—	—
Brisbane		24·3	281	i 5 2k	− 2	e 9 1	− 7	i 5 24	pP	—
Terre Adelie		38·9	203	e 7 15	+ 3	—	—	—	—	—
Pasadena	Z.	89·8	47	i 12 44	+ 2	—	—	i 13 8	pP	—
Palomar	Z.	90·0	48	i 12 46	+ 4	—	—	i 13 10	pP	—
China Lake	Z.	91·3	46	i 12 51	+ 2	—	—	i 13 16	pP	—
Boulder City		93·0	48	e 12 59	+ 3	—	—	i 13 25	pP	—
Tucson		93·1	52	i 13 0	+ 3	—	—	—	—	—
Huancayo		94·8	109	—	—	e 23 44	[+21]	e 26 5	PS	e47·1
College		102·7	13	e 13 38	− 2	—	—	—	—	—
Resolute Bay		122·1	18	i 18 35a	[− 1]	—	—	—	—	—
Ottawa		123·2	55	18 40	[+ 2]	—	—	—	—	—
Kiruna	Z.	145·1	346	i 19 16k	[− 2]	—	—	—	—	—
Ksara		150·5	278	i 19 29	[+ 2]	e 25 43	[−34]	—	—	—
Collmberg	Z.	161·2	335	e 19 41	[0]	—	—	—	—	—
Stuttgart	Z.	164·7	337	e 19 45	[+ 1]	—	—	e 20 38	PKP_2	—
Strasbourg		165·3	340	e 19 48	[+ 3]	—	—	e 20 41	PKP_2	—
Tamanrasset	Z.	167·0	203	i 19 50a	[+ 4]	i 24 44	PP	e 20 18	pPKP	—

Tamanrasset gives also ePKP_2Z = 20m.55s.

Nov. 27d. 20h.-21h. Undetermined shock.

Brisbane iPZ = 55m.9s.k, eSE = 58m.38s.
Pasadena iPZ = 63m.21s.
College iP = 63m.22s.
Palomar iPZ = 63m.26s.a.
China Lake iPZ = 63m.27s.a.
Tinemaha iPZ = 63m.28s.
Boulder City i = 63m.38s.
Tucson e = 63m.48s.
Shasta Dam i = 64m.19s.
Kiruna iPKPZ = 69m.36s.
Stuttgart ePKPZ = 70m.8s. and 70m.12s.
Collmberg eZ = 70m.9s.
Strasbourg eP = 70m.14s.
Paris iP = 70m.16s., e = 70m.28s.
Tamanrasset ePKP_2Z = 71m.26s., ePPZ = 75m.13s.

Nov. 27d. Readings also at 0h. (Apia), 1h. (Collmberg, Stuttgart, Palomar, China Lake, and near Akhalkalaki), 2h. (Apia and near Garm), 3h. (near Garm), 4h. (Apia and Nanking), 5h. and 6h. (La Paz), 7h. (China Lake, Tinemaha, Collmberg, Stuttgart, and Poona), 8h. (near Apia and near Istanbul), 9h. (near Almeria, Alicante, Granada, Malaga, Tortosa, and Toledo), 10h. (near Apia), 11h. (Apia and near Athens), 13h. (Collmberg and near Garm), 15h. (near Akhalkalaki, near Ashkabad, and near Huancayo), 16h. (near Alicante), 17h. (near Ashkabad), 18h. (Apia), 19h. (Kiruna, Santa Lucia, and Tamanrasset), 20h. (Apia (2), Bombay, Calcutta, Poona, and Kiruna), 21h. (Almata II, Frunse, near, Andijan, Dzhergetal, Fergana, Garm, Khorog, Lunacharskoe, Obi-garm, Samarkand, Stalinabad, Tashkent, Tchimkent, and near Palisades), 22h. (near Garm), 23h. (Apia, Huancayo, and La Paz).

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Nov. 28d. 5h. 46m. 14s. Epicentre 34°·1N. 134°·0E. (as on 1951, Sept. 29d.).

Intensity IV at Kôti, Okayama, Kasada; II-III at Sumoto, Takamatu, and Tuda.
Epicentre 34°·0N. 133°·6E. Depth 20km.
Seismological Bulletin of the Central Meteorological Observatory, Japan, for Nov., 1951, Tokyo, 1951, p.308, with macroseismic chart.

A = −·5764, B = +·5969, C = +·5580; δ = −11; h = 0;
D = +·719, E = +·695; G = −·388, H = +·401, K = −·830.

	Δ	Az.	P.	O − C.	S.	O − C.
	°	°	m. s.	s.	m. s.	s.
Takamatu	0·2	11	0 10k	0	0 18	+ 2
Okayama	0·6	354	0 15a	0	0 25	− 1
Kôti	0·7	216	0 9a	− 8	0 16	−12
Sumoto	0·8	71	0 21	+ 3	0 32	+ 1
Muroto	0·9	170	0 15k	− 5	0 26	− 8
Matuyama	1·1	256	0 14a	− 8	0 23	−16
Kobe	1·2	59	0 32	+ 8	0 46	+ 5
Hirosima	1·3	282	0 26	+ 1	0 39	− 5
Simidu	1·6	213	0 22k	− 8	0 42	− 9
Siomisaki	1·6	114	0 35	+ 5	0 58	+ 7
Hamada	1·8	297	0 35	+ 3	0 48	− 8
Owase	1·8	91	0 41	+ 9	1 12	+16
Ooita	2·2	247	0 30	− 8	1 2	− 4
Hikone	2·2	58	0 57	+19	1 27	+21
Kameyama	2·2	70	0 58	+20	1 24	+18
Nagoya	2·7	66	0 47	+ 2	1 22	+ 3
Kumamoto	3·0	245	1 0	P_g	1 26	− 1
Miyazaki	3·1	225	1 3	P_g	1 29	0

Nov. 28d. Readings also at 0h. (Stuttgart, Zürich, near Seattle, near Ashkabad, and near Garm), 2h. (Kimberley, Pretoria, and near Manila), 5h. (Bombay, near Puebla, Vera Cruz, Tacubaya, and near Athens), 10h. (near Dzhergetal, Khorog, Garm, and Obi-garm), 11h. (Triest, Messina, Stuttgart, La Paz, near Huancayo, near Garm, and near Taranto), 12h. (Algiers Univ.), 13h. (near Alicante and near Bogota), 14h. (Bombay and Calcutta), 16h. (near Dzhergetal, Garm, Obi-garm, and Stalinabad), 17h. (Collmberg, Stuttgart, Strasbourg, Tamanrasset, Kiruna, Resolute Bay, Ottawa, Kirkland Lake, Shawinigan Falls, Palisades, near Alicante (5), near Khorog, and Samarkand, and near Huancayo), 19h. (Manila, Poona, Nanking, Zi-ka-wei, and near Akhalkalaki), 20h. (Apia and Palisades), 21h. (near Garm), 22h. and 23h. (Apia).

Nov. 29d. 4h. 45m. 54s. Epicentre 0°·5N. 120°·7E. Depth of focus 0·010.
(as on 1946, Feb. 28d.).

A = −·5105, B = +·8599, C = +·0087; δ = +11; h = +7;
D = +·860, E = +·511; G = −·004, H = +·007, K = −1·000.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		14·0	1	i 3 18	+ 3	i 6 1	+13	i 3 26	PP	e 6·9
Djakarta		15·3	244	e 3 32	0	i 6 27	+ 8	—	—	—
Zi-ka-wei	Z.	30·5	2	i 6 6a	0	11 5	+ 6	—	—	—
Nanking		31·4	356	i 6 16a	+ 2	i 11 18	+ 5	—	—	—
Perth		32·6	187	—	—	i 11 32	0	i 12 7	sS	—
Calcutta	N.	38·3	307	i 7 16	+ 4	—	—	—	—	—
Brisbane		41·7	135	i 7 43k	+ 2	i 13 51	+ 1	i 8 5	pP	—
Mizusawa	E.	42·8	23	i 7 54	+ 4	8 27	sP	—	—	—
Vladivostok		43·6	12	i 7 57	+ 1	i 14 10	− 8	i 7 28	pP	—
Kodaikanal	E.	44·0	285	8 1	+ 2	14 25	+ 1	10 19	PPP	20·1
Riverview		44·5	144	8 6a	+ 3	i 14 36	+ 5	i 8 31	pP	—
Hyderabad	E.	44·8	295	i 8 8	+ 2	i 14 38	+ 3	i 8 36	pP	22·2
Poona		49·3	294	i 8 39	− 2	i 15 38	− 1	10 2	PcP	22·8
New Delhi		50·1	309	e 8 45	− 2	i 15 46	− 4	9 16	pP	—
Yuzno-Sakhlinsk		50·1	19	i 8 48	+ 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Dehra Dun	N.	50·2	311	e 11 48	PPP	—	—	—	—	—
Bombay		50·4	294	i 8 50	+ 1	i 15 56	+ 2	9 23	pP	23·8
Irkutsk		53·4	348	i 9 12	0	16 33	– 2	9 43	pP	—
Przhevalsk		56·4	324	9 35	+ 1	17 24	+ 9	—	—	—
Naryn		57·3	322	i 9 39	– 1	i 17 30	+ 3	—	—	—
Almata II		57·5	324	e 9 42	+ 1	—	—	—	—	—
Rybach'e		57·8	322	i 9 45	+ 1	i 17 40	+ 7	e 10 14	pP	—
Frunse		59·0	322	i 9 52	0	i 17 52	+ 3	i 10 23	pP	—
Andijan		59·3	319	i 9 53	– 1	i 17 55	+ 2	i 10 23	pP	—
Fergana		59·5	318	9 54?	– 1	—	—	i 10 24?	pP	—
Obi-garm		60·1	316	i 9 59	0	i 18 9	+ 6	—	—	—
Stalinabad		60·7	316	i 10 2	– 1	i 18 14	+ 3	—	—	—
Tashkent		61·6	318	i 10 9	– 1	i 18 24	+ 2	i 10 40?	pP	—
Tchimkent		61·9	320	i 10 12	0	i 18 30	+ 4	—	—	—
Auckland	N.	62·3	133	—	—	e 18 36	+ 5	—	—	25·8
Kaimata	N.E.	62·5	140	e 10 18	+ 2	—	—	—	—	—
Samarkand		62·5	315	10 14	– 2	18 35	+ 1	—	—	—
Cobb River	E.	62·7	138	e 10 23	+ 6	—	—	—	—	—
Karapiro	N.	63·2	133	i 10 6?	–14	—	—	—	—	—
Christchurch		63·7	141	—	—	i 18 51	+ 3	e 30 6?	Q	e 34·1
Wellington		64·1	138	i 10 24	– 2	18 51	– 2	—	—	26·3
Tuai	N.	64·8	134	e 10 31	0	—	—	—	—	—
Terre Adelie		68·0	171	i 10 53	+ 2	i 19 50	+ 9	i 11 24	pP	—
Ashkabad		68·1	311	i 10 55	+ 4	—	—	—	—	—
Sverdlovsk		73·6	330	i 11 24	0	i 20 46	+ 1	i 11 58	pP	—
Baku		75·1	312	e 11 36	+ 3	—	—	—	—	—
Shemakla		76·1	312	11 32	– 7	—	—	—	—	—
Goris		77·6	311	i 11 47	0	i 21 33	+ 4	—	—	—
Erevan		79·1	311	i 11 57	+ 2	21 50	+ 5	—	—	—
Leninakan		79·8	312	12 3	+ 4	—	—	—	—	—
Akhalkalaki		80·1	313	i 12 2	+ 1	—	—	—	—	—
Borzhomi		80·2	313	i 12 2	+ 1	e 22 0	+ 3	—	—	—
Tsikhlis-Dzhvari		80·2	313	i 12 2	+ 1	—	—	—	—	—
Abastumanj		80·6	313	12 2?	– 1	e 22 2?	+ 1	—	—	—
Piatigorsk		80·8	315	12 6	+ 2	22 5	+ 2	—	—	—
Sotchi		83·1	314	i 12 16	0	—	—	—	—	—
Ksara		85·4	303	i 12 29	+ 1	23 4	+15	—	—	—
Moscow		85·7	326	i 12 28	– 1	—	—	—	—	—
Yalta		87·2	314	12 36	0	—	—	—	—	—
Helwan		89·2	300	12 46	0	23 30	+ 5	24 12	sS	—
College		90·2	25	i 12 9	–42	—	—	e 16 24	PP	—
Pietermaritzburg	Z.	90·5	241	e 12 36	–16	—	—	—	—	—
Pretoria	Z.	92·5	244	i 13 0	– 1	—	—	—	—	—
Kiruna	Z.	93·4	337	i 13 4	– 2	—	—	i 13 30	pP	—
Kimberley	Z.	95·4	241	i 13 15	0	—	—	—	—	—
Taranto		99·9	311	e 15 13	?	e 28 43	?	e 18 23	pPP	—
Prague		100·0	321	e 13 37	+ 1	—	—	e 17 41	PP	—
Collmberg		100·6	323	e 13 38	0	e 17 51	PP	e 18 15	pPP	—
Cheb		101·3	322	—	—	e 27 25	SPP	e 32 30	SS	—
Triest		101·4	317	—	—	e 27 34	SPP	—	—	—
Jena	E.	101·6	322	e 17 20?	PKP	—	—	e 17 57?	PP	—
Messina		101·6	309	e 17 46	PP	i 27 28	SPP	i 18 23	pPP	—
Resolute Bay		102·0	9	e 13 44k	0	i 27 32	SPP	e 32 25	SS	e 36·1
Rome		103·1	314	e 16 38	?	e 27 22	PS	e 20 14	PPP	e 51·1
Florence		103·6	315	e 18 9	PP	e 27 17	PS	—	—	—
Stuttgart		103·7	321	e 17 6	?	e 27 52	SPP	e 18 13	PP	—
Paris		107·8	322	i 18 43	PP	—	—	—	—	—
Kew		108·4	326	e 19 6	PP	—	—	—	—	e 57·1
Clermont-Ferrand		108·5	319	17 6?	[–71]	—	—	—	—	—
Shasta Dam		109·8	46	e 19 18	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.
Mineral	Z.	110·5	46	i 18 22k	[+ 1]	—	—	i 18 48	pPKP	—
Berkeley	Z.	110·8	49	i 18 22a	[+ 1]	—	—	i 18 56	pPKP	—
Algiers Univ.	Z.	111·6	310	e 19 5	PP	—	—	—	—	—
Hungry Horse		112·3	36	i 18 25	[+ 1]	—	—	—	—	—
Tamanrasset	Z.	112·9	295	e 18 27	[+ 1]	e 19 13	PP	e 14 46	P	—
Fresno	Z.	113·0	49	e 18 52	pPKP	—	—	—	—	—
Tinemaha	Z.	114·0	49	i 18 30	[+ 2]	—	—	e 29 12	PKKP	—
Butte		114·2	37	i 18 30	[+ 2]	—	—	—	—	—
China Lake	Z.	115·0	49	i 18 31	[+ 1]	—	—	e 14 47	P	—
Pasadena		115·1	51	i 18 32a	[+ 2]	i 19 55	PP	e 14 56	P	—
Palomar	Z.	116·4	52	e 18 34k	[+ 2]	e 29 7	PKKP	e 15 5	P	—
Boulder City		117·0	49	i 18 36	[+ 2]	—	—	—	—	—
Tucson		121·5	51	i 18 45	[+ 3]	—	—	e 20 37	PP	—
Kirkland Lake	Z.	128·3	17	i 18 55	[0]	—	—	i 19 20	pPKP	—
Shawinigan Falls	N.	131·7	11	e 19 1	[− 1]	22 20	SKP	—	—	—
Ottawa		132·0	16	18 50	[−12]	22 21	SKP	i 19 28	pPKP	—
Harvard		135·8	12	e 19 1	[− 8]	—	—	—	—	—
Weston		136·0	12	i 19 10	[0]	i 19 58	sPKP	—	—	—
Palisades		136·6	14	e 19 12	[+ 1]	i 22 36	SKP	e 18 59	?	—
Fordham		136·8	16	e 19 5	[− 6]	e 22 20	SKP	—	—	—
La Plata		145·8	183	19 30	[+ 3]	29 30	SKKS	20 0	pPKP	71·0
Bermuda		146·9	8	i 19 33	[+ 4]	—	—	—	—	—
Copiapo	N.	151·3	159	26 38	SKS	(26 38)	[+ 6]	(i 27 29	sSKS	i 27·5
Antofagasta	E.	154·6	157	26 25	SKS	(26 25)	[−11]	27 3	pSKS	—
Huancayo		160·4	126	i 19 53	[+ 5]	e 31 36	SKKS	e 24 12	PP	e 63·2
La Paz		161·9	152	i 19 53a	[+ 4]	i 31 4	SKKS	i 20 38	sPKP	—
Bogota		164·4	71	i 19 57	[+ 5]	i 24 48	PP	i 20 55	PKP_2	—
Fort de France		164·8	5	i 19 53	[+ 1]	—	—	—	—	—

Additional readings and note :—
Manila iPPP = 3m.29s., eSS = 6m.26s.
Perth i = 13m.36s. and 14m.31s.
Brisbane ePPN = 9m.25s., iEN = 9m.45s., isSE = 14m.30s., iE = 15m.30s., eE = 16m.42s., iSSEN = 17m.0s.
Vladivostok isS = 14m.58s.
Kodaikanal QE = 18m.4s.
Riverview iPPZ = 9m.56s., iPSN = 15m.3s., iSSN = 17m.51s., iScS?N = 18m.1s., and numerous unidentified i readings.
Hyderabad PcPE = 10m.14s., SSE = 18m.7s.
Poona PcPE = 9m.53s., PPE = 10m.25s., PPPE = 11m.23s., PPSE = 16m.3s., ScSE = 18m.13s., SSE = 18m.57s., SSN = 19m.9.., QE = 20m.28s.
New Delhi PPPN = 11m.11s., iN = 16m.25s., sSN = 16m.50s., SSN = 20m.55s.
Bombay PPEN = 10m.38s., pPPEN = 11m.10s., PPPPEN = 11m.56s., sSEN = 17m.4s., ScSEN = 18m.14s., SSEN = 19m.31s.
Rybach'e isS = 18m.35s.
Christchurch eEN = 22m.6s., e = 26m.31s., eEN = 28m.21s.
Terre Adelie ePS = 20m.26s., iPPS = 20m.42s.
Helwan PPE = 16m.50s., eE = 29m.36s.
Prague e = 17m.26s., eN = 18m.14s., e = 20m.18s.
Jena eE = 18m.22s., e = 18m.29s.
Messina eE = 32m.15s.?.
Resolute Bay eZ = 15m.30s. and 17m.53s., ePP = 18m.22s., eEN = 28m.26s., eN = 34m.37s.
Rome iPP?Z = 18m.34s., eSS?N = 32m.52s.
Stuttgart ePKP?Z = 17m.37s.
Paris i = 18m.46s., 18m.52s., and 19m.14s., eL = 27m.6s.
Tamanrasset eZ = 18m.2s., 19m.37s., and 19m.48s., ePPPZ = 22m.2s., ePKKPZ = 29m.17s.
China Lake epPKP?Z = 18m.57s., ePKKPZ = 29m.8s.
Pasadena ipPKP?Z = 18m.57s., ePKKPZ = 29m.11s.
Palisades ePP = 21m.50s.
La Plata PKPE = 19m.36s., PPN = 22m.48s., PPP?N = 25m.30s., SKKS?E = 28m.36s., PPSN = 35m.48s., SSE = 41m.24s.
Huancayo i = 20m.36s., e = 31m.0s., eSKSP = 35m.15s., eSS? = 44m.30s., eSSS? = 50m.16s.
La Paz iPKP$_2$Z = 20m.57s., iPPZ = 24m.50s., PPS = 37m.54s., iSS = 45m.14s.
Bogota iPPEZ = 25m.28s., iSKSEZ = 29m.4s., iPPPEZ = 29m.48s.
Long waves were also recorded at De Bilt.

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Nov. 29d. 7h. Undetermined shock.

New Delhi ePEN =37m.35s., eSN =41m.2s.
Ksara iP =37m.37s.a, S? =41m.10s.
Poona iPZ =37m.50s., PPN =38m.18s., PPPE =38m.29s., iSN =41m.55s., QE = 42m.21s., SSSN =43m.1s., RE =43m.31s.
Bombay iPEN =37m.53s., iSEN =41m.35s., SSE =42m.1s.
Collmberg eZ =40m.43s.
Stuttgart ePZ =40m.57s.
Kiruna ePZ =41m.20s.
Tamanrasset ePZ =41m.51s., iZ =42m.10s., ePPZ =43m.42s.
Pretoria iZ =43m.55s.

Nov. 29d. 14h. 26m. 50s. Epicentre 22°·9N. 121°·5E. (as on 26d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		8·3	183	e 2 5	+ 1	e 3 32	– 8	—	—	—
Zi-ka-wei	Z.	8·3	356	e 2 5k	+ 1	e 3 38	– 2	—	—	—
Nanking		9·4	346	i 2 20k	+ 2	4 6	– 1	—	—	—
Calcutta	E.	30·6	276	—	—	e 10 46	–34	i 14 36	Q	i 15·9
Djakarta		32·3	208	6 28	– 5	e 7 52	PPP	—	—	—
New Delhi		40·1	288	e 7 35	– 4	e 13 47	+ 1	16 41	SS	—
Poona		44·6	273	i 8 13	– 3	e 14 54	+ 2	10 2	PP	21·6
Bombay		45·5	274	i 8 22	– 1	i 15 13	+ 8	10 12	PP	22·5
Brisbane	Z.	58·6	147	i 10 1k	0	—	—	—	—	—
Kiruna	Z.	73·1	337	i 11 33	– 1	—	—	—	—	—
Resolute Bay		79·9	9	e 12 14	+ 2	—	—	—	—	—
Granada		101·0	318	17 57a	PP	—	—	—	—	i 55·4
Tamanrasset	Z.	102·9	303	e 18 18	PP	—	—	—	—	—

Additional readings :—
Poona SSN =18m.12s., QN =19m.21s.
Bombay SSN =18m.27s., SSE =18m.34s.
Long waves were also recorded at Ksara and at numerous other European stations.

Nov. 29d. 23h. 28m. 9s. Epicentre 22°·1S. 68°·7W. (as on 9d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Antofagasta	E.	2·2	226	0 49	P_g	i 1 20	S_g	—	—	i 1·4
La Paz		5·6	6	i 1 27	0	i 2 34	+ 1	i 1 38	P*	i 3·6
Santa Lucia	N.	11·4	188	—	—	e 5 36	SSS	—	—	i 6·3
Huancayo		11·8	327	e 2 53	0	e 4 54	–12	—	—	e 5·9
La Plata	E.	15·9	146	—	—	7 15	SSS	—	—	8·6
Bogota		27·1	349	e 5 45	– 1	e 10 56	+32	—	—	13·8
Morgantown		62·3	350	i 10 25	– 1	—	—	—	—	—
Fayetteville		62·7	337	i 10 24	– 5	—	—	i 10 34	P	—
Weston		64·2	358	i 10 50	+11	—	—	—	—	—
Harvard		64·3	358	e 10 29	–10	—	—	—	—	—
Tucson		67·4	323	e 10 57	– 2	—	—	—	—	—
Palomar	Z.	71·8	320	e 11 23	– 3	—	—	—	—	—
Boulder City		72·4	322	i 11 29	– 1	—	—	—	—	—
Mount Wilson	Z.	73·1	320	e 11 32	– 2	—	—	e 11 43	PcP	—
China Lake	Z.	73·9	321	e 11 37	– 2	—	—	—	—	—
Lick	Z.	77·3	320	i 12 7k	+ 9	—	—	i 12 18	PcP	—
Hungry Horse		81·0	332	e 12 16	– 2	—	—	—	—	—
Kimberley	Z.	82·6	118	i 12 29	+ 3	—	—	—	—	—
Tamanrasset	Z.	85·0	63	i 12 43	+ 5	e 16 5	PP	e 13 6	?	—

La Paz gives also i =2m.52s.
Long waves were also recorded at Palisades.

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Nov. 29d. Readings also at 0h. (Strasbourg, near Horseshoe Bay, and Victoria), 3h. (near Apia), 5h. (near Florence), 6h. (Copiapo, near Santa Lucia, near Florence, and near Huancayo), 7h. (La Plata and Apia), 8h. (Copiapo, Djakarta, near Alicante, and near Ashkabad), 9h. (Manila), 10h. (Santa Lucia, Apia, near Dzhergetal, Khorog, Fergana, Andijan, Garm, Obi-garm, and Stalinabad), 12h. (Strasbourg), 13h. (Djakarta, Athens, Stalinabad, near Khorog, Garm, Obi-garm, and Dzhergetal), 14h. (near Mizusawa), 17h. (near Alicante), 20h. (Apia), 22h. (near Apia), 23h. (Leninakan, Kirovobad, Goris, Shemakla, near Tiflis, Borzhomi, Tsikhlis-Dzhvari, Akhalkalaki, Piatigorsk, and Abastumanj).

Nov. 30d. 6h. 7m. 58s. Epicentre 43°·8N. 6°·4E.

Intensity VIII at Chasteuil with some damage; VII-VIII at Taloire; VII at Taulanne and Villars-Brandis; V at La Mure, Moriez, Moustiers-Ste. Marie, Baudinard, and Trigance; IV-V at St. André, Allons, and Mezel; IV at Digne; III-IV at Toulon and Marseilles.

Epicentre 43° 49′N. 6° 26′E. (Strasbourg). Macroseismic area 4000 sq. km.

Annales de l'Institut de Physique du Globe de Strasbourg, 2 ème partie, Séismologie, 1951, Nouvelle Série, Tome XVI, Strasbourg, 1956, p. 81.

A = +·7196, B = +·0807, C = +·6897; δ = +2; h = −4;
D = +·111, E = −·994; G = +·685, H = +·077, K = −·724.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Marseilles		0·9	235	e 0 15	− 5	i 0 30	− 4	—	—	—
Pavia		2·4	55	e 0 44	+ 3	e 1 18	S_g	e 0 50	P_g	—
Clermont-Ferrand		3·1	312	i 0 48	− 3	i 1 39	S_g	i 1 2	P_g	—
Neuchatel		3·2	7	e 0 59	P*	e 1 46	S_g	—	—	—
Florence		3·5	89	e 1 28?	P_g	i 2 6?	S_g	—	—	i 2·4
Bologna		3·6	79	e 1 4	P*	e 1 48	S*	e 1 55	S_g	—
Chur		3·8	35	e 1 2	+ 1	e 1 48	+ 1	—	—	—
Basle		3·8	11	e 1 3	+ 2	e 2 7	S_g	e 1 11	P_g	—
Zürich		3·9	23	e 1 4	+ 2	e 2 6	S_g	e 1 14	P_g	—
Strasbourg		4·9	11	e 1 19	+ 2	e 2 12	− 3	i 1 37	P_g	i 2·8
Stuttgart	Z.	5·3	20	e 1 21?	− 1	e 2 24	− 1	e 2 54	S_g	e 3·0
Tortosa		5·3	238	i 2 31	S	(i 2 31)	+ 6	—	—	3·2
Karlsruhe		5·4	14	e 1 40	P*	i 2 58	S_g	e 1 52	P_g	—
Triest		5·5	69	e 1 48	P_g	e 2 21	− 9	e 3 13	S_g	—
Paris		5·7	332	i 1 25	− 3	i 2 32	− 3	i 3 8	S_g	i 3·2
Jena		8·0	25	e 2 19	P*	e 3 34	+ 1	e 4 22	S_g	e 4·6
Prague		8·3	38	e 3 6	?	e 3 42	+ 2	e 4 34	S_g	—
Collmberg		8·7	28	e 2 44	P_g	e 3 52	+ 2	e 4 47	S_g	e 5·4
Raciborzu		10·2	48	e 2 34	+ 3	e 4 26	− 1	e 8 39	PcP	i 5·7
Tamanrasset	Z.	21·0	182	e 4 46	− 1	e 5 2	?	i 5 7	PP	—

Additional readings:—
Pavia e = 56s., iS = 1m.4s.
Clermont-Ferrand iP_g = 57s.
Strasbourg iP_g = 1m.33s., iS = 2m.24s., iS_g = 2m.37s. and other unidentified i readings.
Stuttgart eP*Z = 1m.39s., eP_gZ = 1m.49s. and 1m.52s., eZ = 2m.4s., 2m.9s., 2m.12s., 2m.15s., 2m.20s., and 2m.36s., eS*Z = 2m.51s.
Paris iP_g = 1m.46s., iS_g = 3m.1s. and many other unidentified i readings.
Jena eEN = 2m.29s., eE = 2m.35s., eN = 2m.39s. and 2m.52s., eEN = 3m.4s., eN = 3m.26s., eS?E = 3m.31s., eN = 3m.44s.
Prague e = 3m.18s., eS = 3m.33s., e = 3m.51s., eS* = 4m.8s., eS_g = 4m.24s.
Raciborzu eN = 3m.47s., eE = 4m.7s., eSSSE = 4m.51s.
Long waves were also recorded at Potsdam.

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Nov. 30d. 7h. 51m. 18s. Epicentre 31°·8N. 40°·9W.

A = +·6436, B = −·5575, C = +·5244 ; δ = +2 ; h = +2 ;
D = −·655, E = −·756 ; G = +·396, H = −·343, K = −·851.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		20·2	277	i 4 43	+ 4	i 8 48	SS	—	—	—
Fort de France		25·1	230	e 5 26	− 2	e 9 58	+ 7	—	—	—
Weston		26·3	302	i 5 39	0	—	—	—	—	—
San Juan		26·4	245	e 5 36	− 4	—	—	—	—	—
Harvard		26·5	302	i 5 40	− 1	—	—	—	—	e 12·6
Seven Falls	E.	27·5	312	e 5 56	+ 6	10 40	+10	6 55	PPP	13·7
Palisades		28·0	298	e 6 2	+ 7	—	—	—	—	e 12·6
Ottawa		30·2	307	6 12	− 2	11 12	− 1	—	—	—
Malaga		30·4	70	i 6 17	+ 1	i 11 23	+ 7	7 9	PP	13·3
Toledo		30·8	64	i 6 20	0	e 8 1	?	i 6 24	P	—
Pennsylvania		30·9	297	i 6 23	+ 3	e 11 32	+ 8	i 6 30	P	—
Granada		31·1	69	i 6 28k	+ 6	e 12 22	+54	7 40	PPP	i 15·0
Almeria		32·0	70	i 6 29	− 1	11 37	− 5	7 35	PP	16·2
Morgantown		32·5	294	e 6 34	0	—	—	e 7 27	PP	—
Rathfarnham C.	Z.	32·9	38	e 6 35	− 3	e 12 44	+48	e 7 44	PP	—
Cleveland		33·7	298	e 6 45k	0	e 12 14	+ 6	i 8 14	PPP	—
Kirkland Lake	Z.	33·7	310	e 6 52	+ 7	—	—	—	—	—
Kew		35·5	44	—	—	e 13 42	+66	—	—	—
Strasbourg		40·0	50	e 8 4	+26	—	—	e 9 27	PPP	—
Karlsruhe	Z.	40·5	49	e 7 42	0	—	—	—	—	—
Stuttgart		41·0	50	e 7 45	− 1	e 17 12	SS	—	—	—
Bogota		41·2	236	e 7 59	+11	e 14 5	+ 3	i 9 27	PP	—
Tamanrasset	Z.	41·9	90	e 7 52	− 2	—	—	e 9 42	PcP	—
Collmberg		43·7	47	e 8 7	− 1	—	—	e 9 58	PP	—
Prague		44·5	48	e 8 13	− 2	—	—	—	—	—
Raciborzu		46·9	48	e 8 37	+ 3	—	—	e 10 8	PcP	—
Resolute Bay		50·3	344	e 8 58k	− 2	e 16 14	+ 1	e 9 5	P	e 26·2
Tacubaya		53·4	271	e 10 10	+46	—	—	—	—	—
La Paz		54·7	212	i 9 30	− 3	i 17 17	+ 4	11 30	PP	26·6
Huancayo		54·7	222	e 9 31	− 2	e 17 24	+11	—	—	e 26·4
Hungry Horse		56·2	310	i 9 42	− 2	—	—	—	—	—
Tucson		58·3	291	i 9 58	− 1	—	—	—	—	—
Boulder City		60·1	296	i 10 11	0	—	—	—	—	—
Helwan	Z.	61·0	71	e 10 16	− 2	—	—	—	—	—
China Lake	Z.	62·3	297	e 10 25	− 1	—	—	i 11 36	?	—
Tinemaha	Z.	62·4	298	e 10 26	− 1	—	—	—	—	—
Palomar	Z.	62·6	293	i 10 29	+ 1	—	—	i 11 33	?	—
Pasadena	Z.	63·4	295	e 10 32	− 2	—	—	i 11 33	?	—
Fresno	Z.	63·6	298	e 10 34a	− 1	—	—	—	—	—
Mineral	Z.	63·7	303	i 10 34a	− 2	—	—	—	—	—
Shasta Dam		64·1	303	e 11 4	+26	—	—	—	—	—
Lick	Z.	64·8	300	e 10 43a	0	—	—	—	—	—
College		68·4	334	11 5	− 1	—	—	i 12 13	?	—
Pretoria	Z.	87·3	122	i 13 20	+30	—	—	—	—	—

Additional readings :—
Seven Falls SSE =12m.10s.
Pennsylvania eZ =7m.3s.
Cleveland iPZ =6m.50s.
Bogota eSSSEZ =17m.13s.
Tamanrasset iZ =7m.55s., eZ =8m.40s. and 12m.54s.
Prague e =8m.36s. and 9m.37s.
Raciborzu eN =8m.42s., ePcPZ =10m.3s., ePPE =10m.17s., ePPPZ =11m.0s.
La Paz iZ =9m.44s., iPS =17m.42s.
Long waves were also recorded at De Bilt, Alicante, Messina, and Potsdam.

Nov. 30d. Readings also at 0h. (Sofia, Tamanrasset, Apia (3), near Athens, and near Taranto), 1h. (Prague, Tchimkent, near Andijan, Dzhergetal, Fergana, Garm, Khorog, Obi-garm, Stalinabad, and near Athens), 2h. (Palisades and near Garm), 4h. (Brisbane), 6h. (Strasbourg), 7h. (near Messina, near Akhalkalaki, and near Santa Clara), 8h. (Stuttgart and Strasbourg), 9h. (Tamanrasset), 11h. (Apia), 16h. (near Alicante (2) and near Erevan), 18h. (Santa Lucia), 19h. (Palisades), 21h. (Apia).

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Dec. 1d. Readings at 0h. (Oaxaca, Puebla, Vera Cruz, and near Tacubaya), 1h. (Apia), 3h. (La Paz), 4h. (Manila), 6h. (Apia and near Dzhergetal), 8h. (Oaxaca, Vera Cruz, near Puebla, and Tacubaya), 9h. (Apia, Collmberg, and Tacubaya), 10h. near Garm and near Sofia), 11h. (near Akhalkalaki, and near Stalinabad), 12h. (Apia), 13h. (near Manila, near Erevan, and near Klyuchi), 14h. (near Dzhergetal), 15h. (Nanking, Collmberg, and near Ashkabad), 16h. (Alicante (3) and near Copiapo), 17h. (Alicante, Bombay, and Poona), 18h. (near Huancayo), 19h. (Tacubaya, near Copiapo and near Huancayo), 20h. (Samarkand, near Dzhergetal, Garm, Khorog, and Obi-garm), 21h. (Besançon and near Copiapo), 22h. (Victoria and near Ili), 23h. (Tamanrasset, near Apia, and near Istanbul).

Dec. 2d. 4h. 40m. 47s. Epicentre 37°·1N. 38°·3E. (given by U.S.S.R.).

A = +·6274, B = +·4955, C = +·6006 ; δ = −13 ; h = −1 ;
D = +·620, E = −·785 ; G = +·471, H = +·372, K = −·800.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Ksara		3·8	212	e 2 4?	+63	i 3 27	+40
Erevan		5·7	53	e 1 26	− 2	2 31	− 4
Abastumanj		5·8	36	e 1 34	+ 5	—	—
Tsikhlis-Dzhvari		6·1	39	1 39	+ 5	—	—
Zugdidi		6·1	26	e 1 36	+ 2	e 2 44?	− 1
Borzhomi		6·2	38	e 1 37	+ 2	—	—
Gori		6·6	41	e 1 46?	+ 5	e 2 58?	0
Sotchi		6·6	9	e 1 40	− 1	—	—
Goris		6·7	67	e 1 41	− 1	3 21	+21
Tiflis		6·8	45	1 56?	+12	e 3 11?	+ 8
Kirovobad		7·3	57	e 1 45	− 5	—	—
Shemakla		8·8	63	2 9	− 2	3 47	− 6
Tamanrasset	z.	31·6	253	e 6 59	+33	—	—

Dec. 2d. 7h. Undetermined shock.

Karapiro N = 32m.0s.
Wellington iP = 32m.30s., eS = 35m.9s.
Cobb River eP?E = 32m.34s., eSE = 35m.10s.
Kaimata ePNE = 32m.52s., eS?NE = 35m.46s.
Christchurch eP? = 33m.1s.
Mineral iPZ = 40m.32s., iZ = 40m.49s.
Mount Wilson iPZ = 40m.50s.
Shasta Dam eP = 40m.55s.
China Lake iPZ = 40m.56s.
Tinemaha iPZ = 40m.57s.
Tucson eP = 41m.9s.
College eP = 41m.29s., e = 43m.49s.
Kiruna iPKPZ = 47m.29s.
Collmberg eZ = 48m.4s. and 48m.18s.
Tamanrasset ePKPZ = 48m.17s.
Stuttgart ePKPZ = 48m.32s.
Brisbane iPZ = 50m.42s. a.
Weston iP = 62m.43s.
Palisades iP = 62m.51s.

Dec. 2d. Readings also at 0h. (Collmberg), 1h. (Apia), 3h. (Apia and Tacubaya), 4h. (near Tananarive), 5h. (Apia, Bogota, near Dzhergetal, and near Garm), 6h. (near Apia and near Dzhergetal), 8h. (near Alicante (2)), 9h. (near Garm (2)), 10h. (near Taranto), 11h. (near Garm), 12h. (near Alicante), 13h. (Apia, Almata, Fergana, Rybach'e, near Almata II, Andijan, Frunse, Ili, near Garm, near Granada, Malaga, and Toledo), 14h. (Apia), 15h. (Tamanrasset), 17h. (Apia (2), Bombay, and Poona), 18h. (Apia (3), 19h. (Hungry Horse, Boulder City, Palomar, Pasadena, China Lake, Tinemaha, Butte, Tucson, Fayetteville, Tamanrasset, Tacubaya, Huancayo, near Antofagasta, and La Paz), 20h. (Collmberg, China Lake, near Ashkabad (2), near Apia, near Dzhergetal, and near Huancayo), 21h. (Apia (2) and Ksara), 22h. (Mount Wilson, China Lake (2), Tamanrasset, near Manila, near Dzhergetal, Garm, Khorog, and Obi-garm), 23h. (Krasnogorka, Rybach'e, near Almata II, Chilisk, Ili, and Przhevalsk).

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Dec. 3d. 6h. 57m. 32s. Epicentre 30°·0N. 92°·0E. (as on 1951, Nov. 21d.).

A = −·0303, B = +·8670, C = +·4975 ; δ = +11 ; h = +2 ;
D = +·999, E = +·035 ; G = −·017, H = +·497, K = −·868.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
New Delhi		13·0	268	e 3 9	0	e 5 22	−13	3 24	PP	5·8
Przhevalsk		16·6	322	e 3 54	− 2	—	—	—	—	—
Hyderabad	N.	17·6	227	e 4 14	+ 6	7 15	− 8	—	—	8·6
Almata II		17·7	323	e 4 5	− 5	—	—	—	—	—
Rybach'e		17·8	317	e 4 8	− 3	—	—	—	—	—
Almata		17·9	323	e 4 10	− 2	—	—	—	—	—
Krasnogorka		18·9	320	e 4 20	− 4	i 7 46	− 7	—	—	—
Frunse		19·0	318	e 4 23	− 3	7 57	+ 3	—	—	—
Andijan		19·2	309	e 4 27	− 1	i 7 58	− 1	—	—	—
Dzhergetal		19·4	305	i 4 37	+ 7	—	—	—	—	—
Fergana		19·4	307	e 4 26	− 4	e 8 0	− 4	—	—	—
Garm		20·0	304	e 4 31	− 6	e 8 13	− 4	—	—	—
Poona		20·1	238	i 4 45	+ 7	i 8 18	− 1	8 44	SS	9·3
Obi-garm		20·3	301	i 4 36	− 4	i 8 19	− 4	—	—	—
Bombay	E.	20·6	242	i 4 53	+10	i 8 35	+ 6	8 51	Q	i 9·8
Stalinabad		21·0	302	i 4 40	− 7	i 8 29	− 8	—	—	—
Tashkent		21·5	308	e 4 53	+ 1	8 47	0	—	—	—
Samarkand		22·6	302	e 5 6	+ 3	e 9 8	+ 1	—	—	—
Nanking		23·0	77	—	—	e 9 35	+21	—	—	e 12·8
Irkutsk		24·0	18	5 21	+ 4	9 41	+ 9	—	—	—
Zi-ka-wei	Z.	25·3	78	—	—	e 10 20	+26	—	—	—
Mary		26·1	294	—	—	e 9 56	−11	—	—	—
Ashkabad		28·9	295	e 6 4	+ 1	—	—	—	—	—
Collmberg	Z.	60·6	315	e 10 14	− 1	—	—	—	—	—
Stuttgart	Z.	63·6	313	e 10 30	− 5	—	—	e 10 36	P	—
Strasbourg		64·5	313	e 10 38	− 3	—	—	—	—	e 34·5
Tamanrasset	Z.	76·1	288	e 11 52	+ 1	—	—	i 11 55	P	—

Additional readings :—
New Delhi SSN = 5m.37s.
Poona iPN = 4m.48s., QE = 8m.25s.?, iE = 8m.31s., SSSE = 9m.0s.
Long waves were also recorded at Hong Kong, Ksara, Potsdam, and Kew.

Dec. 3d. 20h. 55m. 39s. Epicentre 36°·7N. 139°·7E. Depth of focus 0·010.
(as on 1951, Sept. 3d.).

Intensity IV at Ryugasaki, Manabe, Shimozuma ; II-III at Utunomiya, Kumagaya, Tukubasan, Mito, Hunatu, Makabe, Kasama, and Kanuma.
Epicentre 36°·4N. 139°·7E. Depth 70km.

Seismo. Bull. Cent. Met. Obs., Japan, Dec., 1951, Tokyo, 1952, p.337, with macroseismic chart.

A = −·6129, B = +·5198, C = +·5951 ; δ = −2 ; h = 0 ;
D = +·647, E = +·763 ; G = −·454, H = +·385, K = −·804.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Utunomiya	0·2	138	0 15	+ 1	0 23	− 2
Kumagaya	0·6	205	0 15a	− 2	0 24	− 5
Maebasi	0·6	239	0 17a	0	0 26	− 3
Tukubasan	0·6	146	0 16	− 1	0 23	− 6
Mito	0·7	117	0 18	0	0 28	− 3
Inawasiro	0·9	21	0 26	+ 7	0 43	+ 9
Titibu	0·9	215	0 19	0	—	—
Oiwake	1·0	248	0 18	− 2	—	—
Onahama	1·0	76	0 28	+ 8	0 41	+ 5
Tokyo	1·0	177	0 18	− 2	0 28	− 8

Continued on next page.

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	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Hukusima	1·2	30	0 31	+ 8	—	—
Yokohama	1·3	182	0 21	– 3	0 38	– 4
Kohu	1·4	221	0 28	+ 3	0 44	0
Matumoto	1·5	251	0 44	S	(0 44)	– 3
Ajiro	1·7	196	0 26	– 3	0 42	– 9
Misima	1·7	201	0 25	– 4	0 42	– 9
Mera	1·8	177	0 42	+12	—	—
Osima	1·9	188	0 29	– 3	0 48	– 7
Nagoya	2·7	235	0 46	+ 3	—	—

Dec. 3d. Readings also at 0h. (Tacubaya, Fergana, near Dzhergetal, Garm, Khorog, Obi-garm, and Stalinabad), 1h. (Strasbourg, Jena, near Collmberg, and Stuttgart), 2h. (La Paz), 3h. (near Dzhergetal, Garm, Khorog, and Obi-garm), 7h. (China Lake, La Paz, and near Almata II), 9h. (Apia, near Dzhergetal (2), Garm, Khorog and Obi-garm), 10h. (near Dzhergetal), 11h. (near Dzhergetal, Garm, Khorog, and Obi-garm), 12h. (Apia and near Manila), 13h. (Brisbane and near Fort de France) 14h. (near Almata II, near Dzhergetal, Garm, Khorog, and Obi-garm), 15h. (Apia, near Garm, and near Grozny), 16h. (near Garm), 17h. (Besançon, near Barcelona, Tortosa, and near La Paz), 18h. (near Alicante), 19h. (Apia (2) and La Paz), 20h. Huancayo and near Dzhergetal (2)), 22h. (Manila, Andijan, Fergana, Samarkand, near Garm, Obi-garm, Khorog, Dzhergetal, Stalinabad, and near Mizusawa), 23h. (Antofagasta, Samarkand, Stalinabad, near Andijan, Dzhergetal (2), Garm (2), Khorog, Obi-garm, and near Mizusawa).

Dec. 4d. 8h. 50m. 52s. Epicentre 54°·5N. 35°·2W.

A = + ·4766, B = – ·3362, C = + ·8123 ; δ = +1 ; h = –8 ;
D = – ·576, E = – ·817 ; G = + ·664, H = – ·468, K = – ·583.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rathfarnham Castle		17·0	81	i 4 2a	+ 1	e 7 30	+20	i 5 31	?	e 10·1
Kew		21·1	83	—	—	e 7 24	–75	—	—	e 11·3
Seven Falls	E.	23·5	267	e 5 10	– 2	9 27	+ 4	5 48	PP	12·3
Paris		23·9	87	e 5 15	– 1	—	—	e 5 53	PP	e 14·1
Shawinigan Falls	N.	24·9	267	e 5 23	– 3	—	—	—	—	—
Clermont-Ferrand		25·8	94	i 5 36	+ 2	—	—	—	—	e 13·4
Weston		26·5	258	e 5 41	0	—	—	—	—	e 13·6
Harvard		26·6	258	i 5 42	0	—	—	—	—	—
Besançon		26·7	87	e 5 40	– 3	e 6 5	?	e 5 46	P	—
Strasbourg		27·0	83	e 5 49a	+ 4	—	—	e 6 49	PPP	—
Ottawa		27·3	268	e 5 47k	– 1	—	—	—	—	13·7
Stuttgart	Z.	27·8	82	e 5 58?	+ 5	—	—	—	—	—
Kirkland Lake	Z.	28·3	276	e 5 55	– 2	—	—	—	—	—
Kiruna	Z.	28·8	41	i 6 0k	– 2	—	—	—	—	—
Collmberg	Z.	28·8	75	e 6 4	+ 2	—	—	—	—	—
Resolute Bay	Z.	30·5	334	e 6 17	0	—	—	—	—	—
Tamanrasset	Z.	43·9	120	e 8 7	– 3	—	—	e 8 16	P	—
Fayetteville		44·0	270	i 8 10	– 1	—	—	—	—	—
Hungry Horse		47·1	297	e 8 40	+ 5	—	—	—	—	—
College		50·3	330	e 9 0	0	—	—	—	—	—
Ksara		52·6	82	9 8?	–10	—	—	—	—	—
Tucson		56·4	280	e 9 44	– 1	—	—	—	—	—
Tinemaha	Z.	57·0	289	e 9 51	+ 1	—	—	—	—	—
China Lake	Z.	57·6	287	e 9 58	+ 4	—	—	—	—	—
Mount Wilson	Z.	59·0	286	e 10 3	– 1	—	—	—	—	—
Palomar	Z.	59·0	285	e 10 12	+ 8	—	—	—	—	—

Additional readings :—
Paris i = 5m.19s., e = 5m.30s., i = 5m.34s.
Clermont-Ferrand i = 5m.49s., 6m.53s., and 7m.4s.
Long waves were also recorded at Ivigtut, Palisades, Bermuda, and De Bilt.

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Dec. 4d. 11h. Near Tonga Islands.

Apia P =43m.51s., S =45m.9s.
Karapiro ePN =46m.50s.
Wellington eP =47m.22s., eS =51m.10s.
Cobb River ePE =47m.32s., eS?E =51m.26s.
Kaimata ePNE =47m.48s.
Christchurch eP? =47m.59s.
Brisbane iPZ =48m.31s.a.
Mount Wilson eZ =54m.25s.
Palomar eZ =54m.26s.
China Lake iP?Z =54m.31s., eZ =55m.21s.
Kiruna iPKPZ =62m.9s., iZ =62m.17s. and 64m.6s.
Collmberg eZ =62m.13s.
Tamanrasset eZ =62m.36s., iZ =64m.23s., eZ =65m.17s.

Dec. 4d. 11h. 54m. 43s. Epicentre 40°·2N. 72°·0E. (as given by stations of U.S.S.R.).

A = +·2367, B = +·7284, C = +·6429 ; δ = −9 ; h = −2 ;
D = +·951, E = −·309 ; G = +·199, H = +·611, K = −·766.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Fergana	0·2	318	i 0 6	P*	i 0 9	S*	—	—
Andijan	0·6	27	0 14	− 1	0 23	− 3	—	—
Dzhergetal	1·2	212	i 0 24	0	i 0 41	0	—	—
Garm	1·8	227	i 0 33	+ 1	i 0 57	+ 1	—	—
Obi-garm	2·3	229	i 0 43	+ 3	i 1 22	S_g	—	—
Tashkent	2·4	298	e 0 43	+ 2	i 1 8?	− 4	i 1 15?	S*
Stalinabad	3·0	236	e 0 54	+ 4	i 1 29	+ 2	—	—
Frunse	3·3	35	e 0 55	+ 2	i 1 34	− 1	—	—
Rybach'e	3·8	52	e 1 0	− 1	2 8	S_g	—	—
Krasnogorka	3·9	37	e 1 0	− 2	—	—	—	—
Samarkand	3·9	264	e 1 0	− 2	e 2 5	S_g	—	—
Almata	4·8	49	1 16	+ 1	i 2 33	S_g	—	—
Almata II	5·1	51	i 1 18	− 2	e 2 39	S*	2 49	S_g
Ili	5·3	43	i 1 20	− 2	i 2 43	S*	—	—
Przhevalsk	5·3	63	1 19	− 3	—	—	—	—
Chilisk	5·9	53	i 1 36	+ 5	i 3 0	S*	—	—
Mary	8·3	255	—	—	3 33	− 7	—	—
New Delhi	12·4	158	e 2 56	− 5	e 5 6	−15	—	—

Long waves were recorded at Bombay.

Dec. 4d. Readings also at 0h. (Apia, near Bucharest, Campulung, and near Dzhergetal), 1h. (Apia (3) and near Ili), 2h. (Apia), 7h. (near Khorog), 8h. (near Mizusawa and near Manila), 9h. (near Dzhergetal), 10h. (Puebla (2), Vera Cruz (2), and near Tacubaya (2)), 12h. (near Alicante), 14h. (Raciborzu and near Obi-garm), 16h. near Akhalkalaki), 17h. (near Alicante and near La Paz), 18h. (near Palisades), 19h. (Poona and La Paz), 20h. (Tacubaya, near Palisades, and near Apia (2)), 22h. (Tortosa), 23h. (Apia).

Dec. 5d. 6h. 58m. 32s. Epicentre 22°·9N. 121°·5E. (as on 1951, Nov. 29d.).

A = −·4818, B = +·7862, C = +·3869 ; δ = −7 ; h = +4 ;
D = +·853, E = +·522 ; G = −·202, H = +·330, K = −·922.

		Δ	Az.	P.	O−C.	S.	O−C.		Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Hong Kong		6·9	265	1 40	− 5	—	—	—	—	—
Manila		8·3	183	e 1 28	−36	e 3 14	−26	—	—	—
Zi-ka-wei	Z.	8·3	356	e 2 1	− 3	i 3 45	+ 5	—	—	—
Nanking		9·4	346	e 2 19	+ 1	i 4 16	+ 9	e 3 23	?	—
Tomie		11·6	32	e 2 48	− 2	e 7 13	L	—	—	(e 7·2)
Kagosima		11·8	41	e 3 10	PP	—	—	—	—	e 9·3
Nagasaki		12·3	35	e 3 7	+ 8	—	—	—	—	e 9·4
Unzendake		12·5	38	e 3 5	+ 3	—	—	—	—	—
Kumamoto		12·8	38	e 3 19	PP	—	—	—	—	7·1
Saga		12·9	35	e 3 20	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.
Hukuoka		13·2	33	e 3 16a	+ 5	e 5 47	+ 7	—	—	e 6·6
Ooita		13·6	39	e 3 13	− 4	e 5 44	− 6	—	—	e 6·6
Hirosima		14·9	38	e 3 45	PP	—	—	—	—	—
Hamada		15·1	36	e 3 54	PPP	e 6 55	SSS	—	—	e 8·9
Kameyama		17·7	44	4 28?	PP	e 8 0	SS	—	—	e 9·2
Gihu		18·2	45	e 4 22	+ 6	e 8 6	SS	—	—	—
Nagoya		18·2	45	e 4 33	PP	—	—	—	—	—
Omaesaki		18·7	47	e 4 45	PPP	—	—	—	—	—
Shizuoka		19·0	47	e 4 40	PP	e 8 24	SS	—	—	—
Toyama		19·3	42	e 5 1	PPP	e 8 22	SS	—	—	—
Kohu		19·5	45	e 4 49	PP	e 8 40	SS	—	—	—
Matumoto		19·5	44	e 4 42	+11	e 8 34	SS	e 15 34	?	—
Misima		19·5	46	e 4 36	+ 5	e 8 26	SS	e 15 21	?	e 9·6
Ozima		19·6	49	e 4 22	−10	e 7 33	−35	8 21	S	—
Matusiro		19·9	42	i 4 38k	+ 2	i 8 30	SS	—	—	9·7
Nagano		19·9	42	e 4 44	+ 8	8 23	+ 8	—	—	—
Oiwake		19·9	43	e 4 43	+ 7	—	—	—	—	—
Titibu		20·1	44	i 4 40	+ 2	—	—	—	—	—
Maebasi		20·3	43	e 5 0	PP	—	—	e 8 55	PcP	—
Kumagaya		20·4	44	e 5 1	PP	e 9 1	SS	—	—	—
Tokyo		20·4	46	e 4 32	− 9	e 8 6	−19	(e 8 33)	S	e 8·6
Vladivostok		21·9	22	e 4 56	− 1	i 9 2	+ 8	—	—	—
Sendai		22·6	43	e 5 9	+ 6	e 9 28	+21	—	—	e 13·2
Mizusawa	N.	23·3	42	e 5 14	+ 4	e 9 30	+10	—	—	—
Morioka		23·6	42	e 5 16	+ 3	—	—	—	—	—
Miyako		24·1	42	5 17	− 1	e 9 41?	+ 7	—	—	—
Urakawa		26·2	36	e 6 2	+24	e 10 24	+15	—	—	e 12·6
Yuzno-Sakhlinsk		29·5	29	6 11	+ 3	11 11	+ 9	—	—	—
Irkutsk		32·2	340	e 6 32	0	—	—	—	—	—
New Delhi	N.	40·1	288	e 7 37	− 2	i 13 42	− 4	16 35	SS	—
Przhevalsk		40·7	311	7 43	− 1	—	—	—	—	—
Almata II		41·6	311	e 7 52	+ 1	—	—	—	—	—
Ili		42·0	312	7 52	− 2	—	—	—	—	—
Rybach'e		42·3	309	e 7 57	0	14 29	+10	—	—	—
Krasnogorka		43·2	309	i 8 4	0	—	—	—	—	—
Frunse		43·5	308	i 8 7	0	—	—	—	—	—
Poona		44·6	273	i 8 16	0	i 14 53	+ 1	10 3	PP	18·6
Andijan		44·8	305	e 8 15	− 2	15 0	+ 5	—	—	—
Bombay		45·5	274	i 8 37	+14	i 15 20	+15	15 29	PS	22·4
Obi-garm		46·6	303	i 8 30?	− 2	e 15 29?	+ 8	—	—	—
Tashkent		47·2	306	i 8 37	+ 1	—	—	—	—	—
Samarkand		48·8	303	8 46	− 3	—	—	—	—	—
Mary		52·7	302	e 9 18	0	—	—	—	—	—
Sverdlovsk		55·2	324	9 36	− 1	e 17 22	+ 2	—	—	—
Ashkabad		55·5	301	e 9 39	0	—	—	—	—	—
Kizyl-Arvat		57·1	303	9 52	+ 2	—	—	—	—	—
Brisbane		58·6	147	i 10 0k	− 1	—	—	—	—	e 29·0
Baku		61·8	305	e 10 24	+ 1	—	—	—	—	—
Shemakla		62·8	305	10 33	+ 3	—	—	—	—	—
Riverview		63·1	152	10 36	+ 4	e 19 7	+ 5	e 19 27	PPS	e 29·9
Kirovobad		64·5	306	10 39	− 2	—	—	—	—	—
Tiflis		65·5	307	10 49?	+ 2	—	—	—	—	—
Gori		65·9	307	e 10 52	+ 2	—	—	—	—	—
Borzhomi		66·5	307	e 10 53	− 1	—	—	—	—	—
Tsikhlis-Dzhvari		66·5	307	e 10 52	− 2	—	—	—	—	—
Moscow		68·0	323	e 11 0	− 3	—	—	—	—	—
College		69·8	27	e 11 13	− 1	—	—	e 13 43	PP	—
Kiruna		73·1	337	i 11 31	− 3	—	—	—	—	e 38·5
Ksara		74·2	300	i 11 41	+ 1	e 22 3	PPS	—	—	—
Istanbul		77·1	310	e 11 59	+ 2	e 21 50	+ 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.
Upsala		77·2	330	—	—	e 29 0	?	e 35 28	Q	e 39·2
Helwan		79·1	297	12 9	+ 1	e 22 10	+ 3	15 11	PP	—
Resolute Bay	Z.	79·9	9	e 12 12	0	—	—	—	—	—
Collmberg	Z.	83·3	323	e 12 28	− 2	—	—	—	—	—
Cheb		84·2	323	—	—	e 23 41	PS	—	—	e 46·0
Triest		84·5	318	e 12 52	+16	—	—	—	—	e 47·0
Messina		87·8	311	—	—	e 23 45?	+11	e 43 45	Q	e 45·9
Hungry Horse		93·4	34	e 13 18	0	—	—	—	—	—
Alicante		98·3	318	13 52	+11	24 14	[− 5]	19 56	PPP	e 47·0
Pietermaritzburg	Z.	101·9	241	e 28 33	PPS	—	—	—	—	—
Tamanrasset	Z.	102·9	303	17 15	?	e 17 57	?	e 18 18	PP	—
Tucson		105·8	44	e 18 49	PP	—	—	—	—	—
Kimberley	Z.	106·2	244	i 31 33	?	—	—	—	—	—
Bogota		148·7	31	i 20 7	PKP_2	i 30 51	{+40}	—	—	e 64·1
La Paz		168·9	56	i 20 13	[+ 4]	27 8	[− 3]	25 10	PP	—

Additional readings :—
Poona PPPE =10m.30s., PPSE =15m.1s., SSE =18m.11s., SSSE =18m.52s.
Bombay PPE =10m.28s., PPSEN =15m.42s., SSE =18m.58s.
Riverview eE =19m.10s., iScSN =20m.22s.
Helwan ePSZ =23m.0s.
Alicante SS =32m.6s., Q =41m.0s.
La Paz $iPKP_2Z$ =21m.20s.
Long waves were also recorded at Harvard, Weston, Palisades, Bermuda, and at many European stations.

Dec. 5d. 7h. 58m. 39s. (I) ; 8h. 2m. 48s. (II) Epicentre 6°·7N. 82°·5W. (as on 1951, May 11d.).

A = +·1296, B = −·9848, C = +·1159 ; δ = +6 ; h = +7 ;
D = −·991, E = −·131 ; G = +·015, H = −·115, K = −·993.

		Δ	Az.	P.	O – C.	S.	O – C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
I	Balboa Heights	3·7	52	i 1 1	+ 1	i 1 44	− 1	—
II		3·7	52	i 1 2	+ 2	i 1 45	0	—
I	San Juan	19·8	51	i 4 32	− 3	—	—	—
II		19·8	51	i 4 33	− 2	—	—	—
I	Huancayo	20·0	159	e 4 35	− 2	—	—	e 9·6
II		20·0	159	e 4 36	− 1	—	—	—
I	Tacubaya	20·6	310	e 4 48	+ 5	—	—	—
II		20·6	310	e 5 4	PP	—	—	—
I	La Paz	27·1	147	5 39	− 7	—	—	—
II		27·1	147	e 5 0	?	e 9 25	−59	12·8
I	Tucson	36·6	318	e 7 11	+ 1	—	—	—
II		36·6	318	e 7 14	+ 4	—	—	—
I	Hungry Horse	49·4	333	e 8 53	0	—	—	—
II		49·4	333	e 8 54	+ 1	—	—	—
I	College	73·6	337	e 11 34	− 3	—	—	—
II		73·6	337	e 11 35	− 2	—	—	—
I	Tortosa	80·4	50	12 21?	+ 6	—	—	—
I	Tamanrasset Z.	85·6	68	e 12 43	+ 2	—	—	—

Long waves were also recorded to shock I at Alicante and shock II at Granada.

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Dec. 5d. 15h. 53m. 17s. Epicentre 33°·2N. 115°·7W. (as on 1951, Jan. 24d.).

Intensity VII at Brawley, with cracks in road and damage; V at Calexico; IV at Calipatria, El Centro, Yuma, etc. Epicentre 33°·1N. 115°·4W. Macroseismic area 3000 sq.m.

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial No. 762, Washington, 1953, p.15-16, with macroseismic chart p.16.

A = −·3636, B = −·7555, C = +·5450; δ = +1; h = +1;
D = −·901, E = +·343; G = −·236, H = −·491, K = −·838.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
La Jolla	1·4	256	i 0 25	− 2	i 0 41	− 5	—	—
Riverside	1·5	300	i 0 28	0	i 0 55	+ 6	—	—
Pasadena	2·3	295	i 0 45	+ 5	e 1 15	+ 6	—	—
Boulder City	2·8	14	i 0 53	+ 6	e 1 33	+11	—	—
Tucson	4·2	102	i 0 58	− 9	i 1 54	− 3	—	—
Lubbock	11·6	84	e 2 33	−17	—	—	i 3 11	P
Hungry Horse	15·2	4	e 3 46	+ 8	—	—	—	—
Fayetteville	17·9	75	i 4 7	− 5	i 9 21	?	—	—

Pasadena also gives iNZ = 0m.55s., iSN = 1m.19s.
Long waves were recorded at Tacubaya, Puebla, and Harvard.

Dec. 5d. Readings also at 0h. (Kew and near Mizusawa), 1h. (Apia, Nanking, and near Garm), 4h. (near Dzhergetal), 5h. (La Paz and near Mizusawa), 6h. (Oaxaca, near Puebla, Tacubaya, Vera Cruz, Stalinabad, near Obi-garm, Garm, Dzhergetal, and Khorog), 7h. (Mizusawa, Brisbane, Resolute Bay, Tamanrasset (2), Kiruna, Chilisk, near Ili, Almata II, Przhevalsk, and Kurmenty), 8h. (La Paz), 9h. (Huancayo, near Istanbul (2), and near Apia (3)), 11h. (near Dzhergetal), 12h. (La Paz and near Nanking), 14h. (Resolute Bay, China Lake, Tinemaha, and Collmberg), 15h. (Nanking), 16h. (Christchurch), 18h. (Brisbane, Riverview, Christchurch, Wellington, Tamanrasset, Apia, and near Granada), 19h. and 20h. (Apia), 21h. (near Mizusawa), 22h. (Apia (2) and near Dzhergetal), 23h. (near Palisades).

Dec. 6d. 14h. 13m. 10s. Epicentre 36°·0N. 3°·2W.

Felt in the department of Oran. Intensity V at Port Say; IV at Martimprey du Kiss and Médroma.

Annales de l'Institut de Physique du Globe de Strasbourg, 2e partie, Séismologie, 1951, Nouvelle Série, Tome XVI, Strasbourg, 1956, p.82.

A = +·8096, B = −·0453, C = +·5852; δ = −4; h = 0;
D = −·056, E = −·998; G = +·584, H = −·033, K = −·811.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Almeria		1·0	35	i 0 40	S	(i 0 40)	+ 4	—	—
Granada		1·2	345	0 23k	− 1	0 47	+ 6	—	—
Malaga		1·2	307	0 24	0	0 36	− 5	0 32	P_g
Toledo		3·9	351	—	—	e 2 15	S_g	—	—
Algiers Univ.	Z.	5·1	79	e 1 19	− 1	i 2 13	− 7	e 1 47	P_g
Tamanrasset	Z.	15·2	148	e 3 38	0	e 6 9	−19	—	—

Additional readings:—
Almeria P_g = 43s. and 51s., iS_g = 55s.
Granada S = 1m.4s., 1m.14s., and 1m.29s.
Malaga iS_g = 1m.3s.
Algiers Univ. iZ = 2m.31s., eZ = 3m.15s.
Tamanrasset eZ = 5m.40s. and 6m.59s.

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Dec. 6d. 14h. 29m. 19s. Epicentre 5°·7N. 77°·4W.

A = +·2171, B = −·9712, C = +·0987 ; δ = +10 ; h = +7 ;
D = −·976, E = −·218 ; G = +·022, H = −·096, K = −·995.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		3·5	108	i 1 0	+ 3	i 1 43	+ 3	i 12 23	PcS	—
Balboa Heights		3·9	327	i 1 1	− 1	i 1 45	− 5	—	—	—
Galerazamba		5·5	23	i 1 37	P*	i 2 41	+11	—	—	—
Port au Prince		13·7	21	e 3 15	− 3	i 5 53	+ 1	—	—	—
San Juan		16·7	40	e 4 0	+ 3	i 7 18	+15	—	—	—
Huancayo		17·7	173	i 4 11	+ 1	i 7 39	+13	—	—	e 9·7
Fort de France		18·3	61	i 4 19	+ 2	—	—	i 8 7	SS	e 10·1
Merida		19·2	324	e 4 35k	+ 7	e 8 14	+15	—	—	—
Vera Cruz		22·6	309	e 5 17	+14	e 9 5	− 2	e 6 5	PPP	—
La Paz		23·9	156	i 5 14a	− 2	e 9 27	− 3	i 5 53	PP	11·7
Puebla		24·2	306	e 5 25	+ 6	e 9 47	+12	e 5 49	PP	—
Tacubaya		25·2	305	e 5 34	+ 5	e 10 1	+ 9	—	—	—
Columbia		28·4	355	e 5 57	− 1	e 10 44	− 1	—	—	—
Bermuda		29·1	24	e 6 1	− 3	e 10 59	+ 3	—	—	e 14·2
Morgantown		33·8	358	i 6 46	0	—	—	e 8 16	PcP	—
Fayetteville		33·9	336	i 6 44	− 3	—	—	i 6 53	?	—
Pennsylvania		34·9	0	i 6 57	+ 2	e 12 31	+ 4	e 12 39	?	—
Palisades		35·3	7	i 7 4	+ 5	e 12 32	− 1	e 17 20	ScS	e 18·6
Cleveland		35·8	356	e 8 3k	+60	e 12 40	− 1	i 8 10	?	—
Weston		36·9	9	e 7 13	+ 1	e 13 5	+ 7	—	—	—
Harvard		37·0	9	i 7 13	0	e 13 13	+14	—	—	e 18·7
Ottawa		39·6	3	e 7 34	− 1	13 41	+ 3	—	—	—
Shawinigan Falls	N.	40·9	7	e 7 44	− 2	—	—	—	—	—
Tucson		40·9	315	i 7 45	− 1	e 13 35	−23	—	—	—
Seven Falls	E.	41·6	8	—	—	14 11	+ 3	17 9	SS	20·2
Kirkland Lake	Z.	42·4	358	e 7 57	− 1	—	—	—	—	—
Pierce Ferry		45·2	318	i 8 19	− 1	—	—	—	—	—
Nelson		45·5	317	i 8 22	− 1	—	—	—	—	—
Boulder City		45·7	317	e 8 24	0	—	—	—	—	—
Overton		45·7	318	i 8 23	− 1	—	—	—	—	—
Palomar	Z.	45·8	313	i 8 29	+ 4	—	—	—	—	—
Pasadena		47·1	314	i 8 36	+ 1	—	—	—	—	—
China Lake	Z.	47·5	316	e 8 38	0	—	—	—	—	—
Tinemaha	Z.	48·6	316	e 8 48	+ 1	—	—	—	—	—
Fresno	Z.	49·5	315	e 8 53a	− 1	—	—	e 9 3	?	—
Butte		50·4	330	i 8 59	− 2	—	—	—	—	—
Lick	Z.	51·1	315	e 9 6k	0	—	—	—	—	—
Berkeley	Z.	51·8	315	e 9 6	− 6	—	—	—	—	—
Mineral	Z.	52·5	318	e 9 15	− 2	—	—	—	—	—
Hungry Horse		52·7	331	i 9 16	− 2	—	—	—	—	—
Shasta Dam		53·2	319	e 9 17	− 5	—	—	—	—	—
Victoria		57·8	326	9 53	− 2	—	—	—	—	—
Resolute Bay		69·7	356	e 11 9	− 5	e 20 17	− 5	e 28 3	Q	e 35·0
Malaga		73·0	53	i 11 33	0	i 21 43	[+ 7]	i 14 46	PP	40·5
Scoresby Sund		73·6	17	i 10 34	−63	—	—	—	—	—
Toledo		73·6	50	e 11 37	0	—	—	e 14 29	PP	—
Granada		73·7	53	i 11 39a	+ 1	21 8	0	—	—	35·5
Rathfarnham Castle		74·2	36	i 11 46	+ 6	e 21 6	− 8	e 26 4	SS	e 35·7
Almeria		74·6	53	11 45	+ 2	21 35	+17	14 41	PP	42·8
Alicante		76·2	52	11 43	− 9	e 21 35	− 1	14 31	PP	e 36·2
College		76·6	336	e 11 50	− 4	—	—	e 14 2	PP	—
Algiers Univ.	Z.	79·0	54	e 12 4	− 3	—	—	—	—	—
Paris		79·1	41	e 12 17	+ 9	e 22 26	+19	e 15 37	PP	e 49·7
Clermont-Ferrand		79·3	45	i 12 12k	+ 3	—	—	—	—	—
Tamanrasset	Z.	81·3	68	e 12 20	0	e 15 24	PP	e 17 13	PPP	—
Besançon		81·4	43	e 12 21	+ 1	—	—	e 12 26	P	—
Basle		82·4	43	e 12 25	0	—	—	—	—	—
Strasbourg		82·6	42	i 12 27k	+ 1	—	—	—	—	—
Zürich		83·1	43	e 12 30	+ 1	—	—	—	—	—
Stuttgart	Z.	83·5	42	e 12 30a	− 1	—	—	—	—	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Jena		85·0	39	e 12 40	+ 2	—	—	e 12 44	PcP	—
Collmberg		85·8	39	e 12 42	0	—	—	e 13 28	?	—
Prague		86·8	40	e 12 48	+ 1	e 23 22	– 3	e 16 24	PP	—
Triest	Z.	86·8	44	i 12 48k	+ 1	—	—	—	—	—
Kiruna	Z.	87·7	23	i 13 1k	+ 9	—	—	—	—	—
Ksara		105·8	54	e 16 49	?	e 26 59	PS	—	—	—

Additional readings :—
Port au Prince i =3m.22s. and 6m.13s.
Vera Cruz e =9m.54s.
La Paz iS =9m.33s., iSS =10m.9s., iSSS =10m.25s.
Palisades e =17m.53s.
Seven Falls SSSE =17m.54s.
Resolute Bay eZ =11m.19s., eE =21m.11s.
Toledo i =11m.46s., e =14m.48s.
Almeria SS =26m.33s.
Alicante PPP =16m.27s., Q =31m.19s.
Paris e =32m.50s. and 33m.45s.
Tamanrasset eZ =15m.12s.
Besançon e =13m.12s.
Strasbourg e =12m.37s., 13m.27s., and 13m.45s.
Prague e =12m.56s., 13m.13s., 14m.10s., 15m.4s., 21m.11s., and 25m.34s.
Triest eZ =13m.32s. and 13m.57s.
Long waves were also recorded at La Plata and Messina.

Dec. 6d. 19h. 20m. 29s. Epicentre 36°·0N. 137°·6E. Depth of focus 0·040.

Intensity II-III at Mito, Tokyo, and Utunomiya. Epicentre as adopted. Depth of focus 250km.

Seismo. Bull. Cent. Met. Obs., Japan, Dec., 1951, Tokyo, 1952, pp.337-338, with macroseismic chart.

A = –·5988, B = +·5468, C = +·5852 ; δ = +1 ; h = 0 ;
D = +·674, E = +·738 ; G = –·432, H = +·395, K = –·811.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Matumoto	0·4	52	0 36	– 1	1 3	– 3
Iida	0·5	159	0 36	– 1	1 2	– 4
Matusiro	0·7	42	0 36	– 2	1 4	– 4
Toyama	0·7	335	0 39	+ 1	1 6	– 2
Nagano	0·8	36	0 40	+ 2	1 7	– 1
Oiwake	0·8	67	0 42	+ 4	1 7	– 1
Kohu	0·9	115	0 39	0	1 6	– 3
Nagoya	1·0	212	0 38	– 1	1 5	– 5
Maebasi	1·2	71	0 41	+ 1	1 9	– 3
Shizuoka	1·2	148	0 39	– 1	1 9	– 3
Hikone	1·3	236	0 41	0	1 11	– 2
Misima	1·4	129	0 41	– 1	1 12	– 2
Kameyama	1·5	219	0 43	+ 1	1 13	– 2
Kumagaya	1·5	84	0 43	+ 1	1 11	– 4
Ajiro	1·6	128	0 43	0	1 13	– 3
Kyoto	1·8	237	0 43	– 1	1 15	– 4
Tokyo	1·8	100	0 44	0	1 14	– 5
Yokohama	1·8	109	0 44	0	1 16	– 3
Osima	1·9	130	0 42	– 3	1 16	– 4
Utunomiya	1·9	73	0 46	+ 1	1 17	– 3
Tukubasan	2·0	84	0 46	0	1 17	– 5
Mera	2·1	121	0 53	+ 6	1 19	– 4
Osaka	2·1	231	0 47k	0	—	—
Mito	2·3	81	0 49	+ 1	1 23	– 3
Niigata	2·3	31	0 50	+ 2	—	—
Owase	2·3	211	0 47k	– 1	1 22	– 4
Toyooka	2·3	258	0 48k	0	1 26	0
Kobe	2·4	236	0 49k	0	—	—
Shirakawa	2·4	62	0 51	+ 2	1 26	– 2
Inawasiro	2·6	52	0 49	– 2	1 24	– 7

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Sumoto		2·8	233	0 52	– 1	1 31	– 4
Hukusima		2·9	53	0 55	+ 1	1 34	– 2
Takamatu		3·4	241	0 58	– 1	—	—
Sendai		3·5	48	1 1	+ 1	1 45	– 3
Mizusawa		4·2	41	1 12	+ 4	2 0	– 2
Morioka		4·6	36	1 16	+ 3	2 10	0
Miyako		5·0	42	1 18	0	2 13	– 5
China Lake	Z.	80·1	52	i 11 45	+ 6	—	—

Dec. 6d. Readings also at 0h. (near Triest), 1h. (Apia (3) and near Akhalkalaki), 2h. (Collmberg), 3h. (Chilisk, near Almata II, Ili, and Kurmenty), 6h. (Kiruna, New Delhi, Poona, Nanking, Zi-ka-wei, and near Hong Kong), 7h. (near Alicante, Dzhergetal, near Garm, Khorog, and Obi-garm), 8h. (near Klyuchi, and near Tashkent), 9h. (Santa Lucia), 12h. (Huancayo, Palisades, Nanking, near Mizusawa, and near Klyuchi (2)), 14h. (Kiruna, Puebla, near Tacubaya, and near Zürich), 15h. (New Delhi, Chilisk, Fergana, Rybach'e, Tchimkent, near Almata II, Dzhergetal, Garm, Khorog, Obi-garm, Przhevalsk, near Kizyl-Arvat, and near Malaga), 16h. (Ksara and near Istanbul), 17h. (Apia), 19h. (Tsikhlis-Dzhvari, Mount Wilson, China Lake, and Tacubaya), 20h. (near Apia), 21h. (Apia (2), Terre Adélie, Kimberley, Pretoria, Tamanrasset, Ksara (2), Strasbourg (2), Stalinabad, near Dzhergetal, Garm (2), Khorog, and Obi-garm), 22h. (Apia (2), Kiruna, Strasbourg, Tamanrasset, China Lake, and near Dzhergetal), 23h. (Mount Wilson, Palomar, and Collmberg),

Dec. 7d. 20h. 52m. 50s. Epicentre 31°·0N. 90°·5E.

A = – ·0075, B = + ·8587, C = + ·5125 ; δ = + 8 ; h = + 2 ;
D = + 1·000, E = + ·009 ; G = – ·004, H = + ·512, K = – ·859.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	8·7	194	i 2 28	+18	i 4 2	+12	4 57	S_g	—
New Delhi		11·8	262	e 2 52	– 1	i 5 3	– 3	—	—	5·4
Przhevalsk		15·0	323	e 3 40	+ 5	—	—	—	—	—
Almata II		16·1	323	e 3 46	– 3	—	—	—	—	—
Rybach'e		16·2	319	e 3 48	– 2	i 6 54	+ 3	—	—	—
Almata		16·3	322	e 3 47	– 5	—	—	—	—	—
Ili		16·7	324	e 3 57	0	—	—	—	—	—
Krasnogorka		17·3	319	e 4 8	+ 4	—	—	—	—	—
Frunse		17·4	317	e 4 6	0	e 7 21	+ 2	—	—	—
Hyderabad	E.	17·4	222	—	—	9 46	L	—	—	(9·8)
Andijan		17·6	308	e 4 11	+ 3	i 7 33	+10	—	—	—
Dzhergetal		17·7	303	i 4 13	+ 3	—	—	—	—	—
Fergana		17·8	306	e 4 8?	– 3	e 7 36?	+ 8	—	—	—
Garm		18·3	301	e 4 16	– 1	e 7 53	+14	—	—	—
Obi-garm		18·7	300	i 4 22	0	—	—	—	—	—
Stalinabad		19·3	300	i 4 27	– 2	—	—	—	—	—
Poona		19·5	234	i 4 34	+ 3	—	—	—	—	11·8
Tashkent		19·9	307	—	—	i 8 20	+ 5	—	—	—
Bombay		20·0	238	i 4 38	+ 1	e 9 4	SSS	—	—	e 10·9
Tchimkent		20·1	310	i 4 36	– 2	—	—	—	—	—
Samarkand		21·0	300	4 47	0	—	—	—	—	—
Hong Kong		22·8	106	(e 4 52)	–13	(8 23)	–48	—	—	(9·5)
Nanking		24·1	80	i 5 17a	– 1	9 27	– 7	—	—	—
Mary		24·5	295	5 26	+ 4	9 51	+11	—	—	—
Borzhomi		39·0	300	e 7 30	0	—	—	—	—	—
Ksara		45·7	288	e 7 28	–56	e 15 35	+27	—	—	—
Kiruna	Z.	54·2	334	i 9 30	+ 1	—	—	—	—	—
Stuttgart	Z.	62·0	313	e 10 22	– 2	—	—	—	—	—
Tamanrasset	Z.	74·5	287	e 11 41	– 1	—	—	e 13 33	?	—

Additional readings and note :—
Calcutta S*N = 4m.33s.
Poona eS?E = 9m.18s., QE = 10m.25s., SSE = 10m.40s., SSSE = 10m.57s.
Hong Kong readings have been reduced by 4m.
Long waves were also recorded at Potsdam.

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Dec. 7d. 21h. 59m. 52s. Epicentre 43°·7N. 17°·2E.

Intensity IV at Imotski (43°27′N. 17°13′E.). Epicentre as adopted (Strasbourg).

M. D. Uzelac.
Aunnaire macroséismique pour l'Année, 1951, de l'Institut séismologique de Béograd, Nouvelle Série No. 11, Belgrade, 1953, p.58.

A = +·6929, B = +·2145, C = +·6884 ; δ = +2 ; h = −3 ;
D = +·296, E = −·955 ; G = +·658, H = +·204, K = −·725.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		2·6	64	e 0 48k	+ 4	e 1 12	− 5	i 0 51	P_g	—
Triest		3·1	309	e 0 58	P*	i 1 39	S_g	e 1 3	P_g	—
Prague		6·6	344	e 2 19	P_g	e 3 2	+ 4	i 3 18	S*	—
Zürich		7·1	304	e 1 48	0	e 3 39	S*	—	—	—
Stuttgart	z.	7·5	315	e 1 54	+ 1	e 3 24	+ 4	e 2 42	P_g	e 4·6
Basle		7·8	303	e 1 55	− 3	e 3 53	S*	e 2 1	P	—
Collmberg	z.	8·1	341	e 2 17?	P*	e 3 50	+15	e 4 31	S_g	e 5·1
Jena		8·2	334	—	—	e 3 35?	− 3	e 4 27	S_g	e 5·0
Strasbourg		8·2	310	—	—	e 3 45	+ 7	e 4 6	S*	i 5·3

Additional readings :—
Belgrade eP_gS_gZ = 1m.9s., iS_gNW = 1m.26s.
Triest iS_gS_g = 1m.47s.
Prague i = 2m.52s., iE = 3m.14s., eS = 3m.40s. and 3m.48s.
Stuttgart eZ = 1m.57s., 2m.0s., 3m.10s., 4m.18s., and 4m.22s., eS_g?Z = 4m.25s., iS_g?Z = 4m.28s.
Collmberg eP_gE = 3m.10s., eZ = 4m.5s., eE = 4m.15s., 4m.37s., and 4m.42s., eS*?Z = 4m.50s.
Jena eS?E = 3m.38s.?, eN = 4m.2s., eE = 4m.11s., eEN = 4m.38s., eN = 4m.49s.
Strasbourg e = 3m.56s., eS_g? = 4m.46s., e = 4m.50s. and 5m.12s.

Dec. 7d. Readings also at 0h. (Apia (2), Vera Cruz, Puebla, and near Tacubaya), 1h. (Almata II, near Kurmenty, Chilisk, and Ili), 2h. (near Dzhergetal), 3h. (2) and 4h. (Apia), 6h. (Andijan, Fergana, Frunse, Ili, Tchimkent, near Khorog, Kulyab, Dzhergetal, Garm, Obi-garm, and Stalinabad), 8h. (near Dzhergetal), 9h. (Apia), 12h. (Messina, College, Hungry Horse, Shasta Dam, Hungry Horse, Tucson, Pasadena, China Lake, Tinemaha, near Apia, and near Ashkabad), 13h. (Fergana, Samarkand, Andijan, Tchimkent, near Obi-garm, Garm, Stalinabad, Dzhergetal, and Khorog), 15h. (near Puebla, Vera Cruz, and Tacubaya), 16h. (Tsikhlis-Dzhvari and near Alicante (3)), 17h. (Raciborzu and near Tsikhlis-Dzhvari), 19h. (Fergana, near Khorog, Dzhergetal, Garm, Obi-garm, and Stalinabad), 20h. (Brisbane, Riverview, Alberni, near Horseshoe Bay, and Victoria, and near Dzhergetal), 21h. (Christchurch), 22h. (Gori, Kirovobad, near Tiflis, Grozny, Tsikhlis-Dzhvari, Akhalkalaki, Erevan, and Zugdidi).

Dec. 8d. 3h. 40m. 34s. Epicentre 43°·9N. 146°·2E. Depth of focus 0·005.
(as on 1951, Aug. 18d.).

Intensity V at Nemuro, Kusiro, Nakashibetsu, Shibetsu, Kenebetsu, Attoko, Tsurui, Onnebira, Toro ; IV at Tanai, Kutaro, Akubetsu, Shari, Honbetsu, etc. ; II-III at Hatinohe, Miyako, Morioka, Arekinai, Yatiyo, etc.
Epicentre 43°·5N. 146°·2E. (Tokyo). Depth between 30 and 100km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for December, 1951, Tokyo, 1952, pp.338-340, with macroseismic chart on p.338.

A = −·6007, B = +·4021, C = +·6909 ; δ = −13 ; h = −3 ;
D = +·556, E = +·831 ; G = −·574, H = +·384, K = −·723.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Nemuro	0·7	218	0 14a	− 1	0 22	− 5	—	—
Abasiri	1·4	275	0 28k	+ 4	0 45	+ 2	—	—
Kusiro	1·6	235	0 24k	− 3	0 43	− 4	—	—
Asahigawa	2·8	268	0 44k	0	1 15	− 2	—	—
Urakawa	3·0	235	0 45	− 2	2 19	+57	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Sapporo		3·6	260	0 55	0	1 39	+ 2	—	—
Yuzno-Sakhlinsk		3·9	323	1 6	+ 7	1 48	+ 4	—	—
Muroran		4·1	250	1 0	− 2	1 55	+ 6	—	—
Mori		4·5	249	1 8k	+ 1	1 59	0	—	—
Hatinohe		4·8	228	1 4	− 8	1 57	−10	—	—
Aomori		5·1	235	1 15	− 1	2 9	− 5	—	—
Miyako		5·3	219	1 12	− 7	2 2	−17	—	—
Morioka		5·6	224	1 19	− 4	2 14	−13	—	—
Mizusawa		6·1	221	1 28	− 2	2 26	−13	—	—
Akita		6·2	230	1 31	0	2 35	− 6	—	—
Isinomaki		6·6	216	1 29	− 8	2 21	−30	—	—
Sakata		6·9	226	1 40	− 1	2 50	− 9	—	—
Sendai		6·9	218	1 35	− 6	2 43	−16	—	—
Yamagata		7·2	220	1 45	0	2 53	−13	—	—
Hukusima		7·5	218	1 44	− 5	2 58	−16	—	—
Onahama		8·0	212	1 51	− 5	3 8	−18	—	—
Niigata		8·0	225	1 56	0	—	—	—	—
Shirakawa		8·2	216	1 57	− 2	3 3	−28	—	—
Aikawa		8·4	229	1 57	− 5	3 22	−14	—	—
Mito		8·7	213	1 54	−12	3 27	−16	—	—
Utunomiya		8·8	216	2 0	− 7	3 28	−18	—	—
Tukubasan		9·0	214	2 1	− 9	3 32	−19	—	—
Tyosi		9·1	209	1 52	−19	3 41	−12	—	—
Takada		9·1	225	2 49	+38	—	—	—	—
Maebasi		9·3	219	2 10	− 4	3 45	−13	—	—
Kumagaya		9·3	217	2 11	− 3	3 44	−14	—	—
Nagano		9·5	223	2 19	+ 2	3 47	−16	—	—
Matusiro		9·5	203	2 35	+18	3 45	−18	—	—
Tokyo		9·6	214	2 8	−10	3 46	−19	—	—
Oiwake		9·6	220	2 30	+12	—	—	—	—
Wazima		9·6	231	2 24	+ 6	—	—	—	—
Yokohama		9·8	213	2 36	+15	3 56	−14	—	—
Toyama		9·9	227	3 9	+47	—	—	—	—
Matumoto		9·9	222	2 37	+15	4 2	−10	—	—
Kohu		10·1	218	2 38	+13	4 3	−14	—	—
Misima		10·4	215	2 17	−12	4 7	−18	—	—
Osima		10·5	212	2 24	− 6	4 7	−20	—	—
Vladivostok		10·5	271	e 2 27	− 3	e 4 16	−11	—	—
Gihu		11·2	224	2 46	+ 6	—	—	—	—
Hikone		11·5	225	2 42	− 2	—	—	—	—
Takamatu		13·4	229	3 20	+11	—	—	—	—
Nanking		24·5	251	i 5 14k	0	9 1	−26	—	—
Irkutsk		28·9	303	e 6 10	pP	—	—	—	—
College		41·4	36	i 7 43	+ 2	—	—	i 7 58	pP
Przhevalsk		48·2	294	8 36	0	—	—	—	—
Ili		48·4	296	i 8 37	0	—	—	—	—
Almata II		48·5	296	i 8 39	+ 1	—	—	—	—
Almata		48·8	295	e 8 43	+ 2	—	—	—	—
Rybach'e		49·7	295	i 8 47	0	—	—	—	—
Krasnogorka		50·0	296	i 8 49	− 1	—	—	—	—
Andijan		53·0	294	i 9 11	− 1	—	—	—	—
Fergana		53·5	294	i 9 16	0	—	—	—	—
Tchimkent		54·0	297	i 9 20	0	—	—	—	—
Dzhergetal		54·5	294	i 9 23	0	—	—	—	—
Resolute Bay	z.	55·0	17	i 9 27k	0	—	—	—	—
Obi-garm		55·8	293	i 9 32	− 1	—	—	—	—
Stalinabad		56·5	294	i 9 37	− 1	—	—	—	—
Samarkand		57·1	296	e 9 41	− 1	—	—	—	—
Kiruna	z.	61·4	340	i 10 12k	0	—	—	i 11 4	PcP
Shasta Dam		64·2	57	i 10 1	−29	—	—	—	—
Hungry Horse		64·4	47	e 10 33	+ 1	—	—	—	—
Poona	z.	64·8	272	i 10 32	− 2	—	—	—	—
Mineral	z.	64·9	57	i 10 35k	0	—	—	—	—
Butte		66·6	48	e 10 46	0	—	—	—	—
Lick	z.	66·7	60	e 10 40a	− 6	—	—	—	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Grozny		67·9	310	10 53	– 1	—	—	—	—
Fresno	Z.	68·2	59	e 11 12	pP	—	—	—	—
Tinemaha	Z.	69·0	58	i 11 18	pP	—	—	i 11 32	?
Tiflis		69·4	309	i 11 5	+ 2	—	—	—	—
Gori		69·7	309	e 11 7	+ 2	—	—	—	—
Tsikhlis-Dzhvari		70·2	309	i 11 11	+ 3	—	—	—	—
China Lake	Z.	70·2	59	e 11 8	0	—	—	i 11 24	pP
Borzhomi		70·2	310	e 11 9	+ 1	—	—	—	—
Pasadena	Z.	70·9	60	i 11 28	pP	—	—	—	—
Brisbane	Z.	71·3	174	i 11 12k	– 3	—	—	—	—
Riverside	Z.	71·5	60	e 11 15	– 1	e 11 39	sP	i 11 33	pP
Boulder City		71·8	57	i 11 19	+ 1	—	—	i 11 36	pP
Palomar	Z.	72·2	60	e 11 38	pP	i 11 44	sP	i 12 0	?
Tucson		76·7	58	e 11 47	+ 1	—	—	—	—
Collmberg		76·9	332	i 11 48	+ 1	e 12 35	?	i 12 6	pP
Prague		77·4	331	i 11 54	+ 4	e 13 17	?	i 12 15	pP
Jena		77·7	332	e 11 52	+ 1	e 12 18	sP	e 12 11	pP
Istanbul	Z.	78·3	317	e 11 56	+ 1	—	—	—	—
Stuttgart	Z.	80·3	333	e 12 6	+ 1	—	—	e 12 25	pP
Strasbourg		80·9	334	i 12 10	+ 1	—	—	e 12 29	pP
Zürich		81·7	333	e 12 15	+ 2	—	—	—	—
Basle		81·9	334	e 12 15k	+ 1	—	—	—	—
Paris		82·3	337	i 12 18	+ 2	e 12 26	PcP	i 12 38	pP
Fayetteville		83·3	46	i 17 23	PPP	—	—	—	—
Ottawa		83·6	28	e 12 23	0	—	—	—	—
Morgantown		87·0	34	e 12 40	+ 1	—	—	—	—
Tamanrasset	Z.	104·5	322	i 18 9	PP	—	—	—	—

Additional readings :—
Riverside eZ = 11m.56s.
Jena eN = 11m.55s.

Dec. 8d. 4h. 14m. 17s. Epicentre 33°·7S. 57°·7E. (as on 1949, Oct. 7d.).
(Focus at Base of Superficial Layers).

A = +·4455, B = +·7047, C = –·5523 ; δ = +11 ; h = +1 ;
D = +·845, E = –·534 ; G = –·295, H = –·467, K = –·834.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		17·3	325	i 4 1	+ 1	i 7 13	+ 3	i 4 10	pP	—
Heard Island		22·5	153	(i 5 14)	+16	—	—	(i 5 22)	pP	(e 9·0)
Pietermaritzburg	Z.	23·6	274	i 5 2	– 7	—	—	—	—	—
Grahamstown	Z.	25·9	263	(i 5 54?)	+23	—	—	—	—	—
Pretoria	Z.	26·7	281	i 5 32	– 6	—	—	—	—	—
Kimberley	Z.	28·5	271	i 5 47	– 7	—	—	—	—	—
Kodaikanal	E.	47·6	27	i 8 38	+ 4	i 15 47	+20	10 32	PP	22·7
Perth		48·3	105	i 8 53	+13	i 15 56	+19	11 38	PPP	—
Djakarta		53·0	70	i 9 21a	+ 5	i 16 54	+12	—	—	—
Poona		54·2	19	i 9 23	– 1	i 17 3	+ 5	12 38	PPP	25·7
Bombay		54·3	18	i 9 27	+ 2	i 17 8	+ 9	14 35	PcS	25·7
Hyderabad	N.	54·6	25	i 9 28	0	i 17 12	+ 9	21 3	SS	—
Calcutta	E.	63·1	32	i 10 36a	+10	i 19 6	+12	15 13	PcS	29·2
New Delhi	N.	64·6	19	i 10 35k	– 1	i 19 18	+ 6	20 29	ScS	—
Lome		66·5	295	i 10 49	+ 1	i 19 46	+11	i 13 19	PP	e 28·0
Dehra Dun	N.	66·5	19	(e 10 40)	– 8	(e 19 28)	– 7	—	—	(28·4)
Ksara		70·2	341	i 11 11	0	20 38	sS	—	—	—
Mary		71·0	4	i 11 17	+ 1	—	—	—	—	—
Kizyl-Arvat		72·4	359	11 23	– 2	—	—	—	—	—
Stalinabad		72·6	9	i 11 26	0	i 21 4	sS	—	—	—
Lenkoran		72·6	352	11 25	– 1	20 59	+12	e 14 15	PP	—
Obi-garm		72·9	10	i 11 28	0	i 21 6	sS	—	—	—
Garm		73·3	11	i 11 28	– 2	—	—	—	—	—
Samarkand		73·5	7	i 11 31	0	—	—	—	—	—
Dzhergetal		73·6	12	i 11 33	+ 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Goris		73·6	352	i 11 31	– 1	—	—	—	—	—
Baku		74·1	354	i 11 36	+ 1	e 21 21	sS	—	—	—
Shemakla		74·4	353	11 37	+ 1	—	—	—	—	—
Erevan		74·5	350	i 11 36	– 1	—	—	—	—	—
Riverview		74·7	121	i 11 40	+ 2	i 21 17	+ 6	i 14 22	PP	e 35·1
Kirovobad		74·8	352	i 11 37	– 2	—	—	—	—	—
Fergana		74·9	11	i 11 37	– 2	—	—	—	—	—
Tamanrasset	Z.	75·0	311	i 11 37a	– 3	e 21 21	+ 7	i 11 45	pP	33·6
Andijan		75·3	11	i 11 36?	– 6	i 21 31?	+14	i 11 53	PcP	—
Tashkent		75·4	9	e 11 43	+ 1	i 21 35	sS	i 11 57	PcP	—
Akhalkalaki		75·9	349	e 11 46	+ 1	—	—	—	—	—
Tiflis		76·0	350	i 11 45	– 1	i 21 39	sS	i 26 25	SS	—
Tsikhlis-Dzhvari		76·2	349	i 11 47	0	—	—	—	—	—
Abastumanj		76·3	348	e 11 48	+ 1	—	—	—	—	—
Gori		76·3	350	e 11 49	+ 2	i 21 42	sS	—	—	—
Borzhomi		76·3	349	e 11 47	0	—	—	—	—	—
Tchimkent		76·4	9	i 11 48	0	—	—	—	—	—
Makhach-Kala		76·9	353	11 51	0	21 49	sS	—	—	—
Manila		77·0	62	i 11 51	0	i 21 42	+ 6	i 11 58	pP	—
Hong Kong		77·4	52	11 54	+ 1	i 21 50	+10	—	—	34·8
Grozny		77·4	351	i 11 52	– 1	—	—	—	—	—
Rybach'e		77·6	14	e 11 54	0	21 55	sS	i 12 5	PcP	—
Frunse		77·8	13	i 11 55	– 1	—	—	—	—	—
Athens		78·0	333	i 11 55k	– 2	e 21 53	+ 6	i 12 38	pP	—
Krasnogorka		78·2	13	i 17 20	PPP	—	—	—	—	—
Almata II		78·7	14	12 0	0	—	—	—	—	—
Sotchi		78·7	347	i 11 59	– 1	—	—	—	—	—
Istanbul		78·9	338	e 12 1	– 1	i 22 7	sS	i 12 8	pP	—
Ili		79·3	14	i 12 2	– 2	i 22 12	+12	—	—	—
Brisbane		79·4	116	i 12 2a	– 2	i 22 12	+10	i 12 26	pP	—
Theodosia		80·9	344	i 12 12	0	—	—	—	—	—
Simferopol		81·2	343	12 12	– 2	22 28	+ 8	—	—	—
Messina		81·6	328	i 12 14k	– 2	e 22 40	sS	i 12 25	pP	—
Sofia		82·3	335	i 12 19	– 1	i 22 39	+ 7	i 12 30	pP	—
Taranto		82·7	330	i 12 11	–11	22 42	+ 6	e 16 41	?	e 34·7
Punta Arenas	N.	82·7	208	12 22	0	e 22 49	+13	—	—	35·0
Kaimata	N.E.	82·9	137	e 12 26	+ 3	e 22 33	– 5	—	—	—
Christchurch		82·9	138	e 12 21	– 2	i 22 45	+ 7	i 12 29	pP	e 38·2
Bucharest		82·9	338	e 12 24	+ 1	e 22 46	+ 8	i 15 39	PP	41·7
Tunis		83·0	324	e 12 21	– 2	e 22 39	0	i 12 32	pP	e 37·7
Campulung	N.	84·0	337	e 12 28	0	e 23 0	+11	—	—	—
Kishinev		84·4	340	12 28	– 2	22 58	+ 5	15 56	PP	—
Cobb River	E.	84·6	136	e 12 33	+ 2	—	—	—	—	—
Belgrade		85·2	334	i 12 33a	– 1	i 23 9	+ 9	i 12 47	sP	e 41·7
Wellington		85·6	137	e 12 35	– 1	i 23 3	– 1	i 28 38	SS	e 39·2
M'Bour		85·6	290	e 12 42	+ 6	i 23 26	sS	i 15 55	PP	e 36·9
Rocca di Papa		85·7	328	e 12 41	+ 4	e 23 13	+ 8	—	—	—
Timisoara		85·7	336	e 12 40	+ 3	e 23 17	ScS	e 16 0	PP	e 35·7
Rome		85·9	328	i 12 36k	– 2	e 23 7	0	i 12 44	pP	e 36·1
Algiers Univ.	Z.	86·7	319	i 12 10k	–32	e 22 58	[– 5]	e 24 2	PS	—
Nanking		87·1	48	12 43k	– 1	23 27	+ 8	—	—	—
Kecskemet		87·2	335	e 12 48	+ 4	—	—	e 12 59	pP	—
Kalossa		87·2	335	12 46	+ 2	e 23 20	0	i 13 2	sP	e 39·7
Budapest		87·9	335	12 47	0	23 28	+ 1	16 27	PP	36·7
Uzhgorod		87·9	337	12 46	– 1	e 23 17	[+ 7]	16 23	PP	—
Florence		88·0	329	i 12 33	–15	i 23 3	[– 8]	24 50	PPS	—
Prato		88·1	329	i 12 45	– 3	i 24 21	PS	—	—	—
Zi-ka-wei	Z.	88·2	50	i 12 47	– 2	i 23 33	+ 4	—	—	—
Karapiro	N.	88·3	135	e 13 14	+25	—	—	e 10 36	?	—
Lwow		88·4	339	i 12 48	– 2	e 23 24	– 7	e 16 28	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.
Triest		88·4	331	i 12 49k	– 1	i 23 31	0	e 13 21	pP	36·5
Bologna		88·5	329	e 12 49	– 1	e 27 54	?	e 16 37	PP	e 38·4
Ogyalla		88·6	335	e 12 52	+ 1	e 23 28	– 5	e 13 4	pP	e 36·2
Tuai	N.	88·6	136	e 12 56	+ 5	e 23 23	[+ 8]	—	—	e 39·7
Skalnate Pleso		89·0	337	12 57	+ 4	e 23 35	– 1	e 13 7	pP	e 36·7
La Plata		89·0	228	12 43	–10	23 7	[–11]	16 19	PP	40·7
Buenos Aires		89·5	228	12 50	– 5	23 30	[+ 9]	—	—	—
Vienna		89·6	333	i 12 54	– 2	e 23 53	+11	e 16 30	PP	—
Almeria		89·8	316	i 12 53	– 3	23 20	[– 2]	30 0	PSS	45·5
Alicante		89·8	318	i 13 2	+ 6	i 23 38	– 6	13 12	pP	e 41·6
Pavia		90·0	328	e 12 56	– 1	e 24 6	sS	i 13 3	P	—
Sverdlovsk		90·2	2	i 12 53	– 5	23 35	[+10]	25 11	PS	—
Barcelona		90·5	322	i 13 4	+ 4	i 23 43	– 7	16 39	PP	e 36·6
Raciborzu		90·5	336	e 12 58	– 2	e 23 58	+ 8	i 13 7	pP	e 36·7
Granada		90·7	315	i 12 58a	– 3	i 23 46	– 6	i 13 8	pP	i 45·7
Moscow		90·7	349	i 12 59	– 2	24 0	+ 8	i 16 38	PP	—
Malaga		90·9	315	i 13 1	– 1	i 23 43	–11	18 37	PPP	42·5
Tortosa		91·0	320	i 13 9?	+ 7	i 23 58?	+ 3	—	—	—
Chur		91·1	329	e 13 1k	– 2	e 24 2	+ 6	—	—	—
Prague		91·8	334	e 13 4	– 2	e 23 49	–13	e 13 56	pP	e 37·7
Zürich		92·0	329	e 13 5k	– 2	e 23 38	[+ 3]	e 30 31	SS	—
Neuchatel		92·4	328	e 13 7	– 2	e 23 45	[+ 8]	—	—	—
Basle		92·5	329	e 13 7k	– 2	e 24 17	+ 9	e 16 31	PP	—
Cheb		92·6	332	e 13 11	+ 1	e 23 51	[+13]	e 14 3	?	e 39·7
Stuttgart		92·8	331	e 13 8k	– 2	i 23 58	–12	i 13 19	pP	e 38·7
Toledo		92·8	317	i 13 8	– 2	i 24 8	– 2	i 13 16	pP	40·7
Clermont-Ferrand		93·2	325	i 13 13	+ 1	e 23 19	[–23]	(e 31 1)	PSS	e 31·0
Strasbourg		93·2	330	e 13 11k	– 1	i 23 54	[+12]	i 13 59	sP	i 39·7
Karlsruhe		93·3	330	e 13 10	– 3	e 23 57	[+15]	i 13 21	pP	e 37·7
Collmberg		93·3	333	i 13 12	– 1	e 24 0	SKKS	e 13 20	pP	e 39·2
Sonneberg		93·3	333	e 13 15?	+ 2	e 23 55	[+13]	e 13 19	pP	e 36·7
Jena		93·6	333	e 13 11	– 3	e 23 45	[+ 1]	e 13 15?	PcP	e 34·7
Yakusima		93·8	55	—	—	e 23 55	[+10]	—	—	—
Potsdam		94·2	334	i 13 18a	+ 1	i 23 55	[+ 7]	i 17 17?	PP	e 36·7
Kagosima		94·5	55	e 13 25	+ 7	(31 14)	PSS	e 17 14	PP	e 31·2
Irkutsk		94·8	27	13 18	– 2	23 49	[– 2]	25 59	PS	—
Lisbon		95·0	314	i 13 18a	– 2	24 19	–10	14 12	pP	40·3
Unzendake		95·0	53	13 29	+ 9	e 23 59	[+ 7]	(34 51)	SSS	34·8
Miyazaki		95·3	55	—	—	i 24 2	[+ 9]	—	—	e 37·1
Coimbra		95·5	315	13 21	– 2	23 38	[–17]	17 24	PP	48·6
Hukuoka		95·6	53	e 13 31	+ 8	e 23 40	[–15]	e 26 7	PS	e 38·4
Paris		95·7	327	i 13 23	– 1	i 23 53	[– 3]	i 13 31	pP	e 51·7
Pulkovo		95·8	346	13 21	– 3	i 24 7	[+11]	i 19 28	PPP	—
Ooita		96·2	54	e 13 31	+ 5	e 23 41	[–18]	(e 35 7)	SSS	e 35·1
Witteveen	Z.	96·9	332	i 13 30	+ 1	—	—	i 17 35	PP	—
De Bilt		97·0	331	e 13 37	+ 7	e 24 19	[+16]	e 17 36	PP	e 45·7
Copenhagen		97·1	336	i 13 27	– 3	23 53	[–10]	i 13 39	pP	39·7
Helsinki		97·3	344	e 13 35	+ 4	e 24 57	+ 8	e 17 34	PP	e 40·7
Matuyama		97·3	54	e 13 31	0	e 24 8	[+ 4]	e 26 17	PS	—
Santiago		97·4	222	e 13 34	+ 3	e 23 50	[–15]	—	—	—
Santa Lucia		97·5	222	e 13 52	+20	24 31	–19	17 46	PP	45·7
Hamada		97·5	53	e 20 15	?	e 24 15	[+10]	e 26 17	PS	—
Muroto		97·9	55	e 18 5	?	—	—	—	—	—
Takamatu		98·5	54	13 37	+ 1	—	—	—	—	—
Kew		98·9	328	e 13 41	+ 3	e 24 23	[+11]	i 13 50	pP	e 40·7
Upsala		98·9	341	e 13 46?	+ 8	i 25 10	+ 8	e 17 41	PP	e 39·4
Sumoto		99·0	55	e 13 41	+ 3	32 20	PSS	—	—	—
Osaka		99·7	55	e 19 56	PPP	—	—	—	—	—
Owase		99·8	55	13 38	– 4	(32 33)	PSS	—	—	32·6
Kyoto		100·0	54	e 14 0	+17	e 25 35	+23	e 32 21	PSS	e 39·9

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.
Kameyama	100·2	55	e 13 58	+14	e 17 20	PP	e 20 33	PPP	—
Hikone	100·5	54	e 16 48	?	—	—	—	—	e 42·1
Kanazawa	101·5	53	—	—	e 24 30	[+ 5]	—	—	—
Omaesaki	101·5	55	e 21 36	?	—	—	—	—	—
Durham	101·7	330	i 18 19	PP	i 24 45	[+19]	i 27 26	PS	—
Shizuoka	101·8	55	e 17 29	?	e 27 29	PS	e 32 49	PSS	e 42·6
Copiapo N.	101·8	226	17 57	PP	25 39	+12	27 19	PS	—
Valdivostok	102·1	46	e 13 54	+ 2	24 29	[+ 1]	i 27 14	PS	—
Matumoto	102·2	53	e 13 59	+ 6	—	—	e 17 46	PP	e 41·9
Misima	102·3	55	e 14 18	+25	e 18 31	PP	(e 21 11)	?	e 21·2
Matusiro	102·5	53	e 13 49	− 5	24 37	[+ 7]	18 27	PP	41·4
Nagano	102·6	53	e 14 2	+ 7	e 24 30	[0]	(e 33 5)	PSS	e 33·1
Oiwake	102·6	54	e 14 7	+12	—	—	—	—	—
Rathfarnham Castle	102·8	327	e 14 17?	+21	e 24 39	[+ 8]	e 20 25	PPP	e 42·7
Mera	102·8	56	e 18 6	PP	—	—	—	—	—
Yokohama	102·9	56	e 20 13	PPP	—	—	—	—	—
Maebasi	103·0	55	e 14 27	+30	—	—	e 18 51	?	—
Bergen	103·1	336	e 19 23	?	i 24 43?	[+11]	i 27 11	PS	i 50·0
Kumagaya	103·1	55	e 14 5	+ 8	e 24 43	[+11]	33 8	PSS	e 43·1
Tokyo	103·1	56	e 13 39	−18	e 23 46	[−46]	(e 33 5)	SS	e 33·1
Aberdeen	103·6	332	i 14 15	+16	i 25 5	[+30]	i 18 25	PP	43·4
Antofagasta E.	104·6	228	18 30	PP	27 32	PS	33 27	SS	44·2
Yamagata	104·9	54	e 18 27	PP	e 27 49	PS	e 33 44	PSS	—
Sendai	105·0	54	—	—	e 27 58	PS	(e 33 41)	PSS	e 33·7
Kiruna	105·0	346	i 14 4	− 1	i 26 0	+ 7	i 14 18	sP	e 48·2
Akita	105·5	53	—	—	27 55	PS	—	—	e 44·4
Mizusawa	105·8	53	e 18 47	PP	27 32	PS	(e 33 48)	PSS	e 33·8
Aomori	106·5	52	e 19 0	PP	e 25 38	−28	e 28 15	?	—
Miyako	106·7	53	e 17 43?	?	e 28 2?	PS	e 33 41?	SS	e 44·4
Sapporo	108·0	49	e 18 30	[+ 6]	e 26 47	+29	(e 34 13)	PSS	e 34·2
La Paz	108·2	236	i 14 19a	P	i 25 7	[+11]	i 18 43	PP	45·9
Urakawa	108·4	50	e 19 25	?	e 25 2	[+ 6]	(e 34 11)	SS	e 34·2
Yuzno-Sakhlinsk	110·7	47	e 14 30	P	—	—	—	—	—
Apia	113·3	127	e 18 51	[+17]	e 29 54	PPS	e 19 35	PP	e 38·7
Huancayo	116·2	234	e 18 37	[− 3]	e 25 44	[+17]	e 14 58	P	e 47·1
Scoresby Sund	118·0	338	e 18 41	[− 3]	—	—	i 20 2	PP	—
Fort de France	121·9	267	i 18 50	[− 1]	—	—	—	—	—
Ivigtut	126·4	325	e 19 11	pPKP	38 10	SS	21 1	PP	64·7
Bogota	126·7	248	i 18 59	[− 1]	e 25 28	[−34]	i 21 0	PP	61·7
San Juan	127·9	269	i 19 4	[+ 1]	—	—	20 59	PP	—
Galerazamba	131·4	254	i 19 23	pPKP	i 24 57	PPP	i 21 35	PP	—
Bermuda	132·2	285	i 19 9	[− 2]	i 22 38	PKS	i 21 39	PP	e 54·2
Balboa Heights	133·7	249	e 19 21	[+ 7]	—	—	—	—	—
Halifax	134·1	302	21 53	PP	26 45	[+25]	39 39	SS	—
Kingston	136·5	261	e 19 49	pPKP	e 22 57	PKS	e 33 16	PS	—
Resolute Bay	136·8	350	i 19 18	[− 1]	i 28 21	SKKS	i 19 47	pPKP	—
Seven Falls E.	139·3	305	19 17	[− 7]	26 39	[+10]	22 15	PP	—
Weston	139·4	298	e 19 13	[−11]	i 22 48	SKP	i 22 7	PP	—
Harvard	139·6	298	i 19 19	[− 5]	i 40 15	SS	i 22 24	PP	e 64·9
Shawinigan Falls N.	140·6	305	e 19 27	[+ 1]	26 41	[+10]	22 28	PP	—
Vermont	140·9	301	e 19 26	[− 1]	—	—	e 24 16	?	—
Fordham	141·2	295	e 19 18	[− 9]	—	—	i 19 27	PKP	—
Palisades	141·3	295	i 19 18k	[− 9]	e 41 12	SS	i 34 53	PPS	—
City College, N.Y.	141·3	295	i 19 20	[− 7]	—	—	i 22 16	PP	—
Ottawa	142·7	303	i 19 23	[− 7]	26 20	[−14]	22 43	PP	62·0
Washington, N.R.L.	143·5	292	i 19 29	[− 2]	—	—	—	—	—
Washington	143·5	292	i 19 27	[− 4]	—	—	—	—	—
Pennsylvania	144·2	295	i 19 29	[− 3]	i 22 55	PP	e 19 42	pPKP	—
Buffalo (Larkin)	144·9	298	i 19 31	[− 3]	—	—	e 22 57	PP	—
College	145·2	19	i 19 31	[− 3]	—	—	i 23 1	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.
Kirkland Lake		145·4	307	i 19 32	[– 3]	—	—	—	—	—
Morgantown		145·8	291	i 19 32	[– 3]	—	—	e 24 33	?	—
Columbia		145·9	283	i 19 37	[+ 1]	e 23 15	PKS	—	—	—
Honolulu		146·3	103	i 19 37	[+ 1]	—	—	—	—	—
Pittsburgh		146·8	294	i 19 24	[–13]	—	—	i 22 57	PP	—
Cleveland		147·0	296	i 19 34	[– 3]	i 23 16	SKP	e 20 46	pPKP	—
Merida		148·3	255	e 19 43	[+ 4]	e 47 43	SSS	e 19 56	pPKP	—
Chicago		151·6	298	e 19 52	[+ 8]	e 23 9	SKP	—	—	—
Vera Cruz		152·6	246	e 19 59	pPKP	e 27 11	sSKS	e 30 53	SKKS	—
Puebla		154·0	242	e 19 58	pPKP	e 34 15	SKSP	e 24 44	?	—
Tacubaya		154·6	242	e 19 53	[+ 4]	i 23 42	PP	i 20 12	pPKP	—
Fayetteville		156·9	285	i 19 49	[– 3]	i 23 36	PKS	—	—	—
Lawrence		157·6	291	i 19 49	[– 4]	—	—	—	—	—
Lincoln		158·4	297	e 20 15	PKP_2	—	—	e 24 5	PP	—
Saskatoon		158·4	333	e 20 13	[+19]	e 44 19	SS	e 50 19	SSS	64·5
Guadalajara		158·8	237	e 20 8	[+14]	e 43 24	SS	e 24 7	PP	—
Rapid City		161·9	310	e 19 48	[– 9]	—	—	e 24 20	PP	—
Lubbock		163·0	276	e 18 58	[–60]	—	—	i 19 18	pPKP	—
Hungry Horse		164·1	339	i 19 59	[– 1]	—	—	—	—	—
Victoria		165·2	2	20 1	[0]	45 47	SS	20 53	PKP_2	70·7
Bozeman		165·2	327	e 20 2	[+ 1]	—	—	i 24 55	PP	—
Butte		165·6	332	i 19 59	[– 2]	—	—	i 25 2	PP	—
Seattle		166·1	0	i 20 3k	[+ 2]	i 27 5	[+ 5]	i 25 13	PP	—
Tucson		170·3	266	e 20 4	[0]	—	—	i 25 16	PP	—
Shasta Dam		173·0	—	i 19 35	[–31]	—	—	—	—	—
Mineral		173·4	—	e 20 5k	[– 1]	i 25 24	PP	i 20 15	pPKP	e 88·9
Boulder City		173·5	—	i 20 7	[+ 1]	—	—	i 25 43	PP	—
Tinemaha		175·3	—	i 20 7	[+ 1]	i 32 33	SKKS	i 21 48	PKP_2	—
Palomar	Z.	175·5	—	i 20 7	[+ 1]	i 25 49	PP	i 29 44	PcPPKP	—
China Lake	Z.	175·6	—	i 20 7	[+ 1]	i 25 42	PP	i 28 59	PcPPKP	—
Berkeley		175·8	—	e 20 7k	[+ 1]	e 46 1	SS	i 20 17	pPKP	—
Riverside	Z.	175·9	—	i 20 7	[+ 1]	i 27 12	[+ 8]	i 25 41	PP	—
Santa Clara		176·3	—	e 20 17k	pPKP	i 46 54	SS	e 25 55	PP	—
Lick	Z.	176·3	—	e 20 7k	[+ 1]	i 25 43	PP	i 20 18	pPKP	—
Fresno	Z.	176·3	—	e 20 7k	[+ 1]	e 25 43	PP	i 20 18	pPKP	e 86·9
Pasadena		176·5	—	e 20 6	[– 1]	i 32 40	SKKS	i 21 54	PKP_2	e 62·7

Additional readings and notes :—

Tananarive i = 4m.4s., i = 4m.35s., isP? = 4m.59s., iPP = 5m.22s., i = 6m.10s. and 6m.19s., iS = 7m.1s., iSS = 7m.34s.
Heard Island readings have been increased by 16m.
Grahamstown readings increased by 9 minutes.
Kodaikanal PPPE = 11m.20s.
Perth i = 13m.33s.
Poona PSN = 17m.10s., SSN = 20m.43s., QN = 23m.2s., SSSN = 23m.10s.
Bombay iPPEN = 11m.50s., PPPEN = 13m.3s., iPPSEN = 17m.31s., SSEN = 20m.59s., iEN = 21m.26s.
Hyderabad PPN = 11m.54s., ScSN = 19m.29s.
Calcutta PPE = 12m.56s., PSE = 19m.22s., PPSE = 19m.35s., SKSE = 20m.20s., SSE = 23m.5s.
New Delhi iN = 13m.18s., PcSN = 15m.3s., iN = 22m.46s. and 27m.3s.
Lome i = 10m.55s., iPcP = 11m.10s., i = 13m.12s., iPPP = 15m.1s., ePS = 20m.20s., eScS = 20m.37s., eSS = 24m.16s., i = 26m.1s., eSSS = 26m.53s.
Dehra Dun readings have been reduced by 2 minutes.
Lenkoran ePPP = 16m.11s.
Riverview i = 11m.44s., iPcPZ = 11m.56s., iN = 12m.21s., iZ = 13m.17s., iE = 13m.32s., iZ = 14m.34s., iN = 21m.23s. and 21m.32s., iE = 21m.48s. and 22m.3s., iN = 22m.9s., iE = 23m.14s., eQN = 31·0m.
Tamanrasset ePPZ = 14m.37s., eSSZ = 25m.57s., QZ = 30m.15s.
Tashkent iSS = 26m.12s.?
Tiflis iPcP = 11m.55s.
Manila i = 12m.25s., iPP = 14m.45s., ePPP = 16m.38s., eSS = 26m.33s.
Athens i = 12m.7s., 12m.11s., and 14m.52s., iPP? = 15m.9s., eS? = 21m.34s., i = 22m.8s. and 22m.11s., isS = 23m.0s., i = 23m.13s.
Brisbane iPPEN = 15m.12s., iPPPE = 17m.1s., iN = 22m.18s., isSE = 22m.48s., iSSN = 27m.13s.
Messina iPPZ = 15m.32s., eZ = 15m.59s., e = 23m.43s.
Sofia iEN = 23m.45s.
Christchurch ePPZ = 15m.23s., ePPPZ = 16m.23s., ePSEN = 23m.48s., eSSEN = 27m.43s., eSSSEN = 31m.28s., eQEN = 34m.13s.

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Bucharest iPPN =15m.46s., iPPPE =17m.38s., iPPPN =17m.42s., iSN =23m.5s., iPSN =23m.55s., iSSE =28m.25s., iSSN =28m.55s., eSSSE =32m.18s.
Tunis eP =12m.29s., ePP =15m.15s., eS =22m.51s., ePS =23m.11s., eSS =28m.11s., eQ =34·7m. and other unidentified readings.
Belgrade iNW =13m.51s., 17m.48s., and 19m.13s., iPPSNW =24m.17s., eNW =27m.3s.
Wellington i =13m.13s. and 13m.55s., PP =15m.31s., iPPP =18m.21s., iS =23m.13s., iScS? =23m.23s., SSS =32m.43s., iQ =35m.29s.
M'Bour i =13m.37s., ePPP? =20m.8s., ePPS =24m.33s. and 26m.25s., iSS =29m.3s., i =30m.23s., eQ =34m.35s.
Timisoara eScSE =23m.20s., eSE =23m.32s., iSS?N =29m.1s.
Rome ePP =16m.4s., iS =23m.16s., ePS? =24m.28s., ePPS? =24m.50s., eSS =29m.24s.
Algiers University eZ =13m.35s., ePPZ =15m.43s., eZ =22m.19s.
Kalossa eSE =23m.28s., eSN =23m.36s. and other unidentified readings.
Budapest PPN =16m.34s., PPPE =18m.25s., PPPN =18m.32s., iSKSE =23m.19s., SKKSN (or iSE) =23m.33s., PSE =24m.43s.?, PPSN =25m.40s., eSSN =29m.28s., SSE =29m.43s.?, SSSE =33m.13s., SSSN =33m.43s. and other unidentified readings.
Lwow eSS =29m.56s.
Triest iZ =13m.6s., iPP =16m.22s., iPPP =18m.16s., iS =23m.52s., isSKS =24m.30s., iPS =24m.47s., iPPS =25m.34s., iSS =29m.59s., iSSS =33m.19s.
Ogyalla ePE =12m.55s., esP =14m.0s., ePP =16m.9s., ePPPN =18m.16s., eSN = 23m.51s., ePSE =24m.46s., eSSE =25m.19s., eSS =29m.31s., eSSS? =32m.43s. and other unidentified readings.
Skalnate Pleso ePP =16m.1s., ePPP =18m.18s., eSN =23m.50s., eSE =23m.56s., ePS = 25m.5s., ePPS =25m.35s., eSS =29m.43s., eSSS =33m.1s. and other unidentified readings.
La Plata P?Z =12m.49s., N =14m.7s., E =14m.49s., PP?E =16m.31s., E =19m.25s., N =20m.19s., SE =23m.13s.
Almeria iPP =16m.17s., iS =23m.50s.
Alicante iPP =16m.33s., PPP =18m.37s., ScS =24m.9s., PPS =25m.6s., SS =29m.49s., SSS =33m.16s., Q =36m.18s.
Pavia e =14m.30s., 15m.9s., 17m.31s., and 21m.53s.
Barcelona PPP =18m.11s.
Raciborzu iN =13m.23s., iE =14m.12s., iPPN =16m.32s., iPPPN =18m.28s., iN = 24m.35s.
Granada iPP =16m.46s., PPP =18m.28s., SKS =22m.49s., S =24m.22s., PS =25m.4s., iSS =30m.7s., SSS =34m.43s., Q =38·9m.
Moscow SKKS =23m.38s., PS =25m.12s., eSS =29m.41s.?
Malaga iPP =16m.49s.
Prague iP =13m.9s., esP =14m.15s., ePPE =16m.27s., ePP =16m.50s., ipPPN = 17m.31s., esPP =18m.3s., ePPPN =18m.36s., eS =24m.15s., eSP? =24m.58s., ePS =25m.31s., esSE =25m.48s., ePPS? =26m.3s., eSS =30m.7s., eSSS =34m.43s. and other unidentified readings.
Zürich eS =24m.12s.
Basle e =17m.21s.
Cheb ePN =13m.16s., ePPN =17m.7s., epPP =17m.55s., ePPP? =19m.1s., eS? = 24m.18s.?, eSPN =25m.12s., ePSN =25m.38s., eSS =30m.55s., eSSS =34m.16s. and other unidentified readings.
Stuttgart i =14m.26s., iPP =17m.3s., iPPP =19m.5s., i =20m.46s., iPPS? =25m.43s.
Toledo iPP =17m.3s., i =25m.4s., SS =31m.7s., SSS =34m.45s.
Clermont-Ferrand iPP =17m.9s., iPPP =19m.14s., e =24m.43s., ePPS =25m.55s., e =26m.13s. and 26m.31s.
Strasbourg esP? =14m.9s., iPP =16m.53s. and 16m.57s., iPPP =19m.9s., iSKS = 23m.11s., iPS =25m.56s., iPPS =26m.36s., iSS =30m.35s., iSSS =34m.25s., iQ = 38m.0s. and many other unidentified readings.
Karlsruhe i =13m.16s.
Collmberg ipP?EZ =13m.26s., eZ =15m.22s., ePPPZ =19m.17s., eSE =24m.24s., eSSSEN =34m.43s.?
Sonneberg epP?E =14m.8s., eN =15m.2s. and 15m.46s., ePPN =16m.46s., ePPE = 16m.49s., ePPP?N =19m.9s., eSKS?N =23m.58s., eSE =24m.25s., eSN =24m.28s., ePS?N =25m.49s.?, eN =31m.23s.
Jena eZ =13m.25s., iE =13m.34s., epP?E =14m.11s., eN =16m.5s., ePPZ =16m.45s., ePPN =16m.53s., ePPP?N =19m.7s.? and 19m.15s., eN =23m.0s., eSKS?N = 23m.35s., eS?N =24m.26s., eS?E =24m.34s., eS?N =24m.38s., ePS?E =25m.42s., ePS?N =25m.46s. and 25m.51s., eSS?N =30m.6s.
Potsdam iPNZ =13m.23s., iE =24m.39s., iPSZ =25m.48s.
Lisbon iEZ =16m.50s., ePP?EZ =17m.20s., PPP =19m.17s., ? =23m.20s., E =25m.57s., PS =26m.15s., PPSN =26m.51s., SS =31m.8s., SSP =31m.16s.
Coimbra E =16m.21s., N =16m.34s., SEN =24m.13s. and 24m.23s., PSEN =26m.6s., iSSEN =31m.14s., N =38m.31s., Q?EN =40·3m.
Hukuoka ePPP =18m.55s., e =31m.34s., eQN =35m.13s.
Paris iPP =17m.16s., iPPP =19m.33s., iSKKS =24m.15s., iS =24m.27s., iSP =25m.50s., iSPP =26m.24s., iSS =31m.15s. and many other unidentified i readings.
Pulkovo iPP =17m.34s.
De Bilt e =22m.55s., ePS =26m.41s., eSS =32m.35s., eSSS =35m.23s.
Copenhagen i =13m.59s., 17m.32s., and 17m.58s., iS =24m.20s., iPS =26m.23s., SS =32m.7s.
Helsinki eN =16m.23s., iSKSEN =24m.13s., iSSN =31m.48s., eN =34m.32s., eSSSN = 35m.43s.
Matuyama e =17m.12s., 19m.10s., and 23m.25s.

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Santa Lucia N =18m.54s. and 22m.2s., PSN =26m.28s., SSN =31m.58s., SSSN = 35m.43s.?, N =41m.4s.
Kew e =17m.17s., ePP =17m.52s., eS? =25m.17s., cPS =26m.43s., eSS =32m.9s., eSSS =36m.21s.
Upsala ePPE =17m.46s.?, iSKKS =24m.22s., iS?N =25m.21s., iPSN =26m.42s., iPS?E =26m.52s., iSSN =31m.54s., esSSN =32m.32s., eSSSE =35m.54s. and other unidentified readings.
Vladivostok iPP =18m.18s., iS =25m.30s., iSS =32m.48s., iSSS =36m.25s.
Matusiro i =19m.51s., S =25m.45s., PS =27m.35s., PPS =28m.22s., SS =33m.11s., PSPS =34m.5s., SSS =36m.48s.
Nagano ePP =18m.38s., i =27m.31s.
Rathfarnham Castle ePP =17m.50s., e =18m.32s., eZ =18m.55s., eSEN =25m.3s., ePKKP?Z =29m.46s., eSSEN =32m.13s., eSSSEN =36m.33s.
Bergen iZ =19m.31s., iE =33m.21s., iNZ =33m.37s., e =37m.5s., iQEN =43m.19s.
Kumagaya e =17m.54s., PP =18m.48s., e =20m.51s. and 27m.36s.
Tokyo ePPN =17m.20s., ePPPN =19m.16s. and other unidentified e readings.
Aberdeen iE =17m.13s., iPPPE =20m.29s., iPSEN =27m.25s., iPPSEN =27m.46s., iSSE =33m.26s., iSSSEN =37m.11s.
Antofagasta E =36m.42s.
Kiruna iPPEN =18m.30s., iPPEZ =18m.38s., ePPP?Z =20m.19s., iSKSEN =24m.57s., iSKKSN =25m.26s., iPS =27m.48s., iPPS?N =28m.33s., iPPSE =28m.38s., iSS?E =33m.9s., eSSS?N =36m.56s. and many other unidentified readings.
Mizusawa eSE =27m.15s.
Miyako eSSS =37m.29s.?
Sapporo eS =28m.22s.
La Paz iZ =17m.35s. and 18m.19s., iPKS =22m.7s., iPS =28m.15s., iSS =34m.3s., SSS =37m.55s.
Urakawa i =28m.31s.
Huancayo e =19m.2s., iPP =19m.46s., ipPP =20m.25s., ePPP? =22m.19s., eS? = 27m.44s., ePKKP =29m.15s., i =29m.32s., ePPS? =31m.7s., eSS =35m.33s., e =39m.12s.
Ivigtut ? =24m.7s., 31m.14s., and 39m.19s.
Bogota iPPPE =23m.54s., iSSSE =41m.42s.
Galerazamba iSKP =22m.50s.
Bermuda iPPP =24m.39s., iPPS =33m.35s., iSS =39m.16s.
Halifax PKS =22m.51s., e =30m.3s., PPS =33m.52s., SSS =44m.43s.
Kingston eSS =39m.43s.
Resolute Bay iZ =19m.24s., iPP =22m.19s., ipPP =22m.41s., i =23m.56s.
Seven Falls PKSE =23m.3s., PPPE =25m.1s., SKKSE =28m.31s., SKKPE =30m.43s., PPSE =34m.39s., SSE =40m.54s., SSSE =45m.39s.
Weston iSP =32m.33s., eSS =40m.50s.
Harvard iPPP =25m.26s., ipPPP =25m.38s., i =31m.57s., iSKKP =34m.44s., esSS = 40m.56s.
Shawinigan Falls PKSN =23m.15s., PPPN =24m.51s., SKKSN =28m.50s., PPSN = 35m.26s.
Palisades ePP =22m.24s., iPPP =25m.42s. and other unidentified readings.
Ottawa PKS =23m.3s., e =25m.22s., PPP =25m.34s., SKKS =29m.19s., PS =33m.3s., PPS =35m.23s., SS =41m.33s., SSS =46m.33s.
Pennsylvania eN =24m.29s., ePPPE =25m.56s., eZ =27m.33s. and 30m.41s.
Cleveland iPKPZ =19m.37s., ePPS?E =34m.58s.
Merida i =20m.28s. and 21m.51s., ePPP =26m.1s.
Vera Cruz ePKP =20m.3s., e =25m.51s., 27m.51s., 28m.3s., and 28m.58s.
Puebla eSKSP =34m.7s.
Tacubaya ipPP =24m.11s.
Guadalajara e =29m.0s., 32m.46s., and 50m.37s.
Victoria PP =24m.46s., PPP =28m.37s., SKS? =35m.31s., SSS =51m.49s.
Seattle iPKP$_2$ =20m.41s., iPP =25m.38s. and many other unidentified readings.
Mineral iZ =20m.26s., iE =21m.38s., iZ =21m.50s., iPP?Z =25m.41s., iZ =28m.48s., eEN =32m.32s.
Tinemaha iZ =21m.5s., iPPZ =25m.42s.
Palomar iPKP$_2$Z =21m.45s., ePPZ =25m.14s.
China Lake iZ =20m.15s., iPKP$_2$Z =21m.41s., iZ =26m.40s.
Berkeley iZ =21m.49s. and 22m.3s., eZ =25m.24s., ePP?Z =25m.41s., eZ =25m.47s. and 28m.57s., eN =32m.37s.
Riverside iZ =28m.48s., iPcPPKPZ =28m.59s.
Lick iZ =20m.29s., 22m.2s., 25m.52s., 26m.3s., and 29m.5s., eN =32m.41s.
Fresno iZ =20m.29s. and 20m.43s., eZ =21m.45s. and 21m.59s., eE =29m.8s. and 32m.11s.
Pasadena iPKPZ =20m.15s., iPPZ =25m.37s., iPcP,PKPZ =28m.55s., iPPPZ =30m.9s., eSKSPE =37m.7s., eSSE =47m.25s., iSSSEN =55m.13s. and other unidentified readings.
Long waves were also recorded at Simidu. Kobe, Angra do Heroismo, New Plymouth, Manzanillo, and Edinburgh.

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Dec. 8d. 13h. 58m. 22s. Epicentre 6°·2S. 154°·8E. Depth of focus 0·020.
(as on 1951, May 21d.).

A = −·8996, B = +·4233, C = −·1073 ; δ = −2 ; h = +7 ;
D = +·426, E = +·905 ; G = +·097, H = −·046, K = −·994.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		21·2	184	i 4 35a	+ 1	i 8 24	+ 9	i 4 54	pP	—
Riverview		27·7	187	5 38	+ 3	e 10 3	− 1	i 11 31	SS	e 12·7
Apia		33·7	105	6 56	pP	—	—	—	—	—
Karapiro	N.	36·8	152	e 6 53	− 1	e 9 7	PcP	e 7 24	pP	—
Tuai	N.	38·2	152	e 7 6	0	e 12 44	− 3	—	—	—
Cobb River	E.	38·3	158	e 7 2	− 4	—	—	—	—	—
Kaimata	N.E.	39·1	161	e 7 14	+ 1	—	—	—	—	—
Wellington		39·2	156	e 7 14	0	e 13 1	− 1	—	—	—
Christchurch		40·3	160	e 7 25	+ 2	13 24	+ 6	e 16 48	SS	e 19·1
Nanking		51·2	320	i 8 50k	+ 1	16 4	+11	—	—	—
College		82·4	21	i 12 3	− 2	—	—	i 12 46	pP	—
Poona	Z.	83·4	290	i 12 11	+ 1	—	—	—	—	—
Berkeley	Z.	88·2	53	i 12 34k	0	—	—	i 13 15	pP	—
Lick	Z.	88·6	52	e 12 35a	− 1	e 12 58	?	e 13 16	pP	—
Shasta Dam		88·6	49	e 11 36	−60	—	—	—	—	—
Mineral	Z.	89·1	50	e 12 37k	− 1	—	—	—	—	—
Fresno	Z.	90·0	53	e 12 43k	+ 1	—	—	—	—	—
Pasadena	Z.	91·0	56	i 12 47k	0	—	—	i 13 25	pP	—
Tinemaha	Z.	91·3	53	i 12 50	+ 1	—	—	e 13 27	pP	—
Riverside	Z.	91·6	56	i 12 50k	0	—	—	i 13 27	pP	—
China Lake	Z.	91·6	54	i 12 51k	+ 1	—	—	i 13 28	pP	—
Palomar	Z.	92·0	57	i 12 53k	+ 1	—	—	i 13 30	pP	—
Boulder City		93·9	55	i 13 1	+ 1	—	—	i 13 40	pP	—
Hungry Horse		95·4	42	e 13 7	0	—	—	—	—	—
Collmberg	Z.	125·0	332	e 18 43	[+ 2]	—	—	—	—	—
Harvard		125·4	40	i 18 43	[+ 1]	—	—	—	—	—
Triest	Z.	128·2	327	e 18 56	[+ 9]	—	—	—	—	—
Stuttgart		128·6	332	e 18 48	[0]	—	—	e 20 57	PP	—
Bermuda		134·9	49	i 22 16	PKS	—	—	—	—	—
San Juan		138·3	68	i 19 6	[0]	—	—	—	—	—
Granada		143·4	331	19 13a	[− 2]	25 50	[−17]	—	—	—
Tamanrasset	Z.	146·1	303	i 19 22a	[+ 2]	e 22 50	PP	e 19 52	pPKP	—

Additional readings :—
Brisbane iPPN = 5m.4s., isSN = 9m.1s., iSSEN = 9m.12s.
Riverview iN = 10m.27s. and 11m.15s.
Triest eZ = 20m.3s., ePP?Z = 20m.11s.
Tamanrasset iPKP$_2$Z = 20m.3s., epPKP$_2$Z = 20m.23s.

Dec. 8d. Readings also at 0h. (Santa Lucia and Apia (3)), 3h. (Apia, Tacubaya, Ili (2), near Dzhergetal, Garm, Khorog, Obi-garm, Almata II (2), Chilisk (2), and Kurmenty (2)), 4h. (Scoresby Sund (2), near Palisades, near Apia, and near Dzhergetal), 5h. (Tamanrasset, Belgrade, Upsala, and Apia), 6h. (Kiruna, Helsinki, Chilisk, near Almata II, Ili, Kurmenty, and Przhevalsk), 9h. (Tacubaya, Apia (2), and near Dzhergetal), 10h. (Tacubaya, Stalinabad, Tchimkent, near Dzhergetal (2), Fergana, Garm, Khorog, Kulyab, and Obi-garm), 11h. (near Almata II), 12h. (China Lake, Mount Wilson, Tamanrasset, Kiruna, and near Alicante), 13h. (Apia, Brisbane, Riverview, China Lake, Palomar, Pasadena, and Riverside), 14h. (Stuttgart, Collmberg (2), and near Erevan), 15h. (Seattle, Shawinigan Falls, and Kirkland Lake), 16h. (near Almata II, Chilisk, Garm, Kurmenty, and near Dzhergetal (2)), 18h. (Dzhergetal), 19h. (Apia), 20h. (Shawinigan Falls and Kirkland Lake), 21h. (Athens, Messina, Rome, near Taranto, and near Huancayo), 22h. (near Apia).

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Dec. 9d. 12h. 6m. 21s. Epicentre 35°·5N. 140°·4E. Focus at Base of Superficial Layers. (as on 1951, April 13d.).

Intensity IV at Yokohama, Makabe, Manabe, Kamogawa, etc.; II-III at Tyosi, Tokyo, Simidu, etc.
Epicentre 35°·3N. 140°·3E. Depth 20-30km.
Seismological Bulletin of the Cent. Met. Obs., Japan, for December, 1951, Tokyo, 1952, p. 340-341, with macroseismic chart p. 340.

A = −·6287, B = +·5201, C = +·5781; δ = −3; h = 0;
D = +·637, E = +·771; G = −·445, H = +·368, K = −·816.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tyosi		0·4	58	0 7	− 2	0 15	− 1
Tokyo		0·6	289	0 8k	− 4	0 17	− 4
Mera		0·7	219	0 8	− 5	0 18	− 5
Yokohama		0·7	264	0 9	− 4	0 16	− 7
Tukubasan		0·8	341	0 11	− 4	0 23	− 3
Mito		0·9	3	0 15	− 1	0 29	+ 1
Kumagaya		1·0	309	0 17	− 1	0 33	+ 2
Osima		1·1	229	0 13	− 6	0 25	− 8
Utunomiya		1·1	338	0 17	− 2	0 33	0
Ajiro		1·2	247	0 17	− 3	0 27	− 9
Misima		1·2	252	0 17	− 3	0 30	− 6
Titibu		1·2	294	0 18	− 2	0 34	− 2
Maebasi		1·3	313	0 20	− 2	—	—
Kohu		1·5	275	0 24	0	0 43	− 1
Onahama		1·5	16	0 28	+ 4	0 51	+ 7
Shirakawa		1·6	355	0 26	0	—	—
Oiwake		1·7	299	0 28	0	0 51	+ 2
Shizuoka		1·7	252	0 23	− 5	0 45	− 4
Omaesaki		2·0	243	0 37	+ 5	—	—
Matumoto		2·1	290	0 35	+ 2	1 4	+ 5
Matusiro		2·1	301	0 30	− 3	0 58	− 1
Nagano		2·2	203	0 38	+ 3	1 3	+ 2
Hukusima		2·3	1	0 39	+ 3	—	—
Hatidyozima		2·4	191	0 31	− 7	0 57	− 9
Takada		2·4	313	0 41	+ 3	1 20	SS
Yamagata		2·7	359	0 54	PP	—	—
Nagoya		2·8	263	0 45	+ 2	1 20	+ 4
Sendai		2·8	8	0 47	+ 4	1 29	SS
Toyama		2·8	294	0 55	PP	1 28	SS
Gihu		3·0	268	0 45	− 1	1 21	− 1
Aikawa		3·1	325	0 57	PP	1 33	SS
Kanazawa		3·2	289	0 53	+ 4	1 40	SS
Kameyama		3·3	261	1 12	PP	1 58	SS
Tu		3·3	258	0 57	+ 6	1 39	+10
Hikone		3·4	269	0 55	+ 3	1 36	+ 4
Hukui		3·4	281	0 49	− 3	—	—
Mizusawa	E.	3·7	8	1 16	PP	1 55	SS
Owase		3·8	249	1 15	PP	—	—
Kyoto		3·9	262	1 6	+ 7	1 49	+ 5
Akita		4·2	356	1 7	+ 4	—	—
Morioka		4·2	6	1 6	+ 3	—	—
Kobe		4·4	259	1 23	PP	2 14	SS
Toyooka		4·6	275	1 23	PP	2 19	SS
Sumoto		4·7	257	1 43	+33	—	—

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Dec. 9d. Readings also at 0h. (near Fort de France), 1h. (Apia, Grahamstown, Kirkland Lake, and Tamanrasset), 2h. (Apia and Pasadena), 3h. (Tacubaya, Mount Wilson, Palomar, China Lake, Tinemaha, Lick, Mineral, Tsikhlis-Dzhvari, and near Ashkabad), 4h. (Apia, Kiruna, and Ashkabad), 5h. (Mount Wilson, Riverside, Palomar, China Lake, Puebla, Vera Cruz, and near Tacubaya), 7h. (Apia, Kiruna, Khorog, Obi-garm, Stalinabad, near Andijan, Dzhergetal, and Garm), 8h. (near Garm (2) and near Merida), 9h. (Andijan, Fergana, Samarkand, near Apia, near Dzhergetal, Garm, Khorog, Obi-garm, and Stalinabad), 10h. (Ashkabad and Ksara), 11h. (Kimberley, Pietermaritzburg, Pretoria, Tamanrasset, and near Apia), 12h. (near Alicante, Apia, and Grahamstown), 13h. (Apia, New Plymouth, Kaimata, near Christchurch, Cobb River, Karapiro, Tuai, and Wellington), 15h. (Apia (2)), 17h. (La Plata, Santa Lucia, Huancayo, near Alicante, and near Ashkabad (2)), 18h. (Christchurch, Nanking, Poona, Tamanrasset, Kimberley, Pretoria, Mount Wilson, China Lake, Tinemaha, Vera Cruz, near Oaxaca, Puebla, Tacubaya, and Apia (2)), 19h. (Apia and China Lake), 20h. (Grahamstown (2)), 21h. (Apia, near Algiers Univ., and near New Delhi), 23h. (Zürich and near Palisades).

Dec. 10d. Readings at 0h. (Tsikhlis-Dzhvari), 1h. (Bermuda), 2h. and 3h. (near Istanbul), 4h. (near Tsikhlis-Dzhvari), 5h. (near Garm), 8h. (near Apia (2)), 9h. (Santa Lucia, Mizusawa, and near Algiers Univ.), 10h. (Kimberley, Ksara (2), Strasbourg, Stuttgart, Triest, China Lake, Riverview, Auckland, Christchurch, Wellington, and near Apia (2)), 11h. (Besançon, Apia, and near Alicante), 12h. (Apia, near Alicante, and near Goris), 13h. (Apia and near Garm), 14h. (near Ashkabad and near Apia), 15h. (Manila, Tamanrasset, and Algiers Univ.), 16h. (Apia and near Zürich), 17h. (Apia, Tsikhlis-Dzhvari, and near La Plata), 18h. (Ashkabad), 19h. (near Palisades), 20h. (Apia (2), Almata, Almata II, near Garm, Obi-garm, Dzhergetal, Fergana, Kulyab, Stalinabad, Andijan, Tashkent, Samarkand, Tchimkent, and Frunse), 21h. (Apia, Istanbul, Messina, Prague, and near Akhalkalaki).

Dec. 11d. 21h. 0m. 23s. Epicentre 37°·1N. 71°·2E. (as on 1951, September 15d.).

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

	Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Garm	2·0	340	i 0 40	+ 5	i 1 5	S_g	—	—	—
Obi-garm	2·0	324	i 0 42?	+ 7	e 1 8?	S_g	—	—	—
Dzhergetal	2·1	0	i 0 41	+ 4	—	—	—	—	—
Stalinabad	2·4	307	i 0 46	+ 5	i 1 16	+ 4	—	—	—
Fergana	3·3	7	i 0 56	+ 3	e 1 41	+ 6	—	—	—
Andijan	3·8	13	e 1 2	+ 1	e 1 52	+ 5	—	—	—
Samarkand	4·2	309	1 7	0	—	—	—	—	—
Tashkent	4·5	341	e 1 11	0	2 2	− 3	—	—	—
Tchimkent	5·3	347	i 1 23	+ 1	—	—	—	—	—
Frunse	6·3	22	i 1 36	0	—	—	—	—	—
Rybach'e	6·5	34	i 1 37	− 2	—	—	—	—	—
Mary	7·4	277	i 1 55	+ 3	i 3 16	− 2	—	—	—
Almata	7·5	34	e 1 53	0	—	—	—	—	—
Przhevalsk	7·7	44	1 54	− 2	—	—	—	—	—
Almata II	7·8	35	1 55	− 3	—	—	—	—	—
New Delhi	9·9	148	e 2 22	− 3	i 3 57	−23	2 30	PP	4·2
Ashkabad	10·2	279	e 2 31	0	i 4 24	− 3	—	—	—
Kizyl-Arvat	11·9	284	e 2 55	+ 1	5 8	− 1	—	—	—
Grozny	20·3	296	e 4 40	0	—	—	—	—	—
Tiflis	20·9	292	e 4 40	− 6	—	—	—	—	—
Tsikhlis-Dzhvari	21·9	292	e 4 57	0	—	—	—	—	—
Tamanrasset Z.	57·6	276	e 10 17	+23	—	—	—	—	e 28·3

New Delhi gives also PPPN = 2m.37s., SSN = 4m.9s., SSSEN = 4m.20s.

Dec. 11d. Readings also at 0h. (La Paz, near Antofagasta, Copiapo, and near Apia), 1h. (near Copiapo), 2h. (Apia, Helwan, Ksara, Algiers Univ. Besançon, Tamanrasset (2), and near Copiapo), 4h. (near Dzhergetal, near Djakarta, and near Almata II), 6h. (La Paz, La Plata, near Santa Lucia, and Copiapo), 8h. (near Copiapo), 9h. (near Dzhergetal), 11h. (Apia and near Andijan), 12h. and 16h. (Alicante), 17h. (Alicante, near Kluychi, and near Djakarta), 18h. (Apia, Tamanrasset, Alberni (2), near Horseshoe Bay (2), and Victoria), 19h. (Alberni (2), Horseshoe Bay (2), near Victoria (2), and near Dzhergetal), 20h. (Apia (2), Ksara, and near Dzhergetal), 21h. (Hong Kong, Nanking, Zi-ka-wei, Ksara, Kiruna, Triest, Collmberg, De Bilt, Stuttgart, Victoria, near Dzhergetal, and near Klyuchi), 22h. (Apia, Paris, Kew, and near Dzhergetal), 23h. (Collmberg).

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Dec. 12d. 1h. 7m. 23s. Epicentre 19°·1N. 61°·5W. (as on 1950, July 23d.).

A = +·4512, B = −·8311, C = +·3252 ; δ = +6 ; h = +5 ;
D = −·879, E = −·477 ; G = +·155, H = −·286, K = −·946.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		4·4	175	i 0 50	−20	1 40	−22	i 1 32	P_g	—
San Juan		4·4	262	e 1 4	− 6	i 2 57	+55	—	—	—
Bermuda		13·5	349	i 3 21	+ 6	i 5 52	+ 5	—	—	e 6·3
Fayetteville		33·3	308	e 5 44	−57	—	—	—	—	—
Huancayo		33·8	205	e 6 33	−13	—	—	—	—	e 16·9
La Paz		36·0	190	e 2 41	?	—	—	—	—	—
Tucson		46·0	297	e 8 27	0	—	—	—	—	—
Palomar	Z.	51·1	299	e 9 8	+ 2	—	—	e 9 17	?	—
Hungry Horse		51·2	318	e 9 6	− 1	—	—	—	—	—
Riverside	Z.	51·6	300	e 9 11	+ 1	—	—	e 9 18	?	—
China Lake	Z.	51·8	302	e 9 12	0	—	—	e 9 20	?	—
Tamanrasset	Z.	62·2	74	e 10 25	− 1	—	—	—	—	—
Collmberg	Z.	65·7	42	e 10 50	+ 2	—	—	—	—	—
Kiruna	Z.	69·4	24	i 11 13	+ 1	—	—	—	—	—
College		71·3	334	e 11 26	+ 3	—	—	—	—	—

Fort de France also gives P = 59s., P_g = 1m.8s., S_g = 1m.52s.

Dec. 12d. 1h. 37m. 40s. Epicentre 16°·5N. 96°·9W. Depth of focus 0·020.

Felt strongly in central and south-east Mexico, with damage to buildings at San Carlos, Jantepec, and on the isthmus of Tehuantepec. Intensity IV.
Epicentre 16°28′N. 96°54′W. Deep.

Monthly Seismological Bulletin, Tacubaya, Dec., 1951, p.3.

A = −·1152, B = −·9524, C = +·2823 δ = +3 ; h = +5 ;
D = −·993, E = +·120 ; G = −·034, H = −·280, K = −·959.

	Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca	0·5	14	i 0 25	+ 2	i 0 46	+ 6	—	—	—
Puebla	2·8	334	i 0 59k	+13	—	—	—	—	1·6
Vera Cruz	2·8	16	0 58k	+12	1 28	+ 7	—	—	1·6
Tacubaya	3·6	323	i 1 11k	+15	i 1 47	+ 8	—	—	—
Guadalajara	7·4	305	i 2 6a?	+20	—	—	—	—	3·9
Manzanillo	7·5	291	i 2 5	+17	—	—	—	—	3·9
Merida	8·2	56	2 15k	+18	3 30	+ 2	—	—	—
Chihuahua	14·8	327	i 3 46k	PP	i 6 43	SSS	—	—	—
Lubbock	17·6	345	3 0?	−57	—	—	—	—	—
Miami	18·0	56	e 3 42	−19	—	—	—	—	—
Balboa Heights	18·5	110	e 3 42	−24	—	—	—	—	—
Kingston	19·3	82	i 3 51	−24	i 6 57	−43	i 4 2	?	—
Fayetteville	19·7	4	e 3 9?	−70	e 6 35	−72	—	—	—
Tucson	20·1	323	i 4 36	+13	—	—	i 5 3	pP	—
Galerazamba	21·8	101	i 4 28	−12	i 8 3	−23	—	—	—
Columbia	22·5	34	i 4 34	−12	i 8 28	−10	—	—	—
Port au Prince	23·5	80	e 4 45	−11	i 8 26	−29	5 5	PP	e 10·2
Lincoln	24·3	359	e 5 4	0	e 9 6	− 2	—	—	—
Palomar	24·6	316	i 5 23	+16	—	—	—	—	—
Boulder City	25·1	323	i 5 26	+15	—	—	—	—	e 13·8
Bogota	25·3	114	i 5 4	− 9	i 9 15	−10	i 10 27	SS	—
Riverside	25·4	316	i 5 29a	+15	i 5 57	sP	i 5 48	pP	—
Ciudad Trujillo	25·8	81	i 5 20	+ 2	i 9 41	+ 8	—	—	—
Pasadena	25·9	316	i 5 35a	+16	i 6 4	sP	i 5 54	pP	e 12·1
Chicago	26·4	13	e 5 17	− 6	i 9 41	− 2	—	—	—
China Lake	26·6	320	i 5 40	+15	—	—	i 5 55	pP	—
Morgantown	27·4	28	e 5 24	− 8	—	—	e 5 49	pP	—
Tinemaha	27·9	320	i 5 53	+16	—	—	i 6 11	pP	—
Pittsburgh	28·0	26	i 5 52	+14	i 10 0	− 9	—	—	—
Rapid City	28·0	350	e 5 44	+ 6	—	—	i 6 20	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.
Cleveland		28·2	23	i 5 32	– 8	i 10 4	– 8	i 6 8	pP	—
Washington		28·3	32	e 5 32	– 9	—	—	i 5 48	pP	—
Fresno		28·6	319	e 5 56	+13	—	—	e 6 16	pP	—
Pennsylvania		29·3	28	i 5 42	– 8	i 10 19	–10	i 5 58	pP	—
San Juan		29·4	80	e 5 32	–18	—	—	e 6 24	pP	—
Lick		30·1	318	e 6 10a	+13	e 11 17	+35	e 6 30	pP	—
Santa Clara		30·3	318	i 6 16a	+18	i 16 13	ScS	i 7 16	pP	—
Berkeley		30·9	318	i 6 18a	+14	i 11 27	+32	i 6 37	pP	e 14·3
Bozeman		31·4	341	i 6 34	pP	i 6 47	sP	—	—	—
Fordham		31·4	33	e 6 0	– 8	i 10 54	– 8	—	—	—
Palisades		31·5	33	i 6 0	– 9	i 11 1	– 3	i 6 22	pP	e 14·4
Mineral	Z.	32·0	323	e 6 25	+12	—	—	—	—	—
Butte		32·2	339	i 6 25	+10	—	—	i 6 41	pP	—
Shasta Dam		32·7	323	e 6 32	+13	—	—	—	—	—
Bermuda (Navy)		33·0	54	e 6 13	– 9	—	—	—	—	—
Bermuda		33·1	54	i 6 10	–13	i 11 55	+26	i 7 1	PP	—
Ferndale		33·7	321	e 7 2	pP	e 12 12	sS	—	—	—
Harvard		33·8	33	i 6 22	– 7	i 11 27	–13	i 7 34	PP	—
Ottawa		33·8	25	e 6 21	– 8	11 32	– 8	6 42	pP	—
Weston		33·8	33	e 6 18	–11	e 11 30	–10	i 6 41	pP	—
Fort de France		34·4	87	i 7 17	sP	i 11 43	– 6	—	—	—
Kirkland Lake	Z.	34·5	19	i 6 28a	– 7	—	—	i 6 32	P	—
Hungry Horse		34·7	340	i 6 44	+ 8	—	—	i 7 5	pP	—
Huancayo		35·5	141	i 6 40	– 3	i 12 8	+ 2	i 7 10	pP	e 14·6
Corvallis	Z.	35·8	328	i 6 57	+11	—	—	—	—	—
Shawinigan Falls	N.	36·1	27	e 6 40	– 8	12 4	–11	7 1	pP	—
Saskatoon		36·4	349	7 15	pP	12 20	0	—	—	17·3
Seven Falls	E.	37·4	28	6 50	– 9	12 31	– 4	7 14	pP	—
Seattle		37·4	332	i 7 12k	+13	e 13 3	+28	e 16 10	SSS	e 17·3
Victoria		38·6	332	7 16	+ 7	13 24	+31	e 7 37	pP	20·1
Halifax		39·6	37	7 31	+14	12 52	–16	8 44	PP	15·5
La Paz		43·4	136	i 7 43k	– 5	i 14 0	– 4	i 8 0	pP	20·3
Antofagasta	E.	47·6	146	8 18	– 3	15 4	+ 1	—	—	23·1
Sitka		50·0	334	e 9 8	pP	e 16 1	+24	—	—	—
Santa Lucia	N.	55·6	153	9 7	–14	16 45	– 8	—	—	25·3
Honolulu		57·8	285	e 9 55	+18	e 18 2	sS	—	—	—
Resolute Bay		58·2	0	e 9 41a	+ 1	i 17 35	+ 8	i 10 3	pP	i 22·8
College		59·1	337	i 9 52	+ 6	—	—	i 10 15	pP	—
La Plata		63·1	144	10 8	– 5	18 26	– 3	10 38	PcP	30·6
Reykjavik	Z.	68·7	26	i 10 47	– 1	—	—	—	—	—
Scoresby Sund		69·5	19	i 10 51	– 2	i 19 55	+ 9	27 32	SSS	35·3
Punta Arenas	N.	72·9	163	—	—	e 20 40	+15	21 16	PS	34·3
Rathfarnham Castle		77·3	37	i 11 34	– 4	e 21 3	–10	i 12 3	pP	e 35·3
Lisbon		78·2	52	i 11 39k	– 4	i 21 17	– 6	i 12 10	pP	36·3
Coimbra		78·4	50	11 40	– 4	i 21 21	– 4	22 0	ScS	36·4
Aberdeen		78·9	33	i 12 3	+16	21 29	– 1	i 22 4	SP	32·0
Durham	E.	79·7	36	—	—	i 21 36	– 3	—	—	—
Kew		81·3	38	i 11 56a	– 4	i 21 56	+ 1	i 22 30	SP	e 32·3
Toledo		81·8	50	i 11 59a	– 3	i 21 54	– 6	27 27	SS	—
Malaga		82·3	53	i 12 1	– 4	i 22 5	0	i 22 53	SP	38·3
Granada		82·8	53	i 12 7k	0	22 2	– 8	13 11	pP	i 38·1
Klyuchi		83·1	326	e 12 42	pP	—	—	—	—	—
Almeria		83·7	53	i 12 11	– 1	i 22 16	– 3	15 16	PP	39·5
Paris		83·8	41	i 12 10	– 2	i 22 18	– 2	i 12 33	pP	e 33·3
De Bilt		84·4	37	i 12 14a	– 1	i 22 28	+ 2	i 12 36	pP	e 34·3
Kiruna	Z.	84·6	20	i 12 16k	0	i 12 48	sP	i 12 40	pP	—
Alicante		84·8	51	i 12 16	– 1	i 22 28	– 2	15 42	PP	e 39·5
Tortosa		84·8	49	i 11 58	–19	i 22 31	+ 1	—	—	—
Witteveen	Z.	85·0	35	i 12 18	0	e 22 35	+ 3	e 12 40	PP	—
Clermont-Ferrand		85·1	43	i 12 17	– 2	i 22 36	+ 3	i 12 46	pP	e 29·1

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Barcelona		85·8	48	12 23	+ 1	i 22 38	+ 2	23 21	SP	e 39·9
Besançon		86·5	42	i 12 23	– 3	i 12 59	sP	i 12 48	pP	—
Copenhagen		87·0	32	e 12 30	+ 2	e 22 55	+ 4	24 5	PS	35·3
Strasbourg		87·1	39	i 12 27a	– 2	i 22 57	+ 5	i 12 51	pP	e 39·3
Neuchatel		87·2	41	e 12 27	– 2	e 22 55	+ 2	—	—	—
Basle		87·4	41	e 12 28	– 2	e 22 58	+ 3	e 16 12	PP	—
Karlsruhe		87·4	38	e 12 30	0	i 22 59	+ 4	—	—	e 35·3
Upsala		87·6	27	i 12 56	pP	i 22 47	–10	e 32 2	SSS	e 35·5
Algiers Univ.	Z.	88·0	52	i 12 29a	– 4	i 22 55	– 6	e 12 53	pP	—
Stuttgart		88·0	39	i 12 32a	– 1	e 23 5	+ 4	i 12 54	pP	e 35·3
Zürich		88·1	41	e 12 32a	– 2	e 22 51	[+ 7]	e 12 51	pP	—
Sonneberg		88·5	37	e 12 37?	+ 2	i 23 11	+ 6	e 12 57	pP	—
Jena		88·5	37	e 12 35	0	i 23 12	+ 7	i 12 58	pP	—
Potsdam		88·7	35	i 12 58a	pP	i 23 15	+ 8	i 22 56	SKS	e 35.3
Chur		88·9	41	e 12 37k	0	e 22 54	[+ 5]	—	—	—
Collmberg		89·2	36	e 12 37	– 2	e 23 18	+ 6	i 13 0	pP	e 36·3
Cheb		89·3	37	e 12 36?	– 3	e 23 20	+ 7	i 13 3	pP	—
Pavia		89·3	42	e 12 42	+ 3	i 23 16	+ 3	e 13 2	pP	e 39·7
Helsinki		90·5	25	e 25 5	PS	e 23 8	[+ 9]	e 24 15	?	e 36·3
Prague		90·5	37	e 12 45	0	e 23 27	+ 3	i 13 8	pP	e 36·3
Bologna		91·0	42	e 12 49	+ 2	i 23 34	+ 6	e 13 15	pP	—
Prato		91·1	43	e 12 48	0	i 23 30	+ 1	—	—	—
Florence		91·3	43	e 12 46	– 3	e 23 10	[+ 6]	e 25 36	PPS	e 35·2
Triest		92·1	41	i 12 50a	– 2	e 23 2	[– 6]	i 13 16	pP	—
Raciborzu		92·7	36	e 12 56	+ 1	i 12 58	PcP	e 13 19?	pP	—
Rome		92·9	45	e 13 0	+ 4	e 23 20	[+ 7]	e 13 17	pP	e 37·3
Rocca di Papa		93·1	45	—	—	e 23 50	+ 4	—	—	—
Skalnate Pleso		94·2	36	e 13 50	pP	e 24 9	+13	e 23 37	SKS	e 41·3
Budapest		94·4	38	13 10	+ 7	e 23 57	0	23 30	SKS	37·8
Tamanrasset	Z.	94·7	65	i 13 1k	– 3	e 23 15	[– 8]	i 13 25	pP	—
Kalossa	N.	94·9	39	13 30	pP	e 24 19	+17	e 24 51	sS	—
Uzhgorod		95·7	36	i 13 12	+ 3	i 23 34	[+ 6]	i 13 32	pP	—
Lome		96·0	82	—	—	i 24 20	+ 9	e 23 42	SKS	—
Lwow		96·0	34	e 13 11	+ 1	i 23 35	[+ 5]	i 13 31	pP	—
Belgrade		96·6	40	e 13 14a	+ 1	e 24 24	+ 8	e 13 36	pP	e 49·1
Messina		96·6	47	e 12 58	–15	e 23 32	[– 1]	e 31 10	SS	45·2
Timisoara		96·6	38	e 12 58	–15	e 23 44	[+11]	e 13 2	P	—
Taranto		96·7	45	—	—	23 34	[+ 1]	e 29 31	?	37·5
Yuzno-Sakhlinsk		97·3	323	13 25	+ 9	23 57	[+21]	13 47	pP	—
Auckland	N.	98·4	235	—	—	e 25 20?	pS	—	—	—
Moscow		98·5	24	e 13 27	+ 6	i 23 52	[+10]	e 13 47	pP	—
Wellington		99·5	230	17 1	PP	i 24 58	+18	e 17 40	pPP	e 41·8
Kishinev		100·2	35	13 30	+ 1	23 57	[+ 6]	i 13 50	pP	—
Christchurch		101·5	228	e 13 50	+15	e 25 0	+ 3	23 50	SKS	e 47·5
Athens		102·3	45	—	—	24 5	[+ 4]	e 25 11	S	—
Istanbul		104·0	39	e 13 52	+ 6	e 25 22	+ 4	i 24 18?	SKS	—
Simferopol		104·4	34	e 17 58?	PP	e 26 52?	SP	—	—	—
Sverdlovsk		104·6	13	i 18 28	PP	i 24 24	[+13]	i 25 6	SKKS	—
Yalta		104·7	34	—	—	e 24 22	[+10]	—	—	—
Sotchi		108·2	32	—	—	i 24 40	[+12]	—	—	—
Irkutsk		109·1	346	e 14 35?	P	24 49	[+18]	18 59	PP	—
Piatigorsk		109·5	30	18 27	[+16]	—	—	—	—	—
Abastumanj		111·1	31	e 18 48	pPKP	—	—	—	—	—
Borzhomi		111·3	31	e 18 56	pPKP	—	—	—	—	—
Grozny		111·3	28	e 18 11	[– 4]	—	—	—	—	—
Tsikhlis-Dzhvari		111·4	31	e 18 52	pPKP	—	—	—	—	—
Gori		111·6	31	e 18 55	pPKP	—	—	—	—	—
Helwan		112·1	48	e 14 45	P	e 24 53	[+10]	e 18 56	pPKP	—
Tiflis		112·1	30	e 18 22	[+ 6]	21 49	PKS	e 28 24	SP	—
Leninakan		112·4	31	e 18 16	[– 1]	—	—	—	—	—

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		112·7	42	e 18 59	pPKP	28 23	SP	—	—	—
Erevan		113·1	31	e 19 6	pPKP	28 30	SP	—	—	—
Goris		114·6	30	e 19 14	PP	—	—	—	—	—
Shemakla		114·8	28	19 18	PP	i 21 37	PKS	e 28 47	SP	—
Brisbane		115·0	247	i 20 12k	pPP	e 35 30	SPS	30 0	SPP	e 54·2
Baku		115·5	27	e 19 11?	pPKP	e 28 59	PS	—	—	—
Riverview		117·1	241	i 20 15	pPKP	e 25 33	[+31]	e 36 11	PSS	e 54·4
Terre Adélie		117·3	203	e 19 49	PP	—	—	—	—	—
Kizyl-Arvat		119·3	23	e 19 54	PP	—	—	—	—	—
Zi-ka-wei	Z.	120·0	322	20 19	PP	i 20 31	?	i 20 55	?	—
Tchimkent		120·2	12	e 18 37	[+ 5]	i 25 10	[− 3]	i 21 54	SKP	—
Frunse		120·4	7	e 18 39	[+ 7]	e 25 23	[+ 9]	e 20 16	PP	—
Nanking		120·8	325	18 42	[+ 9]	25 32	[+17]	i 20 32	pPP	—
Rybach'e		121·0	6	e 20 9	PP	—	—	—	—	—
Ashkabad		121·1	23	i 20 1	PP	—	—	—	—	—
Tashkent		121·1	12	e 20 23	PP	i 25 28	[+12]	26 7	sSKS	—
Przhevalsk		121·2	3	e 19 14?	pPKP	—	—	—	—	—
Samarkand		122·1	15	e 20 18	PP	—	—	—	—	—
Andijan		122·2	10	e 18 43	[+ 7]	25 37	[+17]	30 19	PS	—
Fergana		122·4	10	e 18 40	[+ 4]	25 38	[+17]	27 12	SKKS	—
Mary		122·6	19	e 18 41	[+ 4]	—	—	i 20 12	PP	—
Dzhergetal		123·5	11	e 20 46	PP	—	—	—	—	—
Garm		123·5	12	e 20 45	PP	—	—	—	—	—
Stalinabad		123·6	13	i 20 45	PP	25 35	[+11]	—	—	—
Obi-garm		123·7	12	e 18 45?	[+ 6]	i 22 39	PKS	—	—	—
Grahamstown	Z.	126·7	119	i 18 49	[+ 5]	—	—	—	—	—
Pretoria	Z.	128·3	110	e 18 20	[−28]	—	—	—	—	—
Hong Kong		130·9	321	e 21 44	PP	—	—	—	—	—
New Delhi		134·8	7	i 22 2	PP	i 22 55	PKS	28 52	SKKS	—
Bombay	E.	143·4	17	—	—	e 40 20	SS	—	—	—
Poona	Z.	144·0	15	i 19 20	[+ 3]	—	—	—	—	—
Tananarive		146·1	99	e 19 23	[+ 3]	41 20	SS	23 8	PP	74·6
Djakarta		154·6	292	e 18 39	[−54]	—	—	—	—	—

Additional readings :—
Port au Prince i = 6m.17s., SS = 9m.11s.
Bogota iEZ = 6m.15s.
Riverside iZ = 8m.51s. and 9m.13s.
Pasadena iPPZ = 6m.30s., isPPZ = 6m.50s., iPcPZ = 8m.37s., iN = 9m.6s., iZ = 9m.17s., iSEN = 10m.11s., iN = 10m.26s.
Cleveland eN = 10m.29s., isSN = 10m.41s., iZ = 10m.47s., iE = 10m.52s., iSS?E = 11m.5s.
Pennsylvania esP?E = 6m.4s., iPPZ = 6m.33s.
Lick esPZ = 6m.41s.
Santa Clara iSEN = 14m.49s.
Berkeley ePPEN = 7m.40s., esSN = 11m.58s.
Palisades i = 6m.43s., iPP = 6m.59s., iPPP = 7m.17s., i = 11m.44s., iS? = 12m.11s., i = 14m.1s.
Bermuda eSS = 13m.3s.
Harvard isS = 12m.2s., iPcS = 12m.42s.
Ottawa PP = 7m.30s., e = 12m.10s., SS = 13m.16s., SSS = 14m.4s.
Huancayo ePP = 8m.8s., e = 8m.49s.
Shawinigan Falls PPN = 7m.56s., PcPN = 9m.4s., sSN = 12m.35s.
Seven Falls sPE = 7m.30s., PPE = 8m.19s., PcPE = 9m.10s., sSE = 13m.0s.
Seattle ePP = 8m.52s., eSSS = 16m.46s., and many other unidentified readings.
La Paz iPPZ = 9m.27s., iSS = 17m.20s., iScS = 17m.38s., iSSS = 18m.0s.
Halifax sS = 13m.33s.
Resolute Bay iZ = 9m.44s., i = 10m.13s., ePP = 11m.55s., isS = 18m.16s., iN = 19m.7s.
La Plata PcPE = 10m.32s., E = 11m.2s., PPE = 12m.8s., PPN = 12m.26s., PcSN = 14m.56s., SE = 18m.32s., SKSE = 19m.56s., SS?E = 21m.56s., SSN = 22m.26s.
Scoresby Sund i = 11m.16s. and 11m.40s.
Rathfarnham Castle iPcPZ = 11m.44s., iZ = 12m.9s., ePPZ = 14m.35s., eSSEN = 26m.20s.
Lisbon PcPEN = 11m.50s., ? = 17m.33s., iSKSEN = 21m.23s., ScSEN = 21m.35s., PSEZ = 21m.51s., sSEZ = 21m.55s., QEN = 32m.20s.
Coimbra PEN = 11m.45s.
Aberdeen iE = 12m.44s. and 14m.38s., iEN = 27m.4s.
Kew iPcP = 12m.22s., e = 21m.2s., iEN = 22m.53s., eSS = 27m.4s.
Toledo i = 12m.3s., iPP = 12m.19s., i = 12m.29s., SS? = 27m.42s., SSS = 30m.27s.
Malaga iPP = 15m.7s., iPPP = 16m.57s., iSS = 27m.21s., Q = 33m.37s.
Granada PcP = 12m.23s., i = 13m.44s.

Continued on next page.

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Almeria SS =27m.36s.
Paris iPcP =12m.14s., isP =12m.49s., iPP =15m.28s., ipPP =15m.56s., isPP =16m.6s., iSKS =22m.20s., isS =22m.54s., iSP =23m.7s., iSS =27m.49s., iSSS =31m.12s., iSSS? =31m.49s. and other unidentified i readings.
De Bilt isS =23m.2s., eSS =27m.44s.
Kiruna iZ =12m.20s., 13m.41s., and 14m.59s., ipPPZ =15m.59s., iPPPZ =17m.21s.
Alicante PPP =16m.32s., PS =23m.31s., SS =28m.9s., SSS =31m.12s., Q =33m.52s.
Witteveen iZ =12m.22s.
Clermont-Ferrand i =12m.34s., 13m.5s., 13m.29s., 13m.58s., and 14m.49s., iPP = 15m.22s., e =15m.36s.
Besançon iPcP =12m.27s., i =13m.30s. and 14m.16s., ePP? =15m.53s., e =16m.24s.
Copenhagen i =12m.49s., e =22m.46s., i =23m.39s.
Strasbourg isP =12m.59s., ePP =16m.15s., ePPP =17m.43s., eSKS =22m.46s., isS = 23m.28s., iPPS =24m.24s., eSS? =28m.7s., iSS =28m.30s., eSSS =32m.31s., eQ? = 35m.13s. and other unidentified readings.
Upsala iE =13m.32s. and 13m.50s., ePPE =15m.56s., iN =23m.4s., isSE =23m.28s., iSPN =23m.38s., iE =24m.7s., eSS =28m.32s., eE =31m.10s. and 33m.40s.
Algiers Univ. iZ =12m.34s., esPZ =13m.2s., eZ =14m.29s.
Stuttgart iP =12m.36s., esPZ =13m.2s., ePP =16m.0s., eZ =22m.11s., eSKS =22m.52s., esS? =23m.34s., ePPS? =24m.26s., eSSS =33m.8s.
Sonneberg ePP?N =15m.59s.?, eSKS?E =22m.56s., esS? =23m.47s.
Jena ePEZ =12m.38s., eEN =13m.7s., eE =13m.28s., eN =13m.47s., ePP?E =15m.57s., eSKS?N =22m.52s., esS?N =23m.47s., eN =24m.45s.
Potsdam ePP =16m.14s., ipSE =23m.42s., isSN or ScSN =23m.54s.
Collmberg eEZ =12m.41s., ePPZ =16m.8s., eSE =23m.55s., ePPSE =25m.54s.
Cheb esPN =13m.14s., ePP =16m.5s., eN =18m.32s., eSKS =23m.3s., esS =23m.57s., eE =24m.59s., eSS =28m.48s.
Pavia e =14m.54s. and 22m.51s., eSKS =23m.0s., iPS? =23m.51s., eSS? =30m.7s.
Prague esPE =13m.23s., e =14m.4s., ePPE =16m.18s., eSKS =23m.8s., epS =23m.48s., esS =24m.10s., eSP =24m.41s., ePS =24m.54s., eSS =29m.20s.
Bologna e =23m.15s.
Triest iZ =13m.24s., iPPZ =16m.17s., epPPZ =16m.45s., ePPPZ =18m.7s., iSKKS = 23m.18s., iS? =23m.44s., iSPZ =24m.23s., eSPPZ =25m.5s., eSS =29m.24s., eSSS = 33m.6s.
Raciborzu eZ =15m.1s., eN =15m.7s., eE =15m.44s.
Rome e =30m.30s.
Skalnate Pleso eN =14m.7s., e =14m.26s., 18m.56s., and 21m.9s., eSKSE =23m.40s., e =24m.56s., eSSS =34m.26s.
Budapest eE =24m.2s., PPSE =24m.42s., eN =25m.52s., eSSN =28m.20s.
Tamanrasset isPZ =13m.35s., iZ =16m.29s., iPPZ =16m.38s., ipPPZ =17m.2s., isPPZ = 17m.17s., ePPPZ =18m.42s., eZ =22m.44s. and 38m.21s., ePKP,PKPZ =38m.48s.
Uzhgorod ePP =16m.45s., epPP =17m.9s.
Lome eSKKS =24m.0s.
Lwow sSKS =24m.9s., S =24m.21s., esS =24m.53s.
Belgrade eSKSNW =23m.42s., ePSNW =25m.40s.
Messina e =24m.54s.
Moscow sSKS =24m.34s., ePS =26m.24s.
Wellington i =26m.0s., eSS =33m.10s.?
Kishirev SKKS =24m.31s.
Christchurch ePPEZ =18m.30s., ePPP?E =20m.40s., eSKSE =24m.20s., iSN = 25m.37s., ePSE =27m.0s., PPSE =27m.48s., SS =32m.45s., eSSSN =37m.10s., eQEN =42m.20s.
Athens i =25m.50s.
Istanbul ePPZ =18m.2s., iN =26m.2s., eNZ =26m.52s.?, ePSN =27m.23s., iPPSNZ = 28m.8s., eN =28m.37s. and 29m.39s., eSSN =32m.44s.
Sverdlovsk SS =32m.52s.
Irkutsk esSKS =25m.28s., ePS =28m.5s.?
Helwan eE =25m.56s., eEZ =28m.20s.
Tiflis SS =34m.23s., eSSS =37m.28s.
Brisbane iE =26m.35s., eE =27m.20s., iN =27m.30s., iE =29m.40s., iN =34m.18s.
Riverview iPPP?Z =22m.51s., iSKKKS?E =26m.54s., iE =27m.33s., iN =27m.56s., iPS?Z =29m.47s., iPS?E =29m.52s., iZ =29m.57s., iPPS?E =30m.9s., eSS?E = 36m.15s., eSSS?N =40m.38s., eQN =49·5m.
Tchimkent ePP =20m.3s., iPPP =22m.37s.
Frunse eSKKS =26m.56s., esSKKS =27m.36s.
Nanking e =19m.6s., ePPP =23m.12s., SKKSEN =27m.5s.
Tashkent iPS =30m.13s.
New Delhi PPPN =24m.52s., SKSPN =31m.52s., PSN =32m.21s., PPSN =33m.57s., iN =35m.9s. and 37m.33s., SSN =39m.48s., iN =41m.20s.
Tananarive PPS =35m.26s., e =37m.35s.
Long waves were also recorded at Ivigtut and Bergen.

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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Dec. 12d. 14h. 17m. 33s. (I)
14h. 27m. 51s. (II)
15h. 56m. 20s. (III
16h. 57m. 51s. (IV)
17h. 36m. 17s. (V)
20h. 52m. 19s. (VI)

Epicentre 39°·0N. 71°·8E. (as on 1951, August 4d.).

Given by stations of U.S.S.R.

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.
I Dzhergetal	0·5	296	0 6	P_g	0 12	S_g	—	—	—
II	0·5	296	0 8	P_g	0 14	S_g	—	—	—
III	0·5	296	i 0 8	P_g	0 14	S_g	—	—	—
IV	0·5	296	i 0 7	P_g	i 0 13	S_g	—	—	—
V	0·5	296	i 0 7	P_g	0 11	S_g	—	—	—
VI	0·5	296	i 0 6	P_g	i 0 12	S_g	—	—	—
I Garm	1·2	270	i 0 17	− 7	—	—	—	—	—
II	1·2	270	i 0 18	− 6	—	—	—	—	—
III	1·2	270	i 0 19	− 5	—	—	—	—	—
IV	1·2	270	i 0 17	− 7	0 33	− 8	—	—	—
V	1·2	270	i 0 19	− 5	i 0 34	− 7	—	—	—
VI	1·2	270	i 0 18	− 6	e 0 33	− 8	—	—	—
I Fergana	1·4	359	i 0 24	− 3	0 43	− 3	—	—	—
II	1·4	359	e 0 25	− 2	e 0 43	− 3	—	—	—
III	1·4	359	e 0 24	− 3	—	—	—	—	—
IV	1·4	359	e 0 24	− 3	e 0 42	− 4	—	—	—
V	1·4	359	e 0 23	− 4	—	—	—	—	—
VI	1·4	359	—	—	e 0 38	− 8	—	—	—
I Obi-garm	1·7	260	i 0 28	− 3	e 0 51	− 3	—	—	—
II	1·7	260	i 0 29	− 2	e 0 54	0	—	—	—
III	1·7	260	i 0 28	− 3	i 0 52	− 2	—	—	—
IV	1·7	260	i 0 28	− 3	i 0 49	− 5	—	—	—
V	1·7	260	i 0 29	− 2	i 0 51	− 3	—	—	—
VI	1·7	260	i 0 28	− 3	—	—	—	—	—
I Andijan	1·8	14	e 0 34	+ 2	i 0 59	+ 3	—	—	—
III	1·8	14	e 0 34	+ 2	i 1 3	+ 7	—	—	—
IV	1·8	14	e 0 33	+ 1	i 0 58	+ 2	—	—	—
V	1·8	14	e 0 35	+ 3	i 1 2	+ 6	—	—	—
VI	1·8	14	e 0 29	− 3	i 0 54	− 2	—	—	—
I Stalinabad	2·4	259	i 0 41	0	i 1 13	+ 1	—	—	—
II	2·4	259	i 0 42	+ 1	i 1 14	+ 2	—	—	—
III	2·4	259	i 0 43	+ 2	i 1 15	+ 3	—	—	—
IV	2·4	259	e 0 41	0	i 1 13	+ 1	—	—	—
V	2·4	259	i 0 42	+ 1	i 1 14	+ 2	—	—	—
VI	2·4	259	i 0 41	0	i 1 13	+ 1	—	—	—
I Tashkent	3·0	320	i 0 52	+ 2	i 1 35	S*	—	—	—
II	3·0	320	e 0 47?	− 3	—	—	—	—	—
III	3·0	320	—	—	i 1 33?	S*	—	—	—
IV	3·0	320	—	—	i 1 31?	+ 4	—	—	—
V	3·0	320	—	—	e 1 33?	S*	—	—	—
I Tchimkent	3·7	333	i 1 1	+ 1	i 1 45	0	—	—	—
II	3·7	333	i 1 1	+ 1	i 1 44	− 1	—	—	—
III	3·7	333	e 1 2	+ 2	i 1 45	0	—	—	—
IV	3·7	333	e 1 0	0	—	—	—	—	—
V	3·7	333	—	—	i 1 48	+ 3	—	—	—
VI	3·7	333	e 1 4	+ 4	—	—	—	—	—
I Samarkand	3·8	281	1 3	+ 2	—	—	—	—	—
III	3·8	281	e 1 5	+ 4	—	—	—	—	—
IV	3·8	281	1 6?	+ 5	1 57?	S*	—	—	—
V	3·8	281	—	—	e 1 55	S*	—	—	—
I Frunse	4·4	28	i 1 13	+ 3	i 2 5	+ 3	—	—	—
IV	4·4	28	—	—	i 2 9	+ 7	—	—	—
V	4·4	28	e 1 7	− 3	i 2 9	+ 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.
I Rybach'e	4·7	42	e 1 18	+ 4	i 2 28	S*	—	—	—
II	4·7	42	—	—	e 3 4	?	—	—	—
III	4·7	42	—	—	e 2 41	S_g	—	—	—
IV	4·7	42	—	—	e 2 20	S*	—	—	—
V	4·7	42	—	—	e 2 21	S*	—	—	—
III Krasnogorka	5·0	30	—	—	e 2 45	S_g	—	—	—
IV	5·0	30	i 1 21	+ 3	—	—	—	—	—
I Almata	5·7	41	i 1 33	+ 5	i 2 42	+ 7	—	—	—
II	5·7	41	e 1 25	− 3	—	—	—	—	—
IV	5·7	41	e 1 38	P*	i 3 5	S_g	—	—	—
I Almata II	6·0	43	e 1 36	+ 4	—	—	—	—	—
V	6·0	43	e 1 36	+ 4	—	—	—	—	—
I Przhevalsk	6·1	53	1 36	+ 2	—	—	—	—	—
IV	6·1	53	e 1 38	+ 4	—	—	—	—	—
II Ili	6·3	37	e 1 39	+ 3	—	—	—	—	—
IV	6·3	37	e 1 39	+ 3	—	—	—	—	—
V	6·3	37	e 1 38	+ 2	—	—	—	—	—
III Kurmenty	6·3	48	—	—	e 3 7?	S*	—	—	—
IV	6·3	48	e 1 40	+ 4	—	—	—	—	—
V	6·3	48	e 1 40	+ 4	—	—	—	—	—
I Mary	7·9	263	e 1 54	− 5	—	—	—	—	—
IV	7·9	263	—	—	e 3 21	−9	—	—	—
I Ashkabad	10·6	269	e 2 32	− 4	—	—	—	—	—
IV	10·6	269	—	—	4 33	− 4	—	—	—
I New Delhi	11·3	155	e 2 49	+ 3	e 4 49	− 5	2 57	PP	—
I Kirovobad	19·6	284	e 4 29	− 3	—	—	—	—	—
I Tiflis	20·7	286	e 4 44	0	e 8 36	+ 5	—	—	—
I Borzhomi	21·8	288	e 4 54	− 2	—	—	—	—	—
I Tsikhlis-Dzhvari	21·8	288	i 4 54	− 2	—	—	—	—	—
I Piatigorsk	22·0	292	4 56	− 2	—	—	—	—	—
I Ksara	29·2	271	i 10 41	S	(i 10 41)	−17	—	—	e 15·8
I Stuttgart z.	45·0	305	e 8 19	0	—	—	—	—	—
I Tamanrasset z.	57·9	275	e 9 53	− 3	—	—	e 10 45	PcP	—

Additional readings :—
New Delhi SSN = 5m.0s., SSSN = 5m.11s.
Tamanrasset iZ = 10m.0s.

Dec. 12d. 21h. 39m. 13s. Epicentre 35°·5N. 140°·4E. (as at on 9d.).
Focus at Base of Superficial Layers.

Intensity IV at Yokohama, Kamogawa, Yokaichiba, Kururi, Kengasaki ; II-III at Tyosi, Osima, Mera, Makabe, Manabe, Koshigaya, Yoshio, and Sakura.
Epicentre 35°·2N. 140°·5E. Depth 30-40km.
Seismo. Bull. Cent. Met. Obs., Japan, Dec., 1951, Tokyo, 1952, pp.341-342, with macroseismic chart.

A = −·6287, B = +·5201, C = +·5781 ; δ = −3 ; h = 0 ;
D = +·637, E = +·771 ; G = −·445, H = +·368, K = −·816.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Tyosi	0·4	58	0 10	+ 1	0 18	+ 2
Tokyo	0·6	289	0 12	0	0 25	+ 4
Mera	0·7	219	0 6	− 7	0 15	− 8
Yokohama	0·7	264	0 11a	− 2	0 21	− 2
Tukubasan	0·8	341	0 15	0	0 31	+ 5
Mito	0·9	3	0 17	+ 1	0 33	+ 5
Kumagaya	1·0	309	0 21	+ 3	0 43	+12
Osima	1·1	229	0 15	− 4	0 27	− 6
Utunomiya	1·1	338	0 15	− 4	—	—
Ajiro	1·2	247	0 17	− 3	0 28	− 8

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Misima		1·2	252	0 19	– 1	—	—
Titibu		1·2	294	0 21	+ 1	0 48	+12
Maebasi		1·3	313	0 25	+ 3	—	—
Kohu		1·5	275	0 24	0	0 41	– 3
Onahama		1·5	16	0 29	+ 5	0 58	+14
Shirakawa		1·6	355	0 28	+ 2	0 58	+12
Oiwake		1·7	299	0 29	+ 1	—	—
Shizuoka		1·7	252	0 27	– 1	0 47	– 2
Omaesaki		2·0	243	0 36	+ 4	0 56	0
Iida		2·1	270	0 34	+ 1	1 4	+ 5
Inawasiro		2·1	354	0 44	+11	1 21	+22
Matumoto		2·1	290	0 38a	+ 5	—	—
Matusiro		2·1	301	0 33	0	1 9	+10
Nagano		2·2	203	0 39	+ 4	1 14	+13
Hamamatu		2·3	250	0 36	0	1 5	+ 1
Hatidyozima		2·4	191	0 30	– 8	0 54	–12
Takada		2·4	313	0 47	+ 9	1 31	+25
Niigata		2·7	336	0 45	+ 3	1 28	+14
Yamagata		2·7	359	0 49	+ 7	1 40	+26
Nagoya		2·8	263	0 47	+ 4	1 18	+ 2
Sendai		2·8	8	0 47	+ 4	1 37	+21
Toyama		2·8	294	0 53	+10	1 40	+24
Gihu		3·0	268	0 43	– 3	1 24	+ 2
Aikawa		3·1	325	0 54	+ 6	1 43	+19
Kanazawa		3·2	289	0 54	+ 5	—	—
Kameyama		3·3	261	1 14	?	1 55	?
Hikone		3·4	269	0 51	– 1	1 45	+13
Wazima		3·4	306	1 12	+20	—	—
Mizusawa		3·7	8	1 9	+13	2 1	+22
Owase		3·8	249	1 3	+ 5	—	—
Kyoto		3·9	262	1 3	+ 4	1 52	+ 8
Osaka		4·1	260	1 16	+14	2 5	+16
Akita		4·2	356	1 5	+ 2	—	—
Morioka		4·2	6	1 9	+ 6	2 6	+14
Miyako		4·3	16	1 0?	– 5	2 0?	+ 6
Sumoto		4·7	257	1 12	+ 2	—	—
College		50·8	52	e 8 57	– 2	—	—
Resolute Bay		64·3	14	e 10 32	– 2	e 14 2	PPP
Victoria		68·1	45	10 56	– 2	—	—
Hungry Horse		73·5	52	e 11 29	– 2	—	—
Butte		75·6	43	e 11 37	– 6	—	—
China Lake	z.	78·5	54	e 11 57	– 2	—	—
Mount Wilson	z.	79·1	56	e 12 1	– 2	—	—
Boulder City		80·3	53	e 12 8	– 1	—	—
Collmberg	z.	82·0	330	e 12 15	– 3	—	—
Stuttgart	z.	85·5	330	e 12 32	– 4	—	—
La Paz		148·3	60	e 20 4	[+25]	—	—

Long waves were also recorded at Pavia, Alicante, Almeria, and Granada.

Dec. 12d. Readings also at 0h. (near Andijan), 1h. (Brisbane, Huancayo, Cobb River, near Auckland, Christchurch, Kaimata, Karapiro, New Plymouth, Tuai, Wellington, near Klyuchi, and near Tsikhlis-Dzhvari), 2h. (Apia, Mount Wilson, China Lake, Przhevalsk, near Almata II, Chilisk, Kurmenty (2), and near Ashkabad), 3h. (Horseshoe Bay, near Alberni, and Victoria), 5h. (Bermuda and near Algiers Univ.), 6h. (near Kurmenty and near Dzhergetal), 7h. (Apia), 8h. (near Andijan, Dzhergetal, Fergana, Garm, Obi-garm, and Stalinabad), 9h. (Apia, Przhevalsk, near Almata II, Chilisk, and Kurmenty), 10h. (near Apia and near Dzhergetal), 11h. (Tamanrasset, Grahamstown, and near Kimberley), 12h. (Apia, Collmberg, and near Dzhergetal), 13h. (near Alicante), 14h. (near Dzhergetal), 15h. (near Dzhergetal and near Mizusawa), 16h. (Antofagasta and Granada), 17h. (Abastumanj, Akhalkalaki, Gori, Grozny, Piatigorsk, near Borzhomi, Erevan, Goris, Kirovobad, Leninakan, Tiflis, Tsikhlis-Dzhvari, near Dzhergetal, and near Alicante (5)), 18h. (Apia, Ksara, near Copiapo, and near Kurmenty), 19h. (Apia), 20h. (Apia, Almata II, Fergana, Marv, Andijan, near Dzhergetal, Garm, Obi-garm, Samarkand, Stalinabad, and near Palisades), 21h. (near Kurmenty), 22h. (Huancayo).

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Dec. 13d. 20h. 46m. 1s. Epicentre 40°·2N. 25°·6E. (as on 1947, April 12d.).

Intensity IV-V at Kastron (Lemnos) and IV at Thasos.
Epicentre 40°·25N. 25°·0E. (Strasbourg).

A. Galanopoulos.
Seismological Institute Bulletin, 1951, Athens, 1952, p.29.

A = +·6907, B = +·3309, C = +·6429 ; δ = −12 ; h = −2 ;
D = +·432, E = −·902 ; G = +·580, H = +·278, K = −·766.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·7	214	e 0 36a	− 9	i 1 14	− 5	—	—	—
Istanbul		2·8	72	e 0 55	P_g	e 1 35	S_g	—	—	e 2·4
Sofia		3·0	326	e 0 56	+ 6	i 1 30	+ 3	1 0	P_g	—
Bucharest		4·2	5	e 1 20	P*	i 2 21	S_g	—	—	—
Campulung		5·1	356	e 1 35	P*	e 2 47	S_g	e 1 53	P_g	e 3·0
Belgrade		6·0	322	e 1 47k	P*	i 2 44	+ 1	e 2 0	P_g	—
Taranto		6·4	275	2 7	P_g	—	—	—	—	—
Timisoara		6·4	331	e 1 50	P*	e 3 23	S*	e 2 10	P_g	—
Kalossa		7·9	325	e 3 29	S	(e 3 29)	− 1	e 4 24	S_g	5·0
Messina		8·0	259	e 1 52	− 8	e 3 46	+13	e 2 57	?	—
Budapest		8·7	329	e 3 6	+56	e 4 29	S*	—	—	5·0
Skalnate Pleso		9·8	339	—	—	e 4 10	− 7	e 5 34	S_g	—
Rome		10·0	284	—	—	e 3 53	−29	e 5 15	Q	e 6·1
Triest		10·2	305	e 2 31	0	e 4 20	− 7	i 5 33	S_g	—
Florence		11·2	293	—	—	e 4 6	−46	—	—	5·5
Raciborzu		11·2	335	e 2 58	PP	e 4 47	− 5	e 8 41	PcP	e 6·8
Prague		12·6	325	e 3 25	PPP	e 5 36	+10	—	—	e 6·4
Cheb		13·6	321	—	—	e 5 32	−18	e 6 29	Q	e 6·8
Collmberg		14·2	326	e 3 20	− 4	e 6 25	+21	e 3 31	PP	e 8·3
Zürich		14·2	306	e 3 24	0	e 5 55	− 9	—	—	e 6·9
Stuttgart		14·5	312	e 3 21?	− 7	e 5 59	−12	e 3 38	PP	e 7·7
Jena		14·5	322	e 3 30?	+ 2	e 6 4	− 7	e 3 41	PP	e 7·8
Strasbourg		15·3	308	e 3 38a	− 1	e 6 22	− 8	i 3 52	PP	e 7·0
Besançon		15·8	303	e 3 49	+ 4	—	—	e 4 4	PP	—
Witteveen	Z.	18·1	322	e 4 14	0	—	—	—	—	—
Paris		18·6	304	i 4 21	0	—	—	i 4 9	?	e 10·0
Alicante		20·3	273	(e 6 38)	?	—	—	—	—	e 6·6
Upsala		20·3	347	—	—	e 12 3?	PcS	e 9 33	Q	e 11·6
Kew		21·2	310	e 4 48	− 1	e 8 49	+ 8	—	—	e 11·0
Tamanrasset	Z.	24·3	230	e 5 17	− 3	e 9 12	−25	e 5 47	PP	—
Kiruna	E.	27·8	356	e 5 15	−38	e 10 26	− 9	e 12 20	SSS	e 15·3

Additional readings :—
Athens iP_g = 41s., i = 1m.3s.
Istanbul eP*Z = 1m.3s., eP_gN = 1m.11s., eS_gN = 1m.54s.
Sofia iEN = 1m.7s., iS*EN = 1m.36s.
Bucharest iP*N = 1m.36s., iP_gE = 1m.48s., iS*EN = 2m.41s., iS_gEN = 2m.55s.
Belgrade iSNW = 3m.1s., iP_gS_gNE = 3m.19s.
Timisoara eP_gE = 2m.29s., eS*E = 3m.56s., eS_gE = 4m.16s.
Kalossa eE = 4m.3s., eN = 4m.34s.
Budapest ePN = 3m.28s., eSN = 4m.38s.
Skalnate Pleso e = 5m.17s., eS_gE = 5m.38s.
Triest iP_gP_g = 3m.13s.
Raciborzu eN = 3m.15s.
Prague eN = 3m.45s. and 4m.46s.
Stuttgart eZ = 3m.34s.
Jena ePP?EN = 3m.49s., eE = 4m.59s.
Strasbourg iPP = 3m.47s., iPPP = 3m.56s., e = 6m.3s.
Besançon e = 4m.11s. and 4m.17s.
Tamanrasset iZ = 5m.28s., iPPZ = 5m.39s., eZ = 7m.0s.
Long waves were also recorded at Potsdam, Basle, Pavia, De Bilt, Copenhagen, and Granada.

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Dec. 13d. Readings also at 1h. (Huancayo, La Paz, Berkeley, Lick, Fresno, Mineral, Mount Wilson, Riverside, Palomar, China Lake, Tinemaha, Victoria (2), Christchurch, and Wellington), 2h. (Apia, Almata II, Przhevalsk, Ili, Kurmenty, Frunse, Rybach'e, near Dzhergetal, Garm, Fergana, Andijan, Obi-garm, Stalinabad, Tashkent, Tchimkent, and Samarkand), 4h. (near Athens), 5h. (Przhevalsk, Chilisk, Kurmenty, Almata II, Ili, Almata, Krasnogorka, Frunse, Dzhergetal, near Apia, and near Messina), 7h. (near Almata II and near Kurmenty), 8h. (Paris and Collmberg), 9h. (Pretoria, Kimberley, near Alicante, and near Dzhergetal), 10h. (Hong Kong, Nanking, near Manila, and near Messina), 11h. (Upsala), 12h. (Tamanrasset, Kimberley, near Alicante, and near Almata II), 13h. (Apia and near Alicante), 14h. (near Ashkabad (2)), 15h. (Nanking, Paris, and near Dzhergetal), 16h. (Djakarta, Tamanrasset, near Apia, near Bucharest, and Campulung), 17h. (near Alicante, near Chilisk, Ili, Kurmenty, and Almata II), 18h. (near Alicante), 19h. (near Huancayo and near Apia), 20h. (Paris and near Santa Clara), 21h. (Huancayo, Galerazamba, and near Bogota), 22h. (Victoria, Tamanrasset, and La Paz), 23h. (Cobb River, Kaimata, Karapiro, Tuai, and Wellington).

Dec. 14d. 2h. 9m. 3s. Epicentre 8°·0S. 111°·5E. Depth of focus 0·100.

Epicentre as suggested by U.S.S.R.

A = −·3630, B = +·9215, C = −·1383 ; δ = +6 ; h = +7 ;
D = +·930, E = +·367 ; G = +·051, H = −·129, K = −·990.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Djakarta		5·0	291	i 1 38k	+ 1	i 3 0	+ 5	—	—
Brisbane	Z.	43·8	121	i 7 14k	+ 2	—	—	i 9 6	pP
Przhevalsk		58·6	331	—	—	e 16 13	− 1	—	—
Kurmenty		59·1	331	i 9 0	− 1	—	—	—	—
Almata II		59·7	331	i 9 4	− 1	—	—	—	—
Almata		59·9	331	—	—	e 16 23	− 7	—	—
Dzhergetal		60·0	324	e 9 9	+ 2	—	—	—	—
Irkutsk		60·3	355	—	—	e 16 23?	−12	—	—
Andijan		60·4	326	e 9 10	0	i 16 36	0	—	—
Ili		60·4	332	i 9 7	− 3	—	—	—	—
Fergana		60·5	325	e 9 9	− 1	e 16 34	− 3	—	—
Obi-garm		60·6	323	e 9 13	+ 2	e 16 38	0	—	—
Frunse		60·8	329	i 9 13	+ 1	i 16 39	− 2	i 11 9	pP
Krasnogorka		60·8	329	e 9 7	− 5	i 16 38	− 3	—	—
Stalinabad		61·0	322	e 9 13	0	e 16 39	− 4	e 11 13	pP
Tashkent		62·5	325	e 9 22	− 1	i 17 1	− 1	e 11 19	pP
Samarkand		62·8	321	e 9 23	− 2	—	—	e 11 23	pP
Tchimkent		63·0	326	e 9 25	− 1	17 5	− 3	—	—
Ashkabad		67·4	316	e 9 57	+ 4	—	—	—	—
Kizyl-Arvat		69·3	317	e 10 10	+ 5	—	—	—	—
Sverdlovsk		76·8	334	i 10 47	0	i 19 41	− 2	e 12 51	pP
Kirovobad		76·9	315	—	—	i 19 51	+ 7	—	—
Tiflis		78·4	315	11 5	+10	20 6	+ 7	—	—
Piatigorsk		80·4	317	i 11 10	+ 4	i 20 13	− 6	—	—
Kimberley	Z.	83·3	241	i 11 38	+18	—	—	—	—
Moscow		87·7	327	e 11 42	+ 1	i 21 30	+ 2	e 13 52	pP
Kiruna	Z.	97·8	337	i 12 26k	− 1	—	—	—	—
Tamanrasset	Z.	107·8	292	e 17 25	[+11]	—	—	—	—
Mineral	Z.	122·9	47	e 17 46k	[+ 3]	—	—	—	—
Lick	Z.	123·8	50	i 17 48k	[+ 4]	—	—	—	—
Fresno	Z.	125·5	50	e 17 51	[+ 3]	—	—	—	—
Tinemaha	Z.	126·5	50	i 17 54	[+ 4]	—	—	—	—
Pasadena	Z.	127·5	53	i 17 56	[+ 5]	—	—	i 20 14	sPKP
Riverside	Z.	128·2	53	i 17 57	[+ 5]	—	—	—	—
China Lake	Z.	128·4	50	i 17 55	[+ 2]	—	—	i 20 12	sPKP
Palomar	Z.	128·8	53	i 17 58	[+ 4]	—	—	—	—
Weston		145·7	4	i 18 28	[+ 3]	—	—	—	—
Palisades		146·8	7	i 18 31	[+ 4]	—	—	—	—
Tacubaya		148·2	66	e 18 33	[+ 5]	—	—	—	—

Sverdlovsk also gives isS = 23m.26s.

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Dec. 14d. Readings also at 0h. (near Dzhergetal), 1h. (Wellington, Tuai, and Huancayo), 2h. (near Copiapo), 4h. (Tortosa, near Prague, and near Bagneres), 5h. (Apia, Kew, Raciborzu, and near Dzhergetal), 8h. (Krasnogorka, near Ili, Almata II, Kurmenty, Chilisk, and near Tiflis), 9h. (Kiruna, near Auckland, Christchurch, Tuai, Cobb River, Karapiro, Kaimata, New Plymouth, and Wellington), 10h. (Istanbul, near Athens (2), near Sofia, near Klyuchi, and near Dzhergetal), 11h. (near Dzhergetal (2) and near Sofia), 12h. (near Alicante), 14h. (near Dzhergetal), 16h. (Tamanrasset), 17h. (Apia and Mizusawa), 19h. (Horseshoe Bay, near Victoria, and near Palisades), 20h. (Antofagasta, Apia, Horseshoe Bay, and near Victoria), 21h. (near Palisades), 22h. (Huancayo, near Almata, Almata II, Ili, Krasnogorka, Kurmenty, and Przhevalsk).

Dec. 15d. 4h. 48m. 5s. Epicentre 38°·4N. 73°·6E. Depth of focus 0·015. (as on 1951, October 2d.).

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Dzhergetal	2·0	294	e 0 38	+ 4	i 1 11	+11
Fergana	2·4	325	—	—	e 1 16	+ 6
Andijan	2·5	338	0 43	+ 2	i 1 19	+ 7
Garm	2·7	283	e 0 44	0	e 1 21	+ 4
Kulyab	3·1	261	e 0 49	0	e 1 30	+ 4
Obi-garm	3·1	276	i 0 50?	+ 1	i 1 31?	+ 5
Stalinabad	3·8	274	e 0 58	0	i 1 46	+ 3
Frunse	4·5	9	e 1 8	0	—	—
Rybach'e	4·5	24	—	—	e 1 58	− 1
Krasnogorka	5·0	13	i 1 12	− 2	i 2 10	− 2
Tchimkent	5·0	323	i 1 14	0	i 2 12	0
Samarkand	5·3	286	—	—	e 2 20	+ 1
Almata II	5·6	29	i 1 18	− 4	—	—
Kurmenty	5·8	36	e 1 16	− 9	—	—
Ili	6·1	24	i 1 24	− 5	—	—

Dec. 15d. 9h. 53m. 12s. Epicentre 51°·5N. 173°·5W. (as on 1950, May 8d.).

A = −·6211, B = −·0708, C = +·7806 ; δ = +11 ; h = −6 ;
D = −·113, E = +·994 ; G = −·776, H = −·088, K = −·625.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mitchell Field		2·0	283	i 0 39	+ 4	i 0 58	− 4	—	—
College		18·8	35	e 4 14	− 9	i 4 18	?	—	—
Victoria		31·8	75	6 27	− 1	—	—	—	—
Mineral	Z.	37·0	86	e 7 14a	+ 1	—	—	i 9 33	PcP
Hungry Horse		37·5	70	e 6 50	−27	—	—	e 9 35	PcP
Berkeley	Z.	38·1	91	i 7 24k	+ 2	—	—	i 7 45	?
Reno	N.	38·6	85	e 7 28	+ 2	—	—	—	—
Lick	Z.	38·8	91	i 7 29a	+ 1	—	—	i 9 39	PcP
Tinemaha	Z.	41·1	89	i 7 49	+ 2	—	—	i 9 48	PcP
China Lake	Z.	42·3	88	i 7 54	− 3	—	—	e 9 47	PcP
Pasadena	Z.	43·0	92	e 8 3	0	—	—	—	—
Riverside	Z.	43·6	92	i 8 8	0	—	—	i 9 55	PcP
Boulder City		43·9	87	e 8 11	+ 1	—	—	e 9 57	PcP
Palomar	Z.	44·4	92	e 8 11	− 3	—	—	—	—
Tucson		48·9	88	e 8 49	− 1	—	—	e 10 14	PcP
Fayetteville		56·5	73	i 8 43	−63	—	—	i 8 58	?
Kiruna	Z.	60·5	354	i 10 8	− 6	—	—	—	—
Palisades		64·4	55	i 10 36	− 4	—	—	—	—
Weston		64·8	53	i 10 38	− 5	—	—	—	—
Kimberley	Z.	153·5	322	i 20 0	[+ 7]	—	—	—	—

Additional readings and note :—
College readings are given as for a local shock.
Mineral iZ = 7m.36s.
Lick eZ = 9m.35s.
China Lake iZ = 7m.58s., eZ = 8m.12s., iZ = 9m.51s., eZ = 10m.6s.
Riverside eZ = 8m.22s. and 10m.10s.
Palomar iZ = 8m.14s. and 8m.23s.

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Dec. 15d. 14h. 11m. 57s. Epicentre 36°·0N. 138°·8E. Depth of focus 0·030.

Intensity IV at Kohu, Owada, Irumagawa, Mitsumine, Shimodate, and Makabe; II-III at Maebasi, Titibu, Kumagaya, Tokyo, Yokohama, Utunomiya, Onahama, and Tsuda. Epicentre ad adopted. Depth 180km.
Seismo. Bull. Cent. Met. Obs. Japan, 1951, Tokyo 1951, pp. 342, 343, with macroseimic chart.

A = −·6101, B = +·5341, C = +·5852; δ = −6; h = 0;
D = +·659, E = +·752; G = −·440, H = +·385, K = −·811.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Titibu		0·2	94	0 15	−14	0 29	−23
Kohu		0·4	207	0 29	− 1	0 49	− 4
Maebasi		0·4	28	0 29a	− 1	0 49	− 4
Oiwake		0·4	329	0 29	− 1	0 48	− 5
Kumagaya		0·5	72	0 30a	0	0 47	− 6
Matumoto		0·7	289	0 29	− 2	0 49	− 6
Matusiro		0·7	319	0 29	− 2	0 48	− 7
Nagano		0·8	324	0 30	− 1	0 48	− 8
Tokyo		0·8	112	0 32?a	+ 1	0 52?	− 4
Iida		0·9	238	0 31	− 1	0 49	− 7
Misima		0·9	172	0 31	− 1	0 52	− 4
Yokohama		0·9	129	0 32a	0	0 54	− 2
Ajiro		1·0	166	0 31	− 1	0 53	− 4
Utunomiya		1·0	57	0 34a	+ 2	0 56	− 1
Shizuoka		1·1	198	0 33	0	0 55	− 4
Tukubasan		1·1	78	0 33	0	0 56	− 3
Takada		1·2	338	0 38	+ 4	1 3	+ 3
Osima		1·3	159	0 36	+ 1	1 1	0
Takayama		1·3	277	0 32	− 3	0 54?	− 7
Mera		1·4	142	0 34	− 1	0 58	− 5
Mito		1·4	74	0 37a	+ 2	1 2	− 1
Omaesaki		1·5	199	0 37	+ 1	1 0	− 4
Toyama		1·5	298	0 35	− 1	0 58	− 6
Shirakawa		1·6	46	0 39	+ 2	1 5	− 1
Nagoya		1·7	241	0 36	− 2	0 59	− 8
Tyosi		1·7	99	0 41	+ 3	1 8	+ 1
Gihu		1·8	250	0 37	− 2	0 59	−10
Inawasiro		1·9	34	0 39	− 1	1 8	− 2
Niigata		1·9	6	0 41a	+ 1	1 11	+ 1
Onahama		1·9	61	0 42a	+ 2	1 13	+ 3
Hukui		2·0	271	0 43	+ 2	1 7	− 5
Aikawa		2·1	348	0 40	− 2	1 8	− 6
Ibukisan		2·1	253	1 21	S	(1 21)	+ 7
Wazima		2·1	312	0 41	− 1	1 10	− 4
Hikone		2·2	251	0 41	− 2	1 7	− 9
Hukusima		2·2	37	0 44a	+ 1	1 14	− 2
Yamagata		2·6	29	0 58	+11	—	—
Sendai		2·8	36	0 51	+ 2	1 27	0
Owase		2·9	228	0 47	− 3	1 21	− 8
Hatidyozima		3·0	164	0 52	+ 1	1 28	− 3
Isinomaki		3·1	39	0 53	+ 1	1 31	− 2
Toyooka		3·3	262	1 27	S	(1 27)	−10
Mizusawa	E.	3·6	30	1 5	+ 7	1 41	− 3
Akita		3·8	15	0 58	− 3	1 49	+ 1
Morioka		4·1	26	1 8	+ 4	1 55	+ 1
Takamatu		4·2	248	1 5	− 1	1 51	− 6
Miyako		4·4	34	1 9?	+ 1	1 56?	− 5
Hatinohe		5·0	25	1 17	+ 1	2 12	− 2
Aomori		5·1	17	1 30	+13	2 16	− 1
Urakawa		6·9	26	1 42	+ 2	3 0	+ 2

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Dec. 15d. 18h. 54m. 24s. Epicentre 37°·6N. 71°·6E. Depth of focus 0·010.
(as on 1951, October 9d.).

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Kulyab	1·5	282	e 0 27	0	0 46	– 1
Dzhergetal	1·6	349	i 0 29	+ 1	i 0 53	+ 4
Garm	1·7	324	i 0 29	0	i 0 52	+ 1
Obi-garm	1·9	306	i 0 30	– 2	—	—
Stalinabad	2·4	293	e 0 37	– 1	i 1 5	– 2
Fergana	2·8	3	e 0 44	0	i 1 18	+ 1
Andijan	3·2	11	—	—	i 1 28	+ 1
Tashkent	4·1	336	—	—	i 1 48	– 1
Tchimkent	4·9	343	e 1 13	0	i 2 14	+ 5
Frunse	5·8	23	e 1 26	+ 1	—	—
Krasnogorka	6·2	25	i 1 31	+ 1	—	—
Przhevalsk	7·1	45	1 42	– 1	—	—
Almata II	7·2	36	e 1 43	– 1	—	—
Ili	7·6	32	e 1 46	– 4	—	—

Dec. 15d. Readings also at 0h. (Apia), 2h. (near Akhalkalaki), 3h. (near Mizusawa), 4h. (Apia), 5h. (Apia, Mount Wilson, Palomar, Riverside, and China Lake), 6h. (Apia, Auckland, Mount Wilson, Palomar, and China Lake), 7h. (Alberni, Victoria, near Horseshoe Bay, near Stalinabad, and near La Paz), 8h. (Goris, Leninakan, Sotchi, near Akhalkalaki, Abastumanj, Borzhomi, Erevan, Gori, Kirovobad, Piatigorsk, Tiflis, and Tsikhlis-Dzhvari), 9h. (near Granada (2)), 10h. (Almata II, near Ili, Krasnogorka, Kurmenty, and Przhevalsk), 12h. (near Alicante, near Dzhergetal (2), and near La Paz), 13h. (Almata II, near Chilisk, Ili, and Kurmenty), 14h. (near Dzhergetal), 15h. (Huancayo and La Paz), 17h. (New Delhi and near Alicante), 18h. (Apia, Wellington, Triest, Almata II, near Chilisk, Ili, and Kurmenty), 19h. (Terre Adélie), 20h. (near Athens and near Palisades), 22h. (near Seattle and Victoria), 23h. (Prague).

Dec. 16d. 12h. 25m. 42s. Epicentre 29°·1S. 177°·7W. Depth of focus 0·010.
(as on 1951, Sept. 28d.).

A = –·8745, B = –·0351, C = –·4838 ; δ = +4 ; h = +2 ;
D = –·040, E = +·999 ; G = +·483, H = +·019, K = –·875.

		Δ	Az.	P.	O – C.	S.	O – C.		Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Auckland	N.	10·0	217	e 3 18?	?	—	—	—	—	—	—
Karapiro	N.	10·5	211	e 2 15	–14	e 3 48	–37	—	—	—	—
Tuai	N.	10·6	202	e 2 29	– 1	3 45	–43	—	—	—	—
Wellington		13·6	205	e 2 43	–27	4 51	–48	—	—	—	—
Cobb River	E.	14·3	211	—	—	e 5 10	–45	—	—	—	—
Kaimata	N.E.	16·0	210	e 3 20	–20	e 5 55	–40	—	—	—	—
Apia		16·2	21	—	—	e 6 40	+ 1	—	—	—	—
Christchurch		16·4	206	—	—	5 57	–47	—	—	—	—
Brisbane	Z.	25·8	266	i 5 19k	– 5	—	—	i 5 37	pP		—
Riverview		26·9	251	—	—	e 10 2	0	10 39	sS		e 12·3
Terre Adélie		45·1	203	e 8 7	– 1	—	—	—	—		—
Berkeley	Z.	84·4	41	i 12 23a	0	—	—	e 12 40	pP		—
Lick	Z.	84·4	41	i 12 23a	0	—	—	e 12 39	pP		—
Pasadena		84·4	46	e 12 24	+ 1	—	—	i 12 41	pP		—
Palomar	Z.	84·7	47	i 12 25	+ 1	e 12 37	?	i 12 41	pP		—
Riverside	Z.	84·8	46	e 12 26	+ 1	—	—	e 12 43	pP		—
Fresno		85·1	43	e 12 27a	+ 1	—	—	e 12 40	pP		—
China Lake	Z.	85·8	45	i 12 30	0	e 12 42	?	i 12 45	pP		—
Tinemaha	Z.	86·3	44	e 12 33	+ 1	—	—	e 12 49	pP		—
Mineral	Z.	86·5	39	e 12 33a	0	—	—	e 12 48	pP		—
Reno		87·0	42	e 12 36	0	—	—	—	—		—
Boulder City		87·7	46	i 12 40	+ 1	—	—	i 12 57	pP		—
Tucson		88·0	51	e 12 41	+ 1	—	—	—	—		—
College		96·5	12	e 13 19	– 1	—	—	—	—		—
Kiruna	Z.	139·7	348	i 19 6	[–11]	i 19 59	?	i 21 32	?		—
Jena	N.	157·1	344	e 19 40?	[– 4]	—	—	e 20 15	PKP_2		—
Stuttgart	Z.	159·7	346	e 19 42?	[– 5]	—	—	e 20 26	PKP_2		—
Strasbourg		160·1	348	e 19 45	[– 2]	e 21 3	?	e 20 29	PKP_2		—
Paris		160·3	0	e 19 46	[– 2]	—	—	i 20 30	PKP_2		—
Tamanrasset	Z.	173·1	203	e 19 54	[– 3]	i 20 11	?	i 20 7	pPKP		—

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Dec. 16d. 19h. 13m. 46s. Epicentre 17°·3S. 168°·6E. (as on 1950, Dec. 24d.).

A = −·9365, B = +·1888, C = −·2955 ; δ = 0 ; h = +5 ;
D = +·198, E = +·980 ; G = +·290, H = −·058, K = −·955.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		17·6	232	i 4 1k	− 7	7 17	− 6	—	—	e 8·7
Apia		19·2	83	i 4 34	+ 6	i 4 44	PP	i 5 13	PPP	—
Auckland	N.	20·2	165	e 4 43	+ 4	e 8 35	+14	—	—	e 9·7
Karapiro	N.	21·4	165	e 4 54	+ 3	—	—	—	—	—
New Plymouth	E.	22·2	168	4 14?	?	—	—	—	—	—
Riverview		22·7	220	i 5 2k	− 2	i 9 8	− 1	i 5 15	pP	e 10·8
Cobb River	E.	24·0	173	e 5 18	+ 1	—	—	—	—	—
Wellington		24·5	168	5 22	0	e 9 49	+ 9	e 5 55	PP	12·2
Kaimata	N.E.	25·3	176	e 5 42	+12	—	—	—	—	—
Christchurch		26·4	174	e 5 44?	+ 4	e 10 14	+ 2	—	—	e 12·9
Terre Adélie		52·6	194	e 9 28?	+10	e 16 50?	− 6	—	—	—
Berkeley		84·9	48	e 12 37	− 1	e 24 9	SP	—	—	e 39·6
Lick	Z.	85·1	48	e 12 40	+ 1	—	—	—	—	—
Shasta Dam		86·1	45	i 12 44	0	—	—	—	—	—
Fresno	Z.	86·2	50	e 12 44	0	—	—	—	—	—
Pasadena		86·4	53	e 12 45	0	—	—	e 16 8	PP	e 40·2
Mineral	Z.	86·5	46	e 12 46	0	—	—	—	—	—
Riverside	Z.	86·9	53	e 12 49	+ 1	—	—	—	—	—
Palomar	Z.	87·0	54	e 12 49	+ 1	—	—	—	—	—
Reno		87·4	47	e 12 51	+ 1	—	—	—	—	—
China Lake	Z.	87·5	51	e 12 52	+ 1	—	—	—	—	—
Tinemaha	Z.	87·5	50	e 12 52	+ 1	—	—	—	—	—
College		88·4	17	e 12 56	+ 1	—	—	—	—	—
Boulder City		89·6	52	e 12 54	− 7	—	—	i 13 36	?	—
Tucson		91·4	57	e 13 10	+ 1	—	—	—	—	—
Hungry Horse		94·6	41	e 17 12	PP	—	—	—	—	—
Kimberley	Z.	122·4	219	i 18 56	[− 1]	—	—	—	—	—
Kiruna		125·6	346	i 18 58	[− 6]	e 27 44	{− 7}	e 42 14?	SSS	—
Prague		141·3	333	e 20 40	?	e 23 14	PKS	e 22 46	PP	—
Jena	Z.	141·7	336	e 19 32	[− 1]	—	—	e 20 1	?	—
Stuttgart	Z.	144·4	336	e 19 34	[− 4]	e 20 40	?	e 19 46	?	—
Triest		144·8	329	i 19 34a	[− 5]	e 35 20	PPS	e 23 6	PP	—
Strasbourg		145·1	337	i 19 38k	[− 1]	—	—	—	—	—
Chur		145·8	333	e 19 39	[− 2]	—	—	—	—	—
Zürich		145·8	336	e 19 39a	[− 2]	—	—	—	—	—
Basle		146·0	337	e 19 40	[− 1]	—	—	—	—	—
Paris		146·6	343	i 19 42	[0]	i 19 46	PKP_2	i 19 56	pPKP	e 78·2
Neuchatel		146·7	337	e 19 42	[0]	—	—	—	—	—
Besançon		146·9	338	e 19 41	[− 1]	—	—	—	—	—
Florence		147·4	329	19 48	[+ 5]	e 26 47	[− 3]	—	—	—
Rome		148·1	325	e 19 41	[− 3]	—	—	e 23 43	?	—
Messina	Z.	148·5	317	e 19 48	[+ 3]	—	—	—	—	—
Tamanrasset	Z.	163·2	292	20 3k	[− 1]	e 24 48	PP	i 20 52	PKP_2	—

Additional readings :—
Riverview iPPN = 5m.33s., iEN = 9m.12s., iE = 9m.20s., iN = 9m.34s., iZ = 9m.41s., iSSN = 9m.58s.
Kiruna iZ = 19m.2s., eE = 29m.39s., eSSE = 37m.14s.?.
Triest $ePKP_2Z$ = 19m.47s., eSKKS? = 28m.47s.
Strasbourg e = 19m.51s., i = 19m.55s., e = 20m.11s.
Besançon e = 19m.47s., 20m.0s., and 20m.24s.
Tamanrasset ePPPZ = 28m.13s.
Long waves were also recorded at Santa Clara.

Dec. 16d. Readings also at 0h. (Manila and near Apia), 1h. (Seattle and Victoria), 2h. (near Apia and near Mizusawa), 3h. (Victoria), 4h. (Apia), 7h. (Apia, Brisbane, Samarkand, Tchimkent, near Andijan, Dzhergetal, Fergana, Garm, Obi-garm, Stalinabad, near Almata II, Chilisk, Ili (2), Kurmenty, and Przhevalsk), 8h. (Garm), 9h. (China Lake, Riverside, Tinemaha, Huancayo, near La Paz, near Almata II, Chilisk, Ili, Krasnogorka, Kurmenty, and Rybach'e), 11h. (near Alicante), 12h. (near Alicante (4) and Palisades), 13h. (near Tacubaya), 15h. (Reykjavik), 16h. (near Ashkabad and near Dzhergetal), 18h. (Stuttgart), 19h. (Terre Adélie), 20h. (near Kurmenty), 21h. (Brisbane, Huancayo, and near Yalta), 22h. (Apia and near Garm), 23h. (near Alberni).

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Dec. 17d. 12h. 30m. 8s. Epicentre 18°·0S. 173°·0W. (as on 1949, Nov. 27d.).

A = −·9446, B = −·1160, C = −·3071 ; δ = +4 ; h = +5 ;
D = −·122, E = +·993 ; G = +·305, H = +·037, K = −·952.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		4·3	16	e 1 1	− 7	—	—	i 1 40	?	—
Auckland	N.	21·6	208	(e 4 52?)	− 2	(e 8 52)	+ 3	—	—	—
Karapiro	N.	22·2	207	e 5 4	+ 4	e 9 9	+ 9	—	—	—
Kaimata	N.E.	27·8	207	e 5 56	+ 3	—	—	—	—	—
Christchurch		28·2	204	—	—	e 10 32	− 9	—	—	e 13·9
Brisbane		32·6	247	i 6 35	0	—	—	i 6 48	?	e 16·6
Riverview		35·7	237	—	—	e 13 7	PcS	e 15 17	SS	e 17·7
Terre Adélie		56·9	201	e 9 51	+ 2	—	—	—	—	—
Lick	Z.	73·3	41	e 11 39	+ 4	—	—	—	—	—
Pasadena	Z.	73·6	45	e 11 35	− 2	—	—	—	—	—
Fresno		74·0	42	e 11 38	− 1	—	—	e 11 58	PcP	—
Palomar	Z.	74·0	47	e 11 38	− 1	—	—	—	—	—
Riverside	Z.	74·0	45	e 11 37	− 2	—	—	—	—	—
China Lake	Z.	74·9	44	e 11 44	0	—	—	—	—	—
Shasta Dam		74·9	38	i 11 43	− 1	—	—	—	—	—
Mineral	Z.	75·2	38	i 11 45	− 1	—	—	i 11 56	PcP	—
Tinemaha	Z.	75·2	43	e 11 44	− 2	—	—	—	—	—
Reno		75·7	40	e 11 48	− 1	—	—	e 12 1	PcP	—
Boulder City		76·8	46	e 12 0	+ 5	—	—	—	—	—
Tucson		77·7	50	e 12 0	0	—	—	—	—	—
Victoria		79·6	31	12 13	+ 3	—	—	—	—	—
Hungry Horse		84·4	35	i 12 34	− 2	—	—	—	—	—
College		84·8	11	i 12 36	− 1	—	—	—	—	—
Fayetteville		91·8	53	i 13 11	0	—	—	—	—	—
Huancayo		93·5	104	—	—	e 26 27	PPS	e 31 3	SSP	—
Witteveen	Z.	145·3	0	i 19 43	[+ 3]	—	—	—	—	—
Collmberg		146·4	353	e 19 43	[+ 1]	—	—	e 19 51	PKP_2	—
Jena	N.	146·9	354	e 19 46?	[+ 4]	—	—	—	—	—
Prague		147·5	351	e 19 44	[+ 1]	e 19 52	PKP_2	e 20 19	?	—
Paris		149·0	6	e 19 41	[− 5]	i 19 53	PKP_2	i 20 3	pPKP	—
Stuttgart	Z.	149·3	357	e 19 51	[+ 5]	—	—	e 20 2	?	—
Strasbourg		149·5	359	e 19 57	[+10]	—	—	—	—	—
Ksara		149·8	307	e 19 53	[+ 6]	—	—	e 23 25	PP	—
Besançon		150·8	0	e 20 1	PKP_2	—	—	—	—	—
Triest		151·9	350	e 19 57	[+ 7]	—	—	e 20 41	?	e 102·9
Clermont-Ferrand		152·1	6	e 20 3	PKP_2	—	—	e 20 21	?	—
Alicante		158·7	17	19 32	[−27]	—	—	—	—	—
Tamanrasset	Z.	175·0	—	i 20 13k	[+ 1]	e 25 45	PP	e 21 53	PKP_2	—

Additional readings and note :—
Auckland readings have been reduced by 2m.
Jena eN = 19m.57s., eE = 20m.13s., eN = 20m.30s., eE = 20m.42s.
Paris e = 19m.48s. and 22m.17s.
Strasbourg i = 20m.4s., e = 20m.15s.
Besançon e = 20m.8s. and 20m.19s.
Tamanrasset eZ = 20m.23s.
Long waves were also recorded at Wellington.

Dec. 17d. 17h. 51m. 39s. Epicentre 11°·5N. 86°·3W. Depth of focus 0·010.
(as on 1951, September 28d.).

A = +·0633, B = −·9782, C = +·1981 ; δ = +13 ; h = +6 ;
D = −·998, E = −·065 ; G = +·013, H = −·198, K = −·980.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida	9·9	341	i 2 23a	+ 2	e 4 17	+ 6	—	—	—
Galerazamba	10·9	93	—	—	e 5 38	?	—	—	—
Vera Cruz	12·2	310	—	—	e 5 5	− 1	e 6 27	?	—
Chinchina	12·4	121	i 3 4	+10	i 5 26	+15	—	—	—
Puebla	13·7	304	e 3 37	pP	e 5 53	+12	e 6 12	sS	—

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.
Bogota		13·9	119	i 3 25	+11	i 6 13	sS	—	—	—
Tacubaya		14·7	304	i 3 33	+ 9	—	—	—	—	—
San Juan		20·6	68	e 4 36	+ 3	—	—	—	—	—
Columbia		22·9	11	i 4 57	+ 1	i 9 1	+ 7	—	—	—
Fort de France		24·7	81	e 5 13	0	e 9 39	+14	—	—	—
Fayetteville		25·5	346	i 5 19	− 2	—	—	i 5 23	P	—
Huancayo		25·8	155	i 5 36	+12	e 9 51	+ 7	e 6 5	PP	—
Lubbock		26·2	331	4 27	−60	e 8 42	−68	—	—	—
Lawrence		28·5	345	5 35	−13	—	—	—	—	—
Bermuda		28·6	41	—	—	e 13 51	?	—	—	—
Morgantown		28·6	10	i 5 48	− 1	—	—	e 8 55	PcP	—
Tucson		30·6	317	e 6 5	− 2	—	—	—	—	—
Palisades		31·3	19	i 6 13	0	—	—	—	—	—
La Paz		33·1	147	e 6 47	pP	—	—	—	—	16·0
Harvard		33·4	20	i 6 27	− 4	—	—	—	—	—
Weston		33·4	20	i 6 32	+ 1	—	—	—	—	—
Ottawa		35·0	13	i 6 44a	− 1	—	—	—	—	—
Palomar	Z.	35·4	314	i 6 48	0	i 12 53	ScP	i 7 53	PP	—
Boulder City		35·5	319	i 6 50	+ 1	—	—	—	—	—
Riverside	Z.	36·1	315	i 6 54	0	i 13 0	ScP	i 9 18	PcP	—
Mount Wilson	Z.	36·7	315	e 7 1	+ 2	e 12 56	ScP	e 8 7	PP	—
Shawinigan Falls	N.	36·8	16	e 6 59	− 1	—	—	—	—	—
Kirkland Lake	Z.	36·9	7	i 7 0a	− 1	—	—	—	—	—
China Lake	Z.	37·2	317	i 7 3	0	i 13 0	ScP	i 7 31	pP	—
Seven Falls	E.	37·8	17	e 7 8	0	—	—	—	—	—
Tinemaha	Z.	38·4	318	i 7 13	0	i 9 28	PcP	e 7 41	pP	—
Reno	Z.	40·7	320	i 7 33	+ 1	—	—	—	—	—
Lick	Z.	40·8	316	i 7 34k	+ 1	—	—	—	—	—
Mineral	Z.	42·3	320	e 7 46a	0	—	—	—	—	—
Hungry Horse		43·4	333	i 7 53	− 1	—	—	—	—	—
College		67·7	336	i 10 46	− 3	—	—	—	—	—
Kiruna	Z.	85·5	22	i 12 29	+ 1	—	—	—	—	—
Tamanrasset	Z.	87·3	67	e 12 38	+ 1	e 16 12	PP	i 13 14	pP	—

Additional readings :—
Huancayo e = 10m.35s.
Mount Wilson iZ = 10m.39s.
China Lake eZ = 8m.4s., iPcPZ = 9m.23s.
Tinemaha eScPZ = 13m.2s.

Dec. 17d. Readings also at 1h. (Tamanrasset and Brisbane), 4h. (Stalinabad, Fergana, near Garm, Dzhergetal, and Andijan), 6h. (near Garm and near Bogota), 8h. (Santa Lucia), 12h. (Kurmenty, Krasnogorka, near Przhevalsk, Almata II, Chilisk, Ili, and near Apia), 13h. (Apia and near Lwow), 16h. (Ashkabad), 17h. (Poona and near Palisades), 18h. (Huancayo and Harvard), 19h. (Obi-garm, Krasnogorka, Almata II, Ili, Frunse, Mary, near Garm, Stalinabad, Kulyab, Dzhergetal, Fergana, Samarkand, Tashkent, Andijan, Tchimkent, and near Palisades), 21h. (Apia, Bogota, La Paz, near Huancayo, near Kurmenty, Chilisk, Almata II, and Ili), 22h. (Apia), 23h. (near Kurmenty).

Dec. 18d. 14h. 9m. 7s. Epicentre 19°·3S. 174°·5W. Depth of focus 0·005.

A = −·9402, B = −·0905, C = −·3285 ; δ = +8 ; h = +5 ;
D = −·096, E = +·995 ; G = +·327, H = +·031, K = −·945.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		6·1	26	i 1 23	− 7	i 2 20	−19	—	—	—
Auckland	N.	19·8	206	i 4 30?	+ 2	i 8 24	+22	—	—	—
Karapiro	N.	20·5	205	e 4 36	+ 1	e 8 23	+ 7	—	—	—
Wellington		23·8	201	i 5 8	0	i 9 14	− 1	i 5 28	pP	—
Cobb River	E.	24·3	205	e 5 12	0	e 9 32	+ 8	e 15 58	ScS	—
Kaimata	N.E.	26·0	205	e 5 31	+ 2	e 10 6	+14	—	—	—
Christchurch		26·5	201	i 5 33k	0	10 2	+ 1	i 5 59	sP	e 12·6
Brisbane		30·8	248	i 6 11	− 1	i 11 4	− 5	i 6 27	pP	e 13·9
Riverview		33·8	237	i 6 37k	− 1	i 11 55	− 1	i 12 22	sS	e 16·1
Terre Adélie		55·2	200	i 9 30	+ 2	i 17 8	+ 3	i 9 47	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.
Manila		71·9	293	e 11 17	– 1	—	—	—	—	—
Santa Barbara	Z.	74·6	45	i 11 35a	+ 1	—	—	i 11 52	pP	—
Santa Clara		75·0	41	e 11 37k	+ 1	e 21 42	sS	e 11 57	pP	—
Berkeley		75·1	41	i 11 37a	0	e 21 43	sS	i 11 55	pP	—
Lick	Z.	75·2	41	e 11 37a	0	i 11 50	PcP	i 11 55	pP	—
Pasadena		75·5	46	i 11 38a	– 1	i 21 43	sS	i 11 56	pP	i 33·8
Riverside	Z.	75·9	46	i 11 42a	+ 1	—	—	i 12 0	pP	—
Palomar	Z.	75·9	47	i 11 41a	0	—	—	i 11 58	pP	—
Fresno	Z.	76·0	42	i 11 42a	0	e 11 55	PcP	e 12 0	pP	—
China Lake		76·8	44	i 11 46a	0	e 39 5	P′P′	i 12 4	pP	—
Shasta Dam		76·8	38	i 11 46	0	—	—	—	—	—
Tinemaha	Z.	77·1	43	i 11 49a	+ 1	i 12 16	?	i 12 9	pP	—
Mineral	Z.	77·1	39	i 11 47a	– 1	e 12 0	PcP	i 12 6	pP	—
Djakarta		77·3	268	e 11 40	– 9	e 21 31	– 2	—	—	—
Reno		77·7	40	e 11 51a	0	e 21 43	+ 6	e 12 11	pP	—
Klyuchi		78·2	346	e 11 56	+ 2	—	—	—	—	—
Boulder City		78·8	45	i 11 58	+ 1	e 22 0	+11	—	—	—
Zi-ka-wei	Z.	79·4	308	12 0	– 1	e 21 57	+ 2	e 12 18	pP	—
Tucson		79·6	50	i 12 3	+ 1	e 21 29	–28	—	—	—
Nanking		81·7	308	12 15	+ 2	22 24	+ 5	—	—	—
Tacubaya		83·2	67	i 12 25a	+ 4	e 22 41	+ 7	i 17 37	PPP	—
Puebla		84·0	67	e 12 38	pP	—	—	—	—	—
Butte		85·8	38	i 12 33	– 1	—	—	i 12 51	pP	—
Hungry Horse		86·2	36	i 12 35	0	—	—	—	—	—
College		86·4	11	i 12 35	– 1	—	—	i 12 54	pP	—
Lubbock		86·9	53	e 11 41	–58	—	—	—	—	—
Huancayo		94·5	104	i 13 18	+ 4	e 23 53	[+11]	e 13 37	pP	e 43·4
La Paz		99·4	111	i 13 40	+ 3	i 24 17	[+ 9]	i 17 41	PP	—
Irkutsk		99·8	322	e 17 47	PP	24 13	[+ 3]	e 26 45	PS	—
Resolute Bay		105·7	15	e 14 5	0	—	—	—	—	—
Przhevalsk		115·2	309	e 18 37	[+ 3]	—	—	—	—	—
Poona	Z.	115·7	282	i 18 36	[+ 1]	i 29 17	PS	—	—	—
Bermuda		116·5	62	e 19 38	PP	e 29 45	PS	—	—	e 54·4
Bombay		116·8	282	e 19 53?	PP	i 25 27	[+ 5]	i 29 44	PS	—
Andijan		119·7	306	e 18 44	[+ 2]	—	—	e 19 44	PP	—
Fergana		120·1	306	e 18 44	[+ 1]	e 20 17	PP	—	—	—
Tchimkent		122·0	309	e 18 49	[+ 2]	—	—	—	—	—
Tashkent		122·0	307	e 19 9?	[+22]	—	—	—	—	—
Grahamstown	Z.	124·0	201	i 18 52	[+ 1]	—	—	—	—	—
Sverdlovsk		124·8	327	e 18 53	[0]	e 36 35	SS	—	—	—
Mary		128·0	303	e 19 7	[+ 8]	—	—	e 21 22	PP	—
Kimberley	Z.	128·7	201	i 19 2	[+ 2]	—	—	—	—	—
Kiruna	Z.	130·6	353	i 19 3	[– 1]	i 22 24	PKS	—	—	—
Ashkabad		130·7	304	e 19 6	[+ 2]	e 22 29	PKS	—	—	—
Moscow		136·3	334	e 19 18	[+ 4]	e 22 52	PKS	—	—	—
Kirovobad		139·1	311	e 19 19	[0]	—	—	—	—	—
Tiflis		139·9	313	e 19 24	[+ 3]	e 22 56	PKS	—	—	—
Piatigorsk		140·1	317	e 19 26	[+ 5]	e 23 13	PKS	e 22 23	PP	—
Rathfarnham C.	Z.	144·9	11	i 19 26k	[– 4]	e 41 43	SS	e 22 57	PP	—
Simferopol		145·1	324	e 19 30	[0]	—	—	—	—	—
Yalta		145·4	323	19 32	[+ 1]	—	—	—	—	—
Kishinev		146·4	332	19 35	[+ 3]	—	—	—	—	—
Potsdam		146·5	353	i 19 35	[+ 2]	—	—	e 19 38	PKP	—
Witteveen	Z.	146·5	359	i 19 36	[+ 3]	—	—	e 19 54	pPKP	—
Collmberg		147·5	352	e 19 35	[+ 1]	e 20 25	?	i 19 38	PKP	—
Raciborzu	Z.	147·7	345	e 19 29	[– 6]	—	—	i 19 39	PKP_2	—
Uzhgorod		147·7	339	i 19 40	[+ 5]	—	—	—	—	—
Jena	E.	148·1	352	e 19 37	[+ 2]	—	—	—	—	—
Prague		148·5	349	e 19 39	[+ 3]	e 20 14	sPKP	e 19 59	pPKP	—
Ksara		149·4	304	19 50?	PKP_2	—	—	—	—	—
Ogyalla	N.	149·7	343	e 19 46	[+ 8]	—	—	e 20 2	pPKP	—
Budapest		149·8	342	19 47	[+ 9]	—	—	e 20 31	?	—
Karlsruhe	Z.	150·3	356	e 19 40	[+ 2]	—	—	i 19 46	PKP	—
Paris		150·5	4	i 19 42	[+ 3]	e 23 20	PP	i 20 6	pPKP	e 71·9
Stuttgart	Z.	150·5	354	e 19 40	[+ 1]	—	—	e 19 46	PKP	—

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.
Timisoara		150·6	336	18 53?	[–46]	—	—	—	—	—
Strasbourg		150·7	356	e 19 41a	[+ 2]	—	—	i 20 5	pPKP	—
Kalossa	N.	150·7	341	e 19 49	[+10]	—	—	e 20 32	?	—
Belgrade	Z.	151·7	336	e 19 42	[+ 1]	—	—	—	—	—
Basle		151·8	356	e 19 48	[+ 7]	—	—	—	—	—
Besançon		152·1	358	e 19 43	[+ 2]	—	—	i 20 23	$pPKP_2$	—
Chur		152·3	353	e 19 43	[+ 2]	—	—	e 19 50	PKP	—
Neuchatel		152·4	356	e 19 42	[0]	—	—	—	—	—
Triest		152·9	347	i 19 43a	[+ 1]	42 52?	SS	i 20 39	$pPKP_2$	—
Clermont-Ferrand		153·6	3	i 19 44	[+ 1]	—	—	i 20 23	$pPKP_2$	—
Pavia		154·0	353	e 20 39	?	—	—	e 21 51	?	—
Helwan	Z.	154·3	300	e 20 10	PKP_2	—	—	i 22 9	?	—
Florence		155·1	349	e 19 45	[0]	e 30 26	SKKS	—	—	—
Rome		156·7	346	e 20 17	PKP_2	—	—	e 21 13	?	—
Tortosa		158·1	9	20 13	PKP_2	—	—	i 24 36?	PP	—
Messina	Z.	159·2	338	e 20 11	PKP_2	—	—	e 19 16	?	—
Granada		160·5	22	20 47a	PKP_2	—	—	24 17	PP	—
Almeria		161·2	20	20 13	[+20]	44 49	SS	24 37	PP	81·9
Algiers Univ.	Z.	162·5	6	e 19 57	[+ 3]	i 20 30	sPKP	e 20 14	pPKP	—
Tamanrasset	Z.	176·5	—	i 20 6k	[+ 3]	i 20 38	sPKP	i 20 25	pPKP	—

Additional readings :—
Wellington ePP = 5m.43s., iS = 9m.19s., sS = 9m.44s., PcS = 11m.37s., eScS = 16m.11s.
Cobb River eE = 5m.17s., eS?E = 9m.35s.
Christchurch i = 10m.15s., eQEN = 11m.3s., eScS = 16m.21s.
Brisbane epPE = 6m.31s., isPZ = 6m.37s., iPPE = 7m.20s., ePPPE = 7m.34s., iE = 8m.18s., isSE = 11m.33s., iN = 11m.43s., iE = 12m.33s., iScSE = 16m.48s.
Riverview iPPPEZ = 8m.7s., iSSSN = 14m.24s., iScSE = 17m.3s. and other unidentified readings.
Terre Adélie ePcP = 10m.28s., isS = 17m.39s., iScS = 19m.10s.
Santa Clara esSE = 22m.25s.
Berkeley iZ = 12m.9s., eEN = 31m.11s.
Lick iZ = 12m.9s.
Pasadena eZ = 11m.53s. and 12m.11s., ePPEN = 14m.52s., eEN = 22m.27s., eQN = 31·3m.
China Lake iZ = 12m.16s. and 12m.33s.
Zi-ka-wei eZ = 22m.11s. and 23m.8s.
Huancayo e = 14m.2s., ePP? = 17m.6s., i = 24m.29s., eS = 24m.59s., e = 26m.13s., 31m.33s. and 38m.15s.
La Paz iS = 24m.48s., iPS = 25m.45s., iSS = 32m.30s.
Irkutsk eSKKS = 24m.44s., eSS = 31m.53s.?
Rathfarnham Castle eZ = 19m.56s., 20m.48s., and 32m.13s.
Raciborzu eZ = 19m.7s., eN = 19m.12s.
Jena eE = 19m.42s. and 20m.28s., eN = 20m.31s., eE = 20m.48s. and 21m.7s., eEN = 21m.17s., eE = 22m.16s.
Prague i = 19m.42s., eN = 20m.26s., e = 20m.47s., 21m.0s., 21m.43s., 21m.53s., 22m.21s., and 23m.40s.
Ogyalla eN = 20m.19s., eE = 20m.38s., e = 21m.11s., 22m.9s., and 22m.45s.
Karlsruhe iEZ = 20m.5s., i = 20m.19s., iZ = 20m.31s., eZ = 21m.20s.
Paris i = 19m.47s., 19m.53s., 20m.21s., 20m.34s., and 21m.47s., e = 22m.54s.
Stuttgart eZ = 20m.5s., 20m.19s., 20m.31s., 21m.24s., and 22m.4s.
Strasbourg i = 19m.47s. and 19m.51s., i = 20m.27s., e = 21m.20s. and 22m.10s.
Belgrade eZ = 19m.49s., 20m.10s., and 21m.23s.
Besançon i = 19m.50s., e = 19m.58s., i = 20m.42s., e = 21m.58s. and 22m.35s.
Triest $iPKP_2Z$ = 20m.12s., ePSKS = 36m.46s.
Clermont-Ferrand i = 19m.51s., 20m.23s., and 21m.3s.
Algiers Univ. eZ = 21m.14s., ePP?Z = 24m.56s.
Tamanrasset $iPKP_2Z$ = 21m.47s., $ipPKP_2Z$ = 22m.10s., ePPZ = 25m.37s., epPPZ = 26m.4s., iZ = 29m.4s., ePPP?Z = 31m.4s.
Long waves were also recorded at Palisades and Alicante.

Dec. 18d. 16h. 53m. 13s. Epicentre 52°·2N. 179°·3W. Depth of focus 0·005.
(as on 1949, Aug. 25d.).
A = –·6154, B = –·0075, C = +·7882 ; δ = +3 ; h = –6 ;
D = –·012, E = +1·000 ; G = –·788, H = –·010, K = –·615.

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Mitchell Field	1·7	99	i 0 37	+ 9	i 1 9	+19	—	—
College	20·5	39	i 4 36	+ 1	—	—	e 4 57	PP
Resolute Bay	39·1	25	e 7 22a	– 1	—	—	—	—
Shasta Dam	39·9	83	i 7 30	+ 1	—	—	—	—
Hungry Horse	40·6	68	i 7 35	0	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mineral	Z.	40·6	83	i 7 35a	0	—	—	—	—
Reno		42·2	83	i 7 49a	+ 1	—	—	—	—
Lick	Z.	42·4	87	i 7 50a	0	—	—	—	—
Fresno	Z.	43·9	86	i 8 2k	0	—	—	—	—
Tinemaha	Z.	44·7	85	i 8 8	0	—	—	i 8 25	pP
China Lake		45·9	85	i 8 17a	– 1	i 13 34	ScP	i 8 35	pP
Pasadena	Z.	46·6	87	i 8 22	– 1	—	—	i 8 40	pP
Riverside	Z.	47·2	87	i 8 27	– 1	—	—	i 8 45	pP
Boulder City		47·5	83	i 8 30	0	—	—	—	—
Palomar		48·0	87	i 8 33a	– 1	—	—	i 8 51	pP
Tucson		52·4	84	i 9 7	– 1	—	—	i 9 24	pP
Fayetteville		59·7	69	i 9 57	– 3	—	—	—	—

China Lake gives also iPcPZ = 10m.8s., iZ = 10m.19s.

Dec. 18d. Readings also at 0h. (Kimberley, Palomar, China Lake, Tinemaha, Resolute Bay, near Apia, and near Garm), 1h. (Santa Lucia), 4h. (Terre Adélie, near Almata II, Chilisk, and Ili), 5h. (Bombay, Poona, and near Calcutta), 8h. (Copiapo), 9h. (near Santa Lucia), 10h. (Alberni, Andijan, Obi-garm, Samarkand, near Fergana, Garm, Kulyab, Stalinabad, Tashkent, Tchimkent, near Horseshoe Bay, and Victoria), 12h. (Djakarta and near Athens), 13h. (Apia, near Alicante, and near Djakarta), 14h. (Apia, China Lake, Pasadena, Palomar, and Collmberg), 15h. (Apia), 16h. (La Paz and Wellington), 17h. (Apia, Kimberley, near Alicante, and near Dzhergetal (2)), 18h. (near Kurmenty and near Dzhergetal), 19h. (near Palisades), 20h. (Terre Adélie, Wellington, Apia, Kimberly, Poona, China Lake, Mount Wilson, Riverside, Tinemaha, Strasbourg, and Stuttgart), 21h. (Brisbane), 22h. (Copiapo), 23h. (Copiapo, Fergana, near Dzhergetal (2), Garm, Kulyab, Obi-garm, and near Palisades).

Dec. 19d. 18h. 24m. 42s. Epicentre 35°·5N. 140°·4E. (as on 12d.).

Focus at the base of superficial layers.

Intensity V at Senzu; IV at Tokyo, Yokohama, Ajiro, Hanbara, Kengasaki; II-III at Tukubasan, Osima, Makabe, Sengokubara, and Huchu.
Epicentre 35°·5N. 140°·2E. Depth 40km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1951, Tokyo, 1952, pp.343-344, with macroseismic chart.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Tyosi	0·4	58	0 14	+ 5	0 25	+ 9
Tokyo	0·6	289	0 11	– 1	0 18	– 3
Mera	0·7	219	0 15	+ 2	0 26	+ 3
Yokohama	0·7	264	0 13	0	0 22	– 1
Tukubasan	0·8	341	0 14	– 1	0 23	– 3
Mito	0·9	3	0 17	+ 1	0 29	+ 1
Kumagaya	1·0	309	0 17	– 1	0 29	– 2
Osima	1·1	229	0 21	+ 2	0 34	+ 1
Utunomiya	1·1	338	0 17	– 2	0 31	– 2
Ajiro	1·2	247	0 18	– 2	0 30	– 6
Misima	1·2	252	0 19	– 1	0 33	– 3
Titibu	1·2	294	0 17	– 3	0 30	– 6
Maebasi	1·3	313	0 22	0	0 38	0
Kohu	1·5	275	0 20	– 4	0 37	– 7
Oiwake	1·7	299	0 25	– 3	—	—
Shizuoka	1·7	252	0 26	– 2	0 45	– 4
Omaesaki	2·0	243	0 44	+12	—	—
Iida	2·1	270	0 32	– 1	0 57	– 2
Inawasiro	2·1	354	0 34	+ 1	0 56	– 3
Nagano	2·2	203	0 31	– 4	—	—
Hamamatu	2·3	250	0 39	+ 3	—	—
Hukusima	2·3	1	0 35	– 1	—	—
Hatidyozima	2·4	191	1 5	S	(1 5)	– 1
Nagoya	2·8	263	0 48	+ 5	—	—
Sendai	2·8	8	0 56	+13	—	—
Kameyama	3·3	261	1 24	S	(1 24)	– 5

Kameyama gives also S = 1m.52s.

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Dec. 19d. Readings also at 0h. (Apia and near Dzhergetal), 1h. (Apia and near Alicante), 2h. (near Dzhergetal and near Kurmenty), 4h. (near Garm), 5h. (Apia and Tamanrasset), 6h. (near Copiapo, near Erevan, and near Athens), 7h. (near Athens), 8h. (Alberni, Victoria, and near Athens), 9h. (near Dzhergetal), 10h. (Apia), 12h. (near Alicante and near Palisades), 13h. (Oaxaca, Puebla, Vera Cruz, and near Tacubaya), 17h. (near Alicante and near Dzhergetal), 19h. (Apia), 20h. (Collmberg), 21h. (China Lake, Riverside, near Garm (2), and near Dzhergetal).

Dec. 20d. 19h. 12m. 2s. Epicentre 38°·3N. 20°·8E. (as on 1951, May 26d.).

Felt throughout the Greek Archipelago ; Intensity VI at Hog, Thekla ; V at Lixourion, Assos, Asprogherakas, Zante, Ithaca, and Mytikas ; IV at Katasturi, Leukade, Astakos, and Aetolikon. Epicentre as adopted (Strasbourg).

A. Galanopoulos.
Seismo. Instit. Bull., 1951, Athens, 1952, p.30.

A = +·7355, B = +·2794, C = +·6172 ; δ = −4 ; h = −1 ;
D = +·355, E = −·935 ; G = +·577, H = +·219, K = −·787.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·3	98	i 0 45a	P_g	e 1 16	S_g	—	—	—
Taranto		3·5	309	0 51	− 6	1 39	− 1	1 6	P_g	—
Messina		4·2	270	e 0 55	−12	1 39	−18	—	—	e 2·3
Sofia		4·8	23	e 1 17	+ 2	2 17	+ 5	e 1 35	P_g	—
Belgrade		6·5	358	e 1 46a	+ 7	e 3 0	+ 5	e 1 53	P*	i 3·9
Istanbul		7·0	64	e 1 38	− 8	e 3 12	+ 4	(e 2 23)	P_g	e 3·5
Rocca di Papa		7·1	302	1 42	− 6	3 47	S_g	—	—	—
Bucharest	N.	7·3	32	e 1 59	+ 9	e 3 35	+20	—	—	—
Rome		7·3	302	e 1 42	− 8	i 3 44	S*	2 48	P_g	4·2
Timisoara		7·4	2	e 2 25	P_g	e 4 0	S_g	—	—	e 4·7
Florence		9·0	310	e 2 8	− 5	e 3 40	−18	—	—	i 4·8
Triest		9·0	327	e 2 12	− 1	i 3 47	−11	e 2 52	P_g	—
Prato		9·2	310	e 2 33	+17	i 4 19	+16	—	—	—
Budapest		9·3	353	e 3 19	?	e 5 7	S_g	—	—	e 6·2
Ogyalla		9·7	350	e 2 59	P_g	e 4 30	+15	e 5 36	S_g	e 5·8
Uzhgorod		10·4	6	e 2 29	− 5	e 4 21	−11	—	—	e 6·1
Kishinev		10·5	32	e 2 34	− 1	—	—	—	—	—
Skalnate-Pleso		10·9	358	—	—	e 6 14	S_g	—	—	—
Pavia		11·1	312	—	—	e 4 38	−11	—	—	e 7·4
Helwan	Z.	12·1	131	e 3 51	+54	e 5 4	−10	—	—	—
Prague		12·6	341	i 3 11	+ 8	e 5 27	+ 1	e 7 7	S_g	e 7·7
Zürich		12·7	319	e 3 12	+ 7	e 5 15	−13	—	—	e 6·0
Ksara		13·0	106	e 3 20	+11	e 7 7?	L	—	—	(e 7·1)
Cheb		13·2	336	e 3 41	+30	—	—	—	—	e 7·0
Basle		13·4	318	e 2 54	−20	—	—	—	—	e 7·8
Stuttgart		13·4	325	e 3 8	− 6	e 5 28	−17	e 3 31	PP	e 8·0
Karlsruhe		13·9	324	e 3 19	− 2	—	—	e 3 28	PP	e 7·5
Strasbourg		14·0	322	e 3 21	− 1	e 6 53	SS	i 3 37	PP	e 7·0
Besançon		14·1	314	e 3 33	+10	e 5 46	−16	e 4 24	PP	e 6·5
Collmberg		14·1	340	e 3 24	+ 1	e 6 23	+21	e 3 31	PP	e 8·4
Algiers Univ.	Z.	14·2	269	e 3 13	−11	—	—	—	—	—
Jena		14·2	336	e 3 25	+ 1	e 5 43	−21	e 3 43	PP	e 9·0
Potsdam		15·1	342	—	—	e 6 46?	+21	—	—	i 8·5
Paris		16·9	314	i 3 56	− 3	e 5 28	?	i 4 12	PP	e 8·2
Borzhomi		17·6	71	e 4 19	+11	—	—	—	—	—
Piatigorsk		17·7	62	4 16?	+ 6	7 53?	+27	—	—	—
Tsikhlis-Dzhvari		17·7	71	e 4 21	+11	—	—	—	—	—
Tiflis		18·7	71	4 26	+ 4	8 12	+24	—	—	—
Granada		19·3	274	i 4 22a	− 7	—	—	5 4	PP	—
Toledo		19·3	283	i 4 20	− 9	—	—	e 5 6	PP	—
Kew	N.	19·8	318	—	—	e 8 17	+ 4	—	—	e 10·0
Kirovobad		19·9	75	4 39	+ 3	—	—	—	—	—
Tamanrasset	Z.	20·3	225	i 4 29a	−11	e 8 21	− 2	e 4 56	PP	9·6
Moscow		20·8	27	e 4 43	− 2	e 8 39	+ 6	—	—	—
Kiruna		29·6	3	e 6 8	− 1	—	—	—	—	e 14·0
Poona	Z.	49·9	98	e 9 2	+ 5	—	—	e 9 22	?	—
Resolute Bay		59·7	345	e 10 4	− 5	—	—	—	—	—

For Notes see next page.

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NOTES TO DECEMBER 20d. 19h. 12m. 2s.

Additional readings :—
Athens i =50s. and 1m.11s.
Sofia S_gEN =2m.44s.
Belgrade eZ =2m.10s., ePSZ =2m.34s., eS_gNW =3m.30s.
Istanbul eS*Z =2m.48s.
Timisoara iP*N =2m.44s., eN =3m.23s., eS*N =4m.27s., iS*E =4m.32s.
Triest S_gS_g =4m.56s.?.
Budapest eE =3m.39s., iE =6m.6s.
Ogyalla e =3m.7s., eE =5m.10s., e =5m.24s.
Skalnate Pleso eN =6m.28s., eE =6m.40s., e =7m.9s.
Pavia e =5m.14s., and 5m.20s.
Prague e =3m.46s. and 6m.7s., eS* =6m.31s., e =7m.20s.
Stuttgart eZ =3m.18s., eSS =7m.33s.
Strasbourg e =3m.47s. and 3m.53s.
Jena eE =3m.28s.?, eZ =3m.58s., eE =4m.1s., 4m.26s., 5m.24s., and further readings later than S.
Paris iPPP? =4m.20s., e =4m.50s.
Long waves were also recorded at Copenhagen and Upsala.

Dec. 20d. Readings also at 0h. (Tamanrasset, Collmberg, Jena, Prague, Stuttgart, Kiruna, Ksara, Bombay, Kodaikanal, Poona, Tananarive, Kimberley, Apia, and near Dzhergetal), 1h. (Apia (2), near Chilisk, Ili, and Kurmenty), 3h. (near Almata II, Ili, and Kurmenty), 7h. (near Copiapo and near Tacubaya), 8h. (near Obi-garm (2)), 10h. (Scoresby Sund), 11h. (Apia and Bombay), 13h. (Besançon and Stuttgart), 14h. (near Huancayo and near Apia), 15h. (Apia, Algiers Univ., Kiruna, and near Djakarta), 17h. (near Dzhergetal), 18h. (Santa Lucia), 19h. (near Palisades), 20h. (near Akhalkalaki), 21h. (near Palisades), 22h. (Alicante, Malaga, Granada, Toledo, Besançon, Clermont-Ferrand, Strasbourg, Stuttgart, and near Tortosa).

Dec. 21d. 8h. 37m. 26s. Epicentre 26°·5N. 99°·7E.

A = −·1510, B = +·8833, C = +·4438 ; δ = −2 ; h = +3 ;
D = +·986, E = +·168 ; G = −·075, H = +·437, K = −·896.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	11·1	252	i 2 47a	+ 4	i 5 15	+26	5 31	SS	—
Nanking		17·5	66	3 58	− 9	i 7 17	− 4	—	—	—
Zi-ka-wei	Z.	19·6	70	i 4 24a	− 8	i 7 51	−17	—	—	—
New Delhi		20·1	282	i 4 35	− 3	i 8 13	− 6	4 52	PP	9·3
Hyderabad		21·6	250	i 4 55	+ 1	i 9 1	+12	5 7	PP	11·6
Manila		23·1	116	i 5 9	+ 1	i 8 56	−20	i 5 30	PP	i 10·6
Przhevalsk		23·6	319	5 13	0	e 9 31	+ 6	—	—	—
Kurmenty		24·0	320	5 17	0	—	—	—	—	—
Chilisk		24·3	321	i 5 26	+ 6	—	—	—	—	—
Almata II		24·7	319	e 5 26	+ 2	—	—	—	—	—
Almata		24·9	319	i 5 29	+ 3	—	—	—	—	—
Rybach'e		25·0	315	5 26	− 1	9 53	+ 4	—	—	—
Poona		25·1	257	i 5 27	− 1	9 49	− 2	—	—	—
Ili		25·3	320	e 5 27	− 3	—	—	—	—	—
Bombay		25·9	259	i 5 39	+ 4	i 10 9	+ 5	6 27	PP	12·6
Irkutsk		26·0	6	5 36	0	10 15	+ 9	—	—	—
Frunse		26·2	315	i 5 39	+ 1	10 15	+ 6	—	—	—
Kodaikanal	E.	26·5	238	e 5 43	+ 2	e 10 19	+ 5	6 28	PP	12·7
Andijan		26·7	309	5 42	− 1	10 19	+ 2	—	—	—
Fergana		27·0	309	e 5 43	− 2	—	—	—	—	—
Colombo	E.	27·1	227	5 53	+ 7	10 45	+21	—	—	14·9
Unzendake		27·2	68	5 40k	− 7	10 32	+ 7	—	—	—
Saga		27·3	67	5 47	− 1	—	—	—	—	—
Yakusima		27·3	73	e 5 42	− 6	e 10 35	+ 8	—	—	—
Hukuoka		27·4	67	e 5 45	− 4	e 10 23	− 5	e 6 54	PP	e 14·9
Kagosima		27·4	71	e 5 45k	− 4	e 10 32	+ 4	e 6 27	PP	e 16·5
Garm		27·6	305	e 5 49	− 2	—	—	—	—	—
Kumamoto		27·6	68	e 5 46	− 6	11 29	SS	—	—	15·7
Obi-garm		27·9	304	i 5 54	0	—	—	—	—	—
Miyazaki		28·2	71	e 5 54	− 2	e 10 48	+ 7	—	—	e 16·3

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.
Ooita		28·4	68	5 55	– 3	e 10 57	+12	—	—	e 15·1
Stalinabad		28·6	303	i 6 0	0	—	—	—	—	—
Hamada		29·0	65	5 59	– 5	10 57	+ 3	—	—	16·0
Tashkent		29·1	309	i 6 3	– 1	i 10 58	+ 2	—	—	—
Hirosima		29·2	67	e 6 19	+14	—	—	—	—	e 15·3
Matuyama		29·4	68	e 5 46	–21	e 10 6	–55	e 6 58	PP	e 12·2
Simidu		29·5	69	e 5 56	–12	e 11 18	+16	—	—	16·1
Kôti		30·0	68	e 6 20	+ 8	e 11 8	– 2	—	—	e 16·4
Samarkand		30·2	303	e 6 14	0	—	—	—	—	—
Muroto		30·5	68	e 6 0	–17	—	—	—	—	—
Takamatu		30·5	66	e 6 23	+ 6	e 11 15	– 3	—	—	e 16·3
Sumoto		31·2	66	e 6 15	– 8	—	—	—	—	17·5
Toyooka		31·3	65	e 6 21	– 3	—	—	—	—	e 17·4
Kobe		31·5	66	e 6 18	– 8	e 11 44	+10	e 7 47	PP	e 16·9
Osaka		31·8	66	e 6 15	–13	e 12 14	+36	e 7 27	PP	—
Kyoto		32·0	65	e 6 30	0	e 11 30	–12	—	—	e 16·5
Hikone		32·4	65	e 6 25	– 9	—	—	—	—	e 18·6
Kameyama		32·6	66	6 36	+ 1	11 46	– 5	—	—	13·8
Gihu		32·8	65	e 6 57	+20	—	—	—	—	—
Nagoya		33·0	65	e 6 35	– 4	—	—	—	—	e 18·0
Djakarta		33·2	166	i 6 42	+ 2	e 12 6	+ 6	—	—	—
Takayama		33·3	63	e 6 29	–12	—	—	—	—	—
Toyama		33·3	62	e 6 45	+ 4	e 12 15	+13	—	—	e 18·7
Mary		33·7	300	i 6 44	– 1	12 9	+ 1	—	—	—
Matumoto		33·9	63	e 6 48	+ 1	—	—	—	—	e 18·9
Omaesaki		34·0	65	e 7 44	PP	—	—	—	—	18·9
Matusiro		34·1	62	6 48	0	12 18	+ 4	7 58	PP	15·8
Nagano	E.	34·1	62	e 6 53	+ 5	—	—	—	—	e 18·5
Shizuoka		34·2	64	e 6 44	– 5	—	—	—	—	e 19·4
Oiwake		34·4	63	e 6 48	– 3	—	—	—	—	—
Maebasi		34·8	63	e 7 0	+ 6	—	—	e 7 46	PP	e 15·3
Titibu		34·8	63	e 6 46	– 8	—	—	—	—	—
Kumagaya		35·0	63	e 7 4	+ 8	e 13 50	SS	—	—	e 18·7
Yokohama		35·2	65	e 7 4	+ 6	—	—	—	—	—
Mera		35·3	66	7 23	+24	—	—	—	—	e 18·2
Tokyo		35·3	64	e 7 15	+16	13 9	+36	e 8 28	PP	19·1
Torisima		35·7	73	e 7 0	– 2	—	—	—	—	—
Shirakawa		35·8	62	e 7 0	– 3	—	—	—	—	—
Mito		35·9	63	e 7 4	0	—	—	—	—	—
Onahama		36·3	63	7 10	+ 3	e 12 22	–26	—	—	e 19·3
Sendai		36·4	59	e 7 14	+ 6	e 13 50	SS	e 16 19	Q	e 19·1
Mizusawa		36·7	58	e 7 14	+ 4	e 12 52	– 2	e 12 39	?	e 19·3
Miyako		37·4	57	e 7 10?	– 6	e 12 52?	–13	—	—	—
Kizyl-Arvat		38·3	301	i 7 25	+ 1	—	—	—	—	—
Urakawa		38·4	54	e 7 11	–14	e 13 3	–17	—	—	e 16·1
Yuzno-Sakhlinsk		39·4	47	7 31	– 2	13 30	– 5	—	—	—
Sverdlovsk		41·1	329	i 7 49	+ 2	i 14 0?	– 1	—	—	—
Baku		43·3	302	e 8 7	+ 2	—	—	—	—	—
Goris		46·0	301	—	—	15 17	+ 5	—	—	—
Grozny		46·5	306	i 8 31	0	—	—	—	—	—
Tiflis		47·2	303	8 37?	+ 1	15 44?	+15	—	—	—
Erevan		47·4	302	e 8 38	0	15 37?	+ 5	—	—	—
Gori		47·7	304	e 8 42	+ 2	—	—	—	—	—
Borzhomi		48·2	304	e 8 45	+ 1	—	—	—	—	—
Tsikhlis-Dzhvari		48·2	304	8 47	+ 3	15 49	+ 6	—	—	—
Piatigorsk		48·5	307	8 45	– 1	15 48	0	—	—	—
Sotchi		50·9	306	i 9 5	0	16 24	+ 3	—	—	—
Moscow		52·9	322	9 19	– 1	16 48	0	—	—	—
Ksara		54·9	294	9 43?	+ 8	17 46?	+30	—	—	—
Yalta		54·9	307	9 35	0	e 17 17	+ 1	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pulkovo		57·1	326	e 9 53	+ 3	—	—	—	—	—
Kishinev		58·4	312	9 57	− 3	18 3	+ 1	—	—	—
Istanbul		59·0	304	e 10 6	+ 2	e 18 16	+ 6	—	—	—
Helwan		59·5	291	e 10 4	− 3	i 18 26	+10	12 26	PP	—
Perth		60·1	164	—	—	e 22 39	SS	e 28 24	Q	i 31·6
Bucharest		60·6	308	e 10 22	+ 7	e 18 48	+18	e 9 22	?	—
Lwow		61·2	315	—	—	18 49	+11	—	—	—
Kiruna		61·7	335	i 10 18	− 4	i 18 42	− 2	i 10 48	PcP	e 28·6
Uzhgorod		62·5	314	i 10 11?	−17	—	—	—	—	—
Upsala		63·5	326	—	—	e 19 11	+ 4	e 22 34?	SS	e 29·6
Skalnate Pleso		63·7	315	e 10 47	+11	e 19 19	+ 9	e 11 1	PcP	e 32·6
Belgrade		64·5	309	e 10 44a	+ 3	—	—	e 14 48	PPP	e 37·7
Raciborzu		64·9	316	e 10 45	+ 2	—	—	e 11 12	PcP	e 32·6
Ogyalla		65·3	313	e 11 17	+31	e 19 48	+19	e 14 11	PPP	—
Copenhagen		67·0	323	e 10 58	+ 1	i 20 6	+16	—	—	31·6
Prague		67·2	317	e 11 0	+ 2	e 19 57?	+ 5	e 13 50	PP	e 28·9
Potsdam		67·5	319	e 11 4	+ 4	i 19 56	0	—	—	e 30·6
Collmberg		67·8	317	e 11 2	0	e 20 12	+12	—	—	e 33·1
Tananarive		67·8	234	e 11 3	+ 1	e 19 57	− 3	e 20 18	PS	34·8
Taranto		67·9	305	10 17	−45	19 14	−47	—	—	34·3
Cheb		68·5	317	e 11 17	+11	e 20 2	− 6	e 16 28	?	—
Jena		68·8	318	e 11 7	− 1	e 20 21	+10	e 11 18	PcP	e 34·6
Triest		68·9	312	e 11 8	− 1	i 20 21	+ 8	e 13 43	PP	e 35·7
Rome		70·9	308	e 11 25	+ 4	e 20 39	+ 3	e 14 7	PP	e 35·6
Stuttgart		70·9	316	e 11 18	− 3	e 20 54	+18	e 11 31	PcP	e 34·6
Florence		71·1	310	e 11 23	+ 1	e 20 40	+ 2	e 28 50	SSS	—
Prato		71·1	310	e 11 41	+19	e 21 9	+31	—	—	—
Witteveen	Z.	71·1	322	i 11 24	+ 2	—	—	—	—	—
Karlsruhe		71·3	317	e 11 25	+ 2	—	—	e 14 0	PP	e 36·6
Zürich		71·7	315	e 11 26k	0	e 20 48	+ 3	e 21 16	ScS	—
Strasbourg		71·8	316	e 11 27	+ 1	e 20 49	+ 3	e 11 45	PcP	i 34·6
Besançon		73·4	315	e 11 37	+ 1	—	—	e 13 56	PP	—
Brisbane		74·2	132	i 11 40k	0	i 21 23	+ 9	i 11 53	PcP	—
Scoresby Sund		74·9	343	e 11 45	+ 1	—	—	—	—	—
Paris		75·0	318	i 11 46	+ 1	i 21 23	0	i 11 56	PcP	e 36·6
College		75·2	24	i 11 42	− 4	—	—	—	—	—
Kew		75·6	321	—	—	e 21 44	+15	—	—	e 42·6
Riverview		77·4	138	e 11 59	+ 1	e 21 55	+ 6	e 22 9	SKS	e 36·9
Rathfarnham Castle		78·1	324	e 11 48	−14	e 21 28	−28	e 14 44	PP	e 36·6
Resolute Bay		78·6	4	e 12 1	− 4	—	—	e 12 20	PcP	e 34·0
Algiers Univ.	Z.	79·6	306	e 12 9	− 1	—	—	i 12 21	PcP	—
Alicante		81·4	309	12 16	− 4	22 37	+ 6	15 33	PP	e 38·7
Toledo		83·1	311	e 12 29	0	e 23 11	SKS	e 15 34	PP	41·9
Almeria		83·5	308	12 58	+27	23 24	− 28	16 8	PP	47·1
Tamanrasset	Z.	83·6	292	i 12 31k	0	e 15 42	PP	i 12 37	PcP	—
Granada		84·1	309	12 59k	+25	24 2	PS	15 59	PP	i 46·9
Malaga		84·9	309	i 14 39	?	—	—	—	—	46·1
Kimberley	Z.	90·4	238	i 13 8	+ 4	—	—	—	—	—
Auckland	N.	94·6	129	—	—	e 24 38	+ 3	e 30 57	SS	e 40·6
Christchurch		96·5	136	—	—	e 24 14	[+ 5]	e 25 4	S	e 47·9
Hungry Horse		99·6	22	e 13 47	+1	—	—	—	—	—
Shasta Dam		102·6	31	e 18 46	PP	—	—	—	—	—
Tinemaha	Z.	107·4	31	e 19 9	PP	—	—	—	—	—
China Lake	Z.	108·7	30	e 18 26	[− 5]	—	—	e 18 56	PP	—
Boulder City		109·8	29	i 19 10	PP	—	—	—	—	—
Mount Wilson	Z.	109·8	32	e 18 41	[+ 8]	—	—	—	—	—
Weston		111·0	352	e 14 53	P	—	—	—	—	e 58·7
Palomar	Z.	111·1	32	e 18 44	[+ 9]	—	—	—	—	—
Tucson		114·7	28	e 18 47	[+ 5]	—	—	—	—	—
Fayetteville		116·4	13	e 18 53	[+ 7]	—	—	—	—	—
Bogota		148·5	348	i 19 52	[+ 7]	—	—	i 19 58	PKP_2	—
La Plata		159·1	242	—	—	44 22	SS	47 4	SSP	67·0
Huancayo		164·9	342	e 20 10	[+ 4]	e 31 47	{+ 9}	e 24 50	PP	e 63·0
La Paz	Z.	164·9	309	i 20 10	[+ 4]	i 31 52	{+14}	i 21 16	PKP_2	—

For Notes see next page.

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NOTES TO DECEMBER 21d. 8h. 37m. 26s.

Additional readings :—
Calcutta SSSE = 5m.43s.
Nanking iSEN = 7m.3s., iZ = 7m.25s.
New Delhi QEN = 8m.19s., SSEN = 8m.40s., SSSEN = 8m.54s.
Hyderabad iN = 9m.9s.
Manila ePPP = 5m.37s., eSS = 9m.40s.
Bombay PPPEN = 6m.47s., QN = 11m.9s., QE = 11m.15s., SSN = 11m.29s., SSE = 11m.39s.
Kodaikanal PPPE = 6m.43s., QE = 11m.22s.
Matuyama eQ = 11m.34s.
Kobe e = 6m.23s., iZ = 6m.29s., eZ = 9m.13s., eSZ = 12m.10s.
Matusiro eQN = 13m.49s.
Maebasi e = 8m.27s.
Tokyo eSSE = 15m.31s., eSSSN = 17m.57s., iN = 18m.19s.
Kiruna iZ = 10m.21s. and 10m.24s., eScS?E = 20m.23s., eN = 22m.7s., eSSE = 22m.58s., eSSN = 23m.20s., eZ = 24m.9s., eSSSEN = 25m.34s.?.
Upsala i = 19m.21s., eE = 24m.52s., iN = 25m.13s.
Skalnate Pleso e = 14m.48s., eN = 18m.48s., e = 20m.53s.
Raciborzu ePE = 10m.48s., eZ = 12m.27s.?, eE = 12m.33s., eN = 14m.46s., ePPZ = 15m.42s.
Ogyalla e = 20m.46s.
Prague e = 13m.22s. and 15m.26s., ePS?N = 20m.20s., e = 20m.58s.
Tananarive e = 11m.13s. and 20m.8s., eSS = 24m.59s.
Jena ePE = 11m.11s., eE = 11m.28s., eZ = 11m.49s., eE = 11m.54s. and 13m.41s., ePS?E = 20m.57s., eE = 25m.55s.
Triest iSS = 24m.58s., eSSS = 28m.6s.
Rome eSS = 25m.29s.
Stuttgart ePZ = 11m.22s., eSS? = 25m.16s., eSSS = 29m.4s.
Strasbourg ePP = 14m.1s., ePPP = 16m.8s., eSS = 25m.41s., eSSS = 29m.11s., and other unidentified readings.
Besançon e = 11m.47s., 12m.8s., 12m.35s., and 13m.1s.
Brisbane iZ = 11m.45s., iN = 26m.24s.
Paris ePPP = 16m.13s., iPPPP = 18m.37s., ePS = 21m.43s.?, eSS? = 26m.45s., eSSS? = 30m.21s., iPKKP? = 30m.47s. and other unidentified readings.
Riverview eN = 21m.59s., ePSE = 22m.41s., eE = 26m.17s., eQE = 33·1m.
Rathfarnham Castle iZ = 12m.58s. and 13m.18s.
Resolute Bay eZ = 12m.4s., 12m.48s., 13m.13s., and 13m.41s., eN = 18m.18s.
Alicante PPP = 17m.11s., PS = 23m.31s., SS = 27m.45s., SSS = 31m.1s., Q = 33m.33s.
Toledo i = 12m.33s., e = 13m.55s. and 23m.51s.
Tamanrasset eZ = 13m.42s., ePPPZ = 17m.29s.
Granada PPS = 26m.59s., Q = 45·1m.
Auckland eSSSN = 34m.49s.
Christchurch ePSE = 25m.59s., eSSEN = 31m.19s., eQEN = 41m.14s.
La Plata SS?N = 44m.46s.
Huancayo e = 36m.13s., 45m.4s., 48m.49s., and 55m.40s.
La Paz iPPZ = 25m.11s., SS = 45m.34s.
Long waves were also recorded at Terre Adélie, Wellington, Pasadena, Seattle, Palisades, Bermuda, and other Japanese and European stations.

Dec. 21d. 18h. 7m. 5s. Epicentre 49°·2N. 156°·1E.

A = −·5997, B = +·2658, C = +·7548 ; δ = +1 ; h = −5 ;
D = +·405, E = +·914 ; G = −·690, H = +·306, K = −·656.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		33·0	40	i 6 39	0	—	—	i 9 0	PcP	—
Resolute Bay	Z.	47·9	20	e 8 42a	0	—	—	e 8 55	?	—
Hungry Horse		55·7	54	e 9 39	− 1	—	—	—	—	—
Shasta Dam		55·7	66	i 9 41	+ 1	—	—	—	—	—
Mineral	Z.	56·4	66	i 9 46k	+ 1	—	—	—	—	—
Reno	Z.	58·0	65	e 10 1k	+ 4	—	—	—	—	—
Lick	Z.	58·2	68	e 10 1a	+ 3	—	—	—	—	—
Kiruna	Z.	58·6	343	i 10 1	0	—	—	—	—	—
China Lake	Z.	61·7	67	i 10 23	+ 1	—	—	i 12 49	PP	—
Pasadena	Z.	62·5	69	i 10 29	+ 1	—	—	i 12 54	PP	—
Riverside	Z.	63·1	69	i 10 31	− 1	—	—	—	—	—
Boulder City		63·3	65	e 10 34	+ 1	—	—	i 13 0	PP	—
Palomar	Z.	63·8	69	i 10 37	+ 1	—	—	—	—	—
Tucson		68·2	66	e 11 5	+ 1	—	—	—	—	—
Poona	Z.	71·2	277	i 11 25	+ 2	—	—	i 13 47	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.
Fayetteville		74·7	53	i 11 44	+ 1	—	—	i 11 59	PcP	—
Collmberg	Z.	75·0	337	e 11 44	− 1	—	—	e 14 6	PP	—
Witteveen	Z.	75·1	342	i 11 47	+ 1	—	—	—	—	—
Jena		75·7	338	e 11 49	0	—	—	e 14 20	PP	—
Prague		75·8	336	e 11 51	+ 1	—	—	—	—	—
Rathfarnham Castle		76·8	350	e 11 57	+ 2	e 21 49	+ 7	e 21 9	?	e 34·9
Stuttgart	Z.	78·3	339	e 12 5	+ 2	—	—	e 14 25	PP	—
Strasbourg		78·8	340	i 12 9k	+ 3	e 12 20	PcP	i 14 29	PP	—
Paris		79·8	343	i 12 13	+ 1	—	—	i 14 35	PP	—
Triest	Z.	80·0	335	e 12 22	+ 9	—	—	—	—	—
Besançon		80·5	340	i 12 18	+ 3	—	—	—	—	—
Tamanrasset	Z.	103·7	332	e 14 9	+ 4	—	—	—	—	—

Additional readings :—
China Lake iZ = 10m.29s. and 10m.36s.
Pasadena iZ = 10m.41s.
Riverside iZ = 10m.37s. and 10m.44s.
Jena eE = 12m.2s. and 12m.49s.
Prague e = 12m.4s. and 13m.3s.
Paris i = 12m.21s. and 12m.26s.
Besançon e = 12m.22s. and 12m.30s.
Long waves were also recorded at Bombay and Alicante.

Dec. 21d. Read.ngs also at 0h. (Huancayo), 1h. (Santa Lucia), 2h. (near Akhalkalaki), 3h. (Tamanrasset and near Krasnogorka), 4h. (Antofagasta, Huancayo, La Paz (2), La Plata, and Pietermaritzburg), 6h. (Antofagasta and near Dzhergetal), 7h. (Hong Kong and Resolute Bay), 10h. (near Hong Kong (2)), 11h. (Bombay, Calcutta, Poona, Nanking, Zi-ka-wei, Brisbane, Resolute Bay, Stuttgart, Kiruna, and Tamanrasset), 13h. (Apia), 14h. (near Dzhergetal), 16h. (Alicante (3), near Apia (2), and near Copiapo), 17h. (Collmberg, Jena, Prague, Strasbourg, Stuttgart, Rome, Budapest, Sofia, Kalossa, near Belgrade, Timisoara, near Triest, near Alicante, near Dzhergetal, and near Palisades), 18h. (Apia, Alberni, and Horseshoe Bay), 19h. (near Tananarive), 20h. (Kirkland Lake, Ottawa, Seven Falls, Shawinigan Falls, Palisades, and Resolute Bay), 21h. (Palisades and near Kurmenty), 23h. (China Lake, Palomar, Tinemaha, Manila, and near Dzhergetal).

Dec. 22d. 6h. 7m. 8s. Epicentre 35°·7N. 69°·2E. Depth of focus 0·020.

Given by U.S.S.R. stations.

A = + ·2891, B = + ·7609, C = + ·5810 ; δ = + 11 ; h = 0 ;
D = + ·935, E = − ·355 ; G = + ·206, H = + ·543, K = − ·814.

	Δ	Az.	P.	O – C.	S.	O – C.
	°	°	m. s.	s.	m. s.	s.
Kulyab	2·2	12	—	—	e 1 9	+ 1
Stalinabad	2·9	353	i 0 46	− 1	i 1 23	0
Obi-garm	3·0	7	i 0 48?	− 1	i 1 26?	0
Garm	3·4	14	i 0 55	+ 1	i 1 36	+ 1
Dzhergetal	3·9	24	i 1 0	0	i 1 45	− 1
Samarkand	4·3	337	e 1 7	+ 2	1 58	+ 3
Fergana	5·1	23	e 1 16	0	2 15	+ 1
Andijan	5·6	25	e 1 24	+ 2	i 2 28	+ 2
Mary	6·2	290	—	—	2 42	+ 2
Tchimkent	6·6	3	e 1 37	+ 1	i 2 51	+ 1
Naryn	7·8	41	1 48	− 4	i 3 15	− 4
Frunse	8·3	29	e 1 58	0	3 31	0
Rybach'e	8·6	36	e 2 3	+ 1	—	—
Krasnogorka	8·8	30	i 2 7	+ 2	e 3 42	− 1
Almata II	9·8	37	e 2 20	+ 2	—	—
Przhevalsk	9·8	44	e 2 17	− 1	—	—
Ili	10·3	34	e 2 21	− 3	—	—
Chilisk	10·6	39	e 2 28	0	—	—
Kizyl-Arvat	10·8	292	—	—	4 29	− 1

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Dec. 22d. 14h. 47m. 23s. Epicentre 3°·0S. 153°·5E. (as on 1951, June 25d.).

A = −·8937, B = +·4456, C = −·0520 ; δ = −4 ; h = +7 ;
D = +·446, E = +·895 ; G = +·047, H = −·023, K = −·999.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		18·5	332	4 24	+ 5	—	—	—	—	—
Brisbane		24·4	181	i 5 21	0	i 9 41	+ 2	i 5 41	pP	—
Riverview		30·8	183	e 6 19	− 1	i 11 23	0	i 9 13	PcP	e 13·5
Manila		36·6	300	i 7 10	0	—	—	—	—	—
Christchurch		43·8	160	—	—	e 14 37	− 3	e 18 12	SS	e 22·7
Hong Kong		45·9	305	e 8 25	− 1	e 15 10	− 1	—	—	—
Nanking		47·9	319	i 8 41a	− 1	i 15 38	− 1	i 8 50	pP	—
Terre Adélie		64·3	185	e 10 40	+ 1	e 19 18	+ 1	—	—	35·9
Irkutsk		68·9	331	e 11 8	− 1	—	—	—	—	—
College		79·9	22	i 12 10	− 2	—	—	i 12 20	PcP	—
Poona	Z.	81·2	289	i 12 19	0	—	—	—	—	—
Bombay		82·2	289	e 12 25	+ 1	i 22 37	− 2	17 17	PPP	—
Frunse		83·9	313	e 12 33	0	—	—	—	—	—
Fergana		85·6	310	e 12 41	0	e 23 19	+ 6	—	—	—
Berkeley		87·3	52	e 12 52	+ 2	e 23 20	[+ 4]	i 13 3	PcP	e 39·8
Santa Clara	E.	87·5	52	—	—	e 23 23	{ 0}	—	—	—
Tchimkent		87·5	312	e 12 51	0	—	—	—	—	—
Tashkent		87·6	311	e 12 51	0	i 23 33	+ 1	—	—	—
Lick	Z.	87·7	52	e 13 1a	+ 9	—	—	i 13 10	?	—
Stalinabad		87·7	309	i 12 52	0	i 23 34	+ 1	—	—	—
Mineral	Z.	88·0	49	i 12 55a	+ 2	—	—	—	—	—
Samarkand		89·2	309	12 57	− 2	—	—	—	—	—
Reno		89·3	50	e 13 4k	+ 5	—	—	—	—	—
Pasadena		90·3	56	e 13 5	+ 1	—	—	i 13 15	?	e 42·6
Tinemaha	Z.	90·4	53	i 13 8	+ 4	—	—	—	—	—
China Lake	Z.	90·8	54	e 13 8	+ 2	—	—	i 13 19	?	—
Riverside	Z.	90·9	56	e 13 6	− 1	—	—	i 13 19	?	—
Palomar	Z.	91·3	57	i 13 10	+ 1	—	—	i 13 20	?	—
Boulder City		93·1	54	e 13 19	+ 2	e 24 1	{− 4}	—	—	—
Mary		93·1	308	e 13 17	0	—	—	—	—	—
Hungry Horse		93·9	42	i 13 22	+ 1	—	—	—	—	—
Sverdlovsk		94·1	327	e 13 29	+ 7	e 24 29	− 2	—	—	—
Resolute Bay		98·5	14	e 13 42	0	—	—	e 13 52	?	—
Ksara		114·5	306	e 19 38	PP	e 29 24	PS	—	—	—
Triest	Z.	124·9	327	e 18 45	[−17]	—	—	e 20 15	PP	—
Stuttgart	Z.	125·1	332	e 19 3	[0]	e 20 51	PP	e 19 13	?	—
Strasbourg		125·9	333	e 19 6	[+ 2]	—	—	e 19 15	?	—
Besançon		127·7	333	e 19 13	[+ 5]	—	—	e 19 17	?	—
Paris		128·1	337	e 19 19	[+11]	e 21 16	PP	e 21 20	?	—
Chinchina		131·0	85	i 19 25	[+11]	i 22 44	SKP	i 17 30	?	—
Bogota		132·5	86	—	—	e 22 52	SKP	—	—	63·6
Bermuda		133·8	46	—	—	e 22 58	SKP	—	—	e 68·3
La Paz		134·5	117	19 29	[+ 9]	i 26 47	[+17]	e 22 5	PP	—
Tamanrasset	Z.	143·3	306	e 19 36	[0]	i 23 0	SKP	e 22 49	PP	—

Additional readings :—
Brisbane iPPZ = 5m.50s., iZ = 5m.56s., iPPPN = 6m.4s., iN = 6m.29s. and 9m.45s., isSN = 10m.8s., iN = 10m.54s.
Riverview iZ = 6m.33s.
La Paz SS = 40m.13s.
Tamanrasset iZ = 21m.17s.
Long waves were also recorded at Auckland and Wellington.

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Dec. 22d. 22h. 14m. 11s. Epicentre 43°·8N. 18°·5E.

Intensity V at Sarajevo (43° 52′N. 18° 26′E.); IV at Hresa, Nahorevo, etc. Epicentre 43°·75N. 18°·5E. (Strasbourg).

M. D. Uzelac.
Annuaire macroséismique pour l'année, 1951, de l'Institut Séismologique de Beograd, Nouvelle Série No. 11, Belgrade, 1953, p. 58.

A = +·6867, B = +·2298, C = +·6897; δ = +5; h = −3;
D = +·317, E = −·948; G = +·654, H = +·219, K = −·724.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		1·7	54	e 0 28k	− 3	i 0 51	− 3	i 0 33	P_g	—
Timisoara		2·8	44	i 0 47a	0	e 1 24	+ 2	—	—	e 1·9
Triest	Z.	3·9	300	e 1 4	+ 2	i 1 57	S*	—	—	—
Prague		6·9	338	e 2 11	P_g	e 3 3	− 2	e 3 40	S_g	e 4·0
Stuttgart	Z.	8·1	311	e 1 51	−11	e 4 13	S*	e 4 30	S_g	—
Collmberg	Z.	8·4	336	e 2 59	P_g	e 4 26	S*	—	—	—
Jena	E.	8·5	329	—	—	e 3 27?	−18	e 4 12	S*	—
Strasbourg		8·9	307	e 3 25	?	—	—	—	—	e 4·9

Jena gives also eEN = 4m.0s., eN = 4m.23s., eE = 4m.32s.

Dec. 22d. Readings also at 0h. (Stuttgart, Mount Wilson, Palomar, China Lake, Tinemaha, and near Apia), 2h. (near Manila and near Yalta), 3h. (Palisades), 4h. (Strasbourg), 5h. (Stalinabad, Almata II, Fergana, Tchimkent, Naryn, near Kulyab (2), Obi-garm (2), Garm (2), and near Dzhergetal (2)), 6h. (Ashkabad and near Manila), 9h. (Kulyab, near Garm, Obi-garm, Dzhergetal, and near Erevan), 11h. (near Dzhergetal), 12h. (near Alicante), 13h. (Terre Adélie, and near Dzhergetal), 15h. (near Palisades), 16h. (near Alicante), 18h. (near Palisades), 19h. (Kiruna and near Bogota), 20h. (Manila, La Paz, and Kimberley), 21h. (Grahamstown and near Huancayo), 23h. (Apia, Grahamstown, Kimberley, Pietermaritzburg, Puebla, and near Tacubaya).

Dec. 23d. 0h. 21m. 5s. Epicentre 24°·7S. 177°·4W. Depth of focus 0·010.

A = −·9086, B = −·0413, C = −·4156; δ = −2; h = +3;
D = −·045, E = +·999; G = +·415, H = +·019, K = −·910.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		12·1	27	2 45	− 5	5 19	+15	—	—	e 5·9
Auckland	N.	13·8	207	e 2 55?	−17	—	—	—	—	—
Wellington		17·8	200	3 53	−10	e 6 48	−27	e 7 40	SS	e 9·8
Cobb River	E.	18·3	205	e 4 11	+ 2	e 7 7	−19	e 9 7	?	—
Kaimata	N.E.	20·0	205	e 4 25	− 2	—	—	—	—	—
Christchurch		20·5	200	e 4 25	− 7	e 8 40	sS	—	—	e 9·9
Brisbane		26·7	258	i 5 40k	+ 8	i 10 21	sS	e 6 0	pP	—
Riverview		28·8	244	e 5 58	+ 7	e 10 47	+15	e 11 23	sS	e 13·3
Santa Clara	N.	80·8	42	e 12 39	sP	—	—	—	—	—
Berkeley		80·9	42	e 12 5	0	e 22 19	+15	e 33 31	?	—
Lick	Z.	81·0	42	i 12 5k	− 1	—	—	—	—	—
Pasadena		81·2	46	e 12 6	0	—	—	e 12 20	?	e 38·9
Palomar	Z.	81·5	47	e 12 8	0	—	—	i 12 26	?	—
Riverside	Z.	81·6	46	e 12 8	− 1	—	—	—	—	—
Fresno	Z.	81·7	43	e 12 9k	0	—	—	—	—	—
China Lake	Z.	82·5	45	e 12 13	0	—	—	e 12 28	?	—
Shasta Dam		82·7	39	e 12 15	+ 1	—	—	—	—	—
Tinemaha	Z.	82·9	44	e 12 15	0	—	—	—	—	—
Reno	Z.	83·5	42	e 12 19k	+ 1	—	—	—	—	—
Boulder City		84·4	46	e 12 23	0	—	—	e 15 36	PP	—
Tucson		85·1	51	e 12 25	− 1	—	—	—	—	—
Butte		91·6	39	i 12 59	+ 2	—	—	—	—	—
College		92·2	12	e 13 0	0	—	—	—	—	—
Hungry Horse		92·2	37	e 12 59	− 1	—	—	—	—	—
Huancayo		95·7	106	e 13 16	0	e 23 55	[+13]	e 30 47	SS	e 39·2

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.
La Plata		97·5	133	25 31	?	31 25	SS	35 1	SSS	46·0
La Paz		99·8	113	e 13 29	– 6	i 24 11	[+ 8]	i 17 38	PP	47·2
Bogota		104·0	91	27 14	PS	e 25 4	SKKS	—	—	51·9
Bombay		115·2	280	e 29 34	PS	—	—	—	—	e 65·9
Kimberley	Z.	122·7	203	e 18 48	[+ 3]	—	—	—	—	—
Kiruna	Z.	135·5	350	e 19 5	[– 4]	—	—	—	—	—
Ksara		149·7	295	19 40	[+ 6]	36 20	PPS	e 23 7	PP	—
Collmberg	Z.	152·3	346	e 19 49	[+12]	—	—	—	—	—
Prague		153·1	344	e 19 50	[+11]	—	—	e 20 20	pPKP	—
Stuttgart	Z.	155·4	350	e 19 45	[+ 3]	—	—	—	—	—
Strasbourg		155·8	352	e 19 55	[+13]	e 20 14	?	e 20 51	$pPKP_2$	—
Paris		156·0	0	e 19 49	[+ 7]	e 20 26	sPKP	e 20 16	pPKP	—
Triest	Z.	157·1	341	e 19 42	[– 2]	e 19 47	PKP	e 20 24	PKP_2	—
Besançon		157·3	354	e 20 22	PKP_2	—	—	—	—	—
Tamanrasset	Z.	176·7	—	i 20 2k	[+ 4]	e 25 40	PP	e 21 48	PKP_2	—

Additional readings :—
Wellington eP? = 3m.58s.
Brisbane ePPE = 6m.29s., isSE = 10m.55s., iN = 11m.16s.
Riverview iPPEZ = 6m.59s., eSSN = 12m.19s.
Huancayo eS = 24m.34s.
La Plata SSS = 34m.43s., QN = 38·5m.
La Paz iSS = 32m.3s.
Prague e = 20m.5s. and 20m.50s.
Tamanrasset eZ = 28m.47s.
Long waves were also recorded at Karapiro, Colombo, Bermuda, Palisades, Weston, and several European stations.

Dec. 23d. 6h. 30m. 17s. Epicentre 52°·5S. 139°·5E. (as on 1946, March 13d.).

A = –·4648, B = +·3970, C = –·7914 ; δ = –4 ; h = –6 ;
D = +·649, E = +·760 ; G = +·602, H = –·514, K = –·611.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverview		20·5	30	i 4 37a	– 5	i 8 26	– 1	i 4 48	pP	e 9·5
Kaimata	N.E.	23·6	77	e 5 11	– 2	—	—	—	—	—
Christchurch		23·7	82	i 5 15	+ 1	i 9 36	+ 9	i 5 41	PP	e 11·0
Wellington		26·3	79	5 37	– 2	(e 9 58)	–13	—	—	e 10·0
Perth		26·8	311	e 5 23	–21	i 10 21	+ 2	—	—	—
Brisbane		27·0	28	i 5 41a	– 4	i 10 23	+ 1	i 6 29	PP	i 13·7
Auckland	N.	29·2	72	i 8 43?	?	e 11 53	SS	e 13 5	PcS	e 13·7
Djakarta		53·4	318	e 9 23	– 1	—	—	e 12 35	PPP	—
Manila		68·7	341	e 11 10	+ 3	—	—	—	—	—
Pietermaritzburg	Z.	77·6	237	i 12 12	PcP	—	—	—	—	—
Hong Kong		77·7	336	—	—	e 21 51	– 1	e 26 46	SS	28·9
Colombo	E.	77·7	298	—	—	21 57	+ 5	—	—	36·7
Kodaikanal	E.	81·8	298	e 17 11	PPP	—	—	—	—	—
Nanking		86·1	343	e 12 41a	– 3	i 23 9	– 9	—	—	—
Bombay		91·5	299	e 17 52	?	e 24 9	+ 1	—	—	—
La Plata		91·6	167	—	—	24 7	– 2	24 13	ScS	44·5
La Paz		107·2	153	i 20 25	?	i 25 5	[+ 5]	i 30 3	PKKP	—
Pasadena	Z.	123·4	77	e 19 4	[+ 5]	—	—	—	—	—
Lick	Z.	123·6	71	e 19 2	[+ 2]	—	—	—	—	—
Berkeley	Z.	123·6	71	e 19 0	[0]	—	—	—	—	—
Palomar	Z.	123·6	78	e 19 4	[+ 4]	—	—	—	—	—
Riverside	Z.	123·8	77	e 19 5	[+ 5]	—	—	—	—	—
Ksara		123·9	282	(e 19 11)	[+11]	(e 26 3)	[0]	—	—	—
China Lake	Z.	124·9	75	e 19 4	[+ 2]	—	—	—	—	—
Tinemaha	Z.	125·4	73	e 19 9	[+ 6]	—	—	—	—	—
Mineral	Z.	125·6	69	e 19 6	[+ 2]	—	—	—	—	—
Reno	Z.	126·1	71	e 18 54	[–10]	—	—	—	—	—
Tamanrasset	Z.	134·2	248	e 19 22	[+ 2]	i 19 31	?	e22 9	PP	—
Algiers Univ.	Z.	145·8	261	e 19 44	[+ 3]	—	—	—	—	—
Kiruna	Z.	147·7	322	i 19 45	[+ 1]	—	—	—	—	—

Continued on next page.

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	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Jena	148·3	289	e 19 50?	[+ 5]	—	—	e 19 58	PKP$_2$	—
Zürich	148·5	280	e 19 49	[+ 4]	—	—	—	—	—
Stuttgart z.	148·8	284	e 19 48	[+ 3]	e 20 20	?	e 19 55	PKP$_2$	—
Resolute Bay	149·0	24	e 19 44	[− 2]	—	—	e 19 52	PKP$_2$	—
Almeria	149·2	255	20 13	PKP$_2$	—	—	—	—	60·7
Basle	149·2	280	e 19 52	[+ 6]	—	—	—	—	—
Strasbourg	149·5	282	e 19 52$_a$	[+ 5]	—	—	e 20 4	PKP$_2$	—
Besançon	150·0	280	e 19 54	[+ 7]	—	—	e 20 7	PKP$_2$	—
Granada	150·1	254	20 26k	?	—	—	—	—	77·2
Malaga	150·2	254	i 20 3	PKP$_2$	—	—	—	—	e 76·7
Cleveland	150·3	96	e 19 52k	[+ 4]	—	—	e 19 58	?	—
Paris	152·8	278	e 20 0	[+ 9]	—	—	i 20 13	PKP$_2$	—
Rathfarnham C. z.	159·4	287	e 19 43?	[−17]	—	—	—	—	—

Additional readings and note :—
Riverview iPPZ = 4m.55s., iN = 5m.18s., iEN = 8m.17s., iN = 8m.37s., iEZ = 8m.42s.
Christchurch ePZ = 7m.5s., eN = 8m.28s., iS?Z = 8m.57s., eQEN = 10m.13s.
Wellington S = 8m.17s., SS? = 8m.36s.
Brisbane iZ = 5m.50s. and 6m.16s., iPcPZ = 9m.3s., iN = 11m.13s. and 11m.22s., iSSN = 11m.45s., iN = 12m.3s.
La Plata QE = 38·7m.
Ksara readings have been reduced by 2m.
Algiers Univ. iZ = 19m.57s. and 20m.4s., eZ = 21m.2s.
Jena eEZ = 20m.8s., eE = 20m.17s.
Zürich e = 20m.23s. and 21m.20s.
Resolute Bay eZ = 20m.1s. and 21m.3s.
Strasbourg e = 19m.57s. and 20m.30s.
Besançon e = 19m.59s., 20m.13s., and 20m.41s.
Granada PKP$_2$ = 20m.44s., SKKS = 33m.4s., SS = 44m.26s.
Paris i = 20m.9s., e = 20m.42s.
Long waves were also recorded at Cobb River, Karapiro, Bogota, Bermuda, Palisades, and several European stations.

Dec. 23d. 6h. 57m. 21s. Epicentre 15°·1N. 61°·3W. Depth of Focus 0·020.

Intensity III-IV at Morne des Cadets. Epicentre 14°·9N. 61°·3W. (Strasbourg). Depth between 150 and 200km.

Bulletin séismique mensuel de Morne des Cadets.

A = + ·4638, B = − ·8473, C = + ·2589 ; δ = + 6 ; h = + 5 ;
D = − ·877, E = − ·480 ; G = + ·124, H = − ·227, K = − ·966.

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France	0·4	158	i 0 22	0	—	—	—	—	—
San Juan	5·7	306	i 1 24	0	i 2 30	+ 2	—	—	—
Bogota	16·3	232	i 3 42	+ 1	i 6 43	+ 7	e 7 1	sS	—
Chinchina	17·3	236	i 3 55	+ 2	i 6 50	− 8	e 7 22	SS	—
Bermuda	17·5	350	i 3 55	0	i 6 55	− 8	—	—	e 7·3
Balboa Heights	18·8	253	i 4 9	− 1	—	—	—	—	—
Palisades	28·0	340	i 6 27	PP	i 11 9	sS	i 11 18	?	—
Weston	28·5	345	e 5 42	0	—	—	—	—	—
Harvard	28·7	345	e 6 26	PP	e 11 13	sS	—	—	—
Huancayo	30·3	208	i 5 55	− 3	e 10 40	− 5	e 6 51	PP	e 11·8
Cleveland	31·6	330	e 7 25k	PP	e 11 6	0	i 12 52	SS	—
La Paz	32·1	192	i 6 12	− 2	i 11 9	− 4	i 12 15	sS	—
Ottawa	32·6	341	e 6 19	+ 1	—	—	—	—	—
Shawinigan Falls N.	32·8	346	e 6 22	+ 2	—	—	—	—	—
Seven Falls E.	32·9	348	e 6 23	+ 2	—	—	—	—	—
Fayetteville	36·0	311	i 6 49	+ 2	—	—	i 7 7	?	—
Tacubaya	36·4	282	e 6 54	+ 4	—	—	—	—	—
Tucson	48·0	300	i 8 24	0	—	—	i 9 4	pP	—
La Plata	49·8	176	8 27	−11	—	—	10 9	PcP	—
Boulder City	51·9	304	i 8 54	0	—	—	i 9 20	pP	—

Continued on next page.

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1951 **1092**

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Butte		52·6	317	i 9 0	+ 1	—	—	—	—	—
Palomar	Z.	53·2	301	i 9 3a	− 1	—	—	i 9 44	pP	—
Riverside	Z.	53·7	302	i 9 7a	0	—	—	e 9 48	pP	—
China Lake		54·1	304	i 9 9a	− 1	e 10 12	sP	e 9 49	pP	—
Hungry Horse		54·3	319	i 9 11	− 1	—	—	—	—	—
Pasadena		54·4	302	i 9 12a	0	—	—	i 9 53	pP	e 30·6
Tinemaha	Z.	54·8	304	i 9 14a	− 1	—	—	—	—	—
Fresno		56·0	305	e 9 22a	− 2	—	—	e 10 0	pP	—
Reno	Z.	56·3	307	e 9 25	− 1	—	—	—	—	—
Rathfarnham C.	Z.	57·4	35	e 10 29?	sP	—	—	—	—	—
Lick	Z.	57·5	305	i 9 33a	− 2	—	—	—	—	—
Mineral	Z.	57·8	308	i 9 35	− 2	—	—	i 10 18	pP	—
Berkeley	Z.	58·0	305	i 9 37a	− 1	—	—	e 10 39	sP	—
Shasta Dam		58·5	308	i 9 38	− 4	—	—	—	—	—
Victoria		60·4	317	9 52a	− 3	—	—	—	—	—
Paris		61·6	42	i 10 4	+ 1	—	—	e 10 44	pP	—
Resolute Bay		62·4	351	e 10 6	− 2	e 20 57	?	e 10 44	pP	e 30·6
Tamanrasset	Z.	63·2	71	e 11 9	sP	—	—	—	—	—
Besançon		63·7	44	e 10 17	0	—	—	—	—	—
Strasbourg		65·0	42	i 10 25a	0	—	—	—	—	—
Stuttgart	Z.	66·0	42	i 10 31k	0	—	—	—	—	—
Jena	E.	67·7	40	e 10 36	− 6	—	—	e 11 1	?	—
Collmberg	Z.	68·6	40	i 10 47	− 1	—	—	e 11 28	pP	—
Prague		69·4	41	e 10 53	+ 1	e 11 55	sP	e 11 36	pP	—
Kiruna	Z.	73·0	23	i 11 14a	0	—	—	i 11 54	pP	—
College		75·0	334	i 11 22	− 3	—	—	—	—	—
Ksara		87·5	56	(i 13 9)	pP	—	—	—	—	—
Riverview	Z.	145·3	231	i 19 19	[0]	—	—	—	—	—
Brisbane	Z.	145·8	243	i 19 21	[+ 1]	—	—	—	—	—

Additional readings and note :—
La Paz PPZ = 7m.27s.
Palomar iZ = 9m.15s., iPcP?Z = 10m.8s.
Mineral iZ = 9m.41s.
Berkeley iZ = 9m.53s., eSS?E = 25m.3s.
Prague e = 13m.15s.
Ksara reading has been increased by 3m.
Long waves were also recorded at Alicante.

Dec. 23d. 11h. 29m. 28s. Epicentre 49°·2N. 156°·1E. (as on 21d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
College		33·0	40	i 6 38	− 1	—	—	—	—
Hungry Horse		55·7	54	e 9 39	− 1	—	—	—	—
Mineral	Z.	56·4	66	e 9 45	0	—	—	i 9 58	?
Reno	Z.	58·0	65	e 10 2	+ 5	—	—	—	—
Tinemaha	Z.	60·5	67	e 10 14	0	—	—	—	—
China Lake	Z.	61·7	67	e 10 22	0	—	—	—	—
Mount Wilson	Z.	62·5	69	e 10 29	+ 1	—	—	—	—
Boulder City		63·3	65	e 10 33	0	—	—	—	—
Palomar	Z.	63·8	69	e 10 43	+ 7	—	—	—	—
Tucson		68·2	66	e 11 4	0	—	—	—	—
Poona	Z.	71·2	277	i 11 25	+ 2	—	—	—	—
Fayetteville		74·7	53	e 11 44	+ 1	—	—	—	—
Collmberg	Z.	75·0	337	e 11 45	0	—	—	—	—
Jena	Z.	75·7	338	e 11 49	0	—	—	e 12 4	PcP
Prague		75·8	336	e 11 50	0	—	—	e 12 22	?
Stuttgart	Z.	78·3	339	e 12 3	0	—	—	—	—
Strasbourg		78·8	340	i 12 7k	+ 1	—	—	—	—
Weston		79·7	34	e 12 10	− 1	—	—	—	—
Paris		79·8	343	i 12 12	0	—	—	—	—
Triest	Z.	80·0	335	e 12 16	+ 3	—	—	e 12 23	PcP
Besançon		80·5	340	e 12 16	+ 1	—	—	e 12 31	?

Paris gives also e = 12m.29s. and 12m.35s.

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Dec. 23d. 18h. 28m. 42s. Epicentre 44°·1N. 146°·4E. (as on 1947, December 22d.).

A = −·6001, B = +·3987, C = +·6935 ; δ = +2 ; h = −3 ;
D = +·553, E = +·833 ; G = −·578, H = +·384, K = −·720.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa		6·3	220	e 1 38	+ 2	e 2 40	−10	e 2 37	S
College		41·1	36	7 46	− 1	—	—	—	—
Resolute Bay	Z.	54·8	17	e 9 31a	− 3	—	—	—	—
Kiruna	Z.	61·2	339	i 10 21	+ 2	—	—	—	—
Hungry Horse		64·1	46	i 10 35	− 3	—	—	—	—
Mineral	Z.	64·7	58	e 9 25	−77	—	—	—	—
Poona	Z.	64·9	272	i 10 44	+ 1	—	—	—	—
Reno	E.	66·2	57	e 8 57	?	—	—	—	—
Tinemaha	Z.	68·7	58	i 11 5	− 2	—	—	—	—
China Lake	Z.	70·0	59	e 11 11	− 4	—	—	—	—
Pasadena	Z.	70·7	61	e 11 26	+ 6	—	—	e 11 35	?
Collmberg	Z.	76·8	332	e 11 56	+ 1	—	—	e 12 6	PcP
Prague		77·3	331	e 12 7	+ 9	e 12 10	PcP	e 14 56	PP
Jena	Z.	77·5	333	e 11 58	− 1	—	—	e 12 10	PcP
Stuttgart	Z.	80·2	333	e 12 14	0	—	—	e 12 25	PcP
Besançon		82·6	334	e 12 37	PcP	—	—	—	—
Fayetteville		83·1	46	i 12 31	+ 2	—	—	—	—

Dec. 23d. 22h. 9m. 20s. Epicentre 9°·0N. 125°·0E. (as on 1943, November 13d.).

Intensity VI at Dumaguete (Negros) ; III at Ilo-Ilo. Epicentre 9°·1N. 123°·0E. (Manila).

A = −·5666, B = +·8092, C = +·1554 ; δ = −1 ; h = +7 ;
D = +·819, E = +·574 ; G = −·089, H = +·127, K = −·988.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		6·8	325	i 1 52	+ 8	i 2 52	−11	—	—	—
Hong Kong		16·8	323	6 47	S	(6 47)	−18	—	—	—
Djakarta		23·6	230	e 5 11	− 2	e 7 53	?	—	—	—
Nanking		23·7	346	5 19	+ 5	9 30	+ 3	—	—	—
Irkutsk		46·3	342	e 7 33?	−56	—	—	—	—	—
Poona	Z.	50·4	287	i 8 57	− 4	i 10 22	PcP	i 10 52	PP	—
Bombay		51·4	288	e 10 40?	PP	e 16 22	− 6	—	—	—
Przhevalsk		52·7	317	e 9 19	+ 1	—	—	—	—	—
Naryn		53·9	315	i 9 25	− 2	—	—	—	—	—
Ili		54·2	319	e 9 27	− 2	—	—	—	—	—
Frunse		55·4	316	i 9 37	− 1	—	—	—	—	—
Andijan		56·2	313	e 9 43	− 1	—	—	—	—	—
Fergana		56·5	313	e 9 43	− 3	—	—	—	—	—
Obi-garm		57·5	310	i 9 40	−13	e 17 30	−20	—	—	—
Stalinabad		58·2	310	i 9 57	− 1	e 17 50	− 9	—	—	—
Tchimkent		58·6	315	i 10 1	0	—	—	—	—	—
Samarkand		59·8	311	i 10 6	− 3	—	—	—	—	—
Mary		63·3	308	e 10 31	− 2	—	—	—	—	—
Ashkabad		66·1	307	e 10 51	0	—	—	—	—	—
Kizyl-Arvat		67·9	309	e 11 6	+ 4	—	—	—	—	—
Sverdlovsk		68·6	329	11 10	+ 3	20 6	− 3	—	—	—
Tiflis		76·8	311	e 11 57?	+ 2	—	—	—	—	—
Ksara		84·3	303	e 12 40	+ 5	e 23 35	+35	—	—	—
Resolute Bay		93·0	11	e 13 24	+ 7	—	—	—	—	e 50·2
Tamanrasset	Z.	112·9	301	19 15	PP	—	—	e 19 21	PP	—

Long waves were also recorded at Kew, La Plata, and Palisades.

Dec. 23d. Readings also at 0h. (Apia (2), Tamanrasset, Victoria, and near Chinchina), 1h. (Horseshoe Bay, Algiers University, and Brisbane), 2h. (Huancayo and La Paz (2)), 4h. (Messina), 5h. (Ili, near Almata II, Chilisk, Kurmenty, and near Copiapo), 7h. (Huancayo, Tamanrasset, Stuttgart, near Messina, and near Kurmenty), 8h. (Apia), 9h. (near Alicante (2)), 10h. (Alicante and near Lisbon), 11h. (Malaga and near Dzhergetal), 13h. (near Apia), 15h. (near Tacubaya, Puebla, Vera Cruz, and Oaxaca), 19h. (China Lake, Palomar, Pasadena, Riverside, Tinemaha, Puebla, Tacubaya, and near Istanbul), 20h. (Christchurch, Manila, Tamanrasset, near Garm, Djakarta, and near Copiapo), 21h. (near Djakarta), 22h. (China Lake, Palomar, and Tinemaha), 23h. (Apia, China Lake, Mount Wilson, and Palomar).

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Dec. 24d. 5h. Undetermined shock, Mexico.

Guadalajara eP =52m.3s., L =53m.2s.
Tacubaya iP =52m.45s., i =53m.0s., L =54m.30s.
Puebla P =52m.57s., L =54m.56s.
Lubbock PP =53m.37s., eS =58m.6s.
Tucson eP =54m.5s., e =56m.50s.
Palomar ePZ =54m.44s., eZ =54m.49s., iZ =55m.2s.
Riverside ePZ =54m.55s.
Pasadena eP =55m.1s., eZ =55m.19s., eS?Z =58m.29s., eLEN =58·6m.
Boulder City eP =55m.4s.
China Lake ePZ =55m.14s.
Fresno ePZ =55m.23s.
Tinemaha ePZ =55m.28s.
Fayetteville iP =55m.35s.
Lick ePZ =55m.50s.
Reno ePZ =56m.2s.
Mineral ePZ =56m.9s.
Hungry Horse eP =56m.58s.
Ottawa i =58m.34s., S =63m.56s., e =66m.36s.
Santa Clara eE =59m.11s.
Berkeley eSEN =60m.5s.
La Paz eP =60m.12s., eS =67m.8s., i =73m.16s.
Huancayo e =65m.39s., eL =69m.5s.
Palisades e =66m.25s., eL =69m.33s.
Seven Falls eE =68m.1s., LE =72·8m.
Long waves were also recorded at Manzanillo, Vera Cruz, Harvard, Weston, and Seattle.

Dec. 24d. 10h. Undetermined shock.
Balboa Heights iP =27m.6s.
Huancayo eP =30m.10s., eS =33m.50s.
San Juan iP =30m.32s.
Puebla P =30m.48s.
Tacubaya eP =30m.48s.
La Paz P =31m.29s., iS =36m.12s., L =40m.
Fayetteville iP =32m.23s.
Tucson eP =33m.8s.
Palomar iPZ =33m.47s.
Boulder City iP =33m.49s.
Pasadena iPZ =33m.58s.
China Lake iPZ =34m.2s.
Tinemaha iPZ =34m.11s.
Lick ePZ =34m.30s., eZ =34m.41s., iZ =34m.52s.
Mineral ePZ =34m.42s.
Hungry Horse iP =34m.51s.
Victoria P =35m.25s.

Dec. 24d. 14h. 41m. 25s. Epicentre 15°·3N. 144°·3E.

A = −·7837, B = +·5631, C = +·2622 ; δ = +2 ; h = +6 ;
D = +·584, E = +·812 ; G = −·213, H = +·153, K = −·965.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Guam		1·8	177	0 30	− 2	0 49	− 7
College		66·9	26	e 10 55	− 1	—	—
Victoria		80·2	43	12 13	− 1	—	—
Mineral	Z.	83·3	51	i 12 29a	− 1	—	—
Berkeley	Z.	83·4	53	e 12 30	0	—	—
Lick	Z.	84·0	53	e 12 33a	0	—	—
Reno		84·9	51	e 12 37	− 1	—	—
Hungry Horse		86·3	41	i 12 45	0	—	—
Tinemaha	Z.	86·7	53	i 12 46	− 1	—	—
China Lake	Z.	87·6	54	i 12 50	− 1	—	—
Pasadena	Z.	87·6	56	i 12 51	0	—	—
Kiruna	Z.	87·8	342	i 12 55	+ 3	—	—
Butte		88·0	43	i 12 54	+ 1	—	—
Palomar	Z.	88·9	56	e 12 55	− 3	—	—
Boulder City		89·7	53	e 13 1	0	—	—
Tamanrasset	Z.	124·7	312	e 19 4	[+ 2]	—	—

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Dec. 24d. Readings also at 0h. (Prague and near Dzhergetal), 1h. (Palomar, near Pasadena, La Jolla, and near Dzhergetal), 3h. (Puebla and Tacubaya), 5h. (near Almata II, Chilisk, Ili, and Kurmenty), 6h. (Kimberley, Kiruna, Palomar, China Lake, Tinemaha, Hungry Horse, Mount Wilson, Tucson, Resolute Bay, Weston, College, and near Mitchell Field), 7h. (Chilisk, near Almata II, Ili, and Kurmenty), 8h. (near Dzhergetal), 9h. (Apia, Ashkabad, and Manila), 10h. (Djakarta, Nanking, Hong Kong, and La Paz), 11h. (near Apia and near Garm), 15h. (La Plata), 16h. (La Paz, Huancayo, and Chinchina), 20h. (Samarkand, near Tchimkent, near Dzhergetal, Garm, Obi-garm, Kulyab, Stalinabad, and near Apia), 22h. (near Apia), 23h. (Messina and near Garm).

Dec. 25d. 5h. 49m. 23s. Epicentre 33°·7S. 57°·7E. (as on Dec. 8d.).

		Δ	Az.	P.	O – C.	S.	O – C.		Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Tananarive		17·3	325	e 4 6	+ 2	(e 7 23)	+ 7	—	—		e 7·4
Pietermaritzburg	Z.	23·6	274	e 5 8	− 5	—	—	—	—		—
Grahamstown	Z.	25·9	263	i 5 32	− 3	—	—	—	—		—
Pretoria	Z.	26·7	281	e 5 37	− 6	—	—	—	—		—
Kimberley	Z.	28·5	271	e 5 52	− 7	—	—	—	—		—
Poona		54·2	19	i 9 33	+ 4	e 16 52	−14	—	—		—
Bombay		54·3	18	e 9 40	+10	—	—	—	—		—
Terre Adelie		57·1	150	e 9 50	0	e 17 49	+ 4	—	—		—
Mary		71·0	4	i 11 21	− 1	—	—	—	—		—
Ashkabad		71·3	0	e 11 23	0	—	—	—	—		—
Kulyab		72·1	10	e 11 27?	− 1	—	—	—	—		—
Stalinabad		72·6	9	i 11 35	+ 4	—	—	—	—		—
Samarkand		73·5	7	e 11 37	+ 1	—	—	—	—		—
Goris		73·6	352	i 11 38	+ 1	i 21 12	+ 5	—	—		—
Tamanrasset	Z.	75·0	311	i 11 42a	− 3	—	—	i 14 30	PP		—
Andijan		75·3	11	i 11 48	+ 1	—	—	—	—		—
Tiflis		76·0	350	11 51	0	21 41	+ 7	—	—		—
Tsikhlis-Dzhvari		76·2	349	e 11 51	− 1	—	—	—	—		—
Frunse		77·8	13	i 12 3	+ 2	—	—	—	—		—
Krasnogorka		78·2	13	i 12 4	+ 1	—	—	—	—		—
Piatigorsk		78·5	349	12 4	0	—	—	—	—		—
Almata II		78·7	14	e 12 8	+ 2	—	—	—	—		—
Ili		79·3	14	i 12 9	0	—	—	—	—		—
Yalta		80·7	343	e 12 15?	− 1	—	—	—	—		—
Rome		85·9	328	—	—	e 27 17	?	e 30 17	?		—
Triest		88·4	331	e 13 29	+34	e 29 6	SS	—	—		—
Sverdlovsk		90·2	2	i 13 4	0	e 24 6	+10	—	—		—
Stuttgart	Z.	92·8	331	e 13 15	− 1	—	—	—	—		—
Strasbourg		93·2	330	e 13 17	0	—	—	—	—		—
Ottawa		142·7	303	e 19 30	[− 5]	—	—	—	—		—
Kirkland Lake	Z.	145·4	307	e 19 39k	[− 1]	—	—	—	—		—
Mineral	Z.	173·4	—	i 21 41a	PKP_2	—	—	e 25 31	PP		—
Reno		173·9	—	e 21 43a	PKP_2	—	—	e 25 29	PP		—
Tinemaha	Z.	175·3	—	e 20 14	[+ 2]	—	—	—	—		—
China Lake	Z.	175·6	—	e 20 15	[+ 3]	e 32 37	{+ 7}	i 21 50	PKP_2		—
Riverside	Z.	175·9	—	e 20 26	[+14]	—	—	e 22 45	?		—
Fresno		176·3	—	e 20 15	[+ 3]	e 25 44	PP	e 21 53	PKP_2		—
Lick	Z.	176·3	—	e 21 53	PKP_2	—	—	e 25 43	PP		—
Pasadena		176·5	—	e 21 54	PKP_2	—	—	—	—		e 95·6

Additional readings :—
Poona iZ = 9m.41s. and 9m.48s.
Triest e = 29m.34s.
China Lake ePPZ = 25m.40s.
Long waves were also recorded at Palisades, Granada, and Wellington.

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Dec. 25d. 13h. 21m. 53s. Epicentre 38°·4N. 73°·6E. (as on Dec. 15d.).

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Dzhergetal	2·0	294	i 0 41	+ 6	—	—	—	—
Fergana	2·4	325	e 0 43	+ 2	1 14	+ 2	—	—
Andijan	2·5	338	i 0 46	+ 3	i 1 18	+ 4	—	—
Garm	2·7	283	i 0 47	+ 2	1 34	S_g	—	—
Kulyab	3·1	261	i 0 53	+ 2	—	—	—	—
Naryn	3·5	29	i 0 55	– 2	i 1 34	– 6	—	—
Stalinabad	3·8	274	i 1 2	+ 1	i 1 46	– 1	—	—
Tashkent	4·4	313	e 1 10	0	i 2 0	– 2	—	—
Frunse	4·5	9	i 1 12	+ 1	i 2 4	– 1	—	—
Rybach'e	4·5	24	i 1 6	– 5	—	—	—	—
Krasnogorka	5·0	13	i 1 17	– 1	—	—	—	—
Tchimkent	5·0	323	i 1 17	– 1	i 2 12	– 6	—	—
Samarkand	5·3	286	1 21	– 1	—	—	—	—
Almata	5·5	26	e 1 25	0	i 2 44	S*	—	—
Almata II	5·6	29	i 1 25	– 2	—	—	—	—
Kurmenty	5·8	36	i 1 25	– 4	—	—	—	—
Ili	6·1	24	i 1 30	– 4	—	—	—	—
Chilisk	6·3	34	i 1 30	– 6	—	—	—	—
Mary	9·3	269	—	—	3 57	– 8	—	—
New Delhi	10·2	162	e 2 22	– 9	e 4 1	–26	4 13	SS
Poona	19·8	178	—	—	i 8 9	– 4	—	—

Additional readings :—
New Delhi SSSEN = 4m.22s., S_gEN = 5m.3s.
Poona iZ = 8m.29s., 8m.37s., and 9m.8s.
Long waves were also recorded at Kew.

Dec. 25d. 14h. 28m. 20s. Epicentre 28°·5S. 67°·2W. Depth of focus 0·025
(as on 1950, March 27d.).

A = +·3411, B = –·8114, C = –·4747 ; δ = +6 ; h = +2 ;
D = –·922, E = –·388 ; G = –·184, H = +·438, K = –·880.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Buenos Aires		9·6	131	e 2 13	– 2	—	—	—	—	—
La Plata		10·2	131	2 21	– 2	4 10	– 5	—	—	5·3
La Paz		12·0	356	i 2 48	+ 2	i 4 40	–16	i 3 0	PP	5·5
Huancayo		18·6	334	i 3 58	– 7	—	—	—	—	—
Kirkland Lake	Z.	77·2	352	e 11 31	– 3	—	—	—	—	—
Palomar	Z.	77·5	320	i 11 36	0	—	—	e 12 20	pP	—
Riverside	Z.	78·2	320	i 11 40	0	—	—	i 12 24	pP	—
Kimberley	Z.	78·4	116	i 11 41	0	—	—	—	—	—
Pasadena	Z.	78·8	320	i 11 43	0	—	—	e 12 27	pP	—
China Lake	Z.	79·7	322	i 11 48	0	—	—	e 12 31	pP	—
Tinemaha	Z.	80·9	321	i 11 55	+ 1	—	—	e 12 39	pP	—
Lick	Z.	83·0	320	i 12 6a	+ 1	—	—	—	—	—
Reno	Z.	83·5	323	e 12 8a	0	—	—	—	—	—
Mineral	Z.	85·1	322	i 12 18k	+ 3	—	—	—	—	—
Tamanrasset	Z.	86·6	62	i 12 20a	– 3	—	—	e 12 59	pP	—

La Paz gives also iSS = 5m.0s.

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Dec. 25d. 15h. Undetermined shock, very deep.

Brisbane iPNZ = 36m.56s.a, iZ = 37m.6s., iSN = 40m.18s.
Riverview iP?Z = 37m.55s.a, iS?E = 41m.51s., eE = 44m.25s.
College P = 44m.28s.
Mineral ePZ = 44m.41s.k, iZ = 46m.48s.
Berkeley ePZ = 44m.47s.k, eZ = 46m.44s.
Lick iPZ = 44m.49s.k, eZ = 46m.46s
Reno ePZ = 44m.58s.k, eEZ = 47m.0s.
Pasadena iP = 44m.58s.k, iZ = 45m.13s., ipPZ = 46m.57s., iPPZ = 48m.41s.
Tinemaha iPZ = 45m.1s.k, epPZ = 47m.2s.
Riverside iPZ = 45m.2s.k, ipPZ = 46m.56s.
China Lake iPNZ = 45m.2s.k, ipPZ = 47m.1s.
Palomar iPZ = 45m.3s.k, epPZ = 47m.1s.
Boulder City iP = 45m.13s., i = 47m.13s.
Hungry Horse eP = 45m.22s., e = 47m.20s.
Tucson eP = 45m.26s., e = 47m.30s.
Istanbul ePKPZ = 46m.8s.
Kiruna iPKPZ = 50m.36s.
Ottawa iPKP = 50m.50s.a.
Collmberg eZ = 51m.5s.
Stuttgart ePKPZ = 51m.11s., epPKPZ = 53m.51s.
Algiers Univ. iPKPZ = 51m.32s.k, iZ = 51m.42s.
Tamanrasset ePKPZ = 51m.44s., iZ = 51m.51s., ePKP$_2$Z = 52m.11s., eZ = 52m.21s., ipPKPZ = 53m.54s.
Long waves were recorded at Almeria.

Dec. 25d. 15h. 58m. 24s. Epicentre 49°·2N. 156°·1E. (as on 23d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		7·7	20	e 2 2?	+ 6	e 4 4?	+39	—	—	—
Uglegorsk		9·2	275	2 24	+ 8	4 20	+17	—	—	—
Yuzno-Sakhlinsk		9·2	261	2 22	+ 6	4 16	+13	—	—	—
Nemuro		9·3	235	2 18	+ 1	4 45	+40	—	—	—
Urakawa		11·7	238	2 46	− 5	5 8	+ 4	—	—	—
Sapporo		11·9	245	2 58	+ 4	6 3?	SSS	—	—	—
Aomori		13·7	238	3 14?	− 4	—	—	—	—	—
Mizusawa		14·7	232	e 2 29	−62	5 2	−74	4 56	?	—
Sendai		15·5	231	3 34	− 8	7 14?	SSS	—	—	—
Hukusima		16·1	230	3 48	− 1	—	—	—	—	—
Utunomiya		17·3	229	3 52	−12	—	—	—	—	—
Maebasi		17·8	230	4 12	+ 1	7 37	+ 9	—	—	—
Kumagaya		17·9	229	4 19	+ 7	7 51	SS	—	—	—
Oiwake		18·1	230	4 10	− 4	—	—	—	—	—
Matusiro		18·1	233	4 18	+ 4	7 49	SS	—	—	—
Nagano		18·1	233	4 5	− 9	—	—	—	—	—
Tokyo		18·1	229	4 6?	− 8	—	—	—	—	—
Matumoto		18·5	230	4 24	+ 5	7 34	−10	—	—	—
Omaesaki		19·7	229	4 43	+ 9	—	—	—	—	—
Nagoya		19·9	233	4 36	0	—	—	—	—	—
Owase		21·1	233	4 48a	0	—	—	—	—	—
Takamatu		22·1	235	4 57	− 2	9 53	SSS	—	—	—
Irkutsk		32·3	297	e 6 32	− 1	11 57	+11	—	—	—
Nanking		32·7	253	e 6 39	+ 3	i 11 54	+ 2	—	—	—
College		33·0	40	6 40	+ 1	—	—	—	—	—
Hong Kong		42·5	247	—	—	e 14 24	+ 2	—	—	—
Resolute Bay		47·9	20	e 8 42a	0	e 15 44	+ 5	e 8 51	pP	e 26·0
Victoria		50·5	58	9 2	0	—	—	—	—	—
Przhevalsk		52·3	295	e 9 23	+ 8	—	—	—	—	—
Sverdlovsk		53·4	318	9 23	− 1	—	—	—	—	—
Frunse		54·3	297	e 9 29	− 1	—	—	—	—	—
Arcata	z.	54·6	67	e 9 46a	+14	—	—	—	—	—
Hungry Horse		55·7	54	i 9 40	0	—	—	—	—	—
Shasta Dam		55·7	66	i 10 10	+30	—	—	—	—	—
Mineral	z.	56·4	66	i 9 44k	− 1	—	—	i 9 51	?	—
Fergana		57·5	296	e 9 52	− 1	—	—	—	—	—
Berkeley		57·5	68	i 9 59a	+ 6	e 17 54	+ 4	e 24 30	?	e 28·3
Tchimkent		57·6	299	e 9 52	− 2	—	—	—	—	—
Reno	z.	58·0	65	e 9 57	0	—	—	—	—	—
Lick	z.	58·2	68	e 10 4a	+ 6	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		58·4	299	10 3	+ 3	—	—	—	—	—
Kiruna		58·6	343	i 9 59	− 2	e 22 36?	SS	e 23 19	?	e 27·1
Garm		59·3	296	i 10 4	− 2	—	—	—	—	—
Stalinabad		60·5	297	e 10 13	− 1	—	—	—	—	—
Tinemaha	Z.	60·5	67	e 10 16	+ 2	—	—	i 10 27	pP	—
China Lake		61·7	67	i 10 22	0	i 10 28	?	i 10 34	pP	—
Pasadena		62·5	69	e 10 28	0	i 10 32	?	i 10 39	pP	e 29·6
Riverside	Z.	63·1	69	e 10 31	− 1	—	—	i 10 44	pP	—
Boulder City		63·3	65	i 10 33	0	—	—	i 10 46	pP	—
Palomar	Z.	63·8	69	e 10 35	− 1	i 10 42	?	i 10 49	pP	—
Tucson		68·2	66	e 11 5	+ 1	—	—	i 11 18	pP	—
Piatigorsk		70·3	316	11 32?	+15	20 53?	PS	—	—	—
Poona		71·2	277	e 11 17	− 6	i 11 31	P	e 11 37	PcP	—
Tiflis		71·2	313	11 23	0	—	—	—	—	—
Bombay		71·6	278	e 11 27	+ 2	—	—	e 11 51	PcP	—
Kirkland Lake	Z.	71·6	36	e 11 37	+12	—	—	—	—	—
Borzhomi		71·8	314	e 11 28	+ 2	—	—	—	—	—
Tsikhlis-Dzhvari		71·9	314	e 11 31	+ 4	—	—	—	—	—
Zugdidi		72·0	315	e 11 30	+ 2	—	—	—	—	—
Goris		72·1	311	i 11 29	+ 1	e 20 58	+ 8	—	—	—
Kishinev		73·8	326	e 11 37	− 1	—	—	—	—	—
Fayetteville		74·7	53	i 11 42	− 1	—	—	i 11 55	PcP	—
Uzhgorod		74·7	331	e 11 46	+ 3	—	—	—	—	—
Collmberg		75·0	337	i 11 44	− 1	—	—	—	—	—
Witteveen	Z.	75·1	342	i 10 48	−58	—	—	—	—	—
Ottawa		75·5	35	e 11 47k	− 1	—	—	i 12 1	PcP	—
Shawinigan Falls	N.	75·6	33	e 11 50	+ 2	—	—	—	—	—
Jena		75·7	338	e 11 50	+ 1	—	—	e 12 1	PcP	—
Prague		75·8	336	e 11 50	0	e 21 58	PS	e 14 44	PP	—
Seven Falls	E.	75·8	32	e 11 53	+ 3	21 31	0	—	—	—
Cleveland		76·4	41	i 12 6k	+13	e 21 39	+ 1	—	—	—
Rathfarnham C.	Z.	76·8	350	i 11 55k	0	—	—	e 12 12	PcP	—
Stuttgart		78·3	339	e 12 4	+ 1	21 54	− 5	—	—	e 42·6
Belgrade	Z.	78·7	330	e 12 4a	− 2	e 12 15	?	e 13 44	?	—
Istanbul	Z.	78·7	323	i 12 7	+ 1	—	—	—	—	—
Strasbourg		78·8	340	i 12 8k	+ 2	—	—	e 12 17	PcP	e 42·6
Harvard		79·5	34	e 12 11	+ 1	—	—	—	—	e 49·2
Weston		79·7	34	e 12 12	+ 1	—	—	—	—	—
Paris		79·8	343	i 12 12	0	i 12 34	sP	i 12 26	pP	e 42·6
Zürich		79·8	339	e 12 12a?	0	—	—	—	—	—
Basle		79·9	340	e 12 12	0	—	—	—	—	—
Triest	Z.	80·0	335	e 12 12	− 1	—	—	i 12 29	pP	—
Riverview		82·8	184	—	—	i 22 46	+ 1	—	—	e 42·1
Rome		83·8	334	e 12 33	+ 1	e 22 56	+ 1	e 32 16	SSS	—
Helwan	Z.	87·2	315	e 12 50	+ 1	—	—	e 7 21	?	—
Bermuda		91·0	34	—	—	e 24 9	+ 6	—	—	e 52·1
Tamanrasset	Z.	103·7	332	e 14 5	0	—	—	e 17 23	?	—
La Paz		131·6	63	e 19 30	[+15]	—	—	21 52	PP	68·6

Additional readings :—
Jena eN = 11m.53s., eE = 12m.20s. and 12m.40s.
Prague epP? = 12m.6s., e = 12m.19s., 13m.41s., and 13m.56s.
Strasbourg e = 12m.28s., 12m.38s., and 14m.30s.
Paris i = 12m.23s., e = 12m.48s., 13m.8s., and 14m.4s.
Long waves were also recorded at Palisades and at many European stations.

Dec. 25d. Readings also at 0h. (Tamanrasset, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Shasta Dam, Berkeley, Lick, Reno, Mineral, Butte, Hungry Horse, College, Bermuda, Bogota, and Huancayo), 5h. (Hong Kong, Nanking, Zi-ka-wei, and Poona), 6h. (Istanbul and near Manila), 7h. (Sofia), 8h. (2) and 10h. (near Almata II), 11h. (Mount Wilson (2), Palomar (2), Riverside (2), China Lake (2), Tinemaha, Kiruna, Collmberg, Paris, Strasbourg, Stuttgart, and Poona), 12h. (Zürich and near Chur), 13h. (near Dzhergetal), 14h. (near Santa Lucia), 15h. (Kimberley, Brisbane, and near Almata II), 16h. (near Almata II, and near Garm (2)), 18h. (Strasbourg), 19h. (near Huancayo), 20h. (Apia), 21h. (near Almata II), 22h. (Christchurch, Wellington, Brisbane, Riverview, Terre Adelie, Kimberley, Kirkland Lake, Ottawa, and Resolute Bay), 23h. (Paris).

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Dec. 26d. 0h. 46m. 52s. Epicentre 32°·8N. 118°·4W.

Intensity VI at Avalon and Del Mar (slight damage), at Long Beach, San Diego, San Pedro, and San Clemente Island ; V at Balboa, Big Bear City, Indio, Los Angeles, etc. Epicentre 32° 49′N. 118° 21′W. Macroseismic area 18,000 square miles.

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial No. 762, Washington, 1953, p. 17, with macroseismic chart p. 16.

A = −·4006, B = −·7408, C = +·5391 ; δ = −11 ; h = +1 ;
D = −·880, E = +·476 : G = −·256, H = −·474, K = −·842.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Jolla	N.	1·0	81	i 0 19	− 2	—	—	—	—	—
Palomar		1·4	67	i 0 25	− 2	i 0 42	− 4	—	—	—
Pasadena		1·4	8	i 0 25a	− 2	i 0 41	− 5	—	—	—
Riverside		1·5	36	i 0 26a	− 2	i 0 43	− 6	—	—	—
Santa Barbara		2·0	326	i 0 34	− 1	—	—	—	—	—
China Lake		3·1	12	i 0 49a	− 2	—	—	—	—	—
Haiwee	Z.	3·3	6	i 0 54a	+ 1	—	—	—	—	—
Tinemaha	Z.	4·3	2	i 1 6	− 2	—	—	—	—	—
Boulder City		4·4	42	i 1 8	− 2	—	—	—	—	—
Santa Clara		5·4	328	e 1 25k	+ 1	i 2 33	+ 5	—	—	—
Tucson		6·4	93	i 1 37	− 1	e 3 34	Sg	—	—	—
Shasta Dam		8·5	339	i 2 8	+ 1	—	—	—	—	—
Chihuahua		11·4	108	i 2 53k	+ 6	i 4 54	− 2	i 5 23	SS	i 5·6
Lubbock		13·9	82	2 22	−59	e 6 15	+18	—	—	—
Seattle		15·1	350	i 3 45a	+ 9	i 6 10	−15	i 3 53	PP	i 7·8
Hungry Horse		15·9	11	i 3 47	0	i 7 19	SSS	—	—	—
Victoria		16·2	348	3 52	+ 2	7 8	SS	—	—	11·0
Guadalajara		18·1	127	e 4 20	+ 6	e 7 59	SS	—	—	—
Saskatoon		21·2	19	4 48	− 1	8 45	+ 4	—	—	11·0
Tacubaya		21·8	122	i 5 0	+ 4	e 9 6	+14	e 8 19	?	—
Puebla		22·7	121	e 5 5	+ 1	e 9 25	+16	—	—	—
Vera Cruz		24·1	118	e 5 16	− 2	e 9 46	+12	e 9 52	S	—
Cincinnati		28·0	66	i 5 36	−19	e 10 38	0	—	—	—
Merida		28·2	107	e 5 58	+ 2	—	—	e 6 39	PP	—
Cleveland		30·5	62	i 6 15a	− 2	e 11 29	+11	—	—	—
Kirkland Lake	Z.	32·6	50	i 6 34a	− 1	—	—	—	—	—
Buffalo (Larkin)		32·7	59	e 6 36	0	e 11 54	+ 2	—	—	—
Washington		33·8	67	i 6 44	− 2	—	—	—	—	e 16·5
Washington, N.R.L.		33·8	67	i 6 45	− 1	—	—	—	—	15·2
Ottawa		35·0	55	i 6 55a	− 1	8 15	PP	9 27	PcP	18·4
Palisades		36·2	63	i 7 5	− 1	e 12 47	0	i 8 27	PP	i 19·0
College		36·8	339	7 10	− 1	—	—	—	—	—
Shawinigan Falls	N.	37·2	53	e 7 14	− 1	—	—	—	—	—
Harvard		37·9	60	i 7 21	+ 1	—	—	—	—	i 19·9
Weston		38·1	60	i 7 22	0	e 13 18	+ 2	—	—	—
Seven Falls	E.	38·6	53	i 7 26	0	—	—	8 54	PP	20·1
Resolute Bay		43·5	8	i 8 5a	− 2	e 14 33	− 3	e 9 46	PP	e 21·6
Bermuda		44·8	75	e 8 15	− 2	i 18 35	SSS	—	—	e 22·7
Chinchina		48·5	115	i 8 48	+ 2	i 15 53	+ 5	i 10 13	PcP	—
San Juan		48·8	92	i 8 49	0	i 15 55	+ 3	—	—	—
Bogota		49·9	114	i 9 0	+ 3	i 16 12	+ 5	i 11 2	PP	—
Huancayo		60·7	130	i 10 17	+ 2	e 18 43	+11	—	—	—
La Paz		68·6	127	i 11 8	+ 1	20 28	PS	13 46	PP	—
Kiruna		75·0	15	i 11 44k	− 1	—	—	i 11 48	P	e 39·1
Rathfarnham C.	Z.	76·1	34	i 11 49a	− 2	—	—	e 14 35	PP	e 38·1
Witteveen	Z.	82·3	30	i 12 27	+ 2	—	—	—	—	—
Paris		83·2	35	i 12 29	0	—	—	e 15 32	PP	e 46·1
Toledo		85·5	45	i 12 43	+ 2	—	—	e 15 13	PP	—
Jena		85·7	29	e 12 43	+ 1	—	—	e 16 0	PP	—
Strasbourg		85·8	33	e 12 42	0	—	—	e 13 18	?	—
Besançon		86·0	34	e 12 43	0	—	—	e 15 58	PP	—
Collmberg	Z.	86·0	28	e 12 42	− 1	—	—	e 16 1	PP	—
Stuttgart	Z.	86·3	32	e 12 43	− 2	—	—	e 15 57	PP	—
Malaga		87·4	47	i 12 48	− 2	—	—	—	—	—
Prague		87·5	28	e 12 55	+ 4	—	—	e 16 31	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.
Granada		87·6	46	12 53 a	+ 2	—	—	15 52	PP	52·3
Almeria		88·5	46	i 12 29	−27	23 14	[−10]	15 59	PP	—
Alicante		88·7	44	12 50	− 7	23 54	+11	16 30	PP	e 42·5
Triest		90·7	31	e 13 5	− 1	e 23 59	− 2	e 23 31	SKS	—
Algiers Univ.	Z.	91·8	43	—	—	e 30 34	SPS	—	—	—
Tamanrasset	Z.	103·1	52	e 14 1	− 1	i 18 17	PP	i 17 54	?	—
Helwan	Z.	111·4	28	e 19 17	PP	—	—	—	—	—
Poona	Z.	127·6	345	i 19 9	[+ 2]	—	—	—	—	—
Kimberley	Z.	148·2	92	i 19 16	[−29]	—	—	—	—	—
Grahamstown	Z.	150·7	100	i 20 16?	PKP_2	—	—	—	—	—
Pietermaritzburg	Z.	153·2	91	i 20 0	[+ 8]	—	—	—	—	—

Additional readings :—
Seattle e = 6m.56s.
Palisades iP_cP = 9m.30s., eSS? = 15m.8s.
Resolute Bay iZ = 8m.12s., eZ = 8m.35s.
Bogota ePSE = 16m.38s., eSSSE = 20m.32s.
Paris i = 12m.55s., e = 13m.40s. and 13m.44s.
Jena eEZ = 13m.16s. and 13m.23s.
Besançon e = 12m.50s. and 13m.55s.
Prague e = 13m.20s., 14m.25s., and 15m.13s.
Alicante SS = 29m.22s., SSS = 33m.8s., Q = 35m.58s.
Triest eSKKS = 23m.52s.
Long waves were also recorded at Halifax, Kew, De Bilt, Potsdam, and Rome.

Dec. 26d. 10h. 6m. 56s. Epicentre 31°·0N. 90°·5E. (as on 7d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	8·7	194	e 2 22	+12	i 3 58	+ 8	4 10	SS	—
New Delhi		11·8	262	e 2 53	0	i 5 9	+ 3	3 9	PPP	—
Przhevalsk		15·0	323	3 39	+ 4	—	—	—	—	—
Naryn		15·6	316	i 3 43	0	i 6 52	SS	—	—	—
Almata II		16·1	323	e 3 52	+ 3	—	—	—	—	—
Almata		16·3	322	e 3 51	− 1	i 7 7	SS	—	—	—
Ili		16·7	324	e 3 53	− 4	e 7 10	+ 7	—	—	—
Krasnogorka		17·3	319	e 4 4	0	e 7 24	+ 8	—	—	—
Frunse		17·4	317	i 4 3	− 3	i 7 23	+ 4	—	—	—
Hyderabad		17·4	222	i 4 8	+ 2	i 7 24	+ 5	7 39	SS	9·4
Andijan		17·6	308	4 7	− 1	i 7 27	+ 4	—	—	—
Fergana		17·8	306	e 4 10	− 1	7 41	SS	—	—	—
Garm		18·3	301	i 4 14	− 3	i 7 48	+ 9	—	—	—
Stalinabad		19·3	300	i 4 28	− 1	—	—	—	—	—
Poona		19·5	234	i 4 35	+ 4	i 8 14	+ 8	4 55	PP	9·4
Tashkent		19·9	307	i 4 35	− 1	i 8 21	+ 6	—	—	—
Bombay		20·0	238	i 4 44	+ 7	8 29	+12	5 6	PP	9·6
Tchimkent		20·1	310	i 4 39	+ 1	i 8 27	+ 8	—	—	—
Semipalatinsk		20·8	342	e 4 47	+ 2	—	—	—	—	—
Samarkand		21·0	300	4 46	− 1	—	—	—	—	—
Hong Kong		22·8	106	5 6	+ 1	i 9 18	+ 7	5 36	PP	12·2
Kodaikanal	E.	23·9	213	5 20	+ 4	9 45	+15	5 33	PP	11·6
Nanking		24·1	80	5 17	− 1	i 9 43	+ 9	i 5 26	?	—
Mary		24·5	295	i 5 22	0	—	—	—	—	—
Colombo	E.	26·0	205	e 7 25	+109	10 25	+19	—	—	15·5
Zi-ka-wei		26·4	81	e 5 39	− 1	i 10 20	+ 8	i 5 46	?	—
Ashkabad		27·3	294	i 5 30	−18	—	—	—	—	—
Kizyl-Arvat		29·0	297	6 4	0	—	—	—	—	—
Sverdlovsk		33·1	330	i 6 37	− 3	e 11 57	− 2	—	—	—
Baku		34·0	298	e 6 51	+ 3	—	—	—	—	—
Shemakla		35·0	299	6 58	+ 2	—	—	—	—	—
Goris		36·7	297	7 14	+ 4	i 13 2	+ 8	—	—	—
Grozny		37·3	303	e 7 20	+ 4	—	—	—	—	—
Tiflis		37·9	300	7 23	+ 3	13 18	+ 5	—	—	—
Tsikhlis-Dzhvari		38·9	300	e 7 32	+ 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.
Borzhomi		39·0	300	7 33	+ 3	—	—	—	—	—
Piatigorsk		39·3	304	7 32	0	13 38	+ 4	—	—	—
Moscow		44·4	320	8 12	– 2	e 14 46	– 3	—	—	—
Yalta		45·7	304	8 24	0	15 9	+ 1	—	—	—
Helwan	Z.	50·5	285	—	—	e 16 40	PPS	e 20 28	?	—
Lwow		52·2	312	i 9 15	0	—	—	—	—	—
Uzhgorod		53·5	311	e 9 21	– 3	—	—	—	—	—
Kiruna		54·2	334	e 9 25	– 4	i 19 24	ScS	e 22 50	SSS	e 28·1
Belgrade		55·3	306	e 9 38k	0	e 19 33	ScS	e 24 5	Q	e 32·5
Ogyalla	E.	56·3	310	e 9 36	– 9	—	—	—	—	—
Prague		58·3	313	e 9 59	0	—	—	—	—	29·1
Copenhagen		58·5	320	e 9 57	– 3	24 22	SSS	—	—	28·1
Collmberg	Z.	59·0	314	e 10 2	– 2	—	—	—	—	—
Cheb		59·6	314	—	—	e 18 38	PPS	e 24 40	SSS	—
Triest		59·8	309	e 10 6	– 3	e 18 7	–13	e 12 40	PP	—
Jena		59·9	315	e 10 8	– 2	—	—	e 10 22	?	—
Stuttgart		62·0	313	e 10 22	– 2	—	—	—	—	e 34·1
Witteveen	Z.	62·4	318	i 10 25	– 2	—	—	—	—	—
Strasbourg		62·9	313	e 10 30k	0	e 26 4	SSS	e 10 54	?	e 30·1
Besançon		64·5	312	e 10 38	– 3	—	—	e 11 56	?	—
Paris		66·1	315	i 10 50	– 1	i 27 3	SSS	e 12 20	?	e 32·1
College		74·3	23	11 37	– 4	—	—	—	—	—
Resolute Bay		74·5	3	e 11 40	– 2	—	—	—	—	—
Tamanrasset	Z.	74·5	287	e 11 43	+ 1	—	—	e 13 10	?	—
Pietermaritzburg	Z.	83·1	230	e 12 32	+ 3	—	—	—	—	—
Riverview		86·2	134	—	—	e 23 19	0	24 47	PPS	e 41·3
Kimberley	Z.	86·3	233	i 12 44	– 1	—	—	—	—	—
Hungry Horse		98·0	17	e 13 32	– 7	—	—	e 17 5	PP	—
Tinemaha	Z.	107·2	24	e 18 39	[+12]	—	—	—	—	—
China Lake	Z.	108·5	24	e 18 57	PP	—	—	—	—	—
Boulder City		109·3	22	e 18 59	PP	—	—	—	—	—
Mount Wilson	Z.	109·8	25	e 18 58	PP	—	—	—	—	—
Palomar	Z.	111·0	25	e 19 14	PP	—	—	—	—	—
La Paz		155·8	303	e 19 36	[–20]	—	—	—	—	—
Huancayo		157·0	324	e 20 33	PKP_2	—	—	—	—	—

Additional readings :—
New Delhi iEN = 3m.58s., QEN = 5m.1s., SSN = 5m.22s., SSSN = 5m.32s.
Poona PPPE = 5m.5s., QE = 8m.21s.
Bombay QEN = 8m.43s., SSN = 9m.5s., SSE = 9m.10s.
Kodaikanal PPPE = 6m.11s., QE = 10m.21s.
Kiruna iN = 20m.19s., eE = 21m.34s. and 24m.16s., eZ = 24m.28s.
Prague e = 10m.21s., 17m.42s., 19m.28s., and 20m.16s.
Triest ePP?Z = 13m.30s.
Paris i = 10m.54s., e = 11m.0s.
Long waves were also recorded at Palisades, Pasadena, Harvard, Weston, Bermuda, Djakarta, and at many European stations.

Dec. 26d. 16h. 30m. 47s. Epicentre 39°·2N. 95°·8E.

A = –·0785, B = +·7730, C = +·6295 ; δ = –4 ; h = –1 ;
D = +·995, E = +·101 : G = –·064, H = +·626, K = –·777.

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Przhevalsk	13·6	289	3 13	– 4	5 41	– 9	—	—	—
Chilisk	13·8	294	i 3 14	– 5	i 5 44	–10	—	—	—
Irkutsk	14·4	22	i 3 28	+ 1	6 14	+ 5	—	—	—
Almata II	14·4	292	e 3 15?	–12	e 6 0?	– 9	—	—	—
Almata	14·8	292	i 3 35	+ 3	i 6 29	SS	—	—	—
Ili	14·8	295	e 3 27	– 5	i 6 8	–10	—	—	—
Naryn	15·3	285	i 3 36	– 3	i 6 24	– 6	—	—	—
Rybach'e	15·3	289	e 3 33	– 6	i 6 25	– 5	—	—	—
Semipalatinsk	15·7	321	i 3 52	+ 8	—	—	—	—	—
Krasnogorka	16·0	291	e 3 45	– 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		16·4	290	i 3 50	– 3	i 6 48	– 8	—	—	—
Calcutta	E.	17·8	203	i 4 19k	+ 8	i 7 47	SS	4 35	PP	—
Andijan		18·0	282	i 4 14	+ 1	—	—	—	—	—
Fergana		18·5	282	e 4 17	– 2	—	—	—	—	—
New Delhi		18·7	241	i 4 23k	+ 1	i 7 45	– 3	4 38	PP	8·7
Dzhergetal		19·0	280	i 4 26	0	i 8 3	+ 8	—	—	—
Garm		19·8	288	i 4 34	– 1	—	—	—	—	—
Nanking		20·0	104	i 4 38a	+ 1	i 8 30	+13	i 4 41	P	—
Tchimkent		20·1	288	i 4 36	– 2	i 8 19	0	—	—	—
Tashkent		20·3	285	i 4 39	– 1	i 8 23	0	—	—	—
Stalinabad		21·0	282	i 4 47	0	—	—	—	—	—
Samarkand		22·2	280	4 57	– 3	—	—	—	—	—
Zi-ka-wei	E.	22·4	101	4 56	– 6	9 17	+13	—	—	—
Hong Kong		23·0	131	5 11	+ 4	i 9 26	+12	—	—	12·5
Hyderabad		26·4	219	i 5 44	+ 4	i 10 12	0	11 14	SS	13·6
Mary		26·6	279	i 5 42	0	—	—	—	—	—
Poona		28·0	228	i 5 59	+ 4	i 10 36	– 2	6 46	PP	11·4
Bombay		28·4	231	e 6 4	+ 6	e 10 49	+ 4	6 56	PP	11·8
Sverdlovsk		29·0	320	i 6 2	– 2	10 46	– 8	—	—	—
Ashkabad		29·2	280	i 6 5	0	—	—	—	—	—
Kizyl-Arvat		30·5	283	i 6 17	0	—	—	—	—	—
Manila		33·0	130	e 7 13	+34	—	—	—	—	—
Kodaikanal	E.	33·2	215	e 6 42	+ 2	12 3	+ 3	7 48	PP	15·6
Yuzno-Sakhlinsk		34·7	62	e 6 58	+ 4	e 12 29	+ 5	—	—	—
Colombo	E.	35·2	209	e 8 13	PP	12 36	+ 5	—	—	—
Shemakla		35·9	289	7 3	– 1	—	—	—	—	—
Grozny		37·4	293	i 7 16	0	—	—	—	—	—
Goris		37·9	287	i 7 21	+ 1	—	—	—	—	—
Tiflis		38·4	291	7 27	+ 2	—	—	—	—	—
Erevan		39·0	289	e 7 38	+ 8	13 36	+ 7	—	—	—
Zugdidi		40·3	294	i 7 43	+ 3	13 48	– 1	—	—	—
Moscow		41·3	314	7 48	– 1	—	—	—	—	—
Sotchi		41·6	295	i 7 52	+ 1	—	—	—	—	—
Helsinki		47·7	331	e 8 39	– 1	e 15 39	+ 3	e 19 23	SS	—
Kishinev		48·2	303	8 42	– 2	—	—	—	—	—
Kiruna		48·9	331	8 49a	– 1	e 19 30	SS	i 10 16	PcP	e 23·2
Istanbul	Z.	49·9	295	e 8 58	+ 1	e 16 17	PS	i 10 52	PP	—
Lwow		50·4	307	i 8 57	– 4	i 16 8	– 6	—	—	—
Upsala		51·4	321	—	—	e 20 13	SS	—	—	e 26·9
Uzhgorod		51·9	307	i 9 15	+ 3	—	—	—	—	—
Helwan		52·9	281	i 9 19a	– 1	16 55	+ 7	11 25	PP	—
Skalnate Pleso		53·0	308	e 9 13	– 8	16 44	– 6	11 18	PP	—
Sofia	E.	53·3	299	e 9 24	+ 1	—	—	—	—	—
Timisoara		53·5	303	e 9 28	+ 4	—	—	i 10 2	?	—
Budapest		54·3	306	9 31	+ 1	9 34	P	24 13?	Q	e 27·6
Belgrade		54·4	302	e 9 27	– 4	—	—	e 11 34	PP	e 28·1
Ogyalla		54·7	307	e 9 45?	+12	e 10 33	PcP	e 11 9	PP	—
Copenhagen		55·3	317	i 9 36	– 2	e 17 25	+ 4	i 9 39	P	27·2
Potsdam		56·1	314	i 9 43	0	e 21 55	SS	—	—	e 27·2
Prague		56·2	310	i 9 44	0	17 33	0	e 11 49	PP	e 27·2
Collmberg		56·6	312	e 9 45	– 2	—	—	e 10 44	PcP	e 30·7
Cheb		57·4	311	e 11 48	PP	e 17 31	–18	—	—	—
Jena		57·5	312	e 9 52	– 1	e 10 51	PcP	e 11 57	PP	—
Taranto		58·3	299	9 8?	–51	17 3?	–58	—	—	—
Triest	Z.	58·4	306	i 9 58a	– 2	e 12 7	PP	e 13 36	PPP	—
Witteveen	Z.	59·5	316	i 10 8	+ 1	—	—	—	—	—
Stuttgart		59·8	311	e 10 9	0	e 21 47	SS	10 56	PcP	e 30·2
Chur		60·5	308	e 10 13	– 1	—	—	—	—	—
Messina		60·6	297	i 10 14a	– 1	e 18 32	+ 2	e 12 36	PP	—
Florence		60·8	304	i 10 19	+ 3	e 18 41	+ 8	—	—	—

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.
Strasbourg		60·8	311	e 10 15	– 1	—	—	—	—	e 30·2
Zürich		60·8	310	e 10 14a	– 2	—	—	e 12 34	PP	—
Rome		60·9	302	i 10 16a	– 1	e 18 37	+ 3	e 22 54	SS	—
Basle		61·4	310	e 10 19	– 1	—	—	e 11 50	?	—
Besançon		62·4	310	e 10 26	– 1	e 11 5	PcP	e 12 48	PP	—
Paris		63·7	313	i 10 34	– 2	e 26 22	SSS	e 12 59	PP	e 31·2
College		65·1	25	10 44	– 1	—	—	—	—	—
Resolute Bay		66·2	4	i 10 50a	– 2	—	—	i 11 20	PcP	—
Algiers Univ.	Z.	69·8	301	i 11 13k	– 1	—	—	—	—	—
Toledo		72·6	307	i 11 32	+ 1	14 4	PP	e 13 33	?	—
Almeria		73·4	304	11 44	+ 8	21 49	PPS	14 48	PP	—
Granada		73·9	305	i 11 41a	+ 2	—	—	—	—	—
Malaga		74·7	305	i 15 3	PP	—	—	—	—	32·1
Tamanrasset	Z.	76·1	288	i 11 53k	+ 2	e 14 38	PP	e 16 19	PPP	—
Seattle		87·1	24	e 12 52	+ 3	—	—	e 13 13	?	—
Riverview		88·9	136	i 13 4k	+ 6	e 23 31	[+ 5]	i 23 54	S	e 42·3
Hungry Horse		88·9	19	i 12 58	0	—	—	—	—	—
Pretoria	Z.	90·3	236	e 12 35	– 29	—	—	—	—	—
Kirkland Lake	Z.	93·0	356	e 13 17	0	—	—	—	—	—
Shasta Dam		93·2	27	i 13 20	+ 3	—	—	—	—	—
Mineral	Z.	93·8	27	e 13 22k	+ 2	—	—	—	—	—
Shawinigan Falls	N.	94·0	351	e 13 21	0	—	—	—	—	—
Kimberley	Z.	94·5	236	i 13 22	– 1	—	—	—	—	—
Ottawa		95·4	353	i 13 28a	0	—	—	—	—	—
Fresno	Z.	97·6	27	e 13 40k	+ 2	—	—	—	—	—
Tinemaha	Z.	97·9	26	e 13 41	+ 2	—	—	—	—	—
China Lake	Z.	99·2	26	i 13 48	+ 3	—	—	—	—	—
Boulder City		100·0	23	e 13 50	+ 2	—	—	e 17 10	?	—
Pasadena	Z.	100·5	27	e 13 53	+ 2	—	—	e 18 3	PP	—
Palomar	Z.	101·7	26	e 13 58	+ 2	—	—	—	—	—
Fayetteville		104·5	7	e 18 12	PP	—	—	—	—	—
Bermuda		106·5	342	i 18 44	PP	—	—	—	—	—
Bogota		135·4	345	i 19 27	[+ 5]	i 22 59	PKS	i 19 53	?	—
Huancayo		151·8	341	e 19 55	[+ 5]	—	—	—	—	e 66·0
La Paz		153·4	323	i 19 57a	[+ 5]	43 25	SS	i 20 19	PKPₐ	72·5

Additional readings :—
Calcutta SSE = 8m.11s., SSSE = 8m.26s.
New Delhi PPPE = 4m.46s., SSN = 8m.8s.
Poona PPN = 6m.37s., PPE = 6m.41s., SSS = 11m.57s.
Kodaikanal PPPE = 8m.15s., QE = 14m.9s.
Kiruna iZ = 8m.52s., ePPZ = 10m.45s., ePPE = 10m.50s., iN = 20m.29s.
Istanbul eSSZ = 19m.7s.
Upsala eN = 23m.35s., iN = 25m.48s., eN = 26m.1s.
Helwan eZ = 10m.31s., eN = 19m.13s.
Skalnate Pleso eN = 9m.43s., e = 10m.26s., eSS?N = 20m.34s.
Potsdam eN = 22m.7s., eZ = 22m.19s.? and 26m.16s.?, iE = 26m.21s.?.
Prague epP? = 10m.3s., ePcP? = 11m.3s., e = 16m.36s., 17m.47s., and 18m.13s.
Jena eN = 12m.16s.
Stuttgart e = 10m.12s.
Messina iZ = 10m.17s., e = 14m.26s.
Strasbourg e = 10m.39s., 11m.22s., and 24m.13s.?.
Paris i = 11m.4s. and 11m.11s., iPcP = 11m.14s.?.
Tamanrasset iZ = 12m.30s., eZ = 13m.19s., iZ = 15m.34s.
Riverview iPSN = 24m.56s., iN = 25m.8s., iSSN = 29m.52s.
La Paz PKS = 23m.40s., iPPZ = 23m.49s.
Long waves were also recorded at Djakarta, Bergen, Aberdeen, Kew, De Bilt, Alicante, Weston, and Harvard.

Dec. 26d. 16h. 53m. 19s. Epicentre 49°·2N. 156°·1E. (as on 25d.).

	Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
College	33·0	40	6 38	– 1	—	—	—	—	—
Manila	44·9	233	e 8 41	+23	—	—	—	—	—
Resolute Bay	47·9	20	i 8 41a	– 1	—	—	e 10 17	PP	—
Hungry Horse	55·7	54	i 9 41	+ 1	—	—	—	—	—
Shasta Dam	55·7	66	e 9 41	+ 1	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mineral	Z.	56·4	66	e 9 51a	+ 6	—	—	—	—	—
Butte		58·0	55	e 9 56	− 1	—	—	—	—	—
Kiruna		58·6	343	i 9 58	− 3	—	—	—	—	e 33·3
Fresno	Z.	59·8	67	e 10 9a	0	—	—	—	—	—
Tinemaha	Z.	60·5	67	e 10 15	+ 1	—	—	i 10 26	pP	—
China Lake	Z.	61·7	67	i 10 22	0	—	—	i 10 28	pP	—
Pasadena	Z.	62·5	69	e 10 28	0	—	—	i 10 42	pP	—
Riverside	Z.	63·1	69	e 10 38	+ 6	—	—	—	—	—
Boulder City		63·3	65	e 10 32	− 1	—	—	i 10 47	pP	—
Palomar	Z.	63·8	69	i 10 26	−10	—	—	—	—	—
Tucson		68·2	66	e 11 5	+ 1	—	—	i 11 18	pP	—
Apia		68·9	146	(e 11 0?)	− 9	e 11 0?	P	e 11 40	PcP	—
Copenhagen		71·2	340	e 11 21	− 2	—	—	—	—	36·7
Poona	Z.	71·2	277	i 11 23	0	—	—	i 12 19	?	—
Aberdeen		72·5	348	e 11 36	+ 6	—	—	—	—	—
Fayetteville		74·7	53	i 11 44	+ 1	—	—	—	—	—
Collmberg		75·0	337	i 11 45	0	—	—	—	—	—
Witteveen	Z.	75·1	342	i 11 47	+ 1	—	—	—	—	—
Ottawa		75·5	35	e 11 54	+ 6	e 21 41	+13	i 11 59	pP	—
Shawinigan Falls	N.	75·6	33	e 11 48	0	—	—	—	—	—
Jena	N.	75·7	338	e 11 49	0	—	—	—	—	—
Prague		75·8	336	e 11 50	0	—	—	e 14 48	PP	—
Seven Falls	E.	75·8	32	e 12 3	+13	e 21 34	+ 3	—	—	—
Cleveland		76·4	41	i 12 5	+12	i 21 35	− 3	e 21 41	S	30·4
Stuttgart	Z.	78·3	339	e 12 3	0	—	—	e 12 15	PcP	—
Istanbul	Z.	78·7	323	e 12 6	0	—	—	—	—	—
Strasbourg		78·8	340	i 12 7a	+ 1	—	—	e 12 19	PcP	—
Harvard		79·5	34	e 12 13	+ 3	—	—	—	—	—
Weston		79·7	34	i 12 17	+ 6	—	—	—	—	—
Paris		79·8	343	i 12 10	− 2	—	—	i 12 22	PcP	e 44·7
Zürich		79·8	339	e 12 11a	− 1	—	—	e 13 21	?	—
Basle		79·9	340	e 12 12	0	—	—	—	—	—
Chur		80·0	338	e 12 13a	0	—	—	—	—	—
Triest	Z.	80·0	335	e 12 12	− 1	—	—	i 12 19	PcP	—
Palisades		80·0	36	—	—	e 23 33	PPS	—	—	e 31·2
Besançon		80·5	340	i 12 15	0	—	—	—	—	—
Neuchatel		80·5	340	e 12 15	0	—	—	—	—	—
Helwan	Z.	87·2	315	e 12 46	− 3	—	—	—	—	—
Bermuda		91·0	34	—	—	e 24 11	+ 8	—	—	e 41·2
Tamanrasset	Z.	103·7	332	e 14 8	+ 3	—	—	e 16 44	?	—
Pretoria	Z.	133·6	280	e 22 23	PP	—	—	—	—	—

Additional readings :—
Jena eN = 12m.12s., eE = 12m.30s.
Prague e = 12m.8s., 12m.19s., 12m.45s., 13m.25s., and 13m.44s.
Stuttgart eZ = 14m.0s. and 17m.14s.
Strasbourg i = 12m.31s., e = 12m.55s.
Paris i = 12m.17s., ipP? = 12m.34s., isP? = 12m.45s.
Besançon i = 12m.28s., e = 13m.23s.
Long waves were also recorded at Upsala, Potsdam, Kew, Granada, Almeria, and Christchurch.

Dec. 26d. (I) 17h. 22m. 13s. (II) 17h. 27m. 42s. (III) 19h. 33m. 48s. } Epicentre 49°·2N. 156°·1E. (as at 16h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		
		°	°	m. s.	s.	m. s.	s.	m. s.		
I	College	33·0	40	6 39	0	—	—	—	—	—
III		33·0	40	6 38	− 1	—	—	—	—	—
I	Resolute Bay	47·9	20	e 8 41a	− 1	—	—	—	—	—
II		47·9	20	e 8 41	− 1	—	—	—	—	—
I	Hungry Horse	55·7	54	e 9 41	+ 1	—	—	—	—	—
III		55·7	54	e 9 40	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
III Shasta Dam		55·7	66	e 9 41	+ 1	—	—	—	—
I Tinemaha	Z.	60·5	67	e 10 12	− 2	—	—	i 10 25	?
II	Z.	60·5	67	i 10 26	+12	—	—	—	—
III	Z.	60·5	67	e 10 14	0	—	—	i 10 24	?
I China Lake	Z.	61·7	67	e 10 21	− 1	—	—	—	—
II	Z.	61·7	67	e 10 21	− 1	—	—	i 10 34	?
III	Z.	61·7	67	i 10 21	− 1	—	—	i 10 34	?
I Mount Wilson	Z.	62·5	69	e 10 25	− 3	—	—	i 10 38	?
II	Z.	62·5	69	e 10 31	+ 3	—	—	i 10 43	?
III Pasadena	Z.	62·5	69	e 10 28	0	—	—	i 10 40	?
III Riverside	Z.	63·1	69	e 10 30	− 2	—	—	e 10 43	?
I Boulder City		63·3	65	e 10 37	+ 4	—	—	i 10 44	?
III		63·3	65	i 10 33	0	—	—	—	—
III Tucson		68·2	66	e 11 4	0	—	—	e 11 18	?
I Poona	Z.	71·2	277	i 11 23	0	—	—	i 11 37	?
III	Z.	71·2	277	i 11 25	+ 2	—	—	—	—
I Fayetteville		74·7	53	i 11 42	− 1	—	—	—	—
III		74·7	53	i 11 43	0	—	—	—	—
I Collmberg	Z.	75·0	337	e 11 43	− 2	—	—	—	—
II	Z.	75·0	337	e 11 43	− 2	—	—	—	—
III	Z.	75·0	337	e 11 44	− 1	—	—	—	—
I Ottawa		75·5	35	e 11 58	+10	—	—	—	—
I Shawinigan Falls	N.	75·6	33	e 12 0	+12	—	—	—	—
I Stuttgart	Z.	78·3	339	e 12 3	0	—	—	—	—
II	Z.	78·3	339	e 12 2	− 1	—	—	—	—
I Strasbourg		78·8	340	e 12 6	0	—	—	e 12 20	PcP
II		78·8	340	e 12 6	0	—	—	—	—
I Harvard		79·5	34	i 12 22	+12	—	—	—	—
I Paris		79·8	343	i 12 11	− 1	—	—	i 12 26	PcP
II		79·8	343	e 12 11	− 1	—	—	—	—
I Triest	Z.	80·0	335	e 17 13	PPP	—	—	—	—
II	Z.	80·0	335	i 12 3a	−10	—	—	—	—
I Besançon		80·5	340	e 12 16	+ 1	—	—	e 12 30	?

Long waves were also recorded for shock II at Alicante.

Dec. 26d. Readings also at 0h. (Almata, Almata II, Ili, Krasnogorka, Kurmenty, Przhevalsk, Rybach'e, Samarkand, Stalinabad, Tchimkent, near Andijan, Dzhergetal, Fergana, Frunse, Garm, and Naryn), 2h. (near Apia), 3h. (College, Boulder City, Butte, Fayetteville, Hungry Horse, Shasta Dam, Tucson, Weston, Harvard, Resolute Bay, Pasadena, Riverside, Palomar, China Lake, Tinemaha, Lick, Mineral, Palisades, Kimberley, Pietermaritzburg, and Kiruna (2)), 4h. (Palisades), 6h. (College, Boulder City, Butte, Hungry Horse, Seattle, Shasta Dam, Tucson, Victoria, Pasadena, Riverside, Palomar, China Lake, and Tinemaha), 7h. (Huancayo, La Paz, Riverside, China Lake, Tinemaha, Mount Wilson, and near Apia), 8h. (Apia (4)), 11h. (Collmberg, Stuttgart, Prague, and near Zürich), 14h. (Pasadena, Riverside, Palomar, China Lake, Tinemaha, Prague, near Dzhergetal, and near Apia (2)), 15h. (near Dzhergetal), 16h. (Resolute Bay, Mount Wilson, Palomar, China Lake, Tinemaha, Tamanrasset, Collmberg, Kiruna, Kimberley, and near Apia), 17h. (near Copiapo), 18h. (near Akhalkalaki), 20h. (Mount Wilson, Riverside, China Lake, Palomar, and Brisbane), 21h. (Bermuda), 22h. (Goris, near Akhalkalaki, Borzhomi, Gori, Grozny, Tiflis, Tsikhlis-Dzhvari, and near Istanbul), 23h. (China Lake, Collmberg, Paris, Stuttgart, and Poona).

Dec. 27d. 2h. 21m. 44s. Epicentre 49°·2N. 156°·1E. (as on 26d.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		33·0	40	6 38	− 1	—	—	—	—	—
Resolute Bay		47·9	20	e 8 42a	0	—	—	—	—	—
Hungry Horse		55·7	54	e 9 39	− 1	—	—	—	—	—
Shasta Dam		55·7	66	i 9 41	+ 1	—	—	—	—	—
Mineral	Z.	56·4	66	i 9 50	+ 5	—	—	—	—	—
Reno	Z.	58·0	65	e 9 57a	0	—	—	—	—	—
Kiruna		58·6	343	i 10 0	− 1	—	—	—	—	e 33·3
Fresno	Z.	59·8	67	e 10 20a	+11	—	—	—	—	—
China Lake	Z.	61·7	67	e 10 21	− 1	—	—	i 10 34	?	—
Pasadena	Z.	62·5	69	e 10 29	+ 1	—	—	e 10 41	?	—

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.
Riverside	Z.	63·1	69	e 10 31	– 1	—	—	e 10 43	?	—
Boulder City		63·3	65	e 10 33	0	—	—	i 10 38	P	—
Palomar	Z.	63·8	69	e 10 36	0	—	—	—	—	—
Tucson		68·2	66	e 11 4	0	—	—	e 11 7	P	—
Copenhagen		71·2	340	e 11 23	0	—	—	—	—	—
Poona	Z.	71·2	277	i 11 24	+ 1	—	—	—	—	—
Fayetteville		74·7	53	i 11 43	0	—	—	—	—	—
Collmberg		75·0	337	i 11 45	0	—	—	—	—	—
Ottawa		75·5	35	e 12 0	PcP	—	—	—	—	—
Jena		75·7	338	e 11 49	0	—	—	—	—	—
Prague		75·8	336	e 11 50	0	e 12 19	?	e 12 0	PcP	—
Stuttgart	Z.	78·3	339	e 12 4	+ 1	—	—	—	—	—
Istanbul	Z.	78·7	323	e 12 8	+ 2	—	—	—	—	—
Strasbourg		78·8	340	i 12 8	+ 2	—	—	—	—	—
Harvard		79·5	34	i 12 22	PcP	—	—	—	—	—
Paris		79·8	343	i 12 13	+ 1	—	—	i 12 20	PcP	e 51·3
Triest	Z.	80·0	335	e 12 8	– 5	—	—	e 12 15	PcP	—
Besançon		80·5	340	i 12 17	+ 2	e 12 47	?	e 12 23	PcP	—
Tamanrasset	Z.	103·7	332	i 14 8k	+ 3	i 14 19	?	e 17 27	?	—
Kimberley	Z.	137·1	280	e 19 27?	[+ 2]	—	—	—	—	—

Additional readings :—
Strasbourg e = 12m.23s., 12m.38s., 12m.48s., and 13m.4s.
Paris ipP? = 12m.26s., i = 12m.29s., 12m.36s., and 13m.3s.
Long waves were also recorded at Upsala, Palisades, and Wellington.

Dec. 27d. 16h. 26m. 32s. Epicentre 38°·3N. 20°·8E. (as on 20d.).

Felt in the island of Cephalonia, intensity V at Hag Thekla ; IV to V at Lixourion ; IV at Valsamata, Diinata, Argostolion, Assos, Asprogherakes, and Zante ; intensity IV at Katastari, Leukade ; intensity III at Leukas and in the Provinces of Elide ; intensity IV at Lechaena, Gastonni, Agoulinitsa, and Vonitsa ; intensity III at Mytikas.
Epicentre as adopted (Strasbourg).

A. Galanopoulos.
Seismological Institute Bulletin, 1951, Athens, 1952, page 31.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·3	98	e 0 46	P_g	e 1 17	S_g	—	—	e 1·4
Taranto		3·5	309	e 0 52	– 5	e 1 35	– 5	e 1 26	?	—
Sofia		4·8	23	e 1 30	P*	2 45	S_g	—	—	i 3·1
Belgrade		6·5	358	e 2 10	P_g	e 2 47	– 8	e 3 9	S*	e 4·5
Istanbul	Z.	7·0	64	e 1 55	+ 9	—	—	—	—	—
Rocca di Papa		7·1	302	e 2 28	P_g	—	—	—	—	—
Bucharest		7·3	32	e 1 58	+ 8	e 3 16	+ 1	e 3 32	S*	4·4
Triest		9·0	327	e 2 10	– 3	i 3 48	–10	i 4 49	S_g	—
Florence		9·0	310	—	—	e 4 18	+20	—	—	e 5·3
Prato		9·2	310	—	—	e 4 46	S*	i 13 37	?	—
Chur		11·9	320	e 2 51a	– 3	e 4 54	–15	—	—	—
Raciborzu	Z.	11·9	352	e 3 26	+32	e 4 41	–28	—	—	e 7·4
Prague		12·6	341	e 3 8	+ 5	e 5 30	+ 4	—	—	e 7·2
Zürich		12·7	319	e 3 6	+ 1	e 5 10	–18	—	—	—
Ksara		13·0	106	—	—	e 5 23	–12	e 9 57	?	—
Basle		13·4	318	e 3 29	PP	e 5 32	–13	—	—	—
Stuttgart	Z.	13·4	325	e 3 9	– 5	e 6 8	SS	e 3 23	PP	—
Strasbourg		14·0	322	i 3 25	+ 3	e 6 15	SS	e 6 24	SSS	6·8
Collmberg	Z.	14·1	340	e 3 29	+ 6	—	—	e 3 44	PPP	—
Jena		14·2	336	e 3 32	+ 8	e 5 58	– 6	e 6 43	SSS	e 7·5
Tamanrasset	Z.	20·3	225	i 4 32a	– 8	e 8 28	+ 5	i 5 19	PPP	—
Kiruna	Z.	29·6	3	i 6 7	– 2	—	—	e 5 43	?	—

Additional readings :—
Athens i = 49s., eS_g = 1m.22s.
Belgrade eP_gZ = 2m.37s., eZ = 3m.57s., iS_gNW = 4m.6s.
Triest i$P_g$$P_g$ = 2m.48s.
Prague e = 3m.48s. and 5m.15s., eS*? = 6m.12s., eS_g = 6m.55s.
Jena eN = 3m.40s., eEN = 4m.33s.
Tamanrasset eZ = 5m.48s.
Long waves were also recorded at Rome.

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Dec. 27d. 16h. 36m. 24s. Epicentre 49°·2N. 156°·1E. (as at 2h.).

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
College		33·0	40	e 6 38	– 1	—	—	i 6 45	?
Resolute Bay		47·9	20	e 8 42a	0	—	—	—	—
Hungry Horse		55·7	54	e 9 46	+ 6	—	—	—	—
Kiruna	Z.	58·6	343	i 10 0	– 1	—	—	—	—
Tinemaha	Z.	60·5	67	e 10 17	+ 3	—	—	—	—
China Lake	Z.	61·7	67	e 10 21	– 1	—	—	—	—
Mount Wilson	Z.	62·5	69	e 10 27	– 1	—	—	—	—
Boulder City		63·3	65	e 10 32	– 1	—	—	—	—
Poona	Z.	71·2	277	i 11 24	+ 1	—	—	—	—
Bombay		71·6	278	e 11 19	– 6	e 20 14	–30	—	—
Fayetteville		74·7	53	e 11 46	+ 3	—	—	—	—
Collmberg		75·0	337	e 11 45	0	—	—	—	—
Stuttgart	Z.	78·3	339	e 12 4	+ 1	—	—	—	—
Istanbul	Z.	78·7	323	e 12 7	+ 1	—	—	—	—
Strasbourg		78·8	340	e 12 8	+ 2	—	—	—	—
Paris		79·8	343	i 12 14	+ 2	—	—	—	—
Tamanrasset	Z.	103·7	332	10 41	?	—	—	—	—

Long waves were recorded at Messina.

Dec. 27d. Readings also at 0h. (Riverside, China Lake, Mount Wilson, and Palomar), 1h. (Tacubaya), 2h. (Palomar), 3h. (China Lake, Mount Wilson, Palomar, Riverside, Tinemaha, Resolute Bay, Sofia, Poona, Djakarta, and Manila), 4h. (China Lake, Mount Wilson, near Kishinev, near Bucharest, Campulung, and Istanbul), 7h. (Poona and near Istanbul), 8h. (Pietermaritzburg), 9h. (Manila, near Malaga, and near Erevan), 10h. (Tacubaya), 11h. (China Lake (2), Mount Wilson (2), Palomar, and near Dzhergetal), 12h. (near Almata II, Ili, Kurmenty, and near Ashkabad), 16h. (Resolute Bay, China Lake, Pasadena, Riverside, Collmberg (2), Stuttgart (2), Triest, Paris, Kiruna, Tamanrasset, Poona (2), Krasnogorka, Przhevalsk, near Almata II, Ili, Kurmenty, and Naryn), 17h. (near Yalta), 19h. (Triest, Poona, Manila, Djakarta, China Lake, Mount Wilson, and near Palisades (2)), 20h. (Apia, Istanbul and near Athens), 21h. (Tacubaya, China Lake, Mount Wilson, Palomar, and near Istanbul).

Dec. 28d. 2h. 49m. 26s. Epicentre 37°·5N. 118°·5W. (as on 1950, September 28d.).

Intensity VI at Long Valley; V at Bishop, Laws, and Yosemite National Park; IV at Benton, Fresno. Epicentre 37° 34′N. 118° 35′W. (Pasadena).
Macroseismic area 10,000 square miles.

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial No. 762, Washington. 1953, page 17, with macroseismic chart on page 16.

A = –·3795, B = –·6989, C = +·6062; δ = –4; h = –1;
D = –·879, E = +·477; G = –·289, H = –·533, K = –·795.

		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
Tinemaha		0·5	155	i 0 12	– 2	i 0 21	– 2
Haiwee		1·4	163	i 0 28	+ 1	i 0 47	+ 1
China Lake		1·8	157	i 0 26	– 6	—	—
Santa Clara		2·7	267	e 0 47k	+ 2	i 1 6	–13
Santa Barbara	Z.	3·2	198	e 0 53	+ 1	e 1 36	+ 4
Pasadena		3·4	175	e 0 55	0	e 1 43	+ 6
Riverside	Z.	3·6	165	e 0 59	+ 1	—	—
Palomar	Z.	4·4	162	e 1 10	0	—	—
Shasta Dam		4·4	318	e 1 8	– 2	—	—
Tucson		8·2	128	i 2 3	0	i 2 42	P_g
Butte		9·6	30	e 2 23	+ 2	—	—
Hungry Horse		11·3	15	i 2 45	– 1	—	—

Long waves were recorded at Bozeman.

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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Dec. 28d. 9h. 20m. 26s. Epicentre 16°·9N. 98°·7W. (as on 1948, Oct. 1d.).
Focus at Base of Superficial Layers.

Strongly felt in the Mexican State of Guerrero ; Intensity IV in the Federal District. Epicentre 16°4′N. 99°33′W. (Tacubaya).

Monthly Seismological Bulletin of Tacubaya for Dec., 1951, p.6.

A = −·1448 B = −·9464, C = +·2889 ; δ = +10° ; h = +5 ;
D = −·988, E = +·151 ; G = −·044, H = −·286, K = −·957.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		1·9	86	i 0 34a	+ 3	i 1 2	+ 8	—	—	i 1·2
Puebla		2·2	12	i 0 36a	+ 1	—	—	—	—	i 1·3
Tacubaya		2·5	349	i 0 40a	+ 1	—	—	—	—	1·4
Vera Cruz		3·3	47	i 0 56a	+ 5	i 1 44	+15	—	—	i 2·0
Manzanillo		5·8	292	e 1 14	−12	—	—	—	—	i 2·5
Guadalajara		5·8	311	e 1 22	− 4	i 2 23	− 9	—	—	i 2·8
Merida		9·5	64	e 2 25	+ 7	i 4 13	+ 9	i 2 30	PP	—
Mazatlan		9·6	312	i 2 12a	− 7	—	—	i 2 23	P	4·6
Chihuahua		13·5	331	i 3 10a	− 2	i 5 50	+ 9	i 5 58?	SS	—
Lubbock		16·8	351	e 2 54	−60	6 21	−38	—	—	—
Tucson		18·8	327	i 4 19	0	i 7 58	sS	—	—	—
Fayetteville		19·5	10	i 4 27	0	i 8 25	SS	—	—	—
Balboa Heights		20·2	109	i 4 37	+ 2	e 8 36	SS	—	—	—
Kingston		20·9	83	i 4 42	0	i 8 26	− 2	i 5 2	PP	11·1
Lawrence		22·2	7	e 4 54	− 1	—	—	—	—	—
St. Louis		22·9	17	i 5 1	− 1	i 9 7	+ 2	—	—	—
Palomar	Z.	23·1	319	i 5 5a	+ 1	i 5 35	PP	i 5 12	pP	—
La Jolla		23·1	318	i 5 5	+ 1	—	—	—	—	—
Columbia		23·3	39	i 5 5	− 1	i 9 22	+10	—	—	—
Boulder City		23·8	327	i 5 12	+ 1	—	—	i 12 41	PcS	—
Lincoln		23·9	3	e 5 8	− 4	i 9 32	+ 9	—	—	—
Riverside	Z.	23·9	319	i 5 12a	0	e 6 51	?	i 5 23	pP	—
Pasadena		24·5	319	i 5 18a	+ 1	i 9 43	+10	i 5 28	pP	e 11·1
China Lake		25·2	324	i 5 25a	+ 1	—	—	—	—	—
Chinchina		25·5	113	i 5 49	+22	i 10 14	+24	i 10 33	SS	—
Tinemaha	Z.	26·5	323	i 5 38	+ 2	—	—	—	—	—
Chicago		26·6	18	i 5 35	− 2	e 10 11	+ 3	—	—	—
Bogota		27·0	114	i 5 45	+ 4	i 10 21	+ 7	i 5 50	pP	—
Fresno	Z.	27·2	322	e 5 42	− 1	—	—	—	—	—
Ciudad Trujillo		27·5	83	—	—	i 10 32	+10	i 15 19	?	—
Pittsburgh		28·5	31	i 5 54	0	i 13 1	PcS	i 6 3	pP	—
Cleveland		28·6	27	e 5 53a	− 2	i 10 56	sS	i 6 4	pP	13·8
Lick		28·7	321	e 5 56a	0	e 10 34	− 8	i 6 11	sP	—
Washington		28·9	37	i 5 58	0	e 11 28	+43	—	—	—
Washington, N.R.L.		28·9	37	i 5 58	0	—	—	—	—	—
Santa Clara		28·9	321	e 6 1a	+ 3	i 10 56	+11	—	—	—
Reno	Z.	29·1	327	e 6 0a	0	—	—	—	—	—
Berkeley		29·4	321	e 6 3	+ 1	i 11 4	+11	e 13 46	Q	e 15·8
Pennsylvania		29·8	33	i 6 6	0	e 11 6	+ 7	i 10 0	?	—
Bozeman		30·5	344	e 6 11	− 1	i 11 19	+ 9	—	—	—
Mineral	Z.	30·6	325	e 6 13a	0	—	—	—	—	—
San Juan		31·1	82	e 6 14	− 3	—	—	i 7 8	PP	—
Butte		31·2	342	i 6 21	+ 3	—	—	—	—	—
Shasta Dam		31·3	325	e 6 18	− 1	—	—	—	—	—
City College, N.Y.		32·0	37	i 6 25	0	i 11 36	+ 2	—	—	—
Palisades		32·1	37	i 6 26	0	i 11 48	sS	i 6 36	pP	e 15·0
Arcata	Z.	32·4	324	e 6 35	+ 6	—	—	—	—	—
Hungry Horse		33·8	342	i 6 40	− 1	—	—	—	—	—
Ottawa		34·3	29	i 6 45a	0	12 15	+ 6	i 6 54	pP	—
Bermuda		34·4	57	i 6 46	0	—	—	—	—	e 16·3
Weston		34·5	37	i 6 46	− 1	e 12 24	+12	i 7 58	PP	—
Corvallis	Z.	34·5	330	i 6 47	0	e 12 11	− 1	—	—	—
Harvard		34·5	37	i 6 46	− 1	i 12 21	+ 9	i 8 11	PP	e 16·6
Kirkland Lake	Z.	34·7	21	i 6 49a	0	—	—	—	—	—
Saskatoon		35·7	352	6 55	− 2	12 40	+ 9	—	—	17·5

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		36·2	88	i 6 58	– 4	i 12 48	+ 9	—	—	—
Seattle		36·3	333	e 7 2k	0	e 12 43	+ 3	e 7 10	pP	e 17·6
Shawinigan Falls	N.	36·6	31	e 7 4	– 1	12 35	–10	8 25	PP	—
Huancayo		36·9	138	e 7 10	+ 3	i 12 58	+ 8	(e 15 46)	SSS	e 15·8
Victoria		37·4	333	7 12	0	13 5	+ 8	—	—	17·9
Seven Falls	E.	37·9	32	e 7 16	0	13 16	+11	8 50	PP	19·1
Halifax		40·4	40	e 7 46	pP	14 8	+26	9 52	PPP	18·9
La Paz		44·8	135	i 8 16	+ 4	i 14 49	+ 2	i 8 24	pP	21·1
Sitka		48·9	335	e 8 42	– 3	i 15 50	+ 5	—	—	—
Copiapo	N.	51·9	147	e 9 10	+ 3	e 16 26	0	e 21 54	SSS	—
Honolulu		55·8	285	e 9 45	pP	e 17 30	+11	—	—	—
Santa Lucia		56·7	152	9 42	– 1	17 28	– 3	e 21 19	SS	—
Ivigtut		56·8	27	i 9 43	0	e 17 46	sS	12 58	PPP	29·6
Resolute Bay		57·8	2	i 9 48a	– 2	i 17 51	+ 5	i 10 0	pP	e 27·5
College		58·1	338	9 51	– 1	17 56	+ 6	—	—	—
Concepción	N.	58·7	155	e 9 39	–18	e 17 39	–18	e 18 26	PS	—
Buenos Aires		63·9	143	10 33	+ 1	19 5	+ 1	—	—	—
La Plata		64·4	143	e 10 33	– 2	i 19 10	0	12 58	PP	33·0
Scoresby Sund		69·8	21	i 11 9	0	i 20 25	+10	24 40	SS	33·6
Punta Arenas	N.	73·8	163	11 31	– 2	20 41	–20	25 22	SS	34·6
Rathfarnham Castle		78·1	38	e 12 9?	pP	e 21 34?	–14	—	—	e 39·6
Apia		78·3	251	e 12 22	+24	e 22 58	PPS	e 32 1	?	e 36·9
Aberdeen		79·5	33	i 11 39	–26	i 22 4	+ 1	i 14 48	PP	—
Kew		82·1	39	i 12 18a	– 1	i 22 40	+10	e 15 25	PP	e 35·6
Bergen		82·2	29	i 12 28	pP	22 42?	+11	i 23 10	PS	e 35·2
Toledo		82·8	51	i 12 23	+ 1	i 22 43	+ 6	e 15 39	PP	42·2
Malaga		83·4	54	i 12 28	+ 3	i 23 18	PS	i 15 44	PP	41·5
Granada		83·9	53	i 12 29a	+ 1	22 56	+ 8	15 55	PP	41·4
Paris		84·6	41	i 12 33	+ 2	e 23 3	+ 8	i 12 41	pP	38·6
Kiruna		84·8	21	i 12 32k	0	e 22 50	– 7	i 12 43	pP	e 41·6
Almeria		84·9	53	i 12 31	– 2	i 22 49	– 9	17 37	PPP	42·8
De Bilt		85·1	37	e 12 36	+ 2	e 23 21	+22	—	—	e 39·6
Alicante		85·9	52	12 39	+ 1	i 23 17	+10	15 55	PP	e 40·8
Barcelona		86·8	48	e 12 54	pP	23 39	+23	—	—	e 43·2
Besançon		87·4	42	i 12 47	+ 2	—	—	e 12 56	pP	—
Copenhagen		87·6	32	i 12 46	0	23 28	+ 4	16 16	PP	41·6
Strasbourg		87·9	40	i 12 46a	– 1	i 23 29	+ 2	i 16 17	PP	e 43·6
Upsala		88·0	27	e 12 57?	pP	e 23 22	– 5	i 16 11	PP	e 41·6
Basle		88·2	41	e 13 10	+21	—	—	—	—	—
Stuttgart		88·7	39	e 12 51	0	e 16 18	PP	e 13 4	pP	e 46·6
Zürich		88·9	41	e 12 49	– 3	—	—	e 16 10	PP	—
Algiers Univ.	Z.	89·1	52	i 12 53k	0	i 15 59	?	e 16 21	PP	—
Helsinki		89·1	25	e 13 0	+ 7	e 23 45	+ 8	e 16 38	PP	e 41·6
Jena		89·2	37	e 12 53?	– 1	e 16 34	PP	e 13 6	pP	—
Potsdam		89·4	35	i 12 53	– 2	i 24 1	+21	i 16 27?	PP	e 39·6
Collmberg		89·8	36	e 12 56	0	e 16 34	PP	e 13 8	pP	e 44·6
Cheb		90·1	37	e 13 0	+ 2	e 23 54	+ 7	e 16 52	PP	—
Pavia		90·2	42	e 12 58	0	e 41 50	Q	e 16 33	PP	—
Prague		91·2	36	e 13 2	– 1	e 23 59	+ 3	e 16 39	PP	e 43·6
Florence		92·2	43	i 13 12	+ 4	e 23 54	–11	i 16 58	PP	—
Triest		92·9	40	e 13 11	0	e 23 44	[+ 4]	i 13 22	pP	e 50·3
Pulkovo		93·2	23	i 13 11	– 1	i 23 48	[+ 6]	i 16 56	PP	—
Raciborzu		93·3	35	e 12 53	–20	e 24 54	+39	e 13 11	P	e 51·6
Rome		93·8	44	i 13 14a	– 1	23 52	[+ 7]	i 17 2	PP	—
Ogyalla		94·5	37	e 13 27	pP	e 23 59	[+10]	e 19 20	PPP	—
Skalnate Pleso		94·9	35	e 13 36	sP	e 24 9	[+18]	e 17 5	PP	—
Budapest		95·2	37	e 17 10	PP	24 10	[+17]	e 16 40	?	e 51·6
Yuzno-Sakhlinsk		95·9	323	e 13 25	+ 1	—	—	e 17 16	PP	—
Tamanrasset	Z.	96·1	65	i 13 27k	+ 2	e 23 59	[+ 1]	i 13 36	pP	44·6
Uzhgorod		96·4	35	i 13 44?	sP	—	—	i 17 20?	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.
Lwow		96·6	33	i 13 26	– 2	e 24 6	[+ 5]	e 17 23	PP	—
Auckland	N.	97·2	234	e 17 42	PP	e 24 4	[0]	—	—	e 44·8
Timisoara		97·4	37	17 34	PP	—	—	—	—	—
Belgrade		97·4	39	e 13 43k	pP	i 24 15	[+10]	e 17 33	PP	e 54·5
Taranto		97·6	44	i 15 57	?	23 7	[–59]	e 30 34	?	40·6
Wellington		98·4	230	13 42	+ 6	24 11	[+ 1]	17 42	PP	46·5
Moscow		98·8	23	e 13 38	0	24 16	[+ 4]	i 17 49	PP	—
Christchurch		100·5	228	13 53	+ 8	24 25	[+ 5]	e 17 54	PP	e 46·0
Kishinev		100·9	33	14 2	sP	24 21	[– 1]	17 44	PP	—
Bucharest		101·0	37	e 18 11	PP	e 24 29	[+ 6]	e 27 1	PS	—
Athens		103·2	44	—	—	i 24 49	[+16]	i 27 32	PS	—
Sverdlovsk		104·5	11	e 14 4	+ 1	24 42	[+ 3]	i 18 19	PP	—
Istanbul	Z.	104·7	38	e 14 8	+ 4	e 25 58?	+ 7	e 18 27	PP	e 49·6
Simferopol		105·0	33	18 23	PP	27 47	PS	—	—	—
Yalta		105·3	33	e 18 28	PP	e 24 51	[+ 9]	e 20 44	PPP	—
Theodosia		105·6	32	i 18 22	PP	24 51?	[+ 7]	—	—	—
Irkutsk		108·3	345	e 14 21	P	25 3	[+ 7]	18 48	PP	—
Sotchi		108·8	31	i 18 50	PP	i 25 6	[+ 8]	i 28 18	PS	—
Piatigorsk		110·0	28	19 0	PP	25 9	[+ 6]	21 54	PKS	—
Zugdidi		110·6	29	e 19 21	PP	—	—	—	—	—
Abastumanj		111·7	30	e 19 29	PP	—	—	—	—	—
Borzhomi		111·9	30	e 19 23	PP	e 28 49	PS	—	—	—
Gori		112·1	29	e 19 27	PP	—	—	—	—	—
Tiflis		112·6	29	19 23	PP	29 6	PS	20 55	?	—
Helwan		113·1	46	e 19 19	PP	e 25 34	[+ 19]	21 51	PPP	—
Ksara		113·5	40	e 14 31	P	28 16	PS	19 9?	PP	—
Erevan		113·7	30	i 19 28	PP	29 4	PS	—	—	—
Goris		115·1	28	i 19 33	PP	29 15	PS	i 21 43	PPP	—
Shemakla		115·2	28	19 32	PP	—	—	—	—	—
Riverview		115·8	240	i 19 49	PP	i 25 34	[+ 8]	i 26 48	SKKS	e 53·2
Baku		116·0	26	e 19 18?	PP	e 29 41?	PS	—	—	—
Terre Adélie		117·0	204	e 19 56	PP	e 25 44	[+14]	—	—	55·4
Kizyl-Arvat		119·6	22	e 20 24?	PP	i 30 17?	PS	—	—	—
Tchimkent		120·1	10	i 20 9	PP	e 25 48	[+ 7]	e 22 43	PPP	—
Frunse		120·2	5	e 20 10	PP	i 25 55	[+14]	e 22 45	PPP	—
Rybach'e		120·8	4	e 20 12	PP	—	—	—	—	—
Tashkent		121·0	10	i 18 54	[+ 5]	i 30 17	PS	i 20 17	PP	—
Ashkabad		121·3	20	e 20 7	PP	—	—	—	—	—
Naryn		121·8	4	e 20 19	PP	25 52	[+ 6]	i 23 11	PPP	—
Andijan		122·1	8	18 54	[+ 3]	30 25?	PS	e 20 24	PP	—
Samarkand		122·2	13	e 18 53	[+ 2]	—	—	20 28	PP	—
Fergana		122·3	8	e 18 52	[0]	e 30 30?	PS	e 23 3	PPP	—
Mary		122·8	17	18 57	[+ 4]	25 57	[+ 7]	20 34	PP	—
Obi-garm		123·6	10	i 19 8?	[+14]	e 30 0?	PS	20 50?	PP	—
Stalinabad		123·6	11	e 18 56	[+ 2]	e 26 5	[+13]	i 20 36	PP	—
New Delhi	N.	134·6	5	e 19 20	[+ 5]	28 45	SKKS	i 21 48	PP	—
Calcutta	E.	140·2	350	i 20 2k	[+37]	41 4	SS	32 49	SKSP	—
Bombay		143·5	13	i 19 33	[+ 2]	i 23 1	PKS	i 22 44	PP	68·0
Poona		144·0	11	19 31	[– 1]	22 55	PKS	22 44	PP	—
Hyderabad		145·8	4	19 36	[+ 1]	42 2	SS	—	—	—
Tananarive		147·9	98	e 19 47	[+ 8]	e 30 9	SKKS	36 10	PPS	71·6
Djakarta		152·9	291	e 19 48	[+ 2]	i 23 37	PP	i 20 9	PKP,	—
Colombo	E.	156·3	3	20 6	[+15]	—	—	—	—	71·6

Additional readings :—
Merida i = 4m.22s.
Kingston i = 8m.56s.
Palomar iZ = 5m.23s.
Pasadena iNZ = 5m.57s., iZ = 7m.10s., iN = 9m.54s., iZ = 10m.36s.
Chinchina iPP = 7m.0s., iS_cS = 16m.46s.
Bogota iPPZ = 5m.59s.
Cleveland iN = 10m.23s.
Lick eZ = 9m.11s., eN = 13m.52s., eZ = 14m.55s.
Palisades iPP = 7m.41s., i = 10m.56s., iSZ = 12m.1s.
Ottawa PP = 8m.3s., e = 14m.36s. and 17m.4s.
Seattle ePP = 8m.26s., eP_cP = 9m.29s. and other unidentified e readings.

Continued on next page.

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Shawinigan Falls PcPN =9m.33s., eN =15m.0s. and 15m.41s.
Huancayo i =7m.42s., ePP =8m.29s., e =9m.16s.
Seven Falls PPPE =9m.19s., PcPE =9m.41s., eE =12m.49s., 15m.37s., 16m.9s., and 17m.41s.
Halifax PP =9m.26s., SS =17m.10s., SSS =17m.54s.
La Paz iPP =10m.14s., iPS? =15m.8s., iSS =18m.4s., iScS =18m.22s., SSS =19m.14s.
Copiapo eN =18m.51s. and 24m.34s.
Santa Lucia eSN =17m.17s., SSSN =24m.34s., E =26m.34s., and 33m.34s.
Ivigtut 19m.33s.
Resolute Bay iEN =19m.50s., eEN =22m.4s.
Concepción N =24m.34s.
La Plata PcSE =15m.16s., E =15m.52s., SKSN =20m.16s., SKSE =20m.22s., E = 22m.4s., SSN =23m.4s., SSE =23m.40s., SSSE =26m.52s., QEN =29·1m.
Scoresby Sund 21m.20s.
Punta Arenas N =12m.57s.
Aberdeen iE =12m.16s. and 13m.54s., iPPSE =23m.39s., iE =24m.34s., eSSSE = 31m.39s., iN =34m.54s., eE =38m.9s.
Kew eZ =14m.1s., iS =23m.25s., ePS? =24m.41s., e =27m.0s.
Bergen iZ =12m.50s.
Malaga iPPP =17m.54s.
Granada iS =23m.17s., PS =24m.8s., SS =29m.37s.
Paris iPP =15m.44s., iPPPP =19m.22s., iS =23m.7s., iSP =24m.2s., iSS =28m.44s., iSSS =32m.26s. and many other unidentified i readings.
Kiruna iPP =15m.48s., ePPPE =17m.45s., iPPPZ =17m.50s., ePPP?N =17m.54s., iPSN =23m.47s., iPPSZ =24m.10s., eSSZ =28m.28s., and many other unidentified readings.
Almeria PP =15m.37s., SS =28m.21s.
Alicante PPP =17m.57s., PS =24m.9s., PPS =24m.47s., SS =29m.15s., SSS =32m.45s., Q =34m.45s.
Besançon e =13m.33s. and 13m.52s.
Copenhagen 18m.16s., 19m.54s., iS =23m.42s., SS =29m.4s.
Strasbourg iS =23m.49s., iPS =24m.43s., iSS =29m.34s. and 29m.44s., iQ =35m.51s., and other unidentified readings.
Upsala iE =16m.57s., ePPPE =18m.16s., eS?N =23m.53s., ePSE =24m.59s., eN = 25m.51s., eSS?N =29m.9s., eSS?E =30m.9s., eN =31m.4s., eQN =37·6m.
Stuttgart e =14m.16s.
Helsinki eSEN =24m.9s., eSSN =30m.8s.
Jena eN =13m.10s.?, eEN =13m.23s., eE =16m.19s., ePP?N =16m.40s., eE =18m.17s.
Cheb e =14m.30s. and 17m.24s., eSKS =23m.39s.
Prague e =14m.19s., 14m.51s., and 17m.13s., ePPP? =18m.51s., eSKS =23m.44s., eE = 23m.50s., ePS=25m.3s., eE=25m.24s., ePPS=25m.40s., eSS=30m.4s., eSSS=34m.4s.
Florence iS =24m.25s., iPS =25m.40s.
Triest ePPZ =16m.55s., ePPPZ =19m.2s., iS =24m.24s., iPS? =24m.55s.
Raciborzu ePcPE =12m.58s., ePPPE =18m.6s., eN =25m.10s.
Rome iS =24m.22s., iPS? =25m.44s., SS =30m.56s., SSS =34m.46s.
Ogyalla eN =14m.44s., e =16m.13s., ePP =17m.10s., e =17m.57s., eE =18m.56s.
Skalnate Pleso e =13m.57s. and 23m.40s., ePS =25m.55s., e =29m.10s.
Budapest E =24m.14s.
Tamanrasset eZ =16m.24s., iPPZ =17m.17s., ePPPZ =19m.13s., iZ =19m.49s., ePPSZ = 26m.29s., eSSZ =31m.52s., eSSSZ =35m.34s.?, ePKP,PKPZ =38m.34s.?.
Lwow eSS =30m.46s.
Belgrade eZ =14m.2s., ePPSNW =26m.39s.
Wellington PPPZ =18m.44s., eSKS?Z =24m.6s., SKKS =24m.55s., S =25m.14s., ePS =26m.44s., ePPS =27m.9s., e =28m.14s., PKKP =29m.34s., SS =31m.40s., Q =42·0m.
Moscow iSKKS =24m.30s.
Christchurch ePPPZ =19m.44s., eS =25m.29s., ePSEZ =26m.51s., eE =31m.34s., eSS?NZ =32m.49s., eSSSE =35m.54s., eQN =41m.19s.
Bucharest eN =21m.44s., eE =22m.10s., eN =24m.39s.
Sverdlovsk PPP =20m.12s., iPS =27m.41s., SS =33m.50s.
Istanbul ePSZ =27m.40s.
Irkutsk PPP =20m.55s., PS =28m.27s.?, SS =33m.34s., SSS =37m.34s.
Piatigorsk PS =28m.32s.
Helwan eEN =26m.40s., PSEN =29m.7s., ePPSZ =29m.43s.
Riverview iPSE =29m.33s., iZ =29m.39s., ePPSZ =30m.44s., iSSE =36m.16s., eSSSE = 40m.28s.
Tchimkent iPS =30m.2s.
Frunse iPS =30m.12s., iSS =36m.24s.
Tashkent eSS =36m.18s.
Naryn iPKS =22m.1s., SKKS =27m.12s., iPS =30m.15s.
Mary PKS =22m.18s.
Stalinabad ePS =30m.36s.
New Delhi iPKSN =22m.46s., PPPN =24m.47s., PSN =31m.53s., PPSN =33m.57s., iN =35m.27s., SSN =39m.44s., SSSN =45m.2s.
Calcutta PPE =22m.43s., PPPE =25m.55s., SSSE =46m.7s.
Bombay ePPE =22m.57s., iPKSE =23m.13s., PPPN =25m.54s., PPPE =26m.15s., PPSE =36m.3s., eSSN =41m.11s., iSSE =41m.54s., SSSE =47m.5s.
Poona PKS,EZ =23m.6s., PPPEZ =25m.38s., PKKSEZ =29m.41s., SKSPEZ =33m.2s., SKKKSEZ =36m.49s., SSEZ =41m.36s., SSSEZ =46m.20s.
Long waves were also recorded at Tortosa.

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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Dec. 28d. 15h. 59m. 14s. Epicentre 9°·0S. 71°·0W. Depth of focus 0·100.
(as on 1947, Aug. 6d.).

A = +·3216, B = −·9341, C = −·1554 ; δ = +12 ; h = +7 ;
D = −·945, E = −·326 ; G = −·050, H = +·147, K = −·988.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		5·2	235	i 1 22	−17	(i 2 38)	−19	e 2 23	?	i 2·6
La Paz		8·0	160	i 1 42	−20	i 3 11	−28	i 5 40	?	—
Bogota		13·9	347	i 3 1	+ 4	i 5 37	+19	i 12 33	?	—
Galerazamba		20·1	349	e 4 27	+33	e 7 13	+12	—	—	—
San Juan		27·6	10	i 5 2	+ 2	—	—	i 6 35	pP	—
Tacubaya		39·6	315	i 6 56	+17	—	—	—	—	—
Fayetteville		49·9	336	i 7 59	+ 2	—	—	—	—	—
Weston		51·1	0	i 8 8	+ 2	—	—	—	—	—
Harvard		51·3	0	i 8 8	+ 1	—	—	—	—	—
Ottawa		54·3	356	e 8 31	+ 2	—	—	—	—	—
Shawinigan Falls	N.	55·3	359	e 8 38	+ 2	—	—	—	—	—
Seven Falls	E.	55·9	0	e 8 44	+ 4	—	—	—	—	—
Tucson		55·9	319	i 8 38	− 2	—	—	e 10 41	?	—
Kirkland Lake	Z.	57·5	353	i 8 51a	+ 1	—	—	e 9 34	PcP	—
Palomar	Z.	60·6	317	i 9 10	− 1	i 9 45	PcP	e 11 11	pP	—
Boulder City		60·8	320	e 9 12	0	—	—	—	—	—
Riverside	Z.	61·3	317	i 9 15	0	i 9 47	PcP	e 11 16	pP	—
Pasadena	Z.	62·0	317	i 9 19	− 1	i 9 49	PcP	e 11 19	pP	—
China Lake	Z.	62·5	319	i 9 23	0	—	—	e 11 23	pP	—
Tinemaha	Z.	63·7	319	i 9 31	0	i 9 37	P	i 9 47	PcP	—
Fresno	Z.	64·5	318	e 9 34a	− 2	—	—	—	—	—
Lick	Z.	66·1	318	e 9 44a	− 2	—	—	i 9 59	PcP	—
Berkeley	Z.	66·8	318	e 9 48a	− 2	—	—	i 9 51	P	—
Mineral	Z.	67·7	320	i 9 55	0	—	—	—	—	—
Shasta Dam		68·4	320	i 9 57	− 2	—	—	—	—	—
Hungry Horse		68·5	331	e 10 0	0	—	—	—	—	—
Corvallis	Z.	71·2	324	e 10 16	0	—	—	—	—	—
Victoria		73·5	327	10 30	+ 1	—	—	—	—	—
Tamanrasset	Z.	81·2	65	i 11 10a	0	—	—	i 13 20	pP	—
Resolute Bay		84·8	354	e 11 28a	0	—	—	—	—	—
College		92·5	335	i 12 2	− 1	—	—	i 14 15	pP	—

Dec. 28d. Readings also at 0h. (Akhalkalaki and near Manila), 1h. (near Apia), 2h. (Brisbane, Manila, Poona, Kiruna, Tamanrasset, Bogota, La Paz, near Huancayo, and near Kurmenty), 3h. (Taranto, China Lake, and Mount Wilson), 4h. (near Garm and near Dzhergetal), 6h. (near Klyuchi), 7h. (near Dzhergetal), 8h. (Kimberley), 9h. (Helwan), 11h. (near Tacubaya), 12h. (near Dzhergetal and near Athens (2)), 15h. (Tinemaha, Resolute Bay, Pretoria, Tamanrasset, Abastumanj, near Akhalkalaki, Borzhomi, Erevan, Gori, Goris, Tiflis, Tsikhlis-Dzhvari, near Dzhergetal, and near Manila), 16h. (Resolute Bay, Ksara, Poona, and near Garm), 17h. (Pretoria, Grahamstown, Tamanrasset (2), Poona, Ksara, Resolute Bay (3), and near Apia), 19h. (Kiruna, Poona, and near Manila), 20h. (near Palisades), 21h. (Apia), 22h. (Shawinigan Falls, Seven Falls, and near Ottawa), 23h. (Poona).

Dec. 29d. 10h. Undetermined shock.

Copiapo ePN = 42m.30s., eN = 46m.53s.
Huancayo eP = 43m.51s., eS = 49m.1s., eL = 52m.0s.
La Paz PZ = 44m.6s., PPZ = 45m.2s., SE = 48m.40s., SN = 49m.8s., L = 51m.52s.
Bogota ePE = 46m.12s., iSE = 52m.50s.
Reno ePZ = 48m.39s.a.
Riverside ePZ = 49m.2s.
Pasadena ePZ = 49m.5s.
China Lake ePZ = 49m.14s.
Fresno ePZ = 49m.22s.k.
Tinemaha ePZ = 49m.23s.
Lick iPZ = 49m.29s.a.
Berkeley ePZ = 49m.34s.a.
Mineral iPZ = 49m.46s.k.
Triest eZ = 56m.14s. and 56m.47s.
Stuttgart ePKP?Z = 56m.30s.?.
Poona iZ = 58m.4s.
Christchurch e = 67m.0s.?.

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Dec. 29d. 12h. 53m. 58s. Epicentre 18°·8N. 100°·7W. (as on 1947, Oct. 3d.).
Focus at Base of the Superficial Layers.

A = −·1767, B = −·9307, C = +·3203 ; δ = +2 ; h = +5 ;
D = −·982, E = +·187 ; G = −·060, H = −·315, K = −·947.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Tacubaya		1·6	71	i 0 25a	− 1	i 1 7	+21	—	—
Puebla		2·4	86	e 0 45	+ 7	i 1 11	+ 5	i 1 25	?
Guadalajara		3·0	307	e 0 55	+ 9	i 1 42	+20	—	—
Oaxaca		4·2	115	e 1 1	− 2	i 1 42	−10	i 1 26	?
Vera Cruz		4·4	84	e 1 11	+ 5	e 2 11	+14	i 1 19	?
Lubbock		14·8	356	e 2 34	−55	7 28	+76	—	—
Tucson		16·2	328	e 3 50	+ 3	—	—	—	—
Fayetteville		18·2	17	i 4 15	+ 3	—	—	i 4 21	pP
Palomar	Z.	20·4	320	e 4 38	+ 1	—	—	—	—
Boulder City		21·1	328	i 4 46	+ 2	—	—	i 4 57	pP
Riverside	Z.	21·2	320	i 4 45	0	—	—	—	—
Pasadena		21·8	320	i 4 51	0	—	—	—	—
China Lake	Z.	22·6	324	i 5 0	+ 1	—	—	—	—
Tinemaha	Z.	23·8	324	i 5 12	+ 1	—	—	—	—
Fresno	Z.	24·5	322	e 5 18k	+ 1	—	—	—	—
Lick	Z.	26·0	321	i 5 31a	− 1	—	—	—	—
Reno	Z.	26·4	327	e 5 36k	+ 1	—	—	—	—
Hungry Horse		31·4	344	i 6 20	0	—	—	—	—
Palisades		31·9	40	i 6 25	+ 1	—	—	—	—
San Juan		32·8	85	i 6 33	+ 1	—	—	—	—
Ottawa		33·7	32	i 6 29k	−11	—	—	—	—
Harvard		34·2	40	e 6 43	− 1	—	—	—	—
Weston		34·3	40	i 6 48	+ 3	—	—	—	—
Shawinigan Falls	N.	36·0	34	e 6 56	− 4	—	—	—	—
Seven Falls	E.	37·3	34	e 6 58	−13	—	—	—	—
College		55·6	338	i 9 33	− 2	—	—	—	—
Resolute Bay		56·0	2	e 9 35	− 3	—	—	—	—
Kiruna	Z.	83·7	20	i 12 27k	0	—	—	—	—
Tamanrasset	Z.	97·0	63	e 13 29	− 1	—	—	—	—

Dec. 29d. 14h. 6m. 41s. Epicentre 36°·6N. 68°·7E. (as on 1940, September 1d.).

A = +·2923, B = +·7497, C = +·5936 ; δ = −15 ; h = 0 ;
D = +·932, E = −·363 ; G = +·215, H = +·553, K = −·805.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Kulyab	1·6	33	e 0 21?	− 9	e 0 42?	− 9	—	—
Stalinabad	2·0	1	i 0 39	+ 4	i 1 9	S_g	—	—
Obi-garm	2·2	20	i 0 40	P*	e 1 15	S_g	—	—
Khorog	2·5	69	i 0 41	− 2	i 1 17	S*	—	—
Garm	2·7	27	e 0 47	+ 2	e 1 33	S_g	—	—
Dzhergetal	3·3	36	e 0 55	+ 2	i 1 49	S_g	—	—
Samarkand	3·4	337	e 0 59	P*	1 37	0	1 56	S_g
Fergana	4·5	31	e 1 11	0	e 2 29	S_g	—	—
Andijan	5·0	33	e 1 20	+ 2	i 2 56	S_g	—	—
Mary	5·5	282	—	—	2 51	S*	i 3 12	S_g
Naryn	7·4	47	—	—	i 4 8	S_g	—	—
Frunse	7·8	35	e 1 55	− 3	—	—	—	—
Krasnogorka	8·3	35	i 2 2	− 2	—	—	—	—
Almata II	9·4	42	i 2 17	− 1	—	—	—	—
Przhevalsk	9·5	49	e 2 18	− 2	—	—	—	—
Ili	9·7	38	i 2 21	− 1	—	—	—	—
Kizyl-Arvat	10·1	288	—	—	e 4 30	+ 5	—	—

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Dec. 29d. 19h. 33m. 12s. Epicentre 39°·2N. 70°·7E. (as on 1951, May 2d.).

A = +·2568, B = +·7334, C = +·6295 ; δ = +9 ; h = −1 ;
D = +·944, E = −·331 ; G = +·208, H = +·594, K = −·777.

	Δ	Az.	P.	O − C.	S.	O − C.
	°	°	m. s.	s.	m. s.	s.
Dzhergetal	0·4	88	0 9	P_g	0 19	− 2
Garm	0·4	237	i 0 2	P_g	i 0 5	S_g
Obi-garm	0·9	237	i 0 10	P_g	e 0 21	S_g
Fergana	1·4	31	e 0 26	− 1	i 0 51	+ 5
Kulyab	1·5	209	e 0 28	0	i 0 46	− 3
Stalinabad	1·6	247	i 0 22	− 8	i 0 42	− 9
Khorog	1·9	158	i 0 34	0	i 1 3	S_g
Andijan	2·0	39	e 0 37	+ 2	i 1 9	S_g
Tashkent	2·4	333	e 0 36	− 5	i 1 11?	− 1
Samarkand	2·9	279	0 44	− 4	1 21	− 3
Tchimkent	3·1	345	e 0 54	+ 3	i 1 37	S*
Naryn	4·6	60	e 1 14	+ 2	i 3 9	+62
Frunse	4·7	38	e 1 15	+ 1	2 39	S_g
Krasnogorka	5·2	38	e 1 21	0	—	—
Rybach'e	5·2	50	—	—	e 2 58	S_g
Almata II	6·4	49	e 1 40	+ 2	—	—
Przhevalsk	6·7	58	e 1 38	− 4	—	—
Kurmenty	6·9	54	e 1 47	+ 2	—	—
Mary	7·1	260	—	—	3 6	− 4
Chilisk	7·3	51	e 1 52	+ 2	—	—
Ashkabad	9·8	267	—	—	e 3 1	?

Dec. 29d. 22h. 4m. 5s. Epicentre 20°·4N. 120°·4E. (as on 1945, August 9d.).

A = −·4747, B = +·8090, C = +·3465 ; δ = −12 ; h = +5 ;
D = +·863, E = +·506 ; G = −·175, H = +·299, K = −·938.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		5·8	174	i 1 31	+ 2	e 2 38	0	—	—	—
Hong Kong		6·1	289	1 27	− 7	—	—	(1 59)	P_g	2·0
Saga		15·5	33	e 4 3	PPP	—	—	—	—	—
Muroto		17·7	40	e 4 3	− 7	—	—	—	—	—
Takamatu		18·2	37	e 4 24k	+ 8	e 7 53	+16	—	—	—
Osaka		19·5	39	e 4 34	+ 3	—	—	—	—	—
Hikone		20·4	38	e 4 41	0	—	—	—	—	—
Tu		20·6	41	e 4 18	−25	e 7 29	−60	4 45	P	—
Nagoya		20·7	40	e 4 44	0	—	—	—	—	—
Iida		21·5	40	e 4 58	+ 6	—	—	—	—	—
Toyama		21·9	37	e 4 57	0	e 9 3	+ 9	—	—	—
Matumoto	E.	22·0	39	e 5 2	+ 4	e 9 7	+11	—	—	—
Misima		22·0	42	e 4 57	− 1	—	—	—	—	—
Osima		22·0	43	e 5 4	+ 6	—	—	—	—	—
Hunatu		22·1	41	5 6	+ 7	9 5	+ 7	—	—	—
Matusiro		22·4	38	5 1	− 1	i 9 13	+ 9	5 51	PPP	—
Maebasi		22·8	39	e 5 8	+ 3	e 9 23	+12	e 5 55	PPP	—
Kumagaya		22·9	40	e 5 16	+10	—	—	e 8 56	PcP	—
Mito		23·7	41	e 5 21	+ 7	—	—	—	—	—
Mizusawa		25·8	40	5 37	+ 3	e 5 50	?	5 55	?	—
Djakarta	Z.	29·6	208	i 6 10	+ 1	—	—	—	—	—
Calcutta	E.	29·9	280	e 6 16	+ 4	e 11 19	+10	13 24	SSS	12·9
Irkutsk		34·2	343	e 6 47	− 2	e 12 12	− 4	—	—	—
Hyderabad	N.	39·7	273	—	—	e 13 37	− 3	—	—	—
Colombo	E.	41·5	257	7 47	− 3	14 14?	+ 7	—	—	24·9
Przhevalsk		41·5	311	e 7 50	0	—	—	—	—	—
Kurmenty		41·8	313	i 7 53	0	—	—	—	—	—
Almata II		42·5	313	e 7 58	− 1	—	—	—	—	—
Kodaikanal	E.	42·5	264	(e 7 43)	−16	(e 14 10)	−12	(17 46)	Q	(19·8)
Naryn		42·9	310	i 8 1	− 1	i 14 27	0	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rybach'e		43·1	311	e 8 2	– 2	—	—	—	—	—
Poona		43·8	276	i 8 8	– 1	e 14 33	– 7	9 52	PP	—
Krasnogorka		44·0	312	i 8 11	0	—	—	—	—	—
Frunse		44·3	311	i 8 11	– 2	e 14 42	– 6	—	—	—
Bombay	E.	44·7	277	i 8 15	– 1	i 14 51	– 3	e 10 7	PP	—
Andijan		45·4	307	8 22	0	e 15 5	+ 1	—	—	—
Garm		46·7	305	e 8 31	– 1	—	—	—	—	—
Obi-garm		47·1	305	i 8 33	– 2	i 15 24	– 4	—	—	—
Stalinabad		47·8	305	i 8 37	– 4	—	—	—	—	—
Tashkent		47·8	308	i 8 41	0	i 15 34	– 4	—	—	—
Tchimkent		47·8	309	i 8 39	– 2	i 15 36	– 2	—	—	—
Samarkand		49·3	305	8 51	– 2	—	—	—	—	—
Mary		53·2	303	i 9 25	+ 3	16 56	+ 4	—	—	—
Ashkabad		56·0	303	i 9 41	– 2	e 17 27	– 3	—	—	—
Brisbane	N.	57·1	145	i 9 51k	+ 1	i 17 49	+ 4	—	—	—
Riverview		61·4	152	e 10 26	+ 6	e 18 49	+ 9	e 20 12	ScS	e 29·7
Gori		66·6	308	e 10 54	0	—	—	—	—	—
Borzhomi		67·2	308	e 10 56	– 2	—	—	—	—	—
Piatigorsk		67·2	311	10 54?	– 4	19 47?	– 5	—	—	—
Tsikhlis-Dzhvari		67·2	308	e 11 1	+ 3	—	—	—	—	—
Moscow		69·4	324	11 8	– 4	e 20 13	– 5	—	—	—
Sotchi		69·6	310	e 11 12	– 1	—	—	—	—	—
Theodosia		72·4	312	e 11 30	0	—	—	—	—	—
College		72·5	27	e 11 29	– 1	—	—	—	—	—
Pulkovo		72·6	327	e 11 30	– 1	—	—	—	—	—
Ksara		74·5	300	i 11 41k	– 1	22 11	PPS	—	—	—
Kiruna		75·0	337	i 11 42	– 3	e 21 23	0	i 11 48	PcP	e 38·9
Istanbul	Z.	77·9	309	e 12 0	– 1	—	—	—	—	—
Uzhgorod		80·1	318	12 13	0	—	—	—	—	—
Resolute Bay		82·5	9	i 12 25k	– 1	e 22 43	+ 1	i 12 34	PcP	—
Copenhagen		83·0	328	e 12 26	– 2	—	—	—	—	42·9
Prague		84·3	322	i 12 34k	– 1	—	—	—	—	—
Collmberg		84·6	323	e 12 35	– 1	—	—	—	—	—
Jena		85·6	323	e 12 40?	– 1	e 13 8	?	e 12 45	PcP	—
Triest	Z.	86·7	318	i 12 46	– 1	—	—	e 13 16	?	—
Witteveen	Z.	87·4	327	i 12 50	0	—	—	—	—	—
Stuttgart	Z.	88·0	322	e 12 51	– 2	—	—	—	—	—
Kew		91·7	328	—	—	e 34 55?	SSS	—	—	—
Hungry Horse		96·1	33	i 12 32	–59	—	—	—	—	—
Weston		116·6	9	e 13 7	?	—	—	—	—	—
La Paz	Z.	171·0	66	i 20 15	[+ 5]	i 21 4	PKP_2	i 25 29	PP	—

Additional readings and notes :—
Mizusawa readings given as for local shock.
Kodaikanal eE =(10m.1s.), readings have been increased by 3 minutes.
Poona PPPE =10m.26s., ScPE =13m.29s., PSE =14m.39s., PPSE =14m.59s., SSE = 17m.37s., SSSE =18m.41s.
Bombay iPSEN =14m.59s., iPPSE =15m.10s., SSE =18m.10s., SSN =18m.30s.
Riverview ePSN =19m.10s.
Kiruna eN =25m.8s.
Prague e =13m.7s., 13m.18s., 14m.49s., and 21m.54s.
Long waves were also recorded at Upsala, Potsdam, De Bilt, Rome, Paris, and Palisades.

Dec. 29d. Readings also at 0h. (Ashkabad), 3h. (near Apia), 5h. (near Istanbul), 6h. (Resolute Bay and near Garm), 9h. (Poona, Bombay, New Delhi, near Calcutta, Stuttgart, near Basle, Neuchatel, Zürich, near Almata II, Chilisk, Ili, Kurmenty, and near Apia (2)), 10h. (near Istanbul (2) and near Apia), 11h. (Puebla, Vera Cruz, and near Tacubaya), 12h. (near Garm and near Prague), 13h. (near Garm and near Mizusawa (2)), 14h. (Puebla, Vera Cruz, near Tacubaya, near Dzhergetal (2), near Yalta, near Pretoria, and Pietermaritzburg), 15h. (Bermuda and near Dzhergetal), 16h. (Puebla, near Vera Cruz, and Tacubaya), 17h. (Fergana, Kulyab, near Dzhergetal, Garm, Obi-garm, Khorog, and Stalinabad), 18h. (Manila), 19h. (Tacubaya, Santa Lucia, and near Palisades), 20h. (Copiapo), 21h. (Apia, La Paz, and Huancayo), 22h. (Puebla and Tacubaya), 23h. (Palisades, Fergana, near Dzhergetal, Garm, Obi-garm (2), Khorog, and Stalinabad).

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Dec. 30d. 17h. 42m. 14s. Epicentre 62°·0N. 148°·8W.

Felt at Palmer. Epicentre 62°·5N. 146°·0W. (U.S.C.G.S.).

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial 762, Washington, 1953, p. 18.

A = −·4036, B = −·2445, C = +·8816 ; δ = −11 ; h = −10 ;
D = −·518, E = +·855 ; G = −·754, H = −·457, K = −·472.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		2·9	9	0 54	P*	—	—	—	—	—
Sitka		8·4	120	e 3 2	+56	e 4 38	+53	—	—	—
Victoria		19·6	122	4 36	+ 4	—	—	—	—	—
Resolute Bay		22·5	32	i 5 4a	+ 2	e 9 11	+ 6	i 5 15	pP	e 12·2
Hungry Horse		23·7	109	i 5 15	+ 1	—	—	—	—	—
Shasta Dam		26·6	131	e 5 43	+ 1	—	—	—	—	—
Mineral	Z.	27·2	130	i 5 47k	0	—	—	—	—	—
Reno	Z.	28·6	128	e 6 0a	0	—	—	—	—	—
Lick	Z.	29·9	133	i 6 10a	− 2	—	—	—	—	—
Fresno	Z.	31·1	130	e 6 22a	0	—	—	—	—	—
Tinemaha	Z.	31·4	128	e 6 26	+ 1	—	—	i 6 55	?	—
Boulder City		33·6	125	i 6 45	+ 1	—	—	—	—	—
Pasadena		34·0	130	e 6 47	− 1	—	—	—	—	—
Riverside	Z.	34·4	130	i 6 51	0	—	—	i 7 21	?	—
Tucson		38·4	123	e 7 25	0	—	—	—	—	—
Kirkland Lake	Z.	39·7	78	e 7 36	0	—	—	—	—	—
Scoresby Sund		42·7	24	e 8 1	+ 1	—	—	—	—	—
Ottawa		43·8	77	i 8 8a	− 1	—	—	e 18 24	SS	22·1
Cleveland		44·0	86	e 8 11	0	e 15 7	+24	e 18 6	SS	—
Shawinigan Falls	N.	44·2	73	e 8 12	0	—	—	—	—	—
Seven Falls	E.	44·7	72	e 8 15	− 1	14 48	− 6	10 7	PP	21·1
Harvard		47·9	76	e 8 41	− 1	i 10 8	PP	i 8 52	pP	e 24·3
Palisades		48·0	80	i 8 42	− 1	i 10 21	PP	i 8 53	pP	e 25·7
Fordham		48·1	80	i 8 42	− 1	—	—	—	—	25·4
Weston		48·1	76	i 8 42	− 1	—	—	—	—	e 24·9
Kiruna	Z.	50·2	6	i 8 57	− 3	—	—	—	—	—
Rathfarnham C.	Z.	61·8	25	e 10 16	− 7	e 22 39	SS	e 10 43	?	—
Collmberg	Z.	66·1	13	e 10 50	− 1	—	—	—	—	—
Jena		66·3	14	e 10 52	0	—	—	—	—	—
Paris		67·2	21	i 10 58	0	—	—	—	—	—
Prague		67·5	12	i 11 0	0	—	—	e 11 17	pP	—
Strasbourg		68·2	17	i 11 4k	0	—	—	—	—	—
Stuttgart	Z.	68·2	16	e 11 4	0	—	—	e 11 16	pP	—
Besançon		69·2	19	e 11 10	0	—	—	e 11 22	pP	—
Chur		70·1	17	e 11 15	− 1	—	—	—	—	—
San Juan		70·5	88	i 11 15	− 3	—	—	—	—	—
Granada		77·2	29	11 57k	0	—	—	—	—	—
Istanbul	Z.	77·3	3	e 11 57	− 1	—	—	—	—	—
Malaga		77·5	29	i 12 0	+ 1	—	—	—	—	—
Ksara		84·4	357	i 12 36	0	—	—	e 27 54	SS	—
Huancayo		92·9	110	e 13 15	− 1	—	—	—	—	—
Poona	Z.	92·9	320	i 13 17	+ 1	—	—	i 13 29	pP	—
Tamanrasset	Z.	93·0	24	e 13 16	− 1	—	—	—	—	—
Pretoria	Z.	143·7	5	i 19 32	[− 5]	—	—	—	—	—
Kimberley	Z.	146·5	10	i 19 43	[+ 1]	—	—	—	—	—
Grahamstown	Z.	151·1	8	i 19 55	[+ 6]	—	—	—	—	—

Additional readings :—
Resolute Bay i = 6m.48s., eN = 9m.26s.
Lick iZ = 6m.18s. and 7m.19s.
Seven Falls SSE = 18m.10s.
Palisades i = 10m.9s., e = 22m.59s., iQ = 24m.59s.
Jena eE = 11m.11s., eN = 11m.25s. and 11m.40s., eE = 11m.49s.
Strasbourg e = 11m.11s., i = 11m.17s. and 11m.24s., e = 11m.57s.
Besançon e = 11m.57s.
Long waves were also recorded at Bermuda and Almeria.

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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Dec. 30d. 18h. 21m. 7s. Epicentre 28°·0N. 57°·0E. (as on 1951, Aug. 16d.).

A = +·4816, B = +·7416, C = +·4670 ; δ = 0 ; h = +2 ;
D = +·839, E = −·545 ; 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.
Ashkabad		10·0	6	i 2 30	+ 3	i 4 30	+ 8	—	—	—
Mary		10·4	22	i 2 36	+ 2	—	—	—	—	—
Kizyl-Arvat		11·0	357	i 2 43	+ 1	i 5 0	+13	—	—	—
Baku		13·7	336	i 3 21	+ 3	i 6 3	+11	—	—	—
Samarkand		14·3	33	i 3 24	− 2	—	—	—	—	—
Shemakla		14·4	333	3 29	+ 2	—	—	—	—	—
Stalinabad		14·4	40	i 3 27	0	i 6 12	+ 3	—	—	—
Goris		14·5	325	i 3 30	+ 2	i 6 20	+ 9	—	—	—
Garm		15·6	42	e 3 42	− 1	—	—	—	—	—
Erevan		15·9	323	i 3 50	+ 3	—	—	—	—	—
Tashkent		16·7	34	i 3 55	− 2	—	—	—	—	—
Tiflis		16·9	327	i 4 15	+16	7 37	+30	—	—	—
Bombay		17·1	118	i 4 6	+ 4	i 7 25	+13	4 27	PP	8·2
Fergana		17·3	40	4 4	0	—	—	—	—	—
Tsikhlis-Dzhvari		17·6	324	i 4 12	+ 4	e 7 41	+18	—	—	—
New Delhi		17·8	83	e 4 10	− 1	i 7 29	+ 1	4 24	PP	—
Andijan		17·9	41	e 4 10	− 2	i 7 28	− 2	—	—	—
Poona		18·1	118	i 4 20	+ 6	i 7 46	+11	4 37	PP	8·7
Ksara		19·0	291	i 4 29	+ 3	e 8 9	+14	—	—	—
Piatigorsk		19·5	328	4 32	+ 1	8 8	+ 2	—	—	—
Naryn		20·5	44	i 4 40	− 2	i 8 27	0	—	—	—
Frunse		20·6	40	i 4 41	− 2	i 8 29	0	—	—	—
Sotchi		20·9	323	i 4 47	+ 1	i 8 42	+ 7	—	—	—
Rybach'e		21·2	41	i 4 55?	+ 6	i 8 45?	+ 4	—	—	—
Almata		22·2	41	—	—	i 9 6	+ 6	—	—	—
Almata II		22·4	41	e 5 1	− 1	—	—	—	—	—
Hyderabad		22·4	113	5 11	+ 9	9 16	+12	—	—	11·6
Helwan		22·5	281	5 8	+ 6	i 9 9	+ 4	e 6 15	PP	—
Przhevalsk		22·6	44	5 2	− 1	9 9	+ 2	—	—	—
Ili		22·7	38	e 5 2	− 2	—	—	—	—	—
Theodosia		24·2	321	i 5 19	0	—	—	—	—	—
Yalta		24·6	318	i 5 23	0	—	—	—	—	—
Simferopol		24·9	319	5 26	0	—	—	—	—	—
Istanbul		26·3	307	i 5 41	+ 2	e 10 25	+14	—	—	e 14·9
Sverdlovsk		28·9	4	i 6 1	− 2	e 10 57	+ 4	—	—	—
Kishinev		29·1	319	6 3	− 1	—	—	—	—	—
Colombo	E.	30·2	130	—	—	11 15	+ 2	—	—	16·9
Sofia		30·9	307	e 6 22	+ 2	e 11 22	− 2	—	—	—
Moscow		31·0	339	6 21	0	e 11 31	+ 5	—	—	—
Lwow		33·3	320	i 6 41	0	—	—	—	—	—
Belgrade	N.W.	33·5	310	e 7 27	PP	e 13 17	SS	e 8 56	?	e 16·8
Uzhgorod		33·7	317	i 6 46	+ 1	—	—	—	—	—
Skalnate Pleso		35·2	318	—	—	e 14 10	?	e 14 29	SS	—
Budapest		35·3	315	e 6 58	− 1	e 15 53?	Q	i 8 36	PP	e 21·9
Ogyalla		36·0	315	e 7 33	+28	e 12 44	0	e 8 45	PP	e 18·3
Pulkovo		36·6	339	e 7 16	+ 6	—	—	—	—	—
Raciborzu		36·8	319	i 7 9	− 2	e 13 20	PS	e 8 51	PP	e 18·2
Rome		38·6	303	7 29	+ 3	i 13 22	− 1	e 15 57	SS	e 19·6
Helsinki		38·8	336	e 7 21	− 7	e 13 29	+ 3	e 9 0	PP	—
Prague		39·0	317	7 29a	− 1	e 13 18	−11	e 8 44	PP	e 22·4
Cheb		40·3	316	e 9 35	PcP	e 15 23	?	e 17 42	SSS	—
Collmberg		40·3	318	i 7 41	+ 1	e 13 32	−17	e 9 21	PP	—
Potsdam		40·6	320	i 7 43	0	i 14 12?	ScP	i 16 26?	SS	e 24·9
Jena		41·0	317	e 7 47	+ 1	—	—	—	—	—
Chur		41·4	311	e 7 49a	− 1	e 13 58	− 7	—	—	—
Upsala		41·6	332	i 7 50	− 1	i 17 18	SS	i 9 29	PP	e 23·4
Stuttgart		42·0	314	e 7 53	− 1	e 11 48	?	e 8 40	?	—
Copenhagen		42·1	324	i 7 55	0	—	—	—	—	20·9
Zürich		42·2	311	e 7 56a	0	e 14 6	−11	—	—	—
Irkutsk		42·5	41	7 59?	0	—	—	—	—	—

Continued on next page.

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Basle		42·8	311	e 8 4	+ 3	—	—	—	—	—
Strasbourg		42·9	313	i 8 1a	− 1	—	—	e 9 43	PP	e 22·9
Besançon		43·9	311	i 8 10	0	—	—	e 9 55	PP	—
Witteveen	Z.	44·5	320	e 8 13	− 2	—	—	—	—	—
Kiruna		45·5	343	i 8 20	− 3	e 15 9	+ 4	e 10 18	PP	e 22·3
Paris		46·4	312	i 8 30	0	e 20 38	SSS	e 9 57	PP	e 24·9
Tamanrasset	Z.	46·5	276	i 8 35k	+ 4	e 15 2	−17	e 10 9	PcP	—
Tortosa		47·6	302	e 8 33?	− 6	—	—	—	—	—
Kew		48·5	316	i 8 47	+ 1	—	—	—	—	e 25·9
Granada		51·1	297	i 8 59a	− 7	16 29	+ 5	11 29	PP	29·5
Toledo		51·1	300	i 9 5	− 1	—	—	e 11 6	PP	—
Malaga		51·8	297	i 9 13	+ 1	—	—	—	—	—
Scoresby Sund		60·2	339	e 10 10	− 2	—	—	—	—	—
Pretoria	Z.	60·2	210	i 10 13	+ 1	—	—	—	—	—
Kimberley	Z.	64·3	212	i 10 42	+ 3	—	—	—	—	—
Grahamstown	Z.	67·5	207	i 11 3	+ 3	—	—	—	—	—
Resolute Bay		75·9	353	e 11 47	− 3	e 21 47	+15	e 22 22	ScS	e 38·9
College		85·4	11	i 12 39	− 1	—	—	—	—	—
Ottawa		95·2	329	i 13 38	+11	—	—	—	—	—
La Paz		128·3	270	e 19 25	[+16]	e 38 1	SS	21 32	PP	62·4

Additional readings :—
Bombay SSN = 7m.39s., SSE = 7m.44s.
New Delhi PPPEN = 4m.34s., SSN = 7m.52s., SSSN = 8m.5s.
Poona SSEZ = 8m.14s.
Helwan iN = 9m.29s.
Ogyalla e = 8m.3s. and 8m.25s., ePPP = 9m.20s., e = 10m.7s., eE = 11m.12s.
Raciborzu ePZ = 7m.15s., eN = 8m.26s., ePcS?N = 13m.28s., eScSE = 17m.21s.
Helsinki eZ = 7m.38s., eEN = 9m.10s., ePcSNZ = 13m.18s., eN = 13m.33s.
Prague e = 7m.54s., 8m.23s., 9m.17s., 10m.50s., 14m.25s., and 15m.20s., eSSS = 17m.17s.
Collmberg iEZ = 7m.51s., eZ = 12m.13s.
Jena eE = 7m.50s., 7m.57s., and 8m.13s., eN = 8m.26s., eE = 8m.39s., eN = 8m.42s., eE = 10m.30s. and 11m.38s.
Upsala i = 8m.0s., iPcPE = 9m.38s., eN = 18m.31s.
Strasbourg i = 8m.12s. and 9m.3s., e = 11m.18s. and 13m.53s.?
Besançon i = 8m.26s., e = 8m.53s. and 11m.22s.
Kiruna eE = 10m.28s., eEN = 10m.35s., ePPPE = 11m.2s., eEN = 11m.23s., eSSEN = 18m.29s., eN = 21m.31s.
Paris i = 8m.42s., 8m.45s., 8m.57s., and 9m.7s., ePcP? = 9m.23s.
Tamanrasset ePPZ = 10m.29s., eZ = 13m.56s.
Kew eZ = 9m.0s., 9m.8s., and 9m.19s.
Granada ePcP = 9m.23s.
Toledo i = 9m.19s., e = 10m.48s.
Resolute Bay e = 11m.59s.
Long waves were also recorded at De Bilt, Pavia, Bermuda, and Palisades.

Dec. 30d. 22h. 17m. 52s. (I) } Epicentre 27°·2S. 113°·8W.
22h. 23m. 5s. (II)

A = −·3594, B = −·8149, C = −·4546 ; δ = −11 ; h = +3 ;
D = −·915, E = +·404 ; G = +·183, H = +·416, K = −·891.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Concepción	N.	35·6	114	e 15 5	Q	—	—	—	—	—
II	N.	35·6	114	e 15 32	Q	—	—	—	—	—
I Santa Lucia	N.	37·5	109	—	—	e 12 51	−16	e 15 48	SS	—
I Huancayo		39·1	74	e 7 32	+ 1	e 13 35	+ 4	e 9 8	PP	e 16·8
II		39·1	74	e 7 32	+ 1	e 13 12	−19	e 9 1	PP	i 16·8
I La Paz		43·5	85	i 8 10	+ 3	i 14 38	+ 2	18 0	ScS	—
II		43·5	85	i 8 15	+ 8	i 14 39	+ 3	9 11	PP	—
I La Plata		48·0	113	8 38	− 5	15 44	+ 3	10 50	PP	22·6
II		48·0	113	8 49	+ 6	—	—	—	—	—
II Puebla		48·4	20	e 8 49	+ 3	e 19 3?	SS	—	—	e 24·6
I Tacubaya		48·4	18	e 8 56	+10	—	—	—	—	—
II		48·4	18	e 8 48	+ 2	e 15 57	+11	—	—	—
I Chinchina		48·8	55	8 46	− 3	—	—	—	—	i 23·4
II		48·8	55	i 8 42	− 7	i 15 54	+ 2	—	—	i 23·0
I Vera Cruz		49·2	22	e 9 35	+43	—	—	—	—	—
II		49·2	22	e 9 7	+15	—	—	—	—	—

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.
I Bogota		49·7	56	e 8 57	+ 1	e 14 32	PcS	—	—	i 21·3
II Galerazamba		53·1	50	e 9 16	− 5	e 16 16	−35	—	—	21·9
I Apia		55·5	272	e 9 44	+ 5	—	—	—	—	e 29·4
I Tucson		59·2	3	e 10 5	0	—	—	—	—	—
II		59·2	3	e 10 6	+ 1	e 18 37	+25	—	—	—
I Wellington		59·2	236	i 10 9	+ 4	18 8	− 4	i 30 53	PKKP	—
II		59·2	236	i 10 6	+ 1	e 18 29	+17	22 8	SS	e 27·4
II Auckland	N.	60·0	241	—	—	e 17 35	−48	e 19 29	?	e 26·9
I Christchurch		60·3	233	e 10 14	+ 1	e 18 33	+ 7	—	—	e 27·8
II		60·3	233	e 10 32	+19	18 43	+17	e 22 50	SS	e 28·2
I Palomar	Z.	60·3	357	e 10 14	+ 1	—	—	—	—	—
I Riverside	Z.	61·0	356	e 10 17	− 1	—	—	—	—	—
I Pasadena		61·2	356	i 10 21	+ 2	—	—	—	—	e 28·7
II		61·2	356	i 10 20	+ 1	e 18 45	+ 7	e 25 19	Q	e 28·8
I Lubbock		61·5	12	10 20	− 1	—	—	—	—	—
II		61·5	12	e 10 19	− 2	—	—	—	—	—
I Boulder City		62·8	359	e 10 20	−10	—	—	i 10 30	?	—
II		62·8	359	i 10 31	+ 1	—	—	i 10 51	PcP	—
I Fresno	Z.	63·8	355	e 10 38a	+ 2	—	—	—	—	—
II	Z.	63·8	355	e 10 38a	+ 2	—	—	—	—	—
I Tinemaha	Z.	64·0	357	e 10 40	+ 2	—	—	—	—	—
I Lick	Z.	64·6	353	e 10 40k	− 1	—	—	—	—	—
II	Z.	64·6	353	e 10 37a	− 4	—	—	—	—	—
II San Juan		64·7	51	i 10 40	− 2	—	—	—	—	—
I Berkeley	Z.	65·2	353	e 10 47k	+ 2	—	—	—	—	—
II	Z.	65·2	353	e 10 47a	+ 2	—	—	—	—	—
I Fayetteville		65·6	17	i 10 45	− 3	—	—	—	—	—
II		65·6	17	i 10 42	− 6	—	—	—	—	—
II Fort de France		65·9	57	e 10 50	0	—	—	—	—	—
I Reno		66·6	355	e 10 52k	− 2	—	—	—	—	—
II		66·6	355	e 10 56k	+ 2	—	—	—	—	—
I Shasta Dam		68·0	353	e 11 2	− 1	—	—	—	—	—
I Terre Adélie		70·9	204	e 11 24	+ 3	—	—	—	—	—
II Corvallis	Z.	72·0	354	e 11 27	− 1	—	—	—	—	—
I Butte		72·9	1	e 11 32	− 1	—	—	—	—	—
II		72·9	1	e 11 32	− 1	—	—	—	—	—
I Cleveland		74·6	24	e 11 41k	− 2	e 21 21	+ 3	e 26 28	SS	—
II		74·6	24	e 11 41k	− 2	e 21 26	+ 8	e 11 53	PcP	—
I Hungry Horse		75·2	0	e 11 46	0	—	—	—	—	—
II		75·2	0	i 11 47	+ 1	—	—	—	—	—
II Pennsylvania		75·4	27	e 11 52	+ 5	e 21 29	+ 2	e 16 16	PPP	—
I Bermuda		75·5	41	—	—	i 21 34	+ 6	—	—	—
II		75·5	41	i 11 48	0	i 21 36	+ 8	e 26 36	SS	e 36·2
II Victoria		75·9	354	e 11 51	+ 1	—	—	—	—	—
I Palisades		77·3	30	i 11 59	+ 1	i 21 46	− 2	—	—	—
II		77·3	30	i 11 56	− 2	i 21 47	− 1	i 22 19	PS	e 36·9
I Riverview		79·2	237	e 17 37	PPP	e 22 31	PS	—	—	e 36·8
II		79·2	237	—	—	i 22 23	PS	e 27 30	SS	e 36·7
I Harvard		79·5	30	e 12 10	0	—	—	—	—	e 37·1
II		79·5	30	i 12 11	+ 1	—	—	—	—	e 39·4
I Weston		79·5	30	i 12 11	+ 1	—	—	—	—	—
II		79·5	30	i 12 11	+ 1	e 22 3	− 8	—	—	—
I Ottawa		80·1	26	e 12 11	− 2	22 24	+ 6	e 15 28	PP	—
II		80·1	26	e 12 14	+ 1	22 15	− 3	—	—	—
I Brisbane		80·5	244	e 22 57	PS	—	—	—	—	—
II		80·5	244	e 12 14	− 1	i 22 36	+14	e 17 17	PPP	—
I Kirkland Lake	Z.	80·9	22	e 12 18	+ 1	—	—	—	—	—
II	Z.	80·9	22	e 12 17	0	—	—	—	—	—
II Shawinigan Fls.	N.	82·3	27	e 12 23	− 2	—	—	—	—	—
II Seven Falls	E.	83·5	28	e 12 33	+ 2	22 59	+ 7	—	—	—
II Halifax		84·9	34	—	—	e 23 15	+ 9	—	—	—
I College		95·5	346	e 13 25	− 3	—	—	—	—	—
II		95·5	346	e 13 25	− 3	—	—	—	—	—
II Resolute Bay		102·4	5	e 14 1	+ 2	—	—	e 32 55	SS	e 43·9

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		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Tamanrasset	Z.	125·3	80	e 19 6	[+ 3]	—	—	—	—	—
II	Z.	125·3	80	e 19 3	[0]	e 22 50	PKS	e 21 7	PP	—
II Paris		127·0	48	e 19 3	[– 3]	e 38 28	SS	i 55 7	Q	e 58·9
II Djakarta		128·6	236	i 22 49	PKS	—	—	—	—	e 64·9
II Kiruna		131·0	22	—	—	e 39 9	SS	e 47 55?	Q	e 60·9
II Stuttgart	Z.	131·4	48	e 19 15	[0]	—	—	e 18 7	?	e 66·5
II Collmberg	Z.	133·5	45	e 19 21	[+ 2]	—	—	—	—	—
I Istanbul	Z.	146·6	57	e 19 40	[– 2]	—	—	—	—	—
II	Z.	146·6	57	e 19 47	[+ 5]	—	—	—	—	—
I Helwan	Z.	149·3	77	e 20 10	[+24]	e 36 22	PPS	—	—	—
II	Z.	149·3	77	e 19 55	[+ 9]	e 27 0	[+ 7]	e 23 46	PP	—
I Ksara		153·1	70	e 22 48	PKS	—	—	—	—	—
II		153·1	70	20 8	[+16]	—	—	—	—	—
II Colombo	E.	156·0	214	e 20 15	[+19]	—	—	—	—	e 76·9
II Kodaikanal	E.	160·0	213	e 20 25	[+24]	—	—	—	—	—
I Poona	Z.	168·9	221	i 19 47	[–22]	e 26 41	[–30]	i 25 34	PP	—
II	Z.	168·9	221	e 19 57	[–12]	—	—	i 25 14	PP	—
II Bombay		169·7	218	e 20 49	PKP_2	—	—	e 25 19	PP	—

Additional readings :—
La Paz II iSS = 17m.55s.
La Plata I e = 13m.32s. and 17m.2s., SSEN = 19m.8s., SSSN = 20m.38s.
Vera Cruz II e = 9m.19s., 9m.25s., and 10m.21s.
Wellington II eZ = 13m.32s. and 17m.43s., e = 20m.19s.
Lick II eZ = 10m.41s., iZ = 11m.1s.
Cleveland I eN = 26m.17s.
Pennsylvania II iZ = 12m.47s., eZ = 13m.42s., eN = 25m.26s.
Bermuda II e = 32m.21s.
Palisades II i = 12m.11s.
Riverview II eE = 27m.38s., iN = 27m.54s.
Brisbane II iSS?N = 28m.8s.
Paris II i = 38m.43s.
Helwan I SKPZ = 25m.35s., eZ = 26m.38s.
Poona I iZ = 20m.13s. and 29m.32s.
Long waves were also recorded at Guadalajara, Merida, Santa Clara, and other European stations.

Dec. 30d. Readings also at 0h. (near Apia (2), near Dzhergetal and near Zürich), 1h. (Poona, Ksara, Kiruna, Dzhergetal, near Garm, Khorog, Obi-garm, and near Djakarta), 3h. (Copiapo), 4h. (near Istanbul), 5h. (Oaxaca, Vera Cruz, near Puebla, and Tacubaya (2)), 6h. (Kiruna, near Almata II, near Ili, and near Copiapo), 7h. (near Akhalkalaki), 8h. (near Garm), 10h. (Bombay, Poona, and Bucharest), 13h. (Naryn, near Almata II, Chilisk, Przhevalsk, and near Dzhergetal), 14h. and 16h. (near La Paz), 19h. (Grahamstown), 20h. (near Brisbane (2)), 21h. (Ashkabad and near Brisbane (3)), 22h. (Tacubaya), 23h. (near Istanbul and near Collmberg).

Dec. 31d. 3h. 9m. 45s. Epicentre 35°·3N. 25°·2E.

Felt in Crete. Intensiy IV at Rethymnon, Heraclion, Merambelo, Hierapetra, Sitia, and Neapolis. Epicentre as adopted (Strasbourg).

A. Galanopoulos.
Seismo. Institute Bulletin, Athens, for 1951, p. 31.

A = + ·7401, B = + ·3483, C = + ·5752 ; δ = – 8 ; h = 0 ;
D = + ·426, E = – ·905 ; G = + ·520, H = + ·245, K = – ·818.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·9	336	i 0 57	P_g	i 1 31	S*	—	—	—
Istanbul		6·5	27	e 1 38	– 1	e 3 7?	+12	—	—	—
Helwan	Z.	7·5	135	1 52	– 1	3 12	– 8	—	—	e 3·5
Sofia		7·5	349	e 1 53	0	—	—	—	—	—
Ksara		8·9	96	—	—	i 3 39	–16	e 15 44	ScS	—
Raciborzu	Z.	15·6	343	e 3 32	–11	—	—	e 3 47	PP	—
Prague		16·7	335	i 3 57	0	e 7 2	– 1	i 4 55	PP	e 7·7
Zürich		17·3	318	i 4 6a	+ 2	—	—	—	—	—
Stuttgart	Z.	17·9	323	e 4 11	– 1	—	—	—	—	—
Collmberg	Z.	18·3	334	e 4 14	– 3	—	—	e 4 25	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.
Jena		18·5	331	e 4 18	– 1	—	—	—	—	—
Strasbourg		18·5	321	i 4 21k	+ 2	—	—	e 4 41	PP	—
Besançon		18·7	315	i 4 22	0	—	—	—	—	—
Tamanrasset	z.	21·2	239	e 4 54	+ 5	—	—	i 5 11	PP	e 10·5
Paris		21·5	315	i 4 51	– 1	—	—	i 5 5	PP	—

Additional readings :—
Prague e = 6m.19s.
Jena eE = 4m.26s., eN = 4m.31s.
Strasbourg e = 5m.5s.
Besançon e = 4m.27s. and 4m.58s.
Paris i = 5m.1s.

Dec. 31d. 20h. 5m. 45s. Epicentre 13°·0N. 90°·0W. Focus at Base of Superficial Layers. (as on 1951, April 2d.).

A = ·0000, B = – ·9747, C = + ·2235 ; δ = –1 ; h = +6 ;
D = –1·000, E = ·000 ; G = ·000, H = – ·224, K = – ·975.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		7·7	302	e 1 59	+ 6	e 3 22	+ 2	—	—	—
Merida		7·9	3	e 2 3	+ 8	i 3 31	+ 6	i 3 45	SS	4·0
Vera Cruz		8·5	317	e 2 11	+ 7	e 3 42	+ 2	e 4 0	SS	—
Puebla		9·9	308	i 2 40	PP	i 4 33	+19	—	—	—
Tacubaya		10·9	307	e 2 43	+ 6	i 4 57	+18	—	—	—
Columbia		22·5	19	i 4 59	+ 1	—	—	—	—	—
Tucson		27·0	319	e 5 41	0	e 11 39	SS	—	—	—
Huancayo		28·8	148	e 6 0	+ 3	e 11 8	+25	—	—	—
Cleveland		29·3	13	i 6 1k	– 1	e 11 59	SS	i 6 55	PP	—
Palisades		31·3	25	i 6 17	– 2	—	—	—	—	e 15·2
Palomar	z.	31·8	315	i 6 24	0	—	—	—	—	—
Boulder City		32·0	321	i 6 25	0	—	—	—	—	—
Riverside	z.	32·5	316	i 6 29	– 1	—	—	—	—	—
Pasadena		33·1	316	i 6 45	+10	—	—	—	—	—
Ottawa		34·5	18	i 6 45k	– 2	—	—	—	—	—
Tinemaha	z.	34·8	319	i 6 51	+ 1	—	—	—	—	—
Fresno	z.	35·6	318	e 6 55a	– 1	—	—	—	—	—
Kirkland Lake	z.	36·0	11	e 6 58	– 2	—	—	—	—	—
La Paz		36·4	142	e 6 39	–24	—	—	—	—	18·4
Lick	z.	37·2	317	e 7 8a	– 2	—	—	—	—	—
Reno		37·3	322	i 7 11a	0	—	—	—	—	—
Butte		38·0	335	e 7 17	0	—	—	—	—	—
Mineral	z.	38·9	321	e 7 23a	– 1	—	—	—	—	—
Shasta Dam		39·6	321	e 7 27	– 3	—	—	—	—	—
Hungry Horse		40·5	336	i 7 36	– 1	—	—	i 9 40	PPP	—
Corvallis	z.	42·4	326	e 7 51	– 2	—	—	—	—	—
Victoria		44·9	330	8 12	– 1	—	—	—	—	—
Resolute Bay		61·7	359	e 10 13a	– 4	—	—	—	—	—
College		64·9	337	i 10 35	– 3	—	—	—	—	—
Tamanrasset	z.	90·0	67	e 12 59	+ 2	—	—	—	—	—

Additional readings :—
Vera Cruz eS = 3m.45s.
Cleveland eN = 11m.31s.
Long waves were also recorded at Manila, Galerazamba, Guadalajara, Fort de France, Bermuda, and Granada.

Dec. 31d. Readings also at 1h. (Istanbul, Sofia, Tacubaya, and near Copiapo), 5h. (Tacubaya), 7h. (near Tananarive), 8h. (near Dzhergetal), 10h. (near Garm), 11h. (near Almata II (2)), 12h. (Collmberg, Stuttgart, Tamanrasset, near Alicante, Huancayo, La Paz, and near Bogota), 13h. (Ashkabad), 16h. (Merida, Puebla, Tacubaya, Vera Cruz, near Alicante, and near Apia), 17h. (Auckland, Collmberg, near Alicante, and near Apia (2)), 18h. (Merida, Puebla, Tacubaya, and Vera Cruz), 20h. (Fort de France, Algiers Univ., near Dzhergetal, Seven Falls, Shawinigan Falls, and near Ottawa), 22h. (Chinchina), 23h. (Hong Kong, Manila, Nanking, and Poona).

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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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Villaseñor, A., and E.R. Engdahl, *A digital hypocenter catalog for the International Seismological Summary,* Seism. Res. Lett., vol. 76, no. 5, pp. 554-559, 2005.

Villaseñor, A., E.A. Bergman, T.M. Boyd, E.R. Engdahl, D.W. Frazier, M.M. Harden, J.L. Orth, R.L. Parkes, and K.M. Shedlock*, Toward a comprehensive catalog of global historical seismicity,* Eos Trans. AGU, vol. 78, no. 50, pp. 581, 583, 588, 1997.