The International Seismological Summary.

1946 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 1946 contains 110 epicentres, 73 of which are repetitions from previous determinations.

Cases of abnormal focal depth are noted below :—

Oct.	3d.	12h.	36·4N.	141·1E.	0·005
	8d.	13h.	25·5S.	178·5E.	0·090
	9d.	20h.	25·5S.	67·0W.	Base of Superficial Layers.
	13d.	23h.	23·3S.	66·4W.	0·025
	15d.	6h.	18·5S.	169·1E.	0·020
	22d.	10h.	14·5S.	167·6E.	0·020
	24d.	8h.	18·4S.	177·7W.	0·080
	25d.	21h.	54·0N.	159·2E.	0·010
	28d.	11h.	26·0S.	70·2W.	Base of Superficial Layers.
Nov.	2d.	14h.	37·8N.	142·2E.	Suggested Deep.
	2d.	18h.	41·8N.	71·7E.	,, ,,
	3d.	18h.	45·7N.	26·8E.	0·010
	5d.	6h.	25·5S.	67·0W.	0·020
	10d.	12h.	31·5S.	68·6W.	0·015
	17d.	2h.	7·5S.	129·0E.	0·015
	18d.	2h.	22·3S.	179·2W.	0·080
	22d.	2h.	15·7N.	99·5W.	0·025
	28d.	15h.	18·1S.	175·2W.	0·040
	30d.	0h.	15·5N.	91·7W.	0·040

		°	°	
Dec.	1d. 13h.	35·5N.	140·4E.	Suggested Deep.
	7d. 17h.	15·5S.	167·1E.	0·015
	10d. 7h.	43·5N.	139·1E.	0·025
	10d. 10h.	37·3N.	141·3E.	0·010
	10d. 16h.	22·3S.	179·2W.	0·090
	17d. 22h.	20·5S.	177·5W.	0·080
	19d. 2h.	24·1N.	123·1E.	0·010
	21d. 17h.	33·7N.	135·8E.	Suggested Deep.
	21d. 19h.	42·2N.	148·5E.	0·005
	21d. 20h.	42·2N.	148·5E.	0·005
	21d. 23h.	Undetermined Shock		Suggested Deep.
	22d. 2h.	,,	,,	,, ,,
	22d. 17h.	38·6N.	142·5E.	0·010
	26d. 8h.	33·7N.	136·2E.	Suggested Deep.
	26d. 16h.	11·0S.	118·0E.	0·010

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.

May, 1955.

1946 OCTOBER, NOVEMBER, DECEMBER.

Oct. 1d. Readings at 0h. (near Fort de France), 2h. (near Stalinabad), 3h. (Boulder City, Overton, and Pierce Ferry), 4h. (Boulder City, Pierce Ferry, Tucson, Mount Wilson, Pasadena, Palomar, Riverside, and near La Paz), 5h. (Ksara, Collmberg, near Fort de France and near Pierce Ferry), 6h. (Bombay, Stalinabad (2), Tashkent (2), Ksara (2), and Collmberg (2)), 7h. (Boulder City and Overton), 8h. (Andijan near Stalinabad and Obi-garm), 9h. (Pierce Ferry, Tucson, and near Copiapo), 10h. (Auckland, Christchurch, Arapuni, Wellington, Riverview, Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, Overton, Pierce Ferry, Ksara, and Strasbourg), 11h. (Boulder City and De Bilt), 12h. (Bombay), 14h. (Tucson and near La Paz), 15h. (Collmberg, San Juan, near Obigarm, Andijan, Samarkand, Stalinabad, and Tashkent), 17h. (near Collmberg and near Mizusawa), 18h. (Shasta Dam, Tucson, Collmberg, and Riverview), 19h. (Shasta Dam, Lick, near Santa Clara, Berkeley, Branner, Fresno, and near Andijan), 20h. (Bombay and Calcutta), 23h. (Boulder City and near Lick).

Oct. 2d. 4h. 46m. 6s. Epicentre 52°·4N. 158°·7E. (as on 1946 Sept. 13d.).

$A = -\cdot5708$, $B = +\cdot2226$, $C = +\cdot7903$; $\delta = -6$; $h = -6$;
$D = +\cdot363$, $E = +932$; $G = -\cdot736$, $H = +\cdot287$, $K = -\cdot613$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		12·6	229	e 3 3	0	5 17	− 9	5 41	SS	8·2
Sapporo		14·9	238	e 3 38	+ 4	7 4	+44	—	—	8·8
Mori		16·0	237	e 3 50	+ 2	7 17	SS	i 4 22	PPP	—
Mizusawa	E.	18·0	229	4 15	+ 2	7 25	− 7	—	—	—
Sendai		18·8	227	i 4 23	0	7 53	+ 3	—	—	—
Vladivostok		20·2	252	i 4 32	− 7	i 7 47	−34	—	—	—
Mito		20·6	226	4 43	0	8 30	+ 1	—	—	—
Wazima		21·4	233	e 4 56	+ 5	8 36	− 9	—	—	—
Tokyo		21·5	225	c 4 50	− 2	i 8 52	+ 5	—	—	—
Yokohama		21·7	225	4 56	+ 1	e 8 50	− 1	—	—	—
Hunatu		22·1	227	5 0	+ 1	9 0	+ 2	—	—	—
Hikone		23·4	230	5 9	− 2	9 17	− 4	—	—	12·6
Kobe		24·4	231	e 5 19	− 2	9 44	+ 5	—	—	13·2
Sumoto		24·8	231	e 5 23	− 2	9 34	−12	—	—	—
Hukuoka		27·7	237	5 50	− 2	10 29	− 4	—	—	13·4
College		29·5	43	e 6 13	+ 5	e 10 59	− 3	—	—	e 13·0
Irkutsk		32·6	292	6 36	+ 1	11 47	− 4	—	—	—
Sitka		36·9	55	e 7 16	+ 4	i 13 3	+ 5	e 7 29	pP	e 15·3
Honolulu		45·6	115	—	—	e 15 4	− 2	(e 18 47)	SS	e 18·8
Victoria		47·5	61	8 53	+15	15 38	+ 4	10 53	PP	20·9
Grand Coulee		50·2	59	i 8 58	− 2	e 16 10	− 1	—	—	—
Sverdlovsk		52·2	315	i 9 15	0	16 31	− 8	—	—	—
Shasta Dam		52·9	68	i 9 20	0	e 16 48	0	i 9 32	pP	—
Ukiah		53·5	70	—	—	e 16 54	− 3	e 20 46	SS	e 22·9
Saskatoon		53·7	49	8 50	−36	16 21	−38	20 0	SS	23·9
Butte		54·8	57	e 9 35	+ 1	e 17 20	+ 6	e 19 47	S_eS	e 23·6
Berkeley		54·9	71	i 9 43	+ 8	i 17 12	− 4	—	—	e 24·7
Branner		55·2	71	e 9 48	+11	e 17 22	+ 2	—	—	—
Santa Clara		55·4	71	e 9 53	+15	e 17 24	+ 2	—	—	e 26·1
Lick	N.	55·6	71	e 9 51	+11	e 17 12	−13	—	—	—
Bozeman		55·8	57	e 9 53	+12	e 17 27	− 1	e 21 26	SS	e 23·9
Andijan		57·1	294	e 10 0	+10	—	—	—	—	—
Fresno	N.	57·1	70	e 10 0	+10	—	—	—	—	—
Scoresby Sund		57·4	0	9 54	+ 1	17 50	+ 1	18 11	PPS	23·9
Tinemaha		57·7	69	e 9 59	+ 4	e 17 58	+ 5	—	—	—
Logan		58·1	61	e 10 0	+ 2	e 18 1	+ 3	e 19 49	S_eS	e 23·8
Tashkent		58·4	297	e 9 57	− 3	—	—	—	—	—
Haiwee		58·6	69	i 10 2	+ 1	e 18 2	− 2	—	—	—
Santa Barbara	Z.	58·7	72	i 10 15	+13	—	—	—	—	—
Salt Lake City		58·8	62	e 10 4	+ 2	e 18 8	+ 1	e 21 50	SS	e 24·9
Pasadena		59·8	71	i 10 9	0	i 18 19	− 1	i 10 23	pP	e 25·1
Mount Wilson		59·9	71	i 10 9	− 1	e 18 21	0	i 10 21	pP	—
Obi-garm		60·0	294	e 10 8	− 3	—	—	—	—	—
Overton		60·3	67	i 10 12	− 1	—	—	—	—	—
Riverside		60·4	71	e 10 13	0	e 18 25	− 3	i 10 24	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		60·5	68	i 10 13	− 1	i 18 29	0	i 10 25	pP	—
Stalinabad		60·6	295	i 10 14	− 1	—	—	—	—	—
Calcutta	N.	60·6	268	e 10 11	− 4	e 18 18	−12	—	—	—
Samarkand		60·8	297	e 10 21	+ 5	—	—	—	—	—
Pierce Ferry		60·8	67	i 10 16	0	—	—	i 12 47	PP	—
Rapid City		60·9	54	e 10 21	− 4	i 18 14	−20	e 14 22	PPP	e 25·3
Palomar	Z.	61·2	71	i 10 19	0	e 18 35	− 3	i 10 31	pP	—
La Jolla	Z.	61·3	72	e 10 20	0	—	—	—	—	—
Helsinki		61·8	236	i 10 22	− 1	i 18 40	− 6	e 20 5	S_cS	e 29·4
Moscow		61·8	326	e 10 22	− 1	i 18 44	− 2	10 43	pP	—
New Delhi	N.	62·9	282	e 10 25	− 5	e 18 45	−15	i 14 57	PPP	34·0
Denver		63·1	59	e 10 32	0	e 19 11	+ 9	—	—	—
Upsala		63·8	339	10 36	0	19 5	− 6	13 16	PP	e 28·9
Ivigtut		64·7	14	10 41	− 1	19 21	− 1	—	—	30·9
Bergen		65·5	345	e 10 50?a	+ 3	e 19 28	− 4	—	—	32·2
Tucson		65·5	68	e 10 46	− 1	e 19 30	− 2	i 11 1	pP	e 26·6
Grozny		68·5	313	i 11 31	+25	—	—	—	—	—
Copenhagen		68·7	340	i 11 7a	0	i 20 9	− 1	13 37	PP	33·9
Aberdeen		69·7	348	i 11 9	− 5	i 20 16	− 6	e 27 19	SSS	e 34·4
Warsaw		69·8	332	i 11 14a	0	e 20 23	0	e 15 20	PPP	e 33·9
Hyderabad	N.	70·5	272	11 16	− 2	20 18	−14	—	—	—
Sotchi		70·9	316	e 11 17	− 4	—	—	—	—	—
Leninakan		71·4	313	e 11 42	+18	—	—	—	—	—
St. Louis		71·4	49	e 11 23	− 1	i 20 39	− 3	i 11 36	pP	—
Erevan		71·6	311	e 11 36	+11	—	—	—	—	—
Potsdam	E.	71·7	338	e 11 26	0	—	—	—	—	e 34·9
Durham		71·9	347	11 26	− 1	20 43	− 5	—	—	—
Ottawa		72·0	37	11 25	− 3	20 42	− 7	25 24	SS	32·9
Seven Falls		72·2	32	11 28	− 1	20 45	− 6	16 24	PP	33·9
Yalta		72·3	321	e 11 30	+ 1	—	—	—	—	—
Collmberg		72·7	337	e 11 32	0	—	—	e 14 12	PP	e 34·3
Bombay		72·8	277	i 11 31	− 1	e 20 54	− 4	—	—	33·9
Jena	N.	73·4	338	e 11 35	− 1	e 21 0	− 5	—	—	—
De Bilt		73·5	343	i 11 38a	+ 2	e 21 6	0	e 14 24	PP	e 35·9
Prague		73·5	335	e 11 9	−27	e 21 6	0	—	—	e 32·9
Cheb		74·0	338	e 11 40	+ 1	e 21 10	− 1	e 16 16	PPP	e 37·9
Budapest		74·7	332	11 48	+ 5	e 21 19	0	—	—	37·9
Uccle		74·9	343	e 11 35a	− 9	e 21 20	− 2	e 14 30	PP	e 34·9
Bucharest		75·3	326	e 11 48	+ 1	e 21 51	+25	—	—	33·9
Kalossa		75·6	332	e 11 54?	+ 6	—	—	—	—	—
Stuttgart		75·9	339	e 11 53	+ 3	e 21 24	− 8	—	—	e 37·9
Harvard		76·0	35	i 11 50	− 1	—	—	—	—	e 42·4
Westou		76·2	35	i 11 52	0	e 21 29	− 7	—	—	e 40·4
Strasbourg		76·4	340	e 11 53a	0	e 21 37	− 1	e 14 44	PP	e 38·2
Fordham		76·6	38	e 11 52	− 2	e 21 34	− 6	—	—	—
Kodaikanal	E.	76·6	269	e 10 44	−70	e 20 59	−41	—	—	37·6
Belgrade		76·7	330	e 11 57	+ 2	e 22 27	+46	e 17 4	PPP	40·9
Philadelphia		76·8	39	e 11 54	− 1	e 21 26	−16	e 14 57	PP	—
Georgetown		77·0	40	e 11 56	0	e 21 40	− 5	—	—	—
Washington		77·0	40	e 12 4	+ 8	e 21 33	−12	e 27 36	SS	—
Paris		77·1	343	i 11 58a	+ 1	i 21 44	− 2	12 45	pP	e 36·9
Zagreb		77·1	333	e 11 57a	0	e 21 42	− 4	—	—	e 38·9
Istanbul		77·2	322	i 11 59	+ 2	e 21 1	−46	—	—	—
Basle		77·4	340	e 11 58	0	e 21 48	− 1	—	—	—
Zürich		77·4	339	e 11 56a	− 2	e 21 44	− 5	—	—	—
Chur		77·7	338	e 12 1	+ 1	—	—	—	—	e 42·2
Sofia		77·7	327	e 12 3	+ 3	22 6	+14	e 17 54	PPPP	31·9
Triest		77·8	335	e 12 5?	+ 4	e 21 45	− 8	e 12 23	pP	e 37·2
Colombo	E.	77·8	265	e 18 44	?	—	—	—	—	39·2
Neuchatel		78·1	340	e 12 3	+ 1	—	—	—	—	—
Columbia		79·4	46	—	—	e 22 6	− 4	—	—	e 33·3
Brisbane	N.	79·7	184	—	—	i 22 4	− 9	—	—	—
Clermont-Ferrand		80·0	342	i 12 14	+ 1	i 22 17	0	e 17 0	PPP	39·9
Ksara		80·7	314	i 12 17	+ 1	22 35	+11	15 23	PP	—
Rome		81·6	335	i 12 22a	+ 1	i 22 28	− 5	e 15 28	PP	e 36·8

Continued on next page,

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Barcelona	84·4	342	—	—	23 21	+20	—	—	e 44·4
Tortosa	85·2	343	e 13 18	+39	23 8	− 1	16 20	PP	—
Helwan	86·1	315	i 12 45k	+ 1	23 32	+14	16 27	PP	—
Riverview	86·1	185	e 12 45	+ 1	i 23 13	− 5	e 23 1	SKS	e 39·9
Toledo	86·9	346	12 47	− 1	i 23 33	+ 7	16 18	PP	40·8
Bermuda	87·4	35	e 12 56	+ 6	e 23 20	−10	c 16 44	PP	e 36·4
Alicante	87·8	343	e 12 56	+ 4	i 23 34	0	16 22	PP	e 42·5
Lisbon	88·6	350	12 55k	− 1	23 45	+ 3	24 50	PS	41·9
Algiers	88·7	340	e 11 54	−63	e 22 54?	−49	—	—	—
Granada	89·4	346	i 13 5a	+ 5	i 23 54	+ 5	13 29	pP	45·6
Arapuni	91·3	166	—	—	e 24 18	+12	e 30 18	SS	43·9
Wellington	94·3	167	24 18	SKS	24 44	+12	30 44	SS	42·9
Christchurch	96·3	169	13 41	+ 9	24 54	+ 5	24 4	SKS	44·9
Huancayo	121·1	68	e 30 26	PS	e 36 40	SS	e 41 40	SSS	e 52·1
La Paz	128·7	62	19 12	[+ 2]	—	—	22 34	PKS	63·9

Additional readings :—
Mizusawa SN =7m.29s.
Tokyo e =6m.43s.
Sitka iPP? =8m.49s., e =13m.54s.
Victoria SS =18m.54s.?
Grand Coulee i =9m.5s., e =16m.34s.
Shasta Dam esS =17m.15s.
Butte eSS =21m.39s.
Branner eN =10m.0s.
Logan i =10m.7s., 10m.29s., and 19m.24s.
Salt Lake City e =19m.46s.
Pasadena iSZ =18m.10s., e =22m.12s.
Overton i =10m.31s.
Rapid City i =19m.1s.
Palomar eSE =18m.40s.
Helsinki e =19m.8s., eSS =23m.5s., eSSS =26m.4s.
New Delhi iN =19m.15s., and 24m.15s.
Upsala eE =20m.17s., eSS =23m.32s., eSSSE =26m.37s., eSSSN =26m.41s.
Ivigtut 20m.41s.
Tucson i =12m.5s., ePP =13m.24s., i =21m.8s., eSS =23m.46s., ePKP,PKP =39m.28s.
Copenhagen 11m.34s., PPP =15m.30s. and 20m.33s., S_cS =21m.0s., SS =24m.40s., SSS =26m.54s.
Aberdeen iE =20m.38s., eN =29m.9s.
Warsaw ePN =11m.17s., eP_cP?Z =11m.31s., ePSE =20m.48s., PPSZ =21m.1s., eSSE = 28m.10s.
Hyderabad eN =10m.13s.
St. Louis iZ =11m.29s., iP_cP?Z =11m.40s., ePPZ =14m.21s., isSE =21m.5s., iE = 21m.33s., iS_cS?E =21m.57s., eE =24m.58s., eSSSE =28m.46s.
Seven Falls SS =30m.11s.
Collmberg iEZ =11m.38s., iZ =12m.3s., eE =14m.23s., eZ =14m.41s., eN =14m.54s., eE =14m.58s.
Bombay S?N =21m.9s.
De Bilt iZ =12m.4s. and 12m.23s., eSS =25m.48s.
Cheb eSS =26m.8s., eSSS =30m.24s.
Budapest eE =21m.22s., iE =22m.31s.
Uccle eSSE =26m.9s.?
Weston e =21m.54s.
Strasbourg eP_cP =12m.12s., e =18m.35s., eS_cS =22m.2s., ePPS =22m.29s., eSS = 26m.49s.
Philadelphia eS_cS =22m.11s., eSS? =26m.23s., eSSS =30m.0s.
Washington e =12m.14s.
Paris iPP =14m.52s., eSS =26m.58s., e =28m.14s. and 32m.52s., eQ =34·9m.
Zagreb eP =12m.0s.,
Zürich e =14m.19s.
Triest eSS =27m.11s.
Rome ipPN =13m.14s., ePS?N =23m.1s., eSSE =27m.49s.?
Tortosa S_cSN =23m.31s., SSE =29m.13s.
Helwan SKS =23m.3s., eS =24m.18s.
Riverview iSKKSN =23m.8s., iN =23m.29s., eSSEN =28m.43s., eQE =36m.36s.
Toledo P_cPZ =12m.50s., SKSEN =23m.21s., iSEN =23m.45s., SSEN =29m.45s.
Bermuda eSS =29m.5s.
Alicante PPP =18m.23s., SKS =23m.24s., PS =24m.38s., PPS =25m.14s., SS =29m.34s., SSS =33m.38s.
Lisbon Q =33·9m.
Granada PP =16m.23s., PPP =18m.47s., SKS =22m.56s., PS =24m.52s., i =27m.8s., iSS =29m.38s., i =31m.37s., SSS =33m.53s.
Wellington SSS =33m.54s.
Christchurch PS =25m.56s., SS =31m.34s.
Long waves were also recorded at Auckland.

Oct. 2d. 5h. North Pacific, but not repetition of shock at 4h.

Mizusawa PE =48m.43s., SE =51m.21s.
Grand Coulee iP =53m.57s.
Shasta Dam iP =54m.19s., eS =61m.36s.
Tinemaha iPEN =54m.54s.
Haiwee iPZ =54m.59s.
Mount Wilson iPZ =55m.6s.
Pasadena iPZ =55m.7s.
Overton iP =55m.7s.
Boulder City iP =55m.9s.
Riverside iPZ =55m.9s.
Pierce Ferry iP =55m.12s., i =55m.52s.
Palomar iPZ =55m.14s., eZ =57m.44s.
Tucson iP =55m.41s., e =57m.20s.
Collmberg iPZ =55m.54s., eZ =55m.58s. and 56m.8s.
St. Louis iPZ =56m.11s.

Oct. 2d. 6h. 43m. 14s. Epicentre 52°·4N. 158°·7E. (as at 4h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		12·6	229	3 13	+10	5 14	−12	—	—	—
Sapporo		14·9	238	c 3 40	+ 6	c 6 58	+38	—	—	8·2
Mori		16·0	237	c 3 45	− 3	—	—	—	—	—
Mizusawa		18·0	229	e 4 11	− 2	c 7 46	+14	—	—	—
Sendai		18·8	227	4 21	− 2	7 52	+ 2	—	—	9·6
Vladivostok		20·2	252	i 4 30	− 9	i 8 6	−15	—	—	—
Kakioka		20·8	225	4 40	− 5	8 16	−17	—	—	—
Wazima		21·4	233	e 4 49	− 2	8 49	+ 4	—	—	—
Tokyo		21·5	225	4 49	− 3	—	—	—	—	—
Yokohama		21·7	225	4 52	− 3	c 8 45	− 6	—	—	—
Hunatu		22·1	227	4 55	− 4	8 53	− 5	—	—	—
Hikone		23·4	230	5 8	− 3	9 19	− 2	—	—	12·0
Osaka		24·3	231	5 19	− 1	9 43	+ 6	5 34	pP	—
Kobe		24·4	231	i 5 18	− 3	9 42	+ 3	—	—	13·2
Hukuoka		27·7	237	5 48	− 4	10 24	− 9	—	—	13·2
College		29·5	43	e 6 12	+ 4	e 10 53	− 9	—	—	e 13·4
Irkutsk		32·6	292	6 35	0	11 54	+ 3	—	—	—
Sitka		36·9	55	i 7 15	+ 3	i 13 4	+ 6	i 7 28	pP	e 15·8
Honolulu		45·6	115	—	—	e 14 59	− 7	—	—	e 19·9
Victoria		47·5	61	8 38	0	15 39	+ 5	10 53	PP	23·8
Grand Coulee		50·2	59	i 9 0	0	i 16 10	− 1	i 9 10	pP	—
Sverdlovsk		52·2	315	i 9 15	0	16 31	− 8	—	—	—
Shasta Dam		52·9	68	i 9 20	0	e 16 49	+ 1	i 9 31	pP	—
Ukiah		53·5	70	e 9 52	+28	e 16 59	+ 2	e 20 57	SS	e 22·9
Saskatoon		53·7	49	8 50	−36	16 26	−33	20 31	SS	25·8
Butte		54·8	57	e 9 35	+ 1	e 17 15	+ 1	—	—	e 23·9
Berkeley		54·9	71	i 9 32	− 3	i 17 14	− 2	—	—	e 25·6
Branner		55·2	71	e 9 46	+ 9	e 17 18	− 2	e 10 9	pP	—
Santa Clara		55·4	71	e 9 49	+11	e 17 16	− 6	—	—	e 26·4
Lick	N.	55·6	71	e 9 39	− 1	e 17 25	0	—	—	—
Bozeman		55·8	57	e 9 47	+ 6	i 17 29	+ 1	e 21 25	SS	e 23·8
Andijan		57·1	294	e 9 56	+ 6	e 17 58	+13	—	—	—
Fresno	N.	57·1	70	e 9 48	− 2	17 40	− 5	e 12 13	PP	—
Scoresby Sund		57·4	0	i 9 55	+ 2	17 50	+ 1	18 15	PPS	24·8
Tinemaha		57·7	69	e 9 56	+ 1	e 17 52	− 1	—	—	—
Logan		58·1	61	i 10 2	+ 4	i 18 4	+ 6	i 12 6	PP	e 28·6
Tashkent		58·4	297	e 9 56	− 4	e 17 55	− 7	—	—	—
Haiwee		58·6	69	e 10 1	0	e 17 59	− 5	—	—	—
Santa Barbara		58·7	72	e 10 12	+10	e 18 7	+ 1	—	—	—
Salt Lake City		58·8	62	e 10 4	+ 2	e 18 9	+ 2	e 20 5	ScS	e 24·5
Pasadena		59·8	71	i 10 9a	0	i 18 20	0	i 10 20	pP	e 25·1
Mount Wilson		59·9	71	i 10 9a	− 1	e 18 21	0	i 10 20	pP	—
Obi-garm		60·0	294	10 15	+ 4	—	—	—	—	—
Overton		60·3	67	i 10 13	0	i 18 30	+ 4	i 10 24	pP	—
Riverside	Z.	60·4	71	e 10 12	− 1	—	—	e 10 22	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		60·5	68	i 10 14	0	i 18 30	+ 1	i 10 24	pP	—
Stalinabad		60·6	295	i 10 14	− 1	i 18 23	− 7	—	—	—
Pierce Ferry		60·8	67	i 10 17	+ 1	e 18 7	−26	i 10 41	pP	—
Rapid City		60·9	54	i 10 20	+ 3	i 18 37	+ 3	e 14 30	PPP	e 25·4
Palomar		61·2	71	i 10 18a	− 1	i 18 39	+ 1	i 10 29	pP	—
La Jolla		61·3	72	e 10 29	+ 9	e 18 38	− 1	—	—	—
Moscow		61·8	326	e 10 23	0	e 18 40	− 6	e 10 43	pP	—
Helsinki		61·8	236	i 10 23	0	i 18 41	− 5	e 20 6	S_eS	e 29·8
New Delhi	N.	62·9	282	i 10 27	− 3	i 19 17	+17	e 15 1	PPP	34·0
Denver		63·1	59	e 10 33	+ 1	i 18 16	−46	—	—	—
Upsala		63·8	339	i 10 35	− 1	19 7	− 4	19 33	PS	e 29·8
Ivigtut		64·7	14	i 10 42	0	19 22	0	20 49	PPS	31·8
Bergen		65·5	345	10 47a	0	19 31	− 1	24 1	SS	—
Tucson		65·5	68	i 10 47	0	e 19 29	− 3	i 10 58	pP	e 27·0
Copenhagen		68·7	340	i 11 8	+ 1	i 20 8	− 2	13 41	PP	33·8
Aberdeen		69·7	348	i 11 12	− 2	i 20 21	− 1	e 29 6	SSS	e 36·2
Warsaw	E.	69·8	332	e 11 7	− 7	e 20 19	− 4	e 21 13	S_eS	e 34·1
	N.	69·8	332	e 11 18	+ 4	e 20 23	0	—	—	e 34·1
	Z.	69·8	332	i 11 15a	+ 1	e 20 15	− 8	e 14 2	PP	e 34·1
Hyderabad	N.	70·5	272	11 20	+ 2	21 15	PS	21 33	PPS	36·0
Sotchi		70·9	316	e 11 18	− 3	—	—	—	—	—
Leninakan		71·4	313	e 11 36?	+12	—	—	—	—	—
St. Louis		71·4	49	i 11 23	− 1	i 20 40	− 2	i 11 34	pP	—
Erevan		71·6	311	e 11 19	− 6	—	—	—	—	—
Potsdam	E.	71·7	338	e 11 24	− 2	e 21 13	PS	—	—	e 34·8
Durham		71·9	347	11 29	+ 2	20 46	− 2	—	—	—
Ottawa		72·0	37	11 26	− 2	20 42	− 7	14 8	PP	32·8
Seven Falls		72·2	32	11 24	− 5	20 45	− 6	15 23	PPP	32·8
Yalta		72·3	321	e 11 28	− 1	—	—	—	—	—
Collmberg		72·7	337	i 11 32	0	e 20 54	− 3	e 14 6	PP	—
Bombay		72·8	277	i 11 31	− 1	20 54	− 4	—	—	31·8
Jena		73·4	338	e 11 36	0	e 21 1	− 4	—	—	—
De Bilt		73·5	343	i 11 39a	+ 3	e 21 8	+ 2	i 14 24	PP	e 36·8
Prague		73·5	335	e 11 35?	− 1	e 21 3	− 3	—	—	e 35·8
Cheb		74·0	338	—	—	e 21 14	+ 3	e 29 2	SSS	e 40·8
Budapest		74·7	332	i 11 45	+ 2	e 21 12	− 7	21 46?	PS	e 40·8
Uccle		74·9	343	e 11 46a	+ 2	e 21 21	− 1	e 14 35	PP	e 36·8
Bucharest		75·3	326	e 11 43	− 4	—	—	—	—	—
Kalocsa		75·6	332	e 11 46?	− 2	—	—	—	—	—
Stuttgart		75·9	339	e 11 51	+ 1	e 21 31	− 1	—	—	—
Harvard		76·0	35	i 11 51	0	—	—	—	—	e 42·8
Weston		76·2	35	i 11 52	0	e 21 46	+10	e 26 42	SS	—
Strasbourg		76·4	340	e 11 54a	+ 1	e 21 37	− 1	e 12 8	pP	e 39·0
Fordham		76·6	38	i 11 54	0	i 21 36	− 4	—	—	—
Kodaikanal	E.	76·6	269	e 11 53	− 1	e 22 8	+28	—	—	38·8
Belgrade		76·7	330	i 11 54	− 1	e 21 35	− 6	—	—	e 41·8
Philadelphia		76·8	39	e 11 54	− 1	i 21 38	− 4	e 14 49	PP	—
Georgetown		77·0	40	i 11 57	+ 1	21 42	− 3	12 17	pP	—
Washington		77·0	40	e 11 59	+ 3	e 21 45	0	e 29 39	SSS	—
Paris		77·1	343	i 11 59a	+ 2	i 21 42	− 4	i 14 50	PP	e 36·8
Zagreb		77·1	333	e 11 57	0	e 21 44	− 2	—	—	e 43·8
Istanbul		77·2	322	i 11 59	+ 2	e 21 1	−46	—	—	—
Basle		77·4	340	i 12 0a	+ 2	e 21 51	+ 2	—	—	—
Zürich		77·4	339	i 11 56a	− 2	e 21 42	− 7	e 12 17	pP	—
Chur		77·7	338	i 12 1a	+ 1	—	—	—	—	—
Sofia		77·7	327	e 12 1	+ 1	e 21 51	− 1	e 22 57	PPS	—
Triest		77·8	335	e 11 52	− 9	e 21 48?	− 5	e 12 37	pP	e 37·4
Colombo	E.	77·8	265	12 1	0	—	—	—	—	36·6
Neuchatel		78·1	340	i 12 4	+ 2	—	—	—	—	—
Columbia		79·4	46	—	—	e 22 6	− 4	e 27 54	SS	e 34·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	N.	79·7	184	—	—	e 21 59	−14	—	—	—
Clermont-Ferrand		80·0	342	i 12 14	+ 1	i 22 18	+ 1	i 15 16	PP	41·8
Florence	E.	80·2	336	i 12 11	− 3	i 21 53	−26	—	—	—
Ksara		80·7	314	i 12 17	+ 1	22 35	+11	15 23	PP	—
Rome		81·6	335	i 12 22a	+ 1	i 22 31	− 2	13 2	pP	e 37·3
Barcelona		84·4	342	e 12 36	0	23 2	+ 1	—	—	e 31·2
Tortosa		85·2	343	e 12 50	+11	23 6	− 3	16 20	PP	—
Helwan		86·1	315	e 12 44	0	i 23 10	− 8	i 24 34	PS	—
Riverview		86·1	185	e 12 46	+ 2	e 23 11	− 7	i 23 3	SKS	e 39·8
Toledo		86·9	346	i 12 46	− 2	i 23 24	− 2	16 13	PP	41·5
Bermuda		87·4	35	e 12 56	+ 6	i 23 26	− 4	e 16 21	PP	e 35·9
Alicante		87·8	343	e 13 0	+ 8	i 23 36	+ 2	16 18	PP	e 44·1
Lisbon		88·6	350	12 57	+ 1	23 42	0	—	—	—
Algiers		88·7	340	e 12 46	−11	23 19	[− 6]	e 14 46	PP	—
Granada		89·4	346	13 6k	+ 6	i 23 45	− 4	13 42	pP	42·2
Wellington		94·3	167	—	—	24 41	+ 9	24 14	SKKS	43·1
Christchurch		96·3	169	13 29	− 3	24 44	− 5	23 54	SKS	44·8
Huancayo		121·1	68	20 37	PP	e 37 1	SS	e 30 21	PS	e 51·6
La Paz	z.	128·7	62	e 19 10	[0]	—	—	—	—	65·8

Additional readings :—
Mizusawa SN =7m.50s.
Osaka PP =5m.57s., P_cP =8m.20s., SS =10m.37s.
Sitka ePP =8m.44s., ePPP =9m.12s., esS =13m.33s.
Victoria SS =18m.46s.?
Grand Coulee iP_cP =10m.5s., isS =16m.34s.
Shasta Dam i =9m.48s., esS =17m.13s.
Butte e =17m.43s. and 19m.48s.
Logan i =10m.13s., 10m.23s., 18m.27s., and 20m.4s.
Mount Wilson iZ =10m.25s.
Overton i =11m.22s., e =13m.12s.
Riverside iZ =10m.29s.
Pierce Ferry iPP? =12m.25s.
Rapid City i =19m.0s., eSS =22m.38s.
Palomar iZ =10m.34s., eE =19m.2s.
Helsinki e =19m.9s.
Upsala SN =19m.3s., eSS?E =23m.13s., eSS?N =23m.42s.?, eSSSE =26m.42s.?, eSSSN = 26m.51s.
Tucson iP_cP =11m.24s., ePP =13m.2s., ePPP =14m.43s., iS =19m.32s., i =19m.57s., e =22m.30s. and 23m.4s., eSS =23m.56s., ePKP,PKP =39m.25s.
Copenhagen 16m.10s., 20m.37s., S_cS =20m.55s., SS =24m.41s., SSS =28m.16s.
Warsaw eP_cP?Z =11m.33s., ePPPZ =15m.35s., eE =19m.59s., ePSZ =20m.35s., PPSZ =20m.48s., iEZ =21m.1s., iS_cS?Z =21m.22s., eSS?E =24m.21s., eSSZ = 24m.59s., eSSSE =27m.5s.
St. Louis iP_cP? =11m.38s., iPPZ =14m.19s., iZ =16m.1s., isSE =21m.5s., eSSE = 25m.15s., eSSSE =28m.18s.
Ottawa SSN =25m.28s., SSS =27m.46s.?
Seven Falls SS =28m.46s.?
Collmberg eZ =11m.47s. and 12m.35s., eN =14m.21s., eSE =20m.23s.
De Bilt ePPP =16m.10s., eSS =25m.46s.
Cheb e =30m.8s. and 38m.46s.?
Weston eS =21m.59s.
Strasbourg eP_cP =12m.14s., ePP =14m.54s., ePPP =16m.31s., ePS =22m.13s., eSS = 26m.47s., ePKKP =30m.43s.
Belgrade e =13m.6s. and 13m.56s.
Philadelphia eS_cS =22m.18s., e =25m.31s., eSSS =30m.14s.
Washington e =12m.12s.
Paris i =12m.42s., eSS =26m.34s., e =31m.43s. and 32m.54s.
Sofia eEN =18m.4s.
Triest ePP =15m.3s., eSS =26m.48s.
Rome ePPE =15m.27s., ePS?E =23m.33s., eSSE =27m.58s.
Tortosa P_cPN =13m.3s., PPPE =17m.55s., S_cSEN =23m.26s., PSE =23m.50s., SSE = 28m.33s.
Helwan i =13m.22s.
Riverview iN =23m.29s., eQE =36m.34s.
Toledo P_cPZ =12m.52s., SKSN =23m.17s.
Bermuda eSS =29m.4s.
Alicante PPP =18m.9s., SKS =23m.16s., PS =24m.52s., PPS =25m.20s., SS =29m.16s., Q =37m.8s.
Lisbon E =37m.28s.
Granada iPP =16m.18s., PPP =18m.33s., iS =24m.0s., PS =25m.39s., SS =31m.28s.
Christchurch PS =25m.50s., SS =31m.29s.
Long waves were also recorded at Arapuni and Auckland.

Oct. 2d. Readings also at 0h. (San Juan and Shasta Dam), 1h. (Collmberg, Scoresby Sund and Tucson (2)), 3h. (Almeria, Malaga, and near Granada, intensity V-VI at Tistutin and Segangan. Résumen de las Observaciones solares, Meteorológicas y sismológicas efectuadas durante el año, 1946, Vol. 34 A., Tortosa, 1948, p. 208), 4h. (near Bogota), 5h. (Boulder City and Collmberg), 6h. (Shasta Dam), 7h. (Boulder City and Pierce Ferry), 11h. (Brisbane and Riverview), 12h. (Auckland, Christchurch, Wellington, St. Louis, Uccle, Ksara, Andijan, Obi-garm, Tashkent, Sverdlovsk, and Stalinabad), 13h. (Uccle and Boulder City), 15h. (Andijan, Samarkand, near Obigarm, and Stalinabad), 17h. (near Bucharest), 18h. (Toledo), 22h. (La Paz and Pierce Ferry), 23h. (Boulder City, Pierce Ferry, and Tucson).

Oct. 3d. 4h. Undetermined Shock.
Irkutsk P =36m.21s., eS =40m.41s.
Samarkand eP =40m.0s.
Shasta Dam eP =40m.34s.
Overton eP =41m.24s. and e =41m.51s.
Pierce Ferry eP =41m.27s.
Riverside ePZ =41m.31s.
Mount Wilson ePZ =41m.32s.
Palomar ePZ =41m.38s.
Tucson e =42m.1s.
Belgrade e =59m.18s. and 60m.12s.
Ksara eP? =61m.8s., eS? =65m.5s.
Warsaw eE =62m.0s., eLE =64m.0s.
Long waves were also recorded at Cheb, Prague, Rome, De Bilt, Copenhagen, Strasbourg, and Paris.

Oct. 3d. 6h. 39m. 45s. Epicentre 7°·0S. 149°·0E. (as on 1939, January 22d.).

$A = -·8508$, $B = +·5112$, $C = -·1211$; $\delta = -15$; $h = +7$;
$D = +·515$, $E = +·857$; $G = +·104$, $H = -·062$, $K = -·993$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	N.	20·7	170	i 4 41	− 3	i 8 47	+16	e 5 8	PP	—
Riverview		26·8	176	i 5 49a	+ 5	i 10 36	+17	i 6 40	PP	e 13·5
Wellington		41·1	150	i 7 29	−18	i 13 36	−25	i 9 27	PP	27·5
Vladivostok		52·3	345	e 9 15	0	—	—	—	—	—
Irkutsk		70·2	333	e 11 9	− 8	e 20 28	0	—	—	—
Bombay		79·3	291	—	—	e 22 30	+21	—	—	—
Andijan		84·5	312	e 12 43	+ 7	23 17	+15	—	—	—
Stalinabad		86·7	310	e 12 48	+ 1	i 23 37	+13	—	—	—
Tashkent		86·9	312	e 12 50	+ 2	e 23 37	+11	e 24 5	S_cS	—
Sverdlovsk		94·9	327	—	—	e 24 37	0	23 55	SKS	—
Mount Wilson	Z.	96·3	56	i 13 17	−15	—	—	—	—	—
Riverside	Z.	96·9	56	e 13 12	−22	—	—	—	—	—
Ksara		113·0	303	e 19 38	PP	e 29 21	PS	30 30	PPS	—
St. Louis	E.	118·2	50	e 25 23	SKS	e 26 46	(−15)	e 29 23	PS	e 58·5
Budapest	N.	121·4	322	—	—	e 38 43	SSP	—	—	—
Triest		125·5	323	i 39 34?	?	41 34	SSS	—	—	—
De Bilt		126·1	333	e 20 59	PP	—	—	—	—	e 70·3
Stuttgart	Z.	126·3	328	e 19 0	[− 5]	—	—	—	—	—
Rome		128·2	319	e 21 12	PP	e 38 47	SSP	e 35 47?	?	—

Additional readings :—
Riverview eZ =6m.13s., iPPN =6m.43s., iN =11m.0s., eQN =11m.45s., eSSN =12m.4s.
Wellington i =8m.14s., Q =23m.3s.
St. Louis eE =34m.52s.
Long waves were also recorded at Arapuni, Auckland, Pasadena, Tucson, Uccle, Paris, Strasbourg, Clermont-Ferrand, and Alicante.

Oct. 3d. 7h. 17m. 9s. Epicentre 46°·0N. 26°·0E.

$A = +·6265$, $B = +·3056$, $C = +·7170$; $\delta = -2$; $h = -3$;
$D = +·438$, $E = -·899$; $G = +·644$, $H = +·314$, $K = -·697$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bucharest		1·6	178	e 0 24	− 6	i 0 45	− 6	—	—	—
Sofia		3·8	211	e 1 0	− 1	i 1 39	− 8	i 1 44	S_g	—
Belgrade		4·1	254	i 0 27	−38	i 1 14	−41	i 1 56	SS	—
Budapest	E.	5·0	291	e 1 26	P*	e 2 1	−18	—	—	2·9
	N.	5·0	291	e 1 42	P_g	i 2 17	− 1	2 33	S*	2·9

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		5·4	155	e 0 27?	−57	e 0 42?	S*	—	—	—
Yalta		5·9	100	e 1 19	−12	i 2 15	−25	—	—	—
Warsaw		7·0	335	e 2 5	P*	e 3 8	0	e 3 29	SSS	e 3·9
Zagreb		7·0	275	e 1 50	+ 4	e 3 45	S_g	—	—	—
Florence	E.	10·7	264	i 3 1	PPP	—	—	—	—	—
Jena	N.	10·8	302	—	—	e 5 18	SSS	—	—	—
Chur		11·4	280	e 2 49	+ 2	—	—	—	—	—
Stuttgart		11·9	289	e 2 52	− 2	—	—	—	—	—
Zürich		12·1	283	e 2 54	− 3	—	—	i 3 3	PP	e 7·3
Moscow		12·2	33	2 58	0	e 4 57	−19	—	—	—
Basle		12·7	284	e 3 11	+ 6	—	—	—	—	—
Strasbourg		12·7	288	e 3 5	0	e 6 17	+49	e 3 11	PP	—
Copenhagen		12·9	324	3 6	− 1	e 7 24	L	—	—	(e 7·4)
Neuchatel		13·2	282	e 3 8	− 3	—	—	—	—	—
Grozny		14·3	92	e 3 21	− 5	—	—	—	—	—
Ksara		14·3	145	e 3 14	−12	e 5 16	−50	—	—	—
Uccle		15·1	296	e 3 37a	+ 1	—	—	—	—	—
Clermont-Ferrand		15·6	277	i 3 48	+ 5	—	—	i 4 28	PPP	—
Paris		16·2	289	e 3 49	− 1	e 6 51	0	—	—	—
Sverdlovsk		23·9	51	e 5 7	− 9	—	—	—	—	—
Stalinabad		32·2	88	e 6 35	+ 3	—	—	—	—	—

Additional readings :—
Belgrade i = 0m.52s.
Warsaw eN = 2m.16s., eE = 3m.12s.
Strasbourg e = 3m.26s. and 7m.56s.
Long waves were also recorded at Kew, Malaga, and Alicante.

Oct. 3d. 12h. 2m. 4s. Epicentre 36°·4N. 141°·1E. Depth of focus 0·005.
(as on 1942, November 15d.).

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

Intensity IV at Tukubasan and Mito ; II-III at Onahama and Sendai. Seismo. Bull. Cent. Met. Obs., Japan, 1946, Tokyo, 1951, p.24. Macroscismic radius 200-300 km.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mito		0·5	268	0 28	+15	1 19	+56	—	—
Onahama		0·6	343	0 10a	− 4	0 22	− 4	—	—
Kakioka		0·8	257	−0 13	?	0 2	?	—	—
Tukubasan		0·8	257	−0 11	?	0 12	?	—	—
Utunomiya		1·0	279	0 14	− 5	0 26	− 7	—	—
Tokyo		1·3	237	0 18	− 5	0 48	+ 8	—	—
Hukusima		1·4	339	0 24a	0	0 46	+ 3	—	—
Kumagaya		1·4	260	0 23a	− 1	0 40	− 3	—	—
Yokohama		1·5	231	0 15a	−11	0 42	− 3	—	—
Maebasi		1·6	270	0 26k	− 1	0 48	+ 1	—	—
Mera		1·8	215	0 30	0	0 57	+ 5	—	—
Sendai		1·9	355	0 30k	− 1	0 58	+ 4	—	—
Hunatu		2·1	245	0 32	− 2	1 0	+ 1	—	—
Misima		2·2	234	0 33	− 2	1 0	− 2	—	—
Nagano		2·3	277	0 38a	+ 1	0 59	− 5	—	—
Shizuoka		2·6	237	0 39	− 2	1 20	+ 8	—	—
Mizusawa	N.	2·9	0	0 45	0	1 39	+20	—	—
Omaesaki		3·0	232	0 48	+ 1	1 11	−11	—	—
Toyama		3·2	275	0 51	+ 2	1 46	+19	—	—
Morioka		3·3	1	0 53	+ 2	1 36	+ 7	—	—
Nagoya		3·5	250	0 55	+ 1	1 30	− 4	—	—
Hikone		4·1	255	1 1	− 1	2 5	+16	—	—
Kameyama		4·1	249	1 3	+ 1	2 3	+14	—	—
Kyoto		4·6	254	1 9	0	2 18	+16	—	—
Owase		4·6	242	1 16	+ 7	2 10	+ 8	—	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Osaka	4·9	252	1 45	+32	2 50	?	—	—
Sumoto	5·5	250	1 25	+ 4	2 54	+30	—	—
Mori	5·7	356	1 25	+ 1	2 44	+15	—	—
Andijan	52·7	298	e 9 9	− 1	—	—	—	—
Tashkent	54·7	299	e 9 26	+ 1	—	—	—	—
Sverdlovsk	55·5	319	9 32	+ 1	e 17 43	+34	—	—
Stalinabad	56·0	296	e 9 34	0	e 17 38	+22	—	—
Samarkand	56·9	298	e 9 38	− 3	—	—	—	—
Shasta Dam	71·7	53	e 11 17	0	—	—	—	—
Overton	79·2	53	e 12 4	+ 4	—	—	—	—
Boulder City	79·3	54	e 12 0	0	—	—	—	—
Pierce Ferry	79·7	53	e 12 2	0	—	—	—	—
Ksara	81·3	306	e 12 13	+ 2	e 23 29	PS	e 15 23	PP
Tucson	84·2	54	e 12 27	+ 1	—	—	—	—

Long waves were also recorded at Rome, Copenhagen, Cheb, Warsaw, De Bilt, Uccle, Granada, Alicante, Clermond-Ferrand, Strasbourg, and Paris.

Oct. 3d. 15h. 37m. 39s. Epicentre 39°·5N. 44°·0E.

A = +·5566, B = +·5375, C = +·6335; δ = +3, h = −1;
D = +·695, E = −·719; G = +·458, H = +·440, K = −·774.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Erevan		0·8	29	0 19	P_g	0 33	S_g	—	—	—
Grozny		4·1	19	e 1 16	P*	—	—	—	—	—
Piatigorsk		4·6	353	—	—	e 2 31	S_g	—	—	—
Ksara		8·6	232	e 2 14	+ 5	e 4 46	S_g	—	—	—
Yalta		8·9	307	e 3 46	S	(e 3 46)	− 9	—	—	—
Istanbul		11·5	282	i 2 27	−21	e 5 12	+13	—	—	—
Bucharest		14·2	296	3 21	− 3	—	—	—	—	—
Helwan		14·2	231	e 3 27	+ 3	6 9	+ 5	3 45	PPP	e 8·1
Moscow		16·8	348	e 3 58	0	7 10	+ 5	i 4 1	P	—
Samarkand		17·7	82	e 4 5	− 5	—	—	—	—	—
Belgrade		18·2	295	(e 4 39)	PP	(e 7 38)	+ .1	(e 8 12)	SSS	—
Stalinabad		19·3	84	i 4 27	− 2	—	—	—	—	—
Tashkent		19·3	76	e 4 24	− 5	—	—	—	—	—
Warsaw		20·3	318	e 4 41a	+ 1	e 8 45	+22	5 6	PP	e 11·4
Sverdlovsk		20·5	27	i 4 44	+ 2	e 8 30	+ 3	—	—	—
Andijan		21·7	78	e 4 56	+ 1	—	—	—	—	—
Triest		23·0	297	e 5 9	+ 2	i 9 33	+19	e 6 1	PPP	—
Prague		23·3	308	e 5 22	+12	e 8 51	−29	e 10 21?	SSS	e 16·4
Helsinki		23·9	337	i 5 21	+ 5	e 9 54	+24	i 5 27	pP	e 12·4
Rome		24·0	287	e 5 17	0	i 9 36	+ 4	e 10 26	SS	—
Cheb		24·6	307	—	—	e 9 56	+14	e 10 51	SSS	e 18·4
Collmberg		24·6	310	—	—	e 10 1	+19	e 11 2	SSS	—
Florence	E.	24·8	292	e 4 53	−32	—	—	—	—	i 15·0
Upsala		26·3	330	—	—	e 10 36	+25	e 10 48	SS	e 14·4
Copenhagen		26·4	320	6 47	PPP	10 44	+32	—	—	14·4
Zürich		26·7	300	e 5 42a	− 1	—	—	—	—	—
Strasbourg		27·4	303	—	—	e 10 50	+22	e 11 57	SS	—
New Delhi	N.	29·4	102	—	—	i 10 54	− 7	—	—	—
Uccle		29·8	308	—	—	e 10 3	−64	—	—	e 19·7
Bergen	N.	31·8	326	—	—	e 13 21	SS	—	—	e 17·9
Bombay		32·2	122	e 6 28	− 4	e 12 33	+48	—	—	—
Toledo	z.	36·6	287	e 7 4	− 6	—	—	—	—	—
Irkutsk		42·7	52	—	—	e 15 16	+52	—	—	—
Vladivostok		63·1	55	10 34	+ 2	—	—	—	—	—

Additional readings and note:—
Helwan e = 6m.36s.
Belgrade e = (6m.52s.); readings increased by 2m.
Warsaw PZ = 4m.45s., ePN = 4m.48s., PPN = 5m.14s., SSE = 9m.16s., SSZ = 9m.34s., SSN = 9m.46s.
Strasbourg e = 11m.4s. and 11m.9s.
Long waves were also recorded at De Bilt, Paris, and Tortosa.

Oct. 3d. 15h. South West Pacific. New Hebrides.

Brisbane iPN =40m.50s., iPPN =41m.4s., iSE =44m.30s., eSN =44m.34s., iLEN = 45m.50s.
Auckland P_cP =41m.46s., PPP =42m.49s., P_cS =45m.44s., S =46m.39s., sS? =47m.40s., S_cS =50m.6s., Q =50·8m.
Wellington P =41m.50s., P_cPZ =43m.16s., sPPZ =44m.0s., e =44m.22s., P_cS =47m.3s., S =48m.58s., e =51m.10s., Q =53·5m.
RiverviewiP =41m.59s., ipP =42m.25s., iP_cPE =45m.23s., iSEN =46m.20s., i =46m.33s., iEN =46m.56s., isSN =47m.7s., isSE =47m.11s., eQN =47·5m., iSSN =47m.41s., iSSSE =48m.4s., eRZ =48·2m., iN =48m.42s., $iP_cS?E$ =49m.11s.
Christchurch P =42m.43s., S =47m.46s., R =51m.28s.
Istanbul ePKP =44m.30s., eSKS =51m.56s., some error in the time.
Berkeley ePNZ =49m.0s., eSNZ =60m.26s., eLE =74·9m.
Palomar eZ =49m.16s. and 49m.36s.
Riverside eZ =49m.17s.
Pierce Ferry eP =49m.22s.
Mount Wilson eZ =49m.32s.
Boulder City iP =49m.34s.
Tucson eP? =49m.36s., e =52m.4s., eSKS =60m.26s., e =61m.34s., eSS =67m.9s., eL =76m.38s.
Calcutta eN =49m.50s., iS?N =60m.15s.
St. Louis eE =51m.24s., iE =64m.54s., eE =65m.48s., 66m.6s., and 70m.51s., eLE = 86·2m.
Strasbourg ePKP? =56m.2s., e =56m.6s., ePP =59m.3s., eL =100m.0s.
Paris ePKP? =56m.4s., iPP =59m.14s., ePKS? =60m.0s., iPPP? =62m.0s., eSKS? = 64m.8s., eSKKS =66m.30s., e =67m.14s., eL =110m.0s.
Clermont-Ferrand iPKP =56m.10s., iPP =59m.32s., L =122m.0s.
Toledo PZ =56m.25s.
Tortosa PKPN =56m.26s., PKP_2N =57m.33s.
Granada iPKP =56m.30s.a, pPKP =56m.51s., PKP_2 =57m.35s., $pPKP_2$ =58m.23s., SKP =60m.2s., sSKP =60m.29s., iPP =60m.47s., pPP =61m.11s., SKS =63m.15s., sSKS =63m.44s., pPPP =64m.50s., SKKS =66m.56s., SKSP =70m.26s., PPS = 74m.4s., SS =80m.17s., sSS =80m.53s., SSP =81m.47s., SSS =87m.41s., L = 112m.12s.
Rome iPKPZ =56m.58s., PS =67m.52s., ePPSZ =69m.32s., eL =96m.32s.
Ksara e =57m.33s. and 82m.58s.
Alicante PKP =57m.39s., PKP_2 =57m.51s., PKS =61m.23s., PP =61m.27s., SKS = 64m.45s., PPP =65m.9s., SKKS =68m.31s., eL =119m.17s.
Bermuda e =59m.5s. and 71m.8s., eL =100m.25s.
Sitka e =59m.21s., 61m.10s., and 72m.2s., eL =73m.32s.
Copenhagen 59m.25s., 60m.18s., SKS =63m.32s., SKKS =64m.41s., 70m.15s.,96m.0s.
College e =59m.37s., 60m.18s., and 72m.9s.
Kodaikanal eE =60m.15s.
Bozeman eSKS? =60m.27s., ePS =62m.22s., e =66m.10s., eL =82m.15s.
Pasadena eZ =60m.42s., eLZ =75m.24s.
Salt Lake City e =61m.27s., eL =75m.24s.
Bucharest 65m.0s.
Triest e =77m.30s.
Long waves were also recorded at Arapuni, Honolulu, Uccle, De Bilt, Prague, Warsaw, Cheb, Upsala, Helsinki, Tananarive, Harvard, Philadelphia, Rapid City, and Santa Clara.

Oct. 3d. Readings also at 3h. (Granada), 6h. (Kew and Christchurch), 7h. (Malaga near Stalinabad), 8h. (Kew), 11h. (Belgrade), 13h. (Pierce Ferry), 14h. (near Erevan), 16h. (Triest), 17h. (Granada and Boulder City), 19h. (Copiapo, La Paz, La Plata, Tucson, and Shasta Dam),20h. (De Bilt).

Oct. 4d. 14h. 45m. 25s. Epicentre 18°·9N. 68°·9W. (as on 1946, Sept. 25d.).

Intensity IV-V at Port au Prince.
See " List of Earthquakes felt in the Republic of Haiti, during 1946."
Epicentres 19°·2N. 68°·9W. (J.S.A.).
18°·75N. 68°·5W. (Pasadena).

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

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Port au Prince	3·3	264	i 1 19	P_g	—	—	—	—	—
Fort de France	8·5	118	e 2 3	− 4	i 4 3	+18	—	—	e 5·4
Bermuda	13·9	15	i 3 15	− 6	i 5 50	− 7	—	—	i 6·8
Balboa Heights	14·3	228	e 3 30	+ 4	e 6 1	− 5	—	—	—
Columbia	18·5	328	e 4 20	+ 1	—	—	—	—	e 7·8

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Mobile		21·0	308	4 51	+ 4	8 44	+ 7	—	—	—
Georgetown		21·2	344	i 4 50	+ 1	i 8 35	− 6	—	—	—
Philadelphia		21·7	348	i 4 57?	+ 2	—	—	—	—	i 12·0
Fordham		22·3	351	i 5 0	− 1	i 9 2	0	—	—	—
Pennsylvania		23·1	343	i 5 9	+ 1	i 9 25	+ 9	—	—	—
New Kensington		23·5	339	e 5 16	+ 4	i 9 29	+ 6	—	—	e 10·6
Weston		23·5	357	i 5 12	0	i 9 21	− 2	i 5 46	PPP	—
Harvard		23·6	357	i 5 13	0	i 9 26	+ 1	—	—	e 11·7
Cincinnati		24·3	330	i 4 58	−22	i 9 36	− 1	—	—	—
Halifax		26·0	10	5 48	+12	e 10 5	− 1	—	—	12·6
Ottawa		27·0	350	5 45	0	10 18	− 4	—	—	13·6
St. Louis		27·0	321	i 5 45	0	i 10 22	0	i 5 55	pP	—
Chicago		27·8	329	e 5 52	− 1	i 9 30	−65	e 6 36	PP	e 12·9
Shawinigan Falls		27·8	356	e 5 50	− 3	—	—	i 11 29	SS	14·9
Seven Falls		28·2	358	5 49	− 7	10 36	− 5	6 41	PP	13·6
Tacubaya	E.	28·6	277	e 5 59	− 1	e 12 2	+74	—	—	i 14·8
Huancayo		31·4	192	i 6 22	− 3	i 11 34	+ 2	—	—	e 13·7
La Paz	Z.	35·2	178	i 7 18a	+20	i 12 45	+14	i 8 31	PP	19·4
Denver		37·4	312	i 7 19	+ 3	i 13 4	− 1	—	—	—
Rapid City		38·1	320	i 7 23	+ 1	i 13 11	− 5	e 8 48	PP	e 15·9
Tucson		39·8	298	i 7 38	+ 2	i 13 46	+ 4	i 9 5	PP	e 16·7
Salt Lake City		42·6	311	e 7 59	0	i 14 22	− 1	—	—	e 17·6
Logan		42·9	313	i 8 3	+ 1	i 14 24	− 3	i 9 54	PP	e 18·5
Pierce Ferry		43·1	303	i 8 4	0	e 14 1	−29	i 9 46	PP	—
Overton		43·5	304	e 8 9	+ 2	i 14 24	−12	—	—	e 25·6
Boulder City		43·7	303	i 8 10	+ 2	i 14 19	−20	—	—	—
Saskatoon		44·4	327	7 30	−44	13 59	−50	9 32	PP	21·1
Butte		44·9	319	e 8 19	+ 1	i 14 54	− 2	(e 18 6)	SS	e 18·1
Palomar		45·0	299	i 8 19a	0	i 15 1	+ 3	—	—	—
La Jolla		45·3	298	e 8 23	+ 2	—	—	—	—	—
Riverside		45·5	300	i 8 25a	+ 2	e 15 7	+ 2	—	—	—
Mount Wilson		46·1	300	i 8 28a	0	e 15 16	+ 2	—	—	—
Pasadena		46·2	300	i 8 30a	+ 2	—	—	i 10 22	PP	e 19·3
Haiwee	E.	46·3	303	e 8 30	+ 1	—	—	—	—	—
Tinemaha		46·7	304	e 8 35	+ 3	i 15 27	+ 5	—	—	—
Santa Barbara		47·5	300	i 8 40	+ 2	e 15 38	+ 4	—	—	—
Lick		49·4	304	e 8 54	+ 1	e 15 59	− 1	—	—	—
Santa Clara		49·6	304	i 8 55	0	e 16 18	+15	—	—	e 30·1
Grand Coulee		49·7	318	i 8 54	− 2	e 16 3	− 1	i 12 3	PPP	—
Branner		49·8	304	e 8 49	− 7	e 16 25	+19	e 10 51	PP	—
Berkeley		49·9	304	i 8 58	+ 1	e 16 9	+ 2	i 11 0	PP	e 22·8
Shasta Dam		50·4	308	i 8 59	− 2	e 16 18	+ 4	—	—	—
Santa Lucia	N.	52·1	182	9 5	− 9	16 50	+12	—	—	28·6
Victoria		52·7	317	—	—	16 47	+ 1	—	—	24·6
La Plata	E.	54·5	183	9 59	+27	17 0	−10	10 53	PcP	23·3
	N.	54·5	183	9 27	− 5	17 11	+ 1	10 41	PcP	24·0
Lisbon	Z.	55·0	56	9 40	+ 5	17 13	− 4	11 35	PP	25·0
Toledo		59·0	55	i 10 1	− 3	i 18 5	− 5	12 16	PP	27·8
Granada		59·4	57	i 8 54	−72	i 18 5	−10	10 9	pP	27·7
Sitka		61·6	326	10 19	− 3	18 39	− 4	e 23 15	SS	—
Aberdeen	E.	61·8	34	—	—	i 18 35	−11	—	—	e 29·0
Alicante		61·8	56	i 10 36	+13	i 18 42	− 4	12 52	PP	e 28·8
Tortosa		62·4	53	10 40	+13	18 50	− 3	12 49	PP	28·4
Barcelona		63·7	52	—	—	19 5	− 5	(e 23 24)	SS	e 23·4
Paris		63·8	44	i 10 35	− 1	i 19 6	− 5	e 12 34	PP	e 29·8
Clermont-Ferrand		64·2	48	e 10 39	0	i 19 16	0	i 13 6	PP	30·6
Algiers		64·7	58	e 10 9	−33	e 19 20	− 2	i 10 55	pP	e 30·6
Uccle		65·0	42	e 10 43	− 1	e 19 35	+ 9	e 23 32	SS	30·8
De Bilt		65·9	41	i 10 53k	+ 3	i 19 29	− 8	e 23 40	SS	e 31·1
Bergen		66·0	31	10 56a	+ 6	19 30?	− 8	13 30?	PP	28·9
Besançon		66·2	46	e 10 57	+ 5	e 19 35	− 5	—	—	31·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel		66·9	46	e 10 53	− 3	—	—	—	—	—
Basle		67·2	45	e 10 56	− 2	e 19 49	− 3	—	—	—
Strasbourg		67·3	44	e 10 56	− 3	i 19 48	− 6	e 13 19	PP	e 31·9
Zürich		67·9	45	e 11 0	− 2	—	—	—	—	—
Stuttgart		68·2	44	e 11 3	− 1	e 19 45	−19	e 11 22	P_cP	e 31·6
College		68·3	334	i 11 8	+ 3	e 20 5	− 1	e 24 37	SS	e 27·7
Chur		68·6	47	e 11 4	− 3	—	—	—	—	e 41·6
Jena		69·6	42	e 11 11	− 2	e 20 16	− 5	—	—	—
Copenhagen		69·8	37	11 11	− 3	20 19	− 4	—	—	33·6
Cheb		70·2	43	e 11 23	+ 6	e 20 23	− 5	e 15 35	PPP	e 33·6
Florence	E.	70·2	49	i 11 23	+ 6	e 20 48	+20	—	—	—
Potsdam		70·4	40	e 11 29	+11	e 20 29	− 1	e 21 37	SKS	e 31·6
Collmberg		70·5	41	e 11 25	+ 7	e 20 25	− 7	e 13 51	PP	e 33·6
Rome		71·3	52	e 11 19	− 4	i 20 35	− 6	e 15 34	PPP	e 33·4
Prague		71·5	42	e 11 22	− 2	e 20 35	− 8	e 14 4	PP	e 31·1
Triest		71·7	47	e 11 23	− 3	i 20 40	− 5	e 14 2	PP	e 34·6
Upsala		72·1	32	e 11 50	+22	e 20 43	− 7	i 20 59	PS	e 31·6
Zagreb		73·2	47	e 11 41	− 6	e 20 54	− 8	—	—	e 37·6
Budapest		75·0	44	e 12 3	+18	e 26 35?	SS	—	—	38·6
Warsaw	Z.	75·2	40	11 54a	+ 8	e 21 39	+14	14 42	PP	e 36·6
Helsinki		75·7	31	i 11 56	+ 7	i 21 26	− 4	—	—	e 35·6
Belgrade		76·5	47	e 11 33	−21	e 20 54	−45	e 14 11	PP	31·6
Sofia		79·0	49	e 12 11	+ 4	e 22 3	− 3	—	—	40·6
Bucharest		80·5	47	e 12 22	+ 7	e 22 16	− 6	—	—	39·6
Moscow		83·5	33	i 12 28	− 3	i 22 44	− 8	15 41	PP	—
Istanbul		83·6	49	e 12 17	−14	e 22 22	−31	—	—	—
Helwan		89·2	59	i 12 59k	0	i 23 45	− 2	16 35	PP	—
Sotchi		89·9	44	e 13 7	+ 5	—	—	—	—	—
Ksara		91·3	54	e 13 8	− 1	e 24 9	+ 3	25 10	PS	—
Sverdlovsk		93·6	25	i 13 19	0	i 24 25	− 1	17 3	PP	—
Grozny		93·9	42	e 13 28	+ 7	—	—	—	—	—
Leninakan		93·9	44	e 13 26	+ 5	e 23 57	[+ 2]	—	—	—
Tashkent		108·6	32	19 5	PP	25 1	[− 5]	33 35	SS	—
Irkutsk		108·9	4	e 19 1	PP	25 3	[− 5]	28 14	PS	—
Stalinabad		110·4	34	18 37	[+ 3]	25 12	[− 2]	28 35	PS	—
Andijan		110·6	30	e 18 54	[+20]	26 4	{− 5}	—	—	—
Vladivostok		115·4	343	—	—	25 43	[+10]	29 35	PS	—
Wellington		121·9	232	—	—	e 30 59	PS	—	—	—
New Delhi	N.	122·5	35	i 20 46	PP	i 25 51	[− 7]	i 27 25	SKKS	—
Christchurch		123·3	229	21 57	PP	27 17	{−19}	31 37	PS	58·8
Bombay		126·9	47	e 21 5	PP	e 26 13	[+ 2]	—	—	—
Kodaikanal	E.	136·0	51	e 12 47	?	—	—	—	—	—
Riverview		141·4	238	i 23 15	PKS	—	—	—	—	e 58·1

Additional readings :—
Georgetown i =5m.1s.
Philadelphia i =5m.1s.?, and 5m.39s.?
Pennslyvania iE =5m.21s. and 6m.26s.
Weston eS =9m.17s.
Harvard i =5m.21s., 5m.39s., 6m.3s., and 9m.33s.
Cincinnati i =5m.13s., 9m.49s., and 10m.0s.
Halifax S =10m.18s.
Ottawa i =10m.49s.
St. Louis iE =6m.3s., iPP?E =6m.17s., eE =6m.40s. and 10m.52s.
Chicago i =6m.45s.
Shawinigan Falls e =8m.31s.
Seven Falls e =11m.20s.
Tacubaya iE =8m.45s.
La Paz P_cPZ =10m.1s., iSSZ =14m.47s., iZ =15m.57s., S_cS =17m.39s.
Tucson i =9m.21s. and 10m.17s.
Salt Lake City e =9m.59s., eS =14m.14s.
Logan i =8m.26s.
Pierce Ferry iPPP =10m.21s.
Saskatoon SSS =17m.12s.
Palomar iNZ =8m.37s.
Pasadena iS_cPZ =14m.13s.
Grand Coulee i =14m.8s.
Branner eN =11m,59s., eE =18m.42s.

Continued on next page.

Berkeley iN =18m.53s., iE =21m.1s.
La Plata SSN =21m.17s.
Lisbon iPZ =9m.47s., Q =23m.11s.
Toledo P_cPZ =10m.50s., PPPE =14m.28s., P_cSN =14m.47s., PSEN =18m.22s., S_cSE =19m.55s., SSE =21m.57s., QEN =25m.7s.
Granada sP =10m.17s., iP_cP =10m.43s., pP_cP =10m.53s., sP_cP =11m.20s., PPP = 13m.32s., iP_cS =14m.8s., pS =18m.9s., sS =18m.43s., sPS =18m.59s., S_cS = 19m.50s., SS =22m.41s., SSS =24m.44s.
Sitka e =19m.51s., eS_cS =20m.11s.
Alicante P_cP =11m.4s., pP =11m.45s., PPP =14m.8s., PS =18m.58s., PPS =19m.16s., S_cS =20m.28s., SS =22m.54s., Q =25m.40s.
Tortosa P_cPN =11m.18s., PPPE =14m.16s., PSN =19m.10s.
Paris i =10m.58s., e =15m.26s., i =20m.21s., eSS =22m.40s.
Clermont-Ferrand iSS =23m.42s., iSSS =25m.40s.
Algiers iP_cP =12m.0s., eS =18m.33s., eSS =23m.35s.
Uccle eSE =18m.41s., eS_cSE =20m.32s., eSSS?N =26m.44s.
De Bilt iZ =19m.20s., eSSS =26m.15s.
Strasbourg iP =11m.6s., eP_cP =11m.21s., e =12m.43s., ePPP =15m.3s., iPS =20m.4s., iPPS =20m.15s., eS_cS =20m.48s., e =21m.11s., and 21m.24s., eSS =23m.52s., e =24m.28s., eSSS? =27m.29s.
Stuttgart iP =11m.11s. a.
College e =12m.5s., eS_cS =21m.4s.
Jena eZ =11m.17s., eN =11m.22s., eE =11m.32s., eN =20m.11s.
Cheb e =17m.35s.?, eSS =24m.35s.?
Collmberg eE =12m.46s., eSSE =25m.8s.
Rome ePS =21m.14s., eSS =25m.17s.
Prague ePPP =15m.20s., eSS =25m.35s., eSSS =28m.29s.
Triest iPS =21m.5s., eSS =25m.13s.
Upsala eSSE =25m.29s.
Zagreb eP =11m.45s.
Budapest ePN =12m.9s., eN =27m.5s.
Warsaw P_cP =12m.35s., eZ =15m.29s., PPPZ =16m.28s.
Belgrade ePPP =15m.35s., eSS =25m.52s., SSS =29m.0s.
Helwan i =13m.8s., SKS =23m.23s., S =24m.3s.
Sverdlovsk PPP =19m.11s., SKS =23m.48s., iPS =25m.28s., SS =30m.47s., SSS = 34m. 23s.
Tashkent SKKS =25m.57s.?
Irkutsk ePPP =21m.19s., eSS =34m.10s.
Vladivostok S =27m.24s., iSS =35m.37s.
New Delhi SSN =37m.1s.
Christchurch SKP =23m.9s., PPP =24m.19s., SKKS =28m.44s., PPS =32m.40s., SS =38m.3s., SSS =42m.59s.
Riverview iE =23m.41s.
Long waves were recorded at Sofia.

Oct. 4d. Readings also at 0h. (San Juan), 1h. (Boulder City), 3h. (Brisbane, Riverside, Palomar, Tucson, Pierce Ferry, and near Copiapo), 4h. (Overton), 7h. (Shasta Dam), 15h. (Balboa Heights), 17h. (near Stalinabad), 19h. (San Juan), 22h. (Suva), 23h. (Boulder City and near Obi-garm).

Oct. 5d. Readings at 0h. (near Stuttgart (2), Zürich, near Obi-garm and Stalinabad), 1h. (Stuttgart and Zürich), 3h. (Pierce Ferry), 4h. (San Juan), 5h. (near Frunse), 7h. (Boulder City (2), Pierce Ferry, Tucson, and Copiapo), 8h. (Boulder City), 9h. (Boulder City, Pierce Ferry, St. Louis, and Tucson), 10h. (Pierce Ferry and near La Paz), 11h. (Boulder City, Helwan, and Ksara), 15h. (near Leninakan), 16h. (Stalinabad), 17h. (Boulder City, Pierce Ferry, St. Louis, Tucson, Mount Wilson, Riverside, Huancayo, La Paz, La Plata, Santa Lucia, and near Grozny), 18h. (Shasta Dam), 19h. (near Andijan, Frunse, Obi-garm, Samarkand, Stalinabad, Tashkent, and near Tacubaya), 21h. (near Tacubaya), 23h. (Cheb, Almeria, Malaga, Toledo, near Alicante and Granada).

Oct. 6d. Readings at 2h. (Palomar, Tucson, Boulder City, Pierce Ferry, and Tacubaya), 3h. (near Seven Falls), 4h. (De Bilt), 5h. (Tacubaya, Samarkand, and near Obi-garm), 6h. (Tucson), 8h. (Tucson, Shasta Dam, near Tacubaya and near Triest), 10h. (Boulder City and Shasta Dam), 11h. (Santa Lucia), 12h. (Auckland, Christchurch, Wellington, and Shasta Dam), 15h. (Brisbane, Riverview, Harvard, and Ksara), 16h. (Auckland, Christchurch, Wellington, Riverview, Harvard (2), and near Lick), 18h. (Boulder City, Pierce Ferry (2), Frunse, Obi-garm, Samarkand, Stalinabad, Tashkent, and near Andijan), 19h. (Boulder City and Pierce Ferry), 20h. (Pierce Ferry), 21h. (near Andijan, Frunse, Stalinabad, Obi-garm, Samarkand, and Tashkent), 22h. (Boulder City and Pierce Ferry).

Oct. 7d. 6h. Undetermined shock. East Indies.

Brisbane ePN =52m.45s., eS?N =57m.35s.
Riverview eZ =53m.16s., iE =58m.37s. and 58m.54s., eEN =59m.0s., eZ =59m.6s., iE =60m.55s., iZ =61m.20s., iN =62m.30s., iZ =64m.36s., iN =65m.13s., iZ =65m.25s., iE =65m.36s. and 66m.33s., iZ =66m.56s., eLZ =68·4m.
Calcutta eN =55m.27s. and 62m.16s.
Perth i =55m.59s., 59m.55s., and 62m.10s.
Stalinabad iP =57m.38s., iS =66m.48s.
Kodaikanal eE =62m.33s.
Christchurch P? =62m.56s., S? =67m.30s.
Wellington PZ =63m.36s., SZ =74m.25s., Q =76m.28s., RZ =78m.0s.
New Delhi iN =64m.27s.
Palomar ePZ =65m.6s.
Pasadena ePZ =65m.8s., eLZ =108m.17s.
Mount Wilson iPZ =65m.9s.
Riverside iPZ =65m.9s.
Tinemaha ePZ =65m.9s.
Boulder City eP =65m.11s.
Arapuni e =65m.12s., S? =74m.0s.
Pierce Ferry eP =65m.16s., i =65m.22s.
Tucson iP =65m.22s., eL =106m.38s.
St. Louis iPZ =65m.43s.
Harvard i =65m.56s.
La Paz PZ =66m.19s., LZ =129m.
Auckland e =71m.18s., Q? =77·6m., R =80m.
Ksara e =72m.24s.
Warsaw eZ =74m.10s., eLEZ =103m.
Berkeley eZ =75m.36s. and 109m.12s.
De Bilt eE =76m.
Strasbourg e =88m.42s., eL =103·5m.
Long waves were also recorded at Bermuda, Kew, and Helsinki.

Oct. 7d. Readings also at 5h. (La Paz), 9h. (near Frunse), 10h. (near Tananarive), 15h. (near Mineral), 17h. (near Port au Prince), 18h. (Harvard), 19h. (near Stalinabad, near Shasta Dam and Mineral), 20h. (La Paz, Andijan, and near Stalinabad), 23h. (near Branner).

Oct. 8d. 6h. 30m. 40s. Epicentre 24°·0N. 98°·5E. Doubtful identification.
(as on 1946, Jan. 26d.).

$A = -·1352$, $B = +·9045$, $C = +·4045$; $\delta = +2$; $h = +4$;
$D = +·989$, $E = +·148$; $G = -·060$, $H = +·400$, $K = -·915$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Calcutta	N.	9·5	263	e 4 9	S	(e 4 9)	− 1	(i 5·9)
New Delhi	N.	19·6	288	—	—	i 7 57	−11	e 10·0
Hyderabad	N.	19·8	254	4 33	− 2	8 12	− 1	—
Bombay		24·4	263	5 26	+ 5	9 41	+ 2	—
Andijan		27·5	313	e 5 51	+ 1	e 10 41	+11	—
Stalinabad		29·1	308	e 7 14?	PPP	—	—	—
Stuttgart	Z.	71·9	316	e 11 24	− 3	—	—	—

Calcutta readings are recorded as P and S.
Long waves were also recorded at De Bilt, Helsinki, and Kew.

Oct. 8d. 13h. 56m. 22s. Epicentre 25°·5S. 178°·5E. Depth of focus 0·090.
(as on 1946, Sept. 26d.).

$A = -·9034$, $B = +·0237$, $C = -·4281$; $\delta = -4$; $h = +3$;
$D = +·026$, $E = +1·000$; $G = +·428$, $H = -·011$, $K = -·904$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	11·8	195	2 32	− 5	4 42	− 1	7 13	PcP	—
Arapuni	12·8	190	—	—	i 5 38	+38	—	—	—
Tuai	13·3	185	2 54	+ 3	5 12	+ 3	13 42	ScS	—
New Plymouth	14·0	194	3 6	+ 8	5 36	+14	—	—	—
Apia	14·8	40	e 3 3	− 3	i 5 34	− 2	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Wellington		16·1	190	3 18	0	5 34	−24	7 28	P_cP	—
Christchurch		18·6	194	3 42$_a$	0	6 9	−31	—	—	—
Brisbane		22·9	260	i 4 17	− 4	i 7 43	− 7	—	—	—
Riverview		25·1	244	i 4 42	+ 2	i 8 26	+ 1	i 6 25	pP	—
Vladivostok		80·6	328	i 11 8	− 4	e 20 19?	−11	i 23 13	sS	—
Berkeley		84·0	43	i 11 29	0	e 20 38	−25	i 14 42	PP	—
La Jolla		84·3	50	e 11 31	+ 1	i 21 14	+ 8	—	—	—
Pasadena		84·4	48	i 11 31k	0	e 20 56	−11	e 13 48	pP	—
Mount Wilson		84·5	48	i 11 31k	0	e 20 57	−11	e 13 48	pP	—
Palomar		84·8	50	i 11 33k	0	e 21 1	−10	e 13 43	pP	—
Riverside		84·9	49	i 11 32k	− 1	e 20 58	−14	e 13 49	pP	—
Haiwee	N.	85·7	47	—	—	e 21 18	− 1	—	—	—
Shasta Dam		85·7	41	i 11 37	0	—	—	—	—	—
Tinemaha		86·1	46	i 11 40	+ 1	e 21 30	+ 7	—	—	—
Boulder City		87·7	48	i 11 47	0	e 21 19	−19	e 14 0	pP	—
Overton		88·3	48	i 11 51	+ 2	e 21 52	+ 9	e 14 3	pP	—
Pierce Ferry		88·4	49	i 11 50	0	i 21 51	+ 7	e 14 5	pP	—
Tucson		88·5	54	i 11 52	+ 2	i 21 56	+11	i 14 16	pP	—
Ksara		146·6	291	i 18 34	[+ 2]	e 25 12	PPP	20 58	pPKP	—
Copenhagen		148·2	345	i 18 38	[+ 3]	i 21 57	PP	e 20 57	pPKP	—
Istanbul		150·3	310	i 18 11	[−27]	21 57	PP	—	—	—
Helwan		150·6	285	18 38	[− 1]	i 40 56	SS	i 21 1	pPKP	—
De Bilt	z.	153·0	350	i 18 41	[− 1]	—	—	i 22 18	PP	—
Stuttgart	z.	155·3	343	e 18 44	[− 1]	—	—	—	—	—
Strasbourg		155·8	345	e 18 45	[− 1]	—	—	i 23 16	PP	—
Paris		156·5	353	e 18 47	[0]	—	—	—	—	—
Zürich		156·7	344	e 18 45k	[− 2]	—	—	—	—	—
Basle		156·9	344	e 19 19	[+32]	—	—	—	—	—
Rome		160·0	329	i 18 50k	[0]	33 27	PSKS	e 23 12	PP	—
Alicante		167·2	359	19 54	[+57]	22 18	PKS	34 8	PS	e 72·2
Granada		168·2	8	18 51k	[− 7]	30 0	SKKS	23 37	PP	—

Additional readings :—
Auckland P_cS =10m.48s.
Wellington pP?Z =3m.45s., i =4m.6s., 5m.54s., and 6m.4s. iZ =6m.10s., i =6m.26s., 7m.1s., and 7m.42s., iZ =9m.35s., S_cPZ =10m.0s., P_cS?Z =10m.53s., S_cS =13m.50s., i =14m.11s., sS_cPZ =14m.45s., pS_cSZ =17m.11s., sS_cSZ =18m.13s., S_cS,S_cS?Z = 23m.34s.
Brisbane iSE =6m.55s.
Riverview isPEZ =7m.27s., isS?N =11m.39s., iS_cSN =14m.29s.
Vladivostok i =20m.49s., 24m.20s., and 29m.6s.
Berkeley iE =22m.6s.
Pasadena i =22m.12s.
Mount Wilson esPZ =14m.59s.
Palomar esPZ =14m.54s., iN =21m.20s.
Riverside esPZ =15m.0s., e =21m.18s.
Boulder City iS =21m.46s.
Overton eS? =21m.23s.
Pierce Ferry e =15m.11s., eS? =21m.19s., e =25m.4s.
Ksara sPKP =21m.57s.
Copenhagen 26m.2s.
Helwan PKP_2? =18m.55s., PP? =22m.25s.
Stuttgart eZ =18m.54s., iZ =19m.13s.
Strasbourg $ePKP_2$? =18m.55s.
Paris i =19m.19s.
Zürich i =19m.18s.
Rome $iPKP_2Z$ =19m.30s., PPP =26m.56s., PPS? =36m.36s.
Alicante PPS =35m.52s., SS =43m.2s.
Granada pPKP =19m.13s., PKP_2 =19m.53s., $pPKP_2$ =20m.12s., pPP =23m.58s., PPP =27m.55s., eSS =46m.6s.

Oct. 8d. Readings also at 0h. (near Branner), 1h. (Boulder City, Overton, Pierce Ferry, and near Mizusawa), 5h. (Overton, Pierce Ferry, near Bogota, near Mineral and near Stalinabad), 6h. (near Mineral), 7h. (Overton, Pierce Ferry, and Stuttgart), 11h. (near Mizusawa), 12h. (Frunse, Samarkand, near Andijan and Stalinabad), 13h. (near Mineral), 21h. (Ksara), 23h. (Palomar, Pasadena, Riverside, Tucson, Boulder City, Pierce Ferry, Salt Lake City, St. Louis, Philadelphia, Bermuda, Balboa Heights, Huancayo, La Paz, De Bilt, Paris, Kew, Rome, Ksara, and near Triest).

Oct. 9d. 5h. 22m. 49s. Epicentre 7°·0S. 149°·0E (as on 3d.).

$A = -·8508$, $B = +·5112$, $C = -·1211$; $\delta = -15$; $h = +7$;
$D = +·515$, $E = +·857$; $G = +·104$, $H = -·062$, $K = -·993$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		20·7	170	i 4 46	+ 2	i 8 51	+20	i 5 6	PP	10·9
Riverview		26·8	176	i 5 48	+ 4	e 10 33	+14	11 53	Q	e 13·5
Auckland		37·9	145	—	—	13 46	+33	16 47	SSS	20·2
Arapuni		39·2	146	—	—	e 14 11?	+39	—	—	—
Wellington		41·1	150	—	—	13 43	−18	—	—	19·6
Christchurch		41·9	154	14 6	S	(14 6)	− 7	17 30	SS	19·8
Frunse		83·5	315	e 12 40	+ 9	—	—	—	—	—
Andijan		84·5	312	12 37	+ 1	23 11	+ 9	—	—	—
Stalinabad		86·7	310	12 48	+ 1	23 30	+ 6	—	—	—
Tashkent		86·9	312	12 44	− 4	e 23 23	− 3	24 7	SeS	—
Pasadena	z.	96·2	56	e 13 25	− 6	—	—	—	—	e 42·4
Mount Wilson	z.	96·3	56	i 13 36	+ 4	—	—	—	—	—
Riverside	z.	96·9	56	e 13 3	−31	—	—	—	—	—
Palomar	z.	97·2	57	e 13 28	− 8	—	—	—	—	—
Boulder City		99·0	54	e 13 13	−31	—	—	—	—	—
Overton		99·4	54	e 13 43	− 3	—	—	—	—	—
Pierce Ferry		99·7	54	e 13 43	− 4	—	—	e 17 7	PP	—
Ksara		113·0	303	19 45	PP	29 17	PS	—	—	—
La Paz		136·5	123	i 22 49	PP	—	—	—	—	—

Additional readings :—
Brisbane iSSN = 9m.16s.
Christchurch Q = 7m.42s.
Pasadena iZ = 13m.35s. and 13m.47s.
Mount Wilson iZ = 13m.48s.
Riverside eZ = 13m.16s. and 13m.37s.
Palomar eZ = 13m.38s.
Pierce Ferry iP? = 13m.52s.
Long waves were also recorded at Honolulu and other American and European stations.

Oct. 9d. 20h. 25m. 49s. Epicentre 25°·5S. 67°·0W. Focus at base of superficial layers. (as on 1946, July 16d.).

$A = +·3531$, $B = -·8319$, $C = -·4281$; $\delta = +1$; $h = +3$;
$D = -·921$, $E = -·391$; $G = -·167$, $H = +·394$, $K = -·904$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Montezuma		3·3	331	1 0	+ 9	1 21	− 8	—	—	e 1·8
Santa Lucia		8·5	201	2 11	+ 7	4 10	+30	—	—	—
La Paz	z.	9·0	353	i 2 22	+11	i 4 53	+61	—	—	5·4
La Plata		12·2	142	2 43	−11	5 17	+ 7	5 23	SS	6·1
Huancayo		15·5	328	e 3 44	+ 6	—	—	—	—	e 7·1
Fort de France		40·4	10	e 7 39	+ 3	—	—	—	—	—
St. Louis		67·4	340	i 10 55	+ 1	e 19 49	+ 3	i 11 2	pP	e 36·2
Tucson		71·0	322	i 11 15	− 1	e 20 44	+15	e 11 24	pP	e 29·5
La Jolla	z.	75·2	318	e 11 41	0	—	—	—	—	—
Palomar		75·3	319	e 11 40	− 2	—	—	—	—	—
Pierce Ferry		75·7	322	i 11 42	− 2	e 21 36	+14	—	—	—
Boulder City		76·0	321	i 11 44	− 2	—	—	—	—	—
Riverside		76·1	318	i 11 44	− 2	—	—	i 11 58	pP	—
Overton		76·2	322	e 11 45	− 2	—	—	—	—	—
Mount Wilson	z.	76·6	318	e 11 50	+ 1	—	—	e 12 1	pP	—
Pasadena	z.	76·7	318	e 11 48	− 2	—	—	e 12 1	pP	—
Santa Barbara	z.	77·8	317	e 11 53	− 3	—	—	—	—	—
Haiwee	N.	77·9	320	e 11 58	+ 2	—	—	—	—	—
Tinemaha		78·7	320	e 11 58	− 2	—	—	—	—	—
Shasta Dam		83·6	321	e 12 3	−23	—	—	i 12 12	pP	—

Continued on next page,

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grand Coulee	86·7	328	e 12 22	−20	—	—	e 12 41	pP	—
Alicante	88·9	46	e 25 25	PPS	—	—	—	—	e 48·5
Paris	96·4	38	—	—	e 28 11?	?	—	—	e 47·2
Rome	99·3	48	e 19 24?	PPP	e 24 14	[0]	e 26 24	PS	e 42·2
Istanbul	110·6	54	e 27 5	?	e 36 37?	?	—	—	—
Ksara	113·9	63	e 19 25	PP	—	—	—	—	—

Additional readings :—
Copiapo (△ =3°·5), E =20h. 25m. 45s., and 26m.23s.
Santa Lucia E =2m.16s., N =2m.33s., E =3m.10s.
La Plata SN =4m.50s., S?Z =4m.53s.
St. Louis eSE =19m.57s., iPS?E =21m.25s., eE =23m.12s.
Palomar i =11m.44s., iZ =11m.56s.
Shasta Dam i =12m.23s.
Alicante PP =28m.17s., PPP =30m.9s., S =35m.11s., PPS =35m.25s., SS =39m.17s., SSS =41m.49s. The record appears to have been wrongly timed or misinterpreted.
Ksara e =23m.45s., 26m.52s., and 37m.45s.
Long waves were also recorded at Wellington, College, Salt Lake City, Philadelphia, Bermuda, and other European stations.

Oct. 9d. Readings also at 0h. (Huancayo and Riverview), 2h. (New Delhi), 4h. (near Triest), 5h. (De Bilt), 7h. (near Mineral), 8h. (near Alicante (3)), 9h. (Christchurch, Brisbane, Riverview (2), Overton, and Pierce Ferry), 18h. (Pierce Ferry), 19h. (Balboa Heights (2), Bogota, La Paz, La Plata, and Santa Lucia), 20h. (Pierce Ferry, near Algiers and near Mizusawa), 21h. (near Ottawa), 23h. (near Triest).

Oct. 10d. 4h. 23m. 9s. Epicentre 6·1S. 150°·5E. (as on 1946, Jan. 2d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		21·4	174	i 4 52	+ 1	i 8 58	+13	—	—	i 11·1
Riverview		27·6	178	e 6 0	+ 9	i 10 37	+ 5	—	—	e 14·0
Auckland		37·8	147	—	—	e 16 51?	SSS	—	—	20·8
Arapuni		39·2	148	—	—	e 13 51?	+19	—	—	19·0
Wellington		41·2	152	—	—	13 51	−11	17 21	SSS	21·4
Perth		41·3	227	—	—	i 14 36	+32	i 18 4	SSS	i 24·8
Christchurch		42·1	156	7 54	− 1	14 11	− 5	17 4	Q	20·2
Mizusawa	E.	45·8	350	8 26	+ 1	8 55	?	—	—	—
Vladivostok		51·8	343	i 9 4	− 8	e 16 33	0	—	—	—
Honolulu		57·5	60	—	—	e 24 56	SSS	—	—	—
Irkutsk		70·1	332	11 13	− 3	e 20 23	− 4	—	—	—
New Delhi	N.	78·4	301	—	—	e 22 3	+ 3	—	—	—
Bombay		80·4	290	e 12 21	+ 6	e 22 33	+12	—	—	—
College		83·9	32	—	—	e 23 27	+31	—	—	e 32·2
Andijan		85·0	312	e 12 44	+ 6	e 23 21	+14	—	—	—
Sitka		86·7	32	i 14 24	?	e 22 53	−31	—	—	e 39·7
Tashkent		87·4	312	e 12 51	+ 1	e 23 14	[− 3]	e 16 27	PP	—
Berkeley	E.	91·5	52	—	—	e 23 27	[−15]	—	—	e 40·7
Shasta Dam		91·7	49	e 12 58	−12	—	—	—	—	—
Pasadena	Z.	94·5	56	e 13 30	+ 7	—	—	—	—	e 43·2
Mount Wilson	Z.	94·6	56	e 13 6	−18	—	—	—	—	—
Grand Coulee		94·8	42	e 13 38	+13	—	—	—	—	—
Haiwee	N.	94·8	54	e 13 47	+22	—	—	—	—	—
Sverdlovsk		95·0	326	i 13 18	− 8	23 55	[− 6]	i 17 15	PP	—
Riverside	Z.	95·1	56	e 13 6	−20	—	—	—	—	—
La Jolla	Z.	95·2	57	e 13 33	+ 6	—	—	—	—	—
Palomar	Z.	95·5	57	e 13 13	−15	—	—	—	—	—
Boulder City		97·3	54	e 13 22	−14	e 21 24	?	e 17 5	PP	—
Overton		97·7	54	e 13 13	−25	—	—	e 17 1	PP	—
Pierce Ferry		98·0	54	e 13 33	− 6	i 24 3	[−14]	i 17 38	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Salt Lake City		99·7	49	—	—	e 26 28	PS	—	—	e 42·5
Bozeman		100·2	45	—	—	e 24 13	[−15]	e 36 12	SSS	e 43·2
Tucson		100·6	58	e 14 11	+20	—	—	e 17 56	PP	e 39·4
Ksara		113·8	303	e 19 41	PP	29 41	PS	36 21	SS	—
St. Louis		116·5	50	e 19 57	PP	e 25 38	[0]	i 29 17	PS	—
Istanbul		117·5	313	e 24 45	?	27 11	{+14}	—	—	—
Ottawa		124·0	37	e 18 52	[− 8]	—	—	—	—	59·8
Stuttgart	z.	126·4	329	e 19 3	[− 2]	—	—	—	—	—
Rome		128·5	321	19 6	[− 3]	e 38 54	SS	e 22 28	PKS	e 57·9
Paris		129·5	333	e 22 31	PKS	(e 40 51)	?	—	—	e 40·9
Huancayo		131·0	111	e 19 10	[− 4]	—	—	—	—	—
La Paz		135·7	121	19 14	[− 9]	—	—	22 43	PKS	—
Fort de France		147·7	72	e 19 8	[−36]	—	—	—	—	—

Additional readings :—
Riverview iNZ =7m.24s., iEN =11m.8s.
Wellington Q =20m.17s.
New Delhi iN =22m.23s.
Bombay eN =12m.24s.
Tashkent SS =29m.35s.
Pasadena eZ =13m.47s.
Mount Wilson iZ =13m.20s. and 13m.50s.
Sverdlovsk S_cS =24m.42s.
Riverside iZ =13m.52s.
Palomar eZ =13m.44s. and 13m.54s.
Boulder City e =13m.29s.
Pierce Ferry iP =13m.46s., e =16m.55s.
Rome ePKP? =21m.4s., PPS =32m.58s., eSSS =43m.9s.?
Long waves were also recorded at Bermuda and other American and European stations.

Oct. 10d. Readings also at 0h. (Kew and Riverview), 5h. (Brisbane), 6h. (near Shasta Dam), 7h. (near Mineral), 9h. (Balboa Heights, Bogota, Fort de France, Mount Wilson, Palomar, Riverside, Tucson, Boulder City, Overton, Pierce Ferry, Huancayo, and La Paz), 11h. (near Oaxaca, Tacubaya, and near La Paz), 13h. (near Grand Coulee), 15h. (Stuttgart), 18h. (Huancayo, La Plata, and near Santa Lucia), 19h. (Ksara and Santa Lucia), 20h. (near Stalinabad), 21h. (Leninakan and near Grozny), 23h. (Apia).

Oct. 11d. Readings at 0h. (Mount Wilson, Palomar, Riverside, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Philadelphia), 1h. (Apia, Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Bozeman, Butte, Salt Lake City, Grand Coulee, College, St. Louis, and near Sitka), 6h. (Brisbane, Riverview, Christchurch, Mount Wilson, Palomar, Pasadena, Riverside, and Fort de France), 8h. (near Obigarm and Stalinabad), 9h. (Almeria), 11h. (Mount Wilson, Palomar, Riverside, Tucson, Boulder City, Overton, and Pierce Ferry), 12h. (Samarkand near Obigarm and Stalinabad), 13h. (Bombay), 14h. (Santa Lucia), 16h. (Mount Wilson, Riverside, Tucson, near Triest and near Obigarm), 19h. (Triest), 20h. (near Obigarm), 21h. (Huancayo, La Plata, Triest, Malaga, Toledo, and near Alicante), 23h. (near Triest).

Oct. 12d. Readings at 0h. (Ksara), 2h. (Pierce Ferry, Shasta Dam, and Tucson), 3h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry (2), Shasta Dam, near Obigarm and Stalinabad), 4h. (Boulder City and Pierce Ferry), 6h. (Pierce Ferry near Triest and near Samarkand), 8h. (Triest and near Mizusawa), 9h. (near Andijan, Obigarm and Stalinabad), 11h. (Jena and Mizusawa), 12h. (Pierce Ferry), 14h. (near Fort de France), 16h. (Pierce Ferry, La Plata, and near Santa Lucia), 17h. (near Triest), 18h. (Bombay, Balboa Heights, and near Harvard), 19h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, near Obigarm and Stalinabad), 22h. (Arapuni, Wellington, Bombay, and Calcutta).

Oct. 13d. 21h. 24m. 31s. Epicentre 33°·8N. 26°·5E. (as on 1942, June 16d.).

A = +·7452, B = +·3716, C = +·5537 ; δ = −1 ; h = +1 ;
D = +·446, E = −·895 ; G = +·495, H = +·247, K = −·833.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		5·7	132	i 1 41a	P*	2 48	+13	1 53	P_g	—
Istanbul		7·5	15	e 1 54	+ 1	4 30	S_g	—	—	—
Ksara		7·8	87	e 1 56	− 2	i 3 40	+12	—	—	—
Sofia		9·2	346	e 2 19	+ 3	e 4 11	+ 8	4 35	S*	5·0
Bucharest		10·6	358	e 2 35	− 1	e 4 47	+10	—	—	e 5·6
Belgrade		12·0	339	e 2 47?	− 8	5 29	+18	—	—	e 6·1
Yalta		12·2	27	e 3 3	+ 5	—	—	—	—	—
Rome		13·7	310	e 3 9	− 9	e 5 49	− 3	6 29	SSS	e 7·8
Zagreb		14·4	329	e 3 27	0	e 6 18	+ 9	e 3 41	PP	e 7·6
Budapest		14·8	340	3 43	+11	—	—	e 3 59	PPP	e 8·2
Triest		15·3	324	e 3 41	+ 2	e 6 33	+ 3	—	—	i 8·7
Florence	E.	15·5	315	e 3 42	0	e 6 42	+ 7	—	—	—
Chur		18·3	321	e 4 15	− 2	e 7 40	+ 1	—	—	—
Prague		18·5	335	4 19	0	e 7 43	− 1	—	—	e 9·5
Warsaw		18·8	349	4 24k	+ 1	7 55	+ 5	4 40	PP	e 10·0
Zürich		19·1	321	e 4 24	− 3	e 7 56	− 1	—	—	—
Cheb		19·3	333	—	—	e 7 39	−23	—	—	e 10·5
Algiers		19·4	285	4 29	− 1	e 8 2	− 2	—	—	—
Stuttgart		19·7	324	e 4 31	− 3	e 8 17	+ 7	—	—	e 10·7
Basle		19·8	320	e 4 31	− 4	e 8 7	− 6	—	—	—
Neuchatel		19·8	319	e 4 31	− 4	e 8 25	+12	—	—	—
Jena		20·3	333	e 4 38	− 2	e 8 31	+ 8	e 5 16	PP	—
Strasbourg		20·4	324	e 4 39	− 2	e 8 21	− 4	e 5 50	PP	11·3
Barcelona		20·7	300	e 4 38	− 6	—	—	—	—	e 13·9
Clermont-Ferrand		21·5	310	i 4 49	− 3	i 8 39	− 8	—	—	12·0
Tortosa	E.	21·8	297	4 50	− 6	8 50	− 2	5 1	PP	—
	N.	21·8	297	4 53	− 3	8 55	+ 3	5 14	PPP	e 13·5
Alicante		22·2	290	5 4	+ 4	9 8	+ 8	5 26	PP	e 12·7
Moscow		23·3	16	i 5 12	+ 2	i 9 22	+ 2	e 5 30	PP	—
Paris		23·3	317	i 5 8	− 2	i 9 17	− 3	i 5 52	PP	e 13·5
Uccle		23·4	323	e 5 10?a	− 1	e 9 20	− 1	—	—	e 12·5
De Bilt		23·9	327	e 5 19	+ 3	e 9 35	+ 5	—	—	e 11·5
Copenhagen		24·0	341	i 5 18	+ 1	9 38	+ 6	—	—	11·5
Granada		24·7	287	i 5 24a	0	i 9 47	+ 3	5 47	pP	14·4
Toledo		25·1	293	e 5 22	− 6	10 4	+13	—	—	i 12·0
Helsinki		26·4	358	i 5 41	+ 1	e 10 23	+11	—	—	e 15·5
Upsala		26·7	350	i 5 54	+11	10 28?	+11	—	—	e 14·5
Durham		28·7	326	—	—	e 10 51	+ 1	—	—	—
Aberdeen	N.	30·4	331	—	—	e 12 6	+50	—	—	17·5
Sverdlovsk		32·7	35	6 43	+ 7	11 59	+ 7	—	—	—
Stalinabad		34·2	69	7 1	+12	—	—	—	—	—
Tashkent		34·5	65	e 6 57	+ 5	e 12 27	+ 7	—	—	—
Andijan		36·8	66	e 7 21	+10	e 13 1	+ 5	—	—	—
Frunse		38·3	62	e 7 38?	+14	—	—	—	—	—
Bombay		43·7	98	e 8 21	+13	i 15 1	+22	—	—	—
Irkutsk		57·0	46	e 9 29	−21	—	—	—	—	—
St. Louis	Z.	87·1	315	i 12 51	+ 2	—	—	—	—	—
Pierce Ferry		101·3	328	e 18 6	PP	—	—	—	—	—
Tucson		103·0	324	—	—	e 33 46	SS	—	—	—

Additional readings :—
Helwan S* = 3m.9s., S_g = 3m.24s.
Sofia eE = 3m.31s.
Bucharest eE = 2m.59s. and 3m.31s., eN = 3m.35s.
Warsaw eZ = 4m.32s., eE = 4m.37s., PPPZ = 4m.56s., SE = 8m.4s., SN = 8m.11s., SSZ = 8m.50s., eN = 9m.13s.
Algiers e = 9m.5s.
Jena eS?N = 8m.34s.
Strasbourg e = 6m.38s. and 6m.53s., iSS = 9m.5s.
Tortosa P_cP?N = 10m.8s.
Alicante PPP = 5m.38s., P_cP = 8m.56s., SS = 10m.2s., SSS = 10m.26s.
Paris i = 5m.16s.

Continued on next page.

Uccle SE =9m.23s.
Granada iPP =6m.13s., PPP =6m.24s., pPP =6m.34s., P_cP =8m.49s., sS =10m.22s., SS =11m.16s.
Toledo PPEZ =7m.50s., P_cS?E =10m.24s.
Helsinki i =10m.50s.
Durham iEN =11m.13s.
St. Louis iZ =13m.2s.

Oct. 13d. 23h. 13m. 5s. Epicentre 23°·3S. 66°·4W. Depth of focus 0·025.

A = +·3681, B = −·8425, C = −·3933; δ = −1; h = +4;
D = −·916, E = −·400; G = −·157, H = +·360, K = −·919.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		6·9	346	i 1 43k	+ 3	i 2 53	− 4	—	—	i 3·9
Santa Lucia	E.	10·8	200	2 36	+ 5	(4 32)	+ 3	—	—	4·5
La Plata		13·7	150	3 9	+ 2	5 35	0	—	—	7·6
	Z.	13·7	150	3 14	+ 7	5 43	+ 8	—	—	7·1
Huancayo		14·1	321	e 3 14	+ 2	e 5 50	+ 6	e 3 55	pP	e 6·5
Bogota		28·7	343	e 5 40	− 1	e 10 30	+15	—	—	—
Fort de France		38·1	9	e 6 59	− 3	e 12 27	−13	—	—	—
Bermuda		55·4	2	—	—	i 16 37	− 7	—	—	e 22·7
St. Louis		65·5	339	i 10 22	− 3	i 18 45	− 8	i 20 0	sS	—
Harvard		65·6	357	i 10 24	− 1	—	—	—	—	—
Tucson		69·7	320	i 10 49	− 2	—	—	i 11 10	P_cP	—
La Jolla		74·0	317	e 11 16	0	e 21 6	+35	—	—	—
Palomar		74·1	318	i 11 16k	− 1	e 20 32	0	—	—	—
Pierce Ferry		74·3	322	i 11 18	0	—	—	i 12 11	pP	—
Boulder City		74·6	321	i 11 19	− 1	e 20 40	+ 2	—	—	—
Riverside		74·8	318	i 11 20k	− 1	—	—	—	—	—
Mount Wilson		75·4	318	i 11 22k	− 2	e 20 45	− 2	—	—	—
Pasadena		75·4	318	i 11 23k	− 1	i 20 46	− 1	e 12 20	pP	—
Haiwee		76·6	320	e 11 32	+ 1	—	—	—	—	—
Santa Barbara	Z.	76·6	317	e 11 29	− 2	—	—	—	—	—
Tinemaha		77·4	320	i 11 36k	+ 1	e 21 9	+ 1	—	—	—
Lick	N.	79·6	318	e 11 47	0	—	—	—	—	—
Berkeley		80·3	318	e 11 48	− 3	—	—	—	—	—
Shasta Dam		82·2	320	i 11 59	− 2	—	—	i 12 18	pP	—
Granada		84·3	46	12 13a	+ 1	i 22 16	− 3	12 24	P_cP	—
Grand Coulee		85·2	328	i 12 14	− 2	—	—	—	—	—
Toledo		85·6	43	10 31	?	22 31	− 1	11 10	?	—
Alicante		87·0	45	11 54	−31	22 46	+ 1	22 28	SKS	e 26·7
Algiers		88·6	49	14 55?	?	i 23 4	+ 4	—	—	29·9
Tortosa		89·0	44	17 31	PP	23 9	+ 5	22 47	SKS	—
Clermont-Ferrand		93·2	41	—	—	i 22 13	?	—	—	—
Paris		94·4	38	e 17 42	?	e 25 55?	PS	—	—	e 37·9
Uccle		96·4	36	—	—	e 24 8	0	e 23 26	SKS	—
Strasbourg		97·3	40	—	—	e 24 21	+ 5	23 55?	SKKS	e 31·1
Rome		97·4	46	e 13 7	− 6	e 23 31	[+ 1]	e 17 5	PP	—
Triest		99·8	44	—	—	i 24 38	+ 1	i 23 45	SKS	—
Cheb		100·7	39	—	—	e 23 50	[+ 3]	—	—	—
Copenhagen		102·9	34	—	—	i 25 10	+ 8	24 1	SKS	—
Helwan		107·6	64	e 18 34	PP	e 25 12	S	e 24 21	SKS	—
Ksara		112·4	61	e 15 5	P	28 22	PS	e 19 5	PP	—
Bombay		141·8	88	e 22 22	PP	—	—	—	—	—

Additional readings :—
La Paz iZ =2m.37s.
Santa Lucia PE =2m.46s.
La Plata N =5m.1s., E =6m.13s.
Huancayo e =4m.36s., iS =5m.55s.
Bogota eNZ =5m.47s.
Tucson esP =11m.55s., esPP =14m.37s., ePKP,PKP =38m.56s.
Pierce Ferry iP_cP =11m.32s., e =13m.43s.
Pasadena iE =21m.14s.
Lick eN =11m.51s.
Granada sS =22m.27s., PS =22m.53s., SS =27m.51s.
Alicante iS =22m.34s.

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Tortosa S_cSN =23m.15s., PPSN =24m.55s.
Strasbourg e =24m.29s., eSP =25m.43s.
Rome eSE =24m.25s., esSZ =25m.47s., eSSE =30m.55s.?
Copenhagen 24m.43s., SS =32m.7s.
Helwan e =19m.16s.
Ksara pPP =19m.53s., pPS =29m.26s.

Oct. 13d. Readings also at 0h. (La Paz, La Plata, Huancayo, Mount Wilson (2), Pasadena (2), Palomar (2), Riverside (2), Tucson (2), Boulder City (2), Pierce Ferry (2), Shasta Dam, and College), 3h. (Mount Wilson, Tinemaha, Tucson, Boulder City (2), and Pierce Ferry (2)), 8h. (Malaga), 10h. (Tucson), 14h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Pierce Ferry, Bozeman, Butte, Grand Coulee, and College), 17h. (San Juan), 22h. (near Alicante).

Oct. 14d. 4h. 44m. 40s. Epicentre 30°·1S. 177°·8W. (as on 1943, December 2d.).

A = −·8660, B = −·0333, C = −·4990 ; δ = +7 ; h = +2 ;
D = −·038, E = +·999 ; G = +·499, H = +·019, K = −·867.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland		9·2	221	2 4	−12	3 49	−14	—	—	—
Arapuni		9·6	213	2 32	+11	4 50	+38	—	—	6·5
Tuai		9·6	204	2 9	−12	3 42	−30	—	—	—
Wellington		12·7	207	3 0	− 5	4 56	−32	—	—	7·8
Christchurch		15·4	207	4 27	+47	7 16	+44	7 25	Q	8·8
Apia		17·1	22	—	—	e 7 17	+ 5	e 9 54	L	e 11·5
Brisbane	N.	25·7	268	e 5 33	0	—	—	—	—	—
Riverview		26·5	254	i 5 42 a	+ 1	i 10 30	+16	i 6 22	PP	e 13·1
Honolulu		54·6	23	—	—	e 17 25	+14	—	—	e 23·6
Santa Barbara	Z.	84·4	45	e 12 34	− 2	—	—	—	—	—
La Jolla	Z.	84·9	47	e 12 36	− 2	—	—	—	—	—
Branner	N.	85·0	41	e 12 50	+12	e 23 2	− 5	—	—	—
Santa Clara		85·1	41	—	—	e 23 15	+ 7	—	—	—
Pasadena		85·1	46	i 12 40	+ 1	—	—	—	—	e 38·9
Berkeley		85·2	41	e 12 42	+ 3	e 23 10	+ 1	—	—	e 40·1
Mount Wilson	Z.	85·3	46	i 12 38	− 2	—	—	—	—	—
Palomar		85·4	47	e 12 40	0	—	—	—	—	—
Riverside	Z.	85·5	46	i 12 40	− 1	—	—	—	—	—
Vladivostok		86·3	325	e 12 28	−17	i 23 7	−13	22 58	SKS	—
Tinemaha	Z.	87·0	44	e 12 49	+ 1	—	—	—	—	—
Shasta Dam		87·1	39	e 12 48	− 1	—	—	—	—	—
Boulder City		88·4	47	e 12 55	0	—	—	—	—	—
Tucson		88·7	51	e 12 56	− 1	e 23 25	[0]	—	—	e 36·5
Overton		89·0	46	e 13 13	+15	—	—	—	—	—
Pierce Ferry		89·0	47	e 12 59	+ 1	—	—	—	—	—
Victoria		92·1	33	—	—	e 24 31	+18	—	—	45·3
Salt Lake City		93·2	44	—	—	e 23 54	[+ 3]	—	—	e 40·8
Huancayo		94·6	107	—	—	e 23 57	[− 2]	e 25 47	PS	e 43·7
Bozeman		96·7	40	—	—	e 24 24	[+14]	e 25 1	S	e 43·1
College		97·5	12	—	—	e 24 36	[+22]	e 31 40	SS	e 44·2
La Paz		98·0	114	e 13 44	+ 5	i 24 16	[− 1]	i 26 26	PS	48·0
Saskatoon		102·7	36	—	—	e 30 44	?	—	—	51·3
St. Louis		106·3	54	—	—	e 25 0	[+ 4]	i 26 26	S	46·9
Kodaikanal	E.	107·8	272	e 18 48	PP	—	—	—	—	—
Bombay		115·7	277	—	—	e 25 39	[+ 4]	—	—	—
New Delhi	N.	115·8	289	—	—	i 25 35	[0]	e 26 49	SKKS	—
Fordham		118·9	57	e 30 9	PS	e 36 39	SS	—	—	—
Seven Falls		122·5	50	—	—	e 25 56	[− 2]	e 31 56	PPS	70·3
Bermuda		123·6	69	—	—	e 26 4	[+ 2]	e 36 55	SS	e 51·8
Scoresby Sund		137·4	11	—	—	40 32	SS	—	—	72·3
Ksara		151·3	285	e 19 49	[0]	33 53	PSKS	23 29	PP	—
Copenhagen		153·4	347	23 53	PP	43 32	SS	—	—	87·3
Warsaw	Z.	153·9	333	e 19 57	[+ 4]	e 27 39	[+41]	e 37 0	PPS	e 84·3
Helwan		154·8	276	e 20 0	[+ 6]	—	—	e 21 32	PKP_1	—
Istanbul		155·7	303	e 19 50?	[− 5]	e 33 55	PS	—	—	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
De Bilt	157·9	355	e 31 20?	SKKS	e 44 14	SS	e 60 20?	Q	e 80·3
Uccle	159·3	357	e 20 5	[+ 5]	e 34 43	PSKS	e 44 29	SS	e 80·3
Strasbourg	161·0	348	e 24 35	PP	e 37 38	PPS	e 44 52	SS	e 87·3
Paris	161·3	359	e 20 3	[+ 1]	e 30 23	{−57}	e 24 29	PP	e 83·3
Triest	162·0	333	—	—	e 35 5	PS	e 35 56	PS	—
Clermont-Ferrand	164·4	357	e 25 20	PP	—	—	—	—	90·3
Rome	165·6	328	e 20 6	[0]	e 31 34	{− 7}	e 24 52	PP	—
Toledo	169·0	26	e 20 38	[+29]	27 17	[+ 6]	43 15	SS	—
Alicante	171·5	14	e 21 39	PKP_2	—	—	—	—	e 76·6
Granada	171·5	32	19 52a	[−18]	26 52	[−20]	25 17	PP	78·8

Additional readings :—
Auckland i =2m.46s., 3m.3s., and 5m.7s., S_cS =15m.39s.
Wellington i =5m.1s., iZ =5m.13s., 5m.47s., and 6m.20s.
Riverview iE =6m.27s., iN =11m.48s.
Pasadena iZ =12m.50s.
Vladivostok PS =23m.36s., S_cS =24m.8s., PPS =24m.30s.
Tinemaha iZ =13m.3s.
Tucson i =13m.16s., e =23m.48s.
Pierce Ferry e =13m.13s., 13m.57s., and 15m.37s.
Huancayo eS =24m.35s., eSS =31m.2s., e =37m.6s.
College eSSS =35m.30s.
St. Louis iSKKSE =25m.42s., ePSE =27m.56s.
New Delhi eN =24m.16s., iN =29m.37s.
Seven Falls, e =37m.32s. and 59m.20s.
Bermuda eSSS =42m.6s.
Ksara PPS =36m.53s.
Copenhagen 49m.38s.
Warsaw eZ =20m.20s.
Uccle eN =36m.8s.
Strasbourg e =39m.37s. and 50m.12s., eSSS =51m.4s.
Paris e =32m.17s.
Rome ePSKS? =35m.20s., eSS =45m.50s., SSS =52m.40s.
Toledo eZ =21m.23s. and 21m.49s., PPP(Δ >180°)Z =34m.55s., SSPE =44m.30s., SSSE =48m.54s.
Granada SKKS =31m.33s., SS =46m.43s., SSP =48m.13s.
Long waves were also recorded at Colombo, Helsinki, Cheb, Upsala, Rapid City, Butte, Harvard, Ottawa, and Columbia.

Oct. 14d. 23h. 10m. 18s. Epicentre 0°·2N. 125°·2E. (as on 1945, March 10d.).

A = −·5764, B = +·8171, C = +·0035 ; δ = −10 ; h = +7 ;
D = +·817, E = +·576 ; G = −·002, H = +·003, K = −1·000.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverview		41·7	147	—	—	e 13 42	−28	e 16 42	SS	—
Vladivostok		43·2	7	7 57	− 7	e 14 14?	−18	—	—	—
New Delhi	N.	53·8	306	—	—	i 17 4	+ 3	—	—	—
Irkutsk		54·8	345	e 9 32	− 2	17 9	− 5	—	—	—
Frunse		62·0	320	e 10 36	+12	—	—	—	—	—
Andijan		62·5	317	e 10 28	0	e 18 58	+ 4	—	—	—
Stalinabad		64·2	314	e 10 39	0	19 19	+ 3	—	—	—
Tashkent		64·9	317	e 10 43	0	e 19 27	+ 3	—	—	—
Sverdlovsk		76·3	330	—	—	21 33	− 4	26 55	SS	—
Ksara		89·3	304	e 13 23	+24	25 7	PS	16 43	PP	—
Rome	E.	106·4	314	—	—	e 24 46	[−11]	—	—	—
Strasbourg		107·7	323	e 18 42?	PP	e 28 42?	PS	—	—	—
Pierce Ferry		114·4	50	e 18 32	[−10]	—	—	i 19 28	PP	—
Tucson		118·1	52	e 19 51	PP	—	—	—	—	—
Granada		119·9	314	—	—	(28 12)	[+58]	—	—	28·2

Additional readings :—
Riverview iN =17m.37s.
New Delhi iN =17m.36s.
Long waves were also recorded at Uccle and De Bilt.

Oct. 14d. Readings also at 3h. (La Paz), 4h. (San Juan), 9h. (near Bogota), 10h. (Boulder City and Pierce Ferry (2)), 16h. (Collmberg), 21h. (Brisbane and Shasta Dam), 22h. (Boulder City, Pierce Ferry (2), and Shasta Dam), 23h. (Boulder City, Pierce Ferry, Shasta Dam, and Tucson (2)).

Oct. 15d. 6h. 39m. 19s. Epicentre 18°·5S. 169°·1E. Depth of focus 0·020.
(as on 1941, May 7d.).

A = −·9319, B = +·1795, C = −·3154; δ = +14; h = +5;
D = +·189, E = +·982; G = +·310, H = −·060, K = −·949.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		17·3	236	i 3 47	− 6	e 6 57	− 1	e 7 20	SS	—
Auckland		19·0	164	4 8	− 4	7 52	+18	—	—	—
New Plymouth		20·9	169	5 13	PPP	—	—	—	—	—
Tuai		21·4	163	5 42	PPP	—	—	—	—	—
Riverview		22·1	222	e 4 46	+ 3	e 8 43	+12	i 5 26	PPP	e 10·2
Wellington		23·2	170	5 3	+10	10 0	SS	5 36	pP	—
Christchurch		25·1	175	5 17	+ 6	9 48	+26	6 1	pP	—
Honolulu		51·1	42	—	—	e 16 49	sS	—	—	e 22·8
Vladivostok		70·2	333	e 10 57	0	—	—	—	—	—
Shasta Dam		86·6	45	e 12 25	− 1	—	—	e 13 8	pP	—
Pasadena		86·7	53	e 12 26	− 1	e 23 42	PS	i 13 10	sP	—
Mount Wilson	z.	86·8	53	e 12 26	− 1	i 13 10	sP	e 12 58	pP	—
La Jolla		86·9	55	e 12 31	+ 3	e 23 57	PS	—	—	—
Riverside	z.	87·2	54	e 12 29	0	i 13 12	sP	e 13 2	pP	—
Palomar		87·4	54	i 12 30	0	i 23 49	+54	e 13 2	pP	—
Tinemaha		87·9	51	e 12 32	− 1	e 24 6	PS	e 13 4	pP	—
Boulder City		89·3	52	e 12 42	+ 3	—	—	i 13 22	pP	—
College		89·4	17	—	—	e 22 18	−56	—	—	—
Irkutsk		90·0	326	13 7	+25	—	—	—	—	—
Pierce Ferry		90·6	52	i 12 46	+ 1	—	—	i 13 18	pP	—
Tucson		91·6	57	e 12 50	0	e 24 50	sS	i 13 35	pP	—
Bombay		101·5	286	e 17 1	?	e 24 1	[+ 4]	—	—	—
Tashkent		109·2	308	28 37	PS	25 28	[+56]	26 17	SKKS	—
St. Louis	z.	109·5	55	e 19 12	PP	—	—	—	—	—
Sverdlovsk		115·4	324	—	—	25 52	[+56]	29 38	PS	—
Ksara		136·5	299	e 19 44	[+41]	—	—	22 6	PP	—
Helwan		140·0	294	e 17 31	?	e 41 9	SSP	e 22 35	PP	—
De Bilt		144·2	343	e 19 11	[− 6]	—	—	—	—	e 65·7
Uccle		145·6	344	e 19 20	[+ 1]	—	—	c 22 41	PP	—
Stuttgart	z.	145·7	336	e 19 17	[− 2]	—	—	e 19 54	pPKP	—
Triest		146·1	329	e 20 1	[+41]	—	—	—	—	—
Strasbourg		146·4	338	e 19 20	[− 1]	e 28 11	SKKS	e 42 41	SSS	74·7
Chur		147·1	335	e 19 31	[+ 9]	—	—	—	—	—
Zürich		147·1	336	e 20 20	[+58]	—	—	—	—	—
Basle		147·3	336	e 19 56	[+34]	—	—	—	—	—
Paris		147·9	343	e 19 25	[+ 2]	e 26 33	[+20]	e 23 19	PP	e 70·7
Rome		149·3	326	e 19 27	[+ 2]	42 39	SS	i 23 19	PP	—
Granada		160·3	343	i 20 51k	[+71]	—	—	24 40	PP	—

Additional readings :—
Riverview iE = 8m.49s., iSSE = 9m.26s., iN = 9m.31s.
Wellington iZ = 5m.22s., i = 5m.33s.
Christchurch sS = 10m.30s.
Shasta Dam e = 12m.57s., epPP? = 16m.24s.
Pasadena iPPZ = 16m.33s.
Mount Wilson ePPZ = 16m.32s.
Riverside ePPZ = 16m.35s.
Palomar ePPZ = 16m.33s.
Boulder City epPP = 17m.0s.
Pierce Ferry e = 15m.15s., ePP = 16m.22s., epPP = 17m.1s.
Tucson e = 13m.24s., epPP = 17m.17s.
Sverdlovsk SKKS = 26m.58s.
Ksara e = 21m.46s. and 23m.17s.
Uccle e = 20m.0s.
Strasbourg e = 19m.27s., 19m.54s., 20m.4s., 20m.57s., and 23m.23s.
Paris e = 20m.1s., i = 20m.7s., e = 25m.31s., eSKKS = 30m.31s., eSKSP = 33m.43s., eSS = 42m.43s.
Rome ePKP$_2$ = 19m.59s.

Oct. 15d. 7h. Undetermined shock.

Auckland P? =50m.45s., S? =54m.50s., L =55·7m.
Apia 51m.0s.
Wellington P?Z =51m.30s.?, S =56m.30s.?
Christchurch P =51m.46s., S =56m.36s., Q =57m.42s., R =59m.36s.
Riverview iP?Z =53m.1s.a, eS?E =57m.5s., iE =57m.11s., eLE =60m.0s.
Arapuni e =53m.6s.
Mount Wilson ePZ =58m.18s., iZ =65m.28s. and 65m.35s.
Pasadena ePZ =58m.19s., iZ =65m.36s., eLZ =82m.11s.
Shasta Dam eP =58m.19s.
Riverside ePZ =58m.23s., eZ =65m.32s.
Palomar iPZ =58m.25s., iZ =65m.32s.
Tinemaha ePZ =58m.26s., iZ =65m.37s.
La Jolla ePZ =58m.25s.
Boulder City eP =58m.37s.
Pierce Ferry eP =58m.38s., iP =58m.41s., e =59m.47s. and 65m.49s.
Tucson eP =58m.45s., e =65m.54s. and 69m.12s., eL =84m.45s.
Ksara e =65m.33s.?
Stuttgart eZ =65m.50s.
Helwan P =65m.52s., e =66m.12s. and 68m.0s.
Strasbourg e =65m.54s. and 66m.2s.
Basle e =65m.57s.
Paris e =66m.0s., eL =124m.0s.
Granada ePKP =66m.4s.a, ePP =70m.52s., L =128·8m.
Rome ePZ =66m.8s., ePPE =68m.44s., eN =70m.6s., eSKS?N =72m.56s., eLE =112m.30s.
College e =69m.24s., eL =81m.31s.
Balboa Heights e =81m.24s., e =81m.39s.
Long waves were also recorded at Honolulu, Salt Lake City, Copenhagen, De Bilt, Uccle, and Clermont-Ferrand.

Oct. 15d. 14h. Undetermined shock.

Sitka iP =56m.18s., eS =57m.5s., iL =57m.26s.
Grand Coulee e =57m.51s., i =60m.38s.
Shasta Dam eP =58m.43s.
Tinemaha ePZ =59m.44s.
Haiwee eN =59m.57s.
Boulder City e =60m.1s.
Pasadena ePZ =60m.8s., iZ =60m.13s., eZ =60m.53s., and 61m.46s.
Mount Wilson ePZ =60m.9s., iZ =60m.12s.
Pierce Ferry eP =60m.9s.
Rapid City e =60m.12s. and 66m.40s., eL? =67m.53s.
Santa Barbara eEN =60m.12s.
Riverside eZ =60m.14s.
Palomar e =60m.22s., iZ =60m.28s.
La Jolla eZ =60m.29s.
Tucson eP =60m.53s.
Long waves were also recorded at College, Salt Lake City, Butte, and St. Louis.

Oct. 15d. Readings also at 5h. (Boulder City), 6h. (Shasta Dam, Pierce Ferry, and Tucson), 8h. (Balboa Heights and near Zürich), 9h. (near Alicante), 11h. (Collmberg and Apia), 12h. (La Jolla, Mount Wilson, Pasadena, Riverside, Palomar, Shasta Dam, Tinemaha, Boulder City, Pierce Ferry, Tucson, and near Apia), 13h. (Mount Wilson, Tinemaha, Pasadena, Riverside, Palomar, Riverview, Brisbane, and Christchurch), 14h. (Pierce Ferry and Boulder City), 18h. (near Tacubaya), 20h. (Mizusawa, Pasadena, Mount Wilson, Shasta Dam, La Jolla, Riverside, Palomar, Tinemaha, Pierce Ferry, Tucson, Riverview, Brisbane, and Stuttgart).

Oct. 16d. Readings at 2h. (near Mizusawa), 6h. (Pierce Ferry, Samarkand, and near Stalinabad), 7h. (near Tacubaya), 9h. (Brisbane, Riverview, Arapuni, Auckland, Christchurch, and Wellington), 10h. (Mizusawa), 20h. (near Zagreb), 21h. (near Andijan), 22h. and 23h. (near Triest).

Oct. 17d. 17h. Turkey.

Ksara eP? =0m.38s.?, eS? =2m.12s.
Leninakan eP =0m.46s.
Grozny eP =1m.11s.
Helwan eP =1m.45s., e =2m.33s., 3m.45s., and 4m.42s., i =8m.52s.
Samarkand P =3m.8s.
Stalinabad eP =3m.23s.
Tashkent eP =3m.26s.
Andijan eP =3m.56s.
Moscow P =4m.0s., S =7m.55s.
Sverdlovsk eP =4m.35s., eS =8m.45s.

Oct. 17d. Readings also at 6h. (Tinemaha, Boulder City, Tucson, Overton, Pierce Ferry, and Shasta Dam), 7h. (Balboa Heights), 9h. (Overton and Pierce Ferry), 12h. (Boulder City, Overton, Pierce Ferry, and Shasta Dam), 13h. (Boulder City), 15h. (Grand Coulee, and near Sitka), 16h. (Tucson), 20h. (Huancayo, Overton, Pierce Ferry, and near Branner), 23h. (Boulder City, and Pierce Ferry).

Oct. 18d. 4h. 33m. 44s. Epicentre 33°·8N. 26°·5E. (as on 13d.).

$A = +\cdot7452$, $B = +\cdot3716$, $C = +\cdot5537$; $\delta = -1$; $h = +1$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Helwan		5·7	132	e 1 40	P*	i 2 48	S*	3 9	S_g		i 4·6
Istanbul		7·5	15	e 2 1	PP	e 4 37	S_g	—	—		—
Ksara		7·8	87	e 2 16?	P*	(e 4 31)	S_g	—	—		e 4·5
Sofia		9·2	346	e 2 22	PP	(e 5 2?)	S_g	e 2 56?	PPP		e 5·0
Bucharest		10·6	358	e 4 22	S	(e 4 22)	−15	—	—		5·4
Belgrade		12·0	339	e 5 27	SS	—	—	—	—		e 8·5
Rome		13·7	310	e 3 20	+ 2	e 5 58	+ 6	i 6 38	SSS		e 7·8
Budapest		14·8	340	—	—	e 6 31	SS	—	—		e 8·5
Triest		15·3	324	e 3 56	PP	e 6 43	SS	—	—		—
Florence	E.	15·5	315	3 44	+ 2	e 6 31	− 4	—	—		—
Chur		18·3	321	e 4 17a	0	—	—	—	—		—
Prague		18·5	335	e 4 1	−18	—	—	e 8 58	P_cP		—
Warsaw		18·8	349	4 28	+ 5	e 8 21	SS	4 48	PP		e 10·8
Zürich		19·1	321	e 4 26a	− 1	e 8 9	+12	—	—		—
Cheb		19·3	333	—	—	e 8 16?	+14	—	—		e 11·3
Stuttgart	Z.	19·7	324	e 4 33	− 1	—	—	—	—		—
Basle		19·8	320	e 4 34	− 1	—	—	—	—		—
Strasbourg		20·4	324	e 4 36	− 5	e 8 28	+ 3	e 5 26	PPP		e 11·3
Clermont-Ferrand		21·5	310	e 4 52	0	e 8 51	+ 4	—	—		12·3
Alicante		22·2	290	—	—	e 9 10	+10	—	—		e 15·5
Moscow		23·3	16	e 5 16	+ 6	e 9 24	+ 4	—	—		—
Paris		23·3	317	e 4 56?	−14	e 9 27	+ 7	i 5 31	PP		e 13·3
Uccle	E.	23·4	323	—	—	e 9 26	+ 5	—	—		e 12·3
De Bilt		23·9	327	e 5 16	0	e 9 36	+ 6	—	—		e 12·3
Copenhagen		24·0	321	—	—	9 28	− 4	—	—		15·3
Granada		24·7	287	5 23k	− 1	i 9 42	− 2	9 52	sS		—
Durham		28·7	326	—	—	e 11 17	+27	19 49	Q		23·8
Sverdlovsk		32·7	35	e 7 51	PP	—	—	—	—		—

Additional readings :—
Prague e = 5m.31s.
Warsaw eSZ = 8m.24s., SSE = 9m.13s.
Strasbourg e = 4m.42s., 5m.31s., and 8m.38s.
Paris e = 5m.5s.
Granada PPP = 6m.10s., SS = 11m.13s.
Long waves were also recorded at Zagreb and at Aberdeen.

Oct. 18d. 20h. Mozambique.

Intensity VI at Fingoé (Mozambique); IV at Serra de Moué, Vila Mouzinho.

Anais do Observatorio central meteorológico de Infante D. Luis, Observaçoes sismológicas, vol. 84, año de 1946, Lisbonne, 1950, p.18.

Tucson eP = 51m.23s., e = 53m.8s.
Pierce Ferry iP = 51m.26s., i = 51m.35s., e = 56m.8s.
Overton iP = 51m.28s., e = 53m.2s.
Boulder City iP = 51m.29s.
Shasta Dam iP = 51m.33s., i = 51m.42s.
Haiwee ePEN = 51m.35s.
Palomar iP = 51m.36s.
Tinemaha ePEN = 51m.36s.
Pasadena iPZ = 51m.37s.
La Jolla ePZ = 51m. 38s.
Mount Wilson iPZ = 51m.38s.
Santa Barbara ePZ = 51m.41s.
Ksara e = 54m.14s., e = 57m.42s.
Helwan eP = 55m.18s., e = 56m.6s., and 57m.12s.

Oct. 18d. Readings also at 0h. (Bogota, Fort de France, Huancayo, La Paz, Tucson (2), Riverside, Pasadena, Overton (2), Boulder City, Pierce Ferry (2), Tinemaha, Shasta Dam, Mount Wilson, and Grand Coulee), 1h. (Ksara), 2h. (Suva, Pierce Ferry, Tucson, Auckland, and Riverview), 7h. (Tashkent and near Andijan), 9h. (Tashkent), 10h. (Bermuda), 11h. (Pierce Ferry), 12h. (Ksara), 14h. (Boulder City), 17h. (near Andijan), 18h. (Shasta Dam, Zagreb, Rome, Stuttgart, and near Triest), 19h. (Pierce Ferry and near Leninakan), 20h. (Sverdlovsk and Johannesburg), 21h. (Rome), 22h. (Triest, Mizusawa, Shasta Dam, Mount Wilson, Pasadena, Pierce Ferry, and Tucson), 23h. (Riverview).

Oct. 19d. 14h. 23m. 10s. Epicentre 58°·5N. 151°·0W.

$A = -\cdot4593$, $B = -\cdot2546$, $C = +\cdot8511$; $\delta = +15$; $h = -8$;
$D = -\cdot485$, $E = +\cdot875$; $G = -\cdot744$, $H = -\cdot413$, $K = -\cdot525$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Sitka		8·4	89	e 1 55	−11	i 3 16	−27	— —	e 3·5
Victoria		19·1	109	e 4 19	− 8	—	—	— —	8·8
Grand Coulee		21·7	103	i 4 46	− 9	e 11 14	L	— —	(e 11·2)
Shasta Dam		25·4	121	i 5 33	+ 2	e 10 15	+19	— —	—
Saskatoon		25·6	85	5 19	−13	9 39	−20	— —	11·8
Butte		26·2	100	e 5 51	+13	e 10 3	− 6	— —	e 13·6
Bozeman		27·2	99	e 5 52	+ 5	e 10 11	−14	— —	e 14·3
Logan		29·6	106	e 6 7	− 2	—	—	— —	e 15·0
Tinemaha		30·2	119	e 6 16	+ 2	—	—	— —	—
Salt Lake City		30·3	107	e 6 11	− 4	—	—	— —	e 13·5
Haiwee		31·1	120	e 6 24	+ 2	—	—	— —	—
Santa Barbara	z.	31·8	124	e 6 30	+ 2	—	—	— —	—
Overton		32·4	116	i 6 34	0	—	—	— —	—
Rapid City		32·4	94	e 6 46	+12	—	—	— —	e 16·1
Mount Wilson		32·7	122	i 6 37	+ 1	—	—	— —	—
Pasadena		32·7	122	i 6 37k	+ 1	—	—	— —	e 16·0
Boulder City		32·7	116	i 6 35	− 1	—	—	— —	—
Pierce Ferry		33·0	115	i 6 37	− 2	—	—	— —	—
Palomar		33·9	122	i 6 48k	+ 1	—	—	— —	—
La Jolla	z.	34·2	123	e 6 58	+ 9	—	—	— —	—
Tucson		37·6	115	e 7 17	− 1	—	—	— —	e 17·9
Ottawa		45·7	71	8 7	−17	14 37	−31	18 2 SS	20·8
Seven Falls		46·9	67	—	—	e 14 57	−28	— —	20·8
Vladivostok		48·3	286	e 8 49	+ 4	—	—	— —	—
Weston		50·1	71	e 8 43	−16	—	—	e 20 42 SSS	e 25·2
Sverdlovsk		62·3	341	i 10 26	0	e 18 33	−19	— —	—
Andijan		74·7	327	e 11 44	+ 1	—	—	— —	—
Tashkent		75·0	330	—	—	e 21 0	−23	— —	—
Ksara		87·9	354	e 12 46	− 7	e 23 58	+23	— —	—

Additional readings :—
College (△ = 6°·6) e = 22m.26s., i = 22m.40s., e = 23m.12s., eL = 23m.22s.
Overton i = 6m.43s., e = 8m.50s.
Pierce Ferry i = 6m.47s., e = 7m.23s., and 8m.23s.
Tucson e = 7m.31s.
Long waves were also recorded at Lincoln, New Kensington, Columbia, and Bermuda.

Oct. 19d. Readings also at 0h. (near Fort de France), 3h. (near Grozny), 4h. (Shasta Dam), 8h. (Stalinabad), 9h. (Fort de France, Bogota, and Bermuda), 10h. (Overton, and San Juan), 16h. (Ksara), 18h. (Bermuda), 19h. (Balboa Heights).

Oct. 20d. Readings at 0h. (Mount Wilson, Palomar, Tucson, Boulder City, and Pierce Ferry), 2h. (Riverview), 4h. (Boulder City and near Pierce Ferry), 7h. (near Mizusawa), 8h. and 9h. (near Mineral), 10h. (near Andijan), 11h. (Brisbane, Riverview, Huancayo, Boulder City, Overton, and Pierce Ferry), 13h. (Balboa Heights), 14h. (near Basle and Zürich), 19h. (Pierce Ferry), 22h. (Samaraknd, near Stalinabad and Andijan), 23h. (Balboa Heights, Samarkand, and near Stalinabad).

Oct. 21d. 13h. 45m. 10s. Epicentre 8°·1N. 83°·2W. (as on 1944, April 28d.).

$A = +·1172$, $B = -·9832$, $C = +·1400$; $\delta = +2$; $h = +6$;
$D = -·993$, $E = -118$; $G = +·017$, $H = -·139$, $K = -·990$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota	z.	9·7	110	e 2 19	− 3	e 4 9	− 6	e 2 32	PP	—
Tacubaya		19·1	309	e 4 34	+ 7	i 8 20	SS	e 8 23	S	—
Huancayo		21·5	159	e 4 46	− 6	e 8 55	+ 8	e 7 36	?	—
Fort de France		22·6	71	e 4 52	−11	—	—	—	—	—
Columbia		25·9	3	—	—	e 10 10	+ 6	—	—	e 13·3
La Paz	z.	28·6	148	6 4	+ 4	11 4	+16	—	—	15·5
Bermuda		29·5	33	e 8 30	PP	—	—	—	—	—
St. Louis		31·1	349	e 6 17	− 5	e 11 26	− 2	i 6 22	P	—
Tucson		35·1	317	e 6 56	− 1	—	—	—	—	e 16·9
Ottawa		37·7	9	e 7 14	− 5	—	—	—	—	16·8
Pierce Ferry		39·6	320	i 7 38	+ 3	—	—	e 9 13	PP	—
Rapid City		39·9	338	e 7 27	−10	—	—	—	—	e 23·0
Boulder City		40·0	319	e 7 41	+ 3	—	—	e 9 50	PPP	—
La Jolla		40·0	313	e 7 38	0	—	—	—	—	—
Palomar		40·0	314	e 7 40	+ 2	—	—	—	—	—
Overton		40·1	320	e 7 44	+ 5	—	—	i 9 32	PPP	—
Seven Falls		40·3	13	e 9 25	PP	e 18 2	S_cS	—	—	19·8
Mount Wilson	z.	41·3	315	e 7 51	+ 2	—	—	—	—	—
Pasadena	z.	41·3	315	e 7 51	+ 2	—	—	—	—	e 21·0
Haiwee	z.	42·2	317	e 7 59	+ 3	—	—	—	—	—
Santa Barbara	z.	42·6	314	e 8 10	+11	—	—	—	—	—
Tinemaha		42·9	318	e 8 4	+ 2	—	—	—	—	—
Berkeley		46·1	316	e 8 30	+ 2	e 15 32	PPS	—	—	—
Shasta Dam		47·6	320	e 8 39	0	—	—	—	—	—
Grand Coulee		49·9	330	i 9 0	+ 3	—	—	—	—	—
Granada		76·9	54	e 11 48a	− 8	—	—	—	—	—
Paris		81·1	42	e 12 21	+ 3	—	—	—	—	e 37·8
Uccle		82·2	40	—	—	e 22 40	+ 1	—	—	e 35·8
Copenhagen		86·5	34	—	—	e 23 19	− 3	—	—	39·8
Collmberg	z.	87·6	39	e 12 44	− 7	—	—	e 12 55	P_cP	—
Ksara		108·9	52	e 14 57	P	e 26 15	{+18}	—	—	—

Additional readings :—
St. Louis iE = 12m.9s., eE = 13m.26s.
Tucson iP = 7m.0s., i = 7m.16s.
Pierce Ferry i = 8m.7s.
Boulder City e = 8m.33s.
Overton i = 7m.52s.
Collmberg eZ = 12m.47s., 13m.3s., and 13m.14s.
Long waves were also recorded at Balboa Heights, Salt Lake City, Butte, College, De Bilt, Clermont-Ferrand, Prague, Strasbourg, and Alicante.

Oct. 21d. Readings also at 0h. (Apia, Mount Wilson, Haiwee, Pasadena, Palomar, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, and Shasta Dam), 1h. (Istanbul and Ksara), 3h. (Fort de France), 6h. (Mount Wilson, Pasadena, Palomar, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Huancayo (2), and near La Paz), 7h. (near Tacubaya), 10h. (near Mineral), 11h. (Pierce Ferry), 15h. (Belgrade), 19h. (Boulder City and Pierce Ferry), 20h. (near Samarkand), 21h. (near Tacubaya), 22h. (Boulder City, Pierce Ferry, and near Mineral), 23h. (near Triest).

Oct. 22d. 10h. 0m. 13s. Epicentre 14°·5S. 167°·6E. Depth of focus 0·020.

$A = -·9460$, $B = +·2080$, $C = -·2488$; $\delta = +8$; $h = +6$;
$D = +·215$, $E = +·977$; $G = +·243$, $H = -·053$, $K = -·969$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Suva	11·0	110	i 2 57	+23	i 4 57	+23	—	—	—
Brisbane	18·7	224	i 4 6	− 2	i 7 22	− 6	—	—	i 9·3
Auckland	23·2	165	4 45	− 8	9 2	+12	8 31	P_cP	—
Riverview	24·3	214	i 5 6a	+ 2	e 9 5	− 3	i 5 49	pP	e 10·9
Arapuni	24·5	165	—	—	e 9 35	+23	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tuai		25·6	163	5 17	+ 1	—	—	—	—	—
Wellington		27·4	168	5 31	− 1	9 57	− 2	6 20	pP	—
Kaimatu		28·1	174	e 7 27	?	9 57	−13	—	—	—
Christchurch		29·2	172	5 50	+ 1	10 29	+ 1	11 29	Q	13·8
Perth		50·2	241	i 9 54	PP	i 15 44	+ 4	i 19 34	SS	—
Mizusawa	E.	58·8	337	9 42	− 2	e 17 29	− 5	—	—	—
	N.	58·8	337	e 9 45	+ 1	—	—	—	—	—
Branner		83·7	49	e 12 13	+ 1	e 22 17	− 2	e 13 4	pP	—
Berkeley		83·8	49	i 12 13	+ 1	i 22 21	+ 1	i 13 2	pP	e 37·8
Santa Clara		83·8	49	e 12 4	− 8	e 22 12	− 8	e 13 4	pP	e 34·9
Lick		84·0	49	e 12 14	+ 1	e 22 14	− 8	e 13 5	pP	—
Santa Barbara	Z.	84·4	53	e 12 10	− 5	—	—	e 13 3	pP	—
Shasta Dam		84·8	46	e 12 17	0	e 21 59	− 31	i 13 5	pP	—
Mineral	E.	85·2	47	e 12 20	+ 1	—	—	e 13 11	pP	—
Pasadena		85·4	53	i 12 21a	+ 1	e 22 23	[− 3]	i 13 10	pP	34·6
Mount Wilson		85·6	53	i 12 21a	0	e 22 30	[+ 2]	i 13 11	pP	—
La Jolla		85·7	56	e 12 23	+ 1	e 22 32	[+ 4]	e 13 13	pP	—
Sitka		85·8	28	e 12 12	−10	i 22 30	[+ 1]	e 17 54	PP	e 35·4
Calcutta	N.	85·9	295	e 13 17	− 6	e 23 20	[+50]	i 28 38	SS	i 41·8
Irkutsk		85·9	327	i 12 22	− 1	e 22 28	[− 2]	13 5	pP	—
College		86·0	18	e 12 24	+ 1	e 22 28	[− 3]	e 13 6	pP	e 35·2
Riverside		86·0	53	e 12 26	+ 3	—	—	—	—	—
Palomar		86·2	55	i 12 24a	0	i 22 36	[+ 4]	i 13 15	pP	—
Haiwee		86·3	52	e 12 26	+ 1	e 22 34	[+ 1]	e 13 15	pP	—
Tinemaha		86·4	51	i 12 27	+ 2	e 22 36	[+ 3]	i 13 20	pP	—
Boulder City		88·6	53	i 12 37	+ 1	e 22 56	[+ 9]	i 13 31	pP	—
Overton		89·1	52	i 12 39	+ 1	i 23 16	+ 5	i 13 29	pP	—
Pierce Ferry		89·3	53	i 12 39	0	i 22 58	[+ 6]	i 13 32	pP	—
Colombo	E.	89·5	277	12 41	+ 1	22 52	[− 1]	—	—	—
Grand Coulee		89·9	40	i 12 41	− 1	—	—	i 13 33	pP	—
Tucson		90·7	57	i 12 46	0	e 23 30	+ 5	i 13 36	pP	—
Salt Lake City		92·4	48	e 12 57	+ 3	e 23 41	+ 1	e 13 41	pP	—
Kodaikanal	E.	92·6	280	i 12 56	+ 1	i 23 46	+ 4	i 16 26	PP	43·5
Logan		92·7	47	e 13 48	pP	i 23 15	[+ 3]	e 16 44	PP	e 36·7
Butte		93·4	43	—	—	e 23 14	[− 2]	e 30 15	SS	e 38·0
Hyderabad	N.	93·5	287	—	—	23 16	[0]	—	—	—
Bozeman		94·3	44	e 13 6	+ 4	e 23 58	+ 1	e 23 20	SKS	e 38·8
New Delhi	N.	97·1	298	—	—	i 23 30	[− 5]	25 36	PS	—
Saskatoon		98·7	38	—	—	e 22 52	[−51]	(30 47?)	SS	30·8
Bombay		99·0	287	e 13 29	+ 5	i 23 49	[+ 4]	16 35	PP	42·5
Rapid City		99·4	47	—	—	e 24 45	+ 5	i 23 47	SKS	e 42·6
Frunse		101·9	311	13 57	+20	—	—	18 7	PP	—
Lincoln		103·6	50	—	—	e 24 8	[+ 1]	e 26 44	SP	e 60·0
Tashkent		105·6	309	e 13 48	P	26 53	SP	e 18 15	PP	—
Stalinabad		105·7	307	13 55	P	i 24 20	[+ 4]	—	—	—
Samarkand		107·2	307	18 2	PKP	24 21	[− 2]	—	—	—
Florissant		108·2	53	e 13 58	P	i 24 30	[+ 2]	e 14 52	pP	—
St. Louis		108·3	53	e 18 33	PP	i 24 23	[− 5]	e 19 19	pPP	—
Sverdlovsk		111·3	325	i 14 25	P	24 46	[+ 6]	18 13	PKP	—
Huancayo		112·3	109	e 18 22	[+ 5]	i 29 10	pPS	e 20 0	pPP	—
Columbia		115·6	58	—	—	e 25 1	[+ 4]	e 29 2	PS	e 52·4
La Paz	Z.	116·9	118	e 18 35	[+ 9]	29 12	PS	i 19 47	PP	54·5
Ottawa		118·9	46	18 29	[− 1]	25 11	[+ 2]	29 35	PS	34·8
Baku		120·3	308	18 36	[+ 3]	—	—	—	—	—
Fordham		120·9	51	e 20 5	PP	i 25 19	[+ 4]	i 26 50	SKKS	54·8
Seven Falls		121·9	43	e 20 11	PP	25 13	[− 5]	26 50	SKKS	29·8
Weston		122·5	48	e 18 37	[+ 1]	e 25 21	[+ 1]	e 20 15	PP	—
Grozny		122·9	312	18 41	[+ 4]	e 20 11	PP	19 23	pPKP	—
Scoresby Sund		123·7	4	i 20 24	PP	25 28	[+ 4]	27 1	SKKS	—
Moscow		123·9	328	15 4	P	20 19	PP	15 56	pP	—
Leninakan		124·9	310	e 18 42	[+ 1]	—	—	—	—	—
Sotchi		127·1	314	18 43	[− 2]	—	—	i 20 47	PP	—
Bermuda		129·3	60	e 21 1	PP	e 27 47	SKKS	e 38 7	SS	e 51·6
Upsala		129·6	340	i 22 9	SKP	27 29	SKKS	24 22	PPP	e 38·8
Bergen	N.	132·4	348	e 22 14	SKP	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Ksara		132·4	302	i 18 57	[+ 1]	21 22	PP	19 49	pPKP		—
Fort de France		132·9	83	e 18 56	[0]	—	—	—	—		—
Warsaw	z.	133·9	331	18 58 a	[0]	25 26	[−25]	21 30	PP		e 59·8
Copenhagen		134·6	341	e 19 0	[0]	39 17	SS	e 21 33	PP		—
Istanbul		135·4	314	e 18 57	[− 4]	—	—	e 21 31	PP		—
Bucharest		135·8	320	e 19 29	[+27]	—	—	e 22 52	PKS		—
Helwan		137·0	298	i 19 5k	[+ 1]	—	—	19 56	pPKP		—
Potsdam		137·1	337	e 19 12	[+ 8]	—	—	i 22 38	PKS		e 58·8
Prague		138·4	334	e 18 58	[− 8]	e 28 35	SKKS	e 21 59	PP		e 59·8
Jena	N.	138·8	336	e 19 2	[− 5]	—	—	e 21 59	PP		—
Belgrade		138·9	320	e 18 29	[−38]	e 27 29	?	e 21 17	PP		58·8
Durham		138·9	349	19 15	[+ 8]	i 22 47	PKS	—	—		—
Cheb		139·2	335	e 18 47?	[−21]	e 22 3	PP	—	—		e 62·8
De Bilt		139·9	342	e 19 3k	[− 7]	e 40 14	SS	i 20 3	pPKP		—
Zagreb		140·7	328	e 19 3	[− 8]	i 22 54	PKS	e 22 15	PP		—
Uccle		141·3	344	e 19 10	[− 2]	e 22 50	PKS	e 22 11	PP		e 57·8
Stuttgart		141·5	337	e 19 7	[− 5]	e 22 17	PP	e 22 35	PKS		—
Triest		141·9	330	e 19 11	[− 2]	e 35 2	PPS	i 22 51	PKS		—
Strasbourg		142·2	338	e 19 9	[− 4]	e 22 59	PKS	i 22 20	PP		e 67·0
Chur		142·9	334	e 19 12k	[− 3]	—	—	—	—		—
Zürich		142·9	336	e 19 11	[− 4]	—	—	e 22 17	PP		—
Basle		143·1	337	e 19 12	[− 3]	e 26 32	[+26]	e 22 24	PP		—
Paris		143·7	343	i 19 14	[− 2]	e 28 15	SKKS	e 19 56	pPKP		e 67·8
Neuchatel		143·8	337	e 19 13	[− 3]	—	—	e 22 26	PP		—
Besançon		143·9	338	e 19 15	[− 1]	—	—	—	—		—
Florence	E.	144·5	330	e 19 12	[− 5]	—	—	—	—		—
Rome	z.	145·2	327	i 19 17 a	[− 1]	e 25 33	[−37]	i 22 42	PP		—
Clermont-Ferrand		146·2	340	i 19 22	[+ 2]	e 26 52	[+41]	i 22 48	PP		e 67·3
Barcelona		150·4	338	e 19 31	[+ 4]	—	—	—	—		—
Tortosa	N.	151·5	338	i 19 32	[+ 4]	26 8	[−10]	20 16	pPKP		—
Toledo	z.	153·7	345	19 31	[− 1]	26 21	[0]	19 54	pPKP		—
Algiers		153·9	330	e 19 33	[+ 1]	e 23 32	SKP	i 19 56	pPKP		—
Alicante		154·0	338	19 43	[+11]	29 49	SKKS	19 55	pPKP		e 51·1
Granada		156·1	342	19 35k	[0]	29 24	SKKS	20 29	pPKP		—

Additional readings :—
Suva i = 4m.36s. and 5m.17s.
Auckland i = 5m.42s., S_cP = 11m.33s., S_cS? = 15m.39s.
Riverview iZ = 5m.16s., iPPN = 5m.54s., iPPPZ = 6m.5s., iE = 6m.10s., iP_cPZ = 8m.36s., iSN = 9m.12s., iE = 9m.53s. and 10m.4s., isSE = 10m.21s., isSN = 10m.25s., iSSN = 10m.32s., iSSE = 10m.35s., iSSSN = 10m.51s.
Wellington i = 5m.42s., iZ = 6m.31s., sPP = 7m.9s., P_cP = 8m.31s., i = 10m.1s., S_cS = 16m.2s., sS_cS = 17m.3s.
Perth i = 12m.59s.
Branner eN = 16m.39s., eEN = 23m.49s.
Berkeley eQEN = 34m.47s.
Santa Clara esSN = 23m.49s.
Shasta Dam i = 12m.34s., and 13m.11s., epS = 23m.23s.
Pasadena iPPZ = 15m.40s., eEZ = 23m.30s., eSSZ = 27m.58s.
Mount Wilson iZ = 12m.37s., and 15m.45s., iPKKPZ = 30m.25s., eZ = 39m.9s.
Sitka esS = 23m.32s., e = 24m.19s., ePPS = 24m.55s.
College epPP = 16m.25s., eSP = 23m.33s., ePS = 24m.3s., eSS = 28m.19s.
Tinemaha iZ = 30m.23s., eZ = 37m.25s. and 37m.49s.
Boulder City i = 12m.53s. and 13m.27s., isP = 13m.52s., ePP? = 16m.34s., eS? = 23m.31s., ePKKP = 30m.17s.
Overton i = 14m.11s., eSP = 24m.46s., ePKKP = 30m.18s.
Pierce Ferry i = 13m.1s., isP? = 14m.13s., epPP = 16m.53s., eS? = 23m.51s., ePKKP = 30m.12s., ePKP,PKP = 38m.18s.
Grand Coulee i = 12m.56s., isP = 14m.1s.
Tucson ePP = 16m.49s., e = 18m.30s., eSKS = 23m.2s., iS = 23m.33s., ePS = 24m.57s., eSS = 29m.51s., iPKKP = 30m.12s., eSSS = 34m.1s., ePKP,PKP = 38m.14s.
Salt Lake City eSKS = 23m.10s., eSP = 24m.44s., ePPS = 26m.19s., e = 28m.43s., eSSS = 33m.43s.
Kodaikanal PSE = 24m.46s., SSE = 29m.36s.
Logan eSSS = 32m.39s.
Butte eSSS? = 33m.30s.
Bozeman ePS = 25m.25s., eSS = 30m.8s., esSS = 31m.35s.
New Delhi iN = 24m.12s., SSN = 30m.49s.
Bombay eSSE = 35m.29s.

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Tashkent PPP =20m.19s., i =24m.19s., SPP =28m.2s.
Florissant ePPZ =18m.38s., epPPZ =19m.21s., iE =25m.25s., eZ =27m.44s., eSSSZ = 38m.43s.
St. Louis iPP =18m.36s., eZ =19m.45s., eE =20m.42s., and 25m.21s.
Sverdlovsk iPP =18m.50s., SKKS =25m.33s., S =26m.20s., SP =28m.2s., PS =28m.30s., sSS =35m.28s.
Huancayo esPP =20m.19s.
Columbia e =26m.5s., ePPS? =30m.2s., eSS =35m.3s.
La Paz SS? =35m.27s.
Weston eSS =36m.55s.
Scoresby Sund 22m.37s., 29m.27s., and 29m.59s.
Moscow PKP =18m.38s., pPKP =19m.30s., pPP =21m.10s.
Bermuda i =23m.6s.
Upsala i =22m.14s.
Bergen eE =22m.27s.
Ksara pPP =22m.11s.
Warsaw iPKPZ =19m.2s., iSKPZ =22m.13s., eSKPE =22m.21s., PPPZ =23m.56s., ePPS?Z =32m.19s. and other unidentified eZ and iZ readings.
Copenhagen i =22m.17s. and 23m.23s., also 28m.13s., 31m.13s., and 34m.28s., SSS = 44m.11s.
Helwan PP =20m.41s., PPP =23m.50s.
Potsdam ePP?E =22m.47s.
Prague ePS =33m.23s., eSS =40m.17s., eSSS =44m.47s.
Jena eE =19m.5s. and 22m.3s.
Belgrade e =23m.17s., PS =32m.57s., SS =40m.6s., SSS =46m.7s.
Cheb e =13m.6s. and 16m.47s.?
De Bilt iPKP =19m.14s., iPP =22m.9s., ipPP =22m.53s., ePPP =25m.18s.
Zagreb ePPNE =22m.28s.
Uccle ePPSN =35m.4s., eSSE =40m.25s., eSSN =40m.31s., ePSSE =41m.45s., ePSSN =41m.49s., eSSSN =45m.36s.
Stuttgart iZ =19m.15s.
Triest eSS =40m.31s., eSSS =46m.51s.
Strasbourg i =19m.14s. and 19m.18s., e =23m.44s., 24m.35s., and 27m.56s., ePKKS = 31m.16s., ePS =32m.41s., ePPS? =34m.21s., eSS =40m.39s., e =41m.54s., 43m.43s., and 58m.51s.
Zürich e =21m.0s.
Paris i =19m.17s., e =21m.11s., iPP =22m.27s., i =22m.56s., 22m.59s., 24m.16s., and 24m.39s., ePPP =25m.37s., ePPS? =35m.17s., e =39m.37s., eSS =40m.53s., e =42m.13s., eSSS =46m.41s., eQ =66m.47s.
Rome ePSKSE =32m.53s., eSSE =41m.3s., eSSSE =46m.37s.
Clermont-Ferrand i =20m.42s., e =33m.49s., eSS =41m.31s., e =42m.58s.
Barcelona e =19m.39s.
Tortosa pPKPN =20m.52s., sPKPN =21m.22s., SKPN =22m.46s., PPN =23m.26s., pPPN =24m.41s.
Toledo PPE =20m.21s., pPP?NZ =20m.48s., P_cPE =22m.45s., pP_cPEN =23m.21s., sP_cPEZ =23m.30s., SE =24m.7s., sSE =24m.48s., pS_cPZ =26m.33s., SPSZ = 30m.8s.
Alicante i =19m.52s., PP =23m.3s., eS =30m.24s., SS =37m.6s., SSS =41m.0s., Q = 44m.30s.
Granada PP =22m.48s., pPP =24m.11s., sSKKS =30m.20s.

Oct. 22d. 17h. 26m. 54s. Epicentre 18°·0S. 167°·7E. (as on 1945, Aug. 21d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Suva		10·2	92	i 2 33	+ 2	i 4 11	−16	—	—	5·1
Brisbane		16·5	232	i 3 57	+ 3	i 7 10	+12	i 4 10	PP	—
Auckland		19·8	162	4 26	− 9	8 2	−11	12 43	P_cS	9·6
Arapuni		21·2	164	—	—	8 6	−35	—	—	—
Riverview		21·6	219	i 5 1k	+ 7	i 9 1	+12	i 5 13	pP	e 10·3
Tuai		22·3	161	i 5 3	+ 2	9 20	+18	—	—	—
Wellington		24·0	167	5 13	− 4	9 20	−12	—	—	12·1
Kaimata		24·6	174	5 26	+ 3	9 33	− 9	—	—	—
Christchurch		25·8	171	5 33	− 1	9 52	−10	10 22	Q	12·0
Shasta Dam		87·2	45	e 12 50	+ 1	—	—	—	—	—
Calcutta	N.	87·4	294	—	—	i 24 21	PS	—	—	—
Pasadena		87·5	53	i 12 51	0	—	—	—	—	—
Mount Wilson	Z.	87·6	53	i 12 51	0	—	—	e 16 18	PP	—
La Jolla	Z.	87·7	54	e 12 59	+ 7	—	—	—	—	—
Palomar		88·1	54	i 12 55	+ 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Haiwee		88·4	51	e 12 55	0	—	—	—	—	—
Tinemaha		88·6	50	i 12 57	+ 1	—	—	—	—	—
Boulder City		90·7	52	i 13 7	+ 1	—	—	—	—	—
Overton		91·2	52	i 13 10	+ 2	—	—	—	—	—
Pierce Ferry		91·4	52	i 13 10	+ 1	—	—	—	—	—
Tucson		92·5	56	e 13 12	− 2	—	—	—	—	—
Sverdlovsk		114·2	325	e 19 39	PP	e 26 59	{+25}	29 27	PS	—
La Paz	z.	115·2	119	—	—	—	—	e 40 6	SSS	44·1
Ksara		134·3	299	e 19 27	[+ 7]	—	—	22 6	PP	—
Helwan		138·6	295	e 19 36	[+ 8]	—	—	i 22 30	PP	—
Collmberg	z.	141·2	334	e 19 33	[0]	e 25 13	PPP	e 22 40	PP	—
Zagreb		143·7	326	e 19 40	[+ 3]	—	—	—	—	—
Stuttgart		144·7	335	i 19 42k	[+ 3]	—	—	—	—	—
Strasbourg		145·4	337	e 19 40	[0]	—	—	e 22 8	PP	e 73·1
Paris		147·0	342	19 50	[+ 7]	—	—	—	—	e 69·1
Rome		148·2	323	e 19 50	[+ 5]	—	—	e 22 19	PP	e 63·1

Additional readings :—
Pasadena eZ =13m.7s.
Mount Wilson iZ =13m.6s.
Palomar iZ =13m.8s.
Boulder City i =13m.20s.
Pierce Ferry i =13m.23s., e =14m.49s.
Sverdlovsk eS =27m.28s., PPS =30m.47s., eSS =35m.35s., SSS =39m.48s.
Collmberg eZ =19m.50s., 20m.13s., 20m.24s., 22m.48s., 23m.10s., and 23m.42s.
Zagreb e =20m.8s.
Stuttgart iZ =20m.6s.
Strasbourg e =21m.36s.
Paris i =20m.20s. and 20m.50s.
Long waves were also recorded at De Bilt, Copenhagen, Warsaw, and Clermont-Ferrand.

Oct. 22d. Readings also at 3h. (San Juan), 4h. (Boulder City, Overton, Pierce Ferry, and Bermuda), 5h. (Suva and Bogota), 9h. (near Stalinabad), 10h. (near Algiers), 11h. (Boulder City, Pierce Ferry, Pasadena, Tinemaha, and Riverview), 13h. (Arapuni, Auckland, Christchurch, Riverview, Tuai, Wellington, Suva, Palomar, Tucson, Pierce Ferry, and near Stalinabad), 14h. (near Zagreb), 15h. (Collmberg and Jena (2)), 16h. (Helwan and Ksara), 17h. (Balboa Heights and Huancayo), 18h. (Tucson and Palomar), 21h. (Mount Wilson, Pasadena, Palomar, Tucson, Boulder City (2), Overton, Pierce Ferry (2), Tinemaha, St. Louis, Huancayo, La Paz, and near Balboa Heights), 23h. (near Bogota and near Lick).

Oct. 23d. 21h. 17m. 43s. Epicentre 46°·0N. 12°·2E. (as on 1943, July 24d.).

Intensity III in Carinthia ; II at Triest. Bulletin Mensuel de Triest, Oct., 1946.

M. Toperczer and E. Trapp.
Ein Beitrag zur Erdbebengeographie Oesterreichs nebst, Erdbebenkatalog, 1904-1948, Chronik der Starkbeben, Mitteilungen der Erdbebenkommission, Neue Folge No. 65, Vienna, 1950, p. 58. Epicentre 46°6′N. 12°26′E.

$A = +\cdot6814$, $B = +\cdot1473$, $C = +\cdot7170$; $\delta = +9$; $h = -4$;
$D = +\cdot211$, $E = -\cdot977$; $G = +\cdot701$, $H = +\cdot152$, $K = -\cdot697$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Triest		1·1	108	i 0 20	− 2	i 0 34	− 5	—	—	—
Chur		2·0	295	e 0 37	+ 2	e 1 5	+ 3	—	—	—
Florence	E.	2·3	197	i 1 8	S	(i 1 8)	− 1	1 38	SSS	—
Zagreb		2·7	94	e 0 41?	− 4	i 1 20	+ 1	i 0 50	P*	—
Zürich		2·8	299	i 0 48	+ 1	e 1 32	S_g	i 0 55	P_g	—
Stuttgart		3·4	325	i 0 53a	− 2	i 1 34	− 3	i 1 5	P_g	—
Basle		3·5	298	e 0 57a	0	e 1 44	+ 4	e 1 1	P*	—
Neuchatel		3·7	287	e 1 0	0	e 2 2	S_g	—	—	—
Strasbourg		4·0	313	e 1 2	− 2	i 1 50	− 2	i 1 17	P_g	—
Cheb		4·1	2	e 1 14	P*	e 1 44	−11	e 1 22	P_g	—

Continued on next page,

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rome	4·1	178	e 1 31	P_g	e 2 21	S_g	—	—	—
Prague	4·3	18	e 1 31	P_g	i 2 4	+ 4	e 2 12	S*	—
Besançon	4·5	288	e 1 12	+ 1	e 2 27	S_g	—	—	—
Jena	4·9	356	i 1 11	− 6	i 2 30	S*	i 1 33	P_g	—
Collmberg	5·3	5	i 1 13	− 9	e 2 33	+ 8	e 2 40	S*	—
Clermont-Ferrand	6·3	270	i 1 56	P*	e 2 58	+ 8	i 3 23	S_g	—
Paris	7·2	296	e 1 52	+ 3	e 3 10	− 3	e 2 6	P*	—

Additional readings :—
Zagreb iP = 0m.46s., iNE = 1m.10s., iS_g = 1m.24s.
Stuttgart iP*?Z = 0m.56s., iS_g = 1m.48s.
Strasbourg iS_g = 2m.5s.
Cheb eP = 0m.17s.?, iP_g = 1m.17s., i = 1m.28s., iS_g = 1m.50s., e = 2m.1s.
Jena iN = 2m.33s.
Collmberg eE = 2m.44s.
Clermont-Ferrand i = 4m.4s.
Paris e = 2m.49s. and 3m.4s., eS? = 3m.30s.
Long waves were also recorded at De Bilt, Potsdam, and Istanbul.

Oct. 23d. Readings also at 3h. (Pierce Ferry), 5h. (Pierce Ferry, near Suva, and near Triest), 6h. (Santa Lucia, Ksara, and near Triest), 7h. (Cheb, Belgrade, Bucharest, Ksara, Collmberg, Rome, Stuttgart, near Triest, and Zagreb, also Boulder City near Overton, and Pierce Ferry), 8h. (Erevan, Sverdlovsk, Moscow, Leninakan, Samarkand, Stalinabad, Tashkent, Ksara, Helwan, and Rome), 9h. (Boulder City, Overton, and Pierce Ferry), 11h. (near Triest), 17h. (Pierce Ferry), 18h. (Overton and Pierce Ferry), 22h. (Pierce Ferry), 23h. (Boulder City).

Oct. 24d. 2h. Undetermined shock.

San Juan e = 34m.48s., iS? = 35m.23s., iL = 35m.43s.
Fort de France e = 36m.10s.
Bogota ePNZ = 37m.42s., eNZ = 38m.2s. and 40m.31s., S?NZ = 40m.35s.
Harvard eP = 38m.52s., i = 39m.1s., eS = 43m.4s.
Weston eP = 39m.1s., eS = 42m.57s.
St. Louis eP?Z = 39m.27s., eZ = 39m.56s., eE = 42m.7s. and 44m.12s., eLE = 48·4m.
Huancayo e = 40m.33s.
Tucson e = 41m.18s.
Pierce Ferry e = 41m.45s.
Boulder City e = 41m.50s.
Overton e = 41m.53s.
Long waves were also recorded at Bermuda.

Oct. 24d. 8h. 38m. 19s. Epicentre 18°·4S. 177°·7W. Depth of focus 0·080. (as on 1944, December 8d.).

A = − ·9487, B = − ·0381, C = − ·3137 ; δ = − 11 ; h = + 5 ;
D = − ·040, E = + ·999 ; G = + ·313, H = + ·013, K = − ·950.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Suva		3·7	276	i 1 7	−13	i 2 16	− 7	i 2 38	Q	i 3·2
Wellington		23·7	195	4 35	+ 4	7 51	−17	—	—	—
Brisbane	N.	28·4	246	i 5 2	−10	—	—	—	—	—
Riverview		31·8	234	i 5 43k	+ 1	—	—	—	—	e 13·1
La Jolla		77·0	49	i 11 0	+ 2	—	—	—	—	—
Pasadena		77·1	47	i 10 59a	0	—	—	i 12 57	pP	—
Mount Wilson		77·2	47	i 10 59a	0	—	—	i 12 27	pP	—
Palomar		77·5	48	i 11 2a	+ 1	—	—	i 13 0	pP	—
Shasta Dam		78·0	40	i 11 3	− 1	e 20 13	0	i 13 3	pP	—
Tinemaha		78·6	45	i 11 7	0	—	—	i 13 9	pP	—
Boulder City		80·4	47	i 11 17	+ 1	—	—	i 13 17	pP	—
Overton		80·9	47	i 11 21	+ 2	—	—	i 13 22	pP	—
Pierce Ferry		81·0	48	i 11 20	+ 1	—	—	i 13 19	pP	—
Tucson		81·4	52	i 11 23	+ 2	e 20 53	+ 5	i 13 22	pP	—
Grand Coulee		84·3	35	i 11 54	+18	—	—	i 13 36	pP	—
La Paz		102·5	112	e 17 41	PP	—	—	—	—	—
Ksara		146·3	303	i 18 41	[+ 3]	—	—	e 21 49	PP	—
Helwan		151·2	298	e 18 51	[+ 6]	—	—	e 21 5	PP	—

For Notes see next page.

NOTES TO OCTOBER 24d. 8h. 38m. 19s.

Additional readings :—
Mount Wilson eZ =14m.2s.
Palomar iZ =11m.27s.
Pierce Ferry e =15m.14s.
Helwan e =19m.0s.

Oct. 24d. 10h. Undetermined shock.

Brisbane iPN =9m.22s., iSN =12m.32s.
Suva i =9m.28s., L =10·1m.
Wellington PZ =10m.5s., S =13m.39s., P_cP?Z =14m.55s.
Riverview ePZ =10m.9s., eSN =13m.58s., eE =14m.4s., isSEN =14m.11s., eQN = 14·3m., eSSZ =14m.31s., eRE =15·1m.
Auckland e =12m.0s.?
Christchurch =14m.0s.?
Tucson e =16m.3s.
Mount Wilson ePZ =18m.11s.
Palomar ePZ =18m.14s.
Pierce Ferry i =18m.19s.
Overton e =18m.40s.

Oct. 24d. Readings also at 0h. (La Paz), 1h. (Ksara, Helwan, Malaga, Istanbul, near Boulder City, and Pierce Ferry), 5h. (Tucson, Pierce Ferry, and Boulder City), 6h. (Tucson and Granada), 7h. (Huancayo, Tacubaya, La Paz, Pierce Ferry, and near Boulder City), 8h. (near Stalinabad, and near Mineral (2)), 13h. (Ksara and Jena), 18h. (Brisbane, Riverview, Auckland, Mount Wilson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Pasadena, and Ksara), 20h. (Pierce Ferry, Overton, and Tucson), 21h. (near Mizusawa).

Oct. 25d. 21h. 50m. 14s. Epicentre 54°·0N. 159°·2E. Depth of focus 0·010.

A = −·5519, B = +·2097, C = +·8071 ; δ = −2 ; h = −6 ;
D = +·355, E = +·935 ; G = −·754, H = +·287, K = −·590.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sapporo		16·1	234	e 3 50	+ 8	—	—	—	—	—
Morioka		18·8	227	e 4 21	+ 7	7 33	− 4	—	—	—
Mizusawa		19·3	226	e 4 28	+ 8	8 6	+18	—	—	—
Wazima		22·6	231	e 5 13	PP	8 58	+ 9	—	—	—
Tokyo		22·8	224	4 58	+ 3	i 9 7	+14	e 6 19	PPP	—
Yokohama		23·0	224	e 4 57	0	e 9 5	+ 9	—	—	—
Misima		23·6	225	e 5 8	+ 5	9 16	+ 9	—	—	—
Hikone		24·7	228	5 14	+ 1	9 33	+ 8	—	—	—
Kobe		25·6	229	5 28	+ 6	9 46	+ 6	—	—	—
College		28·2	46	e 5 43	− 3	(e 10 9)	−14	—	—	e 10·2
Miyazaki		29·7	232	e 5 58	− 1	—	—	—	—	—
Irkutsk		32·3	290	i 6 25	+ 3	—	—	7 12	pP	—
Grand Coulee		49·2	61	i 8 37	− 3	i 15 30	− 7	i 9 14	pP	—
Sverdlovsk		51·3	316	i 8 59	+ 3	i 16 1	− 5	9 48	pP	—
Shasta Dam		52·1	70	i 9 0	− 2	e 16 12	− 5	i 9 32	pP	—
Frunse		54·0	295	9 18	+ 2	—	—	—	—	—
Berkeley		54·1	72	e 9 18	+ 1	e 16 40	− 4	—	—	—
Scoresby Sund		55·8	1	i 9 30a	+ 1	i 17 7	0	13 0	PPP	—
Tinemaha		56·9	71	i 9 36a	− 1	e 17 21	− 1	i 10 8	pP	—
Haiwee		57·8	71	i 9 42a	− 2	—	—	i 10 14	pP	—
Salt Lake City		57·8	63	i 9 42	− 2	e 17 31	− 2	e 18 22	PS	e 24·2
Tashkent		57·9	297	i 9 43	− 1	—	—	11 55	PP	—
Mount Wilson		59·1	73	i 9 50a	− 2	—	—	i 10 22	pP	—
Pasadena		59·1	73	i 9 50a	− 2	i 17 45	− 5	i 10 23	pP	e 27·8
Overton	Z.	59·4	68	e 39 37	P′P′	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		59·6	69	i 9 54	− 2	e 17 55	− 2	i 10 18	pP	—
Riverside		59·6	73	i 9 54	− 2	—	—	i 10 29	pP	—
Rapid City		59·8	55	e 9 56	− 1	i 17 56	− 3	i 19 32	S_cS	e 36·0
Pierce Ferry		60·0	68	i 9 58	− 1	—	—	i 10 20	pP	—
Stalinabad		60·2	295	i 10 3	+ 3	—	—	—	—	—
Samarkand		60·3	297	e 10 1	0	—	—	—	—	—
Palomar		60·4	73	i 9 59a	− 2	i 18 4	− 3	i 10 31	pP	—
Helsinki		60·5	336	—	—	i 18 6	− 2	—	—	—
La Jolla		60·6	73	i 10 0	− 3	—	—	e 10 31	pP	—
Moscow		60·6	326	i 10 4	+ 1	i 18 10	0	10 55	pP	—
Calcutta	N.	60·9	268	e 9 7	−58	e 18 15	+ 2	—	—	—
Upsala	N.	62·4	339	e 10 12	− 3	i 18 23	− 9	e 13 9	PP	—
Bergen		64·1	346	10 26	0	18 50	− 3	—	—	—
Tucson		64·6	69	i 10 27	− 2	i 18 34	−26	i 11 3	pP	—
Lincoln		65·4	54	—	—	e 19 4	− 5	e 20 1	S_cS	e 32·1
Copenhagen		67·3	341	i 10 46	0	i 19 31	− 1	20 34	PPS	—
Baku		68·2	309	11 2?	+10	—	—	—	—	—
Warsaw		68·5	333	10 54a	0	19 48	+ 1	13 49	PP	e 33·8
Florissant		70·0	51	i 11 1	− 2	i 19 59	− 5	i 11 32	pP	—
St. Louis		70·2	51	i 11 1	− 3	i 19 59	− 8	i 11 33	pP	e 33·8
Ottawa		70·5	37	e 11 3	− 3	e 20 46	S_cS	—	—	24·8
Shawinigan Falls		70·5	34	e 11 4	− 2	(e 19 56)	−14	—	—	19·9
Seven Falls		70·7	33	e 11 4	− 3	i 20 2	−10	e 15 34	PPP	28·8
Collmberg		71·3	338	i 11 7	− 4	e 20 15	− 4	e 20 59	PS	—
Jena	E.	72·0	338	e 11 16	+ 1	—	—	—	—	—
De Bilt		72·1	343	i 11 16a	0	e 20 28	− 1	e 13 57	PP	e 32·8
Prague		72·2	337	e 11 14	− 2	e 20 24	− 6	e 21 11	PPS	e 31·8
Cheb		72·6	339	e 11 21	+ 2	e 20 34	0	e 16 7	PPP	—
Bombay		72·8	278	e 11 37	+17	e 20 39	+ 3	—	—	—
Uccle		73·5	344	e 11 25	+ 1	e 20 41	− 3	e 21 44?	PPS	e 35·8
Harvard		74·5	35	i 10 56	−34	—	—	i 12 0	P_cP	—
Stuttgart		74·5	339	i 11 31a	+ 1	—	—	—	—	—
Weston		74·7	35	i 11 29	− 2	e 20 51	− 7	e 14 17	PP	—
Strasbourg		75·0	340	i 11 33a	+ 1	e 21 2	+ 1	i 12 5	pP	e 35·1
Fordham		75·1	38	e 11 31	− 2	i 20 53	− 9	i 12 3	pP	—
Belgrade		75·5	330	e 11 34	− 1	e 20 46	−20	—	—	e 33·8
Paris		75·7	344	i 11 39a	+ 3	e 21 7	− 2	e 12 31	pP	e 40·8
Zagreb		75·8	334	e 11 37	0	e 21 13	+ 3	—	—	—
Basle		76·0	340	e 11 39a	+ 1	e 21 14	+ 2	—	—	—
Zürich		76·0	340	e 11 38a	0	e 21 11	− 1	e 12 10	pP	—
Istanbul		76·1	323	i 11 41	+ 2	21 59	S_cS	—	—	—
Chur		76·3	340	e 11 41	+ 1	—	—	—	—	—
Neuchatel		76·7	340	e 11 43	+ 1	—	—	—	—	—
Clermont-Ferrand		78·6	343	i 11 53	0	e 21 41	+ 1	e 14 34	PP	32·4
Ksara		79·8	314	i 11 57?	− 2	—	—	—	—	—
Rome		80·3	335	i 12 4	+ 2	i 21 58	0	e 23 22	sS	e 32·4
Brisbane		81·3	184	—	—	i 22 6	− 2	—	—	—
Tortosa	N.	83·8	343	i 12 9	−11	i 22 37	+ 4	24 12	PS	38·0
Helwan		85·1	316	12 28	+ 2	i 22 46	0	e 23 49	PS	—
Toledo		85·4	347	i 12 28	0	22 54	+ 5	13 6	sP	—
Bermuda		86·0	36	e 12 36	+ 5	e 22 50	− 5	i 23 52	PS	—
Alicante		86·4	344	i 12 28	− 5	i 23 1	+ 2	15 54	PP	e 41·1
Riverview		87·7	186	i 13 15	pP	i 22 56	[+ 1]	i 23 15	S	e 37·3
Granada		88·0	346	i 12 36k	− 4	23 10	− 4	—	—	—
Huancayo		120·2	67	e 20 18	PP	—	—	—	—	—
La Paz		127·7	62	18 54	[0]	31 52	PS	—	—	—

Additional readings :—
Grand Coulee i = 8m.47s.
Shasta Dam ePPP = 11m.56s.
Scoresby Sund 17m.42s.
Tinemaha iZ = 14m.18s., ePKP,PKPZ = 39m.36s., eZ = 40m.11s.
Salt Lake City eS_cS = 19m.18s., eSS? = 22m.7s.
Mount Wilson eZ = 10m.0s., ePKP,PKPZ = 39m.31s., iZ = 40m.2s.
Pasadena iZ = 9m.57s. and 11m.11s., eZ = 39m.18s., iPKP,PKPZ = 39m.34s., eZ = 40m.2s.

Continued on next page.

Boulder City ePKP,PKP =39m.20s., iPKP,PKP =39m.31s.
Riverside ePKP,PKPZ =39m.32s., iZ =40m.1s.
Rapid City e =20m.31s.
Pierce Ferry iPP =12m.7s., iPKP,PKP =39m.30s.
Palomar iZ =10m.8s. and 11m.20s., eE =18m.26s., ePKP,PKPZ =39m.23s., iZ =40m.3s.
Upsala eN =14m.33s., eL?N =22m.46s.
Tucson i =12m.19s., ePKP,PKP =39m.17s., iPKP,PKP =39m.54s.
Warsaw eZ =11m.11s., iZ =11m.42s., eZ =15m.40s., SZ =19m.58s., PSE =20m.31s., PSZ =20m.44s., eZ =23m.59s., SSZ =25m.2s., SSSZ =28m.15s.
Florissant isSN =20m.54s., iN =21m.50s., eSSN =24m.44s.
St. Louis eSSE =24m.43s., esSSE =25m.58s., eN =26m.46s., and 28m.0s.
Collmberg eZ =12m.21s., 12m.51s., and 16m.2s.
De Bilt iZ =12m.10s., e =21m.11s., eSS =25m.8s., e =25m.56s.
Cheb e =29m.52s.
Uccle eSSE =26m.13s., eSSSN =30m.17s., eSSSE =30m.18s.
Strasbourg isP =12m.24s., ePP =14m.22s., e =16m.53s., eSS? =22m.5s., e =22m.38s., eSS? =25m.59s., e =26m.46s. and 30m.4s.
Belgrade e =12m.28s. and 21m.15s.
Paris ePP =14m.31s., e =18m.17s. and 22m.41s.
Clermont-Ferrand eSS =26m.35s.
Toledo SKSN =22m.41s.
Alicante PPP =17m.48s., S_cS =23m.16s., SS =28m.52s., Q =35m.0s.
Riverview iPS?N =24m.54s.

Oct. 25d. Readings also at 0h. (Balboa Heights and near Mineral), 3h. (near Mineral (2)), 4h. (Pierce Ferry, Boulder City, Overton, Palomar, and Tucson), 5h. (near Bogota), 9h. (near Stalinabad), 11h. (Tucson, Pierce Ferry, Boulder City, Overton, and Mount Wilson), 12h. (Frunse, Yalta, near Stalinabad and Andijan), 13h. (near Yalta), 14h. (Tinemaha and Mount Wilson), 15h. (Mount Wilson, Tinemaha, near Boulder City (2), Palomar, Pierce Ferry (2), Tucson, and near La Paz), 16h. (Jena, Stuttgart, Collmberg, Boulder City, Overton, and near Pierce Ferry),20h. (La Paz, Pierce Ferry, Boulder City, Mount Wilson, Palomar, Tinemaha, and Tucson), 21h. (Grand Coulee), 22h. (near Grozny), 23h. (Pierce Ferry).

Oct. 26d. 0h. 21m. 3s. Epicentre 60°·3S. 35°·0W.

A = +·4079, B = −·2856, C = −·8672 ; δ = −1 ; h = −9 ;
D = −·574, E = −·819 ; G = −·710, H = +·497, K = −·498.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata	E.	29·4	321	6 5	− 2	10 57	− 4	6 51	PP	17·3
	N.	29·4	321	6 7	0	10 43	−18	13 39	SS	18·2
	Z.	29·4	321	6 8	+ 1	11 6	+ 5	6 57	PP	11·8
Santa Lucia	N.	35·5	303	7 0	0	12 38	+ 2	8 10	PP	17·6
La Paz		49·9	317	i 8 59k	+ 2	i 16 20	+13	i 9 25	pP	24·4
Huancayo		56·6	310	i 9 48	+ 1	e 17 39	+ 1	e 12 10	PP	e 24·1
Tananarive		70·1	92	e 11 16	0	20 35	+ 8	25 18	SS	33·1
Bogota		71·6	318	i 11 25	0	e 20 37	− 7	e 14 4	PP	—
Christchurch		74·1	200	11 39	− 1	21 12	0	26 7	SS	34·4
Wellington		75·9	203	11 48	− 2	26 39	SS	—	—	36·0
Fort de France		77·7	334	e 11 59	− 1	e 14 54	PP	—	—	—
Arapuni		78·8	204	—	—	e 22 27	+23	—	—	34·0
Auckland		80·1	204	—	—	e 27 57?	SS	38 9	Q	44·2
Perth		85·0	155	12 40	+ 2	23 2	− 5	i 15 52	PP	—
Riverview		86·1	185	i 12 43k	− 1	i 23 18	0	e 16 2	PP	e 38·8
Brisbane	E.	92·3	187	e 13 17	+ 4	—	—	—	—	—
Bermuda		95·5	334	e 13 38	+10	e 26 7	PS	e 19 24	PPP	—
Suva		97·3	211	i 13 44	+ 8	i 24 59	+ 1	i 17 59	PP	46·0
Columbia		101·3	322	e 27 1	PS	e 32 41	SS	e 36 39	SSS	e 47·2
Washington		104·7	327	e 16 28	?	e 25 32	(+ 4)	e 28 58	PPS	—
Helwan		104·8	55	e 18 23	PP	e 25 15	[+25]	—	—	—
Fordham		105·7	330	e 14 15	+ 1	e 27 50	PS	e 18 36	PP	—
Weston		106·6	332	e 18 42	PP	e 27 59	PS	e 28 57	PPS	—
Harvard		106·7	332	e 18 42	PP	—	—	—	—	e 50·4
St. Louis		108·5	317	e 18 53	PP	i 25 9	[+ 3]	e 26 9	SKKS	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Florissant		108·7	317	e 18 54	PP	e 25 6	[− 1]	e 28 28	PS	—
Rome		109·0	35	e 14 28	P	e 25 0	[− 8]	i 19 0	PP	—
Clermont-Ferrand		110·2	27	e 18 58	PP	e 28 29	PS	e 21 31	PPP	39·0
Ksara		110·2	56	13 57?	P	—	—	—	—	—
Ottawa		110·5	330	19 9	PP	26 21	{+12}	28 27	PS	51·0
Tucson		110·9	298	e 18 33	[− 2]	e 28 42	PS	e 19 13	PP	e 46·8
Seven Falls		111·0	334	e 19 51	PP	e 28 34	PS	e 34 51	SS	46·0
Paris		112·9	25	e 19 4	PP	e 25 38	[+14]	e 29 18	PS	e 50·0
Istanbul		113·8	47	e 13 55	?	e 19 33	PP	—	—	—
Strasbourg		113·9	29	e 19 31	PP	e 29 17	PS	e 22 10	PPP	e 48·0
Belgrade		114·1	40	e 20 7	PP	e 24 14	[−75]	e 29 6	PS	e 59·1
Stuttgart	z.	114·5	30	e 19 37?	PP	e 29 32?	PS	—	—	—
Palomar		114·6	294	e 18 39	[− 3]	e 28 56	PS	e 19 39	PP	—
Kew		114·9	23	—	—	(e 26 57?){+18}		—	—	e 27·0
Bombay		115·0	95	e 18 55	[+12]	28 25	PKKP	—	—	—
Uccle		115·2	25	e 19 57k	PP	e 29 32	PS	e 35 48	SS	e 51·0
Riverside		115·3	294	e 18 40	[− 4]	—	—	e 19 45	PP	—
Pierce Ferry		115·6	298	e 18 41	[− 3]	e 25 28	[− 6]	e 19 47	PP	—
Boulder City		115·8	297	i 18 45	[0]	—	—	i 19 49	PP	—
Mount Wilson	z.	115·8	294	e 18 44	[− 1]	e 28 58	PKKP	e 19 46	PP	—
Pasadena		115·8	294	e 18 44	[− 1]	e 30 11	PPS	e 19 31	PP	e 54·8
Overton		116·1	298	e 18 50	[+ 5]	—	—	e 19 54	PP	—
Cheb		116·5	31	e 19 49	PP	e 29 7	PKKP	e 22 36	PPP	—
De Bilt		116·6	26	e 18 52	[+ 6]	e 30 11	PS	i 19 49	PP	e 52·0
Hyderabad		116·6	101	—	—	29 39	PS	—	—	—
Prague		117·0	32	e 19 13	[+26]	e 25 51	[+12]	e 29 57	PS	e 60·0
Collmberg	z.	117·8	31	e 18 43	[− 5]	e 28 49	PKKP	e 19 59	PP	—
Rapid City		117·9	311	e 19 23	[+34]	e 29 49	PS	e 20 5	PP	e 59·8
Tinemaha	z.	118·3	295	e 18 49	[0]	—	—	—	—	—
Salt Lake City		118·6	302	e 20 1	PP	e 29 51	PS	e 36 39	SS	e 49·5
Logan		119·4	303	e 20 18	PP	e 41 29	SSS	—	—	e 59·4
Berkeley		120·8	293	i 20 37	PP	e 30 12	PS	—	—	e 57·8
Warsaw		120·8	36	e 18 59	[+ 5]	e 20 3	PP	e 31 52	PPS	e 38·0
Copenhagen		121·6	28	e 19 2	[+ 6]	e 30 33	PS	e 20 27	PP	50·0
Shasta Dam		123·1	295	e 18 53	[− 6]	—	—	—	—	—
Butte		123·2	306	e 32 9	PPS	e 37 20	SS	e 42 17	SSS	e 52·0
Saskatoon		125·9	313	20 20	PP	e 32 57?	PPS	37 33	SS	57·0
Grand Coulee		127·4	303	i 19 2	[− 5]	—	—	e 21 8	PP	—
Victoria		129·7	300	e 22 39	PKS	e 33 21	PPS	e 44 57?	SSS	60·0
Scoresby Sund		130·8	5	19 14a	[0]	28 36	{+11}	21 28	PP	—
Tashkent		131·5	76	e 20 30	[+75]	—	—	—	—	—
Sverdlovsk		138·7	55	i 19 29	[+ 1]	i 40 46	SS	i 22 18	PP	—
Sitka		141·1	302	—	—	e 29 34	{+ 6}	e 41 39	SS	e 73·0
College		150·1	308	e 19 47	[− 1]	e 43 32	SS	—	—	—

Additional readings :—
La Plata QE =11m.57s.?, SSE =13m.9s.
Santa Lucia SSN =16m.0s.
La Paz ipPZ =19m.31s., P_cP =10m.13s., PPZ =10m.39s., iZ =16m.51s., S_cS =19m.1s., SSZ =20m.12s.
Huancayo ePPP =13m.26s., eSS =21m.27s.
Tananarive eQ =29m.27s.
Bogota ePPPZ =15m.22s.
Christchurch Q =30m.52s.
Wellington PP?Z =12m.37s.
Perth i =28m.42s.
Riverview iSN =13m.8s., iPSN =24m.6s., iPPSN =24m.31s., eSSZ =28m.50s., eQE =35m.9s.
Suva i =16m.40s., S =25m.44s.?, iSS =31m.47s., eSSS? =36m.57s.?
Washington eSSS? =48m.18s.
St. Louis eN =23m.19s., ePSN =28m.18s., iSSN =34m.9s.
Florissant eZ =19m.27s., eSSN =34m.3s.
Rome ePS = =28m.38s., eSS =34m.47s.
Ottawa SS =34m.33s.
Tucson ePPP? =21m.51s., ePKKP =29m.33s., eSS =34m.19s., eSSS? =41m.25s.
Paris e =19m.28s., eS? =27m.36s., e =29m.57s.?
Strasbourg e =20m.23s. and 24m.15s., eSSS? =37m.5s.

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Uccle eN =29m.57s., eSSS?E =39m.52s.
Pierce Ferry iPKP =18m.45s., iS =27m.41s.
Boulder City e =18m.11s.
Pasadena eZ =29m.41s., eNZ =36m.27s.
Cheb e =34m.7s. and 39m.0s.
De Bilt e =28m.17s., eSS =35m.57s., eSSS =39m.57s.?
Prague e =39m.57s. and 43m.57s.
Collmberg eZ =19m.16s. and 29m.4s.
Rapid City eSS =36m.32s.
Salt Lake City e =32m.21s., eSSS =41m.2s.
Warsaw eZ =21m.5s., 22m.5s., 34m.12s., and 35m.53s.
Copenhagen SSS =37m.57s.?
Saskatoon SSS =41m.51s., e =45m.57s.?
Grand Coulee i =19m.51s.
Scoresby Sund 19m.53s., 22m.27s., PKS =22m.42s., 33m.21s., and 39m.21s.
Sverdlovsk iPKS =23m.6s.
Sitka eSSS =46m.37s., e =55m.4s.
College e =49m.17s., eSS =52m.11s., eSSS =58m.57s.
Long waves also recorded at Helsinki.

Oct. 26d. Readings also at 0h. (Fresno, St. Louis, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Shasta Dam, near Berkeley and near Yalta), 1h. (near Mineral), 4h. (Tucson), 5h. (Balboa Heights), 6h. (New Delhi), 11h. (Auckland, Christchurch, Wellington, Suva, Riverview, La Paz, Helwan, Ksara, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Grand Coulee, and College), 12h. (Huancayo, Tucson, Salt Lake City, College, De Bilt, and Strasbourg), 13h. (Paris), 14h. (near Erevan), 17h. (near Grozny), 19h. (near Pierce Ferry), 20h. (Grand Coulee and near Pierce Ferry), 21h. (Helwan and Ksara), 22h. (Pierce Ferry).

Oct. 27d. Readings at 8h. (near Santa Lucia), 10h. (Bogota), 18h. (near La Paz).

Oct. 28d. 11h. 19m. 18s. Epicentre 26°·0S. 70°·2W. Focus at Base of Superficial Layers. (as on 1946, Aug. 2d.).

$A = +\cdot3049$, $B = -\cdot8468$, $C = -\cdot4360$; $\delta = +13$; $h = +3$;
$D = -\cdot941$, $E = -\cdot339$; $G = -\cdot148$, $H = +\cdot410$, $K = -\cdot900$.

		△	Az.	P.	O−C.	S.	O−C.		L.
		°	°	m. s.	s.	m. s.		s.	m.
Santa Lucia	N.	7·4	183	1 48	0	3 3		− 9	—
La Paz	Z.	9·6	12	2 34	+15	4 54		+47	i 5·6
La Plata	E.	13·8	133	3 13	− 3	6 3		+15	7·3
Huancayo	Z.	14·7	340	e 3 33	+ 6	e 6 37		+27	—
St. Louis	Z.	67·0	343	i 10 48	− 4	—		—	—
Tucson		69·7	324	i 11 6	− 2	—		—	—
Palomar	Z.	73·8	321	i 11 30	− 3	—		—	—
Pierce Ferry		74·3	324	i 11 33	− 3	—		—	—
Boulder City		74·7	323	i 12 5	+27	—		—	—
Overton		74·9	324	i 13 1	+82	—		—	—
Mount Wilson	Z.	75·2	321	e 11 37	− 4	—		—	—
Pasadena	Z.	75·2	321	e 11 38	− 3	—		—	—
Shasta Dam		82·2	323	e 12 14	− 5	—		—	—

Additional readings :—
Santa Lucia E =1m.54s.
La Plata SN =6m.6s.
Huancayo i =3m.37s.
Tucson i =11m.37s.

Oct. 28d. Readings also at 0h. (near Mineral (2)), 1h. (near Mizusawa), 2h. (Collmberg, Stuttgart, Tucson, and Shasta Dam), 3h. (near Berkeley, Branner, Lick, and San Francisco), 5h. (near Mineral), 7h. (Shasta Dam), 8h. (Mount Wilson, Palomar, Tucson (2), Boulder City, Overton, Pierce Ferry, St. Louis, Huancayo, and La Paz), 9h. (Overton and Pierce Ferry), 12h. (near Mizusawa), 14h. (Berkeley, Haiwee, La Jolla, Mount Wilson, Pasadena, Palomar, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Grand Coulee, College, Bermuda, and Ksara), 16h. (New Delhi and near Grozny), 19h. (Riverview), 20h. (near Ottawa and near Tacubaya), 21h. (Boulder City, Pierce Ferry, Grand Coulee, and Shasta Dam), 22h. (near Boulder City and Pierce Ferry (2)), 23h. (Clermont-Ferrand, Paris, and near Triest).

Oct. 29d. Readings also at 0h. (Mount Wilson, Palomar, Tucson, Overton, Pierce Ferry, Salt Lake City, St. Louis, Florissant, Santa Lucia, Kew, Copenhagen, De Bilt, and Uccle), 2h. (near Tacubaya (2)), 3h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Santa Barbara, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Bozeman, Butte, Salt Lake City, Shasta Dam, Grand Coulee, Rapid City, and St. Louis), 8h. (near Fort de France), 9h. (near Mineral), 10h. (Florissant and near St. Louis), 11h. (Haiwee, Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City (3), Overton (2), Pierce Ferry (3), Shasta Dam, Grand Coulee, College, St. Louis, and Ksara), 14h. (Boulder City and Jena), 18h. (near Florence), 19h. (Samarkand and near Stalinabad), 22h. (Pierce Ferry and near Bogota).

Oct. 30d. 7h. 47m. 32s. Epicentre 54°·2N. 164°·5W.

$A = -\cdot5662$, $B = -\cdot1570$, $C = +\cdot8092$; $\delta = +4$; $h = -6$;
$D = -\cdot267$, $E = +\cdot964$; $G = -\cdot780$, $H = -\cdot216$, $K = -\cdot588$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
College		13·6	31	e 3 22	+ 5	—	—	i 3 31 P	e 6·1
Sitka		16·6	66	i 3 59	+ 3	i 7 8	+ 8	i 4 36 PPP	e 8·4
Victoria		26·0	86	5 43	+ 7	10 15	+ 9	11 19 SS	13·5
Grand Coulee		28·9	83	e 6 1	− 2	e 10 53	0	e 10 34 S	i 11·3
Shasta Dam		31·0	98	e 6 21	0	e 11 28	+ 2	—	—
Mineral	E.	31·7	98	e 6 27	0	e 11 35	− 2	—	—
Berkeley		33·0	102	e 6 38	− 1	i 11 58	+ 1	—	— e 15·0
Honolulu		33·2	168	—	—	i 11 54	− 6	—	— e 13·5
Branner		33·3	102	e 6 38	− 3	e 12 2	0	e 7 57 PP	e 14·3
Santa Clara		33·5	102	e 6 45	+ 2	i 12 6	+ 1	—	— e 15·5
Butte		33·6	81	e 6 48	+ 4	e 12 10	+ 4	e 7 58 PP	e 13·7
Lick		33·7	102	e 6 44	− 1	e 12 7	− 1	e 6 56 ?	e 14·5
Saskatoon		33·9	69	6 19	−28	11 45	−26	7 32 PP	15·7
Bozeman		34·7	81	e 7 1	+ 7	i 12 22	− 2	e 8 17 PP	e 14·0
Fresno	N.	35·2	100	e 7 0	+ 2	e 12 33	+ 2	e 8 19 PP	—
Tinemaha		35·8	99	e 7 4	+ 1	e 12 43	+ 2	—	— —
Logan		36·5	87	e 7 16	+ 7	i 12 58	+ 7	i 8 31 PP	e 15·8
Haiwee		36·7	99	e 7 11	+ 1	e 12 44	−10	—	— —
Santa Barbara		36·8	103	e 7 13	+ 2	e 12 57	+ 1	—	— —
Salt Lake City		37·1	88	e 7 15	+ 1	e 12 59	− 2	e 8 36 PP	e 15·8
Pasadena		37·9	101	i 7 19k	− 1	i 13 11	− 2	i 7 29 ?	e 15·9
Mount Wilson		38·0	101	i 7 20	− 1	e 13 10	− 4	—	— —
Overton		38·4	96	i 7 27?	+ 2	—	—	i 7 43? ?	e 16·5
Riverside		38·5	101	e 7 24	− 2	e 13 19	− 3	—	— —
Boulder City		38·6	97	i 7 27	+ 1	e 13 23	0	i 7 48 ?	—
Pierce Ferry		39·0	96	e 7 29	− 1	e 13 24	− 5	i 9 56 PPP	—
Palomar		39·3	102	i 7 24	− 8	i 13 33	− 1	i 7 24 ?	i 17·7
La Jolla		39·4	103	e 7 33	0	i 13 36	+ 1	—	— —
Rapid City		40·2	78	e 7 40	0	i 13 43	− 5	i 9 27 P_cP	i 16·8
Tucson		43·6	97	i 8 7	− 1	i 14 37	− 1	i 10 2 PP	e 18·2
Lincoln		46·0	77	—	—	i 15 8	− 4	e 18 16 SS	e 19·3
Chicago		50·4	71	e 8 58	− 3	i 16 9	− 5	e 10 49 PP	e 20·9
Florissant		50·9	75	i 9 3	− 2	i 16 18	− 3	i 9 13 pP	e 25·5
Irkutsk		50·9	307	i 9 4	− 1	18 57	S_cS	11 7 PP	—
St. Louis		51·1	75	i 9 3	− 3	i 16 20	− 4	i 9 12 pP	—
Scoresby Sund		52·7	15	i 9 23	+ 5	16 51	+ 5	19 11 S_cS	24·5
Ottawa		54·3	60	9 29	− 1	17 6	− 1	11 34 PP	26·0
Ivigtut		54·4	32	i 9 31	0	17 12	+ 3	17 31 PPS	24·5
Shawinigan Falls		55·0	56	9 33	− 2	17 12	− 5	21 58 SS	26·2
New Kensington		55·6	66	e 9 40	0	e 17 24	− 1	e 11 42 PP	e 22·8
Seven Falls		55·6	55	9 41	+ 1	17 20	− 5	11 44 PP	27·5
Pennsylvania	E.	56·4	65	i 9 43	− 2	e 17 24	−12	e 11 48 PP	—
Mobile		58·0	80	—	—	17 56	− 1	—	— 34·6
Georgetown		58·2	65	i 9 57	− 1	e 17 56	− 3	12 4 PP	e 27·7
Washington		58·2	65	e 9 54	− 4	e 17 48	−11	e 12 2 PP	e 23·8
Fordham		58·5	62	i 9 59	− 1	i 18 4	+ 1	e 12 11 PP	—
Harvard		58·5	59	i 9 58	− 2	i 18 2	− 1	e 12 12 PP	e 30·3
Weston		58·7	59	i 10 0	− 2	i 18 4	− 2	e 20 0 S_cS	—
Columbia		59·6	72	e 10 4	− 4	e 18 11	− 6	e 22 20 SS	—
Tacubaya		60·1	97	e 10 11	0	e 18 22	− 2	—	— —

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Halifax		60·8	53	—	—	e 18 29	− 4	—	—	29·5
Sverdlovsk		63·4	334	i 10 32	− 2	i 19 4	− 2	—	—	—
Bergen		65·5	6	e 10 46	− 1	e 19 32	0	e 24 16	SS	31·5
Helsinki		65·7	355	e 10 46	− 2	e 19 34	0	e 24 12	SS	e 31·5
Upsala		66·3	359	e 10 46	− 6	20 0	+18	e 27 28	SSS	e 29·5
Aberdeen		68·1	10	i 11 2	− 2	i 20 4	+ 1	i 24 35	SS	33·6
Moscow		68·9	347	i 11 10	+ 1	e 20 11	− 2	—	—	—
Edinburgh		69·2	12	20 43	PS	20 18	+ 2	—	—	—
Almata		69·7	317	e 11 16	+ 2	19 37	−45	—	—	—
Bermuda		69·7	62	e 11 20	+ 6	20 20	− 2	i 24 47	SS	e 28·5
Copenhagen		70·4	3	i 11 16	− 2	i 20 30	0	24 52	SS	30·5
Durham		70·5	12	11 22	+ 4	i 20 36	+ 4	i 20 55	PS	—
Frunse		70·9	318	11 21	0	—	—	—	—	—
Suva		73·5	196	—	—	i 20 39	−27	i 21 28	S_cS	33·5
Andijan		73·6	318	e 11 37	0	—	—	—	—	—
De Bilt		73·7	7	e 11 28	−10	i 21 10	+ 2	e 16 11	PPP	e 34·5
Potsdam		73·8	2	e 12 16	P_cP	—	—	—	—	e 32·5
Warsaw	Z.	73·8	357	i 11 40	+ 2	e 21 13	+ 4	14 20	PP	e 38·5
Kew		73·9	11	i 11 40a	+ 1	i 21 11	+ 1	i 12 33	sP	e 39·5
Tashkent		74·3	321	i 11 41	0	e 21 11	− 4	—	—	—
Collmberg		74·9	2	i 11 45	+ 1	e 21 40	+18	e 14 45	PP	e 32·5
Uccle		75·0	9	e 11 46a	+ 1	e 21 24	+ 1	e 22 8	PPS	e 38·5
Jena		75·2	3	e 11 47	+ 1	e 21 43	+18	—	—	—
Cheb		76·1	3	e 12 1	+10	e 21 58	+23	—	—	e 41·5
Prague		76·1	1	e 11 52	+ 1	e 21 39	+ 4	e 22 22	PPS	e 35·5
Samarkand		76·6	322	11 56	+ 2	—	—	—	—	—
Paris		76·8	10	i 11 57a	+ 2	e 21 46	+ 4	e 14 55	PP	e 39·5
Stalinabad		76·9	320	i 11 55	− 1	i 21 45	+ 2	—	—	—
Stuttgart		77·3	5	e 11 59a	+ 1	e 22 3	+15	e 12 9	P_cP	e 47·5
Strasbourg		77·4	6	e 12 0a	+ 2	e 21 55	+ 6	e 14 52	P	e 32·8
Basle		78·4	7	e 12 6a	+ 2	e 22 1	+ 1	—	—	—
Besançon		78·6	8	e 12 6	+ 1	—	—	—	—	33·5
Budapest	E.	78·6	358	e 12 7	+ 2	—	—	—	—	e 41·0
Zürich		78·6	6	e 12 6a	+ 1	e 22 8	+ 6	—	—	—
Neuchatel		78·9	7	i 12 8	+ 1	e 22 3	− 2	—	—	—
Chur		79·2	5	i 12 10	+ 2	e 21 55	−13	—	—	—
Piatigorsk		79·4	341	e 12 10	+ 1	—	—	—	—	—
Clermont-Ferrand		79·9	10	i 12 12	0	i 22 16	0	i 15 16	PP	38·5
Sotchi		80·4	343	e 12 13	− 2	e 22 20	− 1	—	—	—
Zagreb		80·4	359	e 12 14	− 1	e 22 23	+ 2	—	—	—
Triest		80·5	1	i 12 16	+ 1	e 22 17	− 5	—	—	—
Baku		81·3	334	e 12 23	+ 3	e 22 39	+ 9	—	—	—
Belgrade		81·3	357	i 12 27	+ 7	e 22 35	+ 5	e 15 22	PP	e 34·8
Bucharest		81·3	353	e 12 28?	+ 8	e 22 32	+ 2	e 22 46	S_cS	39·5
Calcutta		81·5	296	e 12 20	− 1	i 22 30	− 2	i 22 50	S_cS	—
New Delhi		81·9	308	i 12 21	− 2	22 34	− 2	15 33	PP	—
Florence	E.	82·3	4	i 12 28	+ 3	i 22 45	+ 5	e 23 15	PS	—
Leninakan		82·3	339	e 12 22	− 3	—	—	—	—	—
Erevan		82·7	338	e 12 24	− 3	—	—	—	—	—
Sofia	N.	83·2	354	e 11 31	−58	e 21 50	−59	—	—	—
Barcelona		84·1	10	12 35	+ 1	22 58	0	23 20	PS	e 45·0
Rome		84·2	2	i 12 35a	+ 1	i 23 3	+ 4	i 15 51	PP	37·2
Istanbul		84·4	350	i 12 33	− 3	e 22 49	−12	—	—	—
Tortosa	N.	84·5	11	i 12 37	+ 1	i 23 7	+ 5	15 53	PP	45·7
Toledo		84·8	15	i 12 38	+ 1	i 23 7	+ 2	i 23 18	S_cS	—
Lisbon	N.	85·0	19	i 12 40	+ 2	i 23 10	+ 3	24 7	PS	42·7
Fort de France		85·8	70	i 12 42	0	i 23 15	0	—	—	—
Bogota		86·5	86	e 12 46	0	i 23 7	−15	i 12 58	pP	e 42·5
Alicante		86·8	13	e 12 41	− 6	i 23 32	+ 7	13 23	pP	e 44·7
Granada		87·5	15	i 12 55a	+ 4	i 23 38	+ 7	13 38	pP	46·5
Algiers		88·7	10	12 57	0	i 23 47	+ 4	16 27	PP	47·5
Brisbane	E.	89·2	216	—	—	e 23 18	[−10]	—	—	—
Ksara		90·6	343	i 13 7	+ 2	e 24 7	+ 7	16 44	PP	—
Hyderabad	N.	90·8	302	13 5	− 1	23 34	[− 4]	16 40	PP	44·7
Bombay		92·3	307	e 13 13	0	e 24 3	−12	36 28	Q	37·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Auckland		92·4	196	—	—	24 4	−12	23 32	SKS		42·5
Arapuni		93·5	195	—	—	24 22	− 3	31 16	SSP		39·7
Helwan		95·2	346	i 13 27k	0	24 42	+ 2	17 18	PP		—
Riverview		95·7	215	e 13 24	− 5	i 24 42	− 2	e 17 22	PP		e 44·6
Wellington		96·8	195	—	—	24 45	− 9	23 56	SKS		44·5
Kodaikanal	E.	97·4	299	27 16	PPS	24 26	[+12]	e 34 16	SSS		50·0
Christchurch		98·8	196	13 47	+ 4	24 16	[− 5]	25 4	S		46·8
Colombo	E.	99·0	295	—	—	e 24 39	[+17]	—	—		56·3
Huancayo		99·2	97	e 13 57	+12	i 24 17	[− 6]	i 25 10	S		39·7
La Paz	Z.	106·9	93	e 18 40	PP	i 28 4	PS	34 36	SS		52·5
La Plata		126·8	99	37 52	SSP	37 40	SS	—	—		60·9

Additional readings :—
Grand Coulee i = 6m.12s.
Saskatoon PPPNW = 7m.48s., SS = 13m.56s.
Logan iP = 7m.22s., iP$_c$P = 9m.23s.
Salt Lake City iP = 7m.24s.
Pierce Ferry i = 8m.25s., e = 14m.38s.
Rapid City i = 10m.1s.
Tucson i = 8m.26s., 8m.35s., and 9m.0s., eS = 14m.33s., iS$_c$S = 18m.4s.
Chicago eSS = 19m.45s.
Florissant eZ = 11m.8s., isSN = 16m.36s., iN = 17m.14s., iE = 18m.17s. and 18m.50s.
Irkutsk SS = 20m.15s.
St. Louis iZ = 9m.24s., iP$_c$P?Z = 10m.22s., iPPZ = 11m.2s., ipPP?Z = 11m.14s., isSZ = 16m 40s., eN = 18m.34s., iN = 20m.15s.
Scoresby Sund 12m.25s., 14m.34s., 20m.46s.
Ottawa i = 17m.26s., e = 19m.16s., SS = 20m.58s.
New Kensington ePPP = 13m.2s., eSS? = 20m.48s.
Seven Falls PPP = 13m.10s., SS = 21m.28s., SSS = 23m.3s.
Georgetown i = 10m.7s., e = 18m.12s.
Washington e = 13m.1s., eS$_c$S? = 19m.41s., eSS? = 21m.30s.
Fordham iSS = 22m.11s.
Harvard eSS = 22m.4s., e = 22m.56s.
Weston eSS = 21m.52s.
Columbia eS$_c$S = 19m.54s.
Upsala eN = 19m.10s., iS$_c$SN = 21m.4s., eSS = 24m.28s.?
Aberdeen iSSSE = 27m.12s.
Copenhagen i = 11m.44s., 21m.13s., SSS = 28m.52s.
Suva iSS = 25m.28s.
De Bilt eSS = 26m.28s., eSSS = 29m.48s.
Warsaw iP$_c$P?Z = 11m.53s., eSN = 21m.24s., eSE = 21m.28s., PSZ = 21m.49s., ePSN = 22m.5s., eSSE = 26m.4s., SSSZ = 30m.0s.
Kew iP$_c$PEZ = 12m.6s., ePPEN = 14m.28s?., iPSEN = 21m.30s., iS$_c$S = 22m.12s., eSSEN = 25m.48s.?, eSSZ = 28m.38s., eQEN = 32m.28s.
Collmberg eZ = 12m.7s., 12m.19s., 12m.32s., 12m.47s., 13m.3s., 13m.48s., 14m.1s., and 15m.11s., ePPPZ = 16m.40s., eZ = 17m.14s., eN = 21m.18s., and 24m.8s.
Uccle eSS = 27m.0s., e = 31m.4s.
Prague ePPP = 15m.31s., ePS = 21m.57s., eSS = 27m.28s.
Paris i = 12m.19s., iSKS = 22m.1s., iPS = 22m.28s., eSS? = 27m.34s., eSSS? = 31m.1s., e = 32m.28s., eQ = 38m.28s.
Strasbourg e = 12m.35s., ePPP = 16m.48s., eSS = 28m.52s.
Clermont-Ferrand iPPP = 17m.0s., iPS = 22m.56s., iSS = 27m.29s., iSSS = 30m.46s.
Belgrade ePS = 22m.48s., eSS = 28m.38s.
New Delhi iN = 12m.37s., SN = 22m.30s., SSN = 28m.53s., SSSN = 32m.45s.
Rome iPPPN = 17m.41s., ePS = 23m.53s., eZ = 35m.9s.
Tortosa P$_c$PN = 12m.51s., S$_c$S?N = 23m.25s., SSE = 28m.9s.
Lisbon N = 13m.31s., Z = 13m.34s., iSE = 23m.30s., SSN = 28m.40s., QE = 35m.10s.
Bogota ePPN = 16m.18s., iPSEN = 23m.57s., eSSN = 28m.58s., ePKKPN = 31m.18s.
Alicante PP = 16m.32s., PPP = 18m.13s., S$_c$S = 23m.13s., PS = 23m.45s., SS = 28m.51s., SSS = 32m.33s., Q = 38m.53s.
Granada PP = 16m.52s., PPP = 18m.46s., pS = 23m.56s., sS = 24m.33s., iSS = 29m.28s., SSS = 33m.,52s.
Algiers PS = 24m.59s., eSS? = 28m.50s.
Hyderabad SN = 23m.56s., SSN = 30m.10s.
Auckland SS = 30m.28s.
Helwan i = 21m.11s., PS = 26m.1s., PPS = 26m.42s.
Riverview iZ = 13m.37s., iSKSEN = 23m.59s., iN = 24m.46s., eSSE = 30m.57s., eSSN = 31m.4s., eSSSE = 35m.0s.
Wellington SS = 30m.58s., Q = 40m.3s.?
Christchurch SS = 31m.38s., Q = 41m.3s.
Huancayo ePP = 17m.55s., e = 26m.53s., eSS = 31m.59s., eSSS = 35m.59s.
La Paz iZ = 19m.18s. and 27m.36s., iPPS = 29m.24s., SZ = 30m.8s.
Long waves were also recorded at Apia and Tananarive.

Oct. 30d. 14h. Undetermined shock.

Grand Coulee iP = 21m.50s.
Shasta Dam iP = 22m.23s.
Tinemaha ePEN = 22m.51s.
Haiwee eP = 22m.59s.
Pasadena iP = 23m.6s., iZ = 23m.14s.
Mount Wilson iP = 23m.7s., iZ = 23m.11s.
Riverside ePZ = 23m.9s., iZ = 23m.17s.
Boulder City iP = 23m.11s.
Pierce Ferry iP = 23m.13s., i = 23m.20s.
La Jolla eP = 23m.15s.
Palomar iP = 23m.17s., iZ = 23m.25s., eSE = 31m.17s., iSN = 31m.23s.
Overton eP = 23m.18?s.
Tucson iP = 23m.42s., i = 23m.51s., ePKP,PKP = 52m.55s.
St. Louis iPZ = 24m.18s., iZ = 24m.30s., iSE = 33m.18s., eSS?E = 38m.6s., eN = 41m.31s., eL?N = 49m.30s.
Stuttgart eZ = 24m.54s.
Basle e = 25m.4s.
Zürich e = 25m.4s.
Neuchatel e = 25m.7s.
Ksara eP? = 25m.24s., e = 36m.25s.
Rome ePZ = 25m.28s., eS = 36m.16s.
Helwan iP = 25m.57s., i = 26m.21s.
Long waves were also recorded at College, Helsinki, Copenhagen, De Bilt, New Delhi, and Bombay.

Oct. 30d. Readings also at 1h. (near Mizusawa), 3h. (Palomar, Pierce Ferry, and Tucson), 4h. (Stuttgart, Basle, Zürich, Neuchatel, near Chur, Florence, Rome, and Strasbourg), 5h. (Pasadena, Boulder City, Pierce Ferry, and Tucson), 8h. (Helwan, Samarkand, Frunse Andijan, Tashkent, and Stalinabad), 9h. (Collmberg, Ksara, Pasadena, Mount Wilson, Palomar, Riverside, Haiwee, Shasta Dam, Boulder City, Pierce Ferry, Tucson, and Overton), 13h. (La Paz), 14h. (Malaga near Mizusawa), 15h. (Overton, Pierce Ferry, Mount Wilson, Palomar, and Tucson), 19h. (near La Paz), 20h. (near Ksara), 23h. (Boulder City, near Pierce Ferry, near Triest, and near Stalinabad).

Oct. 31d. Readings at 0h. (near Bogota), 3h. (Boulder City and near Pierce Ferry), 4h. (St. Louis, Grand Coulee, Tinemaha, Haiwee, Pasadena, Mount Wilson, Riverside, Boulder City, Pierce Ferry, Palomar, Tucson, and Shasta Dam), 7h. (Samarkand and near Stalinabad), 11h. (Pasadena, Mount Wilson, Riverside, Boulder City, Pierce Ferry, Palomar, and Tucson), 12h. (near Stalinabad and near La Paz), 18h. (Erevan, Grozny, near Leninakan, and near Apia), 20h. (Grand Coulee, Shasta Dam, Tinemaha, Mount Wilson, Riverside, Boulder City, Pierce Ferry, Palomar, Tucson, and St. Louis), 21h. (near Triest).

Nov. 1d. 11h. 14m. 23s. Epicentre 52°·0N. 174°·5W.

A = −·6153, B = −·0593, C = +·7860; δ = −9; h = −6;
D = −·096, E = +·995; G = −·782, H = −·075, K = −·618.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		18·8	37	i 4 19	− 4	c 7 43	− 7	—	—	c 8·0
Sitka		23·0	61	i 5 10	+ 3	c 9 14	0	c 7 15	?	—
Nemuro		27·9	268	5 56	+ 2	10 35	− 2	—	—	—
Sapporo		30·7	272	c 6 20	+ 1	(13 43)	SSS	—	—	13·7
Mori		31·7	271	c 6 20	− 7	—	—	—	—	—
Victoria		32·3	75	6 32	− 1	11 52	+ 6	7 54	PPP	16·2
Morioka		32·7	266	e 6 33	− 3	11 47	− 5	—	—	—
Mizusawa	E.	33·1	265	e 6 39	− 1	e 11 54	− 5	—	—	—
Honolulu		33·3	149	—	—	e 11 56	− 6	—	—	c 14·0
Grand Coulee		35·2	73	e 6 57	− 1	i 12 21	−10	i 7 3	?	c 14·9
Tokyo		36·1	261	e 7 4	− 1	—	—	—	—	c 16·7
Yokohama		36·4	261	e 7 8	0	12 6	−44	—	—	16·0
Shasta Dam		36·9	85	i 7 12	0	e 13 2	+ 4	—	—	e 15·8
Berkeley		38·7	89	e 7 26	− 1	e 13 27	+ 2	i 9 24	PPP	e 16·4
San Francisco		38·7	89	e 7 31	+ 4	e 13 22	− 3	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Branner	E.	39·1	89	e 7 30	− 1	e 13 30	− 1	—	—	e 16·4
Santa Clara		39·2	89	i 7 34	+ 3	i 14 33	+61	i 9 27	PPP	e 16·8
Lick		39·4	89	e 7 33	0	e 13 34	− 1	e 7 52	?	e 16·3
Osaka		39·4	264	e 7 33	0	13 32	− 3	—	—	—
Kobe		39·6	264	7 31	− 4	13 33	− 5	—	—	—
Butte		40·0	72	e 7 43	+ 5	e 13 45	+ 1	e 9 19	PP	e 16·8
Saskatoon		40·3	61	7 17	−23	13 26	−23	9 3	PP	18·6
Fresno	N.	41·0	88	e 7 54	+ 8	e 14 3	+ 4	e 10 2	PPP	—
Bozeman		41·1	72	e 7 44	− 3	i 13 54	− 7	e 9 7	PP	e 17·0
Tinemaha		41·7	87	e 7 54	+ 2	e 14 14	+ 4	—	—	—
Haiwee		42·5	88	e 7 59	0	e 14 21	− 1	—	—	—
Santa Barbara		42·5	91	e 8 7	+ 8	e 14 21	− 1	—	—	—
Logan		42·8	77	i 8 7	+ 6	e 14 26	0	i 10 13	PPP	i 17·9
Hukuoka		43·3	267	8 11	+ 6	14 39	+ 6	—	—	16·8
Salt Lake City		43·4	78	e 8 8	+ 2	i 14 34	− 1	e 9 45	PP	e 17·9
Mount Wilson	Z.	43·7	90	i 8 8	0	—	—	—	—	—
Pasadena		43·7	90	e 8 5	− 3	i 14 38	− 1	i 8 10k	P	18·0
Miyazaki		43·8	263	8 10	+ 1	14 37	− 3	—	—	15·9
Riverside		44·3	90	e 8 9	− 3	e 14 47	− 1	—	—	—
Boulder City		44·5	86	e 8 14	− 1	e 14 54	+ 3	i 8 33	?	—
Kagosima		44·6	264	e 8 22	+ 6	14 54	+ 2	—	—	—
Pierce Ferry		44·9	85	e 8 17	− 1	e 14 59	+ 3	i 11 12	PPP	—
Palomar		45·0	90	i 8 17	− 2	e 14 58	0	—	—	—
La Jolla		45·1	91	e 8 19	− 1	e 15 9	+10	—	—	—
Rapid City		46·6	69	e 8 33	+ 1	i 15 14	− 7	i 10 41	PP	i 19·0
Irkutsk		47·3	304	i 8 37	0	15 37	+ 6	—	—	—
Tucson		49·5	87	e 8 53	− 1	i 16 1	− 1	i 10 51	PP	i 19·5
Lincoln		52·4	69	e 9 15	− 1	i 16 39	− 3	e 11 9	PP	e 24·2
Scoresby Sund		56·2	11	17 40	PS	17 20	−13	22 2	SS	—
Chicago		56·8	63	e 9 46	− 2	i 17 36	− 5	e 11 45	PP	e 23·0
St. Louis		57·5	67	i 9 51	− 2	i 17 50	0	—	—	—
Ivigtut		59·3	27	10 9	+ 3	18 33	+19	—	—	—
Cincinnati		60·4	63	i 10 12	− 1	i 18 30	+ 2	i 18 57	PPS	—
Ottawa		60·6	53	10 12	− 3	18 27	− 3	22 37	SS	28·6
Shawinigan Falls		61·2	50	10 18	− 1	18 36	− 2	—	—	29·0
Seven Falls		61·7	48	10 17	− 5	18 43	− 1	14 13	PPP	29·6
New Kensington		62·0	58	i 10 24	0	e 18 48	0	e 14 10	PPP	e 24·5
Sverdlovsk		62·5	330	i 10 28	0	i 18 57	+ 3	—	—	—
Pennsylvania		62·8	58	i 10 31	+ 1	e 18 43	−15	i 19 0	PS	—
Mobile		64·3	72	10 43	+ 4	19 15	− 2	—	—	—
Georgetown		64·6	58	i 10 40	− 1	i 19 4	−17	12 58	PP	—
Harvard		64·7	52	i 10 42	0	i 19 21	− 1	—	—	e 28·6
Fordham		64·8	55	i 10 41	− 2	i 19 24	+ 1	—	—	—
Weston		64·9	52	i 10 41	− 2	i 19 23	− 1	e 23 34	SS	—
Apia		65·5	176	—	—	e 19 24	− 8	e 25 38	?	e 30·1
Tacubaya	N.	65·9	88	e 10 56	+ 6	e 19 38	+ 1	e 20 39	ScS	—
Columbia		66·0	64	e 10 49	− 1	e 19 33	− 5	e 23 55	SS	e 26·9
Almata		66·8	311	e 10 56	0	i 19 48	0	—	—	—
Halifax		66·9	46	11 0	+ 4	19 45	− 4	24 19	SS	31·6
Helsinki		67·1	350	i 10 57a	0	e 19 49	− 2	e 14 49	PPP	e 32·1
Bergen		68·0	0	11 3a	0	19 43	−19	13 29?	PP	30·3
Upsala		68·1	353	e 11 3a	− 1	e 20 1	− 2	13 29	PP	e 32·6
Frunse		68·2	312	e 10 55	− 9	—	—	—	—	—
Moscow		69·4	341	i 11 9	− 3	e 20 17	− 1	—	—	—
Suva		70·1	187	—	—	i 19 37?	−50	—	—	24·6
Andijan		70·9	312	11 24	+ 3	e 20 40	+ 4	—	—	—
Aberdeen		71·0	4	i 11 22	0	i 20 38	+ 1	e 11 40	PcP	35·2
Tashkent		71·9	314	e 11 23	− 4	e 20 39	− 9	—	—	—
Edinburgh		72·2	5	21 20	PS	20 50	− 1	21 29	PS	—
Copenhagen		72·5	356	i 11 28a	− 2	i 20 55	+ 1	21 43	PPS	36·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Durham	N.	73·4	4	e 11 37	+ 1	21 7	+ 2	21 36	PS		—
Samarkand		74·2	315	i 11 40	0	i 21 15	+ 1	—	—		—
Stalinabad		74·3	313	11 41	0	21 16	+ 1	—	—		—
Warsaw		75·3	350	e 11 49	+ 2	e 21 28	+ 2	e 21 57	PS		e 38·6
Potsdam		75·8	356	e 11 46	− 4	e 21 27	− 4	e 26 37	SS		e 30·6
Bermuda		76·0	55	i 11 51	0	i 21 34	0	i 26 18	SS		i 29·7
De Bilt		76·3	0	i 11 53a	+ 1	e 21 37	0	i 22 35	PPS		e 36·6
Dehra Dun	N.	76·4	302	e 12 41	+48	—	—	e 25 49	?		e 40·2
Calcutta	N.	76·8	289	e 12 34	+39	i 22 29	PS	—	—		37·7
Kew		76·8	4	e 11 57k	+ 2	e 21 43	+ 1	e 15 1	PP		e 42·6
Collmberg		76·9	356	e 11 54	− 2	e 21 42	− 1	e 15 0	PP		—
Jena		77·3	356	e 11 58	0	e 21 48	0	e 26 59	SS		e 40·2
Uccle		77·6	1	e 12 0a	0	e 21 56	+ 5	e 16 17	PPP		e 36·6
Prague		78·0	354	11 59	− 3	21 53	− 2	e 14 50	PP		e 31·6
Cheb		78·1	356	e 12 9	+ 7	e 21 58	+ 2	e 27 26	SS		e 39·6
New Delhi		78·3	301	i 11 55	− 8	i 21 44	−15	14 58	PP		—
Grozny		78·9	331	e 12 11	+ 4	—	—	—	—		—
Jersey		79·0	5	—	—	e 22 7	+ 1	—	—		—
Paris		79·5	2	i 12 10a	0	e 22 12	+ 1	e 27 27	SS		e 37·6
Stuttgart		79·6	357	e 12 9	− 1	e 22 11	− 1	e 12 29	P_cP		e 40·6
Strasbourg		79·8	358	i 12 12a	0	i 22 18	+ 4	i 27 37	SS		i 37·9
Budapest	E.	80·2	351	12 32	+18	22 24	+ 5	23 19	PPS		35·6
	N.	80·2	351	e 12 50	+36	e 22 50	+31	23 26	PPS		33·6
Baku		80·3	327	e 12 18	+ 4	e 22 25	+ 5	—	—		—
Besançon		81·1	359	e 12 23	+ 5	—	—	—	—		40·6
Neuchatel		81·4	359	e 12 19	− 1	e 22 32	+ 1	—	—		—
Chur		81·5	357	e 12 20a	− 1	e 22 32	0	—	—		—
Erevan		82·1	330	e 12 27	+ 3	—	—	—	—		—
Zagreb		82·1	352	e 12 23	− 1	e 22 41	+ 3	e 28 27	SS		e 40·6
Bucharest		82·3	345	e 12 31	+ 6	e 22 43	+ 3	—	—		29·6
Triest		82·5	354	e 12 23	− 3	i 22 44	+ 2	e 17 30	PPP		—
Clermont-Ferrand		82·6	2	i 12 26a	0	i 22 44	+ 1	i 28 10	SS		38·6
Belgrade		82·7	349	i 12 28	+ 1	e 22 48	+ 4	e 15 1	PP		32·1
Brisbane		84·1	208	e 12 27	− 7	i 22 45	−13	i 28 18	SS		—
Sofia		84·4	347	e 12 37	+ 1	e 23 0	− 1	(29 7)	SS		29·1
Florence	E.	84·5	356	e 12 30	− 6	i 22 54	− 8	—	—		—
Istanbul		85·1	342	i 12 40	+ 1	23 10	+ 2	—	—		—
Rome		86·3	355	i 12 44a	− 1	i 23 17	− 3	e 15 59	PP		—
Hyderabad	N.	86·5	294	12 46	0	23 23	+ 1	16 5	PP		40·2
Barcelona		86·9	3	—	—	23 31	+ 5	29 9	SS		—
Tortosa	N.	87·4	4	e 13 10	+20	i 23 35	+ 5	16 41	PP		40·4
Toledo		88·1	8	e 12 54	0	23 24	[+ 3]	i 23 31	S		—
Bombay		88·4	299	i 12 54	− 1	i 23 41	+ 1	e 16 20	PP		36·3
Lisbon		88·8	12	12 55k	− 2	23 45	+ 1	23 27	SKS		38·5
Auckland		89·0	188	22 29	?	23 14	[−13]	32 52	SSS		40·6
Alicante		89·9	5	i 13 11	+ 9	i 23 51	− 3	13 21	pP		e 43·1
Arapuni		90·1	188	—	—	e 24 37?	+42	—	—		45·6
Ksara		90·5	335	i 13 5	0	23 55	− 4	—	—		—
Riverview		90·6	208	e 13 1	− 4	i 23 33	[− 3]	i 23 56	S		e 38·0
Granada		90·8	8	e 13 12k	+ 6	i 24 6	+ 4	13 28	pP		40·8
Algiers		91·5	5	i 13 14	+ 4	24 19	+11	e 17 7	PP		44·6
Fort de France		92·2	63	e 13 13	0	23 46	[0]	—	—		—
Bogota	Z.	92·8	79	i 13 18	+ 2	e 23 55	[+ 6]	e 17 17	PP		—
Kodaikanal	E.	92·9	291	e 13 14	− 2	e 24 14	− 6	17 4	PP		45·9
Wellington	Z.	93·4	189	13 16	− 2	23 42	[−10]	24 12	sS		42·6
Colombo	E.	94·1	287	e 21 7	?	35 51	?	—	—		56·0
Helwan		95·4	338	i 13 28k	0	23 58	[− 5]	17 29	PP		—
Christchurch		95·8	190	13 21	− 8	23 50	[−15]	17 20	PP		44·3
Perth		103·4	236	—	—	i 24 44	[+ 1]	i 33 25	SS		—
Huancayo		105·0	90	e 18 41	PP	i 24 47	[− 4]	26 4	S		e 41·3
La Paz		112·9	88	19 5	PP	25 11	[−13]	22 1	PPP		55·1
Santa Lucia	N.	123·7	103	31 32	PPS	—	—	—	—		58·2
La Plata	E.	132·5	95	22 40	PP	39 7	SS	—	—		47·8
	N.	132·5	95	22 39	PP	44 19	SSS	—	—		50·4
Tananarive		133·6	300	e 22 49	SKP	—	—	—	—		65·6

For Notes see next page.

NOTES TO NOVEMBER 1d. 11h. 14m. 23s.

Additional readings :—
Victoria SS =13m.52s.
Saskatoon SSNE =16m.15s., SSSNW =16m.46s.
Bozeman e =10m.0s., eS =13m.41s.
Logan i =8m.20s.
Salt Lake City eS =14m.9s., e =15m.28s.
Pasadena eSE =14m.30s.
Pierce Ferry i =8m.21s. and 8m.39s.
Palomar iZ =8m.23s., iNZ =8m.35s.
Tucson i =8m.59s.
Lincoln eS_cS =19m.4s.
Chicago ePPP? =13m.23s., eSS =21m.27s.
St. Louis iS =17m.40s.
Cincinnati i =10m.37s., e =14m.7s. and 20m.23s.
Ottawa PS =19m.0s.
Seven Falls e =21m.17s., SS =22m.57s., e =26m.55s.
New Kensington eS =18m.37s., eSS =22m.20s., iSS =23m.8s.
Pennsylvania iE =10m.44s., eE =20m.16s.
Georgetown i =20m.33s., SS =23m.56s.
Weston iP_cP =11m.13s.
Columbia eS_cS =20m.46s.
Helsinki e =11m.17s. and 11m.32s., ePP =12m.23s., e =20m.12s., 20m.42s., and 22m.29s., eSS =24m.2s.
Bergen PPSE =20m.9s., S_cSN =20m.47s., SSEN =24m.29s.?, SSSN =28m.34s.
Upsala ePE =11m.9s., eSN =19m.57s., eSS?E =24m.7s., eSSN =24m.37s., eSSS =27m.37s.?
Aberdeen iSSN =24m.50s., iE =28m.57s.
Copenhagen 26m.2s.
Warsaw SSN =26m.35s.
Bermuda iPP =14m.10s., iPPP =16m.14s.
De Bilt eSS =27m.3s., eSSS =30m.44s.
Calcutta iPPPN =17m.24s., PSN =23m.14s., SSN =27m.44s., SSSN =30m.49s.
Kew ePPPNZ =16m.50s., ePSEN =22m.12s., ePPS =22m.40s.?, eSSN =26m.55s., eSSSEZ =30m.7s., eQEN =32m.37s.?
Collmberg ePPPZ =17m.0s., ePSZ =22m.20s., ePPS? =26m.56s., eSSE =26m.59s. and many other readings given without phase.
Jena eSN =21m.44s., eN =37m.49s.
Uccle eE =21m.39s., ePSN =22m.9s., eSSN =27m.34s., eSSSN =30m.59s.
Prague eSS? =27m.7s.?
Cheb e =33m.57s.
New Delhi i =18m.21s., PSEN =22m.14s., SSN =27m.24s., SSSN =30m.59s.
Paris ePP =15m.0s., ePPP? =17m.40s., ePS? =23m.48s., i =23m.52s. and 24m.3s., eSSS =31m.36s., eQ =34m.37s.
Stuttgart iP =12m.12s.k, eSS =27m.47s.
Strasbourg ePP =14m.58s., e =15m.34s., ePPP =16m.50s., i =22m.37s., iSSS? =32m.11s.
Budapest SSEN =27m.50s.
Zagreb eNE =22m.57s. and 27m.9s.
Clermont-Ferrand iPP =15m.24s.
Belgrade i =13m.37s., SS =27m.37s.
Brisbane eS?EN =23m.12s., iN =23m.22s.
Rome iSKSN =23m.10s., ePSEN =24m.7s., eSS =24m.51s.
Hyderabad SKSN =23m.8s., SSN =29m.21s.
Barcelona SSS? =33m.17s.
Tortosa PPP?N =18m.27s., S_cSN =23m.53s., PS?N =24m.23s., PPSN =25m.5s., SSN =29m.1s., SSSN =33m.32s., QN =36m.32s.
Toledo iPcPZ =13m.1s., SSE =29m.25s., PKP,PKPE =39m.5s.
Lisbon PZ =12m.59s.a, PSN =25m.6s., SSN =30m.7s., Q =37m.13s.?
Auckland SS =29m.7s.
Alicante PcP =13m.15s., PP =16m.43s., PPP =19m.5s., SKS =22m.51s., sS =24m.47s., PS =24m.51s., PPS =25m.31s., SS =29m.13s., SSS =32m.53s., Q =37m.27s.
Riverview iPZ =13m.5s.k, iPPZ =16m.49s., iPSNZ =25m.4s., eSS?E =29m.34s., eE =31m.48s., iSSS?E =33m.24s., iE =36m.46s., iN =36m.49s.
Granada sP =13m.48s., iPP =16m.41s., pPP =16m.58s., sPP =17m.19s., PPP =18m.46s., pPPP =19m.10s., SKS =22m.58s., SKKS =23m.43s., SS =24m.50s., PPS =25m.41s., SS =30m.34s., SSS =34m.28s.
Algiers PS =25m.4s.
Bogota iZ =13m.29s., ePSZ =24m.52s.
Kodaikanal SKKSE =23m.52s., PSE =25m.37s., SSE =30m.52s.
Wellington iZ =13m.37s., PPZ =16m.46s., pPPPZ =19m.7s., pSZ =24m.17s., PSZ =24m.49s., PPSZ =25m.27s., iZ =28m.35s., SSZ =30m.12s., iZ =32m.21s., SSSZ =33m.27s., iZ =34m.34s., ScS,ScSZ =36m.14s.
Helwan i =13m.47s., eS =24m.53s., ePS =26m.3s., SS =31m.25s.
Christchurch PPZ =20m.29s., eEN =22m.55s., PS =25m.44s., E =30m.2s., SSEN =31m.8s., SSSEN =34m.39s., QEN =38m.57s.
Huancayo eSS =33m.29s., eSSS =37m.25s.
La Paz eP?Z =15m.13s., iPPZ =19m.33s., SKKS =26m.1s., SZ =27m.12s., iPSZ =29m.5s., PPSZ =29m.43s., SSZ =35m.33s.
La Plata PPSE =35m.1s., SS?N =38m.37s., SSSE =45m.19s.

Novenber 1d. 20h. 9m. 26s. Epicentre 10°·5S. 161°·5E. (as on 1944 May 12d.).

A = −·9327, B = +·3121, C = −·1811; δ = +13; h = +6;
D = +·317, E = +·948; G = +·172, H = −·057, K = −·984.

		△	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Suva		18·1	116	i 4 37	PPP	i 7 36	SS	—	—	—
Brisbane		18·7	204	i 4 21	− 1	i 7 57	+ 9	i 8 14	SS	—
Riverview		25·1	199	i 5 30a	+ 2	e 10 14	+23	i 5 45	pP	e 12·0
Wellington		32·8	161	6 39	+ 2	11 34	−20	7 56	PP	15·6
Christchurch		34·3	165	6 49	− 1	12 24	+ 7	—	—	16·8
Perth		47·2	236	—	—	i 18 24	S_eS	—	—	i 21·9
Vladivostok		59·8	336	—	—	i 18 11	− 9	—	—	—
Irkutsk		79·4	328	e 12 5	− 4	21 59	−11	—	—	—
Berkeley	z.	85·7	51	e 12 42	0	—	—	e 13 4	pP	—
Shasta Dam		86·5	48	i 12 45	− 1	—	—	i 13 8	pP	—
Santa Barbara		86·8	55	e 12 49	+ 2	—	—	—	—	—
Pasadena		87·9	55	i 12 53	0	—	—	i 13 10	pP	e 41·3
Mount Wilson		88·1	55	i 12 55a	+ 1	—	—	—	—	—
La Jolla		88·4	56	12 57	+ 2	—	—	—	—	—
Haiwee		88·6	53	i 12 57	+ 1	—	—	i 13 18	pP	—
Riverside		88·6	55	i 12 56a	0	—	—	i 13 20	pP	—
Tinemaha		88·7	52	i 12 58	+ 1	—	—	—	—	—
Palomar		88·8	56	i 12 58a	+ 1	—	—	i 13 18	pP	—
Grand Coulee		90·8	42	i 13 5	− 1	—	—	—	—	—
Boulder City		91·0	54	e 13 7	0	—	—	i 13 30	pP	—
Pierce Ferry		91·7	54	i 13 11	+ 1	—	—	e 16 50	PP	—
Tucson		93·6	58	i 13 21	+ 2	—	—	i 13 42	pP	—
Sverdlovsk		104·7	326	—	—	24 38	[−11]	e 32 52	SS	—
Ksara		125·3	303	e 20 14	[+71]	—	—	e 30 8	PS	—
Stuttgart		135·4	324	19 20	[− 2]	—	—	—	—	—
Strasbourg		136·1	335	e 22 21	PP	—	—	—	—	e 69·6
Rome	z.	138·6	326	e 22 19	PP	e 34 25	PPS	e 25 24	PPP	—
Toledo	z.	148·1	338	i 19 46	[+ 2]	—	—	i 20 29	PKP_2	—
Malaga		151·0	336	19 54	[+ 5]	—	—	—	—	—

Additional readings and notes:—
Riverview iEN =5m.33s., iSSE =10m.44s.
Wellington i =14m.29s.
Christchurch QEN =14m.54s.
Berkeley eZ =19m.48s.
Shasta Dam i =13m.27s.
Pierce Ferry e =14m.26s.
Rome readings wrongly identified.
Long waves were also recorded at Auckland, Copenhagen, De Bilt, Uccle and Paris.

November 1d. Readings also at 7h. (near Bogota), 10h. (near Trieste), 11h. (Collmberg, Stuttgart (2), Toledo, Paris (2), Strasbourg (2), Weston (3), Lick (2), Berkeley (2), Boulder City (2), Grand Coulee (3), Riverside (3), Tucson (3), Pierce Ferry (3), and Shasta Dam (2)), 12h. (Collmberg, Stuttgart (4), Paris (2), Strasbourg, Weston (4), Lick, Berkeley, Boulder City (5), Grand Coulee (3), Riverside (2), Tucson (5), Pierce Ferry (4), and Shasta Dam (6)), 13h. (Neuchatel, Zürich, Collmberg, Stuttgart (2), Paris, Strasbourg, Boulder City (2), Grand Coulee. Riverside (2), Tucson (2), Weston (3), Pierce Ferry (2) and Shasta Dam (2)), 14h. (Shasta Dam), 15h. (Basle, Weston, Boulder City, Riverside and Pierce Ferry), 17h. (Boulder City, Pierce Ferry and Shasta Dam), 19h. (Riverside, Grand Coulee, Boulder City and Pierce Ferry (2), and Shasta Dam), 20h. (Tucson, Shasta Dam, Mount Wilson and Pierce Ferry), 21h. (Pierce Ferry (2)), 23h. (Pierce Ferry (2) and Ksara).

November 2d. 14h. 3m. 58s. Epicentre 5°·5N. 126°·0E. (as on 1940 Oct. 7d.).

$A = -\cdot5851$, $B = +\cdot8054$, $C = +\cdot0952$; $\delta = +7$; $h = +7$
$D = +\cdot809$, $E = +\cdot588$; $G = -\cdot056$, $H = +\cdot077$, $K = -\cdot966$

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	N.	25·9	352	e 5 54	+19	—	—	—	—	—
Miyazaki		26·8	10	10 14	S	(10 14)	− 5	—	—	i 16·6
Hukuoka		28·2	8	e 5 57	+ 1	e 10 21	−20	—	—	—
Yokohama		32·3	20	e 7 43	+70	12 41	+55	—	—	—
Vladivostok		37·8	7	7 44	+24	13 31	+20	—	—	—
Perth		38·5	193	—	—	i 13 17	− 5	i 17 2	SSS	—
Mori		38·7	17	e 7 33	+ 6	i 13 12	−13	i 9 54	P_cP	—
Sapporo		39·8	17	e 7 29	− 7	13 37	− 5	—	—	—
Brisbane		41·9	142	i 7 46	− 8	i 14 0	−13	e 9 50	P_cP	i 17·4
Riverview		45·8	150	i 8 29k	+ 4	i 15 8	− 1	i 10 11	PP	—
Colombo	E.	45·9	274	8 27	+ 1	15 23	+12	—	—	—
Hyderabad	N.	47·9	288	e 8 45	+ 3	15 38	− 1	10 39	PP	22·5
Irkutsk		49·9	342	8 56	− 1	i 16 7	0	—	—	—
New Delhi	N.	51·6	302	i 9 5	− 5	i 16 21	−10	11 5	PP	—
Bombay		53·5	290	e 9 22	− 2	e 17 8	+11	—	—	—
Suva		56·8	115	—	—	i 17 18	−23	—	—	—
Almata		57·2	320	e 9 50	− 1	—	—	—	—	—
Andijan		59·3	315	10 6	0	18 14	0	—	—	—
Stalinabad		61·2	312	i 10 16	− 3	i 18 35	− 3	—	—	—
Auckland		62·0	137	—	—	18 32	−16	—	—	26·0
Samarkand		62·9	312	i 10 33	+ 3	e 19 4	+ 4	—	—	—
Arapuni		63·2	138	i 11 2?	P_cP	—	—	—	—	35·0
Christchurch		64·4	143	10 38	− 2	19 9	− 9	20 22	S_cS	30·5
Wellington		64·4	141	9 32	−68	19 7	−11	13 7	PP	32·0
Sverdlovsk		72·1	329	i 11 23	− 5	i 20 38	−12	—	—	—
Baku		75·9	311	e 11 52	+ 2	i 21 33	+ 1	—	—	—
Grozny		79·2	313	e 12 4	− 4	—	—	—	—	—
Erevan		80·0	310	e 12 15	+ 2	—	—	—	—	—
Moscow		84·6	325	i 12 33	− 3	e 22 51	−12	e 23 50	PS	—
Ksara		87·1	303	i 12 47	− 2	23 32	+ 4	24 52	PPS	—
Helsinki		90·7	331	—	—	e 24 2	+ 1	—	—	e 43·0
Helwan		91·3	300	13 2	− 7	e 23 35	[− 5]	e 16 2	PP	—
Istanbul		91·6	312	e 13 2	− 8	e 23 7	−62	—	—	—
Upsala		94·4	331	13 19a	− 4	i 23 47	[−11]	e 31 2	SS	e 45·0
Warsaw		94·8	323	e 13 19a	− 6	e 23 55	[− 5]	e 26 35	PPS	51·0
Belgrade		97·6	316	—	—	e 24 12	[− 3]	—	—	—
Copenhagen		98·4	329	17 44	PP	i 24 11	[− 8]	27 13	PPS	46·0
Prague		99·3	323	e 23 7	?	e 24 15	[− 9]	e 27 26	PPS	e 49·0
Collmberg	Z.	99·8	323	e 13 43	− 4	—	—	e 17 44	PP	—
Zagreb		99·8	318	—	—	e 24 21	[− 5]	—	—	—
Scoresby Sund		101·2	349	—	—	24 30	[− 3]	—	—	50·0
Triest		101·3	318	e 17 28	PP	i 24 28	[− 5]	—	—	—
Shasta Dam		102·5	47	e 13 58	− 2	—	—	—	—	—
Stuttgart	Z.	103·0	322	e 13 59	− 3	—	—	—	—	—
Rome		103·5	315	e 14 1	− 3	e 24 37	[− 7]	e 18 17	PP	—
Florence	E.	103·7	318	e 17 25	PP	e 26 40	+49	—	—	—
De Bilt		103·9	328	e 14 2	− 4	i 24 42	[− 4]	e 18 17	PP	e 48·0
Strasbourg		104·0	323	e 17 43	PP	26 1	+ 7	e 24 30	SKS	50·5
Aberdeen		104·8	335	—	—	i 24 45	[− 5]	—	—	e 49·3
Paris		107·0	325	e 18 2?	PP	—	—	—	—	e 57·0
Clermont-Ferrand		108·7	322	e 18 42	PP	e 25 7	[0]	e 28 17	PS	52·0
Pierce Ferry		110·3	49	e 18 34	[0]	—	—	i 19 29	PP	—
Alicante		114·0	317	i 25 16	SKS	(i 25 16)	[−12]	29 1	PS	e 55·4
Tucson		114·3	50	e 18 39	[− 3]	e 39 27	SSS	e 29 25	PS	—
Toledo		115·6	318	e 19 25	[+41]	39 45	SSS	21 51	PPP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seven Falls		125·5	13	—	—	e 38 2	SS	—	—	53·0
Harvard		129·6	15	e 19 22	[+11]	i 22 30	PKS	—	—	68·0
Washington		130·9	24	e 22 36	PKS	e 43 25	SSS	—	—	e 52·8
Bermuda		141·0	15	e 22 32	PP	e 27 7	[+26]	e 40 30	SS	e 52·4
Balboa Heights		150·8	59	e 19 59	[+10]	—	—	—	—	—
San Juan		153·4	26	e 20 6	[+14]	—	—	—	—	—
Bogota	z.	157·6	64	i 19 59	[+ 1]	—	—	e 24 9	PP	—
Huancayo		157·9	110	i 20 3	[+ 5]	e 31 2	{ 0}	e 44 21	SS	e 67·9
Fort de France		158·7	20	e 20 1	[+ 2]	—	—	—	—	—
La Paz		162·4	129	i 20 6	[+ 3]	31 26	{+ 1}	35 1	pSKS	75·9

Additional readings and note :—
Brisbane ePPE =9m.11s., eSSE =16m.37s.
Riverview iE =8m.32s., iZ =8m.37s., iSN =15m.3s., ePSE =15m.14s., iSSEN = 18m 18s., iScSEN =18m.28s., iE =19m.29s.
Hyderabad PSN =15m.46s., SSN =18m.30s.
New Delhi iN =11m.21s. and 20m.34s.
Christchurch SSEN =23m.4s., SSSEN =26m.18s., QN =27m.27s.
Wellington iZ =10m.42s., ScS =19m.32s., sPS =20m.32s., SS? =23m.27s., SSSS? = 26m.32s., Q =28m.2s.
Upsala iPKS?E =21m.26s.?, eN =28m.2s.? and 38m.2s?
Warsaw iPZ =13m.23s., PPZ =16m.5s., eZ =17m.29s., PPPZ =18m.44s., PSN = 24m.56s., eZ =27m.21s.
Belgrade e =25m.19s. and 28m.18s.
Prague e =25m.2s., 32m.32s., 34m.44s. and 39m.32s.
Collmberg eZ =13m.52s., 14m.42s., and 18m.5s., ePPPZ =19m.45s., eZ =20m.7s.
Rome ePSE =27m.31s., eSSE =33m.21s., eSSSE =37m.1s.
De Bilt ePPP =20m.22s., ePPS =27m.47s., eSS =32m.32s.
Strasbourg e =18m.28s., ePS =27m.47s., eSS? =33m.50s.
Alicante PPP =31m.3s., eS =35m.59s., SS =41m.23s., SSS =44m.53s., Q =47m.51s.; phases wrongly identified.
Toledo eZ =19m.37s., iZ =19m.53s.
Bermuda e =37m.20s.
La Paz $iPKP_3$ =20m.54s.a, iPPZ =24m.40s., SS?Z =45m.52s.
Long waves were also recorded at Honolulu, Uccle, Cheb, Potsdam, and Granada.

Nov. 2d. 14h. 12m. 0s. Epicentre 37°·8N. 142°·2E.

Intensity II-III at Sendai, Hukusima, Tukubasan; macroseismic radius 200-300km. Suggested depth 40km.

Seismo. Bull. Cent. Met. Obs., Japan for 1946, Tokyo, 1951, p. 25, with isoseismal chart.

$A = -·6259$, $B = +·4855$, $C = +·6103$; $\delta = -7$; $h = -1$;
$D = +·613$, $E = +·790$; $G = -·482$, $H = +·374$, $K = -·792$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Sendai		1·1	294	(0 25)k	+ 3	(0 40)	+ 1
Hukusima		1·4	268	(0 56)	S	(1 13)	?
Onahama		1·4	230	(0 19)	− 8	(0 34)	−12
Mizusawa	E.	1·6	328	e 0 34	+ 4	0 53	+ 2
Mito		2·0	224	0 35	0	0 57	− 5
Morioka		2·1	337	0 39a	+ 2	1 4	0
Kakioka		2·2	226	0 6	?	—	—
Utunomiya		2·2	236	0 0?	?	—	—
Tukubasan		2·3	227	0 40	0	1 3	− 6
Akita		2·5	319	0 29	−14	0 55	−19
Maebasi		2·9	241	e 0 48	0	—	—
Tokyo		2·9	223	e 0 46	− 2	e 1 22	− 2
Yokohama		3·1	221	e 0 57	+ 6	e 1 29	0
Shizuoka		4·2	228	1 53	S	(1 53)	− 4

Nov. 2d. 18h. 28m. 29s. Epicentre 41°·8N. 71°·7E.

Destructive in the districts of Uzbeck and Kirghiz.

P. Caloi and F. Peronaci.
" Il terremoto del Turkestan del 2 Novembre, 1946." Annali di Geofisica. Rivista dell' Instituto Nazionale di Geofisica, Vol. 1, No. 2, April, 1948, pp. 246-252.
Epicentre 41° 52′·35N. ± 5′2; 71° 42′·29E. ± 2′·9E. Depth 73km. ± 23km.

Anonymous.
" Nature," London, November 30, 1946, Vol. 158, p.784.

$A = +·2348$, $B = +·7099$, $C = +·6641$; $\delta = +12$; $h = -2$;
$D = +·949$, $E = -·314$; $G = +·209$, $H = +·630$, $K = -·748$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		1·2	155	i 0 24	0	—	—	—	—	—
Frunse		2·4	63	i 0 43	P*	—	—	—	—	—
Obi-garm		3·5	207	i 1 8?	P_g	—	—	—	—	—
Stalinabad		3·9	216	i 1 6	+ 4	—	—	—	—	—
Almata		4·2	67	i 1 6	− 1	—	—	—	—	—
Samarkand		4·2	241	i 1 9	+ 2	—	—	—	—	—
New Delhi		13·9	160	i 3 15a	− 6	5 57	0	3 22	PP	6·7
Sverdlovsk		16·6	338	i 3 51	− 5	i 7 0	0	—	—	—
Grozny		19·1	283	e 4 27	0	—	—	—	—	—
Erevan		20·6	274	e 4 45	+ 2	i 8 42	+13	—	—	—
Piatigorsk		21·0	286	i 4 49	+ 2	e 8 42	+ 5	—	—	—
Bombay		22·8	177	i 5 6	+ 1	i 9 15	+ 4	—	—	11·5
Sotchi		23·5	285	5 13	+ 1	9 28	+ 5	—	—	—
Irkutsk		24·4	53	i 5 22	+ 1	i 9 33	− 6	—	—	—
Hyderabad	N.	25·0	165	5 26	− 1	9 38	−11	5 57	PP	—
Moscow		26·1	314	i 5 39	+ 2	10 16	+ 9	—	—	—
Yalta		27·4	288	i 5 49	0	10 37	+ 9	—	—	—
Ksara		29·2	266	i 6 8	+ 3	11 34?	+36	—	—	—
Istanbul		31·7	284	i 6 29	+ 2	e 11 26	−11	—	—	—
Bucharest		33·1	291	i 6 40	0	i 11 58	− 1	i 7 48	PP	22·3
Campulung		33·7	293	e 6 47	+ 2	e 12 7	− 1	—	—	16·5
Helsinki		33·8	320	e 6 45a	− 1	i 12 11	+ 1	—	—	—
Helwan		34·5	263	i 6 52k	0	12 18	− 2	—	—	—
Sofia		35·4	288	e 7 1	+ 1	i 12 40	+ 6	i 8 33	PPP	i 16·3
Warsaw		35·4	304	i 6 59a	− 1	12 57	+23	8 12	PP	e 17·5
Colombo	E.	35·5	167	8 0	+60	13 38	+62	—	—	15·5
Belgrade		36·9	293	i 7 15	+ 3	i 13 1	+ 3	i 8 49	PP	e 14·9
Budapest		37·3	297	7 16	0	12 59	− 5	9 2	PPP	16·0
Upsala		37·4	318	i 7 15a	− 1	e 12 57	− 8	8 22	PP	15·5
Kalocsa		37·5	296	7 22	+ 5	i 13 4	− 3	9 13	PPP	e 16·0
Zagreb		39·7	296	i 7 36a	0	i 13 32	− 8	i 9 12	PP	i 21·0
Prague		39·8	303	i 7 35a	− 1	e 13 48	+ 6	e 9 11	PP	e 15·5
Copenhagen		40·2	312	i 7 40a	0	i 13 49	+ 1	9 25	PP	20·5
Potsdam	N.	40·2	306	i 7 42	+ 2	—	—	i 7 55	pP	e 16·4
Zi-ka-wei	E.	40·9	89	e 8 19	+33	15 27	+89	—	—	22·8
Cheb		41·1	303	e 7 54	+ 7	e 14 15	+14	9 27	PP	e 20·9
Triest		41·3	296	i 7 51	+ 2	i 14 3	− 1	i 8 3	pP	—
Jena		41·4	303	e 7 49	− 1	i 14 9	+ 4	i 9 30	PP	—
Rome		43·3	292	i 8 6a	+ 1	i 14 28	− 5	i 9 33	PP	—
Stuttgart		43·4	301	e 8 5k	− 1	e 14 36	+ 1	e 9 49	PP	e 20·0
Florence	E.	43·5	294	i 7 58	− 9	i 14 26	−10	—	—	—
Vladivostok		43·6	68	8 31	+23	e 14 57	+19	—	—	—
Chur		43·7	299	e 8 7	− 1	e 15 9	+30	—	—	—
Zürich		44·2	300	i 8 12a	0	e 14 50	+ 4	e 10 6	PP	—
Strasbourg		44·4	302	i 8 15	+ 1	i 14 47	− 2	i 9 59	PP	e 15·9
Basle		44·8	301	e 8 17a	0	e 14 49	− 6	e 10 11	PP	—
De Bilt		45·0	307	i 8 21a	+ 2	i 15 16	+18	e 10 9	PP	e 21·5
Neuchatel		45·4	300	e 8 20	− 2	e 15 27	+23	e 18 32	SS	—
Besançon		45·9	300	e 8 27	+ 1	e 15 9	− 2	—	—	18·5
Uccle		45·9	306	i 8 26a	0	i 15 13	+ 2	i 8 38	pP	—

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hukuoka		46·4	81	8 30	0	15 34	+16	10 15	PP	24·7
Hamada		47·0	79	8 37	+ 2	14 39	−47	—	—	—
Kagosima		47·5	83	e 8 33	− 5	15 17	−17	—	—	—
Paris		47·6	304	i 8 39	0	i 15 41	+ 6	i 8 51	pP	e 22·5
Miyazaki		47·9	82	8 42	0	15 36	− 3	i 10 38	PP	18·9
Aberdeen		47·9	316	i 8 42	0	i 15 42	+ 3	i 10 35	PP	21·9
Durham	N.	48·2	312	i 8 43	− 1	i 15 48	+ 5	i 15 58	PPS	—
Clermont-Ferrand		48·3	299	i 8 45	0	i 18 58	SS	i 10 38	PP	—
Kew		48·5	308	i 8 47a	+ 1	i 15 57	+ 9	i 10 44	PP	e 21·0
Kobe		49·4	77	e 8 53	0	16 1	+ 1	—	—	—
Osaka		49·6	77	i 9 0	+ 5	16 8	+ 5	—	—	—
Mori		49·9	65	8 59	+ 2	16 19	+12	—	—	26·8
Sapporo		50·0	63	8 57	− 1	16 4	− 5	—	—	27·0
Owase		50·4	77	e 8 49	−12	16 17	+ 3	—	—	—
Jersey		50·4	306	e 9 59	+58	e 19 31?	SS	—	—	e 26·0
Barcelona		50·7	295	i 9 4	+ 1	i 16 23	+ 5	20 0	SS	e 25·1
Morioka		51·3	68	9 7	− 1	16 35	+ 9	—	—	—
Mizusawa		51·6	69	9 9	− 1	16 30	− 1	16 41	S	e 24·7
Sendai		51·8	70	9 10	− 2	16 34	+ 1	—	—	—
Tortosa	N.	52·0	294	i 9 13	0	i 16 38	+ 2	10 17	PcP	21·2
Algiers		52·1	288	i 9 17	+ 3	i 16 45	+ 7	i 9 27	pP	27·1
Tokyo		52·2	73	9 17	+ 2	e 16 48	+ 9	—	—	e 26·4
Yokohama		52·2	74	9 15	0	16 54	+15	—	—	e 25·4
Scoresby Sund		52·4	336	i 9 17	+ 1	16 46	+ 4	11 17	PP	—
Nemuro		52·7	62	8 57	−21	16 53	+ 7	—	—	—
Alicante		53·8	292	i 9 28	+ 2	i 17 9	+ 8	9 44	pP	i 27·1
Reykjavik		54·8	328	e 9 45	+11	e 17 12	− 2	11 41	PP	e 27·1
Toledo	Z.	55·5	295	i 9 41	+ 2	i 17 31	+ 7	10 46	PcP	25·6
Granada		56·5	293	i 9 46k	0	i 17 38	+ 1	10 0	pP	26·5
Lisbon		59·6	297	10 6	− 2	18 20	+ 3	10 48	pP	28·5
Tananarive		64·4	206	10 40	0	e 19 13	− 5	11 17	PcP	32·0
Ivigtut		66·4	333	10 51a	− 2	19 44	+ 1	13 17	PP	—
College		69·3	18	e 11 14	+ 3	e 24 59	SS	e 13 39	PP	28·2
Sitka		78·5	15	i 12 6	+ 2	i 22 11	+10	e 14 58	PP	—
Johannesburg		78·8	220	e 12 7	+ 1	i 22 1	− 3	i 15 13	PP	e 36·5
Perth		83·9	144	e 12 44	+11	i 22 59	+ 3	i 15 54	PP	e 36·9
Halifax		85·1	330	12 39	0	23 10	+ 2	28 55	SS	39·5
Seven Falls		85·4	336	12 40	0	23 12	+ 1	28 49	SS	35·5
Saskatoon		86·4	0	12 23	−22	22 55	−26	28 44	SS	40·5
Shawinigan Falls		86·5	337	12 47	+ 1	23 29	+ 7	16 3	PP	42·5
Ottawa		88·4	339	12 56	+ 1	23 45	+ 5	16 23	PP	42·0
Victoria		89·1	11	12 58	0	25 26	PPS	16 24	PP	44·5
Harvard		89·8	334	i 13 2a	0	e 23 58	+ 5	e 16 45	PP	e 41·5
Weston		89·8	334	i 13 3	+ 1	e 23 31	[− 1]	i 25 8	PS	—
Grand Coulee		90·1	8	i 13 2	− 1	—	—	i 13 6	PcP	—
Seattle		90·1	10	e 13 18	+15	e 24 40	PS	e 30 36	PPS	e 34·3
Fordham		92·0	334	i 13 10	− 2	i 25 31	PS	i 16 58	PP	40·6
Butte		92·5	3	i 13 10	− 4	e 23 47	[0]	i 16 51	PP	e 37·6
Bozeman		92·9	2	e 13 14	− 2	e 24 19	− 1	i 17 1	PP	37·5
Pennsylvania	E.	93·3	337	e 13 13	− 5	e 24 22	− 2	i 25 38	PS	—
New Kensington		94·0	338	e 13 11	−10	e 24 36	+ 6	e 17 16	PP	e 38·3
Chicago		94·7	345	e 13 25	+ 1	e 23 39	[−20]	e 19 8	PPP	e 38·5
Georgetown		94·8	336	i 13 26	+ 1	e 24 53	+17	e 17 13	PP	43·7
Washington		94·8	336	i 13 25	0	e 23 37	[−23]	i 17 9	PP	e 37·6
Bermuda		96·0	324	i 13 31	+ 1	i 24 1	[− 6]	i 17 29	PP	e 39·5
Logan		96·2	3	i 13 38	+ 7	i 24 18	[+10]	i 17 32	PP	e 39·9
Cincinnati		96·6	342	i 13 33	0	i 24 14	[+ 4]	17 25	PP	—
Shasta Dam		96·9	11	i 12 57	−37	e 24 16	[+ 5]	i 13 32	P	—
Lincoln		97·0	351	e 13 44	+ 9	e 24 49	− 6	e 17 36	PP	e 39·8
Salt Lake City		97·8	3	i 13 40	+ 2	i 24 24	[+ 8]	e 17 48	PP	e 29·1
St. Louis		98·2	346	i 13 50	+10	—	—	e 17 50	PP	—
Berkeley		99·7	11	i 13 49	+ 2	e 24 39	[+13]	—	—	e 46·6
Branner	N.	100·1	11	e 14 40	+51	e 27 4	PS	—	—	e 36·2
Santa Clara		100·2	11	e 13 51	+ 2	—	—	e 37 20	?	e 46·5
Columbia		100·5	336	e 13 50	− 1	e 24 37	[+ 8]	e 17 58	PP	e 42·6

Continued on next page.

		△	Az.	P.		O−C.	S.		O−C.	Supp.			L.
		°	°	m.	s.	s.	m.	s.	s.	m.	s.		m.
Tinemaha		101·0	8	e 14	20	+27	—		—	e 18	4	PP	—
Fresno	N.	101·1	9	e 14	8	+15	e 22	37	?	e 18	5	PP	—
Brisbane	E.	101·8	116	e 14	7	+11	i 24	36	[0]	e 17	43	PP	—
Honolulu		102·3	47	e 18	7	PP	e 26	50	PS	e 28	44	PPS	e 42·3
Pierce Ferry		102·3	5	e 14	1	+ 2	e 22	2	PKS	i 18	14	PP	—
Boulder City		102·4	6	i 14	0	+ 1	—		—	i 17	54	PP	—
Pasadena		103·9	9	i 14	6	0	i 27	39	PS	i 18	18	PP	e 41·4
Riverside	Z.	104·1	9	e 18	26	PP	—		—	i 29	59	PKKP	—
Riverview		104·7	123	i 14	10a	+ 1	i 24	51	[+ 2]	i 14	22	pP	e 51·5
Palomar		104·8	8	e 18	39	PP	e 27	49	PS	i 29	57	PKKP	—
Mobile		105·5	343	18	35	pPKP	24	59	[+ 6]	—		—	—
Tucson		106·3	2	e 14	13	P	i 24	50	[− 6]	e 18	29	PP	e 42·5
San Juan		108·5	318	e 14	29	P	e 25	13	[+ 7]	e 18	55	PP	e 43·1
Fort de France		108·9	311	e 18	7	[−24]	e 28	31	PS	—		—	—
Suva		114·2	93	19	41?	[+60]	35	31	SS	i 31	6	PPS	50·5
Merida		114·9	341	i 19	29	PP	e 29	14	PS	e 35	25	SS	e 49·0
Guadalajara	N.	117·7	356	e 17	37	?	e 35	51	SS	40	33	SSS	55·6
Vera Cruz	E.	118·3	347	e 16	10	?	e 25	34	[−10]	e 26	44	SKKS	e 53·2
Tacubaya		118·5	351	e 20	7	PP	e 27	1	{− 3}	e 29	50	PS	54·5
Apia		118·8	83	—		—	—		—	e 54	45	Q	e 63·6
Auckland		122·2	113	21	25	PP	28	48	?	—		—	50·5
New Plymouth		122·8	115	20	59	PP	27	32	{− 1}	—		—	68·5
Arapuni		123·4	114	20	31?	PP	(31	31?)	PPS	—		—	31·5
Christchurch		124·0	121	19	1	[0]	25	47	[−16]	20	30	PP	61·2
Bogota	Z.	124·3	318	i 19	5	[+ 4]	e 32	38	PPS	i 20	48	PP	—
Wellington		124·3	118	19	1	[0]	22	26	PKS	21	7	PP	59·5
La Paz		137·4	294	e 19	15a	[−11]	26	11	[−24]	22	7	PP	65·5
Huancayo		138·7	307	i 19	34	[+ 6]	i 40	48	SS	i 22	20	PP	i 50·2
La Plata	E.	140·4	264	19	32	[+ 1]	23	1	PKS	22	25	PP	70·2
	N.	140·4	264	19	32	[+ 1]	23	7	PKS	22	13	PP	58·6
	Z.	140·4	264	19	32	[+ 1]	22	37	PKS	20	8	?	—
Santa Lucia		149·3	274	19	48	[+ 2]	42	33	SS	—		—	61·5

Additional readings:—
New Delhi iSE =5m.42s., SSN =6m.8s.
Hyderabad PcPN =9m.5s.
Bucharest iPPE =7m.54s., iPcPE =9m.17s., iS?N =12m.6s., iScSE =16m.58s.
Helsinki i =6m.58s., 7m.6s. and 7m.23s.
Sofia iEN =7m.21s., iN =9m.33s., 10m.3s. and 11m.25s., iE =12m.17s. and 12m.51s., iSSN =14m.44s.
Warsaw ePN =7m.2s., PN =7m.14s., eN =7m.29s., iN =8m.4s., PPPN =8m.40s., S?N =13m.6s.
Belgrade i =7m.25s., ePPP? =9m.36s.
Budapest PN =7m.19s., eE =7m.28s., iN =7m.32s., PPN =8m.17s., eN =8m.51s., eE =9m.7s., SSN =14m.44s., SSSN =15m.31s.
Upsala ePN =7m.20s., iP?E =7m55s., iPPPE =8m.39s., iPcP? =8m.54s., iN =9m.59s., eSN =12m.52s., iE =13m.31s?, iN =14m.43s.
Kalossa i =9m.31s., 10m.28s., and 10m.40s., eS?E =12m.51s., eN =14m.44s.
Zagreb iPcP =9m.26s., iPcPZ =9m.30s., iPPP =9m.57s., i =11m.4s., iSSNE =16m.35s., iScS =18m.2s., i =19m.11s.
Prague pP? =7m.51s.
Copenhagen 16m.45s.
Potsdam iPPN =9m.21s.
Cheb iP =7m.57s., i =8m.3s., e =8m.18s., 9m.42s., 10m.49s., 11m.45s., 15m.33s., 16m.8s. 16m.48s., and 17m.15s., i =17m.18s., e =17m.41s. and 18m.19s.
Triest iSS =17m.6s.
Jena iPN =7m.52s., iSSN =16m.31s., iSSE =16m.57s.
Rome i =8m.23s., iPPPEN =10m.5s., iEN =11m.32s., eSSEN =16m.57s., iSSSEN =18m.14s.
Stuttgart eS =14m.21s., eSS =17m.45s., eSSS =18m.44s.
Zürich eSS =18m1s.
Strasbourg ipP? =8m.28s., iPcP =10m.1s., iPPP =10m.41s., i =11m.39s. and 11m.47s., iPcS =13m.19s., i =14m.27s.
Basle eSS =18m.11s.
Uccle iZ =9m.5s., eZ =9m.52s., ePPEZ =10m.12s., ePPN =10m.17s., epPPZ =10m.29s., isSE =15m.27s.
Hukuoka SS =18m.54s.
Paris i =9m.19s., iPcP =10m.9s., iPP =10m.41s., iPPP =11m.11s., ePPS? =16m.31s., i =18m.11s., eSS =19m.31s.
Miyazaki i =9m.6s.
Aberdeen iN =8m.0s., iPPPEN =11m.15s., iPSE =16m.12s., iSSEN =19m.7s,

Continued on next page.

Durham iN =11m.24s., iSS?N =20m.0s.
Kew iPcPN =10m.1s., ePPPNZ =11m.27s., eSSNZ =18m.49s.?, eQN =19m.1s.?.
Jersey e =13m.16s. and 17m.43s.
Tortosa iN =9m.26s., PPN =11m.32s., PPPN =12m.34s., PcSN =14m.42s., PSN = 16m.51s., PPSN =17m.0s., ScSN =19m.10s., SSN =20m.30s.
Algiers iPcP =9m.52s., i =10m.12s., iPPP =12m.2s., iPcS =14m.6s., e =16m.8s., iPS =17m.15s., iSS =20m.28s., SSS =22m.3s., iQ =23m.31s.
Scoresby Sund 12m.27s.
Alicante sP =10m.8s., PcP =10m.24s., PP =11m.28s., PPP =12m.20s., PcS =14m.24s., PS =17m.20s., PPS =17m.36s., ScS =19m.12s., SS =21m.2s., SSS =23m.2s.
Reykjavik eSSEN =20m.6s., eE =24m.7s.
Toledo PPZ =11m.54s., S_cSEN =19m.30s., SSEN =21m.30s., SSSEN =23m.1s., PKKPN =31m.21s., PKKSZ =34m.55s.
Granada sP =10m.22s., P_cP =10m.54s., PP =12m.3s., PPP =13m.0s., P_cS =14m.31s., sS =18m.1s., S_cS =19m.47s., SS =21m.40s.
Lisbon N =10m.19s., E =10m.22s., Z =10m.31s., PP?Z =12m.33s., PP?N =12m.48s., PPP?N =13m.58s., PPP?EZ =14m.7s., E =19m.20s., N =25m.31s.
Tananarive PS =19m.34s., eQ =29m.43s.
Ivigtut 24m.7s.
College iPP =13m.51s., ePPP =15m.19s., iPPP =15m.32s.
Sitka iPP =15m.14s., iPPP? =17m.7s., iSS =27m.12s., eSSS =30m.27s.
Johannesburg eE =22m.13s., eEN =23m.1s., eSSN =27m.19s.
Perth PPP =17m.44s., PS =23m.31s.
Seven Falls e =17m.2s. and 20m.31s., PS =24m.43s., e =31m.12s.
Saskatoon eNE =33m.31s.?, eNW =37m.1s.
Shawinigan Falls SS =29m.1s.
Ottawa PPP =18m.31s., PSN =24m.47s., SS =29m.57s., SSS =33m.31s., e =38m.31s.?
Harvard i =13m.12s., 13m.39s., and 14m.2s., iPPP =18m.41s., eSKS =23m.25s., i = 24m.41s. and 25m.43s., eSS =30m.27s.
Weston iSS =30m.11s.
Victoria SS =30m.17s., SSS =33m.47s.
Grand Coulee i =13m.32s. and 17m.25s.
Seattle ePP =13m.44s.
Fordham iSS =30m.52s., iSSS =35m.19s.
Butte i =13m.46s., iS =24m.53s., ePS =25m.33s., iSS =30m.51s., eSSS =34m.7s.
Bozeman i =13m.51s., ePPP =19m.29s., eSKS =23m.26s., iS =24m.26s., ePS =25m.29s., eSS =30m.18s., iSS =30m.51s., eSSS =34m.51s.
Pennsylvania ePPE =16m.57s.
Chicago e =14m.17s., ePP =16m.45s., eSKKS =24m.6s., iPS =25m.53s., iSS =30m.52s., ePSPS =31m.49s.
Georgetown ePP =17m.27s., iPS =26m.4s., SS =31m.17s.
Washington e =16m.25s. and 20m.8s., iPS =25m.55s., i =26m.15s., eSS =31m.59s.
Bermuda i =21m.7s., iS =24m.56s., ePS =26m.1s., iPS =26m.16s., eSS =31m.3s., iSSS? =34m.26s.
Logan i =14m.19s., e =29m.14s.
Cincinnati i =19m.39s. and 26m.25s., SS =31m.31s.
Shasta Dam i =13m.41s. and 14m.2s., eS =24m.32s., e =29m.4s.
Lincoln eSKS =23m.40s.
Salt Lake City ePPP =19m.36s., iPS =26m.37s., iSS =31m.32s., i =32m.36s., eSSS = 35m.29s., iSSS =36m.1s.
St. Louis ipP =13m.59s., ePP =17m.29s.
Columbia ePS =26m.54s., eSS =32m.0s., eSSS =36m.20s.
Pierce Ferry i =14m.35s. and 15m.21s., ePPS =38m.20s.
Boulder City i =14m.38s., 18m.46s. and 19m.35s., eSS =34m.28s., e =38m.21s.
Pasadena ePKPZ =17m.51s., iPKKPZ =30m.1s., iZ =30m.30s., eSSNZ =33m.7s.
Riverview ePPE =18m.37s., iNZ =18m.46s., iPSNZ =27m.48s., iPPSEN =28m.42s., iE =29m.12s., eSSE =33m.46s., iPSPSN =34m.10s., iPSPSE =34m.13s., eE = 34m.31s. and 36m.54s., eQE =45m.49s.
Tucson ePKP =17m.33s., iPKP =17m.41s., iPKP =17m.56s., iPP =18m.42s. and 18m.58s., iPP =20m.44s., iPS =28m.9s., ePKKP =29m.53s., eSS =33m.14s., eSSS =37m.48s.
San Juan i =20m.6s. and 21m.15s., eSKS =24m.30s., i =26m.7s., eS =26m.37s., ePS = 28m.11s., iPS =28m.23s., eSS =34m.6s.
Brisbane iSKKSE =24m.56s., eSSE =31m.29s.
Suva PP =20m.55s., PPP =22m.46s., i =27m.18s.?, S =28m.1s., SSS =40m.31s.
Merida ePPE =19m.32s., ePPPE =21m.41s., ePPPN =21m.53s., eE =23m.41s., eN = 23m.50s., eE =28m.29s., eSSE =35m.32s., eE =37m.35s., eSSSN =39m.49s.
Guadalajara eSKPN =21m.15s., eSN =27m.34s., eE =52m.43s.
Vera Cruz eZ =17m.32s., iZ =19m.11s., iE =19m.16s., iPPE =19m.32s., eZ =21m.41s., eSE =27m.34s., ePSE =29m.12s., ePPS?E =30m.5s., eSS?E =35m.6s., eSSS?E = 39m.20s., eSSSZ =39m.47s.
Tacubaya ePPE =20m.10s., ePPPEN =22m.40s. and 22m.43s., eSKKSN =26m.55s., ePSEN =30m.8s., ePPS?N =31m.42s., ePPS?E =31m.45s., ePPS?EN =31m.50s., ePPS?N =31m.53s., eSSPN =36m.41s., eSSPE =36m.44s., and many other readings given without phase.
Christchurch SKPEZ =23m.8s., SKKSEN =27m.10s., PS =30m.35s., PPS =32m.13s., EN =36m.31s., SSEN =38m.21s., SSS? =41m.57s., SSSS =45m.56s., QEN = 54m.11s.

Continued on next page.

Bogota eZ =19m.59s.
Wellington iZ =19m.36s., 20m.47s., 23m.6s., 25m.17s., and 26m.21s., i =28m.41s., PSZ =30m.38s., SKKPZ =32m.21s., SPPZ =32m.51s., PPPZ =36m.4s., SSZ = 38m.31s.?, S_cS,S_cSZ =41m.51s.?, SSSZ =43m.1s., iZ =46m.31s.?, Q =54m.31s.?
La Paz iPKPZ =19m.29s., SKP =22m.33s., PPP =24m.31s., SKKS =28m.43s., SZ = 29m.55s., PSKS =31m.31s., PPS =34m.11s., SSZ =39m.39s., iZ =40m.55s., QE = 60m.31s.
Huancayo i =20m.31s., ePS =34m.58s., i =41m.24s., iSSS =45m.2s.
La Plata E =23m.43s., PPP =25m.1s., PSS =41m.19s. and 52m.55s., Q =59m.19s.
La Plata N =23m.31s. and 24m.30s., SKS =27m.1s., PPS =34m.49s. and 38m.43s., SS =40m.37s., SSS =47m.1s.
Santa Lucia E =19m.56s., 20m.1s., and 21m.25s.
Long waves were also recorded at Balboa Heights.

Nov. 2d. The following times are recorded in Central Asia for after-shocks from epicentres at or near that of 18h. In most cases the phase quoted is P, but the figures given are the earliest for each after-shock.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
19	25	0	21	50	51	22	26	39	23	8	19?
20	30	53	22	5	19	22	32	53	23	36	21
21	14	34?	22	17	42	22	43	39?	23	46	37?
21	20	25	22	20	45?	23	2	13	23	58	1?
21	39	53									

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
22	2	18	22	25	23	22	44	27?	23	35	52
22	4	43	22	34	14	23	0	51	23	45	23
22	16	13	22	42	23	23	6	20	23	56	21
22	19	20									

Samarkand.

h.	m.	s.
22	43	14

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
19	25	6	21	41	0	22	16	37	23	1	26?
20	30	56	21	50	30	22	20	11	23	36	12
21	14	42	21	57	26	22	26	14	23	57	8
21	19	17	22	6	16	22	32	37			
21	39	41									

Nov. 2d. Readings also at 0h. (near Bogota), 1h. (Mount Wilson, Palomar, Riverside, Tucson, and Pierce Ferry), 10h. (Palomar), 11h. (Tucson and near Triest), 14h. (Shasta Dam and Tucson), 15h. (Pasadena and Ksara), 16h. and 17h. (near Triest), 19h. (Shasta Dam and Stuttgart), 23h. (Bogota and Cheb).

Nov. 3d. 13h. 34m. 10s. Epicentre 41°·8N. 71°·7E. (as on 2d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		1·9	255	0 39	+ 5	—	—	—	—	—
Frunse		2·4	63	i 0 38	− 3	i 1 6	− 6	i 1 13	S•	—
Almata		4·2	67	i 0 40	−27	i 1 25	P_g	i 1 33	?	—
Samarkand		4·2	241	1 5	− 2	i 2 1	+ 4	—	—	—
New Delhi	N.	13·9	160	e 3 14	− 7	i 5 40	−17	—	—	—
Baku		16·5	272	—	—	e 7 4	+ 6	—	—	—
Sverdlovsk		16·6	338	3 55	− 1	i 7 13	+13	—	—	—
Grozny		19·1	283	4 25	− 2	—	—	—	—	—
Erevan		20·6	274	e 4 44	+ 1	e 8 35	+ 6	—	—	—
Leninakan		20·9	277	e 4 53	+ 7	—	—	—	—	—
Piatigorsk		21·0	286	e 4 46	− 1	c 8 42	+ 5	—	—	—
Bombay		22·8	177	e 5 8	+ 3	—	—	—	—	—
Calcutta	N.	23·7	139	e 5 19	+ 5	e 9 18	− 9	i 10 7	SS	11·2
Irkutsk		24·4	53	e 5 21	0	e 9 52	+13	—	—	—
Hyderabad	N.	25·0	165	5 24	− 3	e 9 45	− 4	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Moscow		26·1	314	5 37	0	10 21	+14	—	—	—
Ksara		29·2	266	e 6 2?	− 3	e 11 30	+32	—	—	—
Istanbul		31·7	284	13 47	SS	e 18 25	L	—	—	(e 18·4)
Kodaikanal	E.	31·9	170	—	—	e 12 32	+52	—	—	—
Helsinki		33·8	320	—	—	e 14 57	SS	—	—	e 17·6
Helwan		34·5	263	e 8 8	PP	e 15 27	SSS	—	—	—
Warsaw	Z.	35·4	304	e 6 59	− 1	e 13 6	+32	e 8 22	PP	e 16·8
Upsala		37·4	318	e 11 10	?	e 12 50?	−15	e 14 56	SS	e 18·8
Copenhagen		40·2	312	—	—	i 13 51	+ 3	—	—	18·8
Collmberg	Z.	40·5	305	e 7 40	− 2	—	—	e 9 15	PP	—
Cheb		41·1	303	e 4 50?	?	—	—	e 9 27	PP	e 23·8
Jena	N.	41·4	303	e 7 52	+ 2	—	—	—	—	—
Rome	Z.	43·3	292	e 6 6	−119	—	—	—	—	—
Stuttgart	Z.	43·4	301	e 8 5	− 1	—	—	—	—	—
Strasbourg		44·4	302	i 8 14	0	e 18 13	SS	e 9 57	PP	e 24·3
Paris		47·6	304	e 8 38	− 1	—	—	—	—	e 29·8

Additional readings :—
Almata iS_E = 1m.49s.
New Delhi iN = 3m.28s.
Warsaw eZ = 8m.48s. and 15m.27s.
Collmberg eZ = 7m.50s. and 10m.0s.
Stuttgart eZ = 8m.8s.
Long waves were also recorded at Belgrade, Prague, De Bilt, Uccle, and Kew.

Nov. 3d. 18h. 46m. 55s. Epicentre 45°·7N. 26°·8E. Depth of focus 0·010.
(as on 1945, December 9d.).

Intensity IV at Bucharest. Epicentre 45°·75N. 26°·5E. Depth 150km.

G. Demetrescu and G. Petrescu.
"Bulletin séismique de l'Observatoire de Bucarest." Service Séismologique de Roumanie, Vol. XII, 1946, p. 31.

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Campulung		1·3	254	e 0 29	+ 5	i 0 45	+ 3	—	—	—
Bucharest		1·4	198	i 0 29	+ 4	i 0 46	+ 2	—	—	—
Sofia		3·9	221	i 1 0	+ 1	i 1 41	− 3	—	—	—
Belgrade		4·5	262	i 1 13	+ 6	i 1 53	− 6	—	—	—
Istanbul		4·9	160	i 1 16	+ 3	i 2 28	+19	—	—	—
Yalta		5·3	101	i 1 25	+ 7	i 2 29	+11	—	—	—
Kalossa		5·5	281	e 1 25	+ 4	i 3 5	?	—	—	—
Budapest	N.	5·6	291	1 23	+ 1	(2 25)	− 1	1 26	PP	2·4
Warsaw		7·5	332	i 1 52k	+ 4	e 3 14	+ 2	—	—	e 3·6
Zagreb		7·6	275	i 1 51a	+ 1	e 3 14	− 1	—	—	—
Triest		9·1	275	i 2 9	− 1	i 4 3	+11	—	—	—
Prague		9·4	303	e 2 11	− 3	—	—	—	—	—
Sotchi		9·5	98	—	—	4 1	0	—	—	—
Cheb		10·6	300	i 2 30	0	(e 4 35)	+ 7	—	—	e 4·6
Collmberg		10·8	306	e 2 30	− 3	—	—	—	—	e 5·6
Rome		11·0	255	e 3 7	+31	e 4 26	−11	—	—	—
Potsdam		11·2	312	e 2 39	+ 1	—	—	—	—	e 5·7
Jena		11·4	303	e 2 40	− 1	—	—	—	—	e 5·6
Chur		12·0	282	e 2 54a	+ 5	—	—	—	—	—
Moscow		12·1	30	e 3 0	+10	i 5 2	− 2	—	—	—
Stuttgart	Z.	12·4	291	e 2 52k	− 2	—	—	—	—	—
Zürich		12·7	284	e 2 54	− 4	e 5 30	+12	—	—	—
Leninakan		13·3	105	e 3 24	+18	—	—	—	—	—
Strasbourg		13·3	290	i 3 11	+ 5	—	—	—	—	e 7·2
Basle		13·4	285	e 3 4	− 3	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copenhagen		13·5	323	i 3 5	− 4	e 5 36	− 1	—	—	8·1
Grozny		13·7	93	i 3 20	+ 9	—	—	—	—	—
Ksara		13·8	146	e 3 15	+ 3	i 5 35	− 9	—	—	—
Neuchatel		13·8	283	e 3 9	− 3	e 5 50	+ 6	—	—	—
Besançon		14·4	284	e 3 24	+ 4	—	—	—	—	—
Helsinki		14·5	356	—	—	e 5 52	− 8	—	—	—
Upsala		15·2	342	i 3 31k	+ 1	i 6 24	+ 8	—	—	—
Uccle	E.	15·8	297	e 3 36	− 2	e 6 34	+ 4	—	—	—
Helwan		16·2	166	3 44	+ 1	i 6 44	+ 5	3 58	PP	—
Clermont-Ferrand		16·6	279	i 3 47	− 1	e 6 50	+ 2	—	—	—
Paris		16·8	289	e 3 48	− 2	e 7 5?	+12	e 4 13	PP	e 10·1
Baku		17·7	100	—	—	i 7 28	+15	—	—	—
Kew	Z.	18·8	298	i 4 13	− 1	—	—	i 4 39	PP	—
Bergen		19·4	329	4 20	− 1	7 57?	+ 7	—	—	e 9·0
Toledo	Z.	23·3	267	i 4 58	− 2	—	—	5 28	PP	—
Sverdlovsk		23·7	50	i 5 7	+ 3	—	—	—	—	—
Malaga		25·0	261	5 11	− 5	—	—	—	—	—
Obi-garm		32·2	86	i 6 30	+ 9	—	—	—	—	—
Pierce Ferry		91·2	328	e 12 54	− 1	—	—	i 13 31	pP	—
Tucson		93·4	325	e 13 41	pP	—	—	—	—	—

Additional readings :—
Sofia iS*EN = 1m.35s.
Belgrade iP_g = 1m.22s., i = 1m.41s.
Kalossa eN = 1m.35s., iE = 3m.11s.
Warsaw eZ = 1m.59s., eSZ = 2m.59s.
Collmberg eZ = 2m.39s.
Helsinki i = 6m.13s., 7m.5s., and 7m.20s.
Upsala iE = 6m.12s. and 7m.35s., iN = 7m.53s., iE = 7m.57s., iN = 8m.15s.
Helwan i = 4m.20s. and 4m.34s.
Kew i = 4m.16s.

Nov. 3d. 19h. 32m. 33s. Epicentre 0°·2N. 16°·9W.

A = +·9568, B = −·2907, C = +·0035 ; δ = −2 ; h = +7 ;
D = −·291, E = −·957 ; G = +·003, H = −·001, K = −1·000.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Granada		38·8	17	i 7 31	+ 3	i 13 28	+ 2	8 6	pP	19·4
Lisbon	N.	38·9	9	i 7 31	+ 2	13 30	+ 2	8 59	PP	18·9
Algiers		40·8	25	i 7 47	+ 2	i 13 54	− 2	i 7 56	pP	i 20·9
Alicante		40·8	19	i 7 47	+ 2	i 13 56	0	8 16	pP	19·7
Toledo	Z.	41·2	15	i 7 51	+ 3	14 3	+ 1	9 21	pP	—
Tortosa		43·4	19	i 8 5	− 1	i 14 37	+ 2	i 8 45	pP	22·0
Barcelona		44·5	20	i 8 16	+ 1	i 15 0	+ 9	18 1	SS	22·0
Fort de France		46·0	289	e 8 27	0	e 15 14	+ 2	—	—	—
Clermont-Ferrand		48·6	19	i 8 48k	+ 1	i 15 51	+ 2	i 10 35	PP	23·4
Rome		49·2	28	i 8 52a	0	i 15 56	− 2	i 10 40	PP	—
Florence	E.	50·1	26	i 9 2	+ 3	i 16 31	PPS	—	—	—
Jersey		50·4	11	—	—	e 16 17	+ 3	—	—	e 24·4
Besançon		50·9	20	e 9 6	+ 1	e 16 23	+ 2	—	—	25·4
Neuchatel		51·0	21	e 9 3	− 3	e 16 23	+ 1	—	—	—
Paris		51·2	16	i 9 4	− 3	i 16 22	− 3	i 9 29	pP	e 25·4
San Juan		51·6	293	i 9 10	0	e 16 29	− 2	e 10 32	PP	e 20·6
Basle		51·7	21	e 9 8a	− 3	e 16 35	+ 3	—	—	—
La Plata		51·8	223	9 9	− 3	16 36	+ 3	20 15	SS	21·4
Chur		51·9	23	e 9 9	− 3	e 16 32	− 3	—	—	—
Zürich		51·9	21	e 9 10a	− 2	e 16 35	0	—	—	—
Strasbourg		52·7	20	9 17k	− 1	i 16 47	+ 1	i 11 11	PP	e 25·0
Triest		52·7	26	i 9 18	0	i 16 46	0	i 9 53	pP	—
Kew		52·9	13	i 9 20a	0	e 16 47	− 1	i 11 45?	PP	e 25·4
La Paz		53·1	248	i 9 22	+ 1	i 17 7	+16	i 9 50	pP	26·2
Stuttgart		53·3	21	9 20	− 3	e 16 48	− 6	e 12 27	PPP	e 26·4

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Uccle		53·5	16	i 9 23k	− 1	i 16 57	0	e 12 33	PPP	e 24·4
Zagreb		53·8	28	i 9 27	+ 1	e 17 4	+ 3	—	—	e 27·4
Helwan		54·5	53	i 9 29k	− 3	17 9	− 1	12 42	PPP	—
De Bilt		54·9	16	i 9 37k	+ 2	i 17 17	+ 1	—	—	e 25·4
Bermuda		55·2	310	i 9 38	+ 1	i 17 25	+ 5	i 9 54	pP	e 22·2
Belgrade		55·4	32	i 9 38	0	e 17 23	+ 1	e 11 39	PP	e 22·6
Cheb		55·6	22	i 9 40	0	i 17 26	+ 1	i 11 42	PP	e 28·4
Sofia		55·6	35	e 9 42	+ 2	e 17 29	+ 4	e 11 53	PP	—
Durham	N.	55·8	10	i 9 42	+ 1	i 17 34	+ 6	i 11 44	PP	—
Kalocsa		55·8	29	9 47	+ 6	—	—	—	—	—
Jena		56·0	22	e 9 40	− 3	e 17 30	0	e 11 45	PP	e 26·3
Prague		56·4	23	i 9 41k	− 4	17 30	− 6	e 11 45	PP	e 22·4
Budapest	E.	56·5	28	11 50	PP	17 40	+ 3	13 10	PPP	27·4
	N.	56·5	28	9 47	+ 1	i 17 37	0	11 54	PP	29·4
Edinburgh		56·6	9	14 37	P_eS	17 27	−11	17 38	PS	—
Collmberg		56·8	22	e 9 44	− 4	e 17 41	0	e 11 18	PP	e 24·4
Bogota	Z.	57·3	275	i 10 51	+59	e 18 30	+43	e 12 33	PP	—
Potsdam		57·7	20	i 9 55	0	e 19 54	?	—	—	e 23·4
Aberdeen		58·0	9	i 9 56	− 1	i 17 58	+ 1	i 21 40	SS	27·8
Istanbul		58·1	39	i 10 0	+ 2	e 18 2	+ 4	—	—	—
Bucharest		58·2	35	e 9 58	0	e 18 2	+ 3	—	—	e 25·4
Huancayo		59·2	256	e 10 5	0	e 18 12	0	e 12 11	PP	e 23·7
Ksara		59·6	50	i 10 7	− 1	18 29	+12	—	—	—
Copenhagen		60·2	18	e 10 12k	0	18 27	+ 2	13 52	PPP	29·4
Halifax		60·5	323	10 14	0	18 32	+ 3	—	—	28·4
Santa Lucia	E.	60·5	230	10 14	0	18 34	+ 5	—	—	30·3
Warsaw		60·8	26	i 10 16k	0	e 18 35	+ 2	12 26	PP	25·4
Bergen		62·4	12	i 10 27	0	18 55	+ 2	12 43	PP	31·0
Balboa Heights		63·0	280	e 10 37	+ 6	e 20 12	+71	—	—	—
Weston		64·3	318	i 10 39	0	e 19 13	PS	i 19 45	PS	—
Harvard		64·5	318	i 10 42k	+ 1	e 19 22	+ 3	—	—	e 27·4
Upsala		65·2	18	i 10 43k	− 2	e 19 27	− 1	e 23 40	SS	e 31·4
Fordham		65·4	315	i 10 46	− 1	i 19 38	+ 8	—	—	23·0
Tananarive		66·0	110	e 10 51	+ 1	e 19 57	+19	23 24	SS	30·4
Seven Falls		66·1	323	10 50	− 1	19 44	+ 5	27 33	SSS	31·4
Georgetown		67·0	313	e 10 58	+ 1	e 19 51	+ 1	e 24 27	SS	e 34·6
Shawinigan Falls		67·0	322	e 10 57	0	e 19 45	− 5	—	—	32·4
Helsinki		67·9	20	i 11 3k	+ 1	i 19 59	− 2	e 13 32	PP	e 29·4
Leninakan		68·0	45	e 11 0	− 3	—	—	—	—	—
Ottawa		68·4	320	11 3	− 3	20 10	+ 3	27 27?	SSS	31·4
Columbia		68·6	307	e 9 57	−70	e 20 7	− 2	—	—	e 28·4
Moscow		70·7	29	i 11 17	− 3	20 32	− 2	—	—	—
St. Louis		76·9	309	i 11 52	− 4	i 21 42	− 1	—	—	—
Sverdlovsk		83·0	33	i 12 26	− 2	i 22 41	− 6	—	—	—
Stalinabad		86·5	51	—	—	i 23 21	− 1	—	—	—
Tashkent		87·0	49	i 12 39	− 9	e 23 8	[− 6]	e 16 5	PP	—
Obi-garm		87·2	51	12 49	0	—	—	—	—	—
Bombay	N.	89·7	71	e 13 2	+ 1	e 23 59	+ 7	—	—	—
Saskatoon		89·7	322	—	—	e 23 31	[0]	e 29 31	SS	40·4
Bozeman		92·8	315	—	—	e 25 31	PS	e 30 45	SS	e 39·0
Tucson		93·2	302	i 13 17	0	e 23 48	[− 3]	e 16 40	PP	e 39·0
New Delhi	N.	93·5	61	e 13 21	+ 2	i 24 25	0	30 31	SS	—
Logan		93·6	312	—	—	—	—	e 30 44	SS	e 41·8
Salt Lake City		93·6	311	e 17 14	PP	e 24 26	0	e 23 52	SKS	e 39·7
Kodaikanal	E.	94·3	80	e 12 47	−36	—	—	—	—	—
Hyderabad	N.	95·0	73	17 59	PP	24 41	+ 3	26 2	PS	—
Boulder City		96·3	306	e 13 31	− 1	—	—	e 17 26	PP	—
Grand Coulee		98·0	318	i 13 37	− 2	—	—	—	—	—
Riverside	Z.	98·6	305	e 17 42	PP	—	—	—	—	—
Tinemaha		99·0	307	e 17 45	PP	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mount Wilson	Z.	99·1	305	i 17 45	PP	—	—	—	—	—
Pasadena	Z.	99·2	305	e 17 42	PP	—	—	—	—	e 46·2
Calcutta	N.	104·0	67	e 20 39	PPP	—	—	—	—	—
Irkutsk		108·4	33	e 14 28	P	26 38	S	28 21	PS	—
Christchurch		136·1	191	19 29	[+ 6]	e 26 47	[+14]	(39 55)	SS	39·9
Wellington		137·8	193	19 31	[+ 4]	22 35	PP	—	—	—
Arapuni		140·6	196	e 20 27?	[+55]	—	—	—	—	54·4
Riverview		144·8	164	i 19 41k	[+ 2]	e 26 41	[− 6]	i 22 54	PP	e 63·8

Additional readings :—
Granada sP =8m.25s., iPP =8m.58s., P_cP =9m.28s., pP_cP =10m.28s., sP_cP =10m.59s., P_cS =13m.22s., sS =14m.19s., iSS =15m.43s., sSS =16m.8s.
Lisbon N =12m.56s. and 18m.21s.
Algiers iPP? =9m.14s., iPPP? =9m.24s., iP_cP =10m.46s., eSS =16m.8s., iSSS =16m.52s.
Alicante sP =8m.36s., PP =9m.16s., P_cP =9m.34s., PPP =10m.8s., P_cS =13m.4s., pS =14m.12s., SS =15m.30s., S_cS =17m.28s., SSS =17m.56s.
Toledo PPPZ =9m.48s., SSZ =16m.47s., SSSZ =17m.4s.
Tortosa P_cPN =9m.46s., PPN =9m.55s., PPPN =10m.38s., P_cSE =13m.31s., iSEN =14m.43s., PSE =14m.52s., SSEN =17m.52s., S_cSN =18m.15s.
Clermont-Ferrand iSS =19m.13s.
Rome iPPPNZ =11m.30s., eSSZ =19m.24s.
Paris i =9m.7s., iPP =10m.58s., i =11m.25s., ePPP? =12m.16s., e =12m.37s. and 14m.51s., iPS =17m.7s., e =19m.27s.?, iSS? =20m.58s., eSSS =21m.39s., eQ =24·4m.
San Juan eSS =19m.31s.
La Plata SE =16m.46s.
Strasbourg eP_cP =10m.14s., ePPP =12m.17s., eP_cS =14m.4s., eSS =20m.23s., eSSS? =22m.22s.
Triest iPPZ =11m.23s., isS =18m.1s., eSS =20m.21s., eSSS =22m.10s.
Kew e =9m.38s., iP_cPZ =9m.57s., eP_cSEN =14m.15s.?, eS_cSE =18m.45s., eSS =20m.35s.?, eQE =22m.57s.
La Paz isPZ =10m.17s., PPZ =11m.33s , PS =17m.39s., SSZ =21m.7s.
Stuttgart iP =9m.25s.a, eS_cS =19m.0s., eSS =20m.57s.
Uccle ePN =9m.26s.
Helwan P_cP =10m.33s.
De Bilt iZ =9m.59s.
Bermuda i =14m.19s., iS_cS =19m.2s.
Belgrade e =10m.37s.
Cheb e =10m.0s., ePPP =12m.59s., e =14m.10a., eSN =17m.31s., e =19m.34s.
Sofia iPPPEN =12m.57s.
Jena eS?N =17m.33s.
Budapest PPPN =13m.2s., ePSN =18m.10s., ePSE =18m.13s., eSSN =21m.27s., SSE =21m.52s., SSSEN =24m.40s.
Collmberg eEN =9m.47s., eZ =10m.5s., 10m.20s., 11m.59s., and 12m.57s., eN =13m.7s., eS_cSE =19m.30s.
Bogota iZ =10m.59s.
Huancayo ePPP =13m.31s., eSS =22m.1s.
Warsaw iZ =10m.38s., eN =10m.43s., $P_cP?Z$ =11m.16s., PPPZ =13m.35s., PPPN =13m.45s., eSZ =18m.49s., PSN =18m.55s., $S_cS?N$ =20m.12s., SSN =22m.41s., SSZ =22m.51s., SSSZ =24m.16s., SSSN =24m.32s.
Bergen PPPN =14m.19s.?, eN =14m.43s., PSN =19m.8s., SSN =23m.19s.
Weston iS_cS =20m.37s.
Upsala S_cS =20m.47s., eSSE =23m.51s.?, eSSSN =26m.49s.
Tananarive SSS? =26m.37s.
Georgetown e =20m.34s.
Helsinki eP_cP =11m.50s., ePPP =15m.8s.
St. Louis iP =11m.57s.
Tucson e =25m.54s., eSS =30m.35s.
Salt Lake City eSS =30m.21s.
Irkutsk SS =34m.9s.
Christchurch S_cSEZ =30m.2s., QE =36m.12s.
Wellington iZ =22m.15s., sS? =23m.7s., P_cS =27m.31s.
Riverview iZ =19m.48s., iE =20m.26s., iNZ =20m.56s., iZ =26m.9s., eP_cP,PKPE =27m.54s., eSKKSE =29m.14s., eSKKKSN =30m.2s., ePSN =33m.24s., ePPSN =35m.24s., eSSN =41m.55s., ePSPSEN =42m.12s., eSSSE =46m.46s., eSSSN =46m.56s.
Long waves were also recorded at Butte and Suva.

Nov. 3d. Turkestan after-shocks. The time entered is that for the first phase recorded at each of the stations.

Almata.

h.	m.	s.
0	18	37
0	20	17?
0	32	21?
0	42	45
0	51	27
1	7	32?
1	42	11
1	50	21
2	10	47?
2	47	11
3	2	21?
3	40	41?
3	49	28
3	58	13?
4	50	55
5	12	13?
5	34	2?
5	56	35?
6	10	1
6	30	50
6	45	34?
6	48	23
6	55	0
6	58	17?
7	3	57
7	36	6
7	47	22
7	57	24
8	12	28
8	29	55
8	41	10
9	8	17
9	22	57
9	30	47?
9	43	42?
10	10	5
10	20	31?
10	27	15?
10	41	11?
10	47	59
11	34	45?
11	55	29?
12	13	3?
13	17	34
13	34	24
13	34	50
13	57	7
14	8	51
14	15	52
14	36	26
15	10	9?
15	22	39?
15	53	42
17	14	15
19	51	42
19	58	6
20	25	50
20	38	28
22	2	26
22	11	32
22	16	55?

Andijan.

h.	m.	s.
18	47	53
19	34	33?
19	50	55
19	57	19
20	3	11
20	25	3
21	51	8
22	1	41
22	9	36
22	15	20
23	48	49
23	50	28

Frunse.

h.	m.	s.
0	19	45
0	30	49
0	41	18
0	51	3
1	7	5
1	41	38
1	49	53
2	10	16
2	45	46
3	1	1
3	16	20
3	39	16?
3	48	57?
3	56	57
4	49	36
5	10	58
5	23	24
5	33	16
5	54	42
6	8	50
6	18	22
6	30	19
6	45	0
6	48	3
6	54	34
6	57	3
7	3	28
7	35	30
7	46	3
7	56	6?
8	11	53?
8	29	39
8	40	46
9	7	46
9	22	29
9	29	29
9	43	6
10	9	18
10	18	46
10	25	56
10	39	54?
10	47	25?
11	34	10?
11	51	42
11	54	6
12	11	42
12	33	56
13	17	6
13	33	20
13	34	48
13	55	46
14	8	20
14	15	31
14	35	54
15	8	48
15	21	25
15	53	13
17	4	14
17	9	41
17	33	49
18	48	8
19	0	55
19	34	31
19	51	11
19	57	36
20	25	26
20	38	6
22	1	54
22	10	1
22	15	34
23	59	47

Obi-garm.

h.	m.	s.
2	46	8
3	16	38
3	39	49
3	49	24
3	57	24
15	8	52
15	21	41
15	53	37
17	14	16
17	34	12
18	48	31
19	51	27
19	58	0
20	25	47
20	38	30
22	10	15
22	15	51
23	49	17
23	51	53

Samarkand.

h.	m.	s.
5	56	34
7	4	7
7	47	4
8	14	9
8	30	44
9	9	58
9	44	0
10	9	46
10	19	46
10	26	38
10	41	4
10	47	56
11	34	50
12	12	36?
13	34	3
13	35	15
14	9	20
14	16	16
14	36	20
15	53	22
17	14	49?
17	34	59
19	52	2
19	58	18
20	25	55
20	37	49
22	2	20
22	10	32
22	16	22

Stalinabad.

h.	m.	s.
0	17	51
0	20	17
0	31	15
0	41	38
0	51	43
1	7	30
1	42	15
1	50	24
2	10	46
2	44	42
2	46	28?
3	49	30
3	57	44
4	50	6
5	12	50
5	33	59
5	55	32
6	9	46
6	19	11
6	31	3
6	45	55
6	49	50
6	57	46
7	4	7
7	36	12
7	46	31
7	56	34
8	12	37
8	29	32
8	41	14
9	8	34
9	23	1
9	43	31
10	9	20
10	19	28
10	26	18
10	40	48
10	47	41
11	34	36
12	12	12
13	17	44
13	34	32
14	8	57
14	15	56
14	36	19
15	9	6
15	22	3
15	53	47
17	14	24
17	34	20
18	48	45
19	51	42
19	58	6
20	25	44
20	38	39
22	10	28?

Tashkent.

h.	m.	s.
2	10	23
2	35	28?
2	59	20
3	8	4
3	14	15
3	17	2?
3	37	22
3	39	22
3	49	2
4	35	36
5	9	0
6	30	32
6	45	10
6	49	22?
6	55	4?
7	3	36
7	53	39
8	38	40
9	5	51?
9	22	27?
9	29	37
10	25	40?
10	47	9
11	33	58?
13	33	27
13	34	49
14	33	42?
17	6	15?
17	12	51
17	33	58
19	51	8?
20	38	10
22	9	39?
22	15	51?
23	48	55
23	49	17?
23	59	42?

Nov. 3d. Readings also at 1h. (Bombay (2), Calcutta, Hyderabad, New Delhi (2), Sverdlovsk, Ksara, Warsaw, Upsala, Cheb, Strasbourg, and De Bilt), 2h. (Sverdlovsk, Cheb (2), De Bilt, Copenhagen, Helsinki, Kew, Prague, Rome, and Triest), 3h. (Helsinki), 5h. (Palomar, Tucson, Boulder City, Pierce Ferry, Grand Coulee, Shasta Dam, and near Fort de France), 6h. (Bogota), 7h. (Cheb), 8h. (near Triest), 11h. (Copenhagen), 13h. (Boulder City, Overton, and Pierce Ferry), 14h. (Boulder City, Overton, and Pierce Ferry), 15h. (near Triest), 16h. (Cheb and Prague), 18h. (College and near Berkeley), 20h. (Wellington, Christchurch, Bogota, La Paz, Paris, Stuttgart, Toledo, and Tortosa), 23h. (La Paz, Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, Pierce Ferry, Grand Coulee, and Shasta Dam).

Nov. 4d. 10h. 22m. 56s. Epicentre 41°·8N. 71°·7E. (as on 3d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		1·2	155	i 0 20	− 4	i 0 36	− 5	—	—	—
Frunse		2·4	63	i 0 36	− 5	i 1 11	− 1	—	—	—
Obi-garm		3·5	207	e 0 56	− 1	e 1 39	− 1	i 1 49	S*	—
Stalinabad		3·9	216	i 1 8	+ 6	i 2 24	S_g	—	—	—
Almata		4·2	67	e 1 0	− 7	i 1 47	−10	—	—	—
Samarkand		4·2	241	1 10	+ 3	2 2	+ 5	—	—	—
New Delhi	N.	13·9	160	e 3 14	− 7	e 5 34	−23	—	—	7·5
Sverdlovsk		16·6	338	e 3 56	0	i 6 54	− 6	—	—	—
Leninakan		20·9	277	e 5 1	+15	—	—	—	—	—
Platigorsk		21·0	286	e 4 53	+ 6	—	—	—	—	—
Bombay	N.	22·8	177	e 2 38	?	e 9 12	+ 1	—	—	—
Calcutta	N.	23·7	139	e 9 31	S	(e 9 31)	+ 4	—	—	e 12·3
Irkutsk		24·4	53	e 5 14	− 7	—	—	—	—	—
Hyderabad	N.	25·0	165	5 22	− 5	9 47	− 2	—	—	12·8
Moscow		26·1	314	5 40	+ 3	—	—	—	—	—
Ksara		29·2	266	e 6 13	+ 8	e 11 58	+60	—	—	—
Kodaikanal	E.	31·9	170	—	—	—	—	e 12 18	SS	—
Warsaw		35·4	304	12 2	?	e 12 16	−18	e 15 4	SS	e 17·1
Belgrade		36·9	293	e 7 53?	+41	e 13 50	+52	e 9 21	PPP	19·1
Upsala		37·4	318	—	—	e 12 34	−31	e 15 50	SS	i 17·9
Prague		39·8	303	e 7 52	+16	e 13 52	+10	e 9 22	PP	e 20·1
Rome		43·3	292	e 7 12	−53	—	—	—	—	—
Stuttgart	z.	43·4	301	e 8 10	+ 4	—	—	—	—	—
Paris		47·6	304	e 8 42	+ 3	—	—	—	—	e 22·1
Grand Coulee		90·1	8	i 13 1	− 2	—	—	—	—	—

Additional readings :—
Bombay eE = 8m.1s.
Warsaw eZ = 14m.4s. and 15m.55s., eN = 16m.23s., eZ = 16m.32s.
Long waves were also recorded at Cheb and De Bilt.

Nov. 4d. 21h. 47m. 44s. Epicentre 40°·0N. 54°·6E.

Intensity IV at Baku ; III at Stalinabad. Suggested epicentre 40°·5N. 55°·0E. (U.S.S.R.) 40°·0N. 54°·0E. (Strasbourg).

" Bulletin préliminaire du réseau séismique de l'U.R.S.S.," November, 1946, p. 3.

$A = +\cdot4450$, $B = +\cdot6262$, $C = +\cdot6402$; $\delta = +1$; $h = -2$;
$D = +\cdot815$, $E = -\cdot579$; $G = +\cdot371$, $H = +\cdot522$, $K = -\cdot768$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		3·6	278	i 1 7	P*	—	—	—	—	—
Grozny		7·4	299	e 2 1	+ 9	e 3 31	+13	—	—	—
Erevan		7·7	274	e 2 1	+ 5	i 3 27	+ 2	—	—	—
Leninakan		8·3	279	2 7	+ 3	3 44	+ 4	—	—	—
Piatigorsk		9·5	299	2 22	+ 2	—	—	—	—	—
Stalinabad		11·1	93	i 2 40	− 3	—	—	—	—	—
Tashkent		11·2	78	i 2 40	− 4	e 4 40	−12	—	—	—
Sotchi		11·7	293	i 2 52	+ 1	5 12	+ 8	—	—	—
Andijan		13·6	81	3 15	− 2	i 5 43	− 7	—	—	—
Theodosia		15·0	296	i 3 33	− 2	i 6 20	− 3	—	—	—
Frunse		15·3	73	i 3 39	0	i 6 18	−12	—	—	—
Yalta		15·8	293	e 3 46	+ 1	i 6 51	+ 9	—	—	—
Ksara		16·2	253	i 3 50	0	6 51?	0	—	—	—
Sverdlovsk		17·3	11	i 4 4	0	i 7 20	+ 4	—	—	—
Istanbul		19·3	282	i 4 31	+ 2	i 7 56	− 6	—	—	—
Moscow		19·3	330	4 32	+ 3	8 0	− 2	—	—	—
Bucharest		21·5	292	i 4 53	+ 1	i 8 43	− 4	i 5 14	PP	—
Helwan		21·5	249	i 4 51k	− 1	i 8 43	− 4	—	—	—
New Delhi		21·8	114	i 4 53k	− 3	i 8 50	− 2	5 10	PP	10·7
Campulung		22·3	294	e 5 14	+13	e 9 4	+ 2	—	—	—
Sofia		23·6	286	e 5 16a	+ 3	i 9 26	+ 1	i 5 30	pP	—
Belgrade		25·6	291	i 5 33a	+ 1	i 9 56	− 3	i 5 56	PP	14·3
Warsaw		26·0	308	i 5 37a	+ 1	i 10 4	− 2	6 22	PP	•—
Bombay		26·2	138	i 5 38	0	i 10 9	0	—	—	12·2
Budapest		26·6	298	i 5 41	− 1	10 16	0	—	—	e 13·3
Kalossa		26·6	297	5 30	−12	e 10 20	+ 4	—	—	—
Helsinki		27·3	327	i 5 50a	+ 2	i 10 28	+ 1	i 6 23	PP	e 14·3
Zagreb		28·7	294	i 6 1a	0	i 11 9	+19	i 7 19	PPP	—
Prague		29·8	304	i 6 11a	0	e 11 9	+ 2	e 6 27	pP	e 14·3
Triest		30·2	295	i 6 12	− 2	i 11 9	− 4	i 6 30	pP	—
Upsala		30·4	323	i 6 15a	− 1	i 11 17	+ 1	i 7 9	PP	—
Hyderabad	N.	30·5	130	6 13	− 4	11 10	− 8	7 27	PP	—
Collmberg		30·8	305	e 5 18	−62	i 11 18	− 5	i 7 12	PP	e 14·3
Potsdam		30·9	308	i 6 22	+ 2	i 11 24	0	i 6 37	pP	12·8
Cheb		31·1	304	i 6 23	+ 1	i 11 33	+ 5	i 7 52	PP	e 16·3
Rome		31·6	289	i 6 26a	0	e 11 26	− 9	e 6 39	pP	—
Jena	E.	31·7	304	i 6 27	0	i 11 33	− 4	—	—	—
Copenhagen		31·8	314	i 6 28a	0	i 11 38	0	—	—	15·3
Florence		32·2	291	i 6 36	+ 4	i 11 41	− 4	—	—	—
Chur		33·1	298	i 6 38a	− 2	—	—	e 13 56	SS	—
Stuttgart		33·2	301	i 6 40a	0	e 11 57	− 3	i 6 54	pP	e 18·3
Calcutta	N.	33·4	111	i 7 9a	+27	i 12 29	+26	i 8 26	PPP	—
Strasbourg		34·1	301	i 6 48a	0	i 12 6	− 8	i 8 9	PP	—
Basle		34·3	299	e 6 49	− 1	e 12 32	+15	—	—	—
Neuchatel		34·8	298	e 6 53	− 1	—	—	—	—	—
Besançon		35·4	298	e 6 59	− 1	e 12 31	− 3	—	—	16·3
De Bilt		35·7	307	i 7 4a	+ 2	i 12 40	+ 1	i 8 16	PP	e 17·3
Irkutsk		35·9	52	i 7 6	+ 2	i 12 44	+ 2	—	—	—
Kodaikanal	E.	35·9	139	i 7 2	− 2	i 12 33	− 9	8 22	PP	17·8
Uccle		36·2	305	i 7 7a	+ 1	e 12 45	− 2	e 8 15	PP	e 18·3
Bergen		36·4	321	7 8?a	0	12 39	−11	8 23	PP	16·3
Clermont-Ferrand		37·6	296	i 7 17a	− 1	i 13 6	− 2	i 8 40	PP	17·1
Paris		37·6	301	i 7 17	− 1	i 13 4	− 4	i 7 28	pP	e 16·3
Kew		39·1	306	i 7 32a	+ 1	i 13 29	− 2	i 9 1	PP	e 15·8
Barcelona		39·3	290	i 7 32	0	i 13 30	− 4	9 17	PP	e 22·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Durham	N.	39·7	310	i 6 58	−38	i 13 33	− 7	i 9 43	PP	—
Aberdeen		40·0	315	i 7 37	− 1	i 13 47	+ 3	i 9 6	PP	20·0
Colombo	E.	40·0	139	7 46	+ 8	—	—	—	—	—
Algiers		40·1	282	i 7 39	0	i 13 37	− 9	i 9 10	PP	22·8
Jersey		40·5	303	i 7 41	− 1	e 13 46	− 6	e 9 16?	PP	e 22·7
Edinburgh		40·6	313	7 42	− 1	13 49	− 5	9 16	PP	—
Tortosa		40·7	289	i 7 43	− 1	i 13 44	−11	9 9	PP	e 19·3
Alicante		42·2	286	i 7 57	+ 1	i 14 13	− 4	8 9	pP	—
Toledo		44·2	289	i 8 12	0	i 14 51	+ 5	i 8 58	pP	—
Granada		44·9	286	i 8 20	+ 2	i 14 50	− 6	8 35	pP	24·3
Lisbon		48·4	290	i 8 44k	− 2	i 15 44	− 2	i 8 59	pP	27·2
Scoresby Sund		48·5	334	i 8 48	+ 2	i 15 41	− 7	10 40	PP	—
Tananarive		59·0	188	i 10 1	− 3	17 58	−12	11 58	PP	e 30·0
Hukuoka		59·4	70	10 6	0	18 13	− 2	23 8	SS	31·2
Kagosima		60·5	72	e 10 6	− 8	18 12	−17	—	—	—
Miyazaki		60·9	71	10 17	0	18 29	− 5	—	—	e 23·8
Ivigtut		61·5	328	i 10 19a	− 2	18 39	− 3	12 30	PP	—
Wazima		62·0	63	e 10 26	+ 2	18 28	−20	—	—	—
Mori		62·1	57	10 26	+ 1	—	—	—	—	33·9
Sapporo		62·1	55	i 10 24	− 1	e 18 51	+ 2	—	—	e 29·8
Kobe		62·2	67	10 25	− 1	18 49	− 2	—	—	—
Osaka		62·5	67	i 10 28	0	18 46	− 8	—	—	—
Nagoya		63·2	65	10 31	− 1	19 18	+15	—	—	—
Morioka		63·7	59	i 10 33	− 3	19 5	− 5	—	—	—
Mizusawa	E.	64·0	60	10 39	+ 1	19 13	0	—	—	—
Sendai		64·3	60	10 39	0	19 24	+ 7	—	—	—
Nemuro		64·7	53	10 38	− 4	19 14	− 8	—	—	—
Tokyo		64·9	64	10 46	+ 3	e 19 24	0	e 12 49	PP	—
Yokohama		64·9	64	10 44	+ 1	e 19 41	+17	—	—	e 30·8
Johannesburg		70·3	205	i 11 16	− 1	i 20 22	− 7	e 24 46?	SS	e 35·3
College		74·0	11	i 11 49	+10	e 21 12	+ 1	i 14 21	PP	e 29·8
Halifax		79·1	320	12 8	0	22 4	− 3	15 19	PP	36·3
Seven Falls		80·6	326	12 19	+ 3	22 30	+ 7	15 30	PP	38·3
Shawinigan Falls		81·9	327	12 23	0	22 38	+ 2	22 55	PS	37·7
Sitka		82·5	6	e 12 30	+ 4	i 22 47	+ 5	e 15 14	PP	e 33·4
Ottawa		84·0	328	12 34	+ 1	23 2	+ 5	15 53	PP	41·8
Harvard		84·5	323	i 12 36a	0	i 23 4	+ 2	e 15 54	PP	e 43·3
Weston		84·5	323	i 12 36	0	i 23 4	+ 2	i 15 53	PP	—
Saskatoon		86·8	349	12 27	−20	23 0	[−13]	15 50	PP	40·3
Fordham		86·9	324	i 12 48	0	i 23 23	− 3	—	—	42·8
Pennsylvania		88·7	326	i 12 59	+ 2	e 23 21	[− 4]	e 16 24	PP	—
Bermuda		88·7	313	i 12 54	− 3	i 23 27	[+ 2]	e 16 25	PP	e 36·4
New Kensington		89·7	327	e 13 25	+24	i 23 51	− 1	e 16 38	PP	e 35·8
Georgetown		89·9	324	i 13 3	+ 1	24 12	+18	16 35	PP	—
Perth		91·3	132	13 12	+ 3	23 41	[+ 1]	24 16	S	38·1
Victoria		91·9	357	13 16	+ 5	24 7	− 4	16 53	PP	45·3
Grand Coulee		92·3	354	i 13 14	+ 1	i 24 8	− 7	i 13 26	pP	—
Seattle		92·7	356	e 14 27	+72	i 25 21	PS	e 30 38	SS	e 36·8
Cincinnati		92·8	328	i 13 17	+ 1	24 41	+22	16 59	PP	—
Butte		93·6	350	e 13 18	− 1	i 24 6	[+13]	e 17 4	PP	e 38·5
Rapid City		93·9	343	i 13 21	0	e 24 26	− 3	e 16 59	PP	e 37·8
Lincoln		95·4	337	—	—	e 24 20	−22	—	—	e 33·9
St. Louis		95·4	332	i 13 24	− 4	i 23 47	[−16]	i 17 21	PP	—
Columbia		95·7	323	e 13 28	− 1	e 24 20	{− 3}	e 17 20	PP	e 38·4
Logan		97·7	348	i 12 43	−55	i 23 33	[−42]	i 16 13	PP	e 38·7
Salt Lake City		98·7	348	e 13 43	+ 1	i 24 35	{−10}	e 17 41	PP	i 39·2
Shasta Dam		99·6	356	e 13 46	0	i 24 47	[+22]	i 17 52	PP	—
San Juan		99·9	303	e 13 47	− 1	i 25 16	− 4	i 17 46	PP	e 40·7
Berkeley		102·5	356	e 18 50	PP	e 24 42	[+ 3]	—	—	—
Branner		102·9	356	e 19 33	?	—	—	—	—	e 53·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Santa Clara		103·0	356	e 14 4	+ 2	i 25 8	{− 8}	i 18 15	PP		e 52·9
Tinemaha		103·0	353	e 14 5	+ 3	e 25 7	{− 9}	e 17 37	PP		—
Fresno	N.	103·5	354	e 14 22	+18	e 27 52	PS	e 18 28	PP		—
Pierce Ferry		103·5	349	e 14 5	+ 1	e 27 14	PS	i 18 23	PP		—
Boulder City		103·8	350	e 14 6	+ 1	e 27 34	PS	i 18 25	PP		—
Mount Wilson	Z.	105·8	353	e 14 16	+ 1	i 29 48	PKKP	i 21 13	PPP		—
Pasadena		105·9	353	e 14 15	− 1	i 25 16	[+21]	i 18 38	PP		43·3
Riverside	Z.	106·0	353	e 14 16	0	—	—	e 29 46	PKKP		—
Palomar	Z.	106·6	352	14 18	0	—	—	i 27 47	PS		—
Tucson		106·9	347	e 14 21	0	i 24 40	[−19]	18 24	PKP		e 42·2
Merida		110·8	323	e 19 23	PP	e 28 56	PS	e 21 15	PPP		—
Brisbane		113·2	107	—	—	e 19 25	PP	—	—		—
Riverview		115·3	113	e 14 51	P	e 25 35	[+ 2]	e 18 45	PKP		e 52·9
Bogota		115·3	300	e 18 42	[− 2]	e 27 32	{+50}	e 19 42	PP		—
Tacubaya		116·1	331	e 19 9	[+24]	e 25 18	[−18]	e 19 51	PP		e 56·5
Guadalajara	N.	116·2	336	e 15 41	?	e 29 17	PS	e 35 37	SS		—
La Paz		125·4	277	i 19 6k	[+ 3]	26 6	[− 1]	i 20 56	PP		64·3
La Plata		127·3	252	19 4	[− 3]	27 51	{−11}	22 50	PKS		62·0
Huancayo		128·0	287	i 19 11	[+ 3]	e 28 4	{− 3}	i 21 10	PP		e 55·8
Christchurch		134·6	116	19 21	[0]	28 16	{−33}	21 46	PP		67·5
Arapuni		134·9	107	22 46	PKS	i 31 46	PS	35 28	PPS		73·5
Wellington		135·4	111	19 20	[− 2]	28 36	{−17}	21 59	PP		62·3
Santa Lucia	N.	136·3	261	23 16?	PP	33 16?	PS	40 46	SS		66·3

Additional readings:—
Bucharest iSN = 8m.31s., E = 9m.14s.
New Delhi iE = 4m.59s., iN = 5m. 2s., PPPN = 5m.20s., iN = 8m.58s., iE = 9m.2s., SSN = 9m.25s., SSE = 9m.28s., SSSN = 9m.40s.
Sofia iN = 6m.6s., iE = 7m.50s.
Belgrade iPPP = 6m.16s., i = 8m.20s.
Warsaw iSZ = 10m.1s.
Budapest PN = 5m.44s., iE = 7m.44s. and 8m.28s., eN = 9m.3s., iS?N = 10m.11s., SN = 10m.20s., eSE = 10m.28s.
Kalossa eN = 10m.28s., iN = 11m.19s., and 11m.32s.
Helsinki i = 6m.7s.
Zagreb eZ = 6m.54s.?, iPPP = 7m.50s., iSS = 12m.15s., i = 14m.43s., iS_cS = 17m.11s.
Prague ePP = 6m.58s.
Triest iZ = 6m.16s., iPPE = 7m.15s.
Upsala iSN = 11m.11s.
Hyderabad P_cPN = 9m.51s., SSN = 12m.50s., S_cSN = 16m.41s.
Collmberg e = 6m.34s., ipPE = 6m.37s., $ePPP_N$ = 7m.30s., iEN = 11m.38s.
Potsdam ipPN = 6m.40s., isPE = 6m.47s., iPPE = 7m.10s., iPPN = 7m.14s., iE = 7m.26s., iN = 7m.37s., iEN = 7m.58s., iSN = 11m.1s., isSN = 11m.42s., isSE = 11m.45s., iSSN = 12m.30s.
Cheb e = 9m.6s., iSS = 13m.28s.
Rome iPPE = 7m.15s., iPPPN = 7m.41s.
Jena iPZ = 6m.30s.
Stuttgart iP = 6m.43s.k, ipP = 6m.58s., ePP = 7m.43s., eSS = 13m.42s., eSSS = 14m.16s.
Calcutta iSSN = 14m.12s.
Strasbourg i = 7m.2s.
De Bilt iSS = 15m.16s.?
Kodaikanal SSE = 15m.0s.
Uccle ePPPEN = 8m.42s., eSSEN = 14m.53s., eSSSE = 15m.14s., eSSSN = 15m.19s.
Bergen iE = 7m.26s., PPPEN = 8m.42s., SSN = 14m.44s., eN = 15m.31s.
Paris iPP = 8m.41s., iPPP = 8m.52s., i = 9m.48s., e = 9m.58s., iPcS? = 13m.24s., iSS? = 15m.28s.
Kew iE = 7m.50s., iEN = 8m.6s., iPPN = 9m.12s., iN = 13m.46s.
Barcelona i = 13m.51s., SS = 16m.35s.
Durham iN = 7m.33s. and 16m.43s.
Aberdeen PPN = 9m.45s.
Algiers iPPP = 9m.30s., iPcP = 10m.2s., eSS = 16m.13s., eSSS = 16m.27s., i = 16m.41s. and 17m.42s., eScS? = 18m.0s.
Jersey e = 16m.52s.
Edinburgh PcP = 9m.46s., PcS = 13m 35s., SS = 16m.38s., ScS = 17m.47s.
Tortosa PPPN = 9m.30s., PcPN = 9m.40s., iSN = 13m.35s., SSE = 16m.2s., SSSN = 16m.54s., iS_cSEN = 17m.47s.
Alicante PcP = 9m.34s., PP = 9m.39s., PPP = 10m.29s., PcS = 13m.33s., SS = 17m.17s., ScS = 17m.33s., SSS = 18m.7s.
Toledo PPZ = 9m.59s., pPPZ = 10m.38s., PPPN = 10m.49s., SSEN = 16m.13s., SSSEN = 18m.4s.
Granada P_cP = 9m.32s., pPcP = 10m.11s., PPP = 10m.40s., PcS = 13m.41s., pPcS = 14m.4s., sS = 15m.47s., SS = 18m.6s.

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Lisbon PP?E =10m.33s., PS?E =15m.58s.?, SSEN =19m.10s.
Scoresby Sund i =15m.57s., 18m.40s., 19m.28s.
Tananarive PPP =13m.46s., iPS =18m.22s., SSS =24m.19s.
Ivigtut i =10m.38s., 13m.34s., 18m.57s., 20m.6s., and 20m.30s.
Tokyo e =11m.57s. and 19m.43s.
Johannesburg eQN =28m.46s.
College ePPP =16m.22s., iS =21m.20s., eSS =26m.0s.
Halifax SS =27m.34s.
Seven Falls PPP =17m.6s., PS =23m.6s., SS =27m.10s., SSS =30m.28s., e =33m.34s.
Shawinigan Falls SS =27m.23s., SSS =32m.22s.
Sitka iP =12m.33s., e =18m.56s., iPPS =23m.45s., eSS =28m.13s.
Ottawa PPP =17m.40s., i =23m.16s., PS =23m.58s., SS =29m.28s., SSSZ =32m.46s., iN =34m.52s.
Harvard ePPP? =17m.33s., iS =23m.20s., ePPS =24m.52s., eSS? =28m.46s., eSKKS? = 36m.56s., e =37m.52s., 38m.31s., and 42m.18s.
Weston eScS =23m.23s., eSS =28m.35s.
Saskatoon PS =23m.56s., eEN =29m.40s.
Pennsylvania ePPP?N =18m.21s., eScSEN =23m.43s., iEN =24m.3s., ePSEN = 24m.54s.
Bermuda iPS =24m.56s., iPPS =25m.44s.
New Kensington ePS =24m.46s., eSS =29m.45s.
Georgetown eSKKS =23m.48s., SS =29m.40s.
Victoria PPP =18m.51s., i =24m.31s., PPS =25m 40s
Seattle ePP =18m.8s., e =23m.41s., iPS =25m.58s.
Cincinnati eSKKS? =24m.1s., ePS =25m.45s.
Butte eSKS =23m.32s., ePS =25m.35s.
Rapid City ePPP =19m.3s., e =20m.40s., eSKS =23m.30s., ePS =25m.42s., eSS = 30m.43s.
St. Louis i =13m.37s., iPPP =19m.21s., iPS =25m.57s., iPPS? =26m.14s.,
Columbia ePS =26m.4s., eSS =31m.22s., eSSS =34m.58s.
Logan i =15m.5s., iSS =29m.36s.
Salt Lake City i =21m.32s., iS =25m.29s., iPS =26m.31s., e =30m.55s., eSS =31m.50s., eSSS =35m.50s.
Shasta Dam i =18m.23s.
San Juan ePPP =20m.6s., iSKS =24m.23s., iPPS =27m.44s., eSS =32m.7s., iSS = 32m.10s.
Tinemaha ePKKPZ =29m.59s.
Pierce Ferry i =14m.20s., i =14m.46s., e =27m.41s., ePPS =28m.35s., e =29m.55s., e PKP,PKP =38m.5s.
Boulder City i =14m.20s., 18m.41s., and 29m.25s., e =29m.55s., e PKP,PKP =38m.13s.,
Mount Wilson eZ =16m.59s., and 17m.29s.
Pasadena eZ =17m.28s., iZ =19m.0s., 20m.40s., and 21m.13s., eZ =22m.53s., iSZ = 26m.43s., iPSN =28m.13s., iPPSN =28m.50s., iZ =29m.6s., iPKKPZ =29m.48s., iSSZ =33m.43s.
Palomar eZ =17m.38s.
Tucson iPP =18m.44s., iPPP =21m.2s., ePS =28m.2s., e =28m.22s., iPPS =29m.11s., iPKKP =29m.46s., iSS =33m.46s., eSSS =38m.23s.
Merida ePPPE =21m.34s., eE =27m.7s. and 27m.47s., eN =28m.3s., ePPSEN =30m.7s., eE =30m.59s., and 34m.52s., eSSSN =38m.51s.
Riverview ePP =19m.28s., iPPEZ =19m.45s., iPPPZ =22m.14s., eSKSE =25m.53s., eSKKSE =26m.36s., iSN =27m.24s., iPSE =29m.21s., eN =29m.50s., ePPSZ = 30m.33s., eE =30m.43s., iZ =34m.47s., iSSEN =35m.37s., eSSSN =39m.50s.
Tacubaya eZ =19m.23s., eN =19m.26s. and 19m.30s., iPPN =19m.54s., iE =20m.9s., iSKP?EN =21m.45s., eE =21m.50s. and 23m.40s., eZ =24m.15s., eSKKSN = 26m.59s., eSKKSE =27m.13s., ePS?N =29m.17s., ePSZ =29m.33s., iPSE = 29m.36s., ePS?N =29m.49s., ePPSZ =30m.41s., ePPSN =30m.46s., 30m.49s., and 30m.52s., eN =32m.48s., eE =32m.57s., eN =34m.30s., iSSE =36m.15s., eSSS?N = 39m.49s., eN =53m.53s.
Guadalajara eSKPN =21m.23s.
La Paz SKP =22m.14s., PPPZ =23m.46s., S?Z =28m.44s., PSZ =31m.0s., PPSZ = 32m.22s., SSZ =37m.48s., SSSZ =44m.4s.
La Plata Z =19m.17s., PPE =21m.4s., E =22m.16s., SKKSN =27m.54s., SSE = 38m.4s., SSN =38m.16s.
Huancayo iPKS =22m.29s., ePPS =32m.43s., iPKP,PKP =37m.28s., eSS =38m.16s., iSS =38m.19s.
Christchurch SKP =22m.54s., PP =24m.49s., PS =31m.56s., SSEN =39m.6s., SSSEN = 45m.1s., SSSS?E =51m.50s., QE =59m.6s.
Wellington iZ =19m.36s., SKPZ =22m.46s., pPKSZ =23m.14s., iZ =31m.1s., PSPZ = 34m.11s., PPSZ =35m.54s., SS =39m.38s., sSSZ =40m.26s., i =42m.13s, and 57m.16s.?
Long waves were also recorded at Auckland and Bozeman,

November 4d. Turkestan after-shocks. Times of earliest phase at each station.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	0	16	4	6	14	9	4	45	14	32	41?
0	34	27?	5	2	21	9	10	36?	14	45	0
1	57	39	5	6	13?	9	18	13	16	31	21
2	8	34	6	43	3	9	48	55	17	17	49
2	30	55?	8	2	11?	10	23	56	18	49	30
2	45	57?	8	5	1?	11	48	5?	18	52	51
3	13	37	8	15	47						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	33	38	5	4	21	9	47	23	17	17	2
1	50	47	5	57	22	9	51	32	17	19	40
1	56	51	6	21	9	10	23	16	18	47	38
2	7	3	6	42	16	12	18	10	18	50	13
2	14	46	7	20	15	12	25	54	18	51	16
2	28	59	8	0	1	13	6	50	19	23	27
2	44	3	8	3	24	14	17	34	20	21	1
3	11	59	8	13	59	14	31	5	20	30	47
3	42	12	9	3	4	14	44	46	21	27	2
4	25	47	9	9	6	15	29	8	23	2	54
5	0	56	9	16	36	16	30	39	23	16	46

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	33	36?	6	29	0	9	52	0	17	17	18
1	57	6	6	42	31	10	23	32	17	20	30
2	44	26	7	20	20	11	47	0	18	48	8?
2	53	42	8	0	29	12	18	49	18	51	15
3	12	22	8	3	48	12	26	12	19	24	8
3	42	42?	8	14	25	14	17	56	20	31	8
4	4	51	9	3	56	14	31	15	21	27	22
5	4	39	9	17	22	14	44	56	23	3	23?
6	22	15	9	47	44	16	30	52	23	17	0

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	0	7	2	29	35	8	14	31	11	47	27
0	0	13	5	4	50	9	3	43	12	18	51
0	34	23	6	29	23	9	9	39	12	26	27
1	51	35	7	20	47	9	17	5	14	17	14?
2	7	47	8	0	37	9	52	20	14	31	40
2	15	27	8	4	5	10	23	52	14	45	18

Samarkand,

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	0	36	6	30	28	10	24	6	21	27	48
0	34	32	6	43	21	12	26	49	23	4	0
2	31	37	8	6	20	14	18	48	23	18	18?
3	43	16	8	15	54	14	33	10			
4	5	36	9	9	48	14	45	52			
5	5	12	9	18	10	16	31	48			

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	0	24	3	43	30	9	17	27	14	45	33
0	34	29	5	5	3	9	48	28	16	31	34
1	57	41	6	29	27?	10	24	4	18	48	37
2	7	59	6	43	3	11	48	40	19	25	37?
2	29	41	7	21	9	12	20	0	20	31	51?
2	44	58?	8	14	42	12	26	35	21	27	43
3	13	9	9	10	6	14	18	39	23	3	37
						14	30	5?	23	17	35

Tashkent,

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	33	55	3	12	32	9	16	42	17	20	22?
1	57	0?	3	42	51	9	47	55	18	47	48
2	5	54?	5	4	20?	12	25	50?	18	51	56?
2	14	56?	6	20	52?.	15	31	50?	21	27	7?
2	28	59?	8	12	23	16	31	7?			

November 4d. Readings also at 1h. (Tucson), 11h. (Santa Lucia), 12h. (near Triest), 14h. (Mount Wilson, Riverside, Palomar, Pierce Ferry and near Leninakan), 15h. (near Tacubaya), 17h. (near Berkeley and Lick), 20h. (Cheb, Paris, San Juan, Bermuda, Harvard, Washington, Seven Falls, Tucson, Palomar, Pasadena, Mount Wilson, Riverside, Pierce Ferry and Sitka), 22h. (Shasta Dam and Stuttgart), 23h. (Stuttgart La Paz, Boulder City, Pierce Ferry, Shasta Dam and near Logan.).

November 5d. 6h. 59m. 40s. Epicentre 25°·5S. 67°·0W. Depth of focus 0·020. (as on Oct. 9d.).

A = +·3531, B = −·8319, C = −·4281; δ = +1; h = +3;
D = −·921, E = −·391; G = −·167, H = +·394, K = −·904.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Montezuma		3·3	331	i 0 52	0	i 1 26	− 6	—		—	1·5
Santa Lucia	E.	8·5	201	3 34	S	(3 34)	− 1	—		—	4·8
La Paz		9·0	353	2 1	− 7	3 25	−22	—		—	4·2
La Plata	E.	12·2	142	3 8	+19	5 34	8S	6 2		8S	6·6
	N.	12·2	142	3 13	PP	5 43	8S	—		—	6·4
	Z.	12·2	142	3 15	PP	5 14	+12	—		—	6·7
Huancayo		15·5	328	e 3 29	− 2	i 6 8	−10	e 4 38	pP		e 6·7
Bogota		30·7	345	i 5 57	− 5	i 10 45	− 6	—	—		e 17·4
Fort de France		40·4	10	e 7 19	− 5	—	—	—	—		—
San Juan		43·6	1	e 13 38	?	—	—	16 59	?		—
Tacubaya	N.	54·5	321	e 9 13	0	—	—	—	—		—
Tucson		71·0	322	i 11 3	+ 1	—	—	i 11 23	pP		—
La Jolla		75·2	318	e 11 29	+ 3	—	—	—	—		—
Palomar		75·3	319	i 11 29	+ 2	—	—	—	—		—
Pierce Ferry		75·7	322	i 11 30	+ 1	—	—	—	—		—
Boulder City		76·0	321	i 11 33	+ 2	—	—	—	—		—
Riverside		76·1	318	i 11 33	+ 1	—	—	e 12 30	P_cP		—
Mount Wilson		76·6	318	i 11 36	+ 2	—	—	—	—		—
Pasadena		76·7	318	i 11 36	+ 1	—	—	—	—		—
Santa Barbara	Z.	77·8	317	i 11 42	+ 1	—	—	—	—		—
Tinemaha		78·7	320	i 11 48	+ 2	—	—	—	—		—
Shasta Dam		83·6	321	i 12 12	+ 1	—	—	e 12 22	pP		—
Grand Coulee		86·7	328	i 12 28	+ 1	—	—	—	—		—
Ksara		113·9	63	e 19 20	PP	28 42	PS	20 6	pPP		—

Additional readings :—
Santa Lucia N = 3m.46s.
Huancayo iP = 3m.33s.
Bogota eSS?E = 12m.13s.
Tacubaya ePE = 9m.17s., eE = 13m.44s., eN = 15m.12s.
Ksara PPS = 29m.43s.

November 5d. Turkestan after-shocks. The time entered is that for the first phase recorded at each station.

Almata.

h.	m.	s.	h.	m.	s.
21	38	27	22	59	30

Andijan

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	50	51	7	52	50	14	8	38	19	55	11
3	56	55	8	3	46	16	18	48	21	37	13
4	37	11	8	8	36	17	0	56	22	7	21
5	15	29	8	27	28	17	33	45	22	11	56
5	15	52	8	49	27	17	36	9	22	58	12
7	26	3	10	49	34	17	55	1	23	9	12
7	38	19	11	37	34	19	1	44	23	26	54

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	51	12	7	38	33	14	8	52	22	8	0
3	57	9	8	4	26	17	55	12	22	12	50
4	37	28	8	8	33	19	1	58	22	58	31
5	15	51	8	50	0?	19	55	20	23	5	22
6	19	14	9	57	40	21	37	28	23	27	5
6	56	17	11	37	47						

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	57	30	7	38	58	11	38	14	19	56	50
4	37	48	8	4	40	13	48	48	21	37	47
5	16	0	8	50	6	17	55	40	22	58	48
6	19	25	9	58	8	19	1	20?	23	27	25
7	26	48									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	52	40	7	40	18	17	55	52	21	38	10
3	58	30	11	39	54	19	2	25	22	59	0
4	39	12									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	52	45?	7	38	55	11	38	22	21	37	55
6	19	34	8	4	46	17	55	47	22	58	54
7	26	59?	8	50	19	19	1	24			

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	50	54?	6	19	6?	7	53	31?	11	38	2
3	56	58	7	27	7?	8	50	13?	21	44	28
4	37	54?	7	38	30	9	58	27?	23	5	19

November 5d. Readings also at 0h. (La Paz (2) and near Lick), 1h. (near Leninakan), 3h. (near Bogota), 4h. (Stuttgart and near Leninakan), 5h. (Shasta Dam), 8h. (near Leninakan), 10h. (Calcutta), 12h. (Shasta Dam), 17h. (near Leninakan), 18h. (near Grozny), 20h. (Ksara, near Fort de France and near Mizusawa), 22h. (La Jolla, Mount Wilson, Pasadena, Riverside, Santa Barbara, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Grand Coulee, Mizusawa (2), Ksara and La Paz).

Nov. 6d. 19h. 56m. 17s. Epicentre 34°·3N. 80°·6E.

$A = +\cdot1352$, $B = +\cdot8167$, $C = +\cdot5610$; $\delta = 0$; $h = 0$;
$D = +\cdot987$, $E = -\cdot163$; $G = +\cdot092$, $H = +\cdot553$, $K = -\cdot828$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Dehra Dun	N.	4·5	209	e 0 15	−56	e 0 48	−77	—		—	e 1·3
New Delhi		6·4	208	i 1 44a	+ 6	i 2 56	+ 3	2 9		P_g	—
Andijan		9·2	317	e 2 18	+ 2	e 3 58	− 5	—		—	—
Almata		9·4	344	e 2 29?	+11	4 9	+ 2	—		—	—
Frunse		9·8	333	2 23	− 1	i 4 9	− 8	—		—	—
Stalinabad		10·5	298	i 2 34	− 1	—	—	—		—	—
Tashkent		11·4	312	i 2 44	− 3	e 4 49	− 7	—		—	—
Samarkand		12·1	300	2 55	− 2	—	—	—		—	—
Calcutta	N.	13·6	148	i 3 21a	+ 4	i 5 51	+ 1	i 3 31		PPP	6·6
Bombay		16·8	206	i 4 2	+ 4	i 7 2	− 3	—		—	8·2
Hyderabad	N.	16·9	187	3 58	− 1	7 25	−18	4 7		PP	9·3
Kodaikanal	E.	24·1	188	i 5 38	+20	i 9 48	+14	—		—	12·3
Irkutsk		24·7	35	i 5 26	+ 2	i 9 52	+ 8	—		—	—
Baku		25·1	293	e 5 42?	+14	e 9 53?	+ 2	—		—	—
Sverdlovsk		26·3	335	i 5 37	− 2	i 10 5	− 6	—		—	—
Grozny		28·4	299	i 6 1	+ 3	10 45	0	—		—	—
Erevan		29·2	292	e 6 13	+ 8	—	—	—		—	—
Leninakan		29·7	294	e 6 12	+ 2	—	—	—		—	—
Piatigorsk		30·5	301	e 6 24	+ 7	e 11 27	+ 9	—		—	—
Sotchi		32·8	299	e 6 30	− 7	—	—	—		—	—
Moscow		36·4	319	e 7 4	− 4	i 12 44	− 6	—		—	—
Ksara		36·8	282	i 7 15	+ 4	e 12 53	− 3	—		—	—
Vladivostok		40·4	62	i 7 43	+ 2	e 13 57?	+ 7	—		—	—
Helwan		41·7	278	i 7 52k	0	14 10	0	9 31		PP	—
Helsinki		44·0	324	i 8 9k	− 2	e 14 38	− 5	e 10 1		PP	e 22·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia		44·9	298	e 8 19	+ 1	e 14 59	+ 3	—	—	e 19·2
Warsaw		45·6	311	e 8 22k	− 2	15 3	− 3	11 2	PPP	22·7
Belgrade		46·6	301	i 8 36	+ 4	e 15 27	+ 6	i 10 21	PP	e 20·0
Budapest	N.	47·2	306	8 36	0	i 15 27	− 2	—	—	e 18·7
Upsala		47·6	322	8 38k	− 1	i 15 31	− 4	10 32	PP	e 23·7
Zagreb		49·5	304	e 8 54	0	e 16 3	+ 1	e 11 1	PP	—
Prague		49·9	310	8 52	− 5	16 1	− 6	e 10 52	PP	e 19·7
Copenhagen		50·4	317	i 9 0	− 1	i 16 12	− 2	—	—	24·7
Collmberg		50·6	312	e 9 4	+ 2	e 16 13	− 4	e 20 5	SS	20·7
Triest		51·1	304	e 9 13	+ 7	i 16 22	− 2	e 11 3?	PP	—
Cheb		51·2	310	e 9 7	0	e 16 24	− 1	e 11 8	PP	e 28·7
Jena		51·5	311	e 9 8	− 1	e 16 27	− 2	e 20 29	SS	—
Florence	E.	53·3	302	e 9 22	− 1	e 16 31	−23	—	—	—
Stuttgart		53·5	309	e 9 23k	− 1	e 16 53	− 4	e 10 31	P_eP	e 27·7
Chur		53·7	307	e 9 4	−22	—	—	—	—	—
Bergen		53·8	324	i 9 23k	− 3	16 22	−39	21 22	SS	25·7
Zürich		54·2	307	e 9 25	− 4	e 17 2	− 4	—	—	—
Strasbourg		54·4	309	e 9 29k	− 2	i 17 12	+ 3	e 11 32	PP	e 28·7
Basle		54·8	307	e 9 32	− 2	e 16 54	−20	—	—	—
De Bilt		55·2	314	i 9 37k	0	i 17 20	0	e 21 3	SS	e 27·7
Neuchatel		55·4	307	e 9 35	− 3	e 17 20	− 2	—	—	—
Besançon		55·9	307	e 9 43	+ 1	—	—	—	—	30·7
Uccle		56·1	312	e 9 43	0	e 17 29	− 3	—	—	e 28·7
Paris		57·7	310	i 9 52	− 3	e 17 40	−13	e 23 43	SSS	e 31·7
Aberdeen	N.	58·1	321	—	—	i 18 1	+ 3	—	—	29·1
Clermont-Ferrand		58·3	306	i 9 56	− 3	18 2	+ 1	e 10 52	P_eP	28·7
Durham		58·5	317	i 10 0	0	i 18 0	− 3	e 24 15	SSS	i 26·4
Kew	Z.	58·7	314	i 9 59	− 3	e 18 3?	− 3	e 22 33	SS	e 26·7
Edinburgh		59·1	319	—	—	e 18 7	− 4	—	—	—
Barcelona		60·4	301	—	—	e 18 24	− 4	—	—	e 34·0
Tortosa		61·8	302	i 10 25	+ 2	18 46	0	11 15	P_eP	e 33·7
Scoresby Sund		62·1	339	10 25a	0	18 54	+ 5	24 55	?	—
Alicante		63·4	300	i 10 35	+ 1	e 19 7	+ 1	10 59	pP	e 29·9
Toledo		65·3	303	i 10 45	− 1	i 19 19	−10	11 18	P_eP	—
Granada		66·1	300	i 10 46k	− 5	i 19 37	− 2	11 9	pP	i 30·7
Lisbon		69·6	303	11 11	− 2	20 19	− 2	—	—	—
College		74·2	20	—	—	e 21 48	+34	e 22 8	?	e 35·7
Grand Coulee		96·3	13	i 13 31	− 1	—	—	e 13 54	P_eP	—
Shasta Dam		102·4	18	e 14 0	+ 1	—	—	—	—	—
Tinemaha	Z.	106·8	16	e 18 37	[+10]	—	—	—	—	—
Boulder City		108·6	13	e 18 34	[+ 4]	—	—	e 29 43	PKKP	—
Pierce Ferry		108·6	12	e 18 33	[+ 3]	—	—	e 29 43	PKKP	—
Mount Wilson	Z.	109·6	17	e 18 35	[+ 3]	—	—	i 19 8	PP	—
Pasadena	Z.	109·7	17	e 18 39	[+ 7]	—	—	e 19 7	PP	—
Riverside	Z.	110·0	17	i 18 36	[+ 3]	—	—	e 19 7	PP	—
Palomar	Z.	111·0	16	e 18 38	[+ 3]	—	—	e 19 0	PP	—
Tucson		112·1	11	e 18 41	[+ 4]	—	—	i 19 27	PP	e 67·5
La Plata		146·0	258	19 43	[+ 2]	—	—	—	—	—
La Paz	Z.	146·8	295	i 19 47k	[+ 5]	—	—	23 13	PP	75·2
Huancayo		148·8	310	e 19 52	[+ 7]	—	—	e 23 22	PP	—

Additional readings :—
New Delhi P?N = 1m.58s., S?N = 3m.19s., S_eE = 3m.38s.
Calcutta iSS = 6m.13s.
Hyderabad SSN = 7m.45s.
Helwan i = 8m.1s., SS = 17m.16s.
Helsinki ePPP = 10m.49s., eSS = 17m.48s.
Warsaw ePN = 8m.42s., PPZ = 10m.3s., SZ = 15m.8s., PSN = 15m.15s., eSSN = 18m.22s., SSZ = 18m.25s., iN = 19m.10s. and 19m.19s., SSSZ = 19m.39s.
Upsala ePN = 8m.44s.?, PPPE = 10m.55s., iS_eS = 18m.33s., eSS = 19m.2s., eSSS? = 20m.43s.
Collmberg eEN = 17m.19s.
Triest eSS = 20m.13s.
Cheb e = 14m.21s., eSS? = 20m.31s.
Stuttgart iZ = 9m.28s.k
Strasbourg ePPP = 12m.49s., eSS = 20m.53s., i = 21m.33s., eQ = 26m.13s.
Paris iP = 9m.56s., e = 20m.45s. and 22m.29s., eQ = 28m.43s.

Continued on next page.

Clermont-Ferrand e =15m.5s.
Tortosa PPN =12m.45s., PPPE =14m.8s., P_cS?N =15m.30s., Q?N =24m.54s.
Alicante P_cP =10m.47s., sP =11m.19s., PP =12m.47s., PPP =14m.13s., PS =19m.25s., sS =19m.45s., SS =22m.35s., SSS =25m.35s.
Toledo iPPZ =13m.2s., SSEN =23m.28s.
Granada PP =13m.27s., pPP =13m.47s., pPPP =14m.37s., pS =20m.7s., sS =20m.37s., iSS =24m.43s., SSS =27m.4s.
Mount Wilson iPKKPZ =29m.39s.
Pasadena iPKKPZ =29m.40s.
Palomar iPKKPZ =29m.37s.
Tucson iPKKP =29m.29s.
Huancayo iPKP =19m.55s.
Long waves were also recorded at Bucharest, Sitka, Bermuda, and Bozeman.

Nov. 6d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	43	35	6	42	14	17	19	26	22	22	27
2	52	44	9	57	22	22	18	51	22	26	2
4	28	37	16	58	36						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	39	52	4	27	20	12	45	36	16	57	42
1	26	5	6	40	28	14	52	28	17	18	37
2	42	6	8	12	24	15	25	21	22	17	7
2	51	33	8	30	53	15	30	59	22	20	55
3	9	15	9	56	39	16	3	34	22	25	12
3	41	7									

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	42	15	6	40	51	16	58	5	22	21	5
2	51	48	8	12	48	17	18	51	22	25	25
4	27	34	9	56	53	22	17	20			

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	42	44	6	41	55?	16	58	18	22	21	30
2	52	10	8	13	0?	17	19	18	22	25	50
4	28	0	9	57	22	22	17	45?			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	14	10?	17	19	27	22	22	46	22	27	12
9	58	24									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	43	1	8	13	1	17	19	24?	22	22	56
2	52	16?	9	57	31	22	18	47	22	25	56
6	41	18	16	58	22						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	38	52	4	43	59	13	40	25	22	17	23?
4	34	2?	10	4	1	17	19	1	22	21	34
									22	25	26?

Nov. 6d. Readings also at 2h. (Balboa Heights), 3h. (Leninakan and near Grozny), 4h. (Ksara, Piatigorsk, and near Grozny), 5h. (Tucson), 8h. (Santa Lucia), 14h. (Istanbul, Bucharest, Sofia, Warsaw, Copenhagen, Cheb, Jena, Stuttgart, Basle, Chur, Neuchatel, Zürich, Paris, Strasbourg, Triest, Ksara, and near Helwan), 16h. (Helwan and Ksara (2)), 17h. (Copenhagen, Cheb, De Bilt, Stuttgart, Warsaw, Istanbul, Hyderabad, and New Delhi), 18h. (Malaga, near Granada, Leninakan, and near Grozny), 20h. (Istanbul), 21h. (near Grozny).

Nov. 7d. 15h. 54m. 6s. Epicentre 41°·8N. 71°·7E. (as on 4d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		1·2	155	i 0 25	+ 1	i 0 42	+ 1	—	—	—
Frunse		2·4	63	i 0 35	− 6	i 1 1	−11	—	—	—
Obi-garm		3·5	207	i 0 59	+ 2	—	—	—	—	—
Stalinabad		3·9	216	e 1 5	+ 3	i 1 55	+ 5	—	—	—
Almata		4·2	67	e 1 1	− 6	e 1 47	−10	—	—	—
Samarkand		4·2	241	1 12	+ 5	i 2 22	S_g	—	—	—
Baku		16·5	272	i 3 59	+ 5	i 7 18	+20	—	—	—
Sverdlovsk		16·6	338	e 3 50	− 6	i 6 48	−12	3 55	?	—
Grozny		19·1	283	i 4 28	+ 1	—	—	—	—	—
Erevan		20·6	274	e 4 50	+ 7	—	—	—	—	—
Leninakan		20·9	277	e 4 50	+ 4	—	—	—	—	—
Piatigorsk		21·0	286	4 52	+ 5	—	—	—	—	—
Bombay		22·8	177	e 5 4	− 1	e 9 17	+ 6	—	—	12·1
Sotchi		23·5	285	e 5 14	+ 2	—	—	—	—	—
Calcutta		23·7	139	e 5 20	+ 6	e 9 36	+ 9	i 10 33	SS	11·8
Irkutsk		24·4	53	i 5 18	− 3	i 9 36	− 3	—	—	—
Hyderabad	N.	25·0	165	5 20	− 7	9 53	+ 4	—	—	—
Moscow		26·1	314	5 42	+ 5	i 10 7	0	—	—	—
Ksara		29·2	266	i 6 8	+ 3	11 8	+10	—	—	—
Istanbul		31·7	284	e 10 54?	S	(e 10 54?)	−43	—	—	—
Kodaikanal	E.	31·9	170	—	—	e 9 14	?	—	—	—
Helsinki		33·8	320	—	—	e 12 7	− 3	e 13 41	SS	e 15·9
Helwan		34·5	263	i 6 51k	− 1	—	—	i 8 36	PP	—
Warsaw		35·4	304	e 9 14	?	e 12 37	+ 3	e 15 51	SS	e 17·9
Belgrade		36·9	293	e 7 26	+14	e 13 6	+ 8	e 17 11	Q	21·9
Budapest		37·3	297	—	—	e 13 39	+35	e 18 6	Q	e 22·9
Upsala	N.	37·4	318	—	—	e 15 28	SS	—	—	i 18·4
Prague		39·8	303	e 7 36?	0	—	—	e 15 58?	SS	e 19·9
Copenhagen		40·2	312	e 7 40	0	e 13 45	− 3	—	—	19·9
Collmberg	N.	40·5	305	—	—	—	—	e 9 47	PP	e 17·9
Jena		41·4	303	e 7 47	− 3	e 14 9	+ 4	e 17 3	SS	—
Stuttgart		43·4	301	e 8 5	− 1	—	—	—	—	e 23·9
Florence		43·5	294	—	—	—	—	i 18 4	SS	—
Zürich		44·2	300	e 8 9	− 3	—	—	—	—	—
Strasbourg		44·4	302	i 8 14	0	—	—	e 18 14	SS	e 23·8
Basle		44·8	301	e 8 16	− 1	—	—	—	—	—
De Bilt		45·0	307	e 8 19	0	e 15 2	+ 4	e 18 14	SS	e 23·9
Neuchatel		45·4	300	e 8 19	− 3	—	—	—	—	—
Uccle		45·9	306	—	—	e 15 13?	+ 2	e 18 6	SS	e 23·9
Paris		47·6	304	i 8 36	− 3	—	—	e 19 18	SSS	e 27·0
Clermont-Ferrand		48·3	229	e 8 43	− 2	—	—	—	—	28·9
Toledo	z.	55·5	295	i 9 34	− 5	—	—	i 11 34	PP	—
Grand Coulee		90·1	8	i 12 59	− 4	—	—	—	—	—
Mount Wilson	z.	103·8	9	e 18 22	PP	—	—	—	—	—
Pasadena	z.	103·9	9	e 18 24	PP	—	—	—	—	—
Palomar	z.	104·8	8	e 18 21	PP	—	—	—	—	—
Tucson		106·3	2	e 18 32	PP	—	—	—	—	—

Additional readings :—
Bombay eP?E =5m.9s.
Helwan i =6m.57s.
Warsaw eZ =9m.25s., 13m.54s., 14m.24s., 16m.2s., and 16m.28s.
Upsala eE =15m.37s.?
Jena eN =7m.50s.
Uccle eE =18m.27s.
Long waves were also recorded at Bucharest, Bergen, Potsdam and Aberdeen.

November 7d. 18h. 6m. 3s. Epicentre 19°·6N. 69°·4W. (as on 1946 Sept. 19d.).

A = +·3317, B = −·8825, C = +·3334; δ = −1; h = +5;
D = −·936, E = −·352; G = +·117, H = −·312, K = −·943.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Port au Prince		3·0	249	(i 0 56)	+ 6	(i 1 30)	+ 3	(i 1 8)	P_s	(i 1·6)
San Juan		3·3	111	i 0 49	− 4	i 1 19	−16	—	—	i 1·6
Fort de France		9·2	120	e 1 26	?	e 3 19	?	—	—	—
Bermuda		13·4	17	—	—	e 5 33	−12	—	—	e 6·0
Balboa Heights		14·4	224	e 3 33	+ 6	e 6 1	− 8	—	—	—
Bogota	z.	15·6	198	i 3 39	− 4	e 6 24	−13	i 3 43	pP	—
Weston		22·8	357	e 5 6	+ 1	e 9 6	− 5	—	—	—
Harvard		22·9	357	i 5 7	+ 1	i 9 15	+ 2	—	—	—
Ottawa		26·3	350	e 5 39	0	—	—	—	—	11·0
Shawinigan Falls		27·0	356	e 5 45	0	—	—	—	—	11·5
Huancayo		32·0	192	e 6 27	− 3	e 11 35	− 7	e 7 35	PP	e 14·4
La Paz	z.	35·9	178	8 33	PP	15 21	SS	—	—	22·0
Tucson		39·1	298	i 7 30	− 1	—	—	—	—	e 26·0
Pierce Ferry		42·3	304	i 7 57	0	—	—	—	—	—
Boulder City		43·0	303	i 8 12	+ 9	—	—	—	—	—
Palomar	z.	44·3	299	i 8 13	0	—	—	—	—	—
La Jolla	z.	44·6	298	i 8 14	− 2	—	—	—	—	—
Riverside		44·8	300	i 8 16	− 1	—	—	—	—	—
Mount Wilson	z.	45·4	300	i 8 21	− 1	—	—	—	—	—
Pasadena	z.	45·4	300	i 8 21	− 1	—	—	—	—	—
Tinemaha		45·9	304	i 8 26	0	—	—	—	—	—
Grand Coulee		48·9	318	e 8 45	− 5	—	—	—	—	—
Shasta Dam		49·6	308	e 8 52	− 3	—	—	—	—	—
Granada		59·4	57	i 10 8 a	+ 2	e 18 30	+15	10 15	pP	28·0
Alicante		61·8	56	e 10 28	+ 5	e 18 32	−14	12 44	PP	e 29·2
Ksara		91·3	54	e 14 27	+78	e 25 23	PS	—	—	—

Additional readings and notes :—
Port au Prince readings have been increased by 2m.
Bogota iPPZ = 3m.48s., iZ = 3m.53s.
Harvard i = 5m.25s.
Granada PP = 11m.33s.
Alicante PPP = 13m.29s., PcS = 15m.22s., ScS = 20m.30s., SS = 22m.36s., SSS = 35m.4s.
Long waves were also recorded at Bozeman and other European stations.

November 7d. 21h. 27m. 44s. Epicentre 49°·5S. 74°·0W.

Approximate.

A = +·1797, B = −·6267, C = −·7582; δ = −9; h = −5;
D = −·961, E = −·276; G = −·209, H = +·729, K = −·652.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia	E.	16·2	10	4 4	+14	8 16	L	8 37	SS	(8·3)
La Plata		18·8	46	4 27	+ 4	7 38	−12	—	—	9·9
La Paz	z.	33·3	12	i 6 41	0	12 6	+ 4	—	—	17·6
Huancayo		37·4	358	e 7 14	− 2	e 12 51	−14	e 9 16	PPP	e 15·4
Tucson		87·7	330	e 12 53	+ 1	—	—	—	—	—
Palomar	z.	90·9	326	e 13 9	+ 2	—	—	—	—	—
Mount Wilson	z.	92·1	325	e 13 1	−11	—	—	—	—	—
Ksara		127·2	80	e 12 20	?	—	—	e 21 54	PP	—

La Plata gives also N = 4m.52s., E = 5m.58s., SE = 7m.38s., S?N = 8m.4s.
Long waves were also recorded at a few European stations.

November 7d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	41	9	11	6	55?	14	49	52	19	58	16
4	10	10	13	22	57	15	23	39?	21	31	0
5	42	57	14	3	57?	15	55	7	23	25	32
10	20	12									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	39	30	5	41	59	11	6	2	15	23	0
1	3	35	6	55	38	13	13	44	15	54	31
1	18	16?	9	32	45	13	21	49	19	56	27
1	44	29	10	12	17	14	3	7	21	30	10
2	44	12	10	18	48	14	49	10	23	23	52
4	9	17	10	21	3						

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	39	42	5	42	22	11	6	25	15	54	41
1	3	45	6	55	57	14	3	22	19	57	22?
1	18	32	9	32	58	14	49	21	21	30	21
2	44	38?	10	12	39	15	23	12	23	24	7
4	9	32	10	18	55						

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	40	10	4	9	43	10	12	51	19	57	0
1	4	1	5	42	28?	10	19	26	21	30	50
1	18	51	6	56	15	11	6	32	23	24	32
2	44	47	9	33	19	15	55	5			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	19	16	6	57	38	13	22	48	15	55	18
4	11	26	11	6	48	14	4	24	19	57	2?
5	42	48	13	13	55	14	51	1			

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	41	1	9	34	16	14	3	54	19	57	10
1	19	7	11	6	45	14	49	54	21	31	3
4	10	48	13	13	23	15	55	11	23	24	56
5	42	40	13	22	39						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	18	27?	13	22	0?	19	56	35?	21	30	41?
11	6	14?									

November 7d. Readings also at 2h. and 3h. (Shasta Dam), 5h. (Suva, Boulder City, Grand Coulee, Pierce Ferry (2) and Shasta Dam), 9h. (Palomar, Tucson, Boulder City, Pierce Ferry, La Paz, and Uccle), 10h. (Huancayo, Ksara, De Bilt, and near Triest), 11h. (New Delhi), 13h. (Suva), 14h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Pierce Ferry, and Shasta Dam), 15h. (near Triest), 17h. (Paris), 18h. (Fort de France).

November 8d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.
15	35	8	16	23	40

Audijan

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	10	49	5	57	6	16	22	48	23	6	48
2	34	36	15	33	32	16	44	40			

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	11	5	15	33	50	16	23	5	16	45	7
5	57	20									

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	11	27	15	34	15	16	45	21	23	6	32
2	35	10	16	23	29						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s
2	11	50	16	24	34	16	46	36	23	7	0
5	59	12									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	11	53	15	34	16	16	45	28	23	6	38
5	59	17	16	23	45						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	35	7?	5	58	3?	15	33	48?

November 8d. Readings also at 0h. (Pasadena, Palomar, Riverside, Tucson, Boulder City, Pierce Ferry, and near Berkeley), 1h. (near Rome), 5h. (Palomar, Tucson, Boulder City, Pierce Ferry, Grand Coulee, and Tacubaya), 6h. (Riverview, Christchurch, Kaimata, near Auckland, New Plymouth, Tuai, and Wellington), 11h. (near Ottawa), 13h. (Bombay), 17h. and 19h. (near Algiers), 21h. (Riverview), 22h. (Boulder City, Brisbane, and Istanbul).

November 9d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	35	2?	12	7	28	14	35	42	17	49	24
9	54	20	13	50	35	14	41	33	19	1	54?
11	3	58	14	29	20	14	52	25	21	41	32

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	34	2	11	2	25	14	34	10	19	0	58
9	6	7	12	6	38	14	40	42	19	55	25
9	9	10	13	49	8	14	51	37	21	40	41
9	52	34	14	27	37	17	47	56			

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	34	27	13	49	25	14	41	10	19	1	21
11	3	7	14	27	57	14	51	53	21	41	0
12	6	56	14	34	21						

Obi-garm.

h.	m.	s.	h.	m.	s.
17	48	45	21	41	12

Samarkand.

h.	m.	s.
19	1	44

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	34	47	12	7	30	14	52	24	21	41	30
9	53	16	14	28	23	19	1	39	22	47	11
11	3	18	14	41	34						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
13	51	48	17	48	53?	19	1	12?	21	41	6

November 9d. Readings also at 0h. (New Delhi), 1h. (Bucharest), 3h. (Istanbul), 4h. (Strasbourg), 5h. (Calcutta), 8h. (Grand Coulee, Overton, and Pierce Ferry), 10h. (near Triest and near Fort de France), 11h. (Erevan and near Leninakan), 12h. (De Bilt and Ksara), 13h. (Bogota, Cheb, Strasbourg and Uccle), 17h. (Boulder City, Pierce Ferry and Harvard), 21h. (Apia, Riverview, Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, Overton, Pierce Ferry, and Shasta Dam), 22h. (Fort de France, Basle, Neuchatel, Zürich, Paris, Strasbourg, Stuttgart, Ksara, Bombay and Calcutta). 23h. (Jena).

November 10d. 0h. 46m. 43s. Epicentre 41°·0N. 79°·0E.

$A = +\cdot1444$, $B = +\cdot7430$, $C = +\cdot6535$; $\delta = -4$; $h = -2$;
$D = +\cdot982$, $E = -\cdot191$; $G = +\cdot125$, $H = +\cdot641$, $K = -\cdot757$

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata		2·7	326	0 49	+ 4	1 23	S*	i 1 32	S_g	—
Frunse		3·8	302	i 1 5	+ 4	i 2 7	S_g	—	—	—
Andijan		5·1	270	e 1 33	P*	i 2 57	S_g	—	—	—
Tashkent		7·3	276	e 1 44	− 6	3 4	−11	—	—	—
Obi-garm		7·5	255	e 1 57	+ 4	i 3 16	− 4	—	—	—
Stalinabad		8·3	256	1 58	− 6	3 38	− 2	4 20	S*	—
Samarkand		9·3	266	2 15	− 2	i 3 56	− 9	—	—	—
Sverdlovsk		19·8	328	e 4 30	− 5	e 8 8	− 5	—	—	—
Calcutta		20·0	153	i 4 45a	+ 8	i 8 23	+ 6	—	—	—
Irkutsk		20·6	47	i 4 37	− 6	e 8 30	+ 1	—	—	—
Bombay		22·7	194	e 4 59	− 5	i 9 5	− 4	—	—	12·4
Hyderabad		23·5	180	5 1	−11	9 15	− 8	—	—	—
Grozny		24·7	285	5 25	+ 1	—	—	—	—	—
Erevan		26·1	279	5 45	+ 8	—	—	—	—	—
Leninakan		26·5	281	5 39	− 2	—	—	—	—	—
Kodaikanal	E.	30·7	182	—	—	e 11 7	−14	—	—	—
Moscow		30·7	312	6 14	− 5	11 18	− 3	—	—	—
Ksara		34·7	271	i 6 51	− 3	12 18	− 6	7 57	PP	—
Helsinki		38·0	319	e 9 7	PP	e 13 11	− 3	—	—	e 19·3
Helwan		39·9	268	i 7 33	− 4	e 13 57	+14	e 9 20	PP	—
Warsaw		40·3	305	e 13 57	PS	e 13 45	− 4	e 16 35	SS	e 22·3
Upsala	E.	41·7	317	e 9 29	PP	e 17 5	SS	—	—	e 23·3
Budapest	E.	42·5	299	e 8 12	+13	17 40	SS	—	—	26·3
	N.	42·5	299	e 9 14	PP	17 42	SS	—	—	25·3
Copenhagen		44·8	312	—	—	14 59	+ 4	18 9	SS	22·3
Prague		44·8	304	e 10 9	PP	e 18 5	SS	—	—	e 23·3
Zagreb		45·0	297	—	—	e 18 17?	SS	—	—	—
Cheb		46·1	304	e 10 16	PP	e 18 31	SS	e 15 11	PS	e 28·3
Triest		46·5	298	e 10 29	PP	19 7	SS	e 25 38	Q	—
Bergen		47·7	320	—	—	e 18 55	SS	—	—	—
Stuttgart		48·5	303	e 8 41	− 5	—	—	e 26 17	Q	e 30·1
Rome		48·7	295	e 8 50	+ 2	e 15 44	− 6	e 10 36	PP	—
Florence	E.	48·8	296	e 10 41	PP	i 19 44	SS	—	—	—
Zürich		49·3	302	e 8 49	− 4	—	—	—	—	—
Strasbourg		49·4	304	e 8 46	− 7	e 15 28	−32	e 19 23	SS	e 26·7
Basle		49·9	302	e 8 56	− 1	—	—	—	—	—
De Bilt		49·9	309	e 8 57	0	16 7	0	19 47	SS	25·3
Neuchatel		50·5	302	e 8 57	− 5	—	—	—	—	—
Aberdeen		52·3	317	i 20 40	PS	—	—	—	—	i 29·2
Paris		52·6	305	e 9 14	− 4	e 16 45	+ 1	—	—	e 29·3

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Alicante	59·2	295	—	—	(e 18 13)	+ 1	(24 9)	SSS	(e 33·0)
Toledo	60·8	298	i 10 12	− 4	—	—	26 32	Q	37·3
Grand Coulee	89·8	12	i 12 59	− 3	—	—	—	—	—
Shasta Dam	96·4	17	e 13 24	− 8	—	—	—	—	—

Additional readings and note :—
Warsaw eN = 16m.51s., 17m 49s., and 18m 57s., eZ = 19m.29s., eN = 19m.47s., cZ = 19m.52s., eN = 20m.16s., eZ = 20m.49s., and 21m.40s., eN = 21m.43s.
Upsala eE = 13m.3s., eN = 16m.56s., eE = 21m.35s.
Copenhagen 18m.25s.
Cheb e = 10m.23s. and 10m.45s., ePSP = 19m.37s.
Rome eSS?E = 19m.40s.
Strasbourg e = 19m.57s.
Aberdeen iN = 21m.1s.
Alicante Q = (28m.27s.), readings reduced by 3m.
Long waves were also recorded at La Paz, Colombo, Granada, Uccle, Potsdam and Collmberg.

November 10d. 12h. 54m. 54s. Epicentre 31°·5S. 68°·6W. Depth of focus 0·015. (as on 1945 May 1d.).

A = +·3117, B = −·7953, C = −·5199; δ = −5; h = +1;
D = −·931, E = −·365; G = −·190, H = +·484, K = −·854.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia		2·2	223	0 48	+11	1 13	+ 8	—	—	1·5
Montezuma		8·8	359	e 2 0	− 5	e 3 26	−17	—	—	e 3·7
La Plata	E.	9·6	114	i 2 29	PP	4 23	SS	—	—	4·9
	N.	9·6	114	i 2 30	PP	3 58	− 4	4 22	SS	4·9
	Z.	9·6	114	i 2 32	PP	4 18	+16	2 41	PP	4·8
La Paz	Z.	15·0	4	i 3 22k	− 4	i 6 2	− 7	i 3 36	pP	7·0
Huancayo		20·3	341	i 4 25	− 3	i 7 55	− 8	i 5 18	PPP	e 8·4
Balboa Heights		41·6	345	e 7 35	− 2	—	—	—	—	—
Fort de France		46·5	11	e 8 14	− 2	—	—	—	—	—
San Juan		49·7	4	e 8 36	− 5	e 15 21	−17	e 9 22	pP	e 20·5
Bermuda		63·6	5	—	—	e 18 28	−13	i 19 18	PS	e 26·6
St. Louis		72·6	342	i 11 13	− 2	i 20 15	−13	i 11 44	pP	—
Tucson		74·9	324	i 11 28	0	—	—	i 11 57	pP	—
Palomar	Z.	79·0	321	i 11 52k	+ 1	—	—	i 12 23	pP	—
Pierce Ferry		79·6	323	i 11 56	+ 2	—	—	i 12 31	pP	—
Riverside		79·7	320	i 11 55	0	i 22 38	PS	i 12 25	pP	—
Boulder City		79·9	323	e 11 57	+ 1	e 21 48	+ 1	i 12 27	pP	—
Overton		80·1	323	i 11 59	+ 2	—	—	i 12 32	pP	—
Mount Wilson		80·3	320	i 12 0k	+ 2	i 22 48	PS	i 12 29	pP	—
Pasadena		80·3	320	i 11 58k	0	i 22 45	PS	i 12 29	pP	—
Santa Barbara		81·3	319	i 12 4k	+ 1	e 22 55	PS	i 12 35	pP	—
Tinemaha		82·5	322	i 12 11	+ 1	e 23 8	PS	i 12 43	pP	—
Berkeley	Z.	85·3	320	e 12 25	+ 1	—	—	e 13 4	pP	—
Shasta Dam		87·4	321	i 12 33	− 1	—	—	i 12 45	pP	—
Grand Coulee		91·1	328	e 12 51	0	—	—	i 13 23	pP	—
Uccle		104·1	37	e 32 48	SSP	—	—	—	—	—
Rome	Z.	104·3	48	e 27 17	PS	—	—	—	—	—
Stuttgart	Z.	105·7	42	e 17 36	?	—	—	—	—	—
Helwan		112·7	67	e 19 18	PP	29 49	PPS	30 44	?	—
Ksara		117·8	65	e 17 20	?	29 42	PS	e 20 2	PP	—

Additional readings :—
Santa Lucia PN = 0m.51s., E = 1m.17s. and 1m.23s., SN = 1m.27s.
San Juan ePcP = 9m.47s., ePP = 11m.0s., esS = 16m.0s., eScS = 18m.17s., iSS = 19m.30s., isSS = 20m.0s.
St. Louis i = 11m.51s., iPcP = 11m.54s., isP? = 12m.3s., isS = 21m.13s.
Tucson i = 12m.16s., e = 14m.36s., ePKP,PKP = 39m.48s.
Palomar iZ = 12m.43s.
Boulder City e = 22m.42s.
Mount Wilson iZ = 12m.44s. and 13m.27s.
Pasadena eZ = 13m.56s.
Tinemaha iZ = 12m.50s.
Uccle eE = 33m.35s.

November 10d. 17h. 42m. 52s. Epicentre 8°·3S. 77°·8W.

Intensity VIII-IX at Quiches and Conchucos, VIII at Sikuas, VII at Corongo, VI-VII at Pampas, III at Lima, Jaen, Tarma, Oxapampa.
Destruction at Mayas, Chalan, Llama, Citabamba, over an area of 1600 sq. km., many dead, very many hurt, considerable land-slides and the formation of a fault 5 km. long.
Pleistoseismic area 2000 sq. km. between Quiches and Conchucos (8°27′S., 77°26′W. to 8°16′S., 77°50′W.).
Macroseiemic area greater than 450,000 sq. km.
Epicentre 8°20′S., 77°50′W. T_0 = 17h. 42m. 54s.

E. Silgado : Informe preliminar sobre la región afectada por el sismo del 10 novembre en el Norte de Ancash y sur del Departamento de la Libertad. Datos sismológicos del Perú, 1946, Instituto geológico del Perú, Boletin 7, Lima 1947, p. 25-31, 3 photos, isoseismic chart p. 31.
E. Silgado : The Ancash, Peru, Earthquake of November 10, 1946. Bull. Seismolog. Soc. of America, vol. 41, No 2, 1951, p. 83-100, 14 figures, macroseismic chart fig. 2, p. 86.

A = +·2091, B = −·9673, C = −·1434 ; δ = −4 ; h = +7 ;
D = −·977, E = −·211; G = −·030, H = +·140, K = −·990.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·4	213	i 1 10	0	i 1 56	− 6	—	—	i 2·1
La Paz		12·5	132	i 2 57k	− 5	5 6	−17	i 3 1	P	6·0
Bogota		13·4	17	i 3 16	+ 2	i 6 4	SS	i 3 25	PP	—
Balboa Heights		17·3	354	i 4 5	+ 1	i 7 34	SS	e 8 37	P_cP	e 9·3
Santa Lucia		25·9	165	5 35	0	10 7	+ 3	6 17	PP	12·6
Fort de France		28·2	37	e 5 54	− 2	e 10 50	+ 9	6 39	PP	e 14·1
San Juan		28·9	23	i 6 2	− 1	i 10 7	−46	—	—	i 11·0
Oaxaca		31·4	325	e 6 31	+ 6	i 11 51	+19	i 7 41	PPP	—
La Plata	E.	32·1	147	6 29	− 2	11 45	+ 2	13 20	SS	17·4
	N.	32·1	147	6 28	− 3	11 20	−23	8 20	PPP	16·2
	Z.	32·1	147	6 26	− 5	—	—	7 32	PP	17·5
Vera Cruz		32·8	327	6' 42	+ 5	i 12 12	+18	i 7 2	pP	i 15·9
Tacubaya		34·7	323	e 6 58	+ 4	i 12 42	+18	e 7 25	pP	e 17·3
Manzanillo	E.	37·7	316	i 7 34	+15	e 13 11	+ 1	e 16 42	SS	—
Guadalajara		38·2	319	i 9 27	PPP	e 13 49	+32	e 16 24	SSS	—
Mobile		40·0	345	7 42	+ 4	13 21	−23	—	—	—
Bermuda		42·3	17	i 8 0	+ 3	i 14 8	−11	i 9 38	PP	e 17·0
Columbia		42·8	356	e 7 57	− 4	e 14 16	−10	e 9 37	PP	i 17·6
Georgetown		47·0	2	i 8 35	0	—	—	i 10 28	PP	—
Washington		47·0	2	i 8 37	+ 2	i 15 28	+ 2	i 10 17	PP	e 19·9
Cincinnati		47·6	353	i 8 46	+ 7	19 36	SSS	10 36	PP	—
St. Louis		48·1	347	i 8 42	− 1	i 15 33	− 9	i 10 20	PP	—
New Kensington		48·6	358	e 8 53	+ 6	e 15 48	− 1	e 11 1	PP	e 21·2
Fordham		49·0	5	i 8 52	+ 2	i 15 57	+ 2	i 10 50	PP	i 24·3
Chicago		50·7	350	i 9 1	− 2	i 16 16	− 2	e 11 4	PP	e 22·1
Weston		50·8	7	i 9 4	0	i 16 24	+ 4	i 10 9	P_cP	—
Harvard		50·9	7	i 9 5k	0	e 16 24	+ 3	e 11 0	PP	e 22·8
Tucson		51·2	323	i 9 5	− 2	i 16 30	+ 5	e 19 39	SS	i 20·4
Lincoln		51·9	342	e 9 11	− 1	i 16 36	+ 1	i 18 59	S_cS	e 20·6
Ottawa		53·5	2	9 24	0	16 57	0	11 26	PP	25·8
Halifax		54·2	13	9 25	− 4	16 56	−10	22 38	SSS	25·1
Shawinigan Falls		54·8	5	9 29	− 5	17 29	+15	12 40	PPP	27·1
Seven Falls		55·2	7	9 40	+ 3	17 23	+ 3	13 11	PPP	27·1
Palomar	Z.	55·6	320	e 9 40	0	—	—	e 39 28	P′P′	—
Pierce Ferry		55·8	324	e 9 40	− 1	e 18 4	PPS	e 39 14	P′P′	—
Boulder City		56·1	324	i 9 47	+ 4	e 17 51	PPS	i 10 36	P_cP	—
Overton		56·3	324	i 9 40	− 5	—	—	1 13 37	PPP	—
Riverside		56·4	320	e 9 44	− 1	—	—	e 39 37	P′P′	—
Mount Wilson		56·9	320	e 9 49	0	e 17 54	+12	e 39 35	P′P′	—
Pasadena		57·0	320	i 9 49	− 1	e 17 39	− 4	i 10 35	P_cP	e 24·4
Rapid City		57·0	338	i 9 50	0	i 17 42	− 1	i 21 56	SS	e 23·0
Salt Lake City		58·0	330	i 9 57	0	e 18 7	+10	e 21 27	SS	i 22·4
Santa Barbara		58·1	319	e 10 6	+ 8	e 18 18	+20	—	—	—
Logan		58·8	331	i 12 9	PP	i 21 33	SS	i 13 10	PPP	e 33·5
Tinemaha		58·9	323	e 10 3	0	e 18 24	+16	i 13 15	PPP	—
Fresno	N.	59·6	322	e 10 16	+ 8	e 18 14	− 3	e 12 13	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick	N.	61·2	321	e 10 23	+ 4	e 18 53	+15	e 39 38	P′P′	—
Bozeman		61·4	334	e 10 16	− 4	e 18 30	−10	i 22 48	SS	i 25·4
Santa Clara	E.	61·4	321	e 10 28	+ 8	i 19 7	+27	—	—	e 26·5
Berkeley		61·9	321	i 10 26	+ 2	i 19 4	+17	i 23 46	?	—
San Francisco		61·9	321	e 10 30	+ 6	—	—	—	—	—
Butte		62·4	334	i 10 24	− 3	e 19 4	+11	e 12 43	PP	e 25·3
Shasta Dam		63·7	324	e 10 32	− 4	e 19 18	+ 8	i 11 16	PcP	—
Saskatoon		65·1	341	10 24	−21	19 7	−20	23 38	SS	30·1
Grand Coulee		66·8	332	e 10 53	− 3	—	—	—	—	—
Seattle		68·2	329	e 12 5	+61	e 20 45	+41	—	—	e 28·8
Victoria		69·3	329	11 16	+ 5	20 32	+15	—	—	33·1
Ivigtut		73·1	15	i 11 32k	− 2	21 2	+ 1	14 16	PP	—
Lisbon		78·9	48	12 5a	− 2	22 7	+ 2	15 4	PP	37·0
Sitka		79·6	333	e 12 28	+18	e 22 35	+23	e 15 8	PP	e 35·7
Granada		82·6	51	i 11 33a	−53	21 47	−56	11 59	pP	37·9
Toledo		83·0	49	i 12 28	0	i 22 52	+ 5	15 46	PP	—
Honoluln		83·8	293	—	—	e 22 50	− 5	e 28 41	SS	e 35·3
Alicante		85·3	50	i 12 44	+ 4	i 23 15	+ 5	13 12	pP	e 39·9
Tortosa	N.	86·6	49	i 13 0	+14	23 31	+ 8	16 28	PP	40·4
Jersey		87·0	39	e 12 48	0	e 23 29	+ 2	—	—	37·1
Algiers		87·4	53	13 1	+11	i 23 35	+ 5	e 16 18	PP	40·6
Barcelona		88·0	48	e 12 54	+ 1	i 24 1	+25	16 35	PP	e 41·1
Edinburgh		88·3	33	12 55	0	23 45	+ 6	16 29	PP	—
Kew		88·8	38	i 12 56	− 1	i 23 34	[+ 9]	e 16 13	PP	e 42·1
Durham		88·9	35	i 12 58	0	i 23 40	− 4	i 16 26	PP	—
College		89·2	336	e 12 58	− 1	e 23 29	[+ 1]	e 16 38	PP	e 35·9
Aberdeen		89·3	32	i 13 0	+ 1	i 23 30	[+ 1]	i 24 5	S	38·1
Paris		89·8	41	i 13 1	− 1	e 23 28	[− 4]	i 13 38	pP	e 42·1
Uccle		91·4	39	e 13 12	+ 3	e 24 8	+ 1	e 16 50	PP	e 42·1
Besançon		91·8	43	e 13 14	+ 3	e 23 45	[+ 2]	—	—	40·1
De Bilt		92·1	37	i 13 13k	+ 1	e 23 48	[+ 3]	e 25 24	PS	e 41·1
Neuchatel		92·4	42	e 13 14	0	—	—	e 22 37	PKS	—
Basle		93·0	42	e 13 15	− 2	e 24 51	[+61]	—	—	—
Strasbourg		93·2	41	e 13 19	+ 2	e 24 2	{− 3}	i 17 5	PP	e 39·8
Zürich		93·6	42	e 13 19k	0	e 24 26	0	e 23 42	SKS	—
Chur		94·2	43	e 13 22	0	e 24 46	+15	e 16 46	PP	—
Stuttgart		94·2	41	e 13 20	− 2	e 24 18	−13	e 17 12	PP	e 40·1
Bergen		94·4	29	e 13 19	− 4	23 48	[−10]	17 10	PP	43·6
Florence		95·0	47	i 13 50	+24	i 24 20	{+ 2}	—	—	—
Rome		95·7	48	e 13 7	−22	i 24 42	− 2	i 26 10	PS	—
Jena		96·0	39	e 13 34	+ 4	e 23 52	[−15]	e 31 32	SS	45·5
Cheb		96·4	40	e 13 38	+ 6	e 23 18	[−51]	e 31 39	SS	e 45·1
Collmberg		96·9	39	e 13 37	+ 3	e 24 19	[+ 8]	e 35 29	SSS	e 39·1
Copenhagen		96·9	34	i 13 34	0	i 25 0	+ 6	26 14	SP	46·1
Potsdam	E.	97·0	38	—	—	e 24 2	[−10]	e 31 32	SS	e 43·1
Triest		97·0	45	e 13 39	+ 4	i 24 12	[0]	e 17 28	PP	—
Wellington		97·4	227	18 6	PKP	24 19	[+ 5]	31 43	SS	43·3
Arapuni		97·7	230	17 38	PP	26 2	PS	32 26	SS	45·1
Christchurch		98·2	224	13 41	+ 1	23 59	[−19]	17 52	PP	45·2
Prague		98·4	40	e 13 39	− 2	e 24 17	[− 2]	e 17 32	PP	e 41·1
Zagreb		98·5	45	e 13 39	− 3	—	—	e 17 45	PP	e 44·1
Upsala		99·8	30	e 13 43	− 4	24 23	[− 3]	17 52	PP	e 41·1
Kalossa		100·6	44	e 14 8	+17	—	—	e 14 20	pP	—
Budapest	E.	100·7	43	e 14 20	+28	i 27 4	PPS	e 17 59	PP	e 32·1
	N.	100·7	43	e 14 12	+20	i 27 2	PPS	e 18 4	PP	43·1
Warsaw		101·9	38	14 1a	+ 4	24 39	[+ 3]	18 11	PP	e 43·1
Belgrade		102·6	46	e 17 35	PKP	e 26 50	PS	e 18 18	PP	42·1
Helsinki		103·5	30	e 14 8	+ 4	e 24 46	[+ 2]	e 27 29	PS	e 48·1
Sofia		103·8	48	e 13 44	−21	24 48	[+ 3]	e 18 24	PP	—
Bucharest		105·7	46	e 17 30	PKP	e 25 3	[+ 9]	e 18 44	PP	33·1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		108·1	50	e 14 27	P	25 1	[− 3]	—	—	—
Helwan		110·7	62	e 14 38	P	28 38	PS	19 14	PP	—
Moscow		111·0	33	18 35	[0]	25 9	[− 7]	19 16	PP	—
Ksara		114·2	57	e 14 57	P	29 26	PS	19 39	PP	—
Sotchi		115·5	46	e 19 41	PP	—	—	—	—	—
Riverview		117·5	225	e 15 10	P	e 25 51	[+10]	i 20 2	PP	e 54·2
Piatigorsk		117·7	44	e 19 59	PP	—	—	—	—	—
Brisbane	N.	119·3	232	e 20 13	PP	e 30 14	PS	—	—	—
Tananarive		119·7	117	—	—	30 23	PS	—	—	e 58·7
Erevan		119·8	48	e 20 3	PP	—	—	—	—	—
Grozny		119·8	44	e 18 58	[+ 6]	—	—	—	—	—
Sverdlovsk		121·8	25	18 56	[0]	25 34	[−22]	i 20 28	PP	—
Baku		123·7	47	e 19 11	[+11]	27 47	[+ 8]	20 36	PP	—
Mizusawa	E.	133·5	318	19 40	[+21]	33 50	PPS	—	—	—
Samarkand		135·7	40	19 30	[+ 7]	—	—	—	—	—
Irkutsk		136·1	358	i 19 25	[+ 2]	26 37	[+ 4]	i 22 3	PP	—
Tashkent		136·1	36	19 26	[+ 3]	—	—	e 22 3	PP	—
Vladivostok		136·6	328	19 40	[+16]	23 13?	PKS	i 22 21	PP	—
Frunse		137·9	30	19 15	[−12]	—	—	—	—	—
Andijan		138·2	35	19 36	[+ 9]	23 11	PKS	—	—	—
Bombay		149·6	67	i 19 55	[+ 8]	23 28	PKS	i 42 43	SS	66·1
Hyderabad	N.	155·2	67	20 0	[+ 5]	23 21	PKS	24 0	PP	—
Kodaikanal	E.	155·5	83	19 40	[−15]	34 46	PS	23 35	PP	64·6
Colombo	E.	157·8	93	20 5	[+ 7]	—	—	—	—	61·0
Calcutta		160·6	42	19 57	[− 4]	38 4	PPS	—	—	—

Additional readings :—
La Paz iPN = 3m.4s.
Bogota iPPP = 3m.34s., iSS = 6m.20s., i = 7m.52s., iPcP = 10m.12s.
Balboa Heights e = 5m.54s.
Santa Lucia E = 5m.38s., PPE = 6m.20s., E = 6m.35s., N = 9m.12s., SE = 10m.31s., E = 11m.5s., SS = 11m.42s.
Fort de France PPP = 6m.57s., SS = 12m.7s., SSS? = 12m.15s.
Oaxaca iE = 7m.51s., eSSE = 13m.35s.
La Plata E = 9m.50s. and 14m.2s., N = 14m.14s., E = 14m.38s.
Vera Cruz ePEN = 6m.46s., iPPN = 7m.48s., iPcPE = 9m.6s., iE = 10m.0s., isSE = 12m.52s., esSSE = 14m.12s.
Tacubaya epPN = 7m.29s., iPPPN = 8m.22s. and 8m.25s., iSSE = 13m.21s.
Manzanillo eSE = 13m.44s.
Guadalajara eSSSN = 17m.11s.
Bermuda ePPP = 10m.31s.
Columbia iPcP = 9m.48s., e = 11m.49s.
Georgetown i = 9m.13s.
Washington iS = 15m.19s.
Cincinnati iPPP = 11m.23s.
St. Louis i = 8m.48s., iPcP = 10m.44s., iPPP = 10m.59s., i = 18m.12s., iSSS = 19m.36s.
New Kensington i = 12m.40s.
Fordham iSS = 19m.56s., iSSS = 21m.24s.
Chicago e = 9m.27s., iPP = 11m10s., e = 11m.49s. and 14m.42s., eSS = 20m.15s.
Weston iSS = 20m.35s.
Harvard i = 9m.9s., ePcP = 10m.28s., ePS = 16m.30s., e = 18m.26s., eScS = 18m.49s., eSS? = 20m.29s., eSSS? = 21m.19s.
Tucson i = 9m.10s., ePKP,PKP = 39m.28s.
Lincoln ePP? = 11m.43s.
Ottawa PS = 17m.22s., SS = 21m.8s., SSSE = 22m.21s.
Halifax SSE = 20m.27s.,
Shawinigan Falls PS = 18m.10s., SS = 21m.38s.
Seven Falls PS = 18m.15s., SS = 20m.35s., SSS = 22m.26s.
Palomar iZ = 9m.48s., eZ = 40m.2s.
Pierce Ferry iP = 9m.44s., i = 12m.42s. and 13m.37s.
Boulder City i = 10m.3s., ePKP,PKP = 39m.22s.
Mount Wilson iZ = 9m.52s. and 39m.57s.
Pasadena i = 9m.52s.k, ePKP,PKPZ = 39m.33s., iZ = 39m.57s.
Rapid City i = 18m.43s.
Salt Lake City e = 22m.17s.
Logan i = 14m.21s., e = 25m.9s., eSS = 30m.3s.
Tinemaha i = 10m.6s., ePKP,PKPZ = 39m.35s.
Fresno ePcP?N = 11m.14s., eN = 13m.44s.
Bozeman e = 12m.12s., 14m.43s., and 23m.33s.
Butte eSS = 22m.52s.
Shasta Dam iP = 10m.35s., e = 19m.52s.

Continued on next page.

Saskatoon PPP =14m.18s., SSS =25m.49s.
Ivigtut 12m.1s.
Lisbon PE =12m.12s., SKSN =22m.12s., PSE =22m.53s., SSE =27m.12s., SSSN = 30m.8s., SSSE =30m.23s., SSSZ =30m.32s., Q?E =33m.8s.
Sitka iS =22m.39s., eSS =27m.34s., eSSS =31m.14s.
Granada pPP =15m.17s., iSKKS =22m.11s., sS =22m.42s., SS =27m.23s., SSS = 30m.59s.
Toledo PcP?EZ =12m.37s., PPPZ =17m.43s., ScSE =23m.10s., PSE =23m.57s., SSPE = 28m.12s., SSSE =32m.8s.
Alicante PcP =12m.47s., sP =13m.22s., PP =16m.0s., PPP =18m.0s., PS =24m.18s., PPS =24m.44s., SS =29m.16s., SSS =32m.34s., Q =36m.8s.
Tortosa PcPN =13m.12s., PPP?N =18m.17s., ScS?N =23m.51s., PSN =24m.33s., PPS?N =25m.0s., SS?N =29m.13s., SSSN =32m.44s., QN =35m.28s.
Algiers ePS =24m.26s.
Barcelona PPP =18m.58s., SS =30m.47s.
Edinburgh SKS =23m.30s., ScS =23m.50s., PS =24m.53s., SS =29m.41s.
Kew iEZ =14m.36s., ePPPEZ =18m.49s., iS =23m.59s., iPS =24m.39s., iPSS = 25m.5s., eZ =28m.28s.?, eSSEN =29m.37s., eSSSEN =33m.8s., eQN =38m.8s.
Durham iE =23m.34s., iSEN =23m.40s., iEN =24m.0s.
College ePPP? =19m.2s., e =24m.43s. and 26m.5s., eSS =29m.24s., eSSS =33m.23s.
Aberdeen iEN =27m.45s.,
Paris i =13m.5s., iPPP =18m.56s., i =20m.46s., 24m.11s., and 24m.20s., ePS? = 25m.14s., ePPS? =25m.44s., eSS =30m.0s., eSSS =33m.16s., eQ =37m.8s.
Uccle eE =22m.53s., eSKSE =23m.46s., ePSE =24m.50s., eN =26m.53s., eE =27m.7s., eSS =30m.2s., eE =32m.55s., eSSSE =33m.55s., eN =39m.20s.
De Bilt iSS =30m.33s., eSSS =33m.38s.
Zürich iP =13m.23s.a
Stuttgart eP =13m.26s.a, ePPS =25m.49s., eSS =30m.56s., eSSS =34m.38s., ePKP, PKPZ =38m.36s.
Bergen eZ =16m.38s., SKS$_2$E =25m.2s.?, PPSN =26m.36s., eN =28m.49s., SSN = 31m.19s., eN =35m.19s., Q =40m.8s.?
Rome eSKSE =23m.32s., iSKKSE =24m.9s., eSS =31m.28s., eSSS =34m.52s.
Jena eN =14m.16s., eE =35m.8s., eN =35m.36s.
Cheb e =15m.20s., and 17m.32s., ePPP =17m.53s., eSS =26m.14s., e =35m.8s.?, and 39m.10s.
Collmberg eE =23m.40s., eScSPE =26m.58s., eN =28m.24s. and 30m.49s., eSSE = 31m.42s., eN =31m.48s.
Copenhagen i =17m.28s., e =19m.38s., SKS =23m.46s., SKKS =24m.38s., SS = 31m.20s., SSS =35m.44s.
Potsdam eE =35m.14s.
Triest iPS =26m.24s., eSS =32m.8s.? eSSS =35m.20s.
Wellington S =25m.31s.
Arapuni Q =39m.14s.
Christchurch PPPNZ =20m.43s., PSE =26m.10s., PPS =26m.40s., SS =31m.43s., SSS =35m.23s.
Prague ePS =25m.56s., ePPS =26m.32s., eSS =31m.26s., eSSS =35m.32s.
Upsala ePE =13m.50s., PPN =18m.0s., SKSN =24m.39s., ePSE =26m.49s., eN = 29m.55s., eSSE =23m.8s., eSSSN =36m.8s.
Warsaw iZ =19m.8s., PPPZ =20m.31s., eN =22m.50s., and 26m.23s., PSZ =27m.9s., PSN =27m.23s., eZ =27m.37s., PPSZ =28m.13s., SSZ =32m.58s., SSN =33m.3s., SSSZ =36m.53s., SSSN =37m.29s.
Belgrade ePS =26m.14s., eSS =32m.6s., eSSS? =36m.25s.
Strasbourg e =16m.31s., 18m.6s., 21m.9s., and 21m.30s., ePS =25m.36s., eSS =30m.46s., eSSS =34m.23s.
Helsinki ePP =17m.25s., ePPS =28m.18s., eSS =33m.15s., eSSS =37m.8s.
Sofia eN =17m.37s., eEN =18m.30s., iPPSEN =27m.40s., SSEN =33m.8s.
Bucharest eE =21m.1s., and 27m.52s.
Helwan i =18m.14s., PPP =21m.35s., SS =34m.56s.
Moscow P =14m.45s., PS =28m.41s.
Riverview eZ =18m.51s., i =20m.21s., iSKKSE =26m.42s., iE =27m.10s., iPSN = 29m.55s., iPSE =30m.0s., eSSE =36m.12s., eE =36m.28s., iE =36m.50s.
Sverdlovsk P =15m.30s., SKKS =27m.28s., iPS =30m.26s., PPS =31m.50s., SS = 36m.48s.,
Baku PS =30m.55s.
Mizusawa PN =19m.46s., PPSN =33m.55s.
Irkutsk PKS =23m.0s., ePPP =24m.40s., SKKS =28m.34s., PPS =34m.26s., SS = 39m.52s.
Bombay eSSN =42m.16s.
Hyderabad PKP$_2$N =20m.29s., SKSPN =34m.7s., SSN =43m.52s.
Calcutta N =21m.7s., iPPN =23m.19s., iPPPN =26m.59s., iSKKSN =30m.9s., PSKSN =33m.35s., PPSN =36m.29s., SSN =42m.49s., SSSN =48m.29s.
Long waves were also recorded at Scoresby Sund and Auckland.

November 10d. 21h. 2m. 35s. Epicentre 8°·3S. 77°·8W. (as at 17h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·4	213	i 1 8	− 2	—	—	—	—	—
Bogota	Z.	13·4	17	i 3 13	− 1	i 5 59	+14	—	—	—
Balboa Heights		17·3	354	e 4 5	+ 1	e 7 32	+16	—	—	—
Fort de France		28·2	37	e 5 55	− 1	e 10 51	+10	—	—	—
San Juan		28·9	23	e 5 58	− 5	—	—	e 6 38	PP	e 10·8
Tacubaya	E.	34·7	323	e 7 2	+ 8	—	—	—	—	—
Tucson		51·2	323	e 9 5	− 2	—	—	—	—	—
Palomar	Z.	55·6	320	e 9 39	− 1	—	—	—	—	—
Pierce Ferry		55·8	324	i 9 41	0	—	—	—	—	—
Boulder City		56·1	324	i 9 43	0	—	—	—	—	—
Overton		56·3	324	i 9 51	+ 6	—	—	—	—	—
Riverside	Z.	56·4	320	e 9 45	0	—	—	—	—	—
Mount Wilson	Z.	56·9	320	e 9 49	0	—	—	—	—	—
Pasadena	Z.	57·0	320	e 9 49	− 1	—	—	—	—	—
Tinemaha		58·9	323	e 10 3	0	—	—	—	—	—
Shasta Dam		63·7	324	e 10 32	− 4	—	—	—	—	—
Grand Coulee		66·8	332	e 10 53	− 3	—	—	—	—	—

Long waves were also recorded at Cheb.

November 10d. 22h. 2m. 31s. Epicentre 8°·3S. 77°·8W. (as at 21h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·4	213	i 1 7	− 3	—	—	—	—	—
La Paz		12·5	132	3 17	PPP	5 34	+11	—	—	6·5
Bogota	Z.	13·4	17	i 3 14	0	i 5 47	+ 2	i 3 25	PP	—
Tucson		51·2	323	e 9 6	− 1	—	—	—	—	—
Palomar	Z.	55·6	320	i 9 39	− 1	—	—	—	—	—
Pierce Ferry		55·8	324	i 9 51	+10	—	—	—	—	—
Boulder City		56·1	324	i 9 43	0	—	—	—	—	—
Overton		56·3	324	i 9 55	+10	—	—	—	—	—
Riverside	Z.	56·4	320	e 9 44	− 1	—	—	—	—	—
Mount Wilson	Z.	56·9	320	e 9 49	0	—	—	—	—	—
Pasadena	Z.	57·0	320	i 9 49	− 1	—	—	—	—	—
Shasta Dam		63·7	324	i 10 32	− 4	—	—	—	—	—
Grand Coulee		66·8	332	i 10 54	− 2	—	—	—	—	—

Bogota also gives iPPPPZ = 3m.29s., iSS?Z = 6m.7s.

November 10d. Turkestan after-shocks. Times are of first readings.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	47	32	7	3	52	14	35	59
1	26	36	8	29	32?	15	27	24
5	8	2	8	53	9	20	42	26

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	48	16	8	28	40	15	26	35
7	2	1	8	52	31	20	41	31
7	52	3	10	28	36	22	30	40
8	6	7						

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	47	48	8	6	19	10	29	0
2	52	35	8	16	18	15	26	49
5	8	23	8	28	51	20	41	53
7	2	23	8	52	43?	22	30	55

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	48	40?	20	42	11	22	31	12

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	48	58	15	27	26	22	31	44
7	3	3	20	42	18			

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	48	41	8	7	7	15	27	22
5	9	31	8	53	28	20	42	16
7	2	43	10	30	33	22	31	32

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	48	27	15	26	42?	22	30	59?
15	7	8	20	41	47?			

November 10d. Readings also at 5h. (Overton) 8h. (Bombay, Hyderabad, San Francisco, near Berkeley and near Balboa Heights), 9h. (Grand Coulee, Ksara, Warsaw, Prague, and De Bilt), 18h. (Bogota, Balboa Heights, Shasta Dam, and Tucson), 19h. (Bogota (2), San Juan, Huancayo (2), Palomar, Pierce Ferry (2), Boulder City, Overton, Riverside, Mount Wilson, Pasadena, Tinemaha, and Shasta Dam), 20h. (Santa Lucia, Tucson, Palomar, Pierce Ferry, Boulder City, Overton, Riverside, Mount Wilson, Pasadena, Grand Coulee, and Tinemaha), 23h. (Tucson, Palomar, Pierce Ferry, Boulder City, Overton, Riverside, Pasadena, Grand Coulee, Tinemaha, Shasta Dam, La Paz, and Istanbul).

November 11d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	56	43	12	58	5	17	13	7	17	37	42

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
6	1	33	11	3	29	13	53	5	17	12	35
8	7	22	12	56	27	14	55	59	17	37	5
9	57	12	13	5	31	16	20	50	21	39	5
10	43	45									

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	56	54	12	56	42	17	37	30	21	39	28
10	44	32	17	12	53						

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	57	40	13	53	34	17	11	32?	17	37	45
10	44	8	16	21	24	17	13	20?	21	39	38
12	57	11									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
17	12	50	17	13	38	17	38	13	21	39	48?

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
13	54	38	17	13	26	17	38	11	21	39	57
17	11	33									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	58	6	12	56	48?	17	13	0?	21	39	17?
10	44	2?	13	53	53	17	37	31			

November 11d. Readings also at 0h. (Huancayo, La Paz, and Bogota), 1h. (La Paz (3), Boulder City, Overton and Pierce Ferry), 2h. (Istanbul and near Mineral), 6h. (Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, and Pierce Ferry), 7h. (near Mineral), 12h. (Huancayo, La Paz, and Bogota), 13h. (Huancayo, La Paz, and Bogota), 15h. (Riverside, Tinemaha, Tucson, and Pierce Ferry), 16h. (near Grozny), 17h. (Huancayo, La Paz, and Bogota), 20h. (near Mizusawa), 21h. (Huancayo, La Paz, Bogota, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Grand Coulee, Shasta Dam, not all one shock), 22h. (Riverview, Helwan, near Oaxaca and near Tacubaya (2)), 23h. (Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Grand Coulee, Shasta Dam, Collmberg, Copenhagen, Basle, Zürich, Paris, Stuttgart, Jena, Istanbul, and Ksara).

Nov. 12d. 5h. 56m. 20s. Epicentre 53°·6N. 164°·4W. (as on 1939, Aug. 20d.).

$A = -\cdot5741$, $B = -\cdot1603$, $C = +\cdot8030$; $\delta = +10$; $h = -7$;
$D = -\cdot269$, $E = +\cdot963$; $G = -\cdot773$, $H = -\cdot216$, $K = -\cdot596$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		14·1	30	e 3 27	+ 4	e 6 3	+ 1	—	—	e 6·5
Sitka		16·8	66	e 4 0	+ 2	i 7 8	+ 3	i 7 30	SS	—
Grand Coulee		28·9	82	e 5 57	− 6	—	—	i 6 12	pP	—
Shasta Dam		30·9	97	e 6 17	− 3	—	—	i 7 29	PPP	—
Honolulu		32·6	166	e 6 45	+10	—	—	—	—	e 13·3
Berkeley		32·8	100	e 6 37	0	i 11 52	− 2	i 14 4	SSS	e 15·1
Saskatoon		34·1	68	—	—	e 11 40	−34	—	—	e 16·7
Tinemaha		35·7	98	e 7 0	− 2	e 12 37	− 2	i 13 12	S_cP	—
Salt Lake City		37·1	87	—	—	e 12 53	− 8	—	—	e 15·5
Pasadena		37·8	100	e 7 14	− 6	e 13 8	− 3	i 13 20	S_cP	e 16·0
Overton		38·3	95	e 7 21	− 3	e 13 24	+ 5	i 7 37	pP	—
Riverside	z.	38·3	100	e 7 20	− 4	—	—	e 13 22	S_cP	—
Boulder City		38·5	96	i 7 21	− 5	e 13 19	− 3	i 7 37	pP	—
Pierce Ferry		38·8	95	e 7 24	− 4	e 13 25	− 1	i 7 42	pP	—
Rapid City		40·2	77	e 7 41	+ 1	e 13 35	−13	—	—	e 16·6
Vladivostok		42·2	282	e 7 57	+ 1	e 14 25	+ 8	—	—	—
Tucson		43·4	96	i 8 1	− 5	e 13 42	S_cP	—	—	e 18·2
Lincoln		46·0	76	—	—	e 15 2	−10	—	—	e 19·2
Chicago		50·6	71	e 9 3	+ 1	e 15 54	−23	e 19 11	S_cS	e 20·8
St. Louis		51·2	75	e 8 54	−13	i 15 50	−35	—	—	—
Irkutsk		51·3	308	9 9	+ 1	—	—	—	—	—
Ottawa		54·6	60	9 27	− 5	16 40	−31	—	—	25·7
Seven Falls		55·9	55	—	—	e 17 19	−10	e 21 7	SS	27·7
Washington		58·4	65	—	—	e 17 59	− 3	—	—	e 28·0
Fordham		58·7	62	e 9 57	− 3	i 18 1	− 5	—	—	—
Harvard		58·8	59	e 9 53	− 9	e 18 1	− 6	e 12 5	PP	e 30·7
Weston		59·0	60	i 9 59	− 5	i 18 2	− 8	—	—	—
Tacubaya		59·9	97	e 10 14	+ 4	e 18 14	− 7	i 10 54	P_cP	—
Sverdlovsk		63·9	334	i 10 37	0	e 19 19	+ 7	—	—	—
Bergen	E.	66·1	6	e 9 20	?	—	—	—	—	—
Upsala	N.	66·9	358	i 10 55	− 1	e 24 11	SS	i 13 26	PP	e 34·7
Aberdeen		68·7	12	—	—	e 28 6	SSS	—	—	e 32·8
Moscow		69·4	347	11 13	+ 1	—	—	—	—	—
Copenhagen		71·0	3	i 11 22	0	e 20 46	+ 9	24 46	SS	36·7
Durham	N.	71·1	12	—	—	20 52	+14	—	—	—
Andijan		74·1	319	e 11 41	+ 1	e 21 17	+ 5	—	—	—
De Bilt		74·3	7	i 11 40	− 1	e 21 30	+15	i 14 28	PP	e 34·7
Warsaw		74·4	357	e 11 42$_s$	0	21 21	+ 5	22 9	PPS	e 39·7
Kew		74·5	11	e 11 38	− 4	e 21 15	− 2	e 13 19	?	e 29·7
Tashkent		74·8	321	e 11 46	+ 2	—	—	—	—	—
Uccle		75·6	9	e 11 49	+ 1	e 21 30	+ 1	e 26 11	SS	e 34·7
Jena	N.	75·8	3	e 11 48	− 2	—	—	—	—	—
Cheb		76·7	3	e 21 57	S	(e 21 57)	+16	e 30 6	SSS	e 40·7
Paris		77·4	10	i 11 57	− 1	—	—	i 12 6	P_cP	e 38·7
Stalinabad		77·4	320	e 12 1	+ 3	e 21 51	+ 2	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stuttgart	z.	77·9	5	e 11 59	− 2	—	—	e 12 10	PcP	—
Strasbourg		78·0	6	i 12 2k	0	e 21 58	+ 3	i 12 12	PcP	e 35·7
Basle		79·0	6	e 12 6	− 1	—	—	—	—	—
Zürich		79·2	6	e 12 7	− 1	—	—	i 12 14a	PcP	—
Chur		79·8	5	e 12 12a	0	—	—	—	—	—
San Juan		80·2	72	e 12 16	+ 2	i 22 10	− 9	e 15 53	PP	e 34·3
Clermont-Ferrand		80·4	10	i 12 15	0	i 22 37	+16	—	—	—
Sotchi		81·0	343	e 12 17	− 1	—	—	—	—	—
Baku		81·8	334	12 28	+ 6	22 43	+ 8	—	—	—
Leninakan		82·9	339	e 12 31	+ 3	—	—	—	—	—
Rome		84·8	2	i 12 38	+ 1	e 23 2	[+ 2]	—	—	—
Istanbul		85·0	350	e 12 35	− 3	e 22 29	[−32]	—	—	—
Lisbon		85·2	20	12 42a	+ 3	23 15	+ 6	—	—	—
Toledo		85·4	15	e 12 38	− 2	23 18	+ 7	16 11	PP	—
Fort de France		85·9	71	—	—	e 32 59	SSS	—	—	—
Alicante		87·4	13	—	—	22 52	[−25]	33 49	Q	e 40·0
Hyderabad	N.	91·2	302	e 13 6	− 2	24 16	+11	23 42	SKS	—
Ksara		91·2	345	e 13 8	0	25 38	PPS	16 46	PP	—
Bombay		92·7	307	e 13 11	− 4	—	—	e 13 19	PcP	—
Riverview	E.	95·2	216	—	—	i 24 49	+ 9	e 31 53	SS	—
Helwan		95·8	347	e 17 20	PP	i 24 6	[+ 1]	—	—	—
Christchurch		98·7	197	e 19 15	PPP	e 26 40	PS	—	—	49·8

Additional readings :—
Tinemaha iZ =7m.13s.
Pasadena iZ =7m.29s.
Tucson i =8m.18s., e =14m.4s.
St. Louis iP =8m.57s., i =9m.7s.
Harvard e =28m.40s.
Tacubaya eE =10m.19s., iE =10m.30s., iPcPN =10m.50s.
Upsala eN =21m.5s.
Copenhagen 26m.16s.
Warsaw SN =21m.29s., eSSN =26m.46s., eSSZ =26m.56s., eSSSN =30m.8s., eSSSZ = 30m.12s.
Uccle eSE =21m.25s., eSSSN =29m.19s.?
Strasbourg eSSS? =30m.41s.
San Juan eSS =27m.11s.
Toledo iPP?Z =12m.55s., SS?N =29m.38s., SSS?N =32m.8s.
Christchurch eEN =28m.54s. and 32m.45s., eE =35m.10s., eEN =41m.18s.
Long waves were also recorded at Bozeman, Butte, Santa Clara, Columbia, Helsinki, Prague, Potsdam, Collmberg, Kodaikanal, and Wellington.

Nov. 12d. 6h. Undetermined shock.

Balboa Heights iP =38m.4s., iS =39m.8s.
Bogota iPZ =38m.4s., iZ =38m.16s. and 38m.34s., iSEZ =39m.8s., iS*Z =39m.25s., iSgZ =39m.45s.
Huancayo eP =41m.30s., eL =45m.34s.
Tucson iP =44m.4s.
Pierce Ferry iP =44m.36s.
Boulder City iP =44m.40s.
Overton eP =44m.41s.
Riverside iPZ =44m.50s.
Tinemaha iPZ =45m.3s.
Grand Coulee iP =45m.40s.

Nov. 12d. 14h. 35m. 42s. Epicentre 49°·0N. 129°·0W. (as on 1941, November 6d.).

$$A = -\cdot4145,\ B = -\cdot5118,\ C = +\cdot7525;\quad \delta = +1;\quad h = -5;$$
$$D = -\cdot777,\ E = +\cdot629;\quad G = -\cdot474,\ H = -\cdot585,\ K = -\cdot659.$$

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grand Coulee	6·7	95	i 1 38	− 4	i 2 52	− 8	i 2 20	Pg	e 5·1
Sitka	9·4	339	e 2 13	− 5	e 4 26	SS	i 4 38	SSS	e 5·0
Shasta Dam	9·5	148	i 2 20	0	—	—	i 2 46	PP	e 6·0
Butte	11·5	99	e 2 42	− 6	—	—	—	—	e 5·6
Berkeley	12·1	154	e 2 56	− 1	e 5 18	+ 4	—	—	e 6·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Francisco		12·2	154	e 3 6	+ 8	—	—	—	—	—
Bozeman		12·6	98	e 2 58	− 5	—	—	—	—	e 6·3
Santa Clara	E.	12·7	154	e 3 18	PP	—	—	—	—	e 7·0
Logan		14·1	115	i 3 25	+ 2	—	—	—	—	e 8·2
Tinemaha		14·2	143	i 3 26	+ 2	e 6 21	SSS	—	—	—
Saskatoon		14·5	69	3 4	−24	6 6	− 5	—	—	7·3
Salt Lake City		14·6	118	i 3 30	0	e 6 24	+11	—	—	e 7·2
Overton		16·4	134	i 3 52	− 1	e 7 49	+53	—	—	—
Boulder City		16·7	136	i 3 56	− 1	—	—	—	—	—
Mount Wilson		16·8	147	e 4 0	+ 2	—	—	—	—	—
Pasadena		16·9	148	e 3 59	0	e 7 18	+11	—	—	—
Pierce Ferry		16·9	134	i 3 58	− 1	e 7 21	+14	e 4 39	PPP	—
Riverside	Z.	17·3	146	i 4 4	0	—	—	—	—	—
Rapid City		18·4	96	i 4 16	− 2	i 8 5	SS	—	—	e 10·7
College		18·8	336	e 4 30	+ 7	e 8 6	+16	—	—	e 8·4
Tucson		21·6	134	i 4 52	− 2	e 7 19	−90	—	—	e 9·3
Lincoln		24·2	97	e 5 18	− 1	i 9 37	+ 2	—	—	e 11·9
Chicago		30·2	89	6 5	− 9	e 10 50	−23	e 6 49	PP	e 14·6
Ottawa		35·8	75	e 7 1	− 2	—	—	—	—	16·3
Shawinigan Falls		37·1	72	e 7 31	+17	—	—	—	—	19·3
Seven Falls		38·1	70	e 7 30	+ 8	e 13 25	+ 9	—	—	19·3
Bermuda		50·0	84	e 10 43	PP	e 15 58	−11	e 19 58	SS	e 23·6
Paris		74·0	32	i 11 39	0	—	—	—	—	e 38·3
Strasbourg		75·9	29	e 11 50	0	—	—	—	—	e 36·3
Stuttgart	Z.	76·1	27	e 11 50	− 1	—	—	—	—	—

Logan also gives i = 4m.33s., e = 5m.19s.
Long waves were also recorded at Seattle, Harvard, Scoresby Sund, and De Bilt.

Nov. 12d. 17h. European shock.

Florence iPE = 13m.54s., iSN = 14m.52s.
Chur eP = 13m.59s., eS_g? = 14m.26s.
Zürich eP = 14m.8s., iP_g = 14m.18s., eS? = 14m.53s., eS_g? = 15m.3s.
Neuchatel eP = 14m.13s., eS? = 14m.57s.
Basle eP = 14m.18s., eS? = 15m.3s., eS_g? = 15m.17s.
Stuttgart eP = 14m.24s., e = 14m.40s., 15m.4s., 15m.12s., and 15m.39s., i = 16m.4s.
Rome eZ = 14m.57s. and 15m.18s.
Jena eN = 15m.18s. and 17m.3s., eE = 17m.15s.
Zagreb e = 15m.24s.
Triest eP? = 15m.42s., eS? = 16m.29s.

Nov. 12d. 17h. 28m. 42s. Epicentre 20°·1S. 173°·1W.

A = −·9330, B = −·1129, C = −·3416; δ = −7; h = +5;
D = −·120, E = +·993; G = +·339, H = +·041, K = −·940.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia	6·4	12	i 1 36	− 2	2 43	−10	—	—	—
Suva	8·2	282	i 1 58	− 5	i 2 38	−60	—	—	—
Auckland	19·8	209	4 34?	− 1	8 12	− 1	17 32	sS_eS	—
Arapuni	20·4	206	4 54	PP	9 12	SSS	—	—	12·3
Tuai	20·5	202	4 40	− 2	8 12	−15	—	—	—
New Plymouth	21·9	206	4 59	+ 2	9 11	+17	—	—	—
Wellington	23·5	204	5 14	+ 2	9 16	− 7	6 53	pPP	—
Kaimata	25·9	206	5 37	+ 2	10 12	+ 8	—	—	—
Christchurch	26·3	203	5 34	− 5	9 56	−15	5 48	pP	12·1
Brisbane	31·8	249	i 6 24	− 4	i 11 19	−19	i 7 25	PP	i 14·5
Riverview	34·5	238	e 6 48 a	− 4	i 12 10	−10	i 6 57	pP	e 15·9
Honolulu	43·8	21	i 8 24	+15	i 14 32	− 8	e 10 36	PPP	i 18·0
Yokohama	71·1	321	e 11 22	0	e 20 34	− 4	—	—	e 33·7
Tokyo	71·2	321	i 11 27	+ 4	e 20 36	− 4	—	—	e 33·2
Mizusawa	72·8	325	i 11 34	+ 2	e 20 58	0	e 11 37	P	e 30·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Miyazaki		74·1	313	e 11 41	+ 1	21 14	+ 2	—	—	23·7
Santa Barbara		74·3	44	e 11 49	+ 8	—	—	—	—	—
Berkeley		74·5	40	i 11 41	− 1	e 21 15	− 2	—	—	e 30·9
Branner		74·6	40	i 11 44	+ 1	e 21 20	+ 2	—	—	e 31·0
Santa Clara	E.	74·7	40	(e 11 34)	− 9	(e 21 32)	+13	—	—	—
Lick		74·9	40	e 11 43	− 1	e 21 24	+ 2	—	—	e 34·3
Pasadena		75·1	45	i 11 42a	− 4	i 21 24	0	i 14 31	PP	e 33·8
Mount Wilson		75·2	45	e 11 46	0	e 21 33	+ 8	—	—	—
Mori		75·3	326	11 48	+ 1	21 27	+ 1	—	—	e 35·5
Riverside		75·5	45	i 11 45	− 3	e 21 32	+ 4	i 12 30	PcP	—
Sapporo		75·5	328	11 51	+ 3	21 28	0	—	—	e 31·3
Fresno	N.	75·7	42	i 11 47	− 2	—	—	e 13 45	?	e 34·5
Hukuoka		75·8	314	11 54	+ 4	21 33	+ 2	—	—	32·0
Shasta Dam		76·7	37	e 11 51	− 4	e 22 6	PS	22 40	PPS	—
Tinemaha		76·8	43	i 11 53	− 2	e 21 51	+ 9	e 14 36	PP	—
Boulder City		78·4	45	i 12 1	− 3	e 22 1	+ 1	e 22 21	ScS	—
Overton		79·0	45	e 12 3	− 4	—	—	i 12 6	P	—
Pierce Ferry		79·0	46	i 12 5	− 2	i 22 10	+ 4	i 12 18	PcP	—
Tucson		79·1	50	i 12 5	− 3	e 22 6	− 1	i 22 50	PS	i 32·8
Vladivostok		80·7	322	i 12 14	− 2	i 22 25	+ 1	—	—	—
Punta Arenas	N.	81·2	143	12 19	0	—	—	32 18	Q	37·6
Seattle		81·4	33	e 13 0	+40	e 23 4	PS	e 16 2	PP	e 35·0
Victoria		81·4	31	12 22	+ 2	22 32	+ 1	23 18	PS	37·3
Tacubaya		82·6	67	e 12 23	− 3	i 22 42	− 1	i 15 30	PP	e 37·8
Salt Lake City		83·0	42	i 12 28	0	i 22 47	0	e 31 40	SSS	e 33·9
Grand Coulee		83·3	34	i 12 26	− 4	—	—	—	—	—
Sitka		83·5	20	e 12 26	− 5	i 22 52	0	e 23 52	PS	i 34·5
Logan		83·6	42	i 12 33	+ 2	i 23 14	+21	e 28 29	SS	e 34·9
Butte		85·6	38	e 12 38	− 3	e 23 0	−13	e 26 28	?	e 34·4
Bozeman		86·3	39	e 12 38	− 7	e 23 13	− 7	e 28 42	SS	e 35·2
College		86·9	11	i 12 47	− 1	i 23 30	+ 4	e 16 14	PP	e 34·7
Santa Lucia	N.	88·9	126	12 58	0	23 47	+ 3	24 57	PS	36·8
Rapid City		90·2	43	e 13 0	− 4	e 23 37	[+ 3]	e 24 56	PS	e 36·2
Saskatoon		92·2	34	12 49	−24	23 51	[+ 5]	16 29	PP	43·3
Huancayo		93·1	104	e 13 17	0	i 23 52	[+ 1]	e 17 11	PP	e 36·8
Lincoln		93·2	47	e 13 18	+ 1	i 24 29	+ 6	e 23 41	SKS	e 37·8
St. Louis		97·0	52	i 13 28	− 7	i 25 1	+ 6	17 19	PP	—
La Plata	E.	97·7	131	17 30	PP	24 6	[− 9]	—	—	31·6
	N.	97·7	131	18 30	?	24 0	[−15]	19 24	PPP	31·7
La Paz	Z.	97·8	111	i 13 38a	0	i 24 40	−22	i 17 38	PP	44·3
Chicago		99·9	49	e 13 45	− 3	e 25 21	+ 1	e 36 2	SSS	e 41·4
Bogota		100·0	88	e 13 53	+ 5	e 24 38	[+11]	e 18 0	PP	39·3
Irkutsk		101·2	322	e 13 51	− 3	24 25	[− 8]	18 4	PP	—
Columbia		102·6	58	—	—	e 24 54	[+14]	e 36 24	SSS	e 46·6
Calcutta	N.	105·0	289	—	—	i 25 50	−12	e 24 36	SKS	46·9
Pennsylvania	E.	106·7	52	e 18 40	PP	e 26 24	+ 8	e 28 38	PPS	—
Georgetown		106·9	55	i 18 43	PP	i 28 2	PS	33 54	SS	—
Colombo	E.	108·3	271	e 18 3	[−27]	33 48	SS	—	—	53·6
Ottawa		109·1	48	18 30	[− 1]	34 0	SS	28 34	PS	45·3
Fordham		109·7	53	e 18 30	[− 3]	i 25 23	[+12]	i 19 2	PP	48·3
Kodaikanal	E.	111·6	274	e 17 16	?	—	—	—	—	—
San Juan		111·6	77	e 19 26	PP	e 24 58	[−21]	e 28 52	PS	e 43·4
Harvard		111·7	52	e 18 15	[−22]	e 28 47	PS	e 19 19	PP	e 48·3
Weston		111·8	52	e 14 38	P	e 25 6	[−14]	i 28 48	PS	—
Hyderabad	N.	112·7	281	19 27	PP	26 21	{ − 3}	29 6	PS	53·0
Seven Falls		112·7	46	19 25	PP	25 18	[− 5]	28 45	PS	53·3
Fort de France		115·2	83	e 18 44	[+ 1]	—	—	—	—	—
Bermuda		115·7	63	e 18 25	[−19]	e 25 54	[+20]	e 19 45	PP	e 46·1
New Delhi	N.	116·2	294	e 19 44	PP	i 30 54	PPS	36 57	SSP	—
Halifax		117·6	49	—	—	e 29 42	PS	e 36 18	SS	56·3

Continued on next page.

		△	Az.	P.	P−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bombay		118·2	282	e 18 44	[− 5]	e 29 57	PS	e 18 50	PKP	—
Frunse		119·6	308	e 20 30	PP	—	—	—	—	—
Andijan		121·2	306	e 18 55	[0]	—	—	—	—	—
Tashkent		123·6	307	e 18 54	[− 6]	27 35	{− 3}	e 30 34	PS	—
Ivigtut		124·0	29	21 6	PP	—	—	—	—	49·3
Stalinabad		124·0	304	e 19 6	[+ 5]	i 31 4?	PS	32 22	PPS	—
Tananarive		124·4	228	20 49	PP	37 33	SS	e 53 3	Q	59·7
Samarkand		125·4	305	19 3	[0]	i 38 28	SS	e 20 59	PP	—
Sverdlovsk		126·2	327	19 11	[+ 6]	26 37	[+28]	21 6	PP	—
Scoresby Sund		126·8	13	21 2	PP	26 24	[+13]	30 49	PS	—
Moscow		137·6	335	19 20	[− 6]	29 3	{− 4}	22 5	PP	—
Helsinki		137·9	348	i 22 58	PP	e 29 10	{+ 2}	—	—	—
Upsala		139·5	353	i 22 57	PKS	e 28 54	{−24}	e 40 50	SS	e 63·3
Bergen	N.	139·7	3	23 12	PKS	e 29 34	{+15}	32 36	PS	65·3
Grozny		140·1	315	e 19 25	[− 6]	—	—	—	—	—
Erevan		142·2	311	e 19 32	[− 3]	—	—	—	—	—
Aberdeen		142·4	9	i 19 30	[− 5]	i 32 47	PS	i 22 30	PP	62·5
Leninakan		142·4	313	e 19 36	[+ 1]	e 23 21	PKS	—	—	—
Edinburgh		143·4	10	e 22 18	PP	—	—	—	—	—
Sotchi		144·0	319	i 19 37	[0]	—	—	—	—	—
Copenhagen		144·2	356	i 19 33	[− 5]	30 0	{+15}	22 48	PP	—
Durham	N.	144·8	9	i 19 35	[− 4]	—	—	i 22 57	PP	—
Theodosia		145·8	324	i 19 45	[+ 4]	—	—	—	—	—
Warsaw		146·1	344	19 39a	[− 2]	26 46	[− 2]	22 56	PP	e 71·3
Yalta		146·8	324	19 46	[+ 4]	—	—	—	—	—
Potsdam		147·4	354	e 19 48	[+ 5]	—	—	i 23 16	PP	e 61·3
De Bilt		148·0	2	e 19 45a	[+ 1]	e 30 18?	{+11}	i 23 14	PP	e 71·3
Collmberg		148·5	352	e 19 41	[− 4]	e 33 21	SKSP	e 23 17	PP	e 52·3
Jena		149·0	354	e 19 45	[− 1]	—	—	e 19 48	PKP	—
Uccle		149·3	5	i 19 46	[0]	e 22 57	SKP	i 23 52	pPP	e 72·3
Prague		149·5	351	i 19 45k	[− 2]	e 33 0	SKSP	e 22 54	PP	e 54·3
Cheb		149·8	354	e 19 52	[+ 5]	e 30 53	{+36}	e 48 53	SSS	e 73·3
Jersey		150·1	12	e 19 51	[+ 3]	(e 47 18)	SSS	—	—	e 47·3
Budapest	E.	150·9	344	19 52	[+ 3]	(43 18)	SS	i 27 21	PPP	43·3
	N.	150·9	344	19 54	[+ 5]	e 33 46	SKSP	i 20 3	PKP	43·3
Ksara		150·9	304	i 19 48	[− 1]	35 56	PPS	—	—	—
Bucharest	E.	151·0	332	e 19 56	[+ 7]	—	—	e 23 12	PP	—
Paris		151·1	8	i 19 48a	[− 1]	26 55	[0]	i 23 29	PP	e 73·3
Stuttgart		151·3	358	i 19 47k	[− 2]	e 33 48	PS	i 19 56	PKP	e 71·3
Strasbourg		151·6	359	e 19 48a	[− 2]	e 27 1	[+ 5]	i 23 37	PP	e 71·6
Istanbul		151·8	324	i 18 46	[−64]	32 26	pS	—	—	—
Kalossa		151·8	344	e 19 55	[+ 5]	—	—	e 20 10	PKP	—
Basle		152·6	359	e 19 48a	[− 3]	e 30 39	{+ 6}	—	—	—
Zürich		152·7	359	e 19 48a	[− 3]	—	—	e 23 46	PP	—
Belgrade		152·9	339	i 19 52	[0]	e 30 25	{− 9}	43 10	SS	55·3
Besançon		152·9	2	e 19 59	[+ 7]	e 44 12	SSP	e 23 45	PP	78·3
Chur		153·2	356	e 19 49	[− 3]	—	—	e 23 44	PP	e 77·9
Neuchatel		153·2	0	e 19 50	[− 2]	e 30 36	{ 0}	—	—	—
Zagreb		153·3	346	e 19 54	[+ 2]	—	—	—	—	e 73·3
Sofia		153·5	333	e 19 54	[+ 1]	e 43 18?	SS	e 34 2	SKSP	—
Triest		153·9	350	e 20 4?	[+11]	e 43 17	SS	e 23 44	PP	—
Clermont-Ferrand		154·2	8	i 19 51a	[− 2]	i 30 54	{+13}	i 23 55	PP	73·3
Helwan		155·8	299	i 19 52k	[− 4]	43 42	SS	23 58	PP	—
Florence	E.	156·1	354	i 20 1	[+ 5]	i 34 10	SKSP	—	—	—
Lisbon		156·8	35	19 56k	[− 1]	34 37	SKSP	24 6	PP	72·0
Rome		157·8	352	i 19 53a	[− 5]	e 31 4	{+ 3}	e 24 4	PP	—
Toledo		158·2	25	e 19 57	[− 2]	43 47	SS	i 24 9	PP	75·7
Barcelona		158·4	12	20 3	[+ 4]	—	—	24 35	PP	e 76·3
Tortosa	N.	158·6	14	i 20 5	[+ 6]	27 1	[− 2]	24 7	PP	75·3
Alicante		160·7	20	19 51	[−11]	31 13	{− 3}	24 35	PP	69·4
Granada		160·7	28	i 20 4a	[+ 2]	31 19	{+ 3}	i 24 27	PP	75·1
Algiers		163·0	11	20 6	[+ 2]	23 35	PKS	24 38	PP	78·3

For Notes see next page.

NOTES TO NOVEMBER 12d. 17h. 28m. 42s.

Additional readings :—
Auckland PP =5m.48s., S_cS? =16m.2s., S_cS,S_cS =22m.53s., sS_cS,S_cS =25m.33s.
Wellington P_cPZ =8m.13s., S_cP? =10m.39s., S_cS? =15m.1s.
Christchurch 7m.6s., P_cPZ =9m.12s., sSEN =10m.19s., P_cSEN =12m.38s.
Brisbane iPPE =7m.8s., iSSE =12m.39s.
Riverview iPPEZ =8m.3s., iP_cPEZ =9m.24s., iSSSEN =14m.39s.
Honolulu eP =8m.28s.
Mizusawa eSE =21m.0s., eLE =30m.11s.
Santa Clara readings increased by 30 minutes.
Pasadena Q =30m.48s.
Pierce Ferry i =14m.44s. and 18m.21s.
Tucson 12m.21s., 13m.48s., and 14m.42s., iPP =15m.28s., iSS =27m.5s., iSSS =30m.51s., iPKP,PKP =39m.5s.
Punta Arenas N =13m.56s., PSN =21m.8s., SSN =26m.28s.
Seattle eSS =28m.20s., e =31m.10s.
Tacubaya iPN =12m.26s., iP_cPEN =12m.41s., iPPPE =17m.24s., eE =21m.30s., eN =21m.33s., ePSN =23m.27s.
Salt Lake City eSS =27m.56s.
Grand Coulee i =14m.4s. and 19m.1s.
Logan i =14m.19s., iPP? =16m.9s., eSSS =32m.10s.
Bozeman e =16m.49s., eSSS =32m.38s.
College eS =23m.17s., eSS =28m.44s., eSSS =32m.26s.
Santa Lucia E =13m.30s., PPN =16m.55s., N =31m.52s.
Rapid City ePP =16m.20s., eSS =29m.34s.
Saskatoon e =37m.42s.
Huancayo iP =13m.20s., iPS =25m.29s., iPPS =26m.27s., eSS =30m.6s., i =30m.49s.
Lincoln eSS =30m.1s.
St. Louis i =20m.23s., and 21m.24s., iSKS =23m.46s.
La Plata N =25m.2s., 28m.18s., and 29m.48s.
La Paz iPPPZ =19m.54s., PSZ =25m.54s., iZ =26m.24s., SSZ =31m.52s., SSSZ =35m.22s.
Chicago ePP =17m.36s., eSKS =24m.36s., e =26m.54s., eSS =31m.57s.
Bogota eZ =14m.11s., ePKKP?E =32m.34s.
Irkutsk PKP =17m.20s., SS =32m.25s.
Columbia e =25m.50s. and 32m.53s.
Calcutta iN =35m.12s.
Georgetown i =18m.54s.
Ottawa e =26m.44s.
Fordham eP =14m.37s., iS =26m.52s., Q =45m.48s.
San Juan eS =26m.53s., eSS =34m.44s., i =35m.5s., eSSS =38m.48s.
Harvard eP =14m.36s., i =19m.31s., e =27m.4s., e =34m.35s., eSS =35m.14s.
Weston ePP =19m.17s., eSS =34m.52s.
Hyderabad ePN =15m.57s., SKKSN =27m.8s., PSN =29m.6s., SSN =34m.48s.
Seven Falls SS =35m.18s., SSS =42m.30s.
Bermuda eS =26m.38s., iPS =30m.18s., iSS =35m.35s., iSSS =40m.8s.
New Delhi PPN =21m.45s., iSKSN =28m.15s., iSKKSN =28m.54s.
Tashkent iSS =37m.24s.
Stalinabad iPP =23m.27s.
Tananarive PS? =30m.10s.
Samarkand iSSS =42m.42s.
Sverdlovsk eP =15m.59s., PKS =22m.31s., SKKS =27m.59s., PS =31m.6s., PPS =32m.32s., SS =37m.36s., SSS =42m.42s.
Scoresby Sund 21m.48s., PPP =24m.12s., PPS =32m.35s., 36m.6s., SS =36m.42s.
Moscow PKS =23m.1s., PPP =24m.33s., SS =40m.23s.
Helsinki eSKKS =32m.10s., ePPS =34m.37s.
Upsala PKSN =23m.0s., eP_cP,PKP?E =27m.39s.?, eE =31m.6s., eN =32m.18s., PPSN =34m.38s., ePPSE =34m.54s., eSSN =41m.6s., eE =56m.42s.
Bergen eN =34m.51s. and 41m.12s.?
Copenhagen 32m.48s., 34m.6s., 36m.52s., 43m.18s., and 47m.12s.
Warsaw PKPN =19m.43s., PKP_2Z =19m.53s., eSKPN =23m.7s., iZ =23m.45s., SKSZ =26m.34s., iZ =27m.20s., eSKKSN =29m.34s., ePKKS??Z =31m.32s., iPSN =33m.13s., PPSZ =35m.33s., SSN =41m.49s.
De Bilt ePSKS =33m.18s., eSS =42m.18s.?, eSSS =49m.18s.?
Collmberg eE =19m.46s., eN =20m.0s. and 20m.46s., eE =20m.55s., 23m.38s., and 23m.50s., ePPPN =26m.36s., eSSE =42m.31s., ePSE =43m.41s., eSSSN =48m.15s.
Uccle pPKPE =19m.49s., iPKP_2N =19m.56s., iZ =20m.33s., iE =21m.14s., iPPN =23m.31s., iPSKSN =33m.36s., e =40m.44s., eSSE =41m.57s.
Prague iZ =20m.11s., eSKKS? =29m.24s., eSKKS? (Δ >180°) =34m.48s., e =38m.48s., eSS? =42m.48s.
Cheb e =39m.27s., 51m.53s., and 63m.0s.
Budapest eE =38m.48s.
Bucharest iE =23m.54s.
Paris iPKP_2 =20m.5s., i =20m.19s., iSKP =23m.21s., i =25m.26s., e =28m.56s., eSKSP =33m.47s., ePPP? =34m.11s., e =40m.3s., eSS =42m.29s., eSSS? =43m.2s., eQ =71m.18s.
Strasbourg eSKP? =22m.55s., e =25m.27s., 27m.12s., and 33m.8s., iPPP? =33m.53s., eSS? =42m.47s., e =44m.42s., e =46m.20s.

Continued on next page.

Kalossa e =21m.18s.
Belgrade i =20m.21s., ePP =22m.0s., e =31m.57s., 35m.30s., and 38m.20s.
Sofia eN =22m.51s. and 33m.34s.
Triest ePKP$_2$ =20m.14s., ePSKS =34m.2s.?
Clermont-Ferrand iPPP? =28m.2s.
Helwan PKKP =20m.21s., PSKS =34m.24s.
Lisbon PKPN =19m.59s., PKP$_2$EZ =20m.26s., PKS?E =23m.30s., E =32m.40s., and 33m.16s., QE =62m.6s.
Rome ePKPN =20m.24s., iPSKSNZ =34m.26s., ePPSNZ =37m.34s., iSSEN =43m.54s., eSSSN =50m.20s.
Toledo iZ =20m.11s., SP?Z =20m.35s., Z =20m.47s., PPZ =21m.2s. and 21m.11s., PPP =24m.33s., SPP =24m.41s., PPPE =27m.53s., SKKSZ =30m.13s., PSKSZ =34m.25s., SKSPZ =35m.6s., PPSN =37m.42s., SSEN =43m.47s., SSSEN =50m.17s., iQE =69m.7s.
Barcelona PPP =27m.44s.
Tortosa PKP$_2$N =20m.43s., SKPN =23m.32s., PPPN =27m.38s., PPN =28m.28s., SKKSN =31m.12s., PPPN =33m.28s., SKKSN =34m.50s., PPSN =37m.43s., SKSPN =38m.22s., SSPN =45m.40s., SSN =51m.0s., SSS?N =56m.24s.
Alicante i =20m.23s., PKP$_2$ =20m.35s., PKS =23m.7s., SKS =26m.39s., PKKP =28m.15s., PKKS =31m.19s., SKSP =34m.47s., PPS =38m.39s., SS =45m.41s., SSS =51m.51s.
Granada iPKP$_2$ =20m.50s., PPP =28m.17s., SKSP =35m.29s., SS =45m.17s.
Algiers PKP$_2$ =20m.53s., PPP? =29m.2s., PSKS =35m.7s., e =40m.3s., SS =45m.18s., eSSS =51m.18s.
Long waves were also recorded at Manzanillo, Oaxaca, and Montezuma.

Nov. 12d. Turkestan after shocks.

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	27	10	8	16	19	14	9	4	22	58	21
4	21	31	11	0	31	14	45	50	23	36	36
7	30	51	13	58	46	19	20	3	23	55	43

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	21	39	14	9	40	19	20	42	22	59	2
11	0	47	14	46	12?						

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
11	1	14	14	46	25	20	7	33?	23	37	16
14	9	47	19	20	40	22	59	2	23	55	21

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
11	1	23	20	8	15	23	18	10	23	56	50
14	46	30?									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	22	10	14	46	31	19	21	48	23	38	4
11	1	22	17	50	2	20	7	39	23	57	11
14	10	40									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
11	1	0	14	9	56?	22	58	48	23	56	11

Nov. 12d. Readings also at 0h. (Tacubaya), 4h. (Tucson, Pierce Ferry, Riverside, Boulder City, Overton, Tinemaha, Harvard, San Juan, and Huancayo), 5h. (La Paz, Bogota, Tucson, Riverside, Tinemaha, and Strasbourg), 7h. (La Paz), 10h. (Rome), 11h. (Sverdlovsk, Grozny, Fort de France, La Paz, La Plata, Huancayo, Santa Lucia, Tucson, Riverside, and Tinemaha), 16h. (near Fort de France), 17h. (Apia (3), Pierce Ferry, Overton, and near Florence), 18h. (Grand Coulee, Pierce Ferry, Overton, and Boulder City), 19h. (Bucharest), 23h. (Shasta Dam, Grand Coulee, and Tucson).

Nov. 13d. 23h. 41m. 56s. Epicentre 41°·8N. 71°·7E. (as on 7d.).

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Andijan		1·2	155	i 0 22	− 2	i 0 40	− 1	—
Tashkent		1·9	255	i 0 36?	+ 2	e 1 1?	+ 2	—
Frunse		2·4	63	i 0 40	− 1	i 1 10	− 2	—
Obi-garm		3·5	207	i 1 3	P*	i 1 47	S*	—
Stalinabad		3·9	216	1 8	P*	2 0	S*	—
Samarkand		4·2	241	1 8	+ 1	i 2 3?	+ 6	—
New Delhi	N.	13·9	160	—	—	i 5 45	−12	i 7·6
Sverdlovsk		16·6	338	4 6	+10	7 17	+17	—
Grozny		19·1	283	e 4 22	− 5	—	—	—
Erevan		20·6	274	e 4 39	− 4	—	—	—
Leninakan		20·9	277	e 5 4?	+18	—	—	—
Bombay		22·8	177	e 6 41	?	e 9 18	+ 7	—
Ksara		29·2	266	e 8 30	?	—	—	—

Nov. 13d. Turkestan after shocks.

Almata.

h.	m.	s.
2	42	50

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	19	22	9	38	12	11	47	59	23	42	18
8	1	22	10	59	36	12	43	19			

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	20	2	9	38	50	12	43	35	23	42	36
8	2	17	11	0	16						

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	20	5	9	38	50	11	48	30	23	42	59
8	2	0	11	0	16	12	44	11			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
11	49	53	12	45	7	23	43	4?

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	38	30?	11	49	33	12	45	12	23	43	4

Tashkent.

h.	m.	s.	h.	m.	s.
11	48	35?	23	42	32?

Nov. 13d. Readings also at 0h. (Riverview), 4h. (Auckland, Christchurch, Suva, Riverview, Pasadena, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Grand Coulee, Shasta Dam, and Santa Lucia), 9h. (Christchurch and Brisbane), 11h. (Harvard), 12h. (near Mineral), 13h. (Jena), 15h. (near Mineral), 16h. (Erevan and near Leninakan), 17h. (La Paz), 19h. (Wellington), 23h. (Overton).

Nov. 14d. 11h. 34m. 44s. Epicentre 19°·6N. 69°·4W. (as on 1946, Nov. 7d.).

$A = +·3317$, $B = -·8825$, $C = +·3334$; $\delta = -1$; $h = +5$;
$D = -·936$, $E = -·352$; $G = +·117$, $H = -·312$, $K = -·943$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan	3·3	111	i 0 52	− 1	i 1 26	− 9	—	—	i 1·7
Bermuda	13·4	17	e 3 18	+ 4	(e 5 43)	− 2	—	—	e 5·7
Bogota	15·6	198	e 3 37	− 6	e 6 18	−19	e 3 46	PP	—
Columbia	17·7	328	e 4 13	+ 3	e 7 28	+ 2	—	—	e 8·9
Mobile	20·2	306	4 55	+16	8 58	+37	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fordham		21·5	351	e 4 53	+ 1	i 8 56	+ 9	—	—	—
Weston		22·8	357	i 5 7	+ 2	e 9 11	0	—	—	—
St. Louis		26·2	321	e 5 37	− 1	i 10 10	+ 1	i 5 40	P	—
Ottawa		26·3	350	5 39	0	10 42	+31	—	—	14·3
Shawinigan Falls		27·0	356	e 5 45	0	—	—	—	—	17·3
Seven Falls		27·5	358	6 10	+20	11 28	+58	—	—	—
Huancayo		32·0	192	e 6 27	− 3	i 11 40	− 2	—	—	e 13·4
La Paz		35·9	178	7 4	0	i 15 31	SS	—	—	—
Tucson		39·1	298	e 7 31	0	—	—	—	—	e 18·9
Salt Lake City		41·8	311	e 7 52	− 1	—	—	e 17 32	SS	e 19·1
Pierce Ferry		42·3	304	i 7 58	+ 1	—	—	—	—	—
Overton		42·8	304	i 8 2	+ 1	—	—	—	—	—
Boulder City		43·0	303	i 8 3	0	—	—	—	—	—
Saskatoon		43·5	327	e 9 56	PP	e 17 58	SS	—	—	22·3
Palomar	z.	44·3	299	i 8 15	+ 2	—	—	—	—	—
Riverside	z.	44·8	300	e 8 18	+ 1	—	—	—	—	—
Pasadena	z.	45·4	300	e 8 24	+ 2	—	—	—	—	e 29·5
Tinemaha		45·9	304	i 8 27	+ 1	—	—	—	—	—
Grand Coulee		48·9	318	e 8 47	− 3	—	—	—	—	—
Berkeley		49·1	304	e 8 52	+ 1	—	—	—	—	e 29·5
Paris		63·7	44	e 10 34	− 2	—	—	—	—	e 30·3
Clermont-Ferrand		64·1	48	i 10 37	− 1	—	—	—	—	—
Uccle	E.	64·8	42	e 10 42	− 1	—	—	—	—	e 30·3
Strasbourg		67·1	44	i 10 47	−10	—	—	—	—	30·3
Stuttgart	z.	68·1	44	e 11 2	− 2	—	—	—	—	—
Rome	z.	71·3	52	e 11 22	− 1	—	—	—	—	—
Istanbul		83·5	49	e 13 13	+42	e 23 30	PS	—	—	—
Helwan		89·3	59	i 13 1	+ 2	e 24 52	PS	—	—	—
Ksara		91·3	54	e 13 11?	+ 2	—	—	16 46?	PP	—

Additional readings :—
Bogota iPPPEZ = 3m.48s., iPPPPEZ = 3m.52s., iSS?E = 6m.43s., $ePcP?E$ = 10m.13s.
Weston iS = 9m.23s.
Pierce Ferry i = 8m.52s.
Boulder City e = 8m.19s.
Long waves were also recorded at Port au Prince, Butte, Sitka, Rapid City, Copenhagen, Cheb, De Bilt, Prague, Kew, and Warsaw.

Nov. 14d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.
19	56	52	20	3	0

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	55	19	8	25	46	19	55	26	20	2	27
7	2	28	11	37	28						

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	56	2?	8	25	59	19	55	37	20	3	1
7	3	16									

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	20	58	7	3	12	19	56	2	20	3	16?
3	56	3	8	26	30						

Samarkand.

h.	m.	s.
8	28	3

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	21	40	7	4	4	8	26	43	20	3	13
3	57	3									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
8	26	11?	19	55	29	20	3	25

Nov. 14d. Readings also at 1h. (Boulder City, Overton, Pierce Ferry, Tucson, Ksara, Bucharest, and near Campulung), 3h. (Bogota, Santa Lucia, and near La Paz), 4h. (Boulder City, Overton, Pierce Ferry, and near Grozny), 8h. (Pierce Ferry), 9h. (near Triest), 10h. (near Leninakan), 11h. (near Mizusawa), 12h. (Shasta Dam and near Leninakan), 15h. (Bozeman and Ksara), 21h. (near Mizusawa), 22h. (Shasta Dam).

Nov. 15d. 2h. 7m. 29s. Epicentre 57°·0S. 45°·0W. Rough.

$A = +\cdot3869$, $B = -\cdot3869$, $C = -\cdot8370$; $\delta = -5$; $h = -8$;
$D = -\cdot707$, $E = -\cdot707$; $G = -\cdot592$, $H = +\cdot592$, $K = -\cdot547$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata		23·8	333	5 11	− 4	9 13	−15	—	—	12·6
Santa Lucia	E.	29·4	312	6 10	+ 3	—	—	—	—	15·5
La Paz	Z.	44·0	327	i 8 11a	0	i 14 53	+10	9 49	PP	25·9
Huancayo		50·5	320	i 9 4	+ 2	e 16 11	SS	i 10 55	PP	e 24·0
Pierce Ferry		109·4	307	e 19 2	PP	e 25 32	[+22]	—	—	—
Boulder City		109·7	306	e 19 4	PP	—	—	—	—	—
Overton		110·0	307	e 18 46	[+11]	—	—	—	—	—
Ksara		113·1	63	e 19 39	PP	—	—	—	—	55·5
Grand Coulee		121·2	51	e 20 25	PP	—	—	—	—	—

Additional readings :—
La Plata N = 6m.31s.
Santa Lucia PN = 6m.14s.
La Paz SSZ = 18m.1s.
Huancayo e = 19m.47s.
Long waves were also recorded at Christchurch, Riverview, and European stations.

Nov. 15d. Turkestan after-shocks.

Almata.
22h.54m.8s.

Andijan.
0h.10m.25s., 1h.13m.34s., 4h.33m.36s., 12h.33m.35s., 22h.52m.39s.

Frunse.
0h.10m.59s., 1h.13m.52s.?, 4h.34m.19s., 22h.53m.35s.

Obi-garm.
1h.14m.8s., 4h.34m.13s.

Samarkand.
0h.12m.43s., 1h.14m.38s., 4h.33m.35s.

Stalinabad.
22h.53m.55s.

Tashkent.
1h.13m.44s., 12h.34m.21s., 22h.52m.48s.

Nov. 15d. Readings also at 0h. (near Leninakan), 1h. (Grand Coulee and Shasta Dam), 2h. (near Apia), 3h. (near Berkeley and Lick), 4h. (Paris and Strasbourg), 6h. (Pierce Ferry), 7h. (La Paz), 8h. (Kew, Clermont-Ferrand, Paris, De Bilt, Uccle, Cheb, Strasbourg, Overton, Pierce Ferry, Shasta Dam), 10h. (near Mineral), 11h. (near Leninakan), 12h. (near Fort de France), 17h. (near Mineral), 18h. (near Mizusawa), 19h. (Istanbul and near Mineral), 20h. (near Istanbul (2)), 22h. (near Bogota).

Nov. 16d. Turkestan after-shocks.

Almata.

3h.4m.53s., 5h.32m.12s.,.6h.28m.26s.

Andijan.

3h.4m.17s., 4h.52m.57s., 6h.27m.50s.

Frunse.

3h.4m.35s., 5h.31m.8s., 6h.28m.8s.

Obi-garm.

3h.4m.23s.?, 4h.52m.31s., 5h.31m.34s., 6h.28m.16s.

Samarkand.

5h.32m.26s., 6h.29m.3s.

Stalinabad.

3h.5m.6s., 4h.52m.8s., 6h.28m.47s.

Tashkent.

3h.4m.32s., 5h.30m.44s.?, 6h.28m.18s.

Nov. 16d. Readings also at 1h. (Boulder City, Pierce Ferry, Tucson, Riverside, Tinemaha, Stuttgart, Grozny, and near Leninakan), 2h. (near Mizusawa), 4h. (near Santa Lucia and near Mineral), 5h. (Boulder City, Pierce Ferry, and Shasta Dam), 7h. (Bogota), 9h. (La Paz), 10h. (Grand Coulee and near Fort de France), 11h. (Arapuni, Auckland, Christchurch, Wellington, Brisbane, Riverview, Overton, and near Suva), 12h. (Pasadena, Palomar, Riverside, Santa Barbara, Tinemaha, Tucson, Grand Coulee, Shasta Dam, La Paz, Copenhagen, Strasbourg, Rome, Helwan, and Ksara), 13h. (Cheb, Jena, Clermont-Ferrand, De Bilt, Uccle, Paris, and near Yalta), 14h. (Copenhagen), 17h. (Warsaw), 21h. (Huancayo, La Paz (2), and Bogota), 22h. (Overton).

Nov. 17d. 2h. 49m. 9s. Epicentre 7°·5S. 129°·0E. Depth of focus 0·015.
(as on 1942, June 4d.).

$A = -\cdot6240$, $B = +\cdot7706$, $C = -\cdot1297$; $\delta = +2$; $h = +7$;
$D = +\cdot777$, $E = +\cdot629$; $G = +\cdot082$, $H = -\cdot101$, $K = -\cdot992$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	N.	30·2	134	i 5 57	− 3	e 10 41	− 8	—	—	i 13·5
Riverview		33·3	146	i 6 29k	+ 2	i 11 41	+ 4	i 6 54	pP	—
Mizusawa	N.	47·7	13	e 8 21	− 4	15 2	− 8	—	—	—
Calcutta	N.	49·8	309	e 8 40	− 2	i 15 14	−26	—	—	—
Auckland		50·8	131	e 11 33	PPP	15 55	+ 1	—	—	28·8
Colombo	E.	51·0	284	e 8 53	+ 2	16 57	+61	—	—	—
Arapuni		51·9	133	—	—	e 17 51?	?	—	—	—
Christchurch		52·3	140	9 21	+21	16 49	+35	11 9	PP	22·2
Wellington	Z.	52·7	137	i 9 25	+22	16 15	− 5	i 19 14	SS	29·8
Kodaikanal	E.	54·2	288	e 9 14	0	e 12 34	PPP	—	—	—
Hyderabad	N.	55·7	297	9 24	− 1	19 4	S_cS	—	—	—
Bombay		61·3	297	e 10 6	+ 2	—	—	—	—	—
New Delhi	N.	61·5	308	i 10 4	− 1	i 18 13	− 2	13 21	PPP	—
Irkutsk		63·2	344	i 10 16	− 1	i 18 36	0	11 41?	PP	—
Almata		69·1	322	10 54	0	—	—	—	—	—
Frunse		70·4	320	11 3	+ 1	—	—	—	—	—
Andijan		70·7	317	e 11 6	+ 2	—	—	—	—	—
Stalinabad		72·2	314	i 11 13	0	—	—	—	—	—
Tashkent		73·1	317	e 11 17	− 1	—	—	—	—	—
Samarkand		73·9	314	e 11 24	+ 1	—	—	—	—	—
Sverdlovsk		84·7	329	i 12 29	+ 8	i 22 38	+ 2	i 13 0	pP	—
Ksara		96·7	303	e 13 20	+ 3	26 3	PS	14 0	pP	—
Helwan		100·3	298	e 13 35	+ 2	24 6	[+ 8]	17 33	PP	—
Warsaw	E.	106·9	322	e 18 30	PP	e 24 31	[+ 2]	(e 27 51)	PS	e 27·8
Shasta Dam		109·0	49	e 14 11	P	e 29 40	PPS	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Copenhagen		111·0	328	e 18 42	PP	29 5	PS	35 8	SS		—
Prague		111·4	321	—	—	e 28 51?	PS	—	—		—
Tinemaha	z.	112·6	53	e 18 22	[+ 1]	—	—	—	—		—
Cheb		112·7	322	e 19 21	PP	e 25 9	[+16]	e 28 45	PS		e 41·8
Triest		112·9	316	e 19 14	PP	e 28 47	PS	i 29 28	PPS		—
Pasadena	z.	113·0	57	e 18 22	[0]	—	—	—	—		—
Riverside	z.	113·7	57	i 18 24	[+ 1]	—	—	e 29 19	PS		—
Palomar	z.	114·2	57	i 18 26	[+ 2]	i 29 19	PS	i 19 17	PP		—
Stuttgart	z.	115·0	320	e 18 28	[+ 2]	—	—	e 19 33	PP		—
Florence	E.	115·1	315	—	—	i 28 25	PS	i 29 33	PS		—
Strasbourg		116·0	321	e 19 24	PP	e 29 51	PS	e 31 5	PPS		e 57·8
De Bilt		116·3	326	e 19 41	PP	e 29 36	PS	e 20 21	pPP		e 58·8
Uccle		117·3	325	—	—	e 27 24?	?	e 29 38	PS		e 59·8
Paris		119·2	322	i 18 37	[+ 3]	e 28 51?	PS	e 19 55	PP		e 63·8
Tucson		119·4	57	i 18 36	[+ 2]	i 30 22	PKKP	e 22 1	PKS		—
Toledo	z.	127·1	315	e 19 44	[+55]	—	—	—	—		—
Ottawa	z.	136·6	26	19 8	[+ 1]	22 26	PKS	—	—		—
Huancayo		149·0	130	i 19 38	[+ 9]	—	—	—	—		—
La Paz	z.	150·7	145	i 19 37	[+ 6]	—	—	24 5	PP		73·8

Additional readings :—
Riverview isPZ = 7m.8s., esSN = 12m.17s., iSSSEN = 14m.18s., iS_eSN = 15m.48s., iS_eSE = 15m.51s.
Mizusawa ePE = 8m.24s.
Christchurch QEN = 19m.1s.
Wellington eZ = 23m.38s.
New Delhi iN = 19m.6s., 19m.44s., and 23m.11s.
Irkutsk isS = 19m.26s.
Ksara PP? = 17m.1s.
Warsaw eE = 19m.12s.
Copenhagen 19m.39s., 21m.59s., SSS = 39m.21s.
Cheb ePPP? = 22m.21s., ePPS = 29m.22s., e = 30m.33s., eSS? = 36m.8s., eSSS = 39m.28s.
Strasbourg e = 19m.42s.
De Bilt ePPP = 22m.6s.
Paris i = 20m.0s., e = 22m.4s., and 36m.51s.?
Toledo iZ = 19m.54s.
Long waves were also recorded at Scoresby Sund.

Nov. 17d. 22h. 24m. 13s. Epicentre 11°·1N. 57°·2E.

$A = +·5317$, $B = +·8250$, $C = +·1913$; $\delta = -7$; $h = +6$;
$D = +·841$, $E = -·542$; $G = +·104$, $H = +·161$, $K = -·982$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Bombay		17·0	61	i 3 59	− 2	i 7 20	+10	—	—		8·0
Kodaikanal	E.	19·9	89	4 35	− 1	8 29	+14	—	—		10·7
Hyderabad	N.	21·5	70	4 50	− 2	8 51	+ 4	5 7	PP		11·0
Colombo	E.	22·8	98	5 2	− 3	9 23	+12	—	—		13·1
New Delhi	E.	25·6	44	e 5 33	+ 1	e 10 5	+ 6	—	—		i 11·5
	N.	25·6	44	i 5 32k	0	i 10 2	+ 3	6 5	PP		12·2
Stalinabad		29·2	18	i 6 9	+ 4	—	—	—	—		—
Samarkand		29·8	14	6 12	+ 1	—	—	—	—		—
Baku		29·9	347	6 17	+ 5	11 18	+ 9	—	—		—
Ksara		29·9	321	i 6 13	+ 1	11 17	+ 8	—	—		—
Helwan		30·5	311	i 6 17a	0	11 17	− 1	7 20	PP		—
Erevan		31·1	341	e 6 23	+ 1	e 11 28	0	—	—		—
Tananarive		31·3	197	e 6 32	+ 8	11 31	0	9 14	P_eP		e 13·2
Calcutta	N.	31·8	65	e 6 46	+18	i 12 5	+27	i 13 49	SS		—
Leninakan		31·8	340	e 6 30	+ 2	—	—	—	—		—
Tashkent		31·9	17	e 6 32	+ 3	—	—	—	—		—
Andijan		32·4	21	e 6 34	0	—	—	—	—		—
Grozny		33·6	344	6 48	+ 4	e 12 14	+ 8	—	—		—
Piatigorsk		35·0	342	6 58	+ 2	e 12 35	+ 7	—	—		—
Sotchi		35·7	338	e 7 1	− 1	e 12 43	+ 4	—	—		—
Theodosia		38·6	335	e 7 35	+ 9	—	—	—	—		—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yalta		38·7	333	7 29	+ 2	e 13 25	0	—	—	—
Bucharest	E.	42·6	327	e 7 41	−18	e 14 27	+ 4	e 17 43	SS	—
Sofia		43·1	322	e 8 7	+ 3	e 14 30	0	e 9 48	PP	—
Sverdlovsk		45·7	3	i 8 34	+10	i 15 18	+10	—	—	—
Belgrade		46·0	323	e 9 6	+39	e 15 57	+45	e 21 59	SSS	e 27·8
Moscow		47·1	345	8 36	+ 1	—	—	10 30	PP	—
Budapest		48·4	326	8 51	+ 5	—	—	i 10 40	PP	19·3
Zagreb		49·2	322	e 8 35	−17	—	—	e 10 50	PP	—
Rome		49·6	317	e 8 59	+ 4	—	—	i 20 5	SS	—
Warsaw	E.	50·3	332	e 8 59	− 1	16 17	+ 4	10 59	PP	e 26·8
	N.	50·3	332	e 9 5	+ 5	16 12	− 1	11 2	PP	e 26·8
	Z.	50·3	332	e 8 52? a	− 8	16 9	− 4	10 48?	PP	e 25·8
Triest		50·5	322	—	—	e 16 15	− 1	e 19 58	SS	—
Prague		52·4	327	e 9 14	− 2	e 16 34	− 8	e 11 20	PP	e 25·8
Cheb		53·5	325	e 9 54	+30	e 16 58	+ 1	e 12 47?	PPP	e 27·8
Chur		53·6	321	e 9 23	− 2	e 17 8	+10	—	—	—
Collmberg		53·8	327	e 9 8	−18	e 17 4	+ 3	e 12 12	PPP	—
Jena		54·4	326	e 9 30	− 1	e 17 6	− 3	—	—	—
Helsinki		54·5	341	e 9 29	− 3	e 17 5?	− 5	—	—	e 29·8
Zürich		54·5	321	e 9 28	− 4	—	—	e 19 11	?	—
Stuttgart		54·7	323	e 9 31	− 2	e 19 2	?	—	—	—
Algiers		54·9	307	e 9 47	+12	17 23	+ 7	e 12 3	PP	29·0
Basle		55·1	321	e 9 37	+ 1	e 17 28	+10	—	—	—
Neuchatel		55·3	320	e 9 35	− 3	—	—	—	—	—
Strasbourg		55·5	322	e 9 38	− 1	e 17 23	− 1	e 11 54	PP	e 21·8
Irkutsk		55·8	33	9 42	+ 1	17 30	+ 2	—	—	—
Copenhagen		56·5	331	e 9 45	− 1	e 17 26	−11	21 37	SS	27·8
Upsala		56·8	337	i 10 19	+31	17 39	− 2	12 18	PP	e 28·8
Clermont-Ferrand		57·3	317	i 9 52	0	i 17 50	+ 3	e 12 14	PP	21·8
Alicante		57·9	308	10 22	+26	i 17 59	+ 4	13 39	PPP	e 27·9
Uccle		58·4	323	e 10 3	+ 3	i 18 8	+ 6	—	—	e 27·8
De Bilt		58·5	326	—	—	e 18 7	+ 4	e 23 47?	SSS	e 27·3
Paris		58·8	321	i 10 1	− 1	e 18 7	0	e 12 17	PP	e 28·8
Granada		60·2	307	i 10·24 k	+12	i 18 29	+ 4	12 24	PP	27·1
Kew		61·4	323	—	—	i 18 42	+ 2	—	—	e 24·8
Bergen	E.	62·2	334	e 10 47?	+21	—	—	—	—	—
Lisbon		64·7	308	10 44	+ 2	19 25	+ 3	—	—	—
Vladivostok		71·3	48	e 13 36	PP	20 39	− 2	i 14 50	PPP	—
Riverview		99·4	123	e 20 17	PPP	e 25 18	+ 3	i 32 16	SS	e 43·4
Bermuda		109·7	310	—	—	e 26 52	S	e 35 27	SS	e 44·1
Sitka		110·8	7	e 19 19	PP	e 27 41	S	e 34 31	SS	e 47·0
San Juan		116·9	297	e 20 13	PP	e 27 51	S	e 36 2	SS	e 49·2
Grand Coulee		121·1	357	e 19 7	[+12]	—	—	i 20 40	PP	—
La Paz		126·8	258	16 27	P	—	—	i 21 5	PP	65·8
Shasta Dam		128·5	359	e 19 13	[+ 4]	—	—	—	—	—
Tinemaha	z.	131·9	354	e 19 28	[+12]	—	—	—	—	—
Pierce Ferry		132·3	350	e 19 22	[+ 6]	—	—	—	—	—
Boulder City		132·6	351	19 18	[+ 1]	—	—	—	—	—
Huancayo		133·5	264	e 19 35	[+16]	e 39 47	SS	e 21 26	PP	e 58·6
Pasadena	z.	134·8	353	e 19 41	[+20]	—	—	e 21 56	PP	e 70·9
Riverside	z.	134·9	353	e 19 44	[+23]	—	—	—	—	—
Palomar	z.	135·4	352	e 19 21	[− 1]	—	—	i 19 42	PKP_1	—
Tucson		135·4	345	e 19 25	[+ 3]	e 22 56	PKS	—	—	e 51·0

Additional readings :—
Hyderabad SSN =9m.41s.
New Delhi PPPN =6m.17s., iE =10m.53s., SSN =11m.13s.
Helwan P_cP =9m.17s., i =11m.35s. and 11m.45s., SS =12m.56s.
Tananarive SS =13m.0s.
Calcutta P_cPN =9m.34s.
Sofia eN =17m.17s., eE =18m.4s.
Belgrade e =11m.59s.
Budapest PN =8m.59s.
Warsaw P_cPZ =9m.51s.?, PPPEN =12m.24s., eN =13m.2s., $P_cS?N$ =14m.3s., $P_cS?Z$ =14m.8s.?, $P_cS?E$ =14m.11s., PSN =16m.27s., PSE =16m.34s., $eS_cS?N$ =17m.55s., $eS_cS?E$ =18m.6s., eN =18m.55s., SSZ =19m.54.?, SSE =20m.1s., SSN =20m.10s., SSSZ =22m.0s., SSSEN =22m.4s.
Prague e =19m.9s., eSS? =21m.11s., eSSS? =23m.17s.

Continued on next page.

Cheb e =19m.14s.
Collmberg eN =9m.21s., ePcS =14m.16s., eScSN =19m.11s., eSSE =20m.2s.
Jena eN =9m.51s. and 17m.13s.
Algiers ScS? =19m.21s., SS =20m.39s., eSSS =22m.47s.
Strasbourg ePPP =13m.2s.
Copenhagen i =10m.37s., 19m.36s.
Upsala eN =18m.4s., eSSN =20m.47s., eE =22m.9s., eN =23m.47s.
Alicante PPP =13m.55s., SS =22m.51s., SSS =26m.39s.
Paris e =10m.14s., ePPP? =13m.22s.
Granada ScS =20m.17s., SS =22m.11s.
Lisbon P =10m.49s.
Sitka ePPS =29m.57s., eSSS =38m.56s.
San Juan e =21m.49s.
Huancayo eP =16m.26s.
Long waves were also recorded at Christchurch, Wellington, and La Plata.

Nov. 17d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	7	19	10	11	30	11	30	29			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	28	3	10	9	59	12	10	21	20	47	25
5	6	43	11	28	48	20	40	29			

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	28	18	5	6	58	11	29	8	12	10	58

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	8	50	10	10	33	12	10	58	20	48	2
5	7	22	11	29	25?	20	38	39			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	29	37	5	8	23	20	39	3	20	49	14
4	9	50	12	11	31						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	8	47	10	11	34	20	38	40	20	48	15
5	8	47	11	29	29						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	28	28?	10	10	18	12	11	20	20	47	38
5	7	12	11	29	4?	20	40	1			

Nov. 17d. Readings also at 2h. (Rome), 3h. (Santa Lucia), 4h. (Pasadena, Palomar, Riverside, Tinemaha, Tucson, Fort de France, La Paz, near Balboa Heights, and Bogota), 11h. (Calcutta), 13h. (Christchurch, Wellington, Riverview, Pasadena, Riverside, Tinemaha, Boulder City, Overton, Pierce Ferry, Jena, Helwan, Ksara, Bombay, Hyderabad, and New Delhi), 14h. (De Bilt, Uccle, Paris, Cheb, Strasbourg, Helsinki, Copenhagen, Upsala, and Kodaikanal), 22h. (Bogota, near Grozny, and near Toledo).

Nov. 18d. 2h. 40m. 28s. Epicentre 22°·3S. 179°·2W. Depth of focus 0·080.
(as on 1945, Nov. 26d.).

A = −·9260, B = −·0129, C = −·3773; δ = 0; h = +4;
D = −·014, E = +1·000; G = +·377, H = +·005, K = −·926.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Suva		4·7	331	i 1 20	− 7	i 2 37	0	—	—	—
Brisbane	N.	25·7	253	e 4 48	− 1	—	—	—	—	—
Riverview		28·5	239	i 5 13k	0	i 9 20	− 4	i 12 24	sS	12·5
Santa Barbara	Z.	79·9	47	i 11 5	− 9	—	—	—	—	—
La Jolla		80·6	49	e 11 20	+ 3	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Pasadena		80·7	48	i 11 20	+ 2	—	—	e 13 27 pP	—
Palomar		81·2	49	i 11 22a	+ 2	e 20 51	+ 5	i 13 30 pP	—
Riverside		81·2	48	i 11 22a	+ 2	e 14 36	sP	e 13 27 pP	—
Shasta Dam		81·9	40	e 11 25	+ 1	—	—	e 13 31 pP	—
Tinemaha		82·4	45	i 11 28a	+ 2	e 21 3	+ 5	— —	—
Boulder City		84·0	47	i 11 36	+ 2	e 21 9	− 4	e 13 45 pP	—
Pierce Ferry		84·7	48	i 11 40	+ 2	—	—	e 13 46 pP	—
Tucson		84·9	52	i 11 41	+ 2	—	—	i 13 44 pP	—
Grand Coulee		88·3	36	e 11 55	0	—	—	e 14 5 pP	—
Copenhagen		145·5	349	18 37	[0]	—	—	— —	—
Ksara		147·1	297	e 18 43	[+ 4]	21 54	sPKP	20 57 pPKP	—
Jena	N.	150·2	345	e 19 32?	[+48]	—	—	— —	—
Helwan		151·6	292	e 18 47	[+ 1]	—	—	i 21 5 pPKP	—
Stuttgart	z.	152·8	348	e 18 48	[+ 1]	—	—	e 21 7 pPKP	—

Additional readings :—
Riverview iS_cSE =14m.52s.
Palomar esPZ =14m.33s.
Boulder City i =11m.46s.
Pierce Ferry e =15m.6s.
Tucson e =15m.8s.
Helwan PKKP =19m.5s., PP =22m.40s.
Stuttgart eZ =18m.56s.

Nov. 18d. 13h. Two undetermined shocks, Indian Ocean.

I.

Colombo ePE =32m.28s., S?E =39m.12s., LE =42m.50s.
Hyderabad PN =33m.47s., SN =41m.31s.
Tananarive eP =34m.35s., eS =37m.25s., eL =38m.17s.
New Delhi ePN =35m.1s., PPN =37m.27s., iSN =43m.52s., SSN =48m.3s., LN =56m.0s.
Helwan eP? =36m.24s., i =36m.37s,. and 38m.9s., S? =46m.36s.
Ksara eP =36m.34s., i =36m.50s., ePS? =47m.45s.
Jena eN =38m.10s. and 38m.17s.
Christchurch P?Z =41m.49s., EN =43m.7s., SEN =48m.22s., QEN =52m.25s., RZ =56m.40s.
Calcutta eS?N =41m.53s., iN =65m.41s.
Riverview iN =42m.3s., eE =46m.3s., eLE =51·6m.
Bombay iS?EN =42m.15s.
Brisbane eEN =42m.57s.
Riverside eZ =44m.20s., 45m.12s. and 49m.23s.
Tucson eP =44m.21s., e =45m.36s. and 49m.31s.
Palomar iZ =44m.22s., iNZ =45m.14s., iZ =49m.35s.
Pierce Ferry eP =44m.22s., e =45m.30s. and 49m.22s.
Boulder City eP =44m.26s.
Tinamaha eZ =45m.17s.
Suva e =47m.12s.?, i =52m.0s., eL =65m.
La Paz eZ =57m.0s., LZ =92m.0s.

II.

Hyderabad PN =42m.6s., SN =46m.43s.
Tananarive e =47m.54s. and 50m.15s., eL =51m.19s.
Helwan eP? =49m.20s., e =50m.58s. and 54m.40s., S? =59m.30s.
Istanbul ePP? =49m.21s.?, ePPP? =51m.20s.
Riverside eZ =57m.4s., 58m.11s. and 61m.37s.
Palomar eZ =57m.8s., iNZ =58m.15s., eZ =61m.53s.
Pasadena eZ =57m.11s. and 62m.18s., eLZ =103m.2s.
Tucson eP? =57m.13s., e =58m.28s. and 62m.18s.
Boulder City eP =57m.15s., e =58m.25s., and 62m.18s.
Pierce Ferry eP? =57m.15s., e =58m.27s., i =62m.22s.
Shasta Dam eP =58m.0s.
Bermuda e =68m.5s., eSS? =79m.30s., eL =91m.24s.
Long waves to one or other of the above 13h. shocks were recorded at Riverview, Wellington, Harvard, Bozeman, Salt Lake City, and a few European stations.

Nov. 18d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	32	28	8	43	21	13	43	45	18	21	53

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	41	46	3	43	45	8	42	42	18	21	11
3	31	4	5	2	4	13	42	6	20	8	29

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	31	45	8	42	58	13	42	19	18	21	29

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	31	56	5	2	38	13	42	48	18	21	48
3	42	53	8	43	25						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	43	9	5	3	57	8	45	0	18	22	0

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	42	49	8	43	46	13	43	8	18	21	56

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	44	17	5	2	18	8	43	10	18	21	27?

Nov. 18d. Readings also at 1h. (Suva and Pierce Ferry), 5h. (La Paz), 7h. (Palomar, Tucson, and Tinemaha), 10h. (Pierce Ferry), 14h. (Hyderabad and Kodaikanal), 15h. (Tuai), 16h. (near Fort de France), 18h. (Sverdlovsk, near Grozny, and near Mizusawa), 22h. (Calcutta), 23h. (Bombay and New Delhi).

Nov. 19d. 11h. Asian shock. U.S.S.R. suggests 35°50′N. 79°40′E., but the readings do not fit.
Almata eP =13m.40s.
Andijan eP =13m.44s., eS =14m.15s.
Frunse eP =13m.50s., eS =15m.38s.
Obi-garm eP =13m.51s., S =15m.32s.
Tashkent eP =14m.3s.
Stalinabad eP =14m.3s., eS =15m.47s.
Samarkand eP =14m.33s.?, eS =17m.2s.
Hyderabad ePN =15m.30s., eSN =19m.0s.
Calcutta ePN =17m.30s., iSN =18m.12s.
Ksara e =20m.42s., e =27m.22s.
Stuttgart eZ =20m.47s.
Long waves were also recorded at other European stations.

Nov. 19d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.
18	58	48	22	9	54

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	4	26	10	28	33	18	57	20	20	16	50
8	9	42	16	11	13	19	50	49	22	8	11

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
10	29	25	18	57	50	19	51	8?	22	8	38?
16	11	56									

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	10	38	18	57	55	20	16	45	22	8	46
10	29	27	19	51	38						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
18	58	35	19	53	7	20	17	25	22	9	4

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.
8	11	35	10	30	33	18	58	12

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	9	59	19	51	54?	20	17	15	22	8	25
18	57	49?									

Nov. 19d. Readings also at 1h. (Palomar, Tucson, Boulder City, Pierce Ferry, Oaxaca, and near Tacubaya (2)), 3h. (Pierce Ferry and near Mizusawa), 5h. (Palomar, Tucson, Boulder City, Overton, and Pierce Ferry), 8h. (Huancayo and La Paz), 10h. (Kodaikanal and New Delhi (2)), 11h. (Cheb, Bombay, and New Delhi), 16h. (Bucharest and Sofia), 17h. (near Balboa Heights), 19h. (Brisbane and Riverview), 20h. (near La Paz), 21h. (near Ottawa), 22h. (Bucharest and near Sofia).

Nov. 20d. 5h. 24m. 26s. Epicentre 8°·3S. 77°·8W. (as on 10d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·4	213	e 1 14	+ 4	i 2 14	+12	—	—	i 2·6
La Paz		12·5	132	3 24	+22	5 44	+21	—	—	7·2
Bogota		13·4	17	i 3 15?	+ 1	i 6 2	+17	i 3 27?	PP	i 6·4
Tucson		51·2	323	i 9 5	− 2	e 16 46	+21	—	—	e 27·4
Palomar		55·6	320	i 9 40	0	—	—	—	—	—
Pierce Ferry		55·8	324	e 9 41	0	—	—	—	—	—
Boulder City		56·1	324	e 9 44	+ 1	—	—	—	—	—
Riverside	z.	56·4	320	e 9 44	− 1	—	—	—	—	—
Pasadena	z.	57·0	320	e 9 50	0	—	—	—	—	—
Grand Coulee		66·8	332	e 10 54	− 2	—	—	—	—	—
Ksara		114·2	57	e 15 36	P	—	—	e 19 48	PP	—

Additional readings :—
Huancayo iP =1m.17s., i =1m.56s.
Bogota iS?EZ =6m.14s.?, iP_cP?EZ =8m.2s.?
Long waves were also recorded at Rome.

Nov. 20d. Turkestan after-shocks.

Almata.
6h.36m.32s., 15h.33m.10s.

Andijan.
6h.34m.40s., 7h.18m.33s., 13h.1m.52s., 15h.31m.26s.

Frunse.
6h.35m.9s., 15h.31m.58s.?

Obi-garm.
15h.32m.5s.

Samarkand.
6h.35m.40s., 15h.32m.39s.

Stalinabad.
6h.36m.16s., 15h.32m.25s.

Tashkent.
6h.35m.20s., 15h.31m.40s.?

Nov. 20d. Readings also at 1h. (Kodaikanal, La Paz, La Plata, Santa Lucia, Palomar, and Tucson), 2h. (Ksara, Bombay (2), Dehra Dun, and near New Delhi), 3h. (near La Paz), 4h. (Bozeman), 5h. (Boulder City, Pierce Ferry, Palomar, Tucson, and Tacubaya), 9h. (Auckland, Christchurch, Brisbane, Riverview, near Apia, and Fort de France), 11h. (near Mizusawa, near Mineral, and near Tacubaya), 12h. (Huancayo and La Paz), 20h. (Grand Coulee), 21h. (Bogota), 23h. (Santa Lucia).

Nov. 21d. 1h. 43m. 28s. Epicentre 38°·8N. 20°·6E. (as on 1945, January 8d.).

Felt at Agrinion, Preveza, Myticas, and Zante. Suggested epicentre 38°·6N. 20°·2E.
Annales de l'Institut de Physique du Globe de Strasbourg, 2e partie, Séismologie Nouvelle Série, tome XI, 1946, p.74.

$A = +\cdot7314$, $B = +\cdot2749$, $C = +\cdot6240$; $\delta = -11$; $h = -1$;
$D = +\cdot352$, $E = -\cdot936$; $G = +\cdot584$, $H = +\cdot220$, $K = -\cdot781$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia		4·4	27	e 1 15	+ 5	i 2 32	S_g	i 1 33	P_g	i 2·8
Belgrade		6·0	359	i 1 34	+ 2	i 2 50	+ 7	i 2 24	PP	—
Istanbul		6·9	68	e 1 48	+ 3	i 4 42	?	—	—	—
Rome		6·9	299	e 1 42	− 3	3 5	0	—	—	i 4·1
Bucharest	E.	7·0	35	e 1 53	+ 7	e 3 12	+ 4	—	—	i 3·9
Kalossa	N.	7·8	353	e 1 59	+ 1	i 4 11	S_g	—	—	e 5·0
Zagreb		7·8	335	e 1 56a	− 2	e 3 27	− 1	e 3 43	S*	—
Triest		8·5	326	i 2 5	− 2	i 3 40	− 5	i 4 39	SS	—
Florence	E.	8·6	308	i 2 40	P_g	i 4 43	S_g	—	—	—
Budapest		8·8	353	2 10	− 1	e 3 52	− 1	—	—	4·9
Chufr		11·4	318	e 2 45k	− 2	e 4 51	− 5	—	—	e 7·1
Yalta		11·6	57	2 54	+ 4	—	—	—	—	—
Simferopol		11·8	54	e 2 56	+ 3	—	—	—	—	—
Prague		12·1	341	—	—	e 5 56	?	—	—	e 7·0
Zürich		12·3	316	e 2 58	− 1	e 5 10	− 8	—	—	e 7·5
Helwan		12·6	132	e 2 56	− 7	5 8	−18	3 11	PP	—
Cheb		12·7	335	—	—	e 6 4	+36	e 6 39	SSS	e 7·2
Basle		12·9	317	e 3 5	− 2	—	—	—	—	e 7·3
Neuchatel		12·9	314	e 2 36	−31	—	—	—	—	e 7·8
Stuttgart		12·9	324	i 3 5	− 2	e 5 58	+25	i 3 19	PP	e 7·7
Ksara		13·3	107	e 3 30	+17	e 6 27	+45	—	—	—
Warsaw		13·4	1	e 3 19k	+ 5	6 2	+17	e 3 33	PP	e 7·5
Strasbourg		13·5	321	e 3 13	− 2	e 6 11	+24	e 3 46	PP	e 7·8
Besançon		13·6	313	—	—	e 5 39	−11	—	—	—
Jena		13·7	335	e 3 16	− 2	—	—	—	—	e 8·1
Algiers		14·0	267	e 3 26	+ 4	e 6 12	+13	—	—	7·5
Clermont-Ferrand		14·7	304	e 3 27	− 4	—	—	—	—	7·5
Tortosa	N.	15·6	284	i 3 4	−39	i 5 46	−51	—	—	e 9·7
Paris		16·4	313	i 3 56	+ 3	e 7 9	+13	—	—	e 9·5
Alicante		16·5	275	e 3 59	+ 5	7 3	+ 5	—	—	e 15·8
Uccle		16·6	324	e 3 59?	+ 3	e 7 10	+10	—	—	e 8·6
De Bilt		17·1	326	—	—	e 7 32?	+20	—	—	e 9·5
Copenhagen		17·8	344	e 4 12	+ 1	i 7 39	+11	—	—	9·5
Leninakan		17·8	76	e 4 25	+14	e 8 6	+38	—	—	—
Erevan		18·5	78	e 4 25	+ 6	—	—	—	—	—
Granada		19·2	274	i 4 28k	0	7 55	− 4	4 43	PP	11·0
Kew		19·4	319	—	—	e 8 9	+ 5	—	—	e 11·0
Grozny		19·5	68	4 35	+ 4	i 8 25	+19	—	—	—
Moscow		20·4	29	4 42	+ 1	8 37	+12	—	—	—
Upsala		21·2	355	i 4 47	− 2	8 46	+ 5	5 18	PP	e 10·8
Helsinki		21·6	6	i 4 52a	− 2	i 8 52	+ 3	—	—	e 11·5
Baku		22·6	76	—	—	e 9 14	+ 7	—	—	—
Aberdeen		23·7	330	—	—	i 9 23	− 4	—	—	—
Sverdlovsk		31·8	42	6 28	0	—	—	—	—	—
Tashkent		37·0	71	e 7 10	− 3	—	—	—	—	—
Andijan		39·4	71	e 7 51	+18	—	—	—	—	—
Grand Coulee		86·5	334	e 12 45	− 1	—	—	—	—	—

Additional readings :—
Belgrade i = 2m.19s., iS = 3m.29s.
Rome i = 3m.37s.
Kalossa ePE = 2m.3s.
Zagreb eNE = 2m.22s., e = 2m.56s., iPPNE = 3m.13s., e = 4m.11s. and 4m.25s.
Budapest PN = 2m.30s.
Helwan i = 5m.26s.
Stuttgart iP = 3m.8s.k.
Warsaw ePE = 2m.57s.?, eSZ = 6m.5s., eSE = 6m.11s., eZ = 6m.41s., eN = 6m.44s.
Paris i = 4m.10s.
Uccle eEN = 5m.34s.
Long waves were also recorded at Collmberg, Bergen, and Jersey.

Nov. 21d. 3h. South Pacific.

Christchurch P =20m.24s., SEN =24m.17s., iEN =24m.36s., LZ =25m.38s.
Wellington PZ =20m.51s., PPZ =21m.30s., P_cP =24m.10s.?, iZ =25m.27s., S =25m.32s., LZ =26·2m.
Brisbane eP?N =22m.30s., eLN =30m.30s.
Riverview ePP?NZ =22m.43s., iSE =26m.36s., eSS?E =27m.41s., eLN =27·9m.
Colombo ePE =26m., LE =56m.16s.
Arapuni S? =27m.6s., L =29·5m.
Tucson eP =34m.25s., eL =71m.4s.
Bombay eN =34m.30s., eE =47m.
Belgrade e =34m.32s.
Grand Coulee eP =34m.41s.
Helwan eP =35m.8s., PKP =38m.24s., PP =40m.12s., SKP =41m.42s.
Ottawa eZ =35m.12s., L =92m.
Weston iP =35m.14s., e =58m.12s.
Istanbul eP =35m.22s., eL =89m.
Harvard e =35m.25s., eL =95m.
Rome PKP? =35m.43s.a, PP? =39m.35s.
Warsaw eZ =35m.53s., eLZ =92m.
Stuttgart eZ =36m.5s.
Ksara e =36m.25s. and 52m.25s.
Calcutta eN =40m.1s.
New Delhi eN =50m.4s. and 66m.28s.
Long waves were also recorded at Auckland, Kodaikanal, Sitka, Pasadena, and other European stations.

Nov. 21d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	11	22	4	6	45	4	32	55?

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	9	16	4	32	2	18	24	5	23	31	23
4	5	13	17	44	18						

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	10	20	4	32	18	17	45	4

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	10	4	4	5	55	17	44	54

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	11	17	4	33	15	17	45	30?	23	33	38
4	7	31									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	11	4	4	7	10	4	33	8?

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	9	40	4	5	41	4	32	34	17	44	30

Nov. 21d. Readings also at 6h. (Riverview), 7h. (near Fort de France), 13h. (Boulder City, Overton, and Pierce Ferry), 15h. (Upsala), 18h. (Santa Lucia), 19h. (Helwan and Ksara), 20h. (near Berkeley, San Francisco, and near Tacubaya), 21h. and 23h. (Tacubaya).

Nov. 22d. 2h. 23m. 42s. Epicentre 15°·7N. 99°·5W. Depth of focus 0·025.

Epicentre given by Tacubaya.

$A = -·1590$, $B = -·9499$, $C = +·2689$; $\delta = -10$; $h = +6$;
$D = -·986$, $E = +·165$; $G = -·044$, $H = -·265$, $K = -·963$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Puebla		3·5	20	0 58	+ 2	—	—	—	—	1·7
Tacubaya	E.	3·7	4	0 54	− 4	—	—	—	—	1·7
Vera Cruz	E.	4·7	42	1 9	− 2	—	—	—	—	2·3
Manzanillo	Z.	5·7	306	1 24	0	—	—	—	—	2·9
Guadalajara	Z.	6·1	324	1 30	+ 1	—	—	—	—	3·0
Tucson		19·4	330	e 4 3	−10	e 6 26	−71	i 4 29	PP	e 7·4
Palomar		23·6	321	i 4 51	− 4	—	—	—	—	—
Pierce Ferry		24·1	330	e 4 56	− 3	e 11 18	?	e 5 37	PP	—
Boulder City		24·4	328	i 4 58	− 4	e 11 42	?	—	—	—
Overton		24·6	329	e 5 2	− 2	e 11 42	?	—	—	—
Pasadena		24·9	322	e 5 2	− 5	—	—	—	—	e 13·3
Santa Barbara	Z.	26·1	319	e 5 13	− 5	—	—	—	—	—
Haiwee		26·2	325	e 5 19	0	—	—	—	—	—
Tinemaha		27·0	325	e 5 25	− 1	—	—	—	—	—
Grand Coulee		35·9	338	e 6 46	+ 3	—	—	—	—	—

Long waves were also recorded at Suva, Bozeman, Butte, Salt Lake City, and Saskatoon.

Nov. 22d. 9h. 29m. 15s. Epicentre 19°·4N. 70°·4W. (as on 1946, September 25d.).

$A = +·3166$, $B = -·8892$, $C = +·3302$; $\delta = -6$; $h = +5$;
$D = -·942$, $E = -·335$; $G = +·111$, $H = -·311$, $K = -·944$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Port au Prince	2·0	245	e 0 48	P_g	—	—	i 1 18	S_g	—
San Juan	4·2	103	e 1 5	− 2	e 1 35	−22	—	—	e 1·8
Weston	22·9	359	e 5 5	− 1	i 9 13	0	—	—	—
Harvard	23·1	359	e 5 6	− 2	i 9 13	− 3	—	—	—
Tucson	38·4	298	e 7 25	0	—	—	—	—	—
Pierce Ferry	41·6	303	e 7 52	+ 1	—	—	—	—	—
Overton	42·1	304	e 6 57	−58	—	—	—	—	—
Boulder City	42·3	303	i 7 57	0	—	—	—	—	—
Palomar Z.	43·5	299	i 8 8	+ 1	—	—	—	—	—
Riverside Z.	44·0	300	e 8 10	− 1	—	—	—	—	—
Tinemaha	45·2	303	i 8 21	+ 1	—	—	—	—	—

Additional readings :—
Weston eS = 9m.9s.
Harvard iP = 5m.18s., 1 = 9m.10s.

Nov. 22d. Turkestan after-shocks.

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.
5	18	46	5	43	9	10	34	3

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	58	20	10	32	31	16	50	56	21	18	13
5	39	55									

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	58	41	5	41	30	10	32	46	21	18	55
5	19	6									

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	58	57	5	39	37	16	51	41	21	18	23
5	19	46									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	59	17	5	39	10	10	34	45	21	19	3

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	59	13	5	39	44	10	33	22	21	18	35
5	21	27									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	58	34	5	19	57	5	39	25?	10	32	56
									16	51	42

Nov. 22d. Readings also at 1h. (near Mineral), 4h. (Ksara), 5h. (Pierce Ferry), 6h. (near Rome), 8h. (Boulder City, Overton, Pierce Ferry, and near Rome), 11h. (Bogota, La Paz, and near Tacubaya), 16h. (Christchurch, Riverview, Bombay, Calcutta, Hyderabad, Kodaikanal, New Delhi, Helwan, Ksara, Bogota, near Berkeley, Lick, and San Francisco), 18h. (Cheb, Colombo, and near Mineral), 19h. (near Mineral), 20h. (near Fort de France).

Nov. 23d. Turkestan after-shocks.

Andijan 18h.54m.48s.
Obi-garm 18h.55m.26s.
Tashkent 18h.55m.4s.

Nov. 23d. Readings also at 1h. (Palomar, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Baku, Sotchi, Piatigorsk, near Erevan, Grozny, and Leninakan), 4h. (near Algiers), 5h. (near Mineral), 6h. (near Apia), 7h. (Palomar, Tinemaha, Tucson, Boulder City, Overton, and Pierce Ferry), 8h. (Haiwee, La Jolla, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Grand Coulee, and Shasta Dam), 9h. (Boulder City and Pierce Ferry), 11h. (Auckland, Wellington, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Helwan, and Ksara), 13h. (Pierce Ferry), 16h. (Auckland and Pierce Ferry), 17h. (Christchurch, Wellington, Palomar, Riverside, Tucson, and Stuttgart), 18h.(near Santa Lucia), 19h. (Pierce Ferry, Shasta Dam, and Istanbul), 20h. (Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, La Plata, and Ksara).

Nov. 24d. Turkestan after-shocks.

Andijan 2h.7m.18s., 6h.37m.41s., 8h.10m.24s., 10h.40m.20s.
Obi-garm 23h.8m.2s.
Samarkand 23h.9m.27s.
Stalinabad 23h.8m.6s.

Nov. 24d. Readings also at 1h. (Pasadena, Riverside, and Tucson), 4h. (near Lick), 8h. (near Mizusawa), 10h. (near Ottawa and Shawinigan Falls), 11h. (La Paz), 12h. (near Mizusawa), 13h. (Brisbane, Riverview, La Paz, near Mizusawa), 14h. (Auckland and Wellington), 16h. (Pasadena, Riverside, Tinemaha, Tucson, and Stuttgart), 17h. (Calcutta), 19h. (near Sofia), 21h. (Shasta Dam, Boulder City, near Pierce Ferry, Fresno, and Lick). 23h. (Tucson, near Guadalajara and Tacubaya).

Nov. 25d. Turkestan after-shocks.

Andijan 4h.13m.37s., 6h.9m.14s., 8h.47m.49s., 10h.51m.14s., 18h.2m.51s., 22h.36m.58s.
Frunse 18h.3m.5s.
Obi-garm 18h.3m.38s.
Samarkand 4h.14m.31s., 6h.10m.25s., 8h.48m.48s., 10h.52m.10s.
Stalinabad 4h.14m.26s., 6h.10m.9s., 10h.52m.2s., 18h.4m.59s.
Tashkent 4h.14m.4s., 6h.10m.50s.?, 8h.48m.27s.?, 10h.51m.52s.?.

Nov. 25d. Readings also at 0h. (Istanbul and near Tacubaya), 1h. (near Tacubaya), 4h. (New Delhi), 6h. (New Delhi and near Tacubaya), 7h. (near Berkeley and Lick), 8h. (near Leninakan), 9h. (near Fort de France), 11h. (Tacubaya (2)), 14h. (Bogota, Bombay, and Riverview), 15h. (Santa Lucia, Brisbane, and Ksara), 16h. (Riverview, Pasadena, Palomar, Riverside, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam and near Stuttgart), 17h. (Bogota), 18h. (Santa Clara, near Branner, Ferndale, and San Francisco), 20h. (near Mineral).

Nov. 26d. Turkestan after-shocks.

Andijan 5h.57m.26s., 10h.24m.47s., 20h.18m.35s., 23m.58m.13s.
Obi-garm 5h.58m.7s., 23h.58m.56s.
Samarkand 5h.58m.35s., 23h.59m.9s.
Stalinabad 5h.58m.17s., 23h.59m.5s.
Tashkent 5h.58m.27s., 23h.58m.38s.

Nov. 26d. Readings also at 0h. (Boulder City, Pierce Ferry, and near Tacubaya (2)), 4h. (Overton), 8h. (Prague, Stuttgart, Sofia, Helwan, Ksara, and near Istanbul), 10h. (Erevan and near Leninakan), 12h. (Bogota, Merida, Oaxaca, Tacubaya, Tucson, Palomar, Tinemaha, Boulder City, Overton, and near La Paz), 15h. (near Tacubaya), 23h. (Grand Coulee and near La Paz).

Nov. 27d. Turkestan after-shocks.

Andijan 9h.8m.58s., 21h.34m.11s.
Frunse 9h.9m.23s., 21h.34m.36s.
Obi-garm 9h.9m.34s., 21h.34m.47s.
Samarkand 9h.9m.45s., 21h.35m.41s.
Stalinabad 9h.9m.42s., 21h.34m.54s.
Tashkent 9h.9m.13s.?, 21h.34m.26s.

Nov. 27d. Readings also at 1h. (near Mizusawa), 2h. (Pasadena, Palomar (2), Tucson (2), Boulder City, Overton, and Pierce Ferry), 3h. (Grozny and near Leninakan), 8h. (Clermont-Ferrand, Paris, Strasbourg, De Bilt, Uccle, Kew, and Ksara), 9h. (La Jolla, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Alicante, near Oaxaca, and Tacubaya), 10h. (Overton, Pierce Ferry, and Alicante), 14h. (Boulder City, Overton, Pierce Ferry, San Francisco, near Berkeley, Branner, and Fresno), 15h. (La Jolla, Pasadena, Palomar, Riverside, Tucson, Boulder City, Overton, Pierce Ferry, Bozeman, Oaxaca, near Guadalajara, and Tacubaya), 17h. (near Tacubaya).

Nov. 28d. 15h. 51m. 33s. Epicentre 18°·1S. 175°·2W. Depth of focus 0·040.
(as on 1945, Aug. 30d.).

$A = -·9478$, $B = -·0796$, $C = -·3088$; $\delta = +2$; $h = +5$;
$D = -·084$, $E = +·996$; $G = +·308$, $H = +·026$, $K = -·951$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
	°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Apia	5·4	38	i 1 15	− 7	i 2 8	−19	—		—	—
Auckland	20·7	204	4 19	0	7 57	+ 9	5	1	pP	—
Arapuni	21·5	201	3 21	−66	8 27	+25	—		—	—
Tuai	21·7	196	4 35	+ 6	8 14	+ 8	—		—	—
New Plymouth	22·9	201	4 51	+11	8 42	+16	—		—	—
Wellington	24·7	200	4 59	+ 2	8 58	+ 2	6	28	sPP	—
Christchurch	27·4	200	6 47	PP	9 41	+ 2	i 15	43	S_eS	11·2
Brisbane	30·7	247	i 5 48	− 2	i 10 27	− 4	i 7	4	PP	i 13·0
Riverview	33·9	237	i 6 21k	+ 3	i 11 24	+ 3	i 7	18	pP	—
Perth	63·1	243	—	—	i 18 12	+ 6	19	27	PPS	—
Mizusawa	70·1	325	e 10 40	− 3	—	—	e 10	57	P	—
Santa Barbara	74·2	45	i 11 7a	0	i 20 20	+ 4	i 12	13	pP	—
Berkeley	74·6	41	e 11 9	0	i 20 23	+ 3	i 22	5	PPS	e 30·8
La Jolla	75·0	47	e 11 12	0	i 20 28	+ 4	i 12	18	pP	—
Pasadena	75·1	46	i 11 12a	0	i 20 28	+ 2	i 12	14	pP	e 31·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mount Wilson		75·2	46	e 11 13	0	e 20 29	+ 2	—	—	—
Fresno	N.	75·5	43	e 11 14	0	e 19 32	−58	—	—	—
Palomar		75·6	47	i 11 15a	0	i 20 34	+ 3	i 12 18	pP	e 41·8
Riverside		75·6	46	i 11 14a	− 1	e 20 33	+ 2	i 12 20	pP	—
Shasta Dam		76·3	38	i 11 18	− 1	e 20 28	−10	i 12 23	pP	—
Haiwee		76·4	44	e 11 18	− 2	e 20 42	+ 2	e 12 26	pP	—
Tinemaha		76·7	43	i 11 22a	+ 1	e 20 48	+ 5	i 12 29	pP	—
Vladivostok		77·9	324	i 11 28	0	i 20 59	+ 3	13 0	sP	—
Boulder City		78·4	46	i 11 30	0	i 21 4	+ 3	i 12 37	pP	—
Overton		79·0	46	i 11 34	0	e 21 10	+ 3	i 12 39	pP	—
Pierce Ferry		79·1	47	i 11 34	0	e 21 3	− 5	i 12 40	pP	—
Tucson		79·4	50	i 11 36	0	e 21 11	0	i 12 39	pP	e 31·5
Sitka		82·3	21	e 11 51	0	i 21 36	− 5	e 12 53	pP	e 34·9
Salt Lake City		82·9	43	e 12 1	+ 7	i 21 53	+ 6	e 13 3	pP	e 35·0
Logan		83·5	42	i 12 0	+ 3	i 21 56	+ 3	i 13 5	pP	e 35·0
Bozeman		86·0	39	—	—	e 22 5	[0]	e 24 10	PS	e 35·0
Rapid City		90·1	44	e 12 32	+ 3	i 22 39	[+ 9]	i 13 40	pP	e 35·5
Huancayo		95·5	104	i 13 0	+ 7	i 23 42	+ 1	e 14 7	pP	e 40·3
St. Louis		97·3	52	i 13 3	+ 1	e 23 14	[+ 4]	i 14 9	pP	—
Irkutsk		98·5	322	16 43	?	i 23 18	[+ 2]	17 7	PP	—
La Paz	Z.	100·4	111	i 14 30k	pP	i 23 34	[+ 9]	i 17 32	PP	—
Bogota	N.	102·0	89	—	—	e 23 31	[− 2]	—	—	—
Calcutta	N.	102·5	290	e 18 16	PP	—	—	—	—	—
Colombo	E.	106·3	272	—	—	23 59	[+ 7]	—	—	—
Ottawa		109·2	47	29 19	PPS	37 51	SSS	—	—	45·0
Kodaikanal	E.	109·5	275	e 17 2	−54	—	—	—	—	—
Hyderabad		110·3	283	e 18 41	PP	e 23 36	[−33]	—	—	—
Fordham		111·0	52	e 19 6	pPKP	e 25 55	SKKS	e 27 56	PS	e 49·7
San Juan		113·1	77	e 18 12	[+ 9]	i 24 23	[+ 3]	e 28 37	PS	e 45·9
New Delhi		113·6	295	e 18 57	[+53]	i 24 20	[− 2]	—	—	—
Bombay		115·9	283	e 18 9	[0]	i 24 43	[+12]	—	—	—
Bermuda		116·5	62	e 20 41	?	e 24 37	[+ 4]	e 34 37	SS	e 48·5
Tashkent		120·8	308	e 17 20	[−58]	i 26 22	SKKS	i 23 50	?	—
Stalinabad		121·3	305	e 18 24	[+ 5]	—	—	—	—	—
Samarkand		122·6	306	e 18 25	[+ 3]	—	—	—	—	—
Sverdlovsk		123·5	328	i 20 0	PP	i 25 2	[+ 5]	i 21 39	PPP	—
Scoresby Sund		125·2	11	37 33	SSP	27 57	SKKS	—	—	—
Sotchi		141·2	319	e 18 59	[+ 3]	—	—	—	—	—
Copenhagen		142·0	353	22 13	PP	—	—	—	—	—
Warsaw		143·6	343	e 19 0k	[− 1]	33 20	PS	22 9	PP	e 39·5
Yalta		144·0	324	e 19 0	[− 2]	—	—	—	—	—
Potsdam		145·2	352	e 19 6	[+ 2]	e 23 36	PKS	—	—	—
De Bilt		146·1	359	i 19 8k	[+ 3]	—	—	i 20 20	pPKP	—
Jena	Z.	146·8	352	i 19 8	[+ 2]	—	—	i 20 19	pPKP	—
Uccle		147·4	2	i 19 10a	[+ 3]	43 27	SSP	e 20 21	pPKP	—
Cheb		147·5	352	e 19 27?	[+20]	e 41 10	SS	e 36 27	?	—
Ksara		148·1	304	i 19 12	[+ 4]	20 58	sPKP	20 29	pPKP	—
Budapest	E.	148·4	342	19 13	[+ 4]	—	—	i 20 4	?	—
Istanbul		149·1	323	i 19 14	[+ 4]	—	—	—	—	—
Stuttgart		149·2	355	i 19 12k	[+ 2]	—	—	e 22 41	PP	—
Kalocsa		149·3	342	i 19 4	[− 6]	—	—	—	—	—
Paris		149·3	3	i 19 14	[+ 4]	e 42 27	SSP	i 20 28	pPKP	e 85·5
Strasbourg		149·5	356	e 19 13	[+ 3]	e 41 33	SS	i 20 30	pPKP	—
Belgrade		150·3	338	e 18 47	[−24]	—	—	e 22 39	PP	—
Basle		150·5	357	e 19 14	[+ 2]	—	—	e 20 30	pPKP	—
Zürich		150·6	356	e 19 14k	[+ 2]	—	—	e 22 51	PP	—
Zagreb		150·8	344	e 19 15k	[+ 3]	—	—	—	—	—
Besançon		150·9	358	e 19 22	[+10]	—	—	e 20 41	pPKP	—
Chur		151·1	354	e 19 15k	[+ 2]	—	—	—	—	—
Neuchatel		151·1	357	e 19 16	[+ 3]	—	—	—	—	—
Triest		151·5	346	e 19 23	[+10]	—	—	e 23 23	PP	—
Clermont-Ferrand		152·4	3	i 19 18	[+ 3]	—	—	i 20 52	pPKP	—
Helwan		153·1	300	i 19 18a	[+ 2]	33 27	PS	23 15	PP	—
Rome		155·4	348	i 19 21k	[+ 2]	e 42 25	SS	20 37	pPKP	—

For Notes see next page.

NOTES TO NOVEMBER 28d. 15h. 51m. 33s.

Additional readings :—
Auckland sS =9m.52s., S_cP =11m.2s., P_cS =11m.27s., S_cS =15m.7s., sS_cS =17m.7s.
Wellington SS =10m.51s., P_cS =11m.46s., S_cS =15m.27s., sS_cS =17m.27s., i =19m.57s.
Christchurch P_cSEN =15m.30s.
Brisbane iSSE =11m.3s.
Riverview iPP =7m.49s., iZ =8m.26s., isPPEZ =9m.2s., isSE =13m.15s., iSSEN = 14m.10s., iSSZ =14m.14s., iSSSN =14m.37s., iS_cSEN =16m.19s.
Pasadena iZ =11m.18s. and 12m.40s., ePPZ =14m.1s.
Palomar eZ =38m.27s.
Shasta Dam e =21m.13s.
Vladivostok pPP =15m.41s., PS =22m.21s.
Tucson isP =13m.14s., ePP =13m.41s., i =21m.32s., ePKP,PKP =38m.25s.
Sitka e =13m.19s., ePPP =17m.12s., i =21m.54s. and 22m.0s., isS =23m.33s., eSS = 26m.51s.
Salt Lake City epPP =16m.41s., esS =23m.39s.
Logan e =15m.14s.
Rapid City ePP? =15m.50s., i =16m.37s., iS =23m.6s., iSP =24m.6s., eSS =29m.21s.
Huancayo iPP =16m.53s., iSKS =23m.15s., i =24m.3s., eSP =24m.47s., i =25m.15s., iPS =25m.27s., ipPS =26m.11s.
St. Louis eS? =23m.44s.
La Paz iZ =24m.51s. and 26m.30s.
Fordham i =25m.13s. and 29m.37s.
San Juan e =15m.37s., eS? =25m.32s., e =30m.27s.
New Delhi iN =25m.28s., SSN =26m.20s., LN =28m.51s.
Bermuda e =25m.57s., eS =26m.45s., e =27m.59s., 28m.52s., 29m.52s., and 35m.7s.
Scoresby Sund 31m,29s. and 36m.49s.
Warsaw ePKPE =19m.3s., ePKPN =19m.12s., eZ =19m.15s., eZ =19m.38s., epPKPZ = 20m.15s., eEZ =20m.53s., PPE =22m.3s., eZ =22m.35s., eN =32m.28s., PPS?N = 34m.0s., eZ =34m.20s.
Jena iPN =19m.12s.
Uccle iEN =19m.20s., i =19m.33s., iN =20m.0s., ipPKP? =20m.25s.
Ksara PP =22m.47s.?
Stuttgart iP =19m.17s.k, iZ =19m.34s., eZ =19m.43s., 19m.56s. and 20m.33s.
Paris i =19m.17s. and 19m.28s., $iPKP_2$ =19m.36s., i =19m.39s.
Strasbourg i =19m.18s., e =19m.30s., $iPKP_2$ =19m.48s., e =21m.56s., ePP? =22m.30s., e =28m.44s.
Belgrade e =21m.0s.
Zürich i =19m.20s., e =31m.26s.
Zagreb iZ =19m.21s. and 19m.31s., i =19m.34s.
Triest ePKP =19m.38s.
Helwan i =19m.24s., PKP_2 =19m.55s., i =20m.12s., $sPKP_2$ =20m.30s., i =24m.18s. and 24m.51s.
Rome PKP_2 =19m.45s., $pPKP_2$ =20m.59s., PP =23m.21s., ePSKS?N =33m.59s., ePPS?N =36m.50s., eSSS? =48m.45s.

Nov. 28d. Turkestan after-shocks.

Andijan 15h.44m.47s.
Frunse 15h.45m.35s.?
Obi-garm 14h.13m.2s.?
Samarkand 14h.13m.38s., 15h.47m.10s.
Stalinabad 14h.13m.16s.
Tashkent 14h.13m.33s., 15h.45m.19s.

Nov. 28d. Readings also at 1h. (Riverside, Tucson, Overton, Pierce Ferry, near Guadalajara, and Tacubaya), 10h. (La Paz), 11h. (near Lick), 14h. (near Alicante (5)), 15h. (near Mineral).

Nov. 29d. Turkestan after-shocks.

Andijan 4h.44m.37s., 15h.53m.38s., 22h.19m.38s.
Frunse 4h.44m.56s.
Obi-garm 4h.45m.20s.?
Samarkand 4h.45m.43s.
Stalinabad 4h.45m.37s.
Tashkent 4h.45m.4s.?

Nov. 29d. Readings also at 4h. (Harvard), 5h. (Overton and Pierce Ferry), 6h. (Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Grand Coulee), 8h. (near Mineral), 10h. (near Balboa Heights), 11h. (La Jolla, Pasadena, Palomar, Riverside, Santa Barbara, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Grand Coulee, and Stuttgart), 12h. (Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, and Pierce Ferry), 13h. (Punta Arenas, Boulder City, Overton, and Pierce Ferry), 16h. (near Fort de France), 17h. (near Mizusawa), 18h. (near Alicante, Almeria, Granada, and Malaga), 19h. (Brisbane, Riverview, Arapuni, Auckland, Christchurch, Wellington, Riverside, Tinemaha, Tucson, Pierce Ferry, Shasta Dam, Ksara, Chur, Stuttgart, Leninakan, near Grozny, Piatigorsk, and Sotchi), 20h. (Grozny and near Piatigorsk), 23h. (Granada and Almeria).

Nov. 30d. 0h. 49m. 21s. Epicentre 15°·5N. 91°·7W. Depth of focus 0·040.
(as on 1942, November 5d.).

$A = -\cdot0286$, $B = -\cdot9637$, $C = +\cdot2656$; $\delta = +8$; $h = +6$;
$D = -1\cdot000$, $E = +\cdot030$; $G = -\cdot008$, $H = -\cdot265$, $K = -\cdot964$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	·°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca	E.	5·1	289	1 5	−14	1 55	−25	—	—	—
Vera Cruz		5·6	312	1 16	− 9	2 13	−18	—	—	—
Merida		5·8	21	1 29	+ 2	2 37	+ 2	—	—	—
Tacubaya	E.	8·1	300	1 52	− 3	3 19	− 7	—	—	3·6
Columbia		20·8	26	e 4 24	+ 4	e 8 0	+10	—	—	e 9·3
Tucson		24·1	318	i 4 52	+ 1	e 10 5	SS	i 5 43	pP	—
Pierce Ferry		28·6	320	i 5 33	+ 1	—	—	—	—	—
Palomar		28·9	314	i 5 35k	0	i 15 53	S_eS	i 6 27	pP	—
Boulder City		29·0	319	i 5 37	+ 1	—	—	—	—	—
Overton		29·1	320	e 5 37	+ 1	—	—	—	—	—
Riverside	Z.	29·6	314	i 5 42	+ 1	—	—	e 6 31	pP	—
Pasadena		30·2	314	i 5 48	+ 2	—	—	e 8 43	?	—
Santa Barbara	Z.	31·5	312	i 5 59	+ 2	—	—	—	—	—
Huancayo		31·8	148	i 6 1	+ 1	—	—	—	—	—
Tinemaha		31·9	318	i 6 2	+ 1	—	—	—	—	—
Harvard		32·0	29	i 6 1	− 1	—	—	—	—	—
Shasta Dam		36·6	320	e 6 40	− 1	—	—	—	—	—
Grand Coulee		39·4	331	e 7 2	− 2	—	—	e 7 57	pP	—
Stuttgart	Z.	85·5	41	e 13 13	+66	—	—	—	—	—

Additional readings :—
Tucson i = 6m.31s.
Riverside iZ = 8m.41s., eZ = 12m.0s.

Nov. 30d. Turkestan after-shocks.

Andijan 12h.46m.54s., 18h.28m.32s.
Frunse 12h.47m.26s.
Obi-garm 8h.40m.6s., 18h.27m.43s.
Samarkand 8h.41m.25s.
Stalinabad 8h.40m.8s., 12h.47m.33s., 18h.27m.37s.

Nov. 30d. Readings also at 7h. (near Leninakan), 11h. (Andijan, Sverdlovsk, Irkutsk, Ksara, Calcutta, and Hyderabad), 12h. (Helwan, Istanbul, Kew, and Riverview), 13h. (Overton), 17h. (Pierce Ferry, Tinemaha, Boulder City, Tucson, and Palomar), 21h. (La Paz, Santa Lucia, and near Mineral), 22h. (Boulder City).

Dec. 1d. 11h. 30m. 16s. Epicentre 23°·5S. 71°·0W. (Rough). (as on 1945, July 30d.).

$A = +·2989$, $B = -·8680$, $C = -·3965$; $\delta = -2$; $h = +4$;
$D = -·946$, $E = -·326$; $G = -·129$, $H = +·375$, $K = -·918$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Montezuma		2·2	66	e 0 32	− 6	i 0 54	−12	i 0 42	P*	e 1·0
La Paz	E.	7·5	22	2 6	PPP	3 39	SS	—	—	4·1
Santa Lucia		9·9	179	2 30	+ 5	4 22	+ 2	2 45	PPP	4·5
La Plata	E.	16·1	138	4 56	+67	7 26	SSS	—	—	8·2
	N.	16·1	138	5 2	+73	7 1	SS	—	—	7·9
Tucson		67·1	324	i 10 58	+ 1	—	—	i 11 10	P_cP	—
Palomar	N.	71·5	320	e 11 23	− 1	—	—	—	—	—
Pierce Ferry		71·9	324	i 11 25	− 2	—	—	e 38 9	P′P′	e 42·5
Boulder City		72·2	323	i 11 27	− 2	—	—	e 11 40	P_cP	—
Riverside	Z.	72·2	320	i 11 27a	− 2	—	—	e 11 40	P_cP	—
Overton		72·4	324	i 11 30	0	—	—	e 38 5	P′P′	e 43·3
Pasadena	Z.	72·8	320	i 11 31	− 1	—	—	i 11 45	P_cP	—
Santa Barbara	Z.	73·9	319	i 11 38	− 1	—	—	i 11 43	P_cP	—
Tinemaha	Z.	74·9	323	i 11 14a	−30	—	—	i 11 27	P_cP	—
Shasta Dam		79·7	323	i 12 8	− 3	—	—	i 12 21	P_cP	—

Additional readings :—
Santa Lucia N = 2m.53s., E = 3m.37s. and 4m.10s.
Riverside ePKP,PKPZ = 38m.1s.
Pasadena ePKP,PKPZ = 38m.10s.
Long waves were also recorded at Brisbane, Auckland, Riverview, Wellington, and Christchurch.

Dec. 1d. 13h. 52m. 15s. Epicentre 35°·5N. 140°·4E. (as on 1946, January 29d.).

Intensity VI at Kotomachi; V at Kamimizo, Numata, and Masutomi; IV at Kakioka, Ito, Tokyo, Tukubasan, Yokohama, Utunomiya, Mito, Kumagaya, Hunatsu, and Shizuoka; II-III at Maebasi and Hukusima.
Epicentre 35°·7N. 140°·4E.; focal depth 70km.; macroseismic radius 200-300km.
The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1946, Tokyo, 1951, p. 26; isoseismic chart, p. 26.

$A = -·6287$, $B = +·5201$, $C = +·5781$; $\delta = -3$; $h = 0$;
$D = +·637$, $E = +·771$; $G = -·445$, $H = +·368$, $K = -·816$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Tokyo	0·6	289	0 16	+ 1	0 26	0
Mera	0·7	219	0 20	+ 3	0 32	S_e
Yokohama	0·7	264	0 18k	+ 1	0 28	0
Kakioka	0·8	346	0 17	− 1	0 28	− 3
Tukubasan	0·8	341	0 16	− 2	0 25	− 6
Mito	0·9	3	0 21a	+ 1	0 33	− 1
Kumagaya	1·0	309	0 23	+ 2	0 32	− 4
Utunomiya	1·1	338	0 20a	− 2	0 33	− 6
Hunatu	1·3	270	0 25	0	0 41	− 3
Maebasi	1·3	313	0 24a	− 1	0 39	− 5
Shizuoka	1·7	252	0 31k	0	0 51	− 3
Omaesaki	2·0	243	0 35	0	1 2	0
Nagano	2·2	303	0 36	− 2	0 58	− 8
Hukusima	2·3	1	0 40k	0	1 3	− 6
Mizusawa	3·7	8	1 1	+ 1	1 41	− 4
Overton	80·2	52	e 13 2	+48	—	—
Pierce Ferry	80·7	52	e 12 13	− 3	—	—

Dec. 1d. Readings also at 0h. (near Mineral), 1h. (near La Paz), 2h. (Strasbourg, near Zürich, Stuttgart, and Ebingen, and near Fort de France), 3h. (Shasta Dam, Manzanillo, Ksara, and near Istanbul), 5h. (near Overton, Boulder City, and Pierce Ferry), 6h. (near Obi-garm, Shasta Dam, near Lick, and near Overton, Boulder City (2), and Pierce Ferry), 8h. (Jena), 9h. (Obi-garm, Frunze, Tashkent, and near Andijan), 10h. (near Mizusawa), 11h. (near Boulder City, Overton, and Pierce Ferry), 12h. (Tucson), 15h. (Samarkand and near Andijan, Frunse, Obi-garm, and Tashkent), 16h. (Tashkent and near Frunse, Andijan, and Obi-garm), 19h. (Cheb), 21h. (near La Paz).

Dec. 2d. Readings at 1h. (Pierce Ferry and near Obi-garm), 7h. (near Frunse, Stalinabad, and Obi-garm), 13h. (near Boulder City and Pierce Ferry), 14h. (Pierce Ferry, Palomar, Riverside, and Tucson), 16h. (Pierce Ferry, Stalinabad, and near Andijan, Tashkent, and Obi-garm), 19h. (Riverview and Strasbourg), 20h. (Shasta Dam and Riverview), 21h. (Riverview, Brisbane, Stalinabad, and near Andijan, Frunze, Obi-garm (2), and Samarkand), 22h. (Brisbane and Riverview), 23h. (Bombay, Calcutta, Balboa Heights, and near Branner).

Dec. 3d. Readings at 1h. (Pierce Ferry and Tucson), 3h. (Huancayo, Balboa Heights, Stalinabad, Samarkand, and near Andijan, and Tashkent), 5h. (Frunze and Andijan), 6h. (Pierce Ferry and Boulder City), 7h. (Huancayo (2), Merida, San Juan, Tucson, Pierce Ferry, Palomar, Boulder City, Pasadena, and Tinemaha), 8h. (Tucson, Samarkand, and near Ob-igarm, Stalinabad, Andijan, and Tashkent), 9h. (Huancayo), 10h. (Andijan near Stalinabad and Obi-garm), 11h. (near Leninakan), (Tucson (2) and near La Paz), 13h. (La Paz, Huancayo, Tucson, Palomar, Riverside, Pasadena, Tinemaha, near Andijan, Frunse, Tashkent, Obi-garm, Stalinabad, and Samarkand), 14h. (Palomar, Tucson, Riverside, Riverview, near Andijan, Tashkent, and Frunse), 17h. (near Tacubaya), 19h. (Tinemaha, Boulder City, Pierce Ferry, Tucson, and Shasta Dam), 21h. (Boulder City, Pierce Ferry, Tucson, and near Obi-garm and Stalinabad), 22h. (Vera Cruz, Oaxaca, near Tacubaya, Tucson, Tinemaha, Pasadena, Palomar, and near Andijan, Frunse, Tashkent, Obi-garm, Stalinabad, and Samarkand), 23h. (Boulder City, near Frunse, Andijan, Tashkent, and Obi-garm).

Dec. 4d. 21h. 40m. 7s. Epicentre 35°·3N. 69°·7E. (as on 1946, July 27d.).

Bulletin of stations of U.S.S.R. suggests epicentre 35°50′N. 68°30′E.

$A = +\cdot2838$, $B = +\cdot7671$, $C = +\cdot5752$; $\delta = -16$; $h = 0$;
$D = +\cdot938$, $E = -\cdot347$; $G = +\cdot200$, $H = +\cdot539$, $K = -\cdot818$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stalinabad		3·3	348	i 0 55	+ 2	i 1 27	− 8	—	—	—
Obi-garm		3·4	0	i 0 59	+ 4	—	—	—	—	—
Samarkand		4·9	334	i 1 11	− 6	i 1 59	−16	—	—	—
Andijan		5·9	21	1 37	+ 6	i 3 13?	SS	—	—	—
Tashkent		6·0	357	e 1 27	− 5	e 2 43	0	e 2 30	?	—
Frunse		8·5	25	e 2 3	− 4	e 3 43	− 2	—	—	—
New Delhi	N.	9·3	134	—	—	i 4 46	SSS	—	—	—
Almata		9·8	33	e 2 33	PP	—	—	—	—	—
Bombay		16·6	170	e 4 23	PPP	e 7 55	SSS	—	—	—
Hyderabad		19·4	153	e 4 3	−27	9 2	SSS	5 2	PPP	12·9
Grozny		20·2	300	e 4 35	− 4	—	—	—	—	—
Calcutta		20·7	122	e 9 6	SS	—	—	—	—	—
Sverdlovsk		22·4	347	e 4 56	− 6	8 54	−10	—	—	—
Kodaikanal	E.	26·0	163	—	—	e 10 54	SS	—	—	—
Ksara		27·8	276	e 10 53	S	(e 10 53)	+18	e 16 50	S_cS	—
Moscow		30·0	323	e 6 35	+23	e 11 34	+24	—	—	—
Stuttgart	Z.	45·8	307	e 8 23	− 2	—	—	—	—	—
Vladivostok		47·8	61	e 8 48	+ 7	—	—	—	—	—

Calcutta also gives iSN = 12m.3s., P_cPN = 13m.48s.
Long waves were also recorded at Warsaw, Copenhagen, Uccle, and De Bilt.

Dec. 4d. 21h. 46m. 41s. Epicentre 36°·5S. 72°·6W. (as on 1939, May 6d.).

$A = +·2410$, $B = -·7689$, $C = -·5922$; $\delta = -1$; $h = 0$;
$D = -·954$, $E = -·299$; $G = -·177$, $H = +·565$, $K = -·806$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia	E.	3·4	27	0 51	− 4	1 37	0	—	—	—
	N.	3·4	27	0 46	− 9	(1 35)	− 2	—	—	1·6
La Plata	E.	12·0	87	i 3 2	+ 7	—	—	3 14	PPP	6·4
	N.	12·0	87	3 3	+ 8	5 41	SSS	—	—	6·2
	Z.	12·0	87	3 6	+11	6 1	SSS	—	—	6·6
La Paz		20·3	13	i 4 3a	− 4	i 8 22	− 1	i 8 17	S	11·4
Huancayo		24·5	354	e 5 19	− 3	e 9 35	− 5	—	—	i 10·5
Bogota	Z.	40·9	358	e 9 44	PPP	—	—	—	—	—
Fort de France		52·1	14	e 9 7	− 7	—	—	—	—	—
San Juan		54·9	8	—	—	e 17 2	−14	e 20 39	SS	e 30·4
Tucson		77·2	329	e 11 57	0	—	—	—	—	—
Palomar	E.	80·9	324	e 12 20	+ 3	—	—	—	—	—
Riverside	Z.	81·6	324	e 12 23	+ 2	—	—	—	—	—
Pierce Ferry		81·8	328	e 12 22	0	—	—	—	—	—
Boulder City		82·1	328	e 12 22	− 2	—	—	—	—	—
Pasadena	Z.	82·1	324	e 12 19	− 5	—	—	e 12 25	P_cP	—
Tinemaha	Z.	84·6	325	e 12 41	+ 5	—	—	—	—	—
Shasta Dam		89·4	325	e 13 3	+ 3	—	—	—	—	—
Riverview	E.	99·0	216	—	—	e 25 24	+12	—	—	e 42·2
Cheb		114·0	44	e 16 38	?	e 22 19	PKS	e 47 45	Q	e 59·3

Additional readings :—
Santa Lucia E = 1m.23s., N = 1m.26s., E = 1m.34s.
Huancayo i = 5m.26s., e = 7m.8s.
Long waves were also recorded at Christchurch, Rome, and Salt Lake City.

Dec. 4d. 22h. 46m. 39s. Epicentre 22°·5N. 122°·5E. (as on 1944, Feb. 5d.).
Destruction in the region of Tainan, with 53 dead, 312 injured, and 100 houses destroyed.
Epicentre 23°N. 121°E.
Annales de l'Institut de Physique du Globe de Strasbourg, 2ème partie, Séismologie, Nouvelle Série, Tome XI, année, 1946, p. 75.

$A = -·4969$, $B = +·7800$, $C = +·3805$; $\delta = +9$; $h = +4$;
$D = +·843$, $E = +·537$; $G = -·204$, $H = +·321$, $K = -·925$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kumumoto		12·6	34	3 23	PPP	—	—	8 32	P_cP	—
Hukuoka		13·1	30	3 28k	PPP	7 51	?	—	—	10·5
Hamada		14·9	32	e 3 32	− 2	6 53	SSS	—	—	—
Kobe		16·5	40	5 4	?	8 25	?	—	—	—
Shizuoka		18·6	44	4 41	+20	8 31	SSS	—	—	—
Yokohama		19·7	47	e 5 23	PPP	e 9 35	?	—	—	e 13·5
Tokyo		20·0	46	e 5 39	+62	e 10 18	+121	e 11 44	?	e 13·8
Sendai		22·3	40	e 5 58	+57	—	—	—	—	—
Mizusawa		23·0	40	5 21	PP	e 9 37	SS	—	—	e 13·9
Mori		24·7	32	e 4 12	−72	—	—	—	—	i 14·2
Calcutta	N.	31·5	277	e 7 14	PP	i 11 51	+17	—	—	—
Irkutsk		32·9	339	e 6 32	− 6	11 44	−12	—	—	—
New Delhi	N.	41·1	288	—	—	i 13 28	−33	16 18	SS	20·0
Hyderabad	N.	41·6	271	e 7 48	− 3	13 50	−18	17 0	SS	—
Almata		42·9	310	e 8 16	+14	—	—	—	—	—
Colombo	E.	43·9	256	8 0	−10	17 54	SS	—	—	26·6
Frunse		44·5	308	e 8 31	+16	—	—	—	—	—
Kodaikanal	E.	44·7	263	1 8 17	+ 1	e 15 27	PPS	9 57	PP	24·5
Andijan		45·8	305	e 8 24	− 1	—	—	—	—	—
Bombay		46·4	275	e 8 21	− 9	i 15 34	PPS	—	—	24·0

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		48·1	306	e 8 39	− 4	e 15 49	+ 7	—	—	—
Stalinabad		48·3	302	e 8 40	− 5	—	—	—	—	—
Samarkand		49·7	303	e 8 44	−12	—	—	—	—	—
Sverdlovsk		56·1	324	9 36	− 7	i 17 18	−14	—	—	—
Riverview		62·3	153	e 10 55	P_eP	i 19 24	PPS	—	—	e 27·2
Baku		62·8	305	e 10 32	+ 2	—	—	—	—	—
Grozny		65·5	308	e 10 12	−35	—	—	—	—	—
Moscow		68·9	323	e 11 11	+ 2	i 19 59	−14	—	—	—
College		69·7	27	—	—	e 20 33	+11	e 21 9	sS	e 32·0
Sotchi		69·8	310	e 11 10	− 4	—	—	—	—	—
Yalta		73·3	311	e 11 31	− 4	—	—	—	—	—
Simferopol		73·4	312	e 11 38	+ 2	—	—	—	—	—
Helsinki		74·4	330	—	—	e 21 7	− 9	e 21 24	PS	e 39·4
Ksara		75·1	301	e 11 38	− 8	e 21 18	− 6	—	—	—
Auckland		76·9	140	—	—	e 22 21?	PS	—	—	—
Sitka		77·6	33	—	—	e 22 15	+24	—	—	e 41·3
Istanbul		78·0	310	e 11 58	− 4	i 21 46	− 9	—	—	—
Upsala		78·0	330	i 12 44	+42	21 42	−13	—	—	e 37·4
Arapuni		78·2	140	—	—	e 21 21	−36	—	—	—
Bucharest		79·0	314	e 21 57	S	(e 21 57)	− 9	—	—	39·4
Warsaw		79·2	322	e 11 58	−10	e 21 58	−10	e 16 59	PPP	e 39·4
Wellington		79·8	143	—	—	23 21	PPS	—	—	—
Helwan		80·1	298	e 12 7	− 6	—	—	—	—	—
Christchurch		80·2	146	12 37	+23	22 39	+20	15 14	PP	40·1
Sofia		81·5	312	e 12 21	0	e 22 26	− 6	—	—	—
Budapest		82·3	319	e 12 36	+11	e 22 21?	−19	—	—	43·9
Copenhagen		82·3	328	e 12 33	+ 8	e 22 33	− 7	e 28 21	SS	37·4
Belgrade		82·5	315	e 12 32	+ 6	e 23 3?	+21	—	—	40·9
Bergen	E.	83·1	334	—	—	e 22 48	0	—	—	42·4
Prague		83·4	323	e 12 23	−10	e 22 47	− 9	e 32 39	SSS	e 41·4
Tananarive		84·0	247	—	—	e 22 50	− 7	—	—	e 38·8
Collmberg		84·1	323	e 12 27	− 7	e 23 3	+ 5	e 16 9	PP	e 43·4
Cheb		85·1	323	e 12 35	− 4	e 23 4	− 4	e 15 43	PP	e 45·4
Triest		86·4	318	e 24 40	PPS	e 23 10	−11	—	—	—
Stuttgart		87·5	323	e 12 50	− 1	—	—	—	—	e 46·4
De Bilt		87·8	327	e 16 21	PP	i 23 23	− 1	—	—	e 45·4
Aberdeen	E.	88·1	334	i 3 55	?	i 23 36	− 1	—	—	e 44·3
Strasbourg		88·4	323	e 13 0	+ 5	e 23 36	− 4	e 16 24	PP	i 47·0
Uccle		89·0	327	e 34 2	?	—	—	e 42 21	Q	e 45·4
Paris		91·2	325	e 17 21?	PP	e 24 1	− 4	—	—	e 47·4
Salt Lake City		99·3	39	—	—	e 25 33?	+19	e 36 40?	SSS	e 51·0
Lisbon		104·1	324	13 9	−58	—	—	53 39	Q	57·2
Tucson		105·4	45	e 19 1	PP	—	—	—	—	e 57·4
Harvard		114·0	11	—	—	31 51	PPS	—	—	—
Weston		114·2	11	—	—	e 27 1	(+27)	37 51	?	e 49·4
La Paz		168·3	62	e 20 56	[+48]	—	—	25 53	PP	85·4

Additional readings :—
College e =26m.9s.
Sitka i =23m.18s., e =28m.28s.
Upsala eN =15m.52s., SSN =25m.58s., eSSSN =29m.21s.
Warsaw PSE =22m.46s., PSN =22m.50s., SSE =26m.40s., SSSN =29m.52s., SSSE = 29m.59s.
Helwan e =12m.42s., i =21m.6s. and 21m.45s.
Christchurch SSSZ =26m.31s., SSSEN =27m.26s., SSSSZ =29m.41s., Q?EN =32m.51s. readings wrongly identified.
Copenhagen 30m.33s.
Belgrade e =14m.35s. and 24m.38s.
Bergen eE =27m.28s.
Collmberg eZ =12m.30s., 14m.40s., 16m.33s., 21m.51s., and 23m.44s.
Cheb e =28m.41s. and 33m.2s.
Strasbourg ePPS? =28m.20s., eSSS? =33m.28s., e =39m.0s.
Paris e =22m.42s.
Lisbon N =38m.39s., E =53m.15s.
Weston eSSS =41m.21s.
Long waves were also recorded at Sapporo and other American and European stations.

Dec. 4d. Readings at 3h. (Balboa Heights), 7h. (near Mizusawa), 9h. (near Andijan (2), Frunse (2), Tashkent (2), Obi-garm, Stalinabad, and Samarkand), 10h. (Huancayo (2), and near Andijan, Frunse, Tashkent, Obi-garm, and Stalinabad), 12h. (Pierce Ferry (2), Tucson (2), and Palomar (2)), 14h. (near Andijan, Frunse, Tashkent, and Obi-garm), 17h. (near Zürich), 20h. (Huancayo), 22h. (Istanbul, Cheb, near Obi-garm, Samarkand, and Stalinabad), 23h. (near Andijan, Stalinabad, and Samarkand).

Dec. 5d. 6h. 44m. 33s. Epicentre 5°·5S. 144°·5E.

$A = -·8104$, $B = +·5781$, $C = -·0952$; $\delta = +1$; $h = +7$;
$D = +·581$, $E = +·814$; $G = +·078$, $H = -·055$, $K = -·996$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		23·3	160	i 5 11	+ 1	i 9 21	+ 1	i 5 34	PP	i 13·6
Riverview		28·9	168	i 6 5a	+ 2	i 10 53	0	i 6 59	PP	e 14·8
Perth		37·6	221	—	—	i 13 15	+ 7	i 16 19	Q	i 20·8
Auckland		41·7	142	7 46	− 6	14 7	− 3	17 16	SS	—
Arapuni		43·0	143	—	—	15 27?	+58	—	—	22·4
Mizusawa	E.	44·5	356	e 8 26	+11	e 14 40	−11	—	—	—
Wellington		44·7	147	8 16	0	14 46	− 8	18 37	SSS	—
Christchurch		45·3	151	8 21	0	14 43	−19	10 4	PP	20·5
Vladivostok		49·7	347	e 8 52	− 4	i 15 56	− 8	—	—	—
Calcutta	N.	61·6	299	—	—	i 18 39	− 4	—	—	—
Colombo	E.	65·7	280	10 50	+ 2	19 36	+ 2	—	—	33·0
Irkutsk		66·9	334	10 55	− 1	19 43	− 6	—	—	—
New Delhi	N.	73·0	302	—	—	i 20 42	−18	—	—	—
Bombay		74·6	290	e 11 45	+ 2	e 21 19	+ 1	—	—	—
Andijan		80·2	312	e 12 24	+10	—	—	—	—	—
Obi-garm		81·7	311	e 12 27	+ 5	i 22 33	− 1	—	—	—
Stalinabad		82·3	310	e 12 27	+ 2	—	—	—	—	—
Tashkent		82·6	313	12 29	+ 3	e 22 40	− 3	e 28 10	SS	—
Samarkand		83·9	310	e 12 33	0	—	—	—	—	—
Sitka		89·4	32	e 13 20	+20	e 23 40	− 9	e 30 11	SS	e 40·7
Sverdlovsk		91·2	327	i 13 6	− 2	i 24 1	− 4	e 17 0	PP	—
Shasta Dam		95·9	50	e 12 27	−63	—	—	—	—	—
Pasadena	z.	99·1	57	e 13 40	− 4	—	—	—	—	e 74·2
Tinemaha	z.	99·1	54	e 13 49	+ 5	—	—	e 17 56	PP	—
Mount Wilson	z.	99·2	57	e 13 41	− 3	—	—	—	—	—
Riverside	z.	99·8	57	e 13 44	− 3	—	—	—	—	—
Palomar	z.	100·2	57	e 13 46	− 3	—	—	i 17 52	PP	—
Boulder City		101·8	55	e 18 1	PP	—	—	e 30 27	PKKP	—
Overton		102·1	54	e 18 10	PP	—	—	e 30 27	PKKP	—
Pierce Ferry		102·5	55	e 14 1	+ 1	—	—	e 18 33	PP	—
Tucson		105·3	59	e 14 39	+27	—	—	e 18 11	PP	e 48·2
Ksara		108·5	304	e 19 1	PP	28 21	PS	—	—	—
Helsinki		109·2	334	—	—	e 34 27?	SS	e 39 27?	SSS	e 63·4
Copenhagen		117·1	333	—	—	29 30	PKKP	35 45	SS	57·4
Cheb		120·2	328	—	—	e 25 27?	[−24]	e 40 27?	SSS	e 58·4
Stuttgart	z.	122·7	327	e 18 59k	[+ 1]	—	—	—	—	—
Huancayo		136·7	115	e 19 28	[+ 4]	—	—	—	—	—
La Paz	z.	141·0	126	i 19 34a	[+ 2]	—	—	—	—	67·4

Additional readings :—
Brisbane iSSE =9m.43s.
Riverview iZ =6m.44s., iN =11m.23s. and 11m.51s., iZ =12m.48s.
Auckland i =14m.34s.
Christchurch sSEZ =14m.59s., SSEZ =17m.57s., QN =18m.9s.
Calcutta iN =20m.9s.
New Delhi iN =21m.18s. and 21m.55s.
Tashkent S_cS =23m.28s., SSS =31m.21s.
Sitka e =24m.19s.
Sverdlovsk SKS =23m.29s., S_cS =24m.32s., iPS =25m.12s., ePPS =25m.50s., SS = 30m.14s.
Mount Wilson iZ =14m.8s.
Palomar iZ =14m.41s.
Pierce Ferry ePKKP =30m.25s.
Tucson ePKKP =30m.10s.
Long waves were also recorded at Bermuda and other European stations.

Dec. 5d. 8h. 41m. 19s. Epicentre 12°·4N. 92°·5E. (as on 1944, July 27d.).

$A = -\cdot0426$, $B = +\cdot9761$, $C = +\cdot2134$; $\delta = +13$; $h = +6$;
$D = +\cdot999$, $E = +\cdot044$; $G = -\cdot009$, $H = +\cdot213$, $K = -\cdot977$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	10·8	339	e 2 50	+11	e 4 33	− 9	—	—	i 5·5
Colombo	E.	13·6	248	3 10	− 7	5 24	−26	—	—	8·6
Hyderabad	N.	14·4	292	3 29	+ 2	6 2	− 7	—	—	—
Bombay		20·0	292	e 4 41	+ 4	e 8 32	+15	—	—	—
New Delhi	N.	21·5	322	e 4 50	− 2	i 9 11	+24	—	—	—
Obi-garm		33·1	326	e 6 41	+ 1	—	—	—	—	—
Stalinabad		33·5	325	e 6 39	− 4	—	—	—	—	—
Tashkent		35·2	329	e 6 54	− 4	e 12 45	+14	—	—	—
Sverdlovsk		50·6	338	9 0	− 2	—	—	—	—	—
Leninakan		51·0	312	e 8 14?	−52	—	—	—	—	—
Collmberg	Z.	73·9	320	e 11 44	+ 5	—	—	—	—	—
Stuttgart	Z.	76·4	318	e 11 23	−30	—	—	—	—	—
Overton		125·1	26	e 18 55	[− 8]	—	—	—	—	—
Boulder City		125·4	27	e 18 54	[− 9]	—	—	—	—	—
Pierce Ferry		125·6	26	e 18 56	[− 8]	—	—	—	—	—
Tucson		130·7	26	e 19 5	[− 8]	e 22 58	PKS	e 22 23	PP	—

Additional readings :—
Collmberg eZ = 11m.55s., and 12m.3s.
Tucson e = 19m.22s.

Dec. 5d. Readings also at 0h. (Huancayo and San Juan), 1h. (La Plata, Tucson, Boulder City, Overton, Pierce Ferry, and Stuttgart), 3h. (Triest and Pierce Ferry), 4h. (Huancayo, near Andijan, Frunse, Obi-garm, Stalinabad, and Tashkent), 7h. (near Huancayo), 9h. (near Andijan, Obi-garm, Samarkand, Stalinabad, Tashkent, and near Mizusawa (2)), 10h. (Huancayo, San Juan, Bermuda, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, near Obi-garm, Samarkand, and Stalinabad), 12h. (Christchurch and Wellington), 14h. and 16h. (Huancayo), 20h. (Riverview).

Dec. 6d. Readings at 3h. (Huancayo), 6h. (Huancayo and near Apia), 7h. (Huancayo and near Hyderabad), 8h. (Huancayo, La Paz, Bogota, Haiwee, Pasadena, Palomar, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Grand Coulee, and Christchurch), 10h. (Pierce Ferry (2)), 11h. (Stuttgart, near Neuchatel and Zürich), 14h. (near Balboa Heights), 23h. (Overton).

Dec. 7d. 17h. 18m. 20s. Epicentre 15°·5S. 167°·1E. Depth of focus 0·015. (as on 1946, July 12d.).

$A = -\cdot9398$, $B = +\cdot2152$, $C = -\cdot2656$; $\delta = +8$; $h = +6$;
$D = +\cdot223$, $E = +\cdot975$; $G = +\cdot259$, $H = -\cdot059$, $K = -\cdot964$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	E.	17·7	225	e 4 2	+ 2	i 7 22	+12	—	—	—
Auckland		22·3	164	4 44	− 3	8 46	+ 7	—	—	—
Riverview		23·2	216	e 5 3	+ 7	i 9 6	+11	i 9 44	sS	i 10·7
Arapuni		23·7	163	—	—	9 40?	SS	—	—	—
Wellington		26·5	168	5 40	+13	9 49	− 1	—	—	10·4
Christchurch		28·3	172	5 38	− 6	10 14	− 5	—	—	11·6
Pasadena	Z.	86·4	54	e 12 25	− 4	—	—	—	—	—
Mount Wilson	Z.	86·5	54	i 12 27	− 3	—	—	i 12 59	pP	—
Riverside	Z.	87·0	54	i 12 30	− 2	—	—	—	—	—
Palomar	Z.	87·2	55	i 12 31	− 2	—	—	i 13 3	pP	—
Boulder City		89·6	53	i 12 43	− 1	—	—	e 13 46	?	—
Pierce Ferry		90·3	53	i 12 46	− 2	—	—	i 13 19	pP	—
Tucson		91·6	57	e 12 53	− 1	—	—	e 13 24	pP	—
Ottawa		119·9	46	i 18 33	[− 2]	e 36 40?	SSP	e 19 41	PP	43·7
Ksara		132·5	302	e 18 57	[− 2]	39 44	SSP	21 42	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Collmberg	z.	138·7	336	e 18 55	[−16]	—	—	e 22 30	PP	—
Stuttgart	z.	142·2	336	e 19 14	[− 3]	—	—	i 19 18	PKP	—
Strasbourg		142·9	338	e 19 18	[− 1]	—	—	e 20 18	pPKP	—
Chur		143·6	335	e 19 19	[− 1]	—	—	i 22 48	PP	—
Zürich		143·6	336	e 19 20	[0]	—	—	—	—	—
Basle		143·8	337	e 19 19	[− 1]	—	—	—	—	—
Neuchatel		144·5	337	e 19 22	[+ 1]	—	—	—	—	—
Paris		144·5	343	i 19 22	[+ 1]	—	—	—	—	—

Additional readings :—
Riverview ePP?N =5m.48s., iEZ =9m.9s., iE =9m.19s., and 10m.3s., iSS?N =10m.36s.
Mount Wilson eZ =13m.13s.
Palomar iZ =13m.17s.
Pierce Ferry epPP =16m.41s.
Tucson e =16m.30s.
Collmberg eZ =19m.0s., 19m.5s., 19m.49s., and 20m.5s.

Dec. 7d. Readings also at 0h. (Shasta Dam, near Almata (2), Andijan (2), Frunse (2), Obi-garm (2), Samarkand (2), Stalinabad (2), and Tashkent (2)), 1h. (near Fresno and near Pierce Ferry), 2h. (Tucson, Overton, Pierce Ferry, Shasta Dam, near Branner, Lick, and Fresno, and near Andijan), 3h. (Overton, Pierce Ferry, Tucson, and near Mizusawa), 4h. (Palomar, Tucson, Boulder City, Overton, and Pierce Ferry), 5h. (Tucson, Boulder City, Overton, Pierce Ferry, and near Mizusawa), 7h. (Shasta Dam), 8h. (Pierce Ferry), 9h. (Boulder City), 10h. (Helwan), 12h. (Alicante and near Andijan), 14h. (Tananarive), 16h. (near Zürich), 17h. (Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City (2), Pierce Ferry, Shasta Dam, and Grand Coulee), 19h. (Ksara, near Erevan, Leninakan, and near La Paz), 23h. (near Obi-garm, Samarkand, Stalinabad, and Tashkent).

Dec. 8d. 12h. Undetermined shock. Chile.
Santa Lucia E =6m.49s., EN =6m.53s., N =6m.56s., E =7m.0s., N =7m.4s.
La Plata PZ =9m.8s., E =9m.48s., EZ =11m.42s., N =11m.48s., Z =12m.0s., N =18m.5s., iS =18m.44s., N =22m.0s., L?E =23m.8s., LN =24m.42s.
La Paz iPZ =10m.38s.k, iZ =11m.10s.
Huancayo eP =11m.33s., i =11m.54s., e =12m.36s., eS =15m.36s., eL =16m.22s.
Tucson iP =18m.19s., e =18m.42s.
Palomar iP =18m.40s.k, ipPZ =19m.6s.
Riverside iPZ =18m.44s.k, ipPZ =19m.9s.
Pierce Ferry iP =18m.44s., ipP =19m.9s.
Boulder City iP =18m.46s., ipP =19m.10s.
Pasadena iPNZ =18m.47s.
Mount Wilson iPZ =18m.48s.k, ipPZ =19m.11s.
Shasta Dam iP =19m.22s.
Long waves were also recorded at New Zealand and European stations.

Dec. 8d. Readings also at 1h. (Tucson, near Obi-garm, Samarkand, Stalinabad, and Tashkent), 4h. (Stuttgart, Overton, Tucson, and near Tacubaya), 5h. (Calcutta and Huancayo), 8h. (Tucson and Pierce Ferry), 9h. (Huancayo, near Almata, Andijan, Frunse, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 11h. (Huancayo), 12h. (La Jolla, Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Helwan, Ksara, Riverview, Fort de France, Tacubaya, Huancayo, and La Paz), 14h. (Collmberg), 16h. (Riverview), 17h. (San Juan), 21h. (Almata, Tashkent, near Andijan, Frunse, near Apia, near Istanbul, and near Tananarive), 22h. (Bombay, Calcutta, New Delhi, Copenhagen, Almata, near Obi-garm, Stalinabad (2), and near Fort de France), 23h. (Scoresby Sund, Andijan, Tashkent, near Obi-garm, and Stalinabad).

Dec. 9d. 5h. 19m. 24s. Epicentre 41°·8N. 71°·7E. (as on November 13d.).

$A = +·2348$, $B = +·7099$, $C = +·6641$; $\delta = +12$; $h = -2$;
$D = +·949$, $E = -·314$; $G = +·209$, $H = +·630$, $K = -·748$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		1·2	155	i 0 20	− 4	i 0 38	− 3	—	—	—
Tashkent		1·9	255	0 37	+ 3	e 1 12	+13	—	—	—
Obi-garm		3·5	207	i 0 59	+ 2	i 1 42	+ 2	i 2 6	S_g	—
Stalinabad		3·9	216	i 1 6	+ 4	i 1 56	+ 6	i 2 22	S_g	—
Almata		4·2	67	1 1	− 6	1 44	−13	—	—	—
Samarkand		4·2	241	i 1 8	+ 1	i 1 58	+ 1	i 2 28	S_g	—
Sverdlovsk		16·6	338	3 56	0	—	—	—	—	—
Grozny		19·1	283	e 4 29	+ 2	—	—	—	—	—
Bombay		22·8	177	—	—	e 9 16	+ 5	—	—	—
Hyderabad	N.	25·0	165	5 23	− 4	9 56	+ 7	—	—	—
Moscow		26·1	314	e 6 2	+25	—	—	—	—	—
Ksara		29·2	266	e 7 23	PPP	e 13 19	SSS	—	—	—
Warsaw		35·4	304	e 6 36?	−24	e 12 20	−14	—	—	e 18·7
Collmberg	N.	40·5	305	e 8 2	+20	—	—	—	—	—
Stuttgart	Z.	43·4	301	e 8 5k	− 1	—	—	—	—	—

Additional readings :—
Collmberg eZ = 8m.56s. and 9m.17s.
Long waves were also recorded at New Delhi, Helsinki, Istanbul, Copenhagen, and Cheb.

Dec. 9d. 12h. Undetermined shock near Almata.

Almata P_g = 27m.4s., S_g = 27m.16s.
Andijan eP_g = 28m.18s., iS_g = 29m.19s.
Tashkent eP = 28m.35s., eS_g = 30m.7s.
Obi-garm P = 28m.41s., S = 29m.55s., eS_g = 30m.39s.
Tchimkent iP = 28m.42s., iS_g = 30m.6s.
Stalinabad iP = 28m.49s., iS = 30m.10s., iS_g = 31m.21s.
Samarkand iP = 29m.14s., iS = 31m.30s. and 32m.0s.
Bombay eE = 31m.46s.
Sverdlovsk P = 31m.57s.
New Delhi iN = 34m.34s. and 35m.58s.
Collmberg eZ = 34m.45s.
Stuttgart eZ = 35m.18s.
Warsaw eE = 40m.0s., eL = 47m.
Hyderabad SN = 40m.39s.
Long waves were also recorded at other European stations.

Dec. 9d. Readings also at 0h. (Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, Shasta Dam, and Riverview), 1h. (Huancayo, La Paz, and Pierce Ferry (2)), 5h. (Huancayo, Tucson, and near Lick), 8h. (Christchurch, Wellington, Huancayo, La Paz, Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, Pierce Ferry, and Shasta Dam), 9h. (Riverview and Salt Lake City), 10h. (Tucson and near Alicante), 11h. (Bermuda, Harvard, Weston, San Juan, Tucson, Boulder City, and Pierce Ferry), 12h. (Shasta Dam, and near Huancayo), 13h. (near Tchimkent), 16h. (Balboa Heights), 19h. (Ksara), 20h. (Huancayo), 22h. (Samarkand, near Andijan, Tchimkent, Obi-garm, and Stalinabad), 23h. (Grand Coulee).

Dec. 10d. 7h. 23m. 0s. Epicentre 43°·5N. 139°·1E. Depth of focus 0·025.
(as on 1943, May 7d.).

Intensity V at Attoko (Hokkaido); IV at Hatinohe; II-III at Miyako.
Suggested depth 100km. Macroseismic radius 300km.
Seismo. Bull. Cent. Met. Obs., Japan 1946, Tokyo 1951, p. 26, with Isoseismal chart.

$A = -\cdot5500$, $B = +\cdot4765$, $C = +\cdot6859$; $\delta = +1$; $h = -3$;
$D = +\cdot655$, $E = +\cdot756$; $G = -\cdot518$, $H = +\cdot449$, $K = -\cdot728$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sapporo		1·7	105	0 30	− 5	0 54	− 9	—	—	—
Mori		1·8	142	0 37k	+ 1	1 28	+23	—	—	—
Hatinohe		3·5	147	1 0	+ 4	1 40	+ 1	—	—	—
Morioka		4·1	157	1 3k	0	1 49	− 4	—	—	—
Miyako		4·4	149	1 0k	− 7	1 48	−11	—	—	—
Mizusawa	E.	4·6	160	1 10	0	2 1	− 3	—	—	—
Nemuro		4·7	89	1 2	− 9	1 47	−19	—	—	—
Vladivostok		5·3	269	i 1 29	+10	i 2 39	+19	—	—	—
Sendai		5·4	165	1 19	− 1	2 19	− 3	—	—	—
Hukusima		5·9	169	1 26k	− 1	—	—	—	—	—
Onahama		6·7	167	1 52	+15	3 22	+29	—	—	—
Nagano		6·9	186	1 44	+ 4	3 4	+ 7	—	—	—
Maebasi		7·1	180	1 43	+ 1	3 5	+ 3	—	—	—
Mito		7·2	171	1 42	− 2	2 59	− 6	—	—	—
Kumagaya		7·3	178	1 48	+ 3	3 13	+ 6	—	—	—
Kakioka		7·3	173	1 40	− 5	—	—	—	—	—
Tukubasan		7·3	173	1 57	+12	3 14	+ 7	—	—	—
Tokyo		7·8	176	1 55	+ 4	3 18	− 1	—	—	—
Hunatu		8·0	182	1 46	− 8	3 22	− 1	—	—	—
Yokohama		8·0	177	1 35	−19	2 59	−24	—	—	—
Shizuoka		8·5	184	2 3	+ 2	3 36	+ 1	—	—	—
Omaesaki		8·9	185	2 8	+ 2	—	—	—	—	—
Irkutsk		24·7	303	5 11	+ 6	9 21	+11	—	—	—
Andijan		48·4	290	8 31	+ 7	i 15 20	+11	—	—	—
Sverdlovsk		49·2	315	i 8 35	+ 4	i 15 29	+ 9	—	—	—
Tchimkent		49·5	294	e 8 40	+ 7	e 15 36	+12	—	—	—
Tashkent		50·2	293	e 8 42	+ 4	—	—	—	—	—
Obi-garm		51·1	290	i 8 50	+ 5	15 57	+11	—	—	—
Stalinabad		51·8	290	e 8 57	+ 7	—	—	—	—	—
Grozny		64·0	306	e 10 20	+ 5	—	—	—	—	—
Grand Coulee		66·0	47	i 10 23	− 5	—	—	—	—	—
Erevan		66·7	304	e 10 37	+ 5	—	—	—	—	—
Leninakan		66·7	305	10 37	+ 5	—	—	—	—	—
Sotchi		67·4	309	10 40	+ 3	—	—	—	—	—
Shasta Dam		68·7	54	i 10 40	− 5	e 19 25	− 6	—	—	—
Warsaw		70·7	324	e 10 57	0	e 18 0?	?	—	—	e 40·0
Copenhagen		71·4	332	i 11 1	0	i 20 7	+ 5	—	—	32·0
Haiwee	N.	74·3	55	e 11 15	− 3	—	—	—	—	—
Santa Barbara		−74·4	58	i 11 15	− 4	—	—	—	—	—
Collmberg	Z.	74·7	328	e 11 12	− 8	—	—	e 13 42	PP	—
Mount Wilson		75·5	57	i 11 21a	− 4	—	—	—	—	—
Pasadena		75·5	57	i 11 21a	− 4	—	—	—	—	—
Jena	N.	75·5	328	e 11 26	+ 1	—	—	—	—	—
Ksara		76·0	303	e 12 11	+43	e 22 10	+77	—	—	—
Riverside		76·1	57	i 11 23a	− 5	—	—	—	—	—
Boulder City		76·3	54	i 11 25	− 4	—	—	i 12 15	pP	—
Belgrade		76·5	324	i 11 30	0	—	—	—	—	—
Pierce Ferry		76·6	53	i 11 28	− 3	—	—	—	—	—
Palomar	Z.	76·8	57	i 11 29a	− 3	—	—	—	—	—
La Jolla	Z.	76·9	58	e 11 29	− 4	—	—	—	—	—
Stuttgart		78·1	329	i 11 41k	+ 2	—	—	—	—	—
Strasbourg		78·8	330	i 11 42	− 1	—	—	—	—	—
Tucson		81·2	54	i 11 53	− 3	—	—	—	—	—
Helwan		81·5	303	i 12 0	+ 3	—	—	e 15 6	PP	—

Additional readings :—
Collmberg eZ = 10m.52s.?, 11m.29s., and 11m.38s.
Belgrade e = 13m.12s., i = 16m.2s.
Pierce Ferry i = 11m.49s.

Dec. 10d. 10h. 20m. 33s. Epicentre 37°·3N. 141°·3E. Depth of focus 0·010.
(as on 1942, November 5d.).

Intensity VI at Kawamati (Hukusima Prefecture); V at Shioyazaki and Kiyi (Morioka Prefecture); IV at Sendai, Mito, Utunomiya, and Onahama; II-III at Kakioka and Titibu. Epicentre 37°·5N. 141°·2E. Depth 100km. Macroseismic radius 200-300km.
Seismo. Bull. Cent. Met. Obs., Japan 1946, Tokyo 1951, p. 27, with Isoseismal 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.
Hukusima		0·8	304	0 15	− 3	0 24	− 8
Sendai		1·0	342	0 15k	− 5	0 25	−11
Mito		1·1	216	0 20a	− 2	0 36	− 2
Kakioka		1·4	220	0 24	− 1	0 48	+ 4
Tukubasan		1·4	222	0 25	0	0 44	0
Mizusawa	E.	1·8	356	0 26	− 4	0 45	− 8
Kumagaya		1·9	233	0 38	+ 6	0 56	+ 1
Tokyo		2·0	218	0 35	+ 2	0 59	+ 2
Yokohama		2·3	215	0 43	+ 6	1 8	+ 3
Morioka		2·4	358	0 34	− 4	1 1	− 6
Hunatu		2·7	229	0 44	+ 1	1 19	+ 5
Nagano		3·0	256	0 42	− 5	1 21	− 1
Hatinohe		3·2	3	0 51	+ 1	1 35	+ 8
Shizuoka		3·3	225	0 55	+ 4	1 36	+ 7

Dec. 10d. 16h. 33m. 14s. Epicentre 22°·3S. 179°·2W. Depth of focus 0·090.
(as on 1946, November 18d.).

A = −·9260, B = −·0129, C = −·3773; δ = 0; h = +4;
D = −·014, E = +1·000; G = +·377, H = +·005, K = −·926.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland		15·4	198	—	—	5 46?	0	—	—	—
Wellington		19·6	174	3 53	+ 2	7 6	+ 9	—	—	—
Brisbane		25·7	253	i 4 50	+ 4	i 8 31	− 3	e 5 56	pP	—
Riverview		28·5	239	e 5 10	0	i 9 17	− 1	i 6 45	pP	e 12·5
Santa Barbara	z.	79·9	47	i 11 7	− 1	—	—	—	—	—
Pasadena	z.	80·7	48	i 11 11	− 1	—	—	i 13 18	pP	—
Mount Wilson	z.	80·9	48	i 11 12	− 1	—	—	—	—	—
Palomar		81·2	49	i 11 15	0	e 20 29	− 7	i 13 21	pP	—
Riverside	z.	81·2	48	i 11 13	− 2	—	—	i 13 23	pP	—
Shasta Dam		81·9	40	i 10 50	−28	—	—	—	—	—
Haiwee		82·0	46	e 11 21	+ 2	—	—	e 13 30	pP	—
Boulder City		84·0	48	i 11 28	− 1	—	—	—	—	—
Pierce Ferry		84·7	48	i 11 29	− 3	—	—	i 13 40	pP	—
Tucson		84·9	52	i 11 33	0	—	—	i 13 42	pP	—
Grand Coulee		88·3	36	i 11 47	− 2	—	—	i 13 58	pP	—
Warsaw		146·3	337	e 18 12	[−20]	—	—	e 20 44	pPKP	—
Ksara		147·1	297	e 18 36	[+ 3]	—	—	i 20 51	pPKP	—
Collmberg	z.	149·5	345	e 18 26	[−10]	—	—	e 20 52	pPKP	—
Helwan		151·6	292	e 18 56	[+16]	—	—	i 21 1	pPKP	—
Stuttgart	z.	152·8	348	e 18 40	[− 2]	—	—	e 21 14	pPKP	—
Strasbourg		153·2	349	e 21 33	pPKP	—	—	e 22 47	PP	—
Paris		153·5	357	e 21 5	pPKP	—	—	—	—	—
Clermont-Ferrand		156·5	356	e 20 8	?	—	—	—	—	—

Additional readings:—
Wellington i = 4m.2s., 4m.8s., and 7m.10s.
Riverview eE = 7m.56s., iSN = 9m.20s., iE = 9m.48s. and 10m.29s., isSN = 12m.20s., iSS?E = 12m.37s., iS_cSE = 14m.45s.
Pasadena iZ = 11m.33s.
Shasta Dam i = 11m.7s.
Tucson e = 11m.51s.
Warsaw eZ = 18m.28s. and 21m.0s.
Ksara sPKP = 21m.53s., PP = 22m.21s., pPP = 24m.27s.
Collmberg eZ = 18m.32s., 18m.38s., and 20m.56s.
Stuttgart eZ = 18m.48s. and 19m.0s.

Dec. 10d. Readings also at 2h. (Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, Pierce Ferry, Bogota, La Paz, near Huancayo, and near Grozny), 4h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Santa Barbara, Tucson, Boulder City, Pierce Ferry, Grand Coulee, Shasta Dam, Bozeman, Butte, Salt Lake City, Rapid City, Lincoln, Chicago, Columbia, near Balboa Heights, near Andijan, Obi-garm, Samarkand, Tashkent, and Tchimkent), 5h. (Bogota and Huancayo), 8h. (Bogota, Huancayo, and Pierce Ferry), 9h. (Huancayo and Shasta Dam), 11h. (Pierce Ferry and Tucson), 12h. (Tucson), 13h. (Pierce Ferry and near Andijan), 14h. (Stuttgart), 15h. (La Jolla, Pasadena, Palomar, Riverside, Tucson (3), Boulder City (2), Pierce Ferry (2), Salt Lake City, near Fresno, and near Grozny), 16h. (near Andijan), 17h. (Boulder City, Pierce Ferry, Salt Lake City, and Tucson), 18h. (Pasadena, Riverside, Tucson (2), Boulder City (3), Pierce Ferry (3), Bogota, Huancayo, La Paz, Collmberg, Stuttgart, and Riverview), 19h. (Merida), 21h. (near Ottawa), 23h. (Almata, near Andijan, Frunse, Obi-garm, Samarkand, Stalinabad, and Tashkent).

Dec. 11d. 13h. 8m. 31s. Epicentre 48°·0N. 114°·2W. (as on 1945, September 23d.).

Intensity VI at Kalespell, Trout Creek, Warland, and Whitefish ; V at Bigfork, Columbia Falls, etc. Macroseismic area 3000 square miles.
Epicentre 48°N. 114°·5W.

R. R. Bodle and L. M. Murphy : United States Earthquakes, 1946, Serial No. 714, Washington, 1948, p. 8.

$A = -·2753$, $B = -·6126$, $C = +·7409$; $\delta = 0$; $h = -5$;
$D = -·912$, $E = +·410$; $G = -·304$, $H = -·676$, $K = -·672$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Butte		2·3	151	—	—	e 0 41	P*	—	—	e 1·0
Grand Coulee		3·2	269	e 0 45	− 7	i 1 36	+ 4	i 0 54	P*	—
Rapid City		8·6	113	—	—	e 2 37	P*	—	—	e 4·3
Shasta Dam		9·4	222	i 2 16	− 2	—	—	—	—	—
Pierce Ferry		11·9	179	e 3 8	PPP	—	—	—	—	e 6·4
Palomar	z.	14·8	189	e 3 35	+ 3	—	—	—	—	—
Tucson		16·0	170	e 3 52	+ 4	—	—	—	—	—

Long waves were also recorded at Bozeman.

Dec. 11d. Readings also at 4h. (Shasta Dam and near Balboa Heights), 6h. (Huancayo and near Grozny), 9h. (Huancayo and near Santa Lucia), 10h. (Tucson, Pierce Ferry (2), Palomar, Mount Wilson, Pasadena, Boulder City, and Malaga), 11h. (near Andijan, Frunse, and Almata), 13h. (Jena), 15h. (Riverview (3) and Rome), 16h. (New Delhi, Ksara, Almata, Stalinabad, Tashkent, near Obi-garm, and Samarkand), 18h. (Rome and near Andijan, Frunse, and Tchimkent), 22h. (Shasta Dam), 23h. (near Leninakan, Piatigorsk, Grozny, and Erevan).

Dec. 12d. Readings at 0h. (near Piatigorsk), 2h. (Almeria, near Alicante, Granada, and Malaga), 3h. (near Tacubaya), 4h. (near Almata, Andijan, Frunse, and Tchimkent), 5h. (La Paz), 7h. (near Almata, Frunse, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 8h. (Tucson, near Almata, Andijan, Frunse, Obi-garm, Samarkand, Stalinabad, and Tchimkent), 9h. (Jena), 10h. (near Leninakan), 11h. (Rome), 18h. (near Tashkent), 21h. (Balboa Heights, Tucson, Boulder City, and Pierce Ferry), 23h. (Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, Pierce Ferry, Shasta Dam, La Paz, near Andijan, Frunse, Obi-garm, Stalinabad, and Tchimkent).

Dec. 13d. 10h. 23m. 14s. Epicentre 16°·9N. 94°·2W. (as on 1946, July 17d.).

$A = -·0701$, $B = -·9548$, $C = +·2889$; $\delta = +2$; $h = +5$;
$D = -·997$, $E = +·073$; $G = -·021$, $H = -·288$, $K = -·957$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca	Z.	2·5	273	0 57	P_g	—	—	—	—	1·7
Vera Cruz		2·9	321	1 5	P_g	—	—	—	—	1·9
Tacubaya	N.	5·3	298	1 41	P_g	—	—	—	—	3·1
Merida		5·9	46	1 37	+ 6	i 2 36	− 4	—	—	3·0
Tucson		21·5	320	i 4 55	+ 3	—	—	e 5 34	PPP	e 11·9
Pierce Ferry		26·0	323	i 5 36	0	—	—	i 6 15	PP	—
La Jolla	Z.	26·2	313	e 5 38	0	—	—	—	—	—
Palomar		26·2	315	i 5 38k	0	—	—	i 6 17	PP	—
Boulder City		26·4	321	i 5 40	0	—	—	i 6 6	PP	—
Overton		26·5	322	i 5 41	0	—	—	i 6 21	PP	—
Riverside	Z.	26·9	314	i 5 43	− 2	—	—	—	—	—
Mount Wilson	Z.	27·5	314	i 5 50k	0	—	—	—	—	—
Pasadena	Z.	27·5	314	i 5 49	− 1	—	—	—	—	—
Haiwee	Z.	28·5	318	i 5 58	− 1	—	—	—	—	—
Santa Barbara	Z.	28·7	314	i 6 1	0	—	—	—	—	—
Tinemaha		29·3	319	i 6 4	− 2	—	—	—	—	—
Huancayo		30·6	145	e 6 23	+ 5	—	—	—	—	—
Shasta Dam		34·0	321	i 7 44	PP	—	—	—	—	—
Grand Coulee		37·0	333	e 7 10	− 3	—	—	—	—	—

Additional readings :—
Tucson e = 7m.17s.
Palomar iZ = 6m.3s.
Grand Coulee i = 7m.44s.

Dec. 13d. 12h. 49m. 0s. Epicentre 6°·0S. 81°·3W.

$A = +·1504$, $B = -·9832$, $C = -·1038$; $\delta = +8$; $h = +7$;
$D = -·988$, $E = -·151$; $G = -·016$, $H = +·103$, $K = -·995$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		8·4	136	e 2 8	+ 2	i 3 42	− 1	—	—	i 4·5
Bogota		12·8	34	e 3 8	+ 2	i 5 53	+23	i 3 45	PPP	6·6
Balboa Heights		14·9	7	e 3 37	+ 3	—	—	—	—	—
La Paz		16·6	130	i 3 56	0	i 7 15	+15	i 7 21	SS	9·0
San Juan		28·5	30	i 6 0	+ 1	e 9 57	−49	i 6 44	PP	e 10·7
La Plata		35·9	145	12 30	S	(12 30)	−12	17 18	Q	19·1
Bermuda		41·3	21	e 7 46	− 3	(e 13 15)	−49	—	—	e 13·2
Tucson		47·3	325	e 8 37	0	—	—	—	—	—
La Jolla	Z.	51·6	321	e 9 13	+ 3	—	—	—	—	—
Palomar		51·7	322	e 9 10	− 1	—	—	—	—	—
Pierce Ferry		51·9	326	e 9 2	−10	—	—	—	—	—
Boulder City		52·3	325	e 9 16	+ 1	—	—	—	—	—
Riverside	Z.	52·4	321	e 9 16	0	—	—	—	—	—
Overton		52·5	326	e 9 21	+ 4	—	—	—	—	—
Mount Wilson	Z.	53·0	321	e 9 21	0	—	—	—	—	—
Pasadena	Z.	53·0	321	e 9 26	+ 5	—	—	—	—	—
Salt Lake City		54·3	332	—	—	e 17 21?	+14	—	—	e 26·4
Tinemaha	Z.	55·0	324	e 9 35	0	—	—	—	—	—
Shasta Dam		59·8	325	e 10 7	− 2	—	—	—	—	—
Granada		83·9	52	i 12 31k	− 2	23 2	+ 6	—	—	43·0
Alicante		86·5	51	e 12 6	−40	e 22 58	[−13]	12 56	pP	e 43·9
Ksara		115·8	55	e 12 39	?	—	—	—	—	—

Additional readings :—
Huancayo iP = 2m.13s., i = 2m.24s. and 3m.56s.
Bogota iSS?NZ = 6m.25s.
La Plata N = 14m.12s.
Palomar iZ = 9m.16s.
Pierce Ferry i = 9m.36s.
Alicante PP = 16m.0s., PPP = 17m.52s., PS = 23m.58s., PPS = 24m.36s., PKKP = 28m.26s., SS = 29m.3s., SSS = 33m.10s., Q = 36m.50s.
Long waves were also recorded at Christchurch, Wellington, Riverview, Sitka, De Bilt, Paris, Strasbourg, and Warsaw.

Dec. 13d. 13h. Undetermined shock.

Shasta Dam eP? =52m.24s., e =53m.9s. and 55m.42s.
Grand Coulee iP =53m.7s., e =54m.50s., i =55m.37s.
Tinemaha eP =53m.42s.
Haiwee ePZ =53m.51s.
Santa Barbara ePZ =53m.53s.
Mount Wilson iPZ =54m.5s.k.
Pasadena iP =54m.5s., eLZ =57·2m.
Overton eP =54m.11s.
Riverside iPZ =54m.12s.k.
Boulder City eP =54m.14s., e =58m.3s.
Pierce Ferry eP =54m.18s.
Palomar iP =54m.22s.k.
Rapid City e =55m.20s., eL =62m.3s.
Tucson eP =55m.20s.
Logan e =56m.45s., eL =58m.4s.
Bozeman e =57m.52s.
Long waves were also recorded at Salt Lake City.

Dec. 13d. Readings also at 0h. (La Paz, Pierce Ferry, and Boulder City), 3h. (Tananarive), 5h. (Shasta Dam, Pierce Ferry, Boulder City, and Overton), 8h. (Rome), 9h. (near Mizusawa), 10h. (Brisbane and Riverview), 16h. (Rome), 17h. (Huancayo), 19h. (near Fort de France), 20h. (Calcutta, Hyderabad, and Bombay), 23h. (Tucson).

Dec. 14d. Readings also at 3h. (Tucson, Andijan, Tashkent, and near Tchimkent), 7h. (Huancayo, La Paz, and Santa Lucia), 8h. (Rome), 9h. (near Lick and Branner), 11h. (Prague), 12h. (near Obi-garm, Stalinabad, and Samarkand), 15h. (near Andijan, Frunse, and Obi-garm), 16h. (near Mizusawa), 17h. (Collmberg and Ksara), 19h. (Boulder City), 20h. (near Andijan), 21h. (Brisbane).

Dec. 15d. 0h. Undetermined shock.

Brisbane ePN =33m.25s., eSN =36m.50s.
Riverview eP?EZ =34m.35s., iZ =34m.53s., eSN =38m.41s., iN =38m.47s., iE =38m.50s., eLN =40·3m.
Auckland e =38m.?
Arapuni e =39m.?
Christchurch eN =40m.17s., eE =41m.43s., QEN =43m.5s., RZ =45m.20s.
Shasta Dam eP =42m.4s.
Palomar ePZ =42m.5s., eZ =42m.10s., iZ =42m.30s.
Mount Wilson iPZ =42m.7s., eZ =42m.26s.
Overton eP =42m.10s.
Riverside ePZ =42m.11s., eZ =42m.28s.
Tinemaha ePZ =42m.12s., eZ =42m.31s.
Boulder City eP? =42m.23s.
Pierce Ferry eP? =42m.24s., i =42m.44s.
Pasadena eZ =42m.25s.
Tucson eP =42m.31s., e =42m.50s.
Ksara ePKP? =48m.3s., e =51m.23s.
Strasbourg e =48m.55s.
Stuttgart e =48m.56s.
Long waves were also recorded at Wellington and Warsaw.

Dec. 15d. Readings also at 0h. (near Stalinabad and Obi-garm), 1h. (Tucson and near Fort de France), 2h. (near La Paz), 3h. (Huancayo), 5h. (near Andijan, Frunse, Tchimkent, Obi-garm, Almata, and Samarkand), 7h. (Warsaw and near Andijan, Tashkent, Tchimkent, Frunse, Samarkand, Obi-garm, Stalinabad, and Almata), 8h. (near Andijan), 10h. (Tucson), 11h. (Tucson, Huancayo, La Paz, and near Andijan, Tashkent, Tchimkent, and Almata), 12h. (Bogota), 15h. (near Andijan), 18h. (near Andijan, Tchimkent (2), and Frunse), 19h. (near Tacubaya (2)), 20h. (Wellington, New Plymouth, Kaimata, Auckland, Christchurch, and Riverview), 21h. (Tucson, Palomar, Mount Wilson, and near Obi-garm, Stalinabad, and Samarkand), 22h. (Santa Lucia), 23h. (Merida, Tacubaya, Palomar, Boulder City, Riverside, Mount Wilson, and Tucson (2)).

Dec. 16d. 21h. Undetermined shock.

Tacubaya eE =43m.59s., eN =44m.2s.
Huancayo eP =44m.14s., e =48m.0s.
La Paz P?Z =45m.48s., LZ =54m.32s.
Tucson iP =46m.29s.
La Jolla ePZ =47m.3s.
Palomar iP =47m.5s.
Pierce Ferry eP =47m.8s.
Boulder City eP =47m.11s.
Riverside ePZ =47m.11s., eZ =49m.10s.
Overton eP =47m.12s.
Pasadena eP =47m.15s., e =49m.12s.
Mount Wilson iPZ =47m.16s.
Santa Barbara ePZ =47m.24s.
Haiwee ePZ =47m.27s.
Tinemaha ePEZ =47m.34s.
San Juan e =48m.35s., 49m.4s., and 50m.24s., eL =52m.15s.
Grand Coulee eP =48m.39s.

Dec. 16d. Readings also at 1h. (Shasta Dam, Tinemaha, Pasadena, Mount Wilson, Haiwee, Riverside, Palomar, Boulder City, Pierce Ferry, Tucson, and near Andijan), 5h. (near Leninakan), 6h. (Pierce Ferry, Boulder City, Overton, Stuttgart, Collmberg, and near Zagreb), 7h. (near Leninakan), 11h. (Tacubaya, Tucson, Palomar, Pierce Ferry, Riverside, Overton, Mount Wilson, and Tinemaha), 15h. (Santa Lucia), 16h. (Calcutta, New Delhi, Hyderabad, Sverdlovsk, and Tashkent), 17h. (Mount Wilson, Palomar, Tucson, De Bilt, Uccle, Helsinki, Kew, Paris, Copenhagen, Prague, and Strasbourg), 18h. and 19h. (near Obi-garm), 21h. (near Branner and near Andijan, Frunse, and Tashkent), 22h. (Aberdeen).

Dec. 17d. 22h. 41m. 7s. Epicentre 20°·5S. 177°·5W. Depth of focus 0·080.
(as on 1945, April 26d.).

$A = -\cdot9365$, $B = -\cdot0409$, $C = -\cdot3481$; $\delta = -12$; $h = +5$;
$D = -\cdot044$, $E = +\cdot999$; $G = +\cdot348$, $H = +\cdot015$, $K = -\cdot937$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Apia		8·6	40	e 2 4	0	i 3 42	− 1	—	—
Auckland		17·6	201	3 38	+ 3	5 57	−31	—	—
Arapuni		18·5	198	—	—	5 53?	−50	—	—
Tual		18·8	194	3 49	+ 3	6 48	0	14 6	S_cS	—
New Plymouth		19·9	199	4 3	+ 7	7 14	+ 8	—	—	—
Wellington		21·7	197	4 13	0	7 38	+ 2	7 0	sP	—
Christchurch		24·4	198	4 27	−10	7 20	−60	—	—	14·5
Riverview		30·8	237	i 5 31k	− 2	i 9 56	− 3	e 13 3	sS	—
Mizusawa		70·8	327	(10 17)	− 6	10 17	P	—	—	—
Santa Barbara		77·5	46	i 11 0	− 1	e 20 8	0	c 13 0	pP	—
La Jolla		78·3	48	i 11 5	0	i 20 17	+ 1	e 13 8	pP	—
Pasadena		78·3	47	i 11 4k	− 1	i 20 16	0	i 13 6	pP	—
Mount Wilson		78·5	47	i 11 5k	− 1	i 20 19	+ 1	i 13 9	pP	—
Palomar		78·8	49	i 11 7k	− 1	i 20 23	+ 2	i 13 10	pP	—
Riverside		78·8	47	i 11 6k	− 2	e 20 21	0	i 13 11	pP	—
Shasta Dam		79·5	39	i 11 10	− 2	e 20 26	− 3	—	—	—
Haiwee		79·6	45	i 11 11k	− 1	i 20 31	+ 1	i 13 17	pP	—
Tinemaha		80·0	44	i 11 13	− 1	i 20 33	− 1	i 13 18	pP	—
Boulder City		81·6	47	i 11 20	− 2	—	—	i 13 24	pP	—
Overton		82·2	46	i 11 24	− 1	—	—	i 12 57	pP	—
Pierce Ferry		82·3	47	i 11 25	− 1	e 21 27	S_cS	i 13 28	pP	—
Tucson		82·5	52	i 11 27	0	e 21 1	+ 2	e 13 31	pP	—
Grand Coulee		85·9	35	i 11 40	− 4	—	—	—	—	—
Salt Lake City		86·2	44	—	—	e 21 38	+ 4	—	—	—
Huancayo		97·0	105	—	—	i 22 26	[+ 6]	e 30 22	SS	e 40·7
San Juan		115·7	78	—	—	i 23 38	[− 3]	e 34 19	SS	—
Copenhagen		144·1	350	i 18 28	[− 7]	—	—	—	—	—
Warsaw	z.	145·2	340	e 18 33k	[− 3]	—	—	—	—	—
Ksara		147·6	300	i 18 41	[+ 1]	35 39	PPS	i 20 55	pPKP	—
Collmberg	z.	148·2	348	e 18 37	[− 4]	—	—	e 20 56	pPKP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
De Bilt		148·4	357	i 18 42	[+ 1]	—	—	i 21 57	?	—
Jena	N.	148·8	348	e 18 43	[+ 1]	—	—	18 54	PKP	—
Uccle		149·7	359	e 18 44	[+ 1]	—	—	—	—	—
Stuttgart		151·3	350	i 18 42k	[− 3]	—	—	—	—	—
Paris		151·7	0	i 18 50	[+ 4]	—	—	—	—	—
Strasbourg		151·7	352	e 18 44	[− 2]	—	—	e 22 28	PP	—
Clermont-Ferrand		154·8	358	e 18 46	[− 4]	—	—	—	—	—
Malaga		162·7	20	19 49	[+50]	—	—	—	—	—

Additional readings :—
Wellington i = 4m.24s., PP = 5m.1s., P_cP?Z = 8m.40s., S_cPZ = 10m.32s., P_cS = 11m.28s., S_cSZ = 14m.13s., sS_cS?Z = 17m.45s.
Riverview iSN = 9m.52s., iE = 13m.18s., iS_cSN = 15m.0s., iE = 19m.5s., iN = 19m.8s.
Pasadena i = 11m.8s., iSE = 20m.38s.
Palomar iN = 20m.45s.
Tinemaha eN = 20m.43s.
Overton i = 12m.44s.
Pierce Ferry iPKKP = 29m.48s.
Tucson i = 11m.37s., ePKKP = 29m.47s., iPKP,PKP = 37m.57s.
Huancayo e = 23m.30s. and 23m.53s.
San Juan e = 24m.10s., eSKKS = 24m.49s., eSP = 28m.50s.
Warsaw eZ = 20m.31s. and 21m.18s.
Collmberg iPZ = 18m.40s., eZ = 18m.48s., eN = 20m.14s., eZ = 21m.23s., ePPP?Z = 22m.11s., eS?Z = 27m.2s., eN = 27m.15s., eZ = 29m.7s., eSS?N = 31m.20s.
Stuttgart iZ = 18m.48s., eZ = 18m.56s.
Paris i = 18m.57s. and 19m.1s.
Strasbourg i = 18m.59s., ePKP$_2$ = 19m.23s., e = 21m.14s., and 22m.32s., ePPP = 25m.41s.

Dec. 17d. Readings also at 0h. (near Obi-garm), 5h. (Palomar, Riverside, Tucson, and Mount Wilson), 9h. (Palomar, Mount Wilson, Tucson, Tacubaya, Auckland, and near Apia), 11h. (Overton and near Tchimkent), 12h. (near Mizusawa), 13h. (Tucson, Palomar, Riverside, Mount Wilson, Pasadena, and Pierce Ferry), 16h. (near Obi-garm), 18h. (Grand Coulee and near Andijan), 20h. (Mizusawa), 21h. (Huancayo and near Istanbul), 23h. (near La Paz).

Dec. 18d. 0h. 24m. 42s. Epicentre 57°·2N. 153°·7W. (as on 1938, Dec. 9d.).

$A = -·4880$, $B = -·2412$, $C = +·8389$; $\delta = +7$; $h = -8$;
$D = -·443$, $E = +·896$; $G = -·752$, $H = -·372$, $K = -·544$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		8·2	18	e 2 34	PPP	—	—	—	—	e 4·2
Sitka		10·0	83	—	—	e 4 18	− 4	—	—	e 5·2
Grand Coulee		22·8	98	e 5 7	+ 2	—	—	i 5 17	PP	—
Shasta Dam		26·0	115	e 5 37	+ 1	—	—	—	—	—
Bozeman		28·5	95	—	—	e 10 34	−12	—	—	e 14·7
Tinemaha		30·9	115	i 6 22	+ 2	—	—	—	—	—
Salt Lake City		31·4	102	e 6 44	+19	—	—	—	—	e 16·0
Haiwee		31·8	116	i 6 28	0	—	—	—	—	—
Santa Barbara	z.	32·3	119	i 6 33	0	—	—	—	—	—
Mount Wilson	z.	33·3	118	i 6 40	− 1	—	—	i 6 56	pP	—
Pasadena		33·3	118	i 6 40	− 1	—	—	i 9 18	P_cP	—
Boulder City		33·5	112	i 6 42	− 1	—	—	—	—	—
Pierce Ferry		33·7	111	i 6 46	+ 1	—	—	—	—	—
Rapid City		33·8	90	e 6 46	0	e 12 21	+11	e 8 18	PPP	e 15·0
Riverside	z.	33·8	118	i 6 45	− 1	—	—	i 7 0	pP	—
Palomar		34·5	117	i 6 52k	0	—	—	—	—	—
Tucson		38·4	111	i 7 25	0	—	—	i 7 39	pP	—
St. Louis		44·6	86	i 8 13	− 3	—	—	i 9 44	PP	—
Ottawa		47·5	69	8 36	− 2	—	—	—	—	25·3
Fordham		51·7	72	e 9 9	− 2	e 16 30	− 2	—	—	—
Collmberg	z.	71·3	10	e 11 20	− 3	—	—	e 11 31	P_cP	—
Paris		72·5	16	i 11 35	+ 5	—	—	i 11 45	P_cP	—
Stuttgart	z.	73·4	11	e 11 32	− 4	—	—	—	—	—
Strasbourg		73·5	12	e 11 34	− 2	—	—	e 11 45	P_cP	—
Andijan		75·0	326	e 11 43	− 2	e 21 18	− 5	—	—	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent	75·4	329	e 11 45	− 2	e 21 19	− 8	—	—	—
Stalinabad	78·1	327	i 12 1	− 1	21 51	− 5	—	—	—
Malaga	82·9	24	12 24	− 4	—	—	—	—	—
Ksara	88·9	352	12 52	− 6	e 23 48	+ 4	—	—	—

Additional readings :—
Pasadena iZ = 6m.54s.
Long waves were recorded at Bermuda and Weston.

Dec. 18d. 1h. Undetermined shock.

Riverview iPZ = 56m.46s.k, iNZ = 56m.59s., iSE = 61m.9s., iN = 61m.18s., eLZ = 62·6m.
Wellington iZ = 57m.50s.
Shasta Dam iP = 64m.3s.
Santa Barbara iPZ = 64m.4s.
Mount Wilson iPZ = 64m.10s.a, iZ = 64m.20s.
Pasadena iP = 64m.10s.a, i = 64m.20s., eLZ = 92·6m.
Haiwee ePZ = 64m.13s., eZ = 64m.24s.
La Jolla iP = 64m.13s.
Riverside iPZ = 64m.13s.a, iZ = 64m.23s.
Palomar iP = 64m.15s.a, iZ = 64m.26s., eNZ = 67m.43s.
Tinemaha iP = 64m.15s., iZ = 64m.24s.
Grand Coulee iP = 64m.23s.
Boulder City eP = 64m.24s.
Overton iP = 64m.26s.
Pierce Ferry iP = 64m.26s., i = 64m.38s. and 68m.6s.
Tucson eP = 64m.37s., e = 64m.48s.
Auckland e = 65m.0s.?
Christchurch S = 65m.4s., QN = 66m.6s., R = 68m.2s.
San Juan e = 74m.8s.

Dec. 18d. 14h. 20m. 26s. Epicentre 40°·4N. 124°·2W. (as on 1943, July 22d.).

Intensity VI at Ferndale and Capetown ; V at Arcata, Eureka, Fortuna, Pepperwood, Petrolia, etc. Macroseismic area 3500 sq. miles in the coastal region.
Epicentre 40°·3N. 124°·5W.

R. R. Bodle and L. M. Murphy : United States Earthquakes, 1946, Serial No. 714, Washington, 1948, p. 16.

$A = -\cdot4293$, $B = -\cdot6316$, $C = +\cdot6456$; $\delta = +2$; $h = -2$;
$D = -\cdot827$, $E = +\cdot562$; $G = -\cdot363$, $H = -\cdot534$, $K = -\cdot764$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale		0·2	343	i 0 8	− 2	i 0 12	− 4	—	—	—
Berkeley		2·9	149	c 0 49	+ 1	i 1 24	0	—	—	—
San Francisco	E.	3·0	153	c 0 52	+ 2	c 1 23	− 4	c 1 35	SS	—
Branner		3·4	152	c 0 55	0	e 1 35	− 2	e 2 16	SSS	—
Santa Clara		3·5	150	c 0 52	− 5	c 1 57	S_E	—	—	—
Lick		3·6	146	c 0 59	+ 1	e 1 44	+ 2	—	—	—
Fresno	N.	5·0	135	i 1 20	+ 2	i 3 0	S_E	—	—	—
Tinemaha		5·7	124	e 1 41	P*	i 3 25	S_E	—	—	—
Haiwee	Z.	6·5	129	c 1 44	+ 5	—	—	i 1 49	PP	—
Santa Barbara		6·9	148	c 1 46	+ 1	i 3 7	+ 2	i 1 51	PP	—
Mount Wilson		7·9	140	i 1 59a	0	i 3 38	+ 8	—	—	—
Pasadena		7·9	140	i 1 59a	0	i 3 34	+ 4	—	—	e 3·8
Grand Coulee		8·4	24	e 2 2	− 4	—	—	—	—	e 4·9
Riverside		8·4	137	i 2 6a	0	—	—	—	—	—
Overton		8·6	114	i 2 8	− 1	—	—	—	—	e 4·7
Boulder City		8·6	118	i 2 10	+ 1	—	—	i 2 28	PPP	e 4·6
Pierce Ferry		9·1	115	i 2 15	+ 1	—	—	i 2 47	PPP	e 4·8
Palomar		9·2	138	i 2 16a	0	i 4 9	+ 6	—	—	—
Salt Lake City		9·4	84	e 2 41	PPP	—	—	—	—	e 5·4
Tucson		13·5	123	e 3 17	+ 2	—	—	i 3 26	PP	e 7·5
Rapid City		16·0	70	e 4 0	PP	—	—	—	—	e 9·7

Long waves were also recorded at Butte, Bozeman, Chicago, and Weston.

Dec. 18d. Readings also at 0h. (Tashkent and near Andijan), 1h. (Bogota, Huancayo, Tucson (2), Riverside, Mount Wilson, and Pasadena), 2h. (near Apia and near Obi-garm, Stalinabad, Samarkand, and Andijan), 4h. (near Santa Lucia), 5h. (near Obi-garm), 6h. (Balboa Heights), 11h. (near Andijan and Obi-garm), 12h. (near Zagreb), 13h. (La Paz), 17h. (Stuttgart and Riverview), 19h. (La Paz), 20h. (Tucson), 21h. (Auckland, Christchurch, and Wellington), 22h. (Palomar and Tucson), 23h. (near Mizusawa).

Dec. 19d. 0h. 43m. 56s. Epicentre 6°·5S. 128°·5E. (as on 1941, Jan. 31d.).

$A = -\cdot6186$, $B = +\cdot7777$, $C = -\cdot1125$; $\delta = +14$; $h = +7$;
$D = +\cdot783$, $E = +\cdot623$; $G = +\cdot070$, $H = -\cdot088$, $K = -\cdot994$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Perth		27·9	203	5 53	− 1	10 26	−11	6 39	PP	—
Brisbane		31·3	135	i 6 24	0	e 11 24	− 7	e 7 22	PP	—
Riverview		34·3	146	i 6 50k	0	i 12 17	0	i 7 0	pP	e 17·8
Mizusawa		46·9	13	e 8 41	+ 7	15 37	+12	—	—	—
Calcutta	N.	48·8	308	e 8 49	0	i 15 57	+ 5	—	—	—
Auckland		51·8	132	e 9 46	+34	16 33	0	—	—	21·1
Christchurch		53·4	141	9 25	+ 1	16 55	0	10 0	pP	22·2
Wellington		53·7	137	9 23	− 3	16 42	−17	21 16	Q	24·1
Hyderabad	N.	54·9	297	9 29	− 6	17 13	− 3	11 32	PP	—
Bombay		60·4	296	i 10 9	− 4	i 18 19	− 9	—	—	26·7
New Delhi	N.	60·5	308	i 12 11	PP	e 18 25	− 4	—	—	—
Irkutsk		62·1	344	10 27	+ 2	18 55	+ 6	—	—	—
Almata		68·0	322	11 3	0	e 20 5	+ 3	—	—	—
Frunse		69·3	321	i 11 10	− 1	—	—	—	—	—
Andijan		69·7	318	11 13	− 1	20 22	0	—	—	—
Obi-garm		70·6	315	11 16	− 3	20 29	− 4	—	—	—
Stalinabad		71·2	314	i 11 21	− 2	i 20 39	− 1	—	—	—
Tashkent		72·0	317	i 11 28	0	e 20 48	− 1	—	—	—
Samarkand		72·9	315	e 11 26	− 7	—	—	—	—	—
Sverdlovsk		83·6	329	i 12 31	0	22 51	− 2	—	—	—
Grozny		89·2	313	e 13 2	+ 3	e 23 47	0	—	—	—
Leninakan		90·2	311	e 13 3	− 1	23 58	+ 2	—	—	—
Ksara		95·7	303	i 13 26	− 3	26 22	PPS	17 10	PP	—
Helsinki		102·3	330	—	—	e 33 4?	SS	—	—	e 50·1
Warsaw		105·8	322	i 18 41a	PP	e 27 52	PS	e 33 50	SS	—
Belgrade		107·3	314	e 19 10	PP	(e 30 34)	PKKP	—	—	e 30·6
Shasta Dam		108·7	50	e 19 2	PP	—	—	—	—	—
Copenhagen		109·9	328	e 18 46	[+13]	28 28	PS	—	—	54·1
Prague		110·3	321	e 19 12	PP	(e 28 4?)	PS	—	—	e 28·1
Collmberg	z.	110·9	322	e 18 34	[− 1]	e 29 32	PS	e 19 17	PP	—
Mount Wilson	z.	113·0	56	e 18 42	[+ 3]	—	—	—	—	—
Pasadena	z.	113·0	56	e 18 36	[− 3]	—	—	e 19 44	PP	—
Riverside	z.	113·6	56	e 18 42	[+ 2]	—	—	e 19 36	PP	—
Stuttgart		114·0	322	e 18 39	[− 2]	—	—	e 19 31	PP	—
Palomar	z.	114·1	57	e 19 42	PP	—	—	—	—	—
Strasbourg		114·9	321	e 19 42	PP	e 29 41	PS	e 30 28	PPS	e 58·6
De Bilt		115·2	326	e 19 44	PP	e 29 29	PS	e 22 14	PPP	e 60·1
Boulder City		115·3	53	e 19 49	PP	—	—	—	—	—
Overton		115·5	53	e 17 52	?	—	—	—	—	—
Pierce Ferry		115·9	53	e 18 47	[+ 2]	—	—	e 19 54	PP	—
Paris		118·1	323	e 18 54	[+ 5]	—	—	e 20 4	PP	—
Clermont-Ferrand		118·9	319	e 20 9	PP	i 29 57	PS	—	—	—
Tucson		119·3	56	e 18 54	[+ 3]	—	—	—	—	—
Malaga		127·6	312	53 24	Q	—	—	—	—	—
Tacubaya		132·0	70	e 19 25	[+ 9]	e 22 51	PKS	e 21 45	PP	—
Chicago		132·5	37	e 22 14	PP	—	—	—	—	—
Harvard		140·0	22	e 19 31	[0]	—	—	—	—	—
Huancayo		150·0	128	e 19 51	[+ 4]	e 26 10	[−44]	e 23 26	PP	e 60·6
Bermuda		151·5	23	e 20 4	[+14]	—	—	e 42 25	SS	—
La Paz		151·8	144	19 57	[+ 7]	—	—	—	—	—
Bogota		157·5	94	e 20 0	[+ 2]	—	—	i 20 35	PKP_2	—
San Juan		161·5	49	e 20 12	[+10]	e 26 52	[−14]	e 24 27	PP	—

Continued on next page.

NOTES TO DECEMBER 19d. 0h. 43m. 56s.

Additional readings :—
Perth SS =11m.52s.
Brisbane iSSE =12m.42s.
Riverview iZ =7m.20s., iE =14m.39s., iN =16m.20s., iScSE =17m.15s.
Christchurch sSNZ =17m.35s., SSEZ =19m.40s.
New Delhi iN =12m.37s.
Warsaw ePE =18m.44s., PPP?Z =24m.0s., eE =27m.57s., eZ =28m.43s., eSKKS?Z = 29m.21s., eS?E =29m.29s., eZ =33m.54s., and 34m.54s.
Belgrade e =23m.4s.?
Collmberg eN =20m.47s.
Pasadena eZ =18m.41s.
Strasbourg e =19m.28s., ePPP? =22m.0s.
Paris ePKP =18m.59s.
Clermont-Ferrand iPP =20m.15s.
Tacubaya iPPPN =24m.57s., ePPSE =33m.51s.
Harvard e =20m.43s.
Huancayo e =39m.17s. and 47m.20s.
San Juan ePPP =28m.18s., e =31m.17s., 32m.11s., and 35m.24s., ePPS =38m.11s., eSS? =45m.26s., eSSS =51m.20s.
Long waves were recorded at Colombo.

Dec. 19d. 2h. 57m. 18s. Epicentre 24°·1N. 123°·1E. Depth of focus 0·010.
(as on 1938, Dec. 22d.).

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	E.	7·1	352	e 1 34	− 9	—	—	—	—	i 4·9
Miyazaki		10·7	42	2 35	+ 3	4 45	+15	—	—	—
Hukuoka		11·4	32	2 43a	+ 2	4 55	+ 8	—	—	6·4
Yokohama		18·2	48	4 12	+ 4	e 7 40	+16	—	—	—
Tokyo		18·4	47	e 4 3	− 7	e 8 2	+34	—	—	e 10·9
Mizusawa	N.	21·4	42	e 4 41	0	e 8 32	+ 4	—	—	—
Mori		23·1	34	4 56	− 2	—	—	i 5 40	PP	—
Sapporo		24·2	33	5 3	− 5	—	—	—	—	e 10·6
Irkutsk		31·6	338	6 11	− 5	11 9	− 7	—	—	—
Calcutta	N.	31·9	275	e 6 29	+11	i 11 27	+ 6	i 13 52	SS	14·6
New Delhi	N.	41·2	286	e 7 41	+ 5	i 13 42	− 1	14 13	sS	i 22·1
Hyderabad	N.	42·1	270	7 45	+ 1	13 58	+ 2	17 24	SS	—
Almata		42·3	310	i 7 47	+ 1	—	—	—	—	—
Colombo	E.	44·8	255	8 7	+ 1	14 39	+ 4	—	—	27·8
Andijan		45·3	304	8 10	0	e 14 41	− 1	—	—	—
Kodaikanal	E.	45·5	262	i 8 15	+ 4	i 14 45	0	9 55	PP	—
Bombay		46·9	274	i 8 24	+ 2	i 15 8	+ 3	i 10 17	PP	24·1
Obi-garm		47·2	302	8 25	0	15 7?	− 2	—	—	—
Tashkent		47·7	305	e 8 28	− 1	e 15 14	− 2	—	—	—
Stalinabad		47·9	301	i 8 25	− 5	15 24	+ 5	—	—	—
Samarkand		49·3	303	e 8 39	− 2	—	—	—	—	—
Sverdlovsk		55·1	325	9 22	− 2	—	—	11 48	PP	—
Riverview		63·5	154	i 10 29k	+ 7	i 19 1	+15	i 10 54	pP	—
Grozny		64·9	309	e 10 35	+ 4	i 19 5	+ 2	—	—	—
Leninakan		66·8	306	e 10 45	+ 2	—	—	—	—	—
Moscow		68·0	324	10 49	− 2	19 32	− 9	e 11 17	pP	—
College		68·1	27	e 10 49	− 2	e 19 44	+ 2	e 23 58	SS	e 27·9
Helsinki		73·3	330	i 11 21	− 2	i 20 38	− 4	e 11 54	pP	e 35·7
Ksara		74·8	300	i 11 32	+ 1	21 4	+ 5	11 58	pP	—
Sitka		75·9	33	i 11 40	+ 2	i 21 18	+ 7	1 21 54	sS	e 36·2
Upsala		76·9	331	i 11 41a	− 2	e 21 9	−13	14 39	PP	e 34·4
Auckland		77·8	140	—	—	e 21 42?	+11	—	—	—
Bucharest		78·3	314	—	—	20 42?	?	25 42?	SS	—
Warsaw		78·3	322	i 11 49a	− 2	e 21 31	− 6	1 12 19	pP	e 35·7
Arapuni		79·1	140	—	—	22 18	+33	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		79·8	298	e 11 59	0	21 51	− 2	—	—	—
Sofia		80·8	312	e 12 6	+ 2	i 22 1	− 2	—	—	42·7
Wellington		80·8	143	—	—	22 11	+ 8	—	—	34·7
Christchurch		81·2	146	12 10	+ 4	22 18	+11	12 38	pP	38·4
Copenhagen		81·2	328	i 12 6	0	i 22 4	− 3	27 48	SS	37·7
Budapest		81·5	318	12 8	0	22 9	− 1	—	—	e 32·7
Belgrade		81·8	315	e 12 6	− 4	22 24	+11	e 14 6	PP	42·7
Scoresby Sund		82·5	350	12 11	− 2	22 21	+ 1	27 42	SS	38·7
Potadam	N.	82·6	325	e 12 19	+ 5	i 22 19	− 2	—	—	e 39·7
Prague		83·0	322	e 12 12?	− 4	i 22 19	− 6	e 31 42?	SSS	e 41·7
Collmberg		83·2	324	e 12 16	− 1	e 22 23	− 4	e 12 42	pP	e 37·7
Cheb		84·1	324	e 11 42?	−39	e 22 34	− 2	—	—	e 44·7
Jena		84·1	323	e 12 20	− 1	e 22 33	− 3	—	—	—
Zagreb		84·1	318	e 12 23	+ 2	i 22 32	− 4	—	—	—
Tananarive		85·1	248	—	—	e 22 45	− 1	e 23 28	sS	e 42·3
Triest		85·6	319	—	—	i 22 41	−10	—	—	—
Stuttgart		86·6	323	i 12 33a	− 1	e 22 47	[− 1]	e 12 58	pP	e 44·7
De Bilt		86·8	328	i 12 35a	0	i 22 52	[+ 3]	13 1	pP	e 39·7
Aberdeen		86·9	334	i 23 1	S	(i 23 1)	− 2	e 40 38	Q	42·9
Chur		87·4	321	e 12 37	0	e 22 52	[− 1]	—	—	e 46·4
Strasbourg		87·5	324	i 12 37	− 1	i 23 9	0	e 13 2	pP	41·7
Zürich		87·7	323	e 12 38	− 1	23 5	− 6	—	—	—
Uccle		88·0	327	e 12 40a	0	e 22 58	[0]	e 16 6	PP	e 40·7
Florence		88·1	317	—	—	i 22 57	[− 1]	—	—	—
Basle		88·2	323	e 12 41	0	e 23 14	− 2	—	—	—
Edinburgh		88·2	333	—	—	e 23 12	− 4	—	—	—
Durham		88·3	331	—	—	i 23 1	[+ 1]	—	—	—
Rome		88·3	314	e 12 44	+ 2	i 23 15	− 2	—	—	—
Neuchatel		88·8	323	e 12 43	− 1	—	—	—	—	—
Grand Coulee		89·3	37	e 12 42	− 4	i 23 30	+ 3	e 23 8	SKS	—
Paris		90·2	326	i 12 51	0	i 23 6	[− 5]	i 13 22	pP	e 49·7
Shasta Dam		91·4	45	i 12 59	+ 3	e 23 52	+ 7	i 13 28	pP	—
Clermont-Ferrand		91·7	323	e 12 58	0	e 23 50	+ 3	e 13 35	pP	41·7
Saskatoon		92·5	29	12 33	−28	23 26	[+ 2]	—	—	44·7
Berkeley		93·1	47	e 13 6	+ 2	e 24 6	+ 6	—	—	—
Butte		93·9	36	e 13 11	+ 3	i 24 12	+ 6	e 23 35	SKS	—
Bozeman		94·9	36	—	—	e 24 18	+ 3	e 23 43	SKS	e 38·1
Tinemaha		96·1	46	e 13 21	+ 3	i 23 51	[+ 7]	e 17 9	PP	—
Haiwee		96·9	46	e 13 22	+ 1	e 23 54	[+ 6]	—	—	—
Salt Lake City		97·7	40	e 13 30	+ 5	e 24 29	−10	i 23 58	SKS	e 41·5
Mount Wilson		97·9	47	i 13 28	+ 2	e 24 1	[+ 8]	i 13 52	pP	—
Pasadena		97·9	47	e 13 28	+ 2	e 24 42	+ 2	e 13 45	pP	e 45·4
Riverside	z.	98·5	47	e 13 30	+ 1	—	—	e 17 27	PP	—
Overton		98·9	44	e 13 37	+ 7	—	—	e 17 28	PP	—
Boulder City		99·0	45	e 13 33	+ 2	—	—	e 17 27	PP	—
Palomar		99·2	48	e 13 34	+ 2	i 24 9	[+ 9]	i 14 0	pP	—
La Jolla	z.	99·3	49	e 13 34	+ 2	—	—	—	—	—
Pierce Ferry		99·4	44	e 13 35	+ 2	—	—	i 17 22	PP	—
Rapid City		100·0	33	e 13 48	+12	e 24 51	− 7	i 24 7	SKS	e 49·5
Tucson		103·9	45	e 13 55	+ 2	e 24 30	[+ 8]	i 18 6	PP	—
Lincoln		105·6	31	—	—	e 24 35	[+ 5]	e 28 45	PPS	e 55·0
Seven Falls		108·0	10	—	—	e 26 6	+ 2	—	—	44·7
Chicago		108·5	25	—	—	e 24 47	[+ 4]	e 26 10	S	e 44·0
Ottawa		108·7	15	18 42	PP	24 42	[− 2]	27 52	PS	49·7
Harvard		112·4	11	e 19 17	PP	(e 28 42?)	PS	—	—	e 28·7
Weston		112·5	11	—	—	e 25 8	[+ 9]	—	—	—
Fordham		113·5	14	e 19 20	PP	e 28 40	PS	—	—	e 56·2
Tacubaya		120·3	48	i 18 47	[+ 7]	i 25 29	[+ 2]	i 21 22	PP	—
Bermuda		123·3	9	e 20 22	PP	e 27 22	S	e 31 54	PPS	e 51·2
San Juan		136·8	14	e 21 54	PP	e 27 56	SKKS	e 25 0	PPP	e 55·1
Fort de France		141·2	8	e 19 14	[− 5]	—	—	—	—	—
Bogota		146·9	34	i 19 35	[+ 6]	—	—	i 23 0	PP	78·7
Huancayo		158·8	59	e 19 54	[+ 8]	e 44 8	SS	i 20 28	pPKP	e 67·7
La Paz		167·0	56	i 20 5	[+11]	i 31 32	SKKS	—	—	81·7

For Notes see next page.

NOTES TO DECEMBER 19d. 2h. 57m. 18s.

Additional readings :—
Tokyo e =5m.35s.
Mizusawa SE =8m.35s.
New Delhi SSN =16m.44s., iN =17m.32s. and 18m.6s.
Kodaikanal SSE =18m.35s.
Bombay SSN =18m.6s., SSE =18m.47s.
Riverview iP$_c$PZ =11m.2s., iPP?NZ =13m.12s., iPSE =19m.37s., isSN =19m.40s., iS$_c$SN =20m.17s., iE =20m.56s., eSSE =23m.31s., iN =23m.41s., eSSS?E =26m.20s.
Moscow sS =20m.23s.
Ksara PP =14m.51s.
Upsala PPPE =16m.17s., eSE =21m.5s., PS?E =21m.40s., iPPSE =22m.25s., eSSE = 26m.17s.
Warsaw ePPZ =14m.48s., eN =21m.53s., eE =22m.0s., PS?EN =22m.13s., PPS?N = 22m.23s., PPS?E =22m.28s., eE =22m.46s., eZ =23m.17s., eSSE =26m.44s., eSSN =27m.7s., eSSS?E =30m.12s., eSSS?Z =30m.17s.
Christchurch PPZ =15m.24s., PPPZ =17m.34s., iE =22m.9s., PS =22m.59s., N = 24m.9s., SSN =27m.38s., SSSN =31m.32s., QN =34m.18s.
Copenhagen 22m.39s., and 23m.30s., SSS =30m.54s.
Budapest eN =22m.25s.
Scoresby Sund 18m.45s. and 33m.42s.
Collmberg eZ =12m.50s. and 15m.43s., eN =23m.6s. and 28m.19s.
Tananarive PS =24m.22s.?, SS? =28m.28s.
De Bilt iPP =15m.56s., epPP =16m.19s., esS =23m.56s., eSS =28m.42s.?
Aberdeen iSS =35m.29s.
Strasbourg esP =13m.26s., e =14m.2s., ePP =16m.1s., epPP =16m.38s., e =20m.1s., eSKS =22m.56s., esS =23m.51s., ePS =24m.29s., e =27m.7s., eSS =28m.48s., e =34m.3s. and 36m.5s.
Uccle ePN =12m.43s., eSN =23m.37s., eSSN =28m.54s., eN =35m.59s.
Durham iEN =23m.17s.
Grand Coulee iP =12m.48s.
Paris ePP =16m.20s., epPP =16m.50s., e =23m.46s., ePS? =24m.20s., e =25m.8s. and 33m.50s.
Shasta Dam eSKS =23m.21s.
Clermont-Ferrand ePP =16m.40s., ePPS? =24m.37s.
Saskatoon SKSN =22m.57s.
Butte eSS =29m.50s.
Bozeman e =28m.29s., eSS =31m.18s.
Salt Lake City e =14m.40s. and 29m.35s.
Mount Wilson iZ =14m.0s., iPPZ =17m.21s.
Pasadena eZ =13m.51s., iPPZ =17m.19s., iSKSEN =24m.0s.
Overton i =17m.9s.
Palomar ePPN =17m.35s.
Pierce Ferry iP =13m.40s.
Tucson ipPP =18m.40s., ePS =27m.12s.
Lincoln e =25m.17s.
Chicago e =25m.26s., eSP =27m.56s., eSS =34m.15s., eSSS =37m.50s.
Ottawa SSN =34m.8s., SSSN =38m.42s.?
Weston e =25m.41s.
Tacubaya iN =22m.15s., PKKPN =29m.3s., ePPSN =31m.20s., eE =34m.29s., eSSE = 36m.23s.
San Juan e =23m.17s., eSP =31m.59s., e =33m.19s., ePPS =33m.59s., eSS? =41m.6s., eSSS? =46m.18s.
Bogota iNZ =19m.58s.
Huancayo ePP =24m.0s., ePPP =27m.46s., eSKSP =34m.9s., eSSS =49m.42s.

Dec. 19d. Readings also at 0h. (La Paz), 4h. (near Lick), 6h. (near Sofia), 7h. (near Almata, Andijan, Obi-garm, and Tashkent), 9h. (College and near Tacubaya (2)), 15h. (near Almata, Andijan, Obi-garm, Samarkand, Stalinabad, and Tchimkent), 16h. (Andijan, near Obi-garm, Samarkand, and Stalinabad), 19h. (Samarkand near Obi-garm and Stalinabad).

Dec. 20d. 19h. 19m. 3s. Epicentre 33°·0N. 135°·6E.

Intensity VII-VIII at Owase, Tokushima, Sumoto, Tsu ; VI at Osaka, Kyoto, Tottori, Unzendake ; V at Toyooka, Toyama, Hunatsu, Shizuoka, Ajiro ; IV at Tokyo, Sakata ; II-III at Mori. Very shallow. Macroseismic radius 750km.

Felt near the east coast of Shihoku Island and everywhere at Okayama, for a period of 10 minutes. Much damage was done by the earthquake and the subsequent tsuname. Land upheavals and subsidences were conspicuous in Sikohu. 1400 people were killed and 3000 injured, and many thousands of houses were destroyed or seriously damaged.

Epicentre as adopted (Tokyo C.M.O.).
Epicentre 33°·3N. 134°·0E. (U.S.C.G.S.).

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$A = -\cdot6004$, $B = +\cdot5879$, $C = +\cdot5421$; $\delta = -2$; $h = +1$;
$D = +\cdot700$, $E = +\cdot714$; $G = -\cdot387$, $H = +\cdot379$, $K = -\cdot840$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Siomisaki	0·5	17	0 2k	P_g	0 6	S_g	—	—	—
Owase	1·2	25	0 22	− 2	0 38	− 3	—	—	—
Sumoto	1·5	336	0 34a	+ 6	1 0	+11	—	—	—
Osaka	1·6	358	0 33a	+ 3	0 52	+ 1	—	—	—
Kobe	1·7	348	0 31a	0	0 43	−11	—	—	—
Kôti	1·8	288	0 35a	+ 3	0 53	− 3	—	—	—
Kameyama	2·0	21	0 33a	− 2	1 2	+ 1	—	—	—
Kyoto	2·0	3	0 35a	0	1 5	+ 4	—	—	—
Hikone	2·3	13	0 39a	− 1	1 8	− 1	—	—	—
Nagoya	2·4	28	0 52	P_g	1 17	S_g	—	—	—
Gihu	2·6	22	0 47a	+ 3	1 2	−15	—	—	—
Toyooka	2·6	346	0 46a	+ 2	1 16	− 1	—	—	—
Hunatu	3·6	46	0 57	− 1	—	—	—	—	—
Miyazaki	3·7	253	1 7a	P*	2 11	S_g	—	—	—
Mera	4·0	61	1 23	P_g	—	—	—	—	—
Kumamoto	4·1	269	1 8a	+ 3	—	—	—	—	—
Yokohama	4·1	54	1 5k	0	2 0	+ 5	—	—	—
Nagano	4·2	30	1 6a	− 1	2 5	S*	—	—	—
Hukuoka	4·4	279	1 17a	P*	—	—	—	—	—
Maebasi	4·4	39	1 14a	+ 4	2 15	S*	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tokyo		4·4	51	1 9k	− 1	2 9	S*	—	—	—
Kagosima		4·5	252	1 16a	P*	2 15	S*	—	—	—
Wazima		4·5	14	0 56a	−15	—	—	—	—	—
Kakioka		5·0	48	1 15	− 3	2 35	S*	—	—	—
Mito		5·2	49	1 21	0	2 21	− 1	—	—	—
Onahama		5·9	47	1 18k	−13	2 44	+ 4	—	—	—
Sendai		6·8	38	1 42	− 2	3 19	S*	—	—	—
Akita		7·6	27	2 11	P*	3 40	+17	—	—	—
Mizusawa	N.	7·6	35	1 53	− 2	3 22	− 1	—	—	—
Miyako		8·4	36	2 6	0	3 42	− 1	—	—	—
Sapporo		11·0	23	2 36	− 6	4 56	+ 9	—	—	—
Zi-ka-Wei		12·1	265	e 3 9	PP	i 5 45	SSS	—	—	—
Irkutsk		29·7	319	i 6 10	0	—	—	—	—	—
Calcutta	N.	42·8	268	i 8 4a	+ 3	i 14 42	+16	i 9 32	PP	—
Almata		46·4	301	i 8 24	− 6	15 24	+ 6	—	—	—
Dehra Dun	N.	48·5	283	e 10 25	PcP	e 17 39	+111	—	—	e 24·9
New Delhi		49·8	281	i 8 51	− 5	i 16 18	+12	10 36	PP	24·0
Andijan		50·2	297	9 2	+ 2	e 16 23	+12	—	—	—
Tchimkent		51·9	300	i 9 16	+ 4	i 16 47	+12	—	—	—
Tashkent		52·3	299	i 9 19	+ 4	—	—	—	—	—
Obi-garm		52·7	296	i 9 22	+ 4	i 16 55	+ 9	—	—	—
Hyderabad	N.	53·4	267	9 27	+ 3	17 5	+10	21 4	SSS	27·0
Stalinabad		53·4	296	i 9 26	+ 2	i 17 2	+ 7	—	—	—
Samarkand		54·5	298	i 9 29	− 3	e 17 15	+ 5	—	—	—
College		55·0	30	e 9 31	− 4	i 17 13	− 4	e 11 12	PP	e 23·0
Sverdlovsk		55·1	219	i 9 37	+ 1	—	—	—	—	—
Bombay		57·4	272	i 9 55	+ 2	i 18 15	PPS	—	—	—
Colombo	E.	57·7	255	9 58	+ 3	18 27	PPS	—	—	30·0
Honolulu		59·5	82	e 10 11	+ 4	e 18 18	+ 2	i 10 20	P	i 28·4
Brisbane	N.	62·4	162	e 10 30	+ 3	—	—	—	—	—
Sitka		62·4	38	i 10 26	− 1	i 18 30	−23	i 12 29	PP	i 25·0
Baku		66·5	304	i 10 56	+ 2	—	—	—	—	—
Moscow		67·6	322	10 59	− 2	20 2	+ 5	—	—	—
Riverview		68·1	166	11 5k	+ 1	i 20 14	+11	i 20 27	PS	30·4
Grozny		68·2	308	11 8	+ 4	—	—	—	—	—
Apia		68·5	123	e 10 37	−29	—	—	—	—	e 28·3
Erevan		70·4	305	10 49	−29	—	—	—	—	—
Leninakan		70·5	306	e 11 29	+11	—	—	—	—	—
Helsinki		71·3	331	i 11 24	+ 1	20 19	−22	—	—	—
Victoria		72·6	43	11 16	−15	20 36	−20	21 9	PS	40·0
Upsala		74·4	332	i 11 36a	− 6	21 28	+12	i 14 43	PP	34·0
Simferopol		74·8	314	11 45	+ 1	—	—	—	—	—
Yalta		75·0	313	i 11 46	+ 1	—	—	—	—	—
Grand Coulee		75·5	42	e 11 46	− 2	e 21 16	−12	i 13 38	PP	—
Scoresby Sund		75·5	352	i 11 48a	0	21 39	+11	—	—	—
Ferndale		76·2	50	e 12 21	PcP	e 21 51	ScS	—	—	—
Shasta Dam		77·3	49	i 11 58	0	e 21 49	+ 1	e 22 47	PS	—
Warsaw		77·7	324	i 12 1a	+ 1	21 58	+ 6	15 11	PP	e 36·0
Bergen		78·4	337	i 12 4a	0	21 57	− 3	i 22 17	ScS	34·5
Auckland		78·6	148	12 7	+ 2	21 52	−10	14 57	PP	34·8
Berkeley		79·0	52	e 12 6	− 1	e 22 8	+ 2	—	—	e 33·0
Copenhagen		79·2	331	i 12 8a	0	i 22 7	− 1	—	—	38·0
Branner		79·3	52	e 12 12	+ 3	e 22 5	− 4	—	—	e 32·7
Saskatoon		79·3	34	12 6	− 3	22 4	− 5	15 11	PP	37·0
Santa Clara		79·4	52	e 11 59	−10	e 22 8	− 2	—	—	e 32·4
Ksara		79·5	303	i 12 10	0	22 26	ScS	—	—	—
Lick		79·7	52	e 12 12	+ 1	e 22 14	+ 1	e 12 17	PcP	—
Buchareet		79·8	316	e 12 13	+ 1	i 22 15	+ 1	i 15 23	PP	—
Arapuni		79·9	148	11 21	−51	22 45	ScS	27 51	SS	35·0
Campulung		79·9	318	e 12 15	+ 3	e 22 31	+15	—	—	30·0
Istanbul		80·0	312	e 12 16	+ 3	e 22 30	+13	—	—	—
New Plymouth		80·1	150	12 7?	− 6	22 15	− 3	—	—	39·0
Butte		80·2	41	e 12 12	− 2	i 22 19	0	e 15 22	PP	33·7
Bozeman		81·2	41	e 12 19	0	i 22 28	− 1	i 27 56	SS	i 37·3
Fresno	N.	81·2	52	e 12 21	+ 2	i 22 39	+10	e 12 45	PcP	e 33·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tuai		81·2	148	12 14?	− 5	22 45	S_cS	—	—	41·0
Reykjavik		81·6	350	e 12 27	P_cP	e 21 59	−34	e 34 51	Q	e 38·9
Budapest	E.	81·7	322	12 23	+ 1	22 46	+12	17 41	PPP	41·0
	N.	81·7	322	12 23	+ 1	22 26	− 8	15 47	PP	—
Kaimata		82·0	154	13 17	+54	24 37?	+120	—	—	—
Tinemaha		82·0	51	i 12 24	+ 1	e 22 36	− 1	—	—	—
Collmberg	Z.	82·1	328	i 12 25	+ 1	e 22 31	− 7	i 15 36	PP	—
Prague		82·3	326	i 12 24a	− 1	22 47	+ 7	e 15 49	PP	e 36·0
Kalossa		82·4	322	12 30	+ 5	e 28 29	SS	16 0	PP	46·5
Sofia		82·4	316	e 12 28	+ 3	i 22 17	−24	i 28 3	SS	i 39·9
Santa Barbara	Z.	82·6	54	i 12 27	+ 1	—	—	—	—	—
Wellington		82·6	151	12 27	+ 1	22 47	+ 4	13 41	pP	39·4
Belgrade		82·7	319	i 12 28	+ 1	i 23 19	S_cS	e 15 54	PP	36·3
Haiwee		82·8	51	i 12 27	0	e 22 26	−19	—	—	—
Jena		83·0	327	i 12 27	− 1	i 22 53	+ 6	i 15 55	PP	e 46·0
Cheb		83·2	327	e 12 29	0	e 22 53	+ 4	e 15 55	PP	e 43·0
Logan		83·2	44	i 12 34	+ 5	i 22 52	+ 3	i 15 35	PP	e 35·0
Aberdeen		83·3	339	i 12 31	+ 1	i 22 52	+ 2	i 15 52	PP	i 37·8
Christchurch		83·3	154	12 31	+ 1	23 3	+13	15 53	PP	40·5
Mount Wilson		83·8	53	i 12 32	0	e 22 46	− 9	—	—	—
Pasadena		83·8	53	i 12 32a	0	i 23 3	+ 8	e 15 48	PP	i 34·8
Salt Lake City		83·8	44	e 12 34	+ 2	i 22 57	+ 2	e 15 46	PP	e 34·9
Riverside	Z.	84·4	53	i 12 36	0	—	—	—	—	—
Zagreb		84·4	322	i 12 35a	− 1	e 22 49	−12	i 12 38	P_cP	e 43·8
Edinburgh		84·7	338	12 31	− 6	22 54	−10	15 46	PP	—
De Bilt		84·8	332	i 12 38a	+ 1	i 23 10	+ 5	i 24 11	PS	41·0
Overton		84·8	49	e 12 38	+ 1	—	—	—	—	—
Boulder City		84·9	50	e 12 39	+ 1	e 23 2	[+ 2]	—	—	—
Helwan		84·9	302	i 12 39	+ 1	e 23 21	S_cS	16 6	PP	—
Durham		85·1	337	i 12 42	+ 3	i 23 16	S_cS	—	—	—
Palomar		85·1	53	i 12 39	0	—	—	—	—	—
La Jolla		85·2	54	e 12 38	− 1	e 23 3	[+ 1]	—	—	—
Pierce Ferry		85·3	49	e 12 41	+ 1	e 22 20	−50	i 16 18	PP	—
Stuttgart		85·6	327	e 12 41a	0	e 23 15	+ 2	e 16 7	PP	e 42·0
Triest		85·7	323	i 12 45	+ 3	i 23 19	+ 5	i 24 19	PS	46·0
Uccle		86·1	332	i 12 43a	− 1	e 23 28	+10	i 12 59	pP	e 44·0
Rapid City		86·4	38	e 12 45	0	i 23 18	− 3	e 16 7	PP	e 36·0
Strasbourg		86·4	328	i 12 47	+ 2	i 23 15	[+ 5]	i 13 11	pP	42·6
Chur		86·9	325	e 12 47	− 1	e 23 12	[− 1]	—	—	—
Zürich		86·9	327	e 12 47a	− 1	e 23 5	[− 8]	e 16 17	PP	—
Basle		87·2	327	e 12 50a	+ 1	e 23 31	+ 3	—	—	—
Neuchatel		87·9	327	e 12 53	0	e 23 19	[− 1]	—	—	—
Besançon		88·2	328	e 12 54	0	e 23 40	+ 2	—	—	44·0
Florence		88·3	323	i 13 1	+ 6	i 23 37	− 2	i 24 40	PS	—
Pavia		88·3	326	e 12 56	+ 1	—	—	e 13 10	pP	—
Paris		88·4	331	i 12 57	+ 2	i 23 41	+ 1	i 13 13	pP	e 42·0
Denver		88·6	42	i 12 54	− 2	i 23 39	− 3	i 16 49	PP	—
Rome		89·0	322	i 12 58a	0	i 23 51	+ 6	i 16 44	PP	—
Tucson		89·8	51	e 13 3	+ 1	i 23 38	[+ 6]	i 16 26	PP	i 36·6
Jersey		89·9	334	i 13 0	− 2	i 23 28	[− 4]	i 16 44	PP	41·0
Clermont-Ferrand		90·6	329	i 13 6a	+ 1	i 23 55	− 5	i 16 42	PP	—
Lincoln		92·1	37	e 13 12	0	i 24 18	+ 5	e 17 7	PP	e 39·1
Barcelona		94·4	326	e 13 20	− 3	i 25 17	+44	17 20	PP	43·0
Chihuahua		95·3	51	e 19 33	PPP	24 30	−11	e 31 15	SS	e 39·1
Chicago		95·6	31	e 13 43	+15	e 24 37	− 6	e 17 13	PP	i 37·5
Tortosa	N.	95·7	327	i 13 30	+ 1	24 9	[+ 4]	14 4	pP	47·1
Ann Arbor		96·8	28	e 17 5	PP	e 24 18	[+ 7]	i 25 6	S	—
Seven Falls		96·8	17	13 40	+ 6	24 13	[+ 2]	17 28	PP	48·0
Shawinigan Falls		96·8	18	13 39	+ 5	24 2	[− 9]	17 29	PP	45·0
Ottawa		97·0	22	13 33	− 2	24 9	[− 3]	17 33	PP	46·0
St. Louis		97·0	35	e 13 31	− 4	i 24 55	0	i 26 24	PS	—
Algiers		97·6	323	e 13 32	− 6	i 24 31	[+16]	i 18 16	pPP	44·7
Alicante		98·1	326	i 13 35	− 5	i 23 59	[−19]	14 15	pP	47·5
Tananarive		98·5	254	e 13 53	+11	24 33	[+13]	18 1	PP	e 40·3
Granada		100·5	328	i 13 52k	+ 1	i 25 18	− 7	14 38	pP	50·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Halifax		100·8	13	—	—	e 25 33	+ 6	e 32 27	SS		54·0
Harvard		100·8	20	i 13 52a	0	24 40	[+ 9]	i 18 13	PP		e 54·0
Weston		101·0	20	i 13 53	0	i 24 57	(− 4)	i 18 1	PP		—
Lisbon		101·5	332	13 59	+ 4	24 52	[+18]	18 16	PP		47·1
Fordham		101·6	21	e 13 55	− 1	i 24 38	[+ 3]	i 18 16	PP		—
Philadelphia		102·0	24	e 14 4	+ 7	i 25 46	+ 9	i 18 16	PP		i 40·3
Georgetown		102·3	26	e 14 15	+16	25 42	+ 2	i 18 24	PP		—
Guadalajara		102·4	55	e 20 11	PPP	e 25 45	+ 5	e 33 10	SS		e 47·2
Manzanillo	N.	102·8	58	e 16 55	?	i 25 37	− 7	e 27 41	PPS		e 48·1
Columbia		105·0	31	e 14 11	0	e 26 14	+12	e 18 41	PP		e 43·4
Tacubaya		106·2	54	e 14 34	P	e 26 5	− 7	e 18 47	PP		e 49·7
Vera Cruz		108·3	51	e 16 17	?	e 25 21	[+16]	e 21 25	PPP		e 52·1
Oaxaca		109·5	53	e 19 23	PP	e 25 17	[+ 7]	i 21 18	PPP		e 53·1
Merida		111·1	45	e 16 52	?	e 25 32	[+15]	i 19 19	PP		e 54·6
Bermuda		112·2	18	e 15 0	P	i 24 39	[−42]	i 19 32	PP		e 46·1
Johannesburg		117·7	256	20 57?	PP	e 27 57?	{+59}	i 36 35	SSP		57·4
San Juan		124·8	26	e 18 57	[− 5]	e 26 25	[+20]	e 20 47	PP		e 49·0
Balboa Heights		126·5	45	e 19 17	[+12]	e 32 16	PPS	—	—		e 53·4
Bogota		133·2	42	e 23 7	PP	—	—	—	—		48·0
Huancayo		144·8	61	e 19 41	[+ 2]	i 29 11	{−38}	i 25 40	PPP		i 57·6
La Paz		153·0	57	i 19 56	[+ 4]	30 36	{+ 1}	23 42	PP		70·5
Montezuma		156·1	70	e 20 35	[+39]	e 31 18	{+26}	e 44 20	SS		58·5
Santa Lucia		158·0	99	—	—	31 57?	{+55}	—	—		—
La Plata	E.	168·6	104	20 15	[+ 7]	31 51	{− 5}	24 39	PP		73·0
	N.	168·6	104	20 27	[+19]	32 9	{+13}	46 9	SS		92·2
	Z.	168·6	104	20 17	[+ 9]	32 3	{+ 7}	—	—		81·0

Additional readings :—
Zi-ka-wei iN =3m.37s., 3m.59s., 4m.45s., 4m.55s., and 6m.5s., SE =6m.45s.
Calcutta iPPP =10m.22s.
New Delhi iE =11m.1s., PPPN =11m.25s., S_cSN =18m.43s., iE =19m.4s., SSN = 19m.42s., iE =22m.50s.
College eS =16m.51s., i =17m.37s., e =21m.35s.
Sitka i =14m.44s.
Riverview eE =20m.31s., iN =20m.57s., iE =21m.12s., iN =21m.18s. and 21m.38s., iE =21m.54s., iN =22m.23s., iE =22m.34s. and 23m.0s., iN =23m.32s., 24m.13s., 24m.58s., and 25m.50s., iE =25m.55s., iN =26m.39s., eE =27m.56s., eQN =29m.3s.
Victoria SS =25m.12s., SSS =27m.45s.
Upsala iPE =11m.42s., PPP =16m.48s., PPPPE =17m.52s., SN =21m.36s., $S_cS?E$ = 21m.58s.?, SSN =26m.24s., SSE =26m.43s., eSSS?E =30m.32s.
Warsaw $P_cS?EN$ =12m.12s., PPPE =16m.53s., PSE =22m.9s., SSE =26m.57s., SSN = 27m.8s.?
Bergen PPE =14m.31s., eE =23m.32s.
Auckland i =12m.57s., PPP =16m.51s., S_cS =22m.31s., i =25m.24s., SS =27m.15s., SSS =30m.59s.
Branner eN =12m.44s., eE =13m.22s.
Saskatoon PPP =16m.57s., PS =22m.52s., SS =27m.25s., SSS =30m.15s., SSSS = 33m.25s.
Lick eEN =14m.18s.
Bucharest iPPN =15m.27s., iSE =22m.27s., iPSEN =23m.10s.
Arapuni PP? =16m.3s., i =24m.27s.
Butte i =12m.29s., e =18m.33s., i =22m.41s., e =24m.56s. and 27m.11s.
Bozeman i =12m.36s., iPP =14m.56s., eSSS =31m.16s.
Fresno ePP?N =13m.14s.
Reykjavik eEN =26m.39s.
Budapest eN =13m.43s., PPE =16m.12s., iN =19m.21s., eE =22m.57s., PSN =23m.1s., SSE =28m.40s., SSSE =32m.31s.
Collmberg iZ =15m.5s., 15m.18s., and 16m.51s., iPPP?Z =17m.23s., iZ =17m.43s., ePKP,PKP?Z =39m.7s.
Prague ePPP =18m.52s., ePS =23m.51s., eSS =28m.9s., eSSS =32m.27s.
Kalossa iE =13m.25s., iN =15m.30s., PPE =16m.5s., iE =16m.30s., iPPPE =17m.46s., iE =20m.14s., eN =24m.18s., eE =24m.47s., SSE =28m.49s.
Sofia i =14m.12s., 19m.21s., and 22m.57s., iPSEN =23m.11s.
Wellington PP =15m.50s., sPP =17m.21s., S =23m.17s., PS =23m.43s., PPS =24m.7s., SPS =24m.57s., SS =27m.54s., pSSS =33m.25s., Q =35m.27s.
Belgrade ePPP =18m.59s., ePS =24m.8s., eSS =29m.27s.
Haiwee ePKP,PKPZ =39m.22s.
Jena iN =19m.13s., iE =19m.17s., iN =19m.20s., iSZ =22m.57s., iSS =28m.45s., iSSEN =28m.49s., eEN =33m.9s., iN =42m.27s., iE =44m.57s.
Cheb eE =12m.22s., iE =12m.33s., 12m.40s., 12m.51s., and 13m.45s., eN =14m.7s., e =14m.10s., ePPP =17m.14s., iE =19m.27s., eN =19m.57s.?, ePS =24m.7s., eSS =28m.50s., e =33m.15s.
Logan iSS =28m.32s.

Continued on next page.

Aberdeen iEN =19m.22s., iSE =22m.59s., iSSEN =28m.32s., iE =37m.13s.
Christchurch iNZ =13m.21s., i =13m.54s., E =17m.4s., iE =21m.28s. and 22m.47s., SS =28m.17s., QN =35m.27s.
Mount Wilson ePKP,PKPZ =39m.8s.
Pasadena eZ =20m.57s., eS?N =22m.45s., eSSN =28m.3s., ePKP,PKPZ =39m.4s.
Salt Lake City ePPP =17m.53s., eS =22m.41s., e =28m.39s.
Riverside ePKP,PKPZ =39m.3s.
Zagreb iP$_c$PZ =12m.51s., e =13m.19s., i =14m.31s., iPPP =17m.46s., eZ =19m.49s., eSKS?NE =23m.9s., ePSZ =23m.28s., iNE =25m.7s., eNE =29m.16s., eZ =29m.50s. and 35m.37s., e =39m.57s.
Edinburgh S$_c$S =23m.5s., SS =28m.25s.
De Bilt iSS =29m.5s., iSSS =32m.30s.
Overton i =17m.9s., e =21m.18s., ePKP,PKP =39m.18s.
Pierce Ferry i =13m.24s., ePKP,PKP =38m.25s.
Stuttgart eP$_c$PZ =13m.0s., eZ =14m.33s., ePPP =17m.30s., ePS =23m.57s., eSS =29m.7s., eSSS =32m.57s.
Triest eSS =29m.17s.
Uccle ipP =13m.3s., iEN =13m.41s., iN =14m.6s., iPPE =16m.19s. and 16m.30s., ePPPN =18m.17s., iPPPE =18m.24s., eSKSE =22m.53s., iPSN =24m.17s., iE =26m.33s. and 27m.32s., eSSN =28m.59s., eSSE =29m.3s., esSSE =29m.51s.
Rapid City eSS =29m.17s., eSSS =32m.53s.
Strasbourg iPP =16m.14s., iPPP =18m.34s., iS =23m.31s., iPS =24m.32s., iSS =29m.31s., iSSS =32m.57s.
Zürich eS =23m.36s.
Florence iSS =29m.43s.
Paris i =13m.7s., isP =13m.33s., i =14m.17s., iPP =16m.34s., iSKS =23m.10s., iSS =30m.0s.
Denver PPP =19m.15s.
Rome iZ =14m.51s., iEN =16m.52s., iN =18m.7s., iE =22m.57s., 23m.17s., 24m.11s., 25m.24s., 25m.51s. and 29m.56s., iSSE =30m.14s.
Tucson i =14m.11s., iPPP =18m.17s., eSS =29m.38s., i =30m.5s., eSSS =33m.41s.
Jersey i =17m.57s. and 20m.57s., iS =24m.24s., i =25m.44s., isS =31m.12s., i =31m.57s.?
Clermont-Ferrand iSKS =23m.25s.
Lincoln i =25m.5s., e =25m.53s., iSS? =30m.35s., eSSS =34m.43s.
Barcelona PPP =19m.33s., PS =26m.12s., SS =31m.49s., SSS =35m.12s.
Chihuahua eZ =33m.21s., eSSZ = =35m.2s.
Chicago ePPP =19m.21s., iS =24m.51s., i =28m.0s., iSS =31m.25s.
Tortosa P$_c$PN =13m.36s., PPN =17m.24s., PPPN =19m.13s., iSN =24m.30s., PPSN =26m.18s., SSN =31m.18s.
Seven Falls PPP =19m.30s., S =25m.1s., PPS =26m.52s., SS =31m.32s., SSS =35m.21s., SSSS =39m.51s.
Shawinigan Falls S =25m.7s., PS =26m.21s., PPS =26m.58s., SS =31m.57s.?, SSS =35m.57s.?, SSSS =40m.57s.?
Ottawa SKKSN =24m.45s., S =25m.1s., PS =26m.24s., PPS =26m.57s., SS =31m.39s., SSSN =35m.57s., SSSS =40m.45s.
St. Louis iP =13m.36s., i =13m.47s., 14m.34s., and 14m.45s., iPP =17m.21s., iPPP =19m.19s. iSKS =23m.55s., eSKS =24m.6s., iPS =26m.4s.
Algiers e =14m.13s., 14m.26s., and 15m.15s., i =17m.29s., iPP =17m.40s., PPP =20m.20s., iS =25m.34s., iPS? =27m.53s., iPPS? =28m.6s., i =28m.35s. and 29m.38s., iSS? =31m.22s., i =32m.25s., iSSS? =35m.29s.
Alicante sP =14m.43s., PP =17m.33s., PPP =19m.9s., PS =26m.31s., PPS =27m.43s., SS =31m.15s., SSP =31m.45s., SSS =35m.29s., Q =42m.7s.
Tananarive PPP =19m.58s., SKKS =24m.56s., S =25m.18s., PS =26m.40s., SS =32m.4s., SSS =35m.54s.
Granada sP =15m.2s., iPP =18m.10s., PPP =20m.33s., SKKS =24m.40s., PS =27m.15s., iSS =32m.25s., SSP =33m.11s., SSS =36m.34s.
Halifax e =40m.3s. and 43m.57s.?
Harvard i =15m.28s., 16m.33s., 17m.16s., 17m.57s., and 19m.44s., iPPP? =20m.46s., iSKP? =22m.0s., i =23m.42s., iS =25m.42s., iPS? =27m.2s., iPPS =28m.20s., i =29m.6s., eSS =32m.37s., ePKKS =33m.33s., e =34m.18s.
Weston iPS =27m.3s., iSS =32m.45s.
Lisbon PN =14m.6s., PPPE =20m.20s., E =23m.45s., N =23m.49s., SKSN =24m.59s., N =25m.57s., E =26m.6s., PSN =27m.35s., iPSN =27m.57s., SSE =33m.3s., iSSN =33m.15s., iSSSN =36m.57s., SSSE =37m.27s., QE =42m.3s.
Fordham iPPP =20m.21s., iSKKS =25m.5s., iS =25m.43s.
Philadelphia iPPP =20m.12s., iSKS =24m.9s., eS? =25m.12s., iSS =31m.54s., iSSS =33m.3s.
Georgetown SKKS =25m.12s.
Guadalajara eSSE =33m.13s., eSSSN =37m.17s., eSSSE =37m.23s., eQN =43m.9s.
Manzanillo eE =18m.56s., ePPPN =20m.17s., eE =21m.52s., eN =23m.16s., eSKKSE =24m.58s., eSSN =32m.52s., eSSE =32m.55s., eSSSSN =38m.2s., eSKSPKPN =42m.37s.
Columbia e =29m.45s., eSS =33m.35s., e =38m.44s.
Tacubaya eN =14m,52s., eE =15m.8s., eN =15m.20s., eSKKSN =25m.47s. and 25m.56s., iSN =26m.30s., eZ =27m.19s., ePSN =27m.49s., ePPSE =28m.39s., iPPSN =28m.42s., ePPSE =28m.49s., eSSN =34m.9s. and 34m.12s., eE =34m.37s., eZ =36m.10s., eE =37m.36s., eSSSZ =38m.5s., eSSSE =38m.19s., eSSSN =38m.29s., eE =46m,39s., eN =47m.29s.

Continued on next page.

Vera Cruz eE =18m.19s., iE =18m.31s., ePPZ =19m.37s., eS?Z =27m.1s., ePSZ = 28m.21s., iPSE =28m.27s., iSSN =34m.17s., eZ =35m.25s., iSSSEN =38m.41s., eQZ =45m.3s.
Oaxaca eN =20m.31s. and 23m.17s., eSN =26m.39s., ePSN =28m.14s., ePPSN = 29m.27s., eN =33m.11s., eSSN =34m.30s., iSSSN =39m.2s., eQN =45m.44s.
Merida iPPPE =21m.28s., iEN =22m.37s., eSKSN =25m.37s., eSE =26m.55s., iPSN = 28m.56s., iPKKPE =29m.35s., iN =31m.32s., iE =32m.25s., iSSE =34m.39s., eSSN =34m.55s., eN =48m.6s.
Bermuda ePKP =18m.59s., iPS? =27m.12s., e =32m.36s., iSS =35m.19s., eSSS? = 38m.30s.
Johannesburg iN =23m.33s., iPSEN =30m.27s., iN =48m.45s., iQEN =50m.57s.
San Juan eP? =15m.50s., e =27m.41s., i =28m.54s., iPS =30m.57s., i =32m.47s., eSS = 37m.55s., eSSS =42m.7s.
Huancayo i =19m.49s., and 20m.24s., iPP? =22m.8s., i =29m.44s., and 31m.33s., iPPS =36m.26s., iSS =39m.57s., i =42m.0s. and 47m.22s.
La Paz iPKP$_2$Z =20m.15s., iSKPZ =23m.19s., PPPZ =28m.22s., PSKS =34m.35s., SSNZ =43m.25s., SSSZ =49m.33s., QNZ =66m.9s.
Montezuma e =25m.56s.
La Plata E. 21m.21s. and 22m.27s., PPP =29m.39s., 34m.9s., SKSP =35m.51s., PPS? =41m.15s., SS =48m.3s., SSS =54m.57s., 58m.15s., Q =66m.45s.
La Plata N. 21m.39s., PP =26m.21s., 34m.9s. and 37m.45s., PPS? =41m.45s., 43m.51s., PSS =49m.3s., SSS =57m.51s., Q =69m.45s.
La Plata Z. 22m.33s. and 27m.21s.

Dec. 20d. 22h. 46m. 0s. Epicentre 33°·0N. 135°·6E. (as at 19h.).

Intensity V at Osaka ; IV at Takamatsu and Owase ; II-III at Kumamoto and Hukuoka.
Epicentre 33°·3N. 135°·0E.
Very shallow. Macroseismic radius more than 300km.
The Seismological Bulletin of the Central Meterological Observatory, Japan, for the year 1946, Tokyo 1951, p. 29, isoseismic chart, p. 29.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Siomisaki		0·5	17	−0 6	−20	0 5	−18	—	—	—
Owase		1·2	25	0 25	+ 1	0 40	− 1	—	—	—
Kobe		1·7	348	0 30$_a$	− 1	0 48	− 6	—	—	—
Toyooka		2·6	346	−0 4	−48	0 41	−36	—	—	—
Omaesaki		2·7	53	0 11	−34	—	—	—	—	—
Kumamoto		4·1	269	0 59$_a$	− 6	1 36	−19	—	—	—
Yokohama		4·1	54	1 26	P$_g$	2 24	S$_g$	—	—	—
Hukuoka		4·4	279	1 2	− 8	1 35	−27	—	—	—
Mito		5·2	49	1 38	P$_g$	2 52	S$_g$	—	—	—
Sendai		6·8	38	1 56	P*	3 38	S$_g$	—	—	—
Mizusawa	E.	7·6	35	2 5	P*	3 59	S*	—	—	—
Morioka		8·0	32	2 6	+ 6	4 2	S*	—	—	—
Miyako		8·4	36	2 6	0	3 45	+ 2	—	—	—
Mori		9·9	22	2 37	+12	5 15	S$_g$	—	—	—
Sapporo		11·0	23	2 55	PPP	5 7	SSS	—	—	—
Shasta Dam		77·3	49	e 11 58	0	—	—	—	—	—
Copenhagen		79·2	331	i 12 5	− 3	i 22 8	0	—	—	—
Tinemaha	Z.	82·0	51	e 12 22	− 1	—	—	—	—	—
Collmberg	Z.	82·1	328	e 12 21	− 3	—	—	e 15 39	PP	—
Belgrade		82·7	319	e 12 23	− 4	e 22 40	− 4	e 15 11	PP	37·3
Jena	N.	83·0	327	e 12 26	− 2	—	—	—	—	—
Mount Wilson	Z.	83·8	53	e 12 33	+ 1	—	—	—	—	—
Pasadena	Z.	83·8	53	e 12 34	+ 2	—	—	—	—	—
Riverside	Z.	84·4	53	e 12 36	0	—	—	—	—	—
Overton		84·8	49	e 12 41	+ 4	—	—	—	—	—
Boulder City		84·9	50	e 13 0	+22	—	—	—	—	—
Palomar	Z.	85·1	53	e 12 40	+ 1	—	—	—	—	—
Pierce Ferry		85·3	49	e 12 41	+ 1	—	—	—	—	—
Stuttgart		85·6	327	e 12 38	− 3	—	—	i 12 57	P$_c$P	e 47·0
Strasbourg		86·4	328	e 12 42	− 3	e 23 13	[+ 3]	—	—	—
Paris		88·4	331	e 12 52	− 3	—	—	e 13 24	P$_c$P	—
Tucson		89·8	51	e 13 2	0	—	—	e 16 30	PP	—
Huancayo		144·8	61	e 19 42	[+ 3]	—	—	—	—	—

Collmberg also gives eZ =12m.33s.
Long waves were also recorded at Helsinki and Budapest,

Dec. 20d. 23h. Undetermined shock.

Besançon eP =32m.17s., iS =32m.34s.
Strasbourg eP =32m.29s., eP_g =32m.36s., eS_g =33m.6s.
Pavia eZ =32m.30s.
Ebingen eP =32m.31s.?, eS_g =33m.5s.
Stuttgart eP =32m.32s., eP_g =32m.45s., iS_g =33m.20s.
Paris eP =32m.56s., eP_g =33m.12s., eS =33m.57s., e =34m.9s., iS_g =34m.11s.
Jena e =33m.31s., 33m.34s., 33m.44s., and 36m.25s.

Dec. 20d. Readings also at 0h. (Tashkent, Ksara, Brisbane, Riverview, and Wellington (2)), 4h. (Huancayo), 8h. (Palomar and Tucson), 10h. (near Obi-garm, Stalinabad, and Samarkand), 11h. (Manzanillo), 12h. (near Obi-garm and Stalinabad), 13h. (La Paz), 17h. (Besançon, Collmberg, near Stuttgart and Strasbourg), 18h. (near La Paz), 21h. (near Andijan, Tchimkent, Samarkand, and Almata), 23h. (Tucson, Palomar, Riverside, Pierce Ferry, Mount Wilson, Paris, Strasbourg, and near Besançon, Stuttgart, and Ebingen).

Dec. 21d. 3h. 39m. 15s. Epicentre 43°·5N. 148°·4E.

A = −·6198, B = +·3813, C = +·6859 ; δ = 0 ; h = −3 ;
D = +·524, E = +852 ; G = −·584, H = +·359, K = −·728.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	N.	7·0	234	1 49	+ 3	3 5	− 3	—	—	—
Irkutsk		30·4	301	—	—	11 41	+25	—	—	—
College		40·8	35	e 7 48	+ 3	e 13 48	− 8	(e 16 57)	SS	e 17·0
Almata		50·4	295	i 9 1	0	—	—	—	—	—
Sverdlovsk		54·0	316	i 9 25	− 3	17 3	0	—	—	—
Tchimkent		55·6	297	i 9 41	+ 1	i 17 24	− 1	—	—	—
Tashkent		56·3	296	e 9 45	0	e 17 35	+ 1	—	—	—
New Delhi	N.	57·8	280	e 9 54	− 1	e 17 59	+ 5	i 18 9	PS	—
Stalinabad		58·1	294	i 9 58	0	—	—	—	—	—
Samarkand		58·7	296	e 9 57	− 5	—	—	—	—	—
Shasta Dam		63·1	58	i 10 30	− 2	—	—	—	—	—
Hyderabad	N.	63·7	269	e 10 37	+ 1	e 19 12	+ 2	19 21	PS	—
Bombay		66·9	275	—	—	e 20 3	+14	—	—	—
Tinemaha	Z.	67·8	59	e 11 1	− 1	—	—	—	—	—
Santa Barbara	Z.	68·5	62	e 11 4	− 2	—	—	—	—	—
Haiwee	Z.	68·6	59	e 11 6	− 1	—	—	—	—	—
Pasadena	Z.	69·7	61	i 11 13	− 1	—	—	—	—	e 36·4
Riverside	Z.	70·3	61	e 11 17	0	—	—	—	—	—
Overton		70·5	57	e 11 18	0	—	—	—	—	—
Boulder City		70·6	58	i 11 19	0	—	—	—	—	—
Palomar	Z.	71·0	62	i 11 21	− 1	—	—	—	—	—
Pierce Ferry		71·1	58	i 11 21	− 1	—	—	—	—	—
Copenhagen		74·4	336	11 41a	− 1	—	—	—	—	36·8
Tucson		75·6	58	e 11 48	0	e 21 25	− 4	—	—	e 31·0
Riverview	E.	77·0	177	—	—	—	—	e 33 45	Q	—
Collmberg	Z.	78·0	332	e 12 1	− 1	e 22 3	+ 8	—	—	—
Jena	N.	78·7	333	e 12 6	0	—	—	—	—	—
Budapest		79·0	327	12 5	− 2	e 22 3	− 3	—	—	e 49·8
Cheb		79·2	333	—	—	—	—	e 30 45?	SSS	e 41·8
De Bilt		79·6	337	i 12 10	0	e 22 15	+ 3	—	—	e 38·8
Istanbul		79·7	317	e 12 8	− 3	—	—	—	—	e 49·8
Uccle		81·0	338	e 12 25	+ 7	e 22 28?	+ 1	e 32 13	SSS	e 38·8
Stuttgart		81·4	334	e 12 20	0	—	—	—	—	e 45·8
Ksara		81·5	308	i 12 21	0	22 39?	+ 7	—	—	—
Strasbourg		82·0	334	e 12 24	+ 1	e 22 47	+10	—	—	e 41·8
Basle		83·0	334	e 12 28	0	—	—	e 15 45	PP	—
Paris		83·3	337	i 12 30	0	—	—	—	—	e 43·8
Seven Falls		83·3	25	—	—	e 22 39	−11	—	—	38·8
Florence		85·0	330	e 13 2	+24	e 23 7	0	—	—	—
Weston		87·4	28	e 12 50	0	—	—	—	—	e 47·2

For Notes see next page.

NOTES TO DECEMBER 21d. 3h. 39m. 15s.

Additional readings :—
Pasadena iZ = 11m.28s.
Overton i = 11m.30s.
Boulder City i = 11m.35s.
Palomar iZ = 11m.37s.
Pierce Ferry i = 11m.33s.
Collmberg eZ = 12m.9s and 12m.13s.
Uccle e = 22m.36s.?
Strasbourg e = 12m.32s., 12m.45s., and 25m.56s.
Paris i = 12m.40s., e = 12m.56s., 30m.45s., and 41m.45s.
Long waves were also recorded at Christchurch, Aberdeen, Helsinki, Upsala, San Juan, and other American stations.

Dec. 21d. 7h. 27m. 9s. Epicentre 33°·0N. 135°·6E. (as on 20d.).
Intensity V at Shionomisaki ; IV at Owase, Sumoto, Kobe ; II-III at Tsuraga, Kashiwara.
Epicentre 33°·5N. 135°·4E. Very shallow. Macroseismic radius between 200 and 300km.
The Seismologoical Bulletin of the Central Meteorological Observatory, Japan, for the year 1946, Tokyo 1951, p. 30, isoseismic chart, p.30.

$A = -\cdot 6004,\ B = +\cdot 5879,\ C = +\cdot 5421 ;\quad \delta = -2 ;\quad h = +1.$

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Siomisaki		0·5	17	0 12	− 2	0 17	S_g	—	—
Owase		1·2	25	0 20	− 4	0 29	−12	—	—
Sumoto		1·5	336	0 24 a	− 4	0 35	−14	—	—
Osaka		1·6	358	0 27 a	− 3	0 42	− 9	—	—
Kobe		1·7	348	0 27	− 4	0 42	−12	—	—
Kyoto		2·0	3	0 26	− 9	0 42	−19	—	—
Hikone		2·3	13	0 33	− 7	1 2	− 7	—	—
Gihu		2·6	22	0 43	− 1	1 10	− 7	—	—
Toyooka		2·6	346	0 40	− 4	1 6	−11	—	—
Omaesaki		2·7	53	0 52	+ 7	1 29	+10	—	—
Miyazaki		3·7	253	1 5	+ 5	1 48	+ 3	—	—
Toyama		3·9	20	1 0	− 2	1 54	+ 4	—	—
Kumamoto		4·1	269	1 11	+ 6	2 20	S_g	—	—
Nagano		4·2	30	1 8	+ 1	2 8	+11	—	—
Hukuoka		4·4	279	1 15	P*	2 25	S_g	—	—
Maebasi		4·4	39	1 14 a	+ 4	2 19	S*	—	—
Tokyo		4·4	51	1 15	+ 5	2 15	S*	—	—
Tukubasan		4·9	48	1 17	0	2 20	+ 5	—	—
Kakioka		5·0	48	1 12	− 6	—	—	—	—
Mito		5·2	49	1 29	+ 8	2 33	+11	—	—
Sendai		6·8	38	1 45	+ 1	3 30	S*	—	—
Mizusawa	E.	7·6	35	e 1 58	+ 3	3 49	S*	—	—
Riverview		68·1	166	e 23 22	?	—	—	—	—
Shasta Dam		77·3	49	e 11 59	+ 1	—	—	—	—
Tinemaha	Z.	82·0	51	e 12 26	+ 3	—	—	—	—
Haiwee	Z.	82·8	51	e 12 27	0	—	—	—	—
Pasadena	Z.	83·8	53	e 12 33	+ 1	—	—	—	—
Riverside	Z.	84·4	53	e 12 36	0	—	—	i 12 42	P_cP
Overton		84·8	49	e 12 40	+ 3	—	—	—	—
Boulder City		84·9	50	e 12 39	+ 1	—	—	—	—
Palomar	Z.	85·1	53	i 12 40	+ 1	—	—	—	—
Pierce Ferry		85·3	49	e 12 42	+ 2	—	—	—	—

Long waves were recorded at Christchurch.

Dec. 21d. 10h. 18m. 43s. Epicentre 44°·1N. 148°·2E.

Intensity IV at Nemuro; II-III at Teshikaga in Hokkaido.
Macroseismic radius 300km.
Seismo. Bull. Cent. Met. Obs., Japan, 1946, Tokyo, 1951, p. 30, with chart of intensities.

$A = -\cdot6130$, $B = +\cdot3801$, $C = +\cdot6926$; $\delta = -6$; $h = -3$;
$D = +\cdot527$, $E = +\cdot850$; $G = -\cdot589$, $H = +\cdot365$, $K = -\cdot721$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		2·0	248	0 38 a	+ 3	1 4	+ 2	—	—	—
Sapporo		5·1	261	1 23	+ 3	2 43	+23	—	—	—
Mori		5·9	253	1 36	+ 5	2 59	+19	—	—	—
Hatinohe		6·0	237	1 43	+11	2 57	+14	—	—	—
Miyako		6·4	228	1 20	−18	2 44	− 9	—	—	—
Morioka		6·8	233	1 42 a	− 2	2 53	−10	—	—	—
Mizusawa	E.	7·2	230	1 50	+ 1	3 4	− 9	—	—	—
Akita		7·4	237	1 48	− 4	2 59	−19	—	—	—
Sendai		8·0	226	1 58	− 2	3 27	− 6	—	—	—
Hukusima		8·6	225	2 3	− 6	—	—	—	—	—
Onahama		9·0	220	2 19	+ 6	3 45	−13	—	—	—
Mito		9·7	220	2 31	+ 9	4 1	−14	—	—	—
Tukubasan		10·0	221	2 23	− 4	4 11	−11	—	—	—
Maebasi		10·4	225	2 30	− 4	4 35	+ 3	—	—	—
Nagano		10·6	229	2 34	− 2	4 34	− 3	—	—	—
Tokyo		10·6	220	2 40	+ 4	4 26	−11	—	—	—
Yokohama		10·8	220	2 58	+19	4 33	− 9	—	—	—
Toyooka		13·3	235	3 13	0	5 48	+ 6	—	—	—
Kobe		13·7	231	3 21	+ 3	6 25	+33	—	—	—
Sumoto		14·1	231	3 40	+17	6 33	+31	—	—	—
Hukuoka		17·3	239	4 6k	+ 2	—	—	—	—	—
Irkutsk		30·0	301	6 15	+ 3	—	—	—	—	—
College		40·4	35	e 7 41	0	i 13 49	− 1	—	—	e 16·9
Sitka		47·6	45	i 8 44	+ 5	i 15 41	+ 6	i 18 34	S_cS	i 19·4
Honolulu		49·8	98	e 10 53	PP	e 16 1	− 5	—	—	e 20·6
Almata		50·0	295	9 1	+ 3	—	—	—	—	—
Calcutta	N.	53·2	266	e 9 34	+12	i 17 21	+29	i 11 40	PP	—
Sverdlovsk		53·5	316	9 25	+ 1	16 57	0	—	—	—
Andijan		54·2	294	9 33	+ 4	—	—	—	—	—
Tchimkent		55·2	297	i 9 39	+ 2	17 17	− 3	—	—	—
Tashkent		55·9	296	e 9 42	0	e 17 20	− 9	—	—	—
Dehra Dun	N.	56·0	281	e 15 3	?	e 24 10	?	—	—	e 33·2
New Delhi		57·6	280	9 53	− 1	i 17 45	− 6	21 43	SS	27·2
Stalinabad		57·7	294	i 9 57	+ 2	i 17 52	− 1	—	—	—
Victoria		57·9	51	—	—	e 17 19	−36	e 24 5	Q	e 28·3
Samarkand		58·3	296	9 59	0	—	—	—	—	—
Grand Coulee		60·7	50	e 10 14	− 1	—	—	—	—	—
Shasta Dam		62·9	58	e 10 30	0	—	—	—	—	—
Hyderabad	N.	63·6	269	10 36	+ 1	19 21	+13	12 54	PP	—
Berkeley		64·7	61	e 10 43	+ 1	i 19 22	0	—	—	e 28·5
Moscow		64·7	324	10 43	+ 1	19 22	0	—	—	—
Saskatoon		64·9	41	10 45	+ 2	19 20	− 4	23 35	SS	31·3
Branner	E.	65·0	61	e 10 45	+ 1	e 19 34	+ 8	—	—	—
Santa Clara		65·2	61	e 10 42	− 3	e 19 17	−11	—	—	e 27·7
Butte		65·4	48	e 11 5	+18	e 19 33	+ 3	e 13 6	PP	e 27·0
Lick		65·4	61	e 10 49	+ 2	e 19 28	− 2	—	—	—
Scoresby Sund		65·6	357	10 48	0	19 33	0	—	—	—
Helsinki		66·3	333	e 10 54	+ 2	e 19 39	− 3	e 15 27	PPP	e 31·3
Bozeman		66·5	48	e 10 56	+ 2	i 19 42	− 2	e 13 24	PP	e 27·3
Bombay	E.	66·7	274	i 10 56	+ 1	i 20 11	+25	24 28	SS	33·6
	N.	66·7	274	e 10 59	+ 4	e 20 7	+21	24 28	SS	33·7
Tinemaha		67·7	59	i 11 2	+ 1	—	—	—	—	—
Haiwee		68·4	59	e 11 7	+ 1	e 20 7	0	—	—	—
Santa Barbara		68·4	62	i 11 7	+ 1	e 20 6	− 1	—	—	—
Logan		68·5	52	e 11 11	+ 5	e 20 12	+ 4	e 21 14	S_cS	e 28·0
Upsala		68·8	335	e 11 11	+ 3	e 20 11	0	e 15 34	PP	e 33·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grozny		68·9	310	e 11 7	− 2	i 20 2	−11	—	—	—
Kodaikanal	E.	69·1	264	e 10 57	−13	e 20 22	+ 7	—	—	—
Mount Wilson		69·6	61	e 11 14	+ 1	e 20 22	+ 1	—	—	—
Pasadena		69·6	61	e 11 12	− 1	i 20 18	− 3	i 11 26	pP	e 28·1
Salt Lake City		69·6	53	e 11 11	− 2	e 20 9	−12	e 21 9	S_cS	e 28·2
Colombo	E.	69·7	259	11 7	− 7	20 20	− 2	—	—	45·9
Piatigorsk		69·9	312	11 17	+ 2	20 27	+ 3	—	—	—
Riverside	Z.	70·2	61	i 11 18	+ 1	—	—	i 11 30	pP	—
Overton		70·4	57	e 11 18	0	—	—	i 11 30	pP	—
Boulder City		70·5	58	i 11 19	+ 1	e 20 28	− 4	—	—	—
Palomar		70·9	62	i 11 21	0	e 20 34	− 2	i 11 35	pP	—
Pierce Ferry		70·9	58	i 11 21	0	—	—	i 11 33	pP	—
La Jolla		71·0	62	e 11 22	0	e 20 29	− 8	—	—	—
Bergen		71·6	341	11 25	0	20 43	− 1	25 45	SS	e 32·8
Leninakan		71·6	309	e 11 36	+11	—	—	—	—	—
Erevan		71·7	308	e 11 21	− 5	—	—	—	—	—
Rapid City		71·7	46	e 11 29	+ 3	i 20 42	− 3	e 14 23	PP	e 30·6
Sotchi		72·0	313	11 33	+ 5	20 55	+ 6	—	—	—
Denver		73·7	50	i 12 41	+63	e 21 8	0	—	—	—
Copenhagen		73·8	336	11 40	+ 2	i 21 9	0	—	—	34·3
Yalta		74·1	317	11 42	+ 2	21 10	− 2	—	—	—
Tucson		75·4	58	e 11 48	+ 1	i 21 29	+ 2	e 14 35	PP	e 31·4
Aberdeen		76·1	343	i 12 7	+16	i 21 32	− 3	i 26 27	SS	34·0
Collmberg		77·4	332	i 12 0	+ 2	e 21 48	− 1	e 16 55	PPP	e 36·3
Lincoln		77·4	44	—	—	e 21 42	− 7	e 26 32	SS	e 31·0
Edinburgh		77·5	344	—	—	i 21 48	− 2	—	—	—
Riverview		77·5	177	i 12 7k	+ 8	i 21 52	+ 2	i 12 30	P_cP	e 33·7
Bucharest		78·0	321	e 12 22	+20	e 21 57	+ 2	—	—	31·3
Prague		78·0	331	e 11 50?	−12	21 51	− 4	e 27 23	SS	e 36·3
Jena	N.	78·2	333	e 12 4	+ 1	e 21 55	− 2	e 27 31	SS	—
Durham	E.	78·3	342	—	—	i 21 55	− 4	—	—	—
Budapest		78·4	327	12 8	+ 4	i 22 3	+ 3	15 21	PP	41·3
De Bilt		79·1	337	—	—	e 22 12	+ 5	e 27 57	SS	e 36·3
Istanbul		79·2	317	i 12 8	0	e 22 11	+ 3	—	—	—
Kalocsa		79·3	327	e 12 23	+14	e 22 9	0	—	—	e 42·3
Belgrade		80·1	324	i 12 20	+ 7	e 22 40	+22	e 28 27	SS	e 38·3
Uccle		80·5	338	i 12 17a	+ 2	e 22 22	0	e 15 25	PP	e 37·3
Sofia		80·6	322	e 12 16	0	e 22 25	+ 2	—	—	32·3
Stuttgart		80·8	334	i 12 19a	+ 2	e 22 41	+16	i 12 39	P_cP	e 40·3
Chihuahua	Z.	80·9	59	—	—	e 20 34	?	—	—	e 43·4
Chicago		81·0	39	e 12 24	+ 6	e 22 24	− 3	e 15 29	PP	e 37·4
Ksara		81·0	308	i 12 21	+ 3	22 45	+18	—	—	—
Zagreb		81·0	328	e 12 21a	+ 3	e 22 10	−17	e 12 46	P_cP	e 38·3
Strasbourg		81·4	334	i 12 22a	+ 2	i 23 13	PS	e 15 38	PP	37·3
Triest		82·0	329	e 12 37	+14	e 22 36	− 1	e 23 1	PS	—
St. Louis		82·2	42	i 12 24	0	e 22 35	− 4	—	—	—
Zürich		82·3	334	e 12 28	+ 3	e 22 41	+ 1	e 28 26	SS	—
Basle		82·4	334	e 12 28	+ 3	e 22 42	+ 1	—	—	—
Chur		82·4	332	e 12 28	+ 3	e 22 42	+ 1	—	—	—
Paris		82·8	337	i 12 30	+ 3	i 22 43	− 2	i 12 53	pP	e 41·3
Ottawa		82·8	29	12 29	+ 2	22 42	− 3	28 47	SS	41·3
Shawinigan Falls		82·8	26	12 29	+ 2	22 48	+ 3	29 17?	SS	44·3
Seven Falls		82·9	25	12 25	− 3	22 43	− 3	28 40	SS	40·3
Neuchatel		83·1	334	e 12 31	+ 2	e 22 48	0	—	—	—
Besançon		83·2	334	e 12 35	+ 6	e 22 50	+ 1	—	—	38·3
Pavia	Z.	84·0	332	e 12 37?	+ 4	e 22 37?	−20	—	—	—
Auckland		84·1	158	—	—	22 47?	−11	28 17?	SS	35·3
Florence		84·5	330	i 12 53	+17	i 23 23	+21	—	—	—
Arapuni		85·4	158	—	—	e 24 17	PPS	e 28 47	SS	36·3
Clermont-Ferrand		85·4	336	i 12 42a	+ 2	i 23 11	0	i 28 50	SS	39·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Rome		85·7	328	i 12 42a	0	23 7	[+ 2]	30 24	SS		43·3
Pennsylvania	N.	85·9	33	—	—	e 23 11	− 5	—	—		e 34·8
Helwan		86·6	309	e 12 50	+ 4	e 23 23	0	e 24 25	PS		—
Harvard		86·8	28	e 12 49	+ 2	e 23 32	+ 7	e 23 27	SKS		e 39·3
Weston		87·0	28	i 12 48	0	i 23 25	− 2	i 16 27	PP		—
Halifax		87·3	22	—	—	e 23 29	0	e 29 17	SS		35·3
Fordham		87·4	30	i 12 52	+ 2	i 23 29	− 1	e 23 19	SKS		42·3
Philadelphia		87·7	32	e 12 53	+ 1	i 23 28	− 5	e 16 30	PP		e 36·0
Georgetown		87·9	33	e 12 53	0	23 26	− 9	16 7	PP		—
Wellington		88·2	160	13 17?	+23	23 37	− 1	23 17	SKS		40·8
Barcelona		89·6	335	e 13 5	+ 4	24 6	+15	29 58	SS		41·2
Christchurch		89·9	162	13 15	+13	23 31	[− 1]	16 25	PP		39·4
Columbia		90·3	39	e 16 47	PP	e 23 34	[− 1]	30 1	SS		e 37·0
Tortosa		90·7	336	—	—	e 24 1	0	i 27 10	?		44·3
Tacubaya		91·9	61	e 13 23	+12	e 23 38	[− 6]	e 30 27	SS		e 44·1
Alicante		93·2	336	e 13 17	0	23 33	[−18]	14 29	pP		e 47·0
Algiers		93·6	332	i 13 17a	− 2	24 41	+15	24 11	SKKS		e 40·3
Vera Cruz	E.	93·9	59	i 15 56	?	e 24 4	[+ 9]	i 17 45	PP		e 47·0
Lisbon		95·1	343	13 37	+11	23 49	[−13]	17 28	PP		46·8
Granada		95·2	338	e 19 12a	PPP	e 35 21	SSS	—	—		46·7
Merida	N.	96·5	53	—	—	e 24 57	+ 6	e 31 15	SS		e 48·8
Bermuda		98·2	28	e 13 47	+ 7	i 25 7	+ 2	e 17 47	PP		e 39·9
San Juan		110·4	35	e 18 35	[+ 1]	e 26 51	S	e 19 17	PP		e 46·2
Tananarive		110·4	264	—	—	e 26 17	{+ 9}	—	—		46·3
Huancayo		130·9	63	e 19 18	[+ 4]	e 32 20	PS	e 22 1	PP		e 53·7
La Paz		138·8	59	i 19 55	[+27]	29 23	{+ 9}	23 9	PKS		66·3
Santa Lucia	E.	148·1	85	20 0	[+16]	—	—	—	—		—
La Plata	E.	157·9	74	—	—	29 35	{−86}	38 17	PPS		74·0
	N.	157·9	74	—	—	26 5	[−58]	30 41	SKKS		68·7

Additional readings :—
Sitka i =10m.53s., e =17m.44s.
Honolulu e =12m.39s., i =16m.8s.
Calcutta iPPPN =12m.37s., iSSN =21m.14s., iSSSN =22m.54s.
New Delhi iE =10m.9s., PPSN =18m.3s., iEN =18m.10s. and 22m.37s.
Grand Coulee iP =10m.17s.
Hyderabad P_cPN =10m.52s., S_cSN =20m.19s., SSN =23m.35s.
Berkeley iN =20m.59s.
Saskatoon eEN =26m.35s.
Branner eE =11m.3s.
Butte eS_cS =20m.41s., eSS =23m.39s.
Scoresby Sund 20m.27s.
Helsinki eSS =24m.20s.
Bozeman e =15m.32s., eSS? =24m.8s., e =26m.6s.
Tinemaha iZ =11m.20s. and 11m.29s.
Logan i =11m.23s., 12m.26s., and 21m.35s., eSS =24m.25s.
Upsala eSE =20m.17s., iPS?E =21m.4s., PPSE =21m.18s?, eSSE =25m.17s.?, eSS?N = 25m.47s., eSSS?N =28m.4s.
Pasadena isPZ =11m.32s., eS =20m.11s.
Salt Lake City eSS =25m.0s.
Riverside iZ =11m.39s.
Palomar isPZ =11m.41s., eSN =20m.38s.
Bergen eSE =20m.53s.
Rapid City iS_cS =21m.27s., eSS =25m.15s., e =29m.2s.
Tucson i =12m.1s., ePPP =16m.12s., e =23m.43s., eSS =25m.57s., e =26m.52s., eSSS? = 29m.39s.
Aberdeen eE =12m.22s., iSSN =26m.43s.
Collmberg iZ =12m.4s. and 12m.41s., eN =14m.23s., eZ =21m.56s., eSSN =27m.4s., eSSSN =31m.1s.
Lincoln eS_cS =22m.18s.
Riverview iEN =22m.1s., iS_cSN =22m.15s., ePSE =22m.34s., eSSE =26m.34s., eSSSE = 29m.50s., eQE =32m.11s.
Prague eSSS =30m.47s.
Durham iN =22m.5s.
Budapest SKKSN =22m.37s., SKKSE =23m.4s., SSN =27m.7s., SSSN =30m.37s., eSSSE =31m.17s.?, eN =40m.1s., eE =40m.5s.
Kalossa e =12m.26s.
Belgrade SSS =31m.34s.
Uccle iN =12m.32s., i =12m.37s., ePPN =15m.30s., eN =18m.50s., eSSE =27m.37s., iN =28m.37s., eE =32m.0s.
Chicago eSS =27m.31s., eSSS =30m.46s.

Continued on next page.

Zagreb eSSE =28m.29s., eSSSE =31m.29s.
Strasbourg ePPP =17m.20s., iSS =28m.9s., iSSS =31m.34s., i =32m.19s.
Paris i =13m.24s.?
Ottawa e =37m.17s.?
Seven Falls e =33m.32s. and 34m.29s.
Auckland S_cS =23m.17s., SSS =31m.17s.?
Rome iEN =19m.20s.
Harvard ePS =24m.22s.
Weston eSKS =23m.13s., eSS =29m.17s.
Fordham iPS? =24m.26s.
Philadelphia e =15m.55s., eS =23m.18s., i =23m.49s., ePPS =24m.43s., eSS =28m.53s., eSSS =32m.50s.
Georgetown SS =29m.21s.
Wellington SP =24m.6s., PS =24m.44s., SS =29m.22s., SSS =33m.2s., Q =36·3m.
Barcelona e =13m.47s., SSS =33m.32s.
Christchurch eZ =14m.16s., PPSE =25m.3s., SSEN =28m.42s., SSSE =31m.39s., SSSSE =33m.47s.
Columbia eSSS? =33m.51s.
Tacubaya eN =13m.37s.
Alicante sP =15m.5s., PP =17m.17s., PPP =19m.53s., SS =31m.1s., SSP =31m.9s., SSS =34m.37s.
Algiers PS =25m.52s.
Vera Cruz eSKKSE =24m.29s., ePPSE =26m.44s., eS_cS,S_cSE =37m.17s.
Lisbon Z =13m.49s.s, PPZ =17m.33s., SKSN =23m.41s., PSN =26m.2s., EN =35m.17s.?, Q =40·3m.
Merida ePPSN =26m.48s., eSSE =31m.43s., eE =36m.6s.
Bermuda iPS =26m.44s., iSS? =32m.2s.
San Juan e =20m.34s., and 23m.59s., ePS =28m.31s., ePPS =29m.45s., eSS =34m.24s., eSSS =38m.46s.
Huancayo eP =15m.40s., e =20m.52s. and 25m.45s., ePPS =33m.5s., eSS =39m.6s.
La Pas iPZ =16m.59s., PSKSZ =32m.3s., SSZ =47m.57s.
La Plata SKKSN =33m.11s., SKSPN =37m.23s., SS?E =43m.35s. SS?N =44m.17s., PSS?N =49m.41s., SSSE =50m.17s., E =60m.11s., Z =67m.59s.
Long waves are also recorded at Cheb, Guadalajara, and Montezuma.

Dec. 21d. 12h. 39m. 25s. Epicentre 44°·1N. 148°·2E. (as at 10h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa	E.	7·2	230	1 50	+ 1	3 11	−21	—	—
Tchimkent		55·2	297	i 9 37	0	—	—	—	—
Stalinabad		57·7	294	i 8 10	?	—	—	—	—
Samarkand		58·3	296	e 9 45	−14	e 14 49?	PPP	—	—
Shasta Dam		62·9	58	i 10 27	− 3	—	—	—	—
Hyderabad	N.	63·6	269	10 34	− 1	19 9	+ 1	—	—
Grozny		68·9	310	e 11 11	+ 2	—	—	—	—
Overton		70·4	57	i 11 15	− 3	—	—	i 15 39	PPP
Boulder City		70·5	58	i 11 16	− 2	—	—	i 16 6	PPP
Pierce Ferry		70·9	58	i 11 18	− 3	—	—	i 16 8	PPP
Leninakan		71·6	309	e 10 34	−51	e 16 23	PPP	—	—
Rapid City		71·7	46	e 11 30	+ 4	—	—	e 16 28	PPP
Copenhagen		73·8	336	11 39	+ 1	—	—	—	—
Yalta		74·1	317	e 11 40	0	—	—	—	—
Tucson		75·4	58	e 11 46	− 1	—	—	—	—
Collmberg	Z.	77·4	332	e 12 1	+ 3	—	—	—	—
Jena		78·2	333	—	—	—	—	e 16 52	PPP
Kalossa		79·3	327	e 12 35?	+26	—	—	—	—
Sofia		80·6	322	e 12 23	+ 7	—	—	—	—
Stuttgart	Z.	80·8	334	e 12 18	+ 1	—	—	—	—
Ksara		81·0	308	e 12 19	+ 1	—	—	e 17 9	PPP
Strasbourg		81·4	334	e 12 22	+ 2	—	—	—	—
Zürich		82·3	334	e 12 25	0	—	—	—	—
Basle		82·4	334	e 12 27	+ 2	—	—	—	—

Additional readings :—
Mizusawa PN =1m.56s.
Tucson i =11m.59s.
Collmberg eZ =12m.11s.
Stuttgart eZ =12m.31s.
Long waves were also recorded at Helsinki and Chur.

Dec. 21d. 17h. 8m. 15s. Epicentre 33°·7N. 135°·8E. (as on 1945, Jan. 14d.).

Intensity VI at Numajima (Osaka Pref.); V at Tokusima; IV at Takamatsu, Sumoto, and Gihu; II-III at Kobe, Kôti, and Kyoto. Suggested epicentre 33°·5N. 135°·7E. depth of focus 40km. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs., Japan for 1946. Tokyo 1951, p. 31, with chart.

$A = -\cdot5977$, $B = +\cdot5812$, $C = +\cdot5523$; $\delta = +7$; $h = +1$;
$D = +\cdot697$, $E = +\cdot717$; $G = -\cdot396$, $H = +\cdot385$, $K = -834$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Siomisaki		0·3	186	−0 56a	−67	—	—
Owase		0·5	36	0 13	− 1	0 21	− 2
Kashiwara		0·8	0	0 19	+ 1	0 33	+ 2
Sumoto		1·0	311	0 20k	− 1	0 32	− 4
Kobe		1·1	328	0 23k	+ 1	0 39	0
Tokusima		1·1	290	−0 51	?	−0 39	?
Kyoto		1·3	357	0 23a	− 2	0 42	− 2
Takamatu		1·6	293	−0 20k	−50	0 3	−48
Gihu		1·9	24	0 35	+ 1	1 6	+ 7
Kôti		1·9	268	−0 22	−56	0 1	−58
Toyooka		2·0	336	0 35k	0	1 2	+ 1
Omaesaki		2·2	66	0 45	P_g	1 17	S_g
Shizuoka		2·5	57	0 49	P_g	1 23	S_g
Hunatu		3·0	53	0 44	− 6	1 24	− 3
Toyama		3·2	21	1 1	P_g	1 55	S_g
Nagano		3·6	33	1 7	P*	1 53	S*
Yokohama		3·6	61	1 15	P_g	—	—
Maebasi		3·8	43	1 11	P*	2 3	S_g
Tokyo		3·8	58	1 13	P_g	2 3	S_g
Miyazaki		4·1	245	0 49	−16	1 44	−11
Izuka		4·2	271	1 5	− 2	—	—
Kakioka		4·4	53	1 12	+ 2	2 24	S_g
Utunomiya		4·4	48	1 49	+39	2 55	+53
Hukuoka		4·5	272	1 11	0	—	—
Mito		4·7	54	1 37	P_g	2 32	S_g
Sendai		6·1	41	1 49	+15	3 18	S_g
Mizusawa	E.	6·9	37	2 45	+60	3 40	+35
Shasta Dam		76·8	50	c 11 57	+ 2	—	—

Mizusawa gives also eSN = 3m.43s.

Dec. 21d. 19h. 39m. 6s. Epicentre 46°·7N. 9°·6E. (as on 1940, Jan. 7d.).

Intensity V at Oberhalbstein (Canton des Grisons); IV-V in the Engadine. Macroseismic radius 35km.

E. Wanner.
"Jahresbericht des Erdbebendienstes der Schweiz im Jahre, 1946," Zürich, 1947, p. 2. Chart of intensity, p. 21, fig. 6. Epicentre 46°30′N. 9°36′E. Macroseismic radius 35km.

$A = +\cdot6787$, $B = +\cdot1148$, $C = +\cdot7255$; $\delta = +16$; $h = -4$;
$D = +\cdot167$, $E = -\cdot986$; $G = +\cdot715$, $H = +\cdot121$, $K = -\cdot688$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	S.	m. s.	
Chur		0·2	—	e 0 4	P*	e 0 8	S*	—	—
Zürich		1·0	314	i 0 19k	− 2	i 0 35	− 1	—	—
Ebingen		1·5	344	e 0 30	+ 2	e 0 54	+ 5	—	—
Pavia	z.	1·5	191	e 0 25	− 3	e 0 46	− 3	e 0 28	P*
Basle		1·6	301	e 0 31k	+ 1	e 0 56	+ 5	—	—
Neuchatel		1·8	279	i 0 34	+ 2	e 1 1	P_g	e 0 37	P_g
Stuttgart		2·1	352	e 0 36	− 1	i 1 14	S_g	i 0 45	P_g
Strasbourg		2·3	327	e 0 43	+ 3	i 1 17	S_g	i 0 47	P_g
Besançon		2·5	283	e 0 52	P_g	i 1 30	S_g	—	—
Triest		3·1	110	e 1 12	P_g	i 1 32	+ 3	—	—

Continued on next page.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.	
Jena	4·4	16	e 1 17	P*	e 2 2	0	e 1 29	P_g
Uccle	5·4	322	—	—	e 2 35	+ 7	—	—
Jersey	8·3	292	—	—	i 2 29	P*	i 2 51	P_g

Additional readings :—
Pavia eZ = 1m.35s., e = 1m.47s.
Strasbourg S_g = 1m.22s.
Jena eE = 1m.22s., 2m.7s., and 2m.23s.

Dec. 21d. 19h. 48m. 44s. Epicentre 42°·2N. 148°·5E. Depth of focus 0·005.

Intensity V at Attoko (Hokkaido) and Yahogi (Iwate pref.); IV at Nemuro. Macroseismic radius 300km.

Seismo. Bull. Cent. Met. Obs., Japan, 1946, Tokyo, 1951, p. 32, with isoseismic chart. Epicentre 41°·7N. 147°·8E. is suggested. The above position given for the next shock is more in agreement with the observations.

A = −·6335, B = +·3882, C = +·6692; δ = −15; h = −2;
D = +522, E = +·853; G = −·571, H = +·350, K = −·743.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Nemuro		2·4	298	0 36	− 2	—	—	—	—	—
Sapporo		5·3	282	1 17	− 2	2 27	+ 8	—	—	—
Hatinohe		5·5	255	1 34	+13	2 28	+ 4	—	—	—
Miyako		5·6	245	1 35	+12	2 39	+12	—	—	—
Mori		5·9	272	1 34	+ 7	2 47	+13	—	—	—
Morioka		6·1	248	1 37	+ 7	2 50	+11	—	—	—
Mizusawa	E.	6·4	244	1 46	+12	2 57	+11	—	—	—
Akita		6·8	252	1 36	− 3	2 56	0	—	—	—
Hukusima		7·6	237	2 9	+19	—	—	—	—	—
Mito		8·5	230	2 21	+18	3 50	+12	—	—	—
Tukubasan		8·8	230	2 20	+13	4 4	+18	—	—	—
Kumagaya		9·3	233	2 38	+24	3 42	−16	—	—	—
Maebasi		9·3	235	2 29	+15	—	—	—	—	—
Tokyo		9·4	229	2 31	+16	4 19	+19	—	—	—
Yokohama		9·7	228	2 47	+28	4 27	+19	—	—	—
Shizuoka		10·7	231	2 49	+16	4 53	+21	—	—	—
Toyooka		12·6	242	3 2	+ 4	6 15	L	—	—	(6·3)
Sumoto		13·2	238	3 37	?	6 39	L	—	—	(6·6)
Hukuoka		16·6	245	3 49	− 1	7 55	L	—	—	(7·9)
Irkutsk		31·2	314	6 13	− 2	11 5	−11	—	—	—
College		41·8	35	e 7 38	− 7	e 13 46	−11	e 16 45	S_eS	e 19·9
Sitka		48·8	44	i 8 40	− 1	i 15 40	+ 2	e 10 22	PP	i 19·3
Honolulu		49·3	96	—	—	e 16 6	+21	—	—	e 20·1
Almata		51·0	297	e 8 55	− 2	16 8	0	—	—	—
Calcutta	N.	53·4	268	i 9 31	+16	i 17 4	+23	e 12 25	PPP	—
Sverdlovsk		55·0	281	i 9 23	− 4	16 50?	−12	—	—	—
Andijan		55·2	295	9 27	− 1	17 4	− 1	—	—	—
Tchimkent		56·3	299	i 9 34	− 2	i 17 17	− 3	—	—	—
Dehra Dun	N.	56·6	282	—	—	e 17 13	−11	—	—	e 26·4
Tashkent		57·0	297	i 9 39	− 2	e 17 26	− 3	—	—	—
New Delhi		58·1	281	9 51	+ 2	i 17 48	+ 5	i 10 3	pP	—
Stalinabad		58·7	295	i 9 51	− 2	i 17 48	− 3	—	—	—
Samarkand		59·3	297	9 52	− 5	17 52	− 7	—	—	—
Grand Coulee		61·7	49	e 10 10	− 4	—	—	i 10 25	pP	—
Shasta Dam		63·7	57	i 10 25	− 2	e 18 54	− 1	e 20 18	S_cS	—
Hyderabad	N.	63·8	270	10 34	+ 6	19 6	+10	—	—	—
Berkeley		65·4	60	e 10 38	0	i 19 18	+ 2	—	—	—
Saskatoon		65·8	41	10 40	− 1	19 17	− 4	24 10	SS	31·3
Santa Clara		65·9	60	e 10 29	−12	e 19 6	−16	—	—	—
Moscow		66·3	324	e 10 43	− 1	19 21	− 6	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Butte	E.	66·5	48	e 10 43	− 2	e 19 28	− 1	e 20 34	ScS	e 27·1
Bombay		67·1	275	i 10 54	+ 5	e 20 2	+26	24 12	SS	—
Bozeman		67·5	48	e 10 51	0	e 19 35	− 6	e 13 22	PP	e 27·2
Tinemaha		68·4	59	i 10 57	0	e 19 59	+ 7	e 39 15	P′P′	—
Santa Barbara	Z.	69·0	62	i 11 3	+ 2	—	—	e 39 22	P′P′	—
Haiwee		69·2	59	i 11 0	− 2	e 20 3	+ 2	—	—	—
Kodaikanal	E.	69·2	265	i 10 56	− 6	e 20 21	+20	—	—	—
Brisbane	E.	69·5	175	—	—	i 20 41	+36	—	—	—
Logan		69·5	51	e 11 6	+ 2	e 20 11	+ 6	e 13 4	PP	e 28·2
Colombo	E.	69·6	260	10 52	−12	20 11	+ 5	—	—	—
Baku		69·7	306	e 11 8	+ 3	20 6	− 1	—	—	—
Salt Lake City		70·1	52	e 11 5	− 2	e 20 9	− 3	i 21 7	ScS	e 28·2
Pasadena		70·2	61	i 11 7	− 1	i 20 16	+ 3	i 39 15	P′P′	e 28·1
Mount Wilson		70·3	61	e 11 8	− 1	e 20 17	+ 3	—	—	—
Grozny		70·3	310	i 11 9	0	20 6	− 8	—	—	—
Upsala		70·6	336	—	—	e 20 8	−10	e 28 14	SSS	e 38·3
Riverside		70·9	61	i 11 11	− 1	i 20 41	+20	i 39 13	P′P′	—
Overton		71·1	57	i 11 13	0	e 20 32	+ 9	e 14 14	PP	—
Boulder City		71·3	58	i 11 14	− 1	e 20 27	+ 1	i 11 20	pP	—
Piatigorsk		71·3	313	11 11	− 4	e 20 15	−11	—	—	—
La Jolla		71·6	62	e 11 18	+ 2	e 20 32	+ 3	—	—	—
Palomar		71·6	61	i 11 16	0	i 20 32	+ 3	i 39 12	P′P′	—
Pierce Ferry		71·7	57	i 11 16	− 1	e 20 37	+ 7	i 14 16	PP	—
Rapid City		72·8	45	e 11 24	+ 1	i 20 43	0	e 14 30	PP	e 31·0
Erevan		73·0	308	11 18	− 7	—	—	—	—	—
Leninakan		73·0	310	11 30	+ 5	—	—	—	—	—
Sotchi		73·4	314	11 29	+ 2	—	—	—	—	—
Denver		74·7	50	e 12 4	+30	e 21 48	PS	—	—	—
Warsaw		75·5	329	e 11 44	+ 5	21 21	+ 8	21 48	PS	e 33·3
Copenhagen		75·6	336	11 34	− 6	—	—	—	—	38·3
Yalta		75·6	317	11 36	− 4	—	—	—	—	—
Riverview		75·7	177	i 12 4k	+24	e 21 47	+32	e 26 46	SS	e 37·3
Tucson		76·2	58	i 11 43	0	e 21 27	+ 6	e 14 42	PP	e 31·8
Aberdeen		78·0	344	—	—	e 21 36	− 4	i 26 49	SS	43·0
Potsdam	N.	78·2	334	i 11 57	+ 3	i 21 42	0	i 13 55	?	e 41·3
Lincoln		78·5	44	—	—	e 21 41	− 4	—	—	e 35·7
Bucharest		79·5	321	e 12 12	+11	i 21 58	+ 2	—	—	31·3
Prague		79·7	332	e 11 50	−12	e 21 53	− 5	—	—	e 40·3
Jena	N.	79·9	333	e 11 59	− 4	e 21 56	− 4	—	—	—
Budapest		80·1	327	12 1	− 3	i 22 2	0	—	—	—
Cheb		80·4	333	e 12 14?	+ 8	e 22 18?	+13	e 27 22	SS	e 40·3
Istanbul		80·7	318	i 12 5	− 3	e 22 8	− 1	e 15 19	PP	—
De Bilt		80·8	338	i 12 6k?	− 2	e 22 6	− 4	—	—	e 36·3
Kalocsa		80·9	327	e 12 16	+ 7	e 22 16?	+ 5	i 12 38	pP	e 44·8
Belgrade		81·7	325	i 12 13	0	e 22 34	+15	—	—	41·3
Sofia		82·1	322	e 12 20	+ 5	i 22 23	0	—	—	39·3
Uccle		82·2	338	e 12 12	− 3	e 22 24	0	e 15 24	PP	e 38·3
Chicago		82·3	39	e 12 26	+10	e 22 22	− 3	e 15 28	PP	e 33·6
Ksara		82·4	309	i 12 16	0	22 32	+ 6	—	—	—
Stuttgart		82·6	334	i 12 13a	− 4	e 22 21	− 7	—	—	e 45·3
Zagreb		82·7	329	e 12 19	+ 1	e 22 25	− 4	—	—	—
Strasbourg		83·2	335	e 12 17	− 4	e 22 36	+ 2	e 15 42	PP	e 39·3
St. Louis		83·4	42	i 12 21	− 1	i 22 43	+ 7	i 23 9	sS	—
Triest		83·7	330	i 12 30	+ 7	i 22 36	− 3	—	—	—
Zürich		84·0	334	e 12 20a	− 5	e 22 38	− 4	—	—	—
Chur		84·1	332	e 12 22	− 3	e 22 40	− 3	—	—	e 44·5
Basle		84·2	334	e 12 21	− 5	e 22 40	− 4	—	—	—
Ottawa		84·3	29	12 22	− 4	22 39	− 6	—	—	37·3
Shawinigan Falls		84·3	26	12 23	− 3	22 37	− 8	15 41	PP	50·3
Seven Falls		84·5	25	12 27	0	22 39	− 8	15 40	PP	39·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Paris		84·6	338	i 12 26	− 2	i 22 41	− 7	i 12 50	pP	e 46·3
Besançon		84·9	335	e 12 29	0	e 22 48	− 3	—	—	40·3
Neuchatel		84·9	334	e 12 25	− 4	e 22 46	− 5	—	—	—
Pavia	z.	85·7	332	e 12 30?	− 3	—	—	—	—	—
Florence		86·2	330	i 12 38	+ 3	i 23 8	+ 4	—	—	—
Wellington	z.	86·4	160	—	—	e 23 16?	+11	—	—	—
Clermont-Ferrand		87·2	336	i 12 42a	+ 2	i 23 18	+ 5	e 28 24	SS	41·3
Rome		87·4	329	i 12 38a	− 3	i 23 11	− 4	i 12 57	pP	—
Harvard		88·3	28	e 12 54	+ 8	e 23 25	+ 2	—	—	e 47·3
Weston		88·5	28	i 12 44	− 3	i 23 26	+ 1	—	—	—
Fordham		88·9	30	i 12 48	0	e 23 15	[+ 5]	e 16 13	PP	—
Philadelphia		89·1	32	e 12 43	− 6	i 23 31	0	e 15 54	PP	e 34·9
Barcelona		91·4	335	—	—	23 51	0	—	—	49·2
Columbia		91·6	39	—	—	e 23 57	+ 4	—	—	e 44·1
Tortosa	N.	92·4	336	—	—	i 23 49	−11	—	—	52·8
Alicante		95·0	336	13 6	−11	i 24 28	+ 5	13 56	pP	e 48·5
Lisbon		96·9	343	13 29	+ 4	24 16	−23	26 7	PS	—
Granada		97·0	338	e 13 36	+10	e 24 0	[+ 4]	—	—	52·3
Bermuda		99·8	28	e 14 32	?	e 24 18	[+ 8]	e 17 37	PP	e 47·3
San Juan		111·8	36	e 19 12	PP	e 26 49	SKKS	e 28 19	PS	e 47·6
Huancayo		131·5	65	e 19 13	[+ 8]	e 22 47	PKS	e 39 5	SS	e 51·0
La Paz	z.	139·5	62	i 19 30	[+10]	26 56	[+34]	23 2	PKS	68·3

Additional readings and notes :—
Sitka e =17m.56s.
Calcutta iPSN =17m.39s.
New Delhi iE =17m.54s., iN =18m.3s. and 22m.34s.
Shasta Dam i =10m.54s. and 15m.49s.
Butte e =19m.52s.
Bozeman eS$_e$S =20m.49s., eSS =23m.33s.
Logan iS =21m.10s.
Salt Lake City eSS =24m.11s., e =24m.59s.
Upsala eE =31m.16s.
Overton i =16m.37s.
Boulder City i =16m.38s.
Pierce Ferry i =11m.50s. and 16m.39s.
Rapid City eSS =25m.24s.
Warsaw eN =13m.47s. and 15m.14s., SE =21m.24s., PPSE =22m.8s., eN =25m.40s., eE =25m.48s., SSN =26m.3s., SSE =26m.27s., SSS?N =29m.42s., SSS?E = 29m.58s.
Riverview iE =21m.54s., eQE =32m.40s.
Tucson i =11m.49s., e =15m.34s. and 22m.4s., eSS =26m.8s.
Bucharest ePE =12m.15s.
Jena eSN =21m.52s.
Cheb e =24m.14s., 31m.46s., and 37m.16s.
Istanbul ePPP =17m.9s., ePS =22m.50s., eSS =28m.39s.
Sofia i =22m.42s.
Uccle eSN =22m.19s., eN =28m.26s.
Chicago eSS? =27m.41s.
Strasbourg eSS =28m.14s., eSSS =32m.16s.
Triest iS =22m.52s. ; the reading entered is given as SKS.
Seven Falls e =18m.34s. and 33m.40s.
Paris Q =37·3m.
Clermont-Ferrand ePS =24m.15s.
Harvard eS =23m.49s. ; the reading entered as S is given as SKS.
Weston e =23m.22s.
Fordham eSS =29m.25s., eSSS =32m.47s.
Philadelphia eS =23m.8s., iPS =24m.23s., eSS =28m.54s.
Alicante PP =17m.0s., PPP =19m.52s., SKS =24m.16s., PS =27m.0s., PPS =27m.48s., PKKP =30m.16s., SS =31m.26s., SSS =35m.24s., eQ =41m.32s.
Lisbon Z =12m.42s., PZ =13m.40s., N =49m.16s., E =51m.37s.
Bermuda eSS =31m.56s.
San Juan e =22m.23s. and 29m.16s., eSS =34m.31s., eSSS =38m.48s.
Huancayo e =20m.9s. and 28m.19s., eSSS? =44m.50s.
La Paz PPPZ =25m.36s.
Long waves were also recorded at Christchurch, Edinburgh, Bergen, and Helsinki.

Dec. 21d. 20h. 20m. 33s. Epicentre 42°·2N. 148°·5E. Depth of focus 0·005.
(as at 19h.).

Intensity V at Attoko; IV at Kusiro; II-III at Nemuro. Macroseismic radius 300km.
Epicentre as adopted.

Seismo. Bull. Cent. Met. Obs., Japan, for 1946, Tokyo, 1951, p.33, with isoseismic chart.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		2·4	298	0 31	− 7	0 55	−12	—	—	—
Sapporo		5·3	282	1 17	− 2	2 23	+ 4	—	—	—
Hatinohe		5·5	255	1 30	+ 9	2 31	+ 7	—	—	—
Miyako		5·6	245	1 26	+ 3	2 38	+11	—	—	—
Mori		5·9	272	1 29	+ 2	2 44	+10	—	—	—
Morioka		6·1	248	1 38k	+ 8	2 51	+12	—	—	—
Mizusawa		6·4	244	1 45	+11	2 54	+ 8	—	—	—
Hukusima		7·6	237	1 59	+ 9	3 37	+21	—	—	—
Mito		8·5	230	2 18	+15	3 57	+19	—	—	—
Tukubasan		8·8	230	2 16	+ 9	4 3	+17	—	—	—
Utunomiya		8·8	233	2 55	?	4 38	?	—	—	—
Kumagaya		9·3	233	2 48	+34	4 19	+21	—	—	—
Maebasi		9·3	235	2 27	+13	4 19	+21	—	—	—
Tokyo		9·4	229	2 33	+18	4 22	+22	—	—	—
Nagano		9·7	239	2 37	+18	4 25	+17	—	—	—
Yokohama		9·7	228	2 47	+28	4 26	+16	—	—	—
Shizuoka		10·7	231	2 57	+24	4 52	+20	—	—	—
Almata		51·0	297	8 58	+ 1	16 7	− 1	—	—	—
Andijan		55·2	295	e 9 28	0	17 5	0	—	—	—
New Delhi	N.	58·1	281	—	—	i 17 46	+ 3	—	—	—
Samarkand		59·3	297	e 9 55	− 2	—	—	—	—	—
Grand Coulee		61·7	49	e 10 9	− 5	—	—	—	—	—
Shasta Dam		63·7	57	i 10 23	− 4	—	—	i 10 41	pP	—
Tinemaha	z.	68·4	59	i 10 55	− 2	—	—	—	—	—
Santa Barbara	z.	69·0	62	i 10 51	−10	—	—	—	—	—
Haiwee		69·2	59	e 10 59	− 3	—	—	—	—	—
Pasadena	z.	70·2	61	i 11 5	− 3	—	—	—	—	—
Grozny		70·3	310	i 11 9	0	i 20 9	− 5	—	—	—
Upsala		70·6	336	—	—	e 24 27?	SS	e 28 27?	SSS	—
Riverside	z.	70·9	61	i 11 9	− 3	—	—	—	—	—
Overton		71·1	57	i 11 11	− 2	—	—	i 11 22	pP	—
Boulder City		71·3	58	i 11 12	− 3	e 20 27	+ 1	—	—	—
La Jolla		71·6	62	e 11 15	− 1	—	—	—	—	—
Palomar		71·6	61	i 11 14	− 2	—	—	i 39 8	P'P'	—
Pierce Ferry		71·7	57	i 11 14	− 3	—	—	i 13 32	PP	i 35·6
Erevan		73·0	308	e 10 29	−56	—	—	—	—	—
Leninakan		73·0	310	11 29	+ 4	20 45	0	—	—	—
Simferopol		75·3	318	e 11 36	− 2	e 21 3	− 8	—	—	—
Copenhagen		75·6	336	i 11 34	− 6	—	—	—	—	—
Tucson		76·2	58	e 11 42	− 1	—	—	i 11 52	pP	—
Potsdam		78·2	334	—	—	e 21 27	−15	—	—	e 41·4
Jena		79·9	331	e 11 59	− 4	—	—	—	—	—
Budapest		80·1	327	11 35	−29	—	—	12 12	P	—
Istanbul		80·7	318	e 11 53	−15	e 21 51	−18	e 15 9	PP	—
Kalossa		80·9	327	12 57	+48	—	—	—	—	—
Ksara		82·4	309	e 12 15	− 1	e 22 27	+ 1	—	—	—
Stuttgart		82·6	334	e 12 12	− 5	—	—	—	—	—
Strasbourg		83·2	335	e 12 18	− 3	—	—	—	—	—
Zürich		84·0	334	e 12 19	− 6	—	—	—	—	—
Basle		84·2	334	e 12 23	− 3	e 22 27	−17	—	—	—
Neuchatel		84·9	334	e 12 22	− 7	—	—	—	—	—
La Plata	E.	158·1	79	—	—	26 45	[− 1]	44 21	SS	52·9

Additional readings:—
Istanbul ePPP = 17m.3s., eS = 21m.27s., readings confused with those of the previous shock.
Stuttgart iZ = 12m.15s., eZ = 12m.21s.
Long waves were also recorded at Colombo, Helsinki, Warsaw, and Cheb.

Dec. 21d. 21h. 59m. 18s. Epicentre 23°·9N. 96°·2E. (as on 1946, Sept. 12d.).

$A = -\cdot0988$, $B = +\cdot9099$, $C = +\cdot4029$; $\delta = +1$; $h = +4$;
$D = +\cdot994$, $E = +\cdot108$; $G = -\cdot044$, $H = +\cdot401$, $K = -\cdot915$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	7·4	260	e 2 4	P*	i 3 18	0	i 3 58	S_g	—
Dehra Dun	N.	17·4	245	—	—	e 6 36	−43	—	—	e 9·6
New Delhi		17·7	289	e 4 7	− 3	i 7 25	− 1	—	—	8·2
Hyderabad	N.	17·8	252	4 14	+ 3	7 37	+ 9	—	—	—
Bombay		22·3	262	e 5 4	+ 3	e 9 9	+ 7	—	—	11·0
Kodaikanal	E.	22·4	237	i 5 15	+13	e 9 21	+17	10 1	SS	—
Colombo	E.	23·0	225	4 43	−24	(9 51)	+37	—	—	9·8
Almata		25·0	325	5 27	0	9 51	+ 2	—	—	—
Andijan		26·1	316	e 5 35	− 2	10 17	+10	—	—	—
Obi-garm		26·9	310	e 5 42	− 3	—	—	—	—	—
Stalinabad		27·5	310	i 5 51	+ 1	—	—	—	—	—
Taskhent		28·4	315	e 5 56	− 2	—	—	—	—	—
Irkutsk		29·0	11	e 5 42?	−22	10 42?	−12	—	—	—
Samarkand		29·2	310	e 6 2	− 3	—	—	—	—	—
Grozny		45·6	309	i 8 24	0	e 15 3	− 3	—	—	—
Leninakan		46·7	305	e 8 33	+ 1	—	—	—	—	—
Sotchi		49·9	308	e 8 58	+ 1	—	—	—	—	—
Ksara		53·1	295	e 9 18	− 3	e 16 52	+ 1	—	—	—
Stuttgart	Z.	70·5	315	e 11 15	− 3	—	—	—	—	—
Strasbourg		71·5	316	e 11 22	− 2	—	—	—	—	—
Riverview	N.	77·6	136	—	—	e 22 16	+25	—	—	—

Additional readings :—
Calcutta iSN = 3m.41s.
New Delhi eSN = 6m.56s.
Long waves were also recorded at Aberdeen, De Bilt, Uccle, and College.

Dec. 21d. 23h. South-West Pacific. Pasadena suggest deep focus.
Tuai P = 15m.29s., S = 18m.27s.
New Plymouth P = 15m.45s., S = 19m.20s.
Wellington P = 16m.5s.?, S = 19m.25s., i = 19m.38s. and 20m.0s., S_cS? = 26m.52s.
Santa Barbara iPZ = 23m.21s.
Pasadena iP = 23m.25s.k?
La Jolla iP = 23m.26s.
Mount Wilson ePEN = 23m.26s.
Palomar iP = 23m.28s., iZ = 23m.49s., 25m.0s., and 26m.36s.
Riverside iP = 23m.28s.k, eZ = 26m.34s.
Haiwee iPZ = 23m.32s.k.
Shasta Dam iP = 23m.32s.
Tinemaha iP = 23m.35s.k.
Boulder City iP = 23m.43s.
Overton iP = 23m.45s.
Pierce Ferry iP = 23m.46s.
Tucson iP = 23m.48s.k.
Grand Coulee eP = 24m.3s.
Auckland e = 30m.?
Yalta P_g = 30m.50s.
Copenhagen P = 30m.23s.
Ksara i = 30m.58s., e = 47m.28s.
Stuttgart eP?Z = 31m.0s., eZ = 31m.8s.
Jena eN = 31m.4s.
Uccle eP? = 31m.5s.
Strasbourg e = 31m.10s.
Basle e = 58m.46s. and 69m.37s.

Dec. 21d. Readings also at 0h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Overton, and Pierce Ferry), 1h. (Brisbane and La Paz), 2h. (Calcutta), 3h. (Palomar, Tucson, Boulder City, Pierce Ferry, Tacubaya, and Mizusawa), 4h. (Haiwee, Palomar, Pasadena (2), Riverside, Tinemaha (2), Tucson, Boulder City, Overton, Pierce Ferry, Merida, Tacubaya, Vera Cruz, near Oaxaca, near Ferndale, and near Mizusawa), 5h. (Haiwee, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Riverview, Strasbourg, Stuttgart, and Mizusawa), 7h. (Palomar and Riverside), 10h. (Haiwee, Palomar, Pasadena, Riverside, Tinemaha, Santa Barbara, Tucson (3), Boulder City (4), Overton (4), Pierce Ferry (4) Shasta Dam (4), Copenhagen (3), Collmberg (3), Stuttgart (2), Punta Arenas, and near Mizusawa (5)), 11h. (Tucson, Boulder City (2), Overton (2), Pierce Ferry (2), Shasta Dam, Collmberg (2), Stuttgart, and Mizusawa (5)), 12h. (Tucson (3), Boulder City, Overton, Pierce Ferry (2), Grand Coulee, Shasta Dam, Copenhagen (2), Collmberg (2), Strasbourg, Stuttgart (2), and Mizusawa (4)), 13h. (Tucson (2), Boulder City (2), Overton (2), Pierce Ferry (2), Shasta Dam (2), Stalinabad, Copenhagen, Collmberg (2), Helsinki, Strasbourg (2), Stuttgart (2), and near Mizusawa), 14h. (Tacubaya (2), Vera Cruz, Palomar, Pasadena, Riverside, Tinemaha, Tucson (2), Boulder City, Overton, Pierce Ferry, Harvard, near Chur and Zürich), 15h. (Palomar, Pierce Ferry, and near Mizusawa), 18h. (Santa Lucia, La Plata, Besançon, near Strasbourg, and Stuttgart (2)), 19h. (Chur, Zürich, and near Stuttgart (2)), 20h. (Haiwee, Pasadena (2), Riverside (2), Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Dehra Dun, Copenhagen (2), Strasbourg, Stuttgart (2), and Mizusawa (2)), 21h. (Mizusawa (2)), 22h. (Mizusawa (2)), 23h. (Shasta Dam (2), Boulder City, Stuttgart, and near Mizusawa).

Dec. 22d. 2h. Undetermined shock suggested deep focus.
Auckland e =28m.0s?
Riverview eN =36m.33s., eLEZ =37·9m.
Santa Barbara iPZ =37m.40s.
Pasadena ePZ =37m.43s., epPZ =38m.1s.
Palomar iPENZ =37m.45s., iZ =37m.58s. and 38m.4s.
Riverside iPZ =37m.45s., ipPZ =38m.3s.
Haiwee ePZ =37m.49s.
Tinemaha iPZ =37m.53s., iZ =38m.1s.
Boulder City iP =37m.59s.
Overton eP =38m.1s., ipP? =38m.14s.
Pierce Ferry eP =38m.2s., ipP? =38m.21s.
Tucson eP =38m.2s., ipP =38m.20s.
Ksara ePKP? =44m.51s., e =45m.18s. and 54m.58s.
Copenhagen P =44m.58s.
Stuttgart eZ =45m.3s.? and 45m.46s.

Dec. 22d. 13h. 21m. 51s. Epicentre 22°·5N. 122°·5E. (as on 1944, Feb. 5d.).

$A = -\cdot4969$, $B = +\cdot7800$, $C = +\cdot3805$; $\delta = +9$; $h = +4$;
$D = +\cdot843$, $E = +\cdot537$; $G = -\cdot204$, $H = +\cdot321$, $K = -\cdot925$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei	E.	8·7	354	—	—	3 47	− 3	—	—	—
Calcutta	N.	31·5	277	e 5 52	−34	e 13 16	SS	—	—	i 14·8
Irkutsk		32·9	338	e 6 9?	−29	11 9?	−47	—	—	—
New Delhi		41·1	288	e 8 20	+33	i 17 59	S_cS	—	—	—
Hyderabad	N.	41·6	271	e 7 57	+ 6	14 21	+13	—	—	—
Kodaikanal	E.	44·7	263	e 6 29	?	—	—	—	—	—
Andijan		45·8	305	e 8 37	+12	—	—	—	—	—
Bombay	E.	46·4	275	e 2 18	?	—	—	—	—	—
Tashkent		48·1	306	e 8 41	− 2	—	—	—	—	—
Stalinabad		48·3	302	e 8 47	+ 2	e 16 17	PPS	—	—	—
Riverview		62·3	153	i 10 31a	+ 5	e 19 22	PS	e 19 58	PPS	e 31·2
Ksara		75·1	301	e 11 45	− 1	e 22 5	PS	—	—	—
Stuttgart	z.	87·5	323	e 12 45	− 6	—	—	—	—	—
Strasbourg		88·4	323	e 12 51	− 4	—	—	—	—	e 47·2
Paris		91·2	325	e 13 3	+ 5	—	—	—	—	e 45·2
Shasta Dam		92·9	44	e 13 10	− 6	—	—	—	—	—
Tinemaha	z.	97·6	45	e 13 32	− 6	—	—	—	—	—
Haiwee	z.	98·4	45	e 13 34	− 7	—	—	—	—	—
Mount Wilson	z.	99·4	47	e 13 46	0	—	—	—	—	—
Pasadena	z.	99·4	47	e 13 46	0	—	—	—	—	—
Riverside	z.	100·0	47	i 13 50	+ ·2	—	—	—	—	—
Tucson		105·4	45	e 18 24	PP	—	—	—	—	—

For Notes see next page,

NOTES TO DECEMBER 22d. 13h. 21m. 51s.

Additional readings :—
Zi-ka-wei eE =20m.26s., iE =4m.35s., 4m.55s., and 5m.51s.
Bombay eN =5m.16s., eE =7m.38s.
Long waves were also recorded at Helsinki, Upsala, Kew, Rome, De Bilt, Uccle, Copenhagen,Cheb, Prague, and Clermont-Ferrand.

Dec. 22d. 17h. 1m. 16s. Epicentre 38°·6N. 142°·5E. Depth of focus 0·010.
(as on 1940, Dec. 25d.).

Intensity VI at Senmaya (Iwate Pref.) ; II-III at Miyako and Mito.
Epicentre 38·5N. 142·6E. Depth of focus 60km.
Macroseismic radius greater than 300km.
The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1946, Tokyo 1951, Isoseismic chart, p.33.

$A = -\cdot6216$, $B = +\cdot4770$, $C = -\cdot6213$; $\delta = -7$; $h = -1$;
$D = +\cdot609$, $E = +\cdot793$; $G = -\cdot493$, $H = +\cdot378$, $K = -\cdot784$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Miyako		1·1	339	0 22	0	0 37	− 1
Mizusawa	E.	1·2	297	0 24	+ 1	0 46	+ 6
Sendai		1·3	255	0 21	− 3	0 37	− 5
Morioka		1·5	317	0 27k	0	0 47	0
Hatinohe		2·1	339	0 14	−20	1 4	+ 4
Akita		2·2	300	0 45	+ 9	0 56	− 6
Mito		2·8	216	0 44	0	1 12	− 5
Utunomiya		2·9	226	0 19	−26	—	—
Kakioka		3·0	218	0 45	− 2	—	—
Kumagaya		3·5	227	0 56	+ 2	1 30	− 4
Maebasi		3·5	233	0 55	+ 1	1 33	− 1
Tokyo		3·6	219	0 56	+ 1	1 40	+ 3

Dec. 22d. Readings also at 0h. (Pierce Ferry, Copenhagen, and Mizusawa (2)), 1h. and 2h. (near Mizusawa), 3h. (Haiwee, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Sitka, Copenhagen, Strasbourg, and Stuttgart), 4h. (near Mizusawa), 5h. (Shasta Dam, Overton, Boulder City, Pierce Ferry, and Tucson), 6h. (near Obi-garm, Stalinabad, and Andijan), 7h. (near Andijan (2), Tchimkent, Obi-garm, and Stalinabad), 8h. (Pierce Ferry, Shasta Dam, Boulder City, Tucson, and near Mizusawa), 13h. (Shasta Dam and near Mizusawa), 14h. (Overton, Boulder City, Pierce Ferry, La Paz, and near Andijan, Tashkent, Obi-garm, Stalinabad, and Almata), 15h. (Jena, Stuttgart, and near Collmberg), 19h. (Fresno and near Andijan), 21h. (near Obi-garm), 23h. (Shasta Dam).

Dec. 23d. Readings at 1h. (Haiwee, Riverside, Overton, Boulder City, Pierce Ferry, and Tucson), 2h. (Overton, Boulder City, and Pierce Ferry), 16h. (Huancayo, La Paz, Tucson, Riverside, Pasadena, and Tinemaha), 17h. (Stuttgart, Collmberg, Boulder City, Pierce Ferry, San Juan, near Mizusawa (2), and near Stalinabad, Obi-garm, and Andijan), 18h. (Collmberg, Paris, Boulder City, and Pierce Ferry), 21h. (near Andijan, Tchimkent, Tashkent, Obi-garm, Almata, and Stalinabad), 22h, (near Andijan and near Ottawa).

Dec. 24d. 1h. 38m. 50s. Epicentre 37°·5N. 121°·5W.

Epicentre and time of origin as adopted (Berkeley).

$A = -·4155$, $B = -·6781$, $C = +·6062$; $\delta = -6$; $h = -1$;
$D = -·853$, $E = +·522$; $G = -·317$, $H = -·517$, $K = -·795$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Lick	E.	0·2	216	i 0 4	− 6	—	—
Santa Clara	Z.	0·4	247	i 0 11	− 2	—	—
Branner		0·6	261	i 0 9	− 6	e 0 50	?
Berkeley		0·7	301	i 0 14	− 3	e 0 24	S*
San Francisco		0·8	290	e 0 16	− 2	i 0 25	S_g
Fresno	N.	1·6	119	e 0 36	+ 6	e 0 53	+ 2
Tinemaha		2·6	99	e 0 50	+ 6	i 1 28	S_g
Haiwee	Z.	3·1	115	e 0 58	+ 7	i 1 44	S_g
Pasadena	Z.	4·3	140	e 1 9	+ 1	—	—
Boulder City		5·6	104	e 1 54	P_g	—	—
Pierce Ferry		6·2	101	e 2 10	P_g	—	—

Dec. 24d. 3h. 59m. 53s. Epicentre 3°·6S. 146°·0E. (as on 1945, April 22d.).

$A = -·8275$, $B = +·5581$, $C = -·0623$; $\delta = +11$; $h = +7$;
$D = +·559$, $E = +·829$; $G = +·052$, $H = -·035$, $K = -·998$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		24·7	165	i 5 22	− 2	i 9 49	+ 5	i 10 44	SS	i 12·9
Riverview		30·5	172	e 6 17	0	i 11 18	0	e 7 16	PP	e 14·5
Auckland		42·4	145	—	—	14 57	+37	—	—	21·1
Arapuni		43·7	146	—	—	14 49	+10	—	—	21·3
Wellington		45·5	150	3 27	?	15 8	+ 3	e 10 37	PPP	22·1
Christchurch		46·3	153	8 19	−10	15 16	0	10 17	PP	22·1
Calcutta	N.	62·0	298	e 9 29	−55	i 19 4	+16	—	—	—
Irkutsk		65·9	333	e 10 51	+ 1	19 39	+ 2	—	—	—
Kodaikanal	E.	69·6	283	e 12 19	+66	—	—	—	—	—
Hyderabad	N.	69·8	290	—	—	20 31	+ 8	—	—	—
New Delhi	N.	73·3	301	21 35	PS	i 21 16	+12	22 6	S_cS	—
Bombay		75·3	290	e 12 3	+16	—	—	—	—	—
Andijan		80·0	312	e 12 17	+ 4	—	—	—	—	—
Obi-garm		81·6	310	12 23	+ 2	—	—	—	—	—
Stalinabad		82·3	310	e 12 28	+ 3	i 22 44	+ 4	—	—	—
Tashkent		82·4	312	e 12 23	− 2	e 22 42	+ 1	—	—	—
Tchimkent		82·4	314	e 12 28	+ 3	—	—	—	—	—
College		83·3	23	—	—	e 22 47	− 3	—	—	e 35·8
Shasta Dam		93·5	49	e 13 19	0	—	—	—	—	—
Berkeley		93·6	52	e 13 19	0	—	—	—	—	e 42·5
Grand Coulee		96·0	42	e 13 29	− 1	—	—	—	—	—
Tinemaha	Z.	96·7	53	e 13 37	+ 4	—	—	—	—	—
Pasadena	Z.	96·8	55	e 13 31	− 3	—	—	e 13 40	P_cP	e 45·7
Mount Wilson	Z.	96·9	55	e 13 30	− 4	—	—	—	—	—
Haiwee	Z.	97·0	54	e 13 34	− 1	—	—	—	—	—
Riverside	Z.	97·5	56	e 13 35	− 2	—	—	—	—	—
Palomar	Z.	97·9	56	e 13 37	− 2	—	—	i 13 46	P_cP	—
Boulder City		100·1	54	e 13 46	− 3	—	—	—	—	—
Pierce Ferry		100·2	54	e 13 47	− 2	—	—	—	—	—
Tucson		103·0	57	e 18 10	PP	—	—	—	—	e 46·7
Ksara		108·7	304	e 14 53?	P	28 39	PS	19 23	PP	—
Cheb		119·4	328	e 34 7?	?	e 41 16	SSS	e 50 7?	Q	e 66·1
Rome		123·7	320	e 19 50	[+50]	e 27 22	{−17}	e 21 14	PP	—
Paris		125·3	331	e 30 7?	PS	—	—	e 36 7?	SS	e 64·1
Huancayo		136·1	111	e 23 12	PKS	e 40 18	SS	—	—	e 64·4
La Paz	N.	140·8	122	23 3	PP	(26 39)	[− 1]	26 39	PPP	72·1

For Notes see next page.

NOTES TO DECEMBER 24d. 3h. 59m. 53s.

Additional readings :—
Riverview iSN =11m.14s.
Wellington PP =7m.26s., i =15m.50s.
Christchurch eZ =7m.40s., P_cS =13m.43s., SNZ =15m.7s., E =16m.57s.
College e =26m.54s.
Rome ePS? =34m.18s.
Huancayo e =26m.5s., eSSS? =47m.7s.
Long waves were also recorded at Bozeman, Salt Lake City, Rapid City, Philadelphia, Weston, Harvard, Chicago, Bermuda, San Juan, and numerous European stations.

Dec. 24d. 9h. 35m. 12s. Epicentre 33°·1N. 134°·8E.

Intensity V at Osaka ; IV at Tokusima ; II-III at Koti, Hikone, Ibukiyama.
Epicentre as adopted. Very shallow. Macroseismic radius between 200 and 300km.
The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1946, Tokyo, 1951, p. 34, isoseismic chart, p. 34.

A = −·5915, B = +·5956, C = +·5435 ; δ = 0 ; h = +1 ;
C = +·710, D = +·705 ; G = −·383, H = +·386, K = −·839.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Tokusima		1·0	349	0 20	− 1	0 36	0	—
Koti		1·2	293	0 18	− 6	0 25	−16	—
Sumoto		1·3	3	0 27a	+ 2	0 44	0	—
Kobe		1·6	11	0 32	+ 2	0 54	+ 3	—
Osaka		1·7	21	0 4a	−27	0 29	−25	—
Kyoto		2·1	22	0 40	+ 3	1 4	0	—
Toyooka		2·4	0	0 17k	−24	0 46	−26	—
Hikone		2·5	29	0 46k	+ 3	1 5	− 9	—
Gihu		2·8	35	0 48	+ 1	—	—	—
Hamada		2·9	308	1 3	P_g	1 59	+35	—
Kumamoto		3·4	266	0 58a	+ 3	1 38	+ 1	—
Shizuoka		3·5	58	1 12	P_g	2 3	sS	—
Hukuoka		3·7	279	0 54a	− 6	1 35	−10	—
Hunatu		4·1	53	1 7	+ 2	2 8	S*	—
Toyama		4·1	29	1 33	+28	2 28	+33	—
Nagano		4·5	38	1 32	P_g	2 29	S_g	—
Yokohama		4·7	59	1 21	+ 7	2 26	S*	—
Mito		5·7	54	1 43	P*	2 54	S*	—
Sendai		7·2	43	2 7	P*	3 40	+27	—
Mizusawa	E.	7·9	39	e 3 9	+70	4 31	+61	—
Irkutsk		29·2	319	e 6 8	+ 3	11 8?	+10	—
Calcutta	N.	42·1	268	e 13 20	S	(e 13 20)	−56	e 25·1
New Delhi		49·1	281	e 16 12	PPS	i 20 19	SSS	—
Tashkent		51·7	299	e 9 10	− 1	e 16 36	+ 4	—
Stalinabad		52·8	296	i 9 19	0	—	—	—
Sverdlovsk		54·4	219	9 32	+ 1	17 14	+ 5	—
Bombay		56·8	272	e 17 28	PS	e 17 41	0	—
Kodaikanal	E.	57·2	261	e 11 12	P_eP	—	—	—
Riverview	N.	68·3	166	e 20 33	PS	e 20 8	+ 2	—
Ksara		78·9	303	e 12 4	− 3	e 22 12	+ 7	—
Collmberg	Z.	81·7	328	e 12 21	− 1	—	—	—
Tinemaha	Z.	82·5	51	e 12 26	0	—	—	—
Mount Wilson	Z.	84·3	53	e 12 33	− 2	—	—	—
Pasadena	Z.	84·3	53	e 12 34	− 1	—	—	—
Riverside	Z.	84·9	53	e 12 38	0	—	—	—
Stuttgart	Z.	85·2	327	e 12 38	− 1	—	—	—
Overton		85·3	49	e 12 41	+ 1	—	—	—
Boulder City		85·4	50	e 12 40	0	—	—	—
Palomar	Z.	85·6	53	e 12 41	0	—	—	—
Pierce Ferry		85·8	49	e 13 45	+63	—	—	—
Rome		88·5	322	e 14 31	?	e 23 47	+ 6	—
Tucson		90·3	51	e 13 9	+ 5	—	—	—
Huancayo		145·4	61	e 19 44	[+ 4]	—	—	—

Long waves were also recorded at Upsala, Helsinki, Copenhagen, De Bilt, Uccle, Paris, Strasbourg, Clermont-Ferrand, Kew, Warsaw, Prague, and Potsdam.

Dec. 24d. 16h. 37m. 23s. Epicentre 43°·5N. 148°·4E. (as on 21d.).

$A = -·6198$, $B = +·3813$, $C = +·6859$; $\delta = 0$; $h = -3$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	7·0	234	1 55	+ 9	3 12	+ 4	—	—	—
Irkutsk		30·4	301	—	—	11 28?	+12	—	—	—
College		40·8	35	e 8 17	+32	e 13 40	−16	e 16 57	SSS	e 19·0
Sitka		47·2	45	e 15 42	PPS	—	—	—	—	e 26·9
Calcutta	N.	53·3	266	e 17 12	PPS	—	—	—	—	—
Sverdlovsk		54·0	316	9 23	− 5	17 11	+ 8	—	—	—
Andijan		54·6	294	9 33	+ 1	—	—	—	—	—
Tchimkent		55·6	297	i 17 25	PS	—	—	—	—	—
Tashkent		56·3	296	e 9 42	− 3	e 17 36	+ 2	—	—	—
Obi-garm		57·4	294	9 48	− 5	17 49	0	—	—	—
New Delhi	N.	57·8	280	e 10 4	+ 9	i 18 1	+ 7	—	—	—
Stalinabad		58·1	294	e 9 55	− 3	—	—	—	—	—
Grand Coulee		61·0	50	i 10 28	+10	—	—	—	—	—
Shasta Dam		63·1	58	i 10 26	− 6	—	—	—	—	—
Hyderabad	N.	63·7	269	—	—	19 16	+ 6	—	—	—
Bozeman		66·7	48	—	—	e 19 39	− 7	—	—	e 31·9
Bombay		66·9	275	e 10 54	− 2	—	—	—	—	—
Tinemaha	Z.	67·8	59	e 10 58	− 4	—	—	i 11 13	PcP	—
Haiwee	Z.	68·6	59	e 11 11	+ 4	—	—	—	—	—
Grozny		69·4	310	e 11 11	− 1	20 19	+ 1	—	—	—
Pasadena	Z.	69·7	61	e 11 9	− 5	—	—	—	—	e 33·4
Piatigorsk		70·4	312	e 11 32	PcP	e 20 50	+20	—	—	—
Overton		70·5	57	e 11 16	− 2	—	—	—	—	—
Boulder City		70·6	58	e 11 12	− 7	—	—	—	—	—
Palomar	Z.	71·0	62	e 11 25	+ 3	—	—	—	—	—
Pierce Ferry		71·1	58	e 11 17	− 5	—	—	i 11 36	PcP	—
Copenhagen		74·4	336	11 38	− 4	i 21 18	+ 2	—	—	37·6
Warsaw		74·4	328	e 12 43	+61	e 21 21	+ 5	e 32 9	?	e 38·6
Tucson		75·6	58	e 11 45	− 3	—	—	i 12 3	PcP	e 40·2
Riverview		77·0	177	e 12 7	PcP	e 21 53	+ 8	—	—	e 35·4
Collmberg	Z.	78·0	332	e 11 58	− 4	—	—	e 12 8	PcP	—
Budapest		79·0	327	12 7	0	e 21 50	−16	—	—	e 42·6
Cheb		79·2	333	—	—	e 21 37?	−31	—	—	e 41·6
De Bilt		79·6	337	e 12 7	− 3	e 22 17	+ 5	—	—	e 37·6
Istanbul		79·7	317	e 11 37	−34	—	—	—	—	—
Uccle		81·0	338	e 12 33	PcP	e 22 17?	−10	e 32 1	?	e 38·6
Stuttgart		81·4	334	e 12 18	− 2	—	—	—	—	e 45·6
Ksara		81·5	308	i 12 21	0	22 35	+ 3	—	—	—
Strasbourg		82·0	334	e 12 23	0	e 22 37	0	e 16 12	PP	40·6
Ottawa		83·2	29	12 40	+11	—	—	—	—	42·6
Paris		83·3	337	e 12 29	− 1	i 22 49	− 1	—	—	—
Clermont-Ferrand		85·9	336	i 12 42	− 1	e 23 17	+ 1	—	—	41·6
Rome		86·2	328	e 12 40	− 4	e 23 17	− 2	—	—	—
Weston		87·4	28	i 13 3	+13	—	—	—	—	e 52·9
Huancayo		131·0	63	e 16 42	P	—	—	e 46 8	Q	e 64·9

Readings also given at Paris i = 12m.42s. and 12m.49s.
Long waves were also recorded at Arapuni, Wellington, Christchurch, Bermuda, Salt Lake City, Philadelphia, San Juan, La Paz, and other European stations.

Dec. 24d. Readings also at 2h. (Ksara and Helwan), 3h. (Ksara, Helwan, and near Andijan, Tashkent, and Tchimkent), 11h. (Tucson, Hyderabad, and near Stalinabad and Obi-garm), 15h. (Tinemaha, Haiwee, Boulder City, Pierce Ferry, Riverside, Palomar, Tucson, and College), 16h. (Paris and near Mizusawa), 18h. (Kew, Collmberg, Stuttgart, and near Mizusawa), 19h. (Shasta Dam, Boulder City, Pierce Ferry, Obi-garm, Stalinabad, and Tashkent), and 20h. (Cheb, College, Pierce Ferry, and Boulder City).

Dec. 25d. 6h. Undetermined shock.

College eP =17m.28s., e =21m.1s., eL =21m.44s.
Grand Coulee eP? =20m.4s.
Tinemaha iP =21m.6s.
Haiwee ePZ =21m.15s.
Mount Wilson iPZ =21m.23s.k
Pasadena iP =21m.24s.
Overton eP =21m.27s., i =21m.41s.
Riverside iPZ =21m.28s.k
Boulder City iP =21m.30s.
Pierce Ferry iP =21m.32s., i =22m.10s.
La Jolla ePZ =21m.35s.
Palomar iP =21m.35s.k
Tucson iP =22m.10s.k, i =24m.10s.
Weston iP? =24m.4s.
Andijan eP =25m.52s., eS =35m.26s.?
Collmberg eZ =25m.54s.
Stuttgart eZ =26m.6s.
Strasbourg e =26m.8s.
Long waves were also recorded at Sitka, Bozeman, and Philadelphia.

Dec. 25d. 7h. 22m. 34s. Epicentre 46°·0N. 12°·2E.(as on 1946, Oct. 23d.).

Intensity IV in Carinthia. Epicentre 46°6′N. 12°26′E.

"Jahrbücher der Zentralanstalt für Meteorologie und Geodynamik," 1936, Neue Folge, Vol. 83, Vienna, 1947, p.5.

$A = +\cdot6814$, $B = +\cdot1473$, $C = +\cdot7170$; $\delta = +9$; $h = -4$;
$D = +\cdot211$, $E = -\cdot977$; $G = +\cdot701$, $H = +\cdot152$, $K = -\cdot697$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Triest		1·1	108	i 0 20	− 2	i 0 35	− 4	—	—
Chur		2·0	295	e 0 41	+ 6	e 1 8	+ 7	—	—
Pavia	z.	2·3	251	e 0 51	P_g	e 1 26?	?	—	—
Zagreb		2·7	94	i 0 44	− 1	i 1 6	−13	i 1 25	S*
Zürich		2·8	299	e 0 47	0	e 1 31	S_g	e 0 53	P_g
Stuttgart		3·4	325	i 0 51k	− 4	i 1 48	S*	i 1 2	P*
Basle		3·5	298	e 0 56	− 1	e 1 55	S_g	—	—
Neuchatel		3·7	287	e 1 1	+ 1	e 2 6	S_g	e 1 14	P*
Strasbourg		4·0	313	i 1 1	− 3	i 1 50	− 2	i 1 24	P_g
Cheb		4·1	2	e 1 10	+ 5	e 1 37?	P_g	—	—
Rome		4·1	178	e 2 6	+61	2 51	+56	—	—
Besançon		4·5	288	e 1 11	0	e 2 26	S_g	—	—
Jena		4·9	356	e 1 16	− 1	e 2 2	−13	—	—
Collmberg	z.	5·3	5	e 1 12	−10	e 2 31	+ 6	e 1 32	P*
Potsdam	E.	6·4	5	—	—	e 3 15?	S*	—	—

Additional readings :—
Strasbourg i =1m.12s., iS_g =2m.14s.
Jena eN =1m.58s., eE =3m.8s.
Long waves were recorded at Prague.

Dec. 25d. 11h. 13m. 4s. Epicentre 51°·5N. 180°.

Not intended as an approximate location.

$A = -\cdot6251$, $B = 0000$, $C = +\cdot7806$; $\delta = +9$; $h = -6$
$D = 000$, $E = +1\cdot000$; $G = -\cdot781$, $H = 000$, $K = -\cdot625$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		21·3	37	e 4 56	+ 6	(e 8 48)	+ 5	—	—	e 8·8
Grand Coulee		38·6	70	i 7 26	0	—	—	—	—	—
Shasta Dam		40·4	81	i 7 42	+ 1	e 13 48	− 2	—	—	—
Mineral	E.	41·1	81	e 7 48	+ 1	e 14 4	+ 3	—	—	—
Berkeley		42·2	85	i 7 57	+ 1	e 17 34	SS	—	—	—
Irkutsk		44·7	302	e 8 17	+ 1	—	—	—	—	—
Tinemaha		45·1	83	i 8 30	+10	e 15 0	+ 1	i 9 59	PP	—
Haiwee		45·9	84	e 8 28	+ 2	e 15 40	+29	—	—	—
Santa Barbara	z.	45·9	87	i 8 26	0	—	—	—	—	—
Salt Lake City		46·8	75	e 8 33	0	e 15 21	− 3	(e 18 51)	SS	e 18·8
Mount Wilson		47·1	86	i 8 34a	− 1	i 15 24	− 4	i 10 23	PP	—
Pasadena		47·1	86	i 8 35	0	i 15 26	− 2	—	—	—
Riverside		47·7	86	i 8 40a	0	e 15 36	0	—	—	—
Overton		47·9	82	i 8 41	− 1	e 15 37	− 2	—	—	—
Boulder City		48·0	82	i 8 52	+ 9	e 15 38	− 3	—	—	—
Pierce Ferry		48·4	82	i 8 45	− 1	e 15 44	− 2	—	—	—
Palomar		48·4	87	i 8 45a	− 1	i 15 46	0	—	—	—
La Jolla		48·5	87	i 8 45	− 1	e 15 45	− 3	—	—	—
Tucson		52·9	83	i 9 19	− 1	i 16 41	− 7	—	—	e 21·5
St. Louis		60·8	64	i 10 12	− 4	i 18 28	− 5	—	—	—
Sverdlovsk		61·1	327	i 10 17	− 1	i 18 56	+19	—	—	—
Ottawa	z.	63·6	50	e 10 30	− 5	—	—	—	—	31·9
Seven Falls		64·5	46	e 10 38	− 3	—	—	—	—	31·9
Almata		64·5	308	e 10 39	− 2	—	—	—	—	—
Harvard		67·7	49	i 10 59	− 2	—	—	—	—	e 36·9
Fordham		67·9	52	i 11 0	− 2	—	—	—	—	—
Weston		67·9	49	i 11 0	− 2	—	—	—	—	e 34·1
Andijan		68·7	309	11 8	+ 1	e 20 28	+18	—	—	—
Tashkent		69·7	311	e 11 13	− 1	—	—	—	—	—
Obi-garm		71·6	310	i 11 25	0	—	—	—	—	—
Stalinabad		72·1	310	i 11 30	+ 2	i 21 8	+18	—	—	—
Copenhagen		72·7	354	11 30	− 2	e 20 47	−10	e 21 15	PS	35·9
Jena		77·5	353	e 11 59	0	—	—	—	—	—
Uccle	N.	78·0	358	e 11 59	− 3	—	—	—	—	—
Stuttgart		79·8	354	i 12 10a	− 2	—	—	—	—	—
Strasbourg		80·1	355	i 12 12	− 1	—	—	—	—	e 44·9
Chur		81·7	354	e 12 21	− 1	—	—	—	—	—
Hyderabad	N.	83·5	290	12 31	0	22 50	− 2	23 6	SKS	—
Bombay		85·6	295	e 12 41	0	i 23 12	− 1	—	—	—
Rome		86·3	352	i 12 37	− 8	e 23 30	+10	16 12	PP	—
Riverview		88·7	203	i 12 55a	− 2	i 23 41	− 2	i 23 22	SKS	e 43·1
Ksara		89·4	331	i 12 59	− 1	—	—	24 59	PS	—

Additional readings :—
Shasta Dam e =13m.27s.
Tinemaha iZ =13m.49s.
Pasadena i =8m.40s., iZ =8m.57s.
Riverside iZ =8m.44s.
Pierce Ferry i =9m.7s.
Palomar iZ =9m.5s.
Stuttgart eZ =12m.14s.
Rome PS =24m.40s.
Long waves were also recorded at Christchurch, Sitka, Bozeman, Philadelphia, Bermuda, San Juan, Clermont-Ferrand, Cheb, and Helsinki.

Dec. 25d. Readings also at 0h. (near Almata, Andijan, Obi-garm, Stalinabad, and Tashkent), 1h. (Bozeman), 4h. (near Ottawa), 6h. (Boulder City, Overton, and Pierce Ferry), 7h. (Malaga and Tucson), 9h. (near Stuttgart), 10h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Pierce Ferry, Huancayo, La Paz, Almata, and near Andijan), 12h. (Merida and Tucson), 13h. (Malaga, near Andijan, Obi-garm, and Tashkent), 16h. (near Almata, Andijan, Obi-garm, Stalinabad, Tashkent, Tchimkent, and near Rome), 19h. (Overton, near Pierce Ferry, near Obi-garm, and Stalinabad).

Dec. 26d. 8h. 4m. 0s. Epicentre 33°·7N. 136°·2E. (as on 1944, Dec. 7d.).

Intensity IV at Siomisaki, Osaka, and Tokusima ; II-III at Omaesaki. Epicentre 33°·6N. 136°·1E. Suggested deep. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs., Japan, 1946. Tokyo, 1951, p. 35, with isoseismic map.

$A = -·6017$, $B = +·5770$, $C = +·5523$; $\delta = +1$; $h = +1$;
$D = +·692$, $E = +·722$; $G = -·399$, $H = +·382$, $K = -·834$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Owase		0·3	0	0 8k	− 3	0 56	?
Siomisaki		0·4	235	0 5	− 8	0 38	+17
Osaka		1·1	330	0 26a	+ 4	0 46	+ 7
Sumoto		1·3	301	0 20a	− 5	0 43	− 1
Hikone		1·6	2	0 26a	− 4	0 49	− 2
Omaesaki		1·9	62	0 44	+10	1 55	+56
Shizuoka		2·2	55	0 54	+16	—	—
Toyooka		2·2	328	0 37	− 1	1 19	S_g
Hunatu		2·8	50	0 40	− 7	1 38	S_g
Hatidyozima		3·1	101	1 2	P_g	2 30	?
Nagano		3·4	28	(1 5)	P_g	(2 3)	S_g
Tokyo		3·5	55	0 52	− 5	1 56	S_g
Maebasi		3·6	40	1 2	P*	2 17	S_g
Wazima		3·7	8	1 18	P_g	2 13	S_g
Tukubasan		4·1	51	1 37	P_g	2 49	S_g
Mito		4·4	51	1 36	P_g	2 39	S_g
Kumamoto		4·7	261	2 11	S	(2 11)	+ 1
Mizusawa	N.	6·7	35	3 50	S_g	4 56	?
Irkutsk		29·5	319	e 6 0	− 8	e 11 0	− 2
Calcutta	N.	43·3	268	—	—	e 13 25	−68
Tashkent		52·4	299	e 9 30	+14	e 16 37?	− 5
Hyderabad	N.	53·9	268	e 7 38	−109	e 16 59	− 3
Sverdlovsk		54·9	320	e 9 36	+ 1	—	—
Bombay		57·9	272	—	—	e 17 52	− 3
Ksara		79·5	303	e 12 14	+ 4	e 23 50	?

Additional readings :—
Nagano readings have been diminished by 1m.
Kumamoto S =3m.34s.
Long waves were also recorded at New Delhi, Riverview, Tacubaya, and several European stations.

Dec. 26d. 16h. 50m. 41s. Epicentre 11°·0S. 118°·0E. Depth of focus 0·010.

$A = -·4610$, $B = +·8669$, $C = -·1896$; $\delta = -2$; $h = +6$;
$D = +·883$, $E = +·469$; $G = +·089$, $H = -·167$, $K = -·982$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Perth		21·0	185	4 39	+ 2	8 16	− 4	—	—	—
Brisbane		36·7	121	e 6 54	− 5	e 12 4	−31	e 7 54	PP	—
Riverview		37·9	132	i 7 9a	0	e 12 51	− 2	i 8 32	PP	e 19·8
Calcutta	N.	44·2	319	e 9 42	PP	i 14 54	+28	—	—	—
Kodaikanal	E.	45·5	296	i 7 40	−31	e 14 15	−30	9 20	PP	—
Hyderabad	N.	48·2	305	8 33	+ 1	15 31	+ 8	18 17	S_cS	—
Bombay		53·5	303	e 9 17	+ 4	i 16 43	+ 7	—	—	22·0
New Delhi	N.	55·7	316	e 9 36	+ 7	i 17 7	+ 1	21 2	SS	—
Christchurch		57·1	135	9 41	+ 2	17 16	− 8	21 57	SS	25·4
Wellington		58·0	132	17 35	S	(17 35)	− 1	24 1	SSS	32·3
Irkutsk		64·1	350	10 27	+ 1	18 49	− 4	—	—	—
Almata		65·7	329	e 10 46	+10	—	—	—	—	—
Andijan		66·5	323	10 43	+ 2	e 19 30	+ 7	—	—	—
Obi-garm		66·9	320	e 10 41	− 3	19 29	+ 1	—	—	—
Stalinabad		67·4	320	i 10 44	− 3	e 19 37	+ 3	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		68·2	254	—	—	e 19 58	+15	—	—	e 30·3
Tashkent		68·7	323	e 10 30?	−25	—	—	e 24 19	SS	—
Tchimkent		69·1	324	i 10 57	− 1	i 19 59	+ 5	—	—	—
Baku		80·9	314	e 12 20	+15	—	—	—	—	—
Sverdlovsk		82·4	332	12 11	− 2	22 21	+ 2	—	—	—
Grozny		84·9	316	e 12 34	+ 9	—	—	—	—	—
Leninakan		85·4	313	e 12 47	+19	—	—	—	—	—
Ksara		89·6	304	i 12 52	+ 4	23 47	+18	—	—	—
Helwan		92·5	300	—	—	e 24 9	+15	e 23 37	SKS	—
Istanbul		96·3	311	e 17 9?	PP	e 25 59?	PS	—	—	—
Sitka		108·2	33	—	—	—	—	(e 33 39)	SS	e 33·6
Cheb		108·4	320	—	—	e 24 48	[+ 6]	e 34 6	SS	e 59·3
Rome	z.	108·8	311	e 28 20	PS	—	—	e 29 53	PPS	—
Tinemaha	z.	123·4	53	e 18 44	[− 2]	e 20 16	PP	e 19 2	pPKP	—
Haiwee	z.	123·8	54	e 18 45	[− 2]	—	—	—	—	—
Pasadena	z.	124·0	56	i 18 44	[− 3]	—	—	i 18 56	pPKP	e 62·1
Riverside	z.	124·7	56	e 18 44	[− 4]	—	—	—	—	—
Palomar	z.	125·2	57	i 18 48	[− 1]	—	—	—	—	—
Boulder City		126·3	53	i 18 50	[− 1]	—	—	—	—	—
Pierce Ferry		126·9	53	e 18 46	[− 6]	—	—	—	—	—
Tucson		130·4	57	e 18 57	[− 2]	—	—	—	—	—
Weston		147·7	13	i 19 31	[0]	—	—	—	—	e 79·3
La Paz	z.	152·0	169	i 19 39	[+ 2]	—	—	23 52	PP	74·3
Huancayo		153·5	150	e 19 47	[+ 8]	e 49 16	SSS	—	—	e 66·7

Additional readings :—
Brisbane ePN =6m.59s.
Riverview iPN =7m.12s., ePPPE =8m.48s., eSN =12m.45s., e =12m.55s., iE =13m.49s., eE =15m.18s., iSSSEZ =15m.32s.
Kodaikanal SSE =17m.40s.
Wellington P_cP =19m.18s., P_cS =23m.13s., Q =30·3m. ; phases wrongly identified.
Cheb e =29m.0s.
Pierce Ferry i =18m.52s.
Huancayo e =21m.2s.
Long waves were also recorded at Arapuni, Auckland, De Bilt, Kew, and Copenhagen.

Dec. 26d. 19h. Ecuador. The readings do not afford exact determination.

Bogota iP =38m.48s., iS =41m.24s.
Balboa Heights eP? =39m.2s.
Huancayo iP =39m.9s., iS =41m.7s., iL =41m.44s.
La Paz iPZ =40m.42s., iSZ =44m.12s., LZ =46m.28s.
San Juan iP =41m.32s., i =41m.45s., e =42m.13s. and 45m.41s., eL =46m.33s.
Tucson iP =44m.52s a, i =45m.2s., e =45m.51s. and 53m.52s., eL =61m.8s.
Pierce Ferry iP =45m.27s.
La Jolla ePNZ =45m.28s.
Palomar iP =45m.29s. a, iZ =45m.38s.
Boulder City iP =45m.31s., i =46m.24s.
Overton eP =45m.32s.
Riverside iPZ =45m.35s. a, iZ =45m.44s. and 45m.48s.
Pasadena iP =45m.39s., iZ =45m.47s. and 45m.52s.
Mount Wilson iPZ =45m.40s. a, iZ =45m.49s.
Haiwee iPZ =45m.45s.
Tinemaha iPZ =45m.52s.
Shasta Dam eP =46m.23s.
Grand Coulee eP =46m.42s.
Long waves were recorded at Salt Lake City.

Dec. 26d. Readings also at 0h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, and Shasta Dam), 3h. (Tucson, near Oaxaca, Tacubaya, and Vera Cruz), 4h. (Riverside, Palomar, Boulder City, Pierce Ferry, and Shasta Dam), 6h. (Andijan, near Obi-garm, and Stalinabad), 7h. (Obi-garm), 12h. (Boulder City, Overton, Pierce Ferry, and Shasta Dam), 13h. (Collmberg, Stuttgart, and near Granada), 14h. (Brisbane and Riverview), 15h. (Huancayo), 18h. (near Irkutsk), 20h. (near Andijan, Obi-garm, Stalinabad, and Tashkent), 21h. (near Mizusawa), 22h. (near Obi-garm and Stalinabad), 23h. (Almeria, Malaga (2), near Alicante and Granada).

Dec. 27d. Readings also at 2h. (Grand Coulee), 5h. (La Paz), 7h. (Overton, Pierce Ferry, Boulder City, Shasta Dam, near Lick and Berkeley, and near Andijan, Tchimkent, and Obi-garm), 10h. (near Erevan and Leninakan), 13h. (near Almata), 15h. (near Andijan), 16h. (Grand Coulee), 17h. (Helsinki and Shasta Dam), 20h. (near Tchimkent), 22h. (near Zagreb and Triest).

Dec. 28d. 0h. 58m. 3s. Epicentre 18°·9N. 68°·9W. (as on Oct. 4d.).

Intensity VI at Ciudad-Trujillo; II at Port-au-Prince.
Repetition of the earthquake of Aug. 4d. 17h.
Liste des séismes ressentis dans la Republique de Haïti an coursant de l'année 1946.
Annales de l'Institut de Physique du Globe de Strasbourg pour l'année 1946, 2ème partie, Séismologie, Nouvelle série, Tome XI, p. 77.

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		2·7	101	i 0 59	PPP	i 1 37	SS	—	—	i 3·0
Port-au-Prince		3·3	264	i 0 52	− 1	i 1 10	−25	i 0 59	PP	i 1·5
Bermuda		13·9	15	—	—	e 5 42	−15	—	—	e 6·4
Balboa Heights		14·3	228	e 3 27	+ 1	—	—	e 5 53	−11	—
Bogota		15·1	200	e 3 40	+ 4	e 6 21	− 4	i 3 48	PP	—
Philadelphia		21·7	348	e 5 1	+ 6	i 8 33	−18	—	—	e 8·8
Fordham		22·3	351	e 5 0	− 1	i 8 57	− 5	i 8 51	S	—
Weston		23·5	357	i 5 14	+ 2	i 9 17	− 6	i 5 41	PP	—
Harvard		23·6	357	i 5 15	+ 2	i 9 19	− 6	—	—	e 13·5
Ottawa		27·0	350	e 5 50	+ 5	e 10 46	+24	—	—	e 13·0
St. Louis		27·0	321	i 5 42	− 3	e 10 22	0	e 11 52	SSS	e 12·9
Shawinigan Falls		27·8	356	e 5 52	− 1	—	—	—	—	11·2
Seven Falls		28·2	358	e 5 50	− 6	—	—	—	—	11·3
Huancayo		31·4	192	e 6 30	+ 5	e 11 36	+ 4	e 7 58	PPP	e 15·9
La Paz	z.	35·2	178	i 7 3	+ 5	i 12 47	+16	i 8 35	PPP	19·3
Rapid City		38·1	320	i 7 20	− 2	—	—	—	—	e 19·1
Tucson		39·8	298	i 7 35	− 1	—	—	i 9 13	PP	e 21·1
Salt Lake City		42·6	311	e 7 58	− 1	e 14 17	− 6	—	—	e 18.7
Pierce Ferry		43·1	303	i 8 2	− 2	—	—	—	—	—
Overton		43·5	304	i 8 7	0	—	—	—	—	—
Boulder City		43·7	303	i 8 8	0	—	—	—	—	—
Palomar		45·0	299	i 8 18	− 1	—	—	—	—	—
Riverside	z.	45·5	300	i 8 22a	− 1	—	—	—	—	—
Mount Wilson		46·1	300	i 8 26	− 2	—	—	—	—	—
Pasadena		46·2	300	i 8 27	− 1	—	—	—	—	e 26·6
Haiwee	z.	46·3	303	e 8 29	0	—	—	—	—	—
Tinemaha		46·7	304	i 8 31a	− 1	e 15 18	− 4	—	—	—
Santa Barbara	z.	47·5	300	i 8 36	− 2	—	—	—	—	—
Grand Coulee		49·7	318	e 8 52	− 4	—	—	—	—	—
Shasta Dam		50·4	308	e 8 57	− 4	—	—	—	—	—
Malaga		58·7	58	10 10	+ 8	—	—	—	—	—
Strasbourg		67·3	44	i 11 4	+ 5	—	—	—	—	e 32·0
Stuttgart		68·2	44	e 11 9	+ 5	—	—	—	—	—
Cheb		70·2	43	e 6 32	?	e 20 38	+10	—	—	e 33·0
Collmberg	z.	70·5	41	e 11 24	+ 6	—	—	e 11 30	PcP	—

Additional readings:—
San Juan i = 1m.7s., 1m.19s., and 1m.47s.
Port-au-Prince iPNE = 0m.55s.
Bogota iNZ = 3m.43s., iPPPPNZ = 3m.52s., eNZ = 6m.30s.
St. Louis iP = 5m.45s.
Huancayo i = 6m.39s., iS = 11m.41s., i = 13m.23s., e = 14m.6s.
Tucson i = 7m.44s.
Pierce Ferry i = 8m.9s.
Palomar i = 8m.26s.
Tinemaha i = 8m.37s.
Long waves were also recorded at Sitka, Kew, Uccle, De Bilt, Prague, and Warsaw.

Dec. 28d. 10h. 9m. 20s. Epicentre 44°·3N. 148°·2E.

Intensity IV at Attoko (Hokkaido).
Epicentre 41°N. 149°E. Very shallow. Macroseismic radius greater than 300km.
The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1946, Tokyo, 1951, p. 35.

$A = -·6102$, $B = +·3784$, $C = +·6960$; $\delta = -5$; $h = -3$;
$D = +·527$, $E = +·850$; $G = -·592$, $H = +·367$, $K = -·718$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		7·4	228	1 54	+ 2	e 3 12	− 6	—	—	—
Irkutsk		29·9	301	e 6 10	− 2	e 11 9	0	—	—	—
College		40·2	35	e 7 42	+ 2	e 13 46	− 2	—	—	e 16·9
Sitka		47·4	45	—	—	i 15 36	+ 4	—	—	e 19·1
Calcutta	N.	53·2	266	e 9 45	+23	e 17 9	+17	—	—	—
Sverdlovsk		53·3	316	i 9 25	+ 2	i 17 10	+16	—	—	—
Tchimkent		55·1	297	e 9 34	− 2	e 17 24	+ 6	—	—	—
Tashkent		55·8	296	e 9 39	− 2	e 17 28	0	—	—	—
Obi-garm		56·9	294	i 9 50	+ 1	e 17 46	+ 4	—	—	—
New Delhi	N.	57·5	280	e 9 57	+ 4	i 17 52	+ 2	18 7	PS	e 31·3
Stalinabad		57·6	294	i 9 54	0	i 17 55	+ 4	—	—	—
Grand Coulee		60·6	50	e 10 13	− 2	—	—	—	—	—
Shasta Dam		62·8	58	e 10 25	− 5	—	—	—	—	—
Hyderabad	N.	63·6	269	e 10 18	−17	19 13	+ 5	12 58	PP	—
Berkeley		64·5	61	e 10 38	− 3	e 19 4	−15	—	—	e 26·9
Bombay		66·7	274	e 10 59	+ 4	—	—	—	—	—
Haiwee	Z.	68·3	59	i 11 19	+14	—	—	—	—	—
Upsala		68·6	335	—	—	e 27 40	SSS	—	—	e 33·7
Grozny		68·7	310	e 11 9	+ 2	e 20 17	+ 7	—	—	—
Pasadena	Z.	69·4	61	e 11 10	− 2	—	—	—	—	e 32·2
Mount Wilson	Z.	69·5	61	e 11 10	− 2	—	—	—	—	—
Piatigorsk		69·7	312	e 11 34	PcP	—	—	—	—	—
Riverside	Z.	70·0	61	e 11 13	− 2	—	—	—	—	—
Overton		70·2	57	e 11 14	− 3	—	—	i 11 43	PcP	—
Boulder City		70·4	58	i 11 16	− 2	—	—	i 11 32	PcP	—
Palomar	Z.	70·8	62	i 11 18	− 2	—	—	—	—	—
Pierce Ferry		70·8	58	e 11 17	− 3	—	—	i 11 36	PcP	—
Leninakan		71·5	309	e 11 39	+15	—	—	—	—	—
Copenhagen		73·6	336	e 11 37	0	i 21 9	+ 2	—	—	35·7
Warsaw		73·6	328	e 11 39a	+ 2	e 21 19	PS	—	—	e 38·7
Tucson		75·3	58	i 11 45	− 2	—	—	—	—	e 38·4
Collmberg		77·2	332	e 11 58	+ 1	22 1?	+14	—	—	42·7
Riverview		77·8	177	e 12 2	+ 1	i 21 54	+ 1	e 22 39	PS	e 32·6
Prague		77·9	331	—	—	e 21 35	−19	—	—	e 35·7
Jena	N.	78·0	333	e 12 2	0	—	—	—	—	—
Budapest	E.	78·2	327	e 12 15	PcP	22 1	+ 4	—	—	e 44·7
	N.	78·2	327	e 12 18	PcP	22 2	+ 5	—	—	e 44·7
Cheb		78·4	333	e 12 40?	+36	—	—	—	—	e 38·7
Istanbul		79·0	317	e 12 5	− 2	e 22 10	+ 4	—	—	—
Belgrade		79·9	324	e 11 50	−22	e 21 51	−25	e 14 57	PP	—
Uccle		80·2	338	e 12 22	+ 8	e 22 25	+ 6	e 29 16	SSS	e 37·7
Stuttgart		80·6	334	e 12 16	0	—	—	i 12 30a	PcP	e 45·2
Ksara		80·9	308	i 12 23	+ 6	e 22 43	+17	—	—	—
Strasbourg		81·2	334	e 12 21	+ 2	e 22 29	0	e 12 37	PcP	e 40·7
Ottawa		82·6	29	e 12 24	− 2	—	—	—	—	45·7
Seven Falls		82·7	25	e 12 28	+ 1	—	—	—	—	44·7
Rome		85·5	328	(12 40)	− 1	12 40	P	—	—	—
Helwan		86·4	309	12 46	+ 1	e 23 25	+ 4	e 18 22	PPP	—
Weston		86·7	28	i 12 49	+ 2	—	—	—	—	e 51·8
Christchurch		89·9	162	e 14 0	+58	23 33	[+ 1]	17 6	PP	42·7
Huancayo		130·8	63	e 24 22	PPP	—	—	—	—	e 59·1

Additional readings :—
Grand Coulee i = 10m.27s.
Overton i = 11m.34s.
Pierce Ferry i = 12m.2s.
Collmberg iZ = 12m.5s. and 12m.10s.

Continued on next page.

Riverview eSSE =26m.59s., eN =27m.7s.
Helwan e =13m.19s. and 13m.40s.
Christchurch PPSE =25m.8s., SSEN =29m.50s., SSSE =33m.45s., QEN =37m.10s.
Long waves were also recorded at Bozeman, Salt Lake City, Bermuda, San Juan, La Paz, Tananarive, Helsinki, Bergen, Lisbon, Aberdeen, Kew, De Bilt, Besançon, Clermont-Ferrand, Potsdam, and Zagreb.

Dec. 28d. 16h. 48m. 47s. Epicentre 33°·7N. 134°·0E.

Intensity V at Tokushima ; IV at Shiomisaki and Koti ; II-III at Tsu, Sumoto, Kobe, Owase, Kyoto, and Yonago.
Epicentre as adopted. Very shallow. Macroseismic radius between 200 and 300km.
The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1946, Tokyo 1951, p. 36, isoseismic chart p. 36.

$A = -\cdot5791$, $B = +\cdot5997$, $C = +\cdot5523$; $\delta = +3$; $h = +1$;
$D = +\cdot719$, $E = +\cdot695$; $G = -\cdot384$, $H = +\cdot397$, $K = -\cdot834$.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Koti	0·4	249	0 3	P_g	0 8	S_g
Sumoto	1·0	51	0 21a	0	0 35	− 1
Kobe	1·4	45	0 26k	− 1	0 46	0
Osaka	1·6	53	0 33	+ 3	0 55	+ 4
Kyoto	1·9	48	0 51k	+17	1 7	+ 8
Owase	1·9	79	0 32	− 2	0 57	− 2
Toyooka	1·9	20	0 35a	+ 1	1 5	+ 6
Omaesaki	3·6	74	1 8	P_g	1 59	S_g
Shizuoka	3·9	69	1 16	P_g	1 48	− 2
Hunatu	4·3	64	1 14	+ 6	2 1	+ 1
Nagano	4·5	47	1 32	P*	2 25	S_g
Maebasi	5·0	55	1 35	P_g	2 20	+ 2
Yokohama	5·0	68	1 48	P_g	2 35	S*

Dec. 28d. Readings also at 1h. (Ksara, Grozny, Sverdlovsk, and near Andijan, Tchimkent, Tashkent, Obi-garm, Almata, and Stalinabad), 2h. (New Delhi and Stuttgart), 5h. (Tucson, Huancayo, La Paz, and Riverview), 10h. (Collmberg, Rome, Ksara, and Obi-garm), 11h. (Stuttgart, near Triest, and Zagreb), 13h. (Mizusawa), 16h. (Alicante).

Dec. 29d. 4h. 14m. 37s. Epicentre 35°·8N. 142°·0E. (as on 1937, Dec 10d.).

$A = -\cdot6406$, $B = +\cdot5005$, $C = +\cdot5823$; $\delta = -6$; $h = 0$;
$D = +\cdot616$, $E = +\cdot788$; $G = -\cdot459$, $H = +\cdot358$, $K = -\cdot813$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Mizusawa		3·4	348	e 0 55	0	1 52	S_g	—
Calcutta	N.	48·1	270	—	—	e 16 14	+32	—
New Delhi	N.	54·4	282	—	—	e 17 8	− 1	31·0
Sverdlovsk		56·4	320	e 9 52	+ 7	e 17 48	+12	—
Shasta Dam		71·5	53	e 11 23	− 1	—	—	—
Tinemaha	Z.	76·1	55	i 11 51	0	—	—	—
Santa Barbara	Z.	76·6	58	i 11 54	0	—	—	—
Haiwee	Z.	76·9	55	e 11 54	− 2	—	—	—
Mount Wilson	Z.	77·9	58	e 11 59	− 2	—	—	—
Pasadena	Z.	77·9	58	e 12 0	− 1	—	—	—
Riverside	Z.	78·5	58	e 12 3	− 1	—	—	—
Boulder City		79·0	54	e 12 5	− 2	—	—	—
Overton		79·0	53	e 12 3	− 4	—	—	—
Palomar		79·2	57	i 12 8	0	—	—	—
Pierce Ferry		79·5	53	e 12 9	− 1	—	—	—
Ksara		82·3	305	9 53	?	e 21 3	?	—
Cheb		83·6	330	—	—	e 31 23?	SSS	e 45·4
Tucson		83·9	54	e 12 32	− 1	—	—	—
Stuttgart	Z.	85·9	331	e 12 43	0	—	—	—
Granada		100·7	333	—	—	e 44 32	Q	58·7

Long waves were also recorded at other European stations.

Dec. 29d. 16h. 14m. 53s. Epicentre 37°·5N. 75°·0E. Given by U.S.S.R.

A = +·2058, B = +·7682, C = +·6062; δ = −4; h = −1;
D = +·966, E = −·259; G = +·157, H = +·586, K = −·795.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		3·8	329	e 1 3	+ 2	i 2 5	S_g	—	—	—
Obi-garm		4·3	287	e 1 11	+ 3	e 1 57	− 3	e 2 11	S*	—
Stalinabad		5·0	284	i 1 19	+ 1	i 2 46	S_g	—	—	—
Frunse		5·4	357	e 1 38	P*	i 3 26	?	—	—	—
Almata		6·0	14	1 38?	+ 6	3 6	S*	—	—	—
Tchimkent		6·3	321	—	—	i 2 33	−17	—	—	—
New Delhi	N.	9·1	168	e 2 10	− 4	—	—	—	—	i 5·4
Calcutta	N.	18·5	138	—	—	e 7 57	+13	—	—	—
Bombay		18·6	185	e 4 21	0	e 7 55	+ 9	—	—	—
Hyderabad	N.	20·2	169	4 33	− 6	8 21	0	—	—	10·4
Irkutsk		25·3	43	—	—	9 58	+ 4	—	—	—
Ksara		31·8	273	—	—	e 10 33	−65	—	—	e 15·4

Dec. 29d. Readings also at 0h. (near Berkeley), 3h. (Andijan, near Obi-garm, and Stalinabad), 4h. (near Granada), 10h. (near Apia), 14h. (Mizusawa, Calcutta, and Collmberg), 17h. (near La Paz), 21h. (near Andijan), 23h. (near Fort de France).

Dec. 30d. 4h. 9m. 9s. Epicentre 0°·7N. 29°·4W. (as on 1943, Aug. 13d.).

A = +·8711, B = −·4909, C = +·0122; δ = −5; h = +7;
D = −·491, E = −·871; G = +·011, H = −·006, K = −1·000.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz	z.	41·9	246	7 53	− 1	e 14 5	− 8	9 33	PP	21·8
Granada		43·4	30	i 8 5a	− 1	i 14 55	+20	i 10 5	PP	21·4
Almeria		43·8	32	8 8	− 1	—	—	—	—	—
Bogota		44·8	276	e 9 11	+54	—	—	—	—	—
Alicante		46·2	31	e 7 41	−47	e 15 11	− 4	—	—	e 22·8
Huancayo		47·3	253	e 8 32	− 5	e 15 22	− 9	—	—	e 20·9
Strasbourg		57·4	28	e 9 51	− 2	—	—	—	—	—
Uccle		57·5	25	—	—	e 18 13	PS	—	—	e 23·8
Stuttgart	z.	58·3	29	e 10 5	+ 6	—	—	—	—	—
De Bilt		58·8	25	—	—	e 18 21	+14	—	—	e 28·8
Cheb		60·7	28	—	—	e 18 48	+16	e 24 51?	SSS	—
Helwan		64·5	58	10 48	+ 7	e 14 41	PPP	e 13 12	PP	—
Ksara		69·2	55	e 11 17	+ 7	e 20 45	+29	—	—	—
Tucson		82·4	303	i 12 26	+ 1	—	—	—	—	—
Pierce Ferry		85·2	306	e 12 42	+ 3	—	—	—	—	—
Overton		85·6	306	e 12 45	+ 4	—	—	—	—	—
Boulder City		85·9	306	e 12 44	+ 1	—	—	—	—	—
Palomar		87·5	304	i 12 52	+ 1	—	—	—	—	—
Riverside	z.	87·9	304	e 12 53	0	—	—	—	—	—
Haiwee	z.	88·4	306	e 12 51	− 4	—	—	—	—	—
Mount Wilson	z.	88·5	304	i 12 57	+ 1	—	—	—	—	—
Pasadena	z.	88·6	304	e 12 57	+ 1	—	—	—	—	—

Additional readings :—
Granada PPP = 11m.0s., SS = 17m.56s.
Strasbourg i = 9m.59s.
Helwan e = 10m.56s.
Tucson i = 12m.34s.
Long waves were also recorded at Bermuda, Clermont-Ferrand, Algiers, Kew, and Copenhagen,

Dec. 30d. Readings also at 0h. (near Berkeley and Lick), 10h. (Pierce Ferry), 11h. (Pasadena, Palomar, Tucson, Boulder City, Overton, Pierce Ferry, San Juan, Merida, Tacubaya (2), Vera Cruz, and near Apia), 12h. (Mizusawa), 13h. (Tucson, Almata, near Andijan and near Alicante), 16h. (Brisbane, Riverview, Tucson, Boulder City, and Pierce Ferry), 17h. (Grozny, Almata, near Andijan, Frunse, Obi-garm, Tashkent, Tchimkent, and near La Paz), 18h. (near Tacubaya (2)), 19h. (near Obi-garm), 22h. (Tucson).

Dec. 31d. Readings at 2h. (Huancayo, Malaga, near Granada, near Almata, Frunse, Obi-garm, Tashkent, and Tchimkent), 5h. (Huancayo and near Stalinabad), 6h. (Bermuda, Harvard, Weston, and near San Juan), 10h. (near Mizusawa), 11h. (Shasta Dam and near Bogota), 12h. (Riverview), 19h. (near Tchimkent), 22h. (near La Paz), 23h. (Huancayo, Haiwee, Mount Wilson, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Grand Coulee, near Bucharest, and near Granada).

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

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A digital hypocenter file of the ISS (Villaseñor and Engdahl, 2005) can be obtained from the USGS web site: http://earthquake.usgs.gov/scitech/iss/

Villaseñor, A., and E.R. Engdahl, *A digital hypocenter catalog for the International Seismological Summary,* Seism. Res. Lett., vol. 76, no. 5, pp. 554-559, 2005.

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