The International Seismological Summary.

1949 July, August, September.

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 third quarter for 1949 contains 222 epicentres, 161 of which are repetitions from previously adopted epicentres.

Cases of abnormal focal depth are noted below :—

July	1d.	3h.	20·8S.	69·0W.	0·010
	2d.	19h.	16·4N.	147·6E.	Suggested Deep.
	3d.	21h.	12·2S.	75·3W.	0·005
	11d.	1h.	50·8N.	6·9E.	Suggested Deep.
	11d.	16h.	34·0N.	132·5E.	Suggested Deep
	12d.	8h.	23·7S.	65·7W.	0·010
	14d.	23h.	30·6N.	139·7E.	0·060
	18d.	4h.	5·5N.	126·0E.	0·010
	18d.	8h.	13·0S.	171·5E.	0·090
	18d.	9h.	41·2N.	142·5E.	0·010
	18d.	17h.	36·7N.	70·5E.	0·030
	21d.	8h.	15·6S.	73·2W.	0·005
	21d.	12h.	36·7N.	70·5E.	0·030
	21d.	15h.	40·1S.	173·8E.	0·010
	23d.	5h.	1·1N.	126·4E.	0·005
	23d.	10h.	19·0S.	169·2E.	0·020
	25d.	3h.	16·4N.	147·6E.	0·025
	30d.	6h.	44·1N.	150·1E.	0·040

Aug.	3d.	15h.	4 N.	143·6E.	Base of Superficial Layers.
	4d.	1h.	34·2N.	140·6E.	0·010
	6d.	0h.	19·0S.	174·2W.	0·005
	6d.	11h.	19·0S.	174·2W.	0·005
	8d.	14h.	14·9N.	93·6W.	0·005
	8d.	19h.	16·0S.	76·0W.	Suggested Deep.
	11d.	13h.	14·9N.	93·6W.	0·005
	11d.	15h.	15·6S.	173·6W.	Suggested Deep.
	12d.	23h.	14·7S.	167·3E.	0·005
	17d.	18h.	42·7N.	145·5E.	0·010
	18d.	9h.	29·8N.	139·0E.	0·060
	21d.	20h.	10·5N.	62·6W.	0·010
	23d.	15h.	15·6S.	73·2W.	0·015
	23d.	21h.	37·5N.	140·7E.	0·010
	24d.	6h.	22·3S.	174·2W.	0·010
	25d.	18h.	Undetermined shock.		Suggested Deep.
	25d.	23h.	7·2S.	129·3E.	0·015
	31d.	0h.	35·0N.	140·2E.	0·010
Sept.	3d.	3h.	62·6N.	150·9W.	0·010
	11d.	21h.	37·7N.	141·8E.	0·005
	12d.	10h.	Undetermined shock.		Suggested Deep.
	14d.	19h.	1·1N.	126·4E.	0·005
	16d.	14h.	39·9N.	142·4E.	Base of Superficial Layers.
	16d.	19h.	1·1N.	126·4E.	0·005
	17d.	10h.	6·5S.	116·5E.	0·080
	18d.	12h.	18·3S.	69·2W.	0·020
	20d.	2h.	38·2N.	137·9E.	0·005
	20d.	13h.	34·2N.	140·6E.	0·010
	21d.	12h.	16·9N.	94·2W.	Base of Superficial Layers.
	22d.	15h.	41·1N.	142·2E.	0·015
	23d.	8h.	43·3N.	134·5E.	0·060
	24d.	7h.	2·3S.	102·2E.	0·015
	27d.	15h.	60·2N.	148·9W.	Suggested Deep.

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

KEW OBSERVATORY,
Richmond,
SURREY.

May, 1957

1949 JULY, AUGUST, SEPTEMBER.

July 1d. 3h. 27m. 4s. Epicentre 20°·8S. 69°·0W. Depth of focus 0·010.
(as on 1949, May 30d.).

Intensity III between South Latitude 20° and 21°. Depth 100km.

F. Greve.
Lista de sismos sensibles al hombre obtenidos por el servicio de postales informativas año, 1949, p. 9.

A = +·3353, B = −·8735, C = −·3531 ; δ = +11 ; h = +4 ;
D = −·934, E = −·358 ; G = −·127, H = +·330, K = −·936.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
La Paz		4·4	11	i 1 18	+ 2	i 2 0	+ 4	—	—
Huancayo		10·6	325	e 2 42	+12	e 4 29	+ 1	—	e 5·1
Bogota		25·7	348	e 5 23	0	e 9 40	− 2	e 5 55 pP	—
Fort de France		36·1	14	e 6 52	− 2	—	—	—	—
Fordham		61·5	357	i 10 7	− 2	—	—	i 10 34 pP	—
St. Louis		62·4	341	i 10 11	− 4	e 18 28	− 4	i 10 50 pP	—
Cleveland		63·1	349	i 10 17	− 3	e 18 39	− 2	i 10 56 pP	—
Ottawa	Z.	66·2	354	e 10 38	− 2	—	—	—	—
Tucson		66·2	322	i 10 40	0	—	—	i 10 58 pP	—
Shawinigan Falls	N.	67·1	358	e 10 45	0	—	—	—	—
Seven Falls	E.	67·6	359	e 10 46	− 2	—	—	—	—
Palomar		70·6	317	i 11 8k	+ 1	—	—	i 11 35 pP	—
Pierce Ferry		70·8	323	i 11 9	+ 1	—	—	—	—
Riverside	Z.	71·3	319	i 11 12k	+ 1	—	—	i 11 39 pP	—
Overton	Z.	71·4	322	i 11 13	+ 1	—	—	—	—
Pasadena		71·9	319	i 11 15k	+ 1	—	—	i 11 44 pP	—
Logan		73·8	328	e11 24	− 2	—	—	—	—
Tinemaha		74·0	321	i 11 28k	+ 1	—	—	i 11 56 pP	—
Reno	Z.	76·5	322	e 11 42a	+ 1	—	—	—	—
Berkeley	Z.	76·9	319	e 11 44k	+ 1	—	—	i 12 16a pP	—
Mineral	z.	78·1	321	i 11 50	0	—	—	—	—
Hungry Horse		79·7	331	i 11 59	0	—	—	—	—
Grahamstown	z.	83·3	123	i 12 16	− 1	—	—	—	—
Malaga	z.	83·6	47	i 11 19a	−60	e 20 39	?	—	—
Strasbourg		97·0	40	e 13 20	− 2	—	—	e 13 56 pP	—

Additional readings :—
La Paz i = 1m.14s. and 1m.24s., iS = 2m.12s., iS_E = 2m.24s.
St. Louis e = 19m.26s.
Cleveland esSE = 19m.49s., esSN = 19m.53s.
Palomar iZ = 11m.28s.
Riverside iZ = 11m.30s.
Pasadena iZ = 11m.30s.

July 1d. 4h. Tonga, probably very deep.

Apia eP = 19m.53s., eS = 22m.19s.
Wellington iP = 19m.57s., eS = 22m.34s., S_cS? = 30m.27s.
Kaimata ePNE = 20m.15s., eSNE = 23m.3s.
Tuai eS?N = 21m.43s.
Pasadena iPZ = 28m.11s.a, iZ = 28m.15s., eZ = 28m.27s.
Berkeley iPZ = 28m.11s.a, iZ = 28m.24s.k
Riverside iPZ = 28m.13s.a, iZ = 28m.16s.
Palomar iPZ = 28m.16s.a, iZ = 28m.33s.
Shasta Dam iP = 28m.18s.
Mineral iPZ = 28m.19s., eZ = 30m.40s.
Tinemaha iPZ = 28m.22s.
Boulder City iP = 28m.28s.
Overton iPZ = 28m.31s.
Pierce Ferry iP = 28m.31s.
Tucson iP = 28m.33s., e = 28m.42s., epP = 30m.51s.
College eP = 28m.53s.
Collmberg eZ = 35m.28s.

July 1d. 22h. 19m. 9s. Epicentre 35°·1N. 23°·4E. (as on 1948, Oct. 10d.).

$A = +\cdot7525$, $B = +\cdot3257$, $C = +\cdot5724$; $\delta = -2$; $h = 0$;
$D = +\cdot397$, $E = -\cdot918$; $G = +\cdot525$, $H = +\cdot227$, $K = -\cdot820$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Messina		7·0	299	e 2 58	S	e 3 15	+ 7	—	—	—
Istanbul		7·4	35	e 1 49	− 3	—	—	—	—	—
Bucharest		9·5	12	2 51?	P_e	—	—	—	—	—
Belgrade		10·0	348	e 2 56	P_e	e 4 9	−13	e 4 45	SSS	e 5·8
Ksara		10·4	93	e 3 5?	?	—	—	—	—	e 6·4
Rome		10·9	312	e 3 38	+58	e 5 5	+21	—	—	—
Bologna		13·2	319	e 3 41	+30	e 5 47	+ 7	—	—	—
Zürich		16·5	322	e 3 58 a	+ 4	e 7 12	+14	—	—	—
Algiers, Univ.	z.	16·6	283	e 3 46	−10	—	—	—	—	—
Basle		17·2	323	e 4 7	+ 4	e 7 28	+14	—	—	—
Stuttgart		17·2	327	e 4 5	+ 2	e 7 36	+22	—	—	e 10·0
Strasbourg		17·8	326	e 4 16	+ 5	e 7 40	+12	e 4 37	PP	e 11·5
Collmberg	z.	17·9	338	e 4 11?	− 1	—	—	—	—	—
Jena.		18·0	337	e 4 15	+ 2	e 8 0	+28	—	—	—
Tiflis		18·0	62	4 8	− 5	e 7 30	− 2	—	—	—
Clermont-Ferrand		18·7	311	e 4 30	+ 8	—	—	—	—	—
Potsdam	z.	18·8	340	e 4 23	0	—	—	—	—	13·2
Grozny		19·1	59	e 4 27	0	—	—	—	—	—
Tamanrasset	z.	19·8	238	e 4 41	+ 6	—	—	—	—	—
Paris		20·6	318	i 4 44	+ 1	—	—	i 5 5	PP	—
Almeria		21·0	282	4 44	− 3	8 58	+21	4 57	pP	11·8
De Bilt		21·4	330	—	—	e 9 3	+18	—	—	e 11·8
Granada		21·9	284	i 5 4k	+ 7	9 5	+11	5 50	PP	25·0
Moscow		22·9	21	e 4 59	− 7	e 9 4	− 9	—	—	—
Kew		23·6	322	e 7 51?	?	—	—	—	—	—
Sverdlovsk		33·2	37	—	—	e 11 49	−11	—	—	—
Murgab		40·2	70	e 7 36	− 4	—	—	—	—	—
Ottawa	z.	71·7	313	e 11 26	0	—	—	—	—	—
College		80·1	357	e 12 10	− 3	—	—	—	—	—
Hungry Horse		88·6	332	i 12 56	0	—	—	—	—	e 42·6
Pierce Ferry		98·8	326	e 13 44	+ 1	—	—	—	—	—

Additional readings: —
Rome eSE = 5m.58s.
Strasbourg e = 5m.4s. and 6m.17s.
Collmberg eZ = 4m.14s.
Clermont-Ferrand e = 4m.33s. and 6m.20s.
Potsdam iZ = 4m.27s.
Long waves were recorded at Berkeley.

July 1d. Readings also at 0h. (Upsala), 1h. (College, Bombay, near Granada, and near Leninakan), 2h. (Overton, near Apia and near Tacubaya), 3h. (Istanbul, College, Overton (2), Pierce Ferry, and near Apia (2), 4h. (Helwan and College), 6h. (Tucson, and near Apia), 7h. (Apia, Riverside, Overton (2), College, and near Copiapo), 9h. (near Kulyab, Obi-garm, and Stalinabad), 10h. (near Apia and near College), 12h. (Andijan, near Kulyab, Obi-garm, and Stalinabad), 14h. (Collmberg (4), Jena and Stuttgart), 15h. (Tacubaya), 16h. (near Christchurch, Kaimata, New Plymouth, Tuai, Wellington, Andijan, Murgab, near Obi-garm, Samarkand, and Stalinabad), 20h. (Strasbourg), 22h. (Shawinigan Falls and College), 23h. (Mount Wilson, Riverside, Tinemaha, Tucson (2), Overton (2), Pierce Ferry, Shasta Dam Honolulu, Scoresby Sund, Paris, and Rome).

July 2d. 2h. 27m. 50s. Epicentre 28°·6N. 68°·5E. (as given by U.S.S.R.).

A = +·3223, B = +·8182, C = +·4762; δ = +9; h = +2;
D = +·930, E = −·366; G = +·175, H = +·443, K = −·879.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
New Delhi		7·7	88	e 2 4	+ 8	i 3 31	+ 6	i 3 57	S*	—
Stalinabad		9·9	1	e 2 21	− 4	3 53	−27	—	—	—
Obi-garm		10·1	4	2 24?	− 4	4 1?	−24	—	—	—
Bombay	E.	10·5	157	—	—	e 4 48	SS	—	—	7·0
Murgab		10·7	24	e 2 32	− 6	4 15	−24	—	—	—
Samarkand		11·1	354	2 46	+ 3	—	—	—	—	—
Poona		11·2	153	e 3 25	?	—	—	—	—	e 6·2
Andijan		12·5	14	e 2 59	− 3	—	—	—	—	—
Tashkent		12·7	3	e 2 57	− 8	—	—	—	—	—
Calcutta	E.	18·9	104	e 8 8	?	i 10 35	?	—	—	—
Grozny		23·5	315	e 5 23	+11	9 34	+11	—	—	—
Ksara		28·3	289	e 9 19	P_cP	—	—	—	—	e 13·5
Sverdlovsk		28·8	352	e 6 41	PP	—	—	—	—	—
Irkutsk		35·5	38	—	—	e 12 6	−30	—	—	—
Stuttgart	z.	49·2	312	e 8 58	+ 6	—	—	—	—	—

New Delhi also gives iS_gN = 4m.29s.
Long waves were also recorded at Istanbul, Rome, De Bilt, Kew, and Scoresby Sund.

July 2d. 11h. 27m. 45s. Epicentre 50°·7S. 162°·7E.

Epicentre suggested by J.S.A.

A = −·6071, B = +·1891, C = −·7718; δ = 0; h = −6;
D = +·297, E = +·955; G = +·737, H = −·230, K = −·636.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Christchurch		9·8	47	2 32	+ 8	i 5 0	+43	2 37	PP	6·3
Kaimata	N.E.	10·2	40	e 2 36	+ 5	e 4 28	+ 1	—	—	—
Wellington		12·6	46	i 3 6	+ 3	i 5 36	+10	i 3 35	PPP	e 5·9
Arapuni	E.	15·6	41	e 4 45	+62	e 6 58	SS	—	—	e 6·6
Tuai	N.	15·6	46	e 3 51	+ 8	—	—	—	—	—
Auckland	N.	16·3	37	i 2 31	?	—	—	i 5 5	?	e 5·3
Melbourne	E.	18·0	310	i 4 7	− 6	e 7 29	− 3	i 7 39	SS	i 8·1
Riverview		18·9	329	i 4 22a	− 2	i 7 58	+ 5	i 4 41	PP	e 8·9
Brisbane		24·3	339	i 5 18a	− 2	i 9 39	+ 2	i 10 46	SSS	—
Batavia		64·1	295	i 10 35	− 3	i 19 7	− 7	—	—	—
Grahamstown	Z.	87·8	216	i 12 49	− 3	—	—	—	—	—
Zi-ka-wei		89·3	326	12 57	− 2	—	—	e 16 27	PP	—
La Paz		99·6	132	13 28	−18	i 24 26	[+ 1]	26 44	PS	46·0
Huancayo		99·7	123	e 20 54	PPP	e 24 27	[+ 1]	e 26 45	PS	e 46·7
Hyderabad	N.	99·7	286	—	—	e 26 45	PS	—	—	—
Bombay		104·8	282	e 4 15?	?	e 27 32	PS	—	—	—
Pasadena		109·4	60	e 18 46	[+14]	—	—	e 19 16	PP	e 63·3
Palomar	Z.	109·5	61	e 18 29	[− 3]	—	—	i 18 38	PP	—
Riverside	Z.	109·7	60	e 18 58	PP	—	—	e 19 25	?	—
Berkeley		110·0	54	e 19 13k	PP	e 28 46	PS	e 48 45	Q	e 52·3
Shasta Dam		112·1	52	29 3	PS	—	—	i 29 40	PPS	—
Tucson		112·2	65	e 19 10	[+32]	—	—	e 19 29	PP	e 51·9
Overton	Z.	113·2	60	e 18 47	[+ 7]	—	—	e 29 34	PKKP	—
Sitka		119·3	33	—	—	e 31 48	PPS	—	—	e 56·6
College		121·4	21	e 18 56	[+ 1]	e 32 34	PPS	e 20 22	PP	e 56·5
Hungry Horse		121·7	50	e 18 54	[− 2]	—	—	e 28 51	PKKP	—
St. Louis		128·8	73	e 19 7	[− 3]	e 28 7	{+ 5}	e 21 16	PP	—
San Juan		129·8	111	e 22 21	PKS	e 25 30	?	—	—	e 57·5
Chicago		132·3	71	e 22 39	PKS	e 37 37	?	—	—	e 74·2
Pennsylvania		137·7	78	e 22 20	PP	e 23 0	PKS	e 34 20	PPS	i 75·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		138·1	268	e 19 29	[+ 2]	e 36 25	?	—	—	—
City College, N.Y.		140·2	81	—	—	e 36 58	?	e 41 2	SS	e 52·1
Bermuda		140·9	99	e 19 32	[0]	e 41 27	SS	e 23 11	PP	e 58·4
Ottawa		141·5	74	e 19 34	[+ 1]	—	—	e 22 45	PP	65·3
Shawinigan Falls	N.	143·8	74	e 19 17	[−20]	—	—	—	—	—
Seven Falls	E.	145·3	74	e 19 37	[− 3]	—	—	—	—	—
Istanbul		146·8	271	i 19 38	[− 4]	—	—	—	—	—
Tamanrasset	Z.	147·0	221	i 19 41 a	[− 2]	—	—	i 19 46 k	PKP_2	60·3
Rome		157·7	258	e 19 54 a	[− 4]	23 20	SKP	e 20 21	PKP_2	—
Bologna	Z.	159·8	263	e 20 41	PKP_2	—	—	—	—	—
Algiers Univ.	Z.	159·8	233	e 20 3	[+ 2]	—	—	e 24 16	PP	—
Prague		159·8	281	e 22 0	?	—	—	—	—	—
Scoresby Sund		160·0	5	24 17	PP	31 7	{+ 5}	44 39	SS	—
Collmberg		161·0	283	e 19 51	[−11]	e 51 15	SSS	e 20 45	PKP_2	—
Potsdam	Z.	161·1	287	e 20 18	[+16]	—	—	i 24 29	PP	e 81·6
Copenhagen		161·6	297	e 20 50	PKP_2	—	—	e 21 40	?	—
Almeria		162·6	223	e 20 1	[− 2]	27 3	[− 4]	20 51	PKP_2	66·9
Zürich		162·7	269	e 19 59	[− 5]	—	—	e 20 49	PKP_2	—
Alicante		162·8	231	19 53	[−11]	26 52	[−15]	44 51	SS	e 75·1
Stuttgart		162·8	274	e 20 0	[− 4]	e 46 51	SSP	e 20 48	PKP_2	e 92·2
Malaga	Z.	163·2	218	i 19 48 k	[−16]	—	—	i 21 6 a	PKP_2	71·4
Granada		163·3	221	—	—	45 13	SS	51 39	SSS	67·6
Strasbourg		163·6	272	e 20 1	[− 3]	e 45 45	SS	e 20 55	PKP_2	72·3
Tortosa	N.	164·2	238	29 31	PKKP	32 2	{+28}	39 17	PPS	e 87·2
Clermont-Ferrand		165·6	258	e 20 3	[− 3]	—	—	e 24 50	PP	77·3
De Bilt		165·9	284	e 20 3	[− 4]	e 45 15?	SS	e 21 2	PKP_2	e 72·3
Paris		167·0	269	e 20 3	[− 4]	e 26 55	[−15]	e 21 1	PKP_2	e 86·3
Aberdeen	E.	169·0	312	e 22 38	?	—	—	—	—	e 80·6
Kew		169·3	281	i 20 10	[+ 1]	—	—	e 25 4	PP	e 90·2
Rathfarnham Castle		172·7	295	24 48	PP	e 33 24	?	—	—	—

Additional readings :—
Christchurch SEN =5m.11s.
Riverview iN =4m.34s., iPPPE =4m.50s., iN =4m.54s., iNZ =8m.4s., isSN =8m.12s., iE =8m.18s., iSSEN =8m.27s., iSSSNZ =8m.40s.
Brisbane iZ =9m.49s.
La Paz SS =31m.40s., Q =42m.27s.
Huancayo eSS =31m.55s., e =42m.14s.
Berkeley eSE =28m.53s., eN =45m.15s.
St. Louis eSKP =22m.17s., eS =29m.40s., ePPS =33m.11s.
Pennsylvania eE =27m.53s., 32m.46s., and 40m.49s.
Bermuda e =24m.44s.
Tamanrasset eZ =20m.14s., ePP?Z =23m.36s.
Rome eSKKS?E =30m.30s., SS =44m.0s., e =44m.59s.
Algiers University iZ =20m.12s.k.
Scoresby Sund 32m.21s., 34m.42s.
Collmberg ePPZ =24m.28s., eZ =24m.34s., 30m.6s., and 35m.52s.
Almeria PP =24m.31s., SS =44m.47s.
Zürich ePP =24m.34s.
Alicante SSP =45m.53s., SSS =51m.23s., Q =67m.23s.
Stuttgart iPKP$_2$ =20m.53s.a, iPPZ =24m.36s.k, ePP =24m.53s., eZ =25m.21s., ePPP? =28m.25s., ePSKS =35m.33s.
Malaga iPPZ =24m.38s.k, PPPZ =28m.32s.
Strasbourg e =21m.43s. and 22m.44s., ePP =24m.41s., e =25m.57s. and 26m.54s., i =29m.48s., e =38m.38s., eSSS =51m.15s.
Clermont-Ferrand i =29m.30s. and 29m.49s.
De Bilt ePP =24m.50s., eSSS =51m.15s.?
Paris ePP =24m.20s. and 24m.52s., e =25m.57s., 35m.46s., 37m.7s., 43m.15s.?, and 46m.15s.?
Kew eZ =20m.39s. and 21m.23s., ePPPEZ =29m.4s., ePPEZ(Δ >180°) =32m.56s., e =35m.18s., eSKSP?EN =41m.18s., eSSS?EZ =50m.38s.
Long waves were also recorded at Apia, Honolulu, Harvard, Victoria, and La Plata.

July 2d. 19h. 57m. 11s. Epicentre 16°·4N., 147°·6E.

Suggested epicentres : 16°N. 147·5°E., depth 60km. (U.S.C.G.S.).
16°·0N. 147°·5E. (U.S.S.R.).
16°N. 148°E., depth 50km. (Gutenberg).
16°·1N. 145°·8E., depth 100km. (J.S.A.).
16°·5N. 147°·0E. (Poona).

A = −·8104, B = +·5143, C = +·2806 ; δ = −1 ; h = +5 ;
D = +·536, E = +·844 ; G = −·237, H = +·150, K = −·960.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mera		19·7	341	4 27	− 7	8 7	− 3	—	—	—
Osima		19·7	340	4 23	−11	8 6	− 4	—	—	—
Omaesaki		20·0	339	4 30	− 7	8 17	0	—	—	—
Misima		20·2	340	4 34	− 5	8 23	+ 2	—	—	—
Owase		20·4	332	4 37	− 4	8 28	+ 3	4 57	PP	10·4
Hunatu		20·6	341	4 42	− 1	8 30	+ 1	—	—	—
Kakioka		20·8	344	i 4 44	− 1	8 34	+ 1	—	—	—
Kameyama		20·9	334	4 43	− 3	8 28	− 7	—	—	—
Tukubasan		20·9	344	4 45	− 1	8 34	− 1	—	—	—
Kumagaya		21·0	342	i 4 48	+ 1	8 38	+ 1	—	—	—
Nagoya		21·0	337	4 44	− 3	8 41	+ 4	16 12	S_eS	11·4
Osaka		21·2	332	e 4 45	− 4	8 44	+ 3	16 23	S_eS	11·3
Sumoto		21·2	330	i 4 46	− 3	i 8 39	− 2	9 31	SSS	10·7
Maebasi		21·3	341	4 49	− 1	8 41	− 2	—	—	—
Miyazaki		21·3	320	4 39	−11	i 8 45	+ 2	—	—	e 10·7
Onahama		21·3	346	i 4 52	+ 2	8 46	+ 3	—	—	—
Hikone		21·4	334	e 4 55	+ 4	8 46	+ 1	10 8	SSS	15·1
Kobe		21·4	333	4 46	− 5	8 38	− 7	5 22	PPP	e 11·5
Kagosima		21·7	317	4 54	− 1	8 49	− 2	—	—	—
Matusiro		21·7	340	i 4 52	− 3	8 48	− 3	—	—	11·5
Toyama		22·2	338	4 57	− 3	9 0	0	—	—	12·0
Kumamoto		22·4	322	e 5 2	0	8 59	− 5	—	—	12·2
Hirosima		22·5	325	4 57	− 5	8 59	− 6	—	—	10·3
Sendai		22·6	348	e 5 5	+ 2	9 7	0	—	—	—
Wazima		22·9	339	e 5 7	+ 1	9 19	+ 6	—	—	e 11·2
Hamada		23·1	326	5 1	− 7	9 10	− 6	—	—	—
Hukuoka		23·1	322	e 5 5	− 3	9 6	−10	—	—	12·3
Mizusawa		23·4	348	5 13	+ 2	9 22	+ 1	—	—	—
Miyako	Z.	23·7	351	5 12	− 2	—	—	—	—	—
Morioka		23·9	350	5 16	0	9 28	− 2	—	—	e 17·0
Hatinohe		24·6	351	i 5 18	− 5	9 36	− 6	—	—	—
Nemuro		26·9	357	5 44	− 1	10 16	− 4	—	—	—
Zi-ka-wei	Z.	28·0	307	5 52	− 3	10 39	+ 1	6 33	PP	12·3
Nanking	E.	30·4	306	e 6 35	+19	e 11 15	− 1	i 7 23	PPP	—
Klyuchi		41·1	12	e 7 47	0	—	—	e 10 33	PPP	—
Brisbane		43·9	174	i 8 9k	− 1	i 14 38	− 4	i 9 59	PP	i 21·1
Batavia		46·2	245	i 8 27a	− 1	i 15 12	− 3	—	—	—
Irkutsk		49·4	327	8 51	− 2	15 53	− 7	—	—	—
Apia		50·1	125	8 58	− 1	e 16 22	+12	e 11 1	PP	e 22·8
Riverview		50·1	177	i 8 59k	0	i 16 9	− 1	i 9 9	pP	24 7
Honolulu		51·7	75	e 9 5	− 6	e 16 55	PPS	e 10 55	PP	e 21·4
Melbourne	E.	54·0	183	e 10 15	+47	i 17 2	− 1	—	—	—
Calcutta	E.	55·9	287	e 9 41	− 1	i 17 25	− 4	i 12 46	PPP	24·8
Auckland	N.	58·9	155	e 9 4	−59	i 18 10	+ 2	e 22 8	SS	27·8
Tuai	N.	61·5	155	e 10 26	+ 5	—	—	—	—	—
Kaimata	N.E.	62·6	161	e 10 34	+ 6	—	—	—	—	—
Wellington		62·7	158	i 10 25	− 4	e 18 49	− 8	i 12 48	PP	27·8
Semipalatinsk		63·1	319	e 10 33?	+ 1	i 18 54	− 8	—	—	—
Christchurch		63·9	160	i 10 35	− 2	19 8	− 4	i 11 16	P_eP	30·1
College		64·5	26	i 10 38	− 3	i 19 3	−16	i 13 26	PP	e 26·2
New Delhi		65·4	295	e 10 45	− 2	i 19 32	+ 2	i 20 32	S_eS	—
Hyderabad	N.	65·8	283	e 10 49	0	19 31	− 4	13 5	PP	29·4
Frunse		66·6	311	e 10 55	+ 1	i 19 44	− 1	—	—	—
Murgab		67·3	306	i 10 57	− 2	19 50	− 4	—	—	—
Colombo	E.	67·4	271	10 54	− 5	19 44	−11	—	—	33·8

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		68·4	308	e 11 5	− 1	i 20 4	− 3	i 11 15	?	—
Sitka		69·6	35	i 11 9	− 4	e 20 14	− 7	e 13 38	PP	e 28·8
Poona		69·9	285	11 14	− 1	i 20 15	− 9	—	—	37·8
Obi-garm		70·6	307	i 11 20	+ 1	i 20 30	− 3	—	—	—
Tashkent		70·7	309	i 11 21	+ 1	i 20 29	− 5	—	—	—
Bombay		70·8	285	e 11 18	− 2	i 20 32	− 3	i 21 12	PPS	30·2
Stalinabad		71·3	307	i 11 23	0	i 20 32	− 9	—	—	—
Samarkand		72·6	307	11 29	− 2	—	—	—	—	—
Sverdlovsk		74·8	326	i 11 41	− 3	i 21 11	− 9	—	—	—
Victoria		77·2	43	11 57	0	21 47	0	26 43	SS	36·8
Seattle		78·1	44	i 12 4a	+ 2	e 21 34	−22	i 15 0	PP	—
Ferndale	N.	78·1	51	e 12 11	+ 9	e 22 1	+ 5	—	—	e 34·5
Ukiah		79·2	52	e 12 15	+ 7	e 22 8	0	e 15 11	PP	e 35·6
Ashkabad		79·5	307	12 14	+ 4	22 10	− 1	—	—	—
Shasta Dam		79·5	51	i 12 10	0	e 22 10	− 1	e 15 8	PP	—
San Francisco		80·1	54	i 12 14	+ 1	—	—	e 13 18	?	e 40·8
Berkeley		80·2	54	i 12 13k	− 1	i 22 17	− 2	i 12 32a	pP	e 39·9
Mineral		80·2	51	e 12 49?k	+35	—	—	—	—	—
Branner		80·4	54	e 12 14k	− 1	e 22 20	− 1	—	—	—
Santa Clara		80·6	54	e 12 19	+ 3	i 21 23	−60	—	—	—
Lick	Z.	80·8	54	i 12 17k	0	e 22 55	+30	e 15 12	PP	—
Reno		81·7	52	i 12 22	0	e 22 35	+ 1	e 23 48	PPS	e 37·5
Fresno		82·4	54	i 12 25k	0	i 22 39	− 2	e 38 59	P'P'	e 43·1
Hungry Horse		83·4	42	i 12 30	0	e 22 48	− 3	e 15 39	PP	—
Tinemaha		83·5	54	i 12 32	+ 1	e 22 53	+ 1	i 12 48	pP	—
Pasadena		84·4	56	i 12 34k	− 2	i 22 57	− 4	i 12 51	pP	e 34·3
Butte	N.	85·0	43	e 12 37	− 1	e 23 0	[− 1]	e 15 48	PP	e 35·3
Riverside		85·1	56	i 12 37k	− 2	e 23 4	[+ 3]	i 12 57	pP	—
Baku		85·2	311	e 12 47?	+ 8	e 23 6?	− 3	—	—	—
Palomar		85·6	57	i 12 41k	0	i 42 43	SKPP'	i 12 59	pP	i 43·2
Bozeman		86·1	44	e 12 46	+ 2	e 23 8	[0]	e 16 21	PP	e 36·4
Saskatoon		86·5	37	12 47	+ 1	23 9	[− 2]	—	—	37·8
Logan		86·9	47	i 12 45	− 3	e 23 9	[− 4]	e 16 15	PP	e 38·4
Pierce Ferry		87·1	54	i 12 49	0	e 23 15	[0]	e 15 54	PP	—
Grozny		87·2	315	i 12 49?	0	23 12?	[− 3]	—	—	—
Moscow		87·4	328	12 47	− 3	e 23 9	[− 8]	23 23	S	—
Tiflis		88·5	313	i 12 55	− 1	i 23 11	[−13]	—	—	—
Erevan		89·2	312	13 3	+ 4	23 30	[+ 2]	—	—	—
Leninakan		89·5	313	13 6	+ 6	e 23 28	[− 2]	—	—	—
Tucson		90·8	56	i 13 7	+ 1	e 23 56	− 6	i 16 42	PP	e 37·6
Helsinki		90·9	335	e 13 12	+ 5	e 23 45	{− 3}	e 23 29	SKS	e 44·8
Sotchi		91·2	316	e 13 8	0	—	—	—	—	—
Rapid City	E.	91·9	43	—	—	i 23 45	[+ 1]	e 28 18	?	e 45·0
Scoresby Sund		93·0	356	13 15k	− 2	24 19	− 2	17 1	PP	—
Theodosia		93·4	318	13 22	+ 4	e 23 51	[− 1]	e 17 3	PP	—
Upsala		94·0	337	13 20	− 1	24 0	[+ 4]	16 59	PP	e 40·8
Yalta		94·4	318	13 21	− 2	—	—	—	—	—
Lubbock		97·3	51	13 39	+ 3	—	—	—	—	—
Lwow		97·5	327	13 44	PcP	e 23 12	?	—	—	—
Bergen		97·7	342	e 14 37	+59	24 59	− 2	17 38	PP	43·8
Lincoln	E.	97·7	43	e 13 34	− 4	e 24 4	[−11]	e 17 26	PP	e 48·7
Ksara		98·1	307	i 13 43	+ 3	26 29	PS	—	—	—
Copenhagen		98·9	336	13 41	− 2	i 24 17	[− 5]	17 51	PP	—
Bucharest		99·4	321	e 16 1	?	e 24 21	[− 3]	—	—	42·8
Istanbul		99·4	317	e 13 44	− 2	—	—	i 17 49	PP	—
Skalnate Pleso		99·8	328	e 13 48	+ 1	—	—	e 17 39	PP	—
Raciborzu		100·2	329	e 13 51	+ 2	e 24 26	[− 2]	e 17 46	PP	—
Potsdam		101·0	333	e 13 51	− 1	i 24 29	[− 3]	i 18 5a	PP	e 50·8
Budapest		101·5	326	e 17 58	PP	e 24 25	[− 9]	—	—	e 50·8
Ivigtut		101·6	7	e 18 2	PP	e 25 35	+ 1	e 24 30	SKS	48·8
Ogyalla		101·7	327	e 13 54	− 2	i 24 31	[− 4]	—	—	—
Collmberg		101·8	332	e 13 54	− 2	e 24 30	[− 6]	e 25 29	S	e 47·8
Prague		102·0	331	e 14 22	?	e 24 31	[− 6]	—	—	—
Kalossa	E.	102·2	326	e 18 10	PP	e 24 29	[− 9]	—	—	e 51·8
Belgrade		102·4	323	e 13 59k	0	i 24 36	[− 3]	e 18 16	PP	e 46·8

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Aberdeen	E.	102·5	343	i 18 14	PP	i 24 32	[− 7]	i 25 52		S	e 51·1
Jena		102·7	332	e 14 1	+ 1	e 24 33	[− 7]	e 18 9		PP	e 49·5
Chicago		102·9	39	e 13 55	− 6	e 25 42	− 3	e 18 15		PP	e 44·2
Cheb		103·0	331	e 14 23	+21	e 24 36	[− 5]	—		—	—
St. Louis		103·4	43	i 14 2	− 2	i 24 41	[− 2]	i 18 16		PP	—
Edinburgh		103·9	343	e 18 22	PP	25 46	− 7	33 6		SS	—
Zagreb		104·2	327	14 49?	+42	e 24 42	[− 5]	—		—	e 52·8
De Bilt		104·4	336	i 14 7k	− 1	i 24 44	[− 4]	i 18 30		PP	e 49·8
Durham		104·4	341	e 18 26	PP	i 24 45	[− 3]	i 27 49		PS	—
Tananarive		104·4	254	27 42	PS	e 24 50	[+ 2]	34 0		SSP	47·2
Stuttgart		105·3	332	e 14 10	− 2	e 24 46	[− 6]	i 18 38a		PP	e 49·8
Tacubaya		105·3	64	i 14 46	pP	—	—	i 18 48		PP	—
Triest		105·5	328	e 18 32	PP	e 24 48	[− 5]	—		—	e 51·1
Strasbourg		106·1	333	e 14 16	P	e 24 49	[− 6]	i 18 38		PP	e 52·8
Chur		106·6	331	e 18 40	PP	—	—	—		—	e 52·8
Zürich		106·7	332	e 14 14a	P	e 25 44	{+ 2}	e 18 38		PP	—
Cleveland		106·7	36	i 17 47	PKP	i 24 55	[− 3]	i 27 59		PS	—
Kew		106·8	339	e 14 18	P	e 24 54	[− 5]	i 18 45		PP	e 51·8
Basle		107·0	332	e 18 45	PP	e 26 16	− 3	—		—	—
Ottawa		107·0	30	17 51	[−36]	24 56	[− 3]	e 18 43		PP	43·2
Taranto		107·0	322	18 49	PP	e 24 54	[− 5]	e 25 49		SKKS	48·2
Bologna		107·5	328	e 15 0a	P	e 25 7	[+ 5]	e 19 14		PP	—
Shawinigan Falls	N.	107·6	27	e 16 17	?	—	—	e 18 50		PP	—
Neuchatel		107·7	332	e 18 47	PP	—	—	—		—	—
Florence Arc.		108·0	328	18 8	[−21]	24 56	[− 8]	18 59		PP	53·6
Florence Xim		108·0	328	i 19 2	PP	i 24 40	[−24]	—		—	—
Paris		108·0	336	e 14 22	P	e 24 55?	[− 9]	i 18 50		PP	e 52·8
Prato		108·0	328	e 18 13	[−16]	e 30 20	?	—		—	—
Seven Falls	E.	108·0	25	18 8	[−21]	24 52	[−12]	28 11		PS	44·5
New Kensington	E.	108·7	34	e 18 57	PP	e 24 56	[−11]	e 28 24		PS	e 57·2
Rome		108·7	326	e 14 27a	P	i 24 55	[−12]	e 18 39		PKP	49·3
Pennsylvania		109·2	36	i 18 58	PP	i 25 0	[− 9]	i 28 26		PS	e 50·2
Jersey	E.	109·4	339	—	—	e 26 36	S	—		—	—
Clermont-Ferrand		110·3	334	e 14 41	P	e 25 16	[+ 3]	i 18 39		PKP	52·8
Georgetown		110·9	35	e 15 21	?	e 29 52	PPS	—		—	—
Washington		110·9	35	i 19 13	PP	e 29 59	PPS	—		—	e 58·1
City College, N.Y.		111·2	32	e 18 20	[−16]	e 25 13	[− 4]	e 28 38		PS	e 49·8
Harvard		111·2	29	e 14 37	P	e 25 14	[− 3]	e 18 37		PKP	e 53·8
Philadelphia		111·2	34	e 18 57	[+21]	e 24 54	[−23]	e 28 41		PS	e 49·3
Fordham		111·3	32	e 14 39	P	e 25 4	[−14]	i 28 40		PS	53·8
Columbia		111·8	41	e 19 16	PP	e 25 21	[+ 1]	e 28 49		PS	e 45·8
Halifax		112·9	23	19 30	PP	25 28	[+ 4]	28 56		PS	52·1
Barcelona		114·2	332	e 19 31	PP	—	—	—		—	e 56·8
Tortosa		115·4	332	19 52	PP	25 29	[− 4]	22 17		PPP	e 53·8
Algiers Univ.	z.	117·4	328	e 19 53	PP	e 22 24	SKP	—		—	—
Alicante		117·9	332	20 8	PP	25 38	[− 5]	22 40		PKS	e 61·6
Toledo		118·1	335	18 52	[+ 3]	e 29 41	PS	e 20 0		PP	48·8
Almeria		120·0	332	19 29	[+36]	37 15	SSP	i 20 57		PP	83·8
Granada		120·2	333	i 19 0k	[+ 7]	i 25 57	[+ 6]	i 20 30a		PP	i 58·7
Malaga	z.	120·9	334	i 18 56a	[+ 2]	31 33	PPS	i 20 32k		PP	71·9
Lisbon		121·0	338	20 28a	PP	27 18	{− 2}	22 29		PKS	59·9
Bermuda		122·5	32	e 20 29	PP	e 30 4	PS	e 37 14		SS	e 55·1
Grahamstown	z.	124·6	240	i 19 3	[+ 1]	—	—	—		—	—
Tamanrasset	z.	126·2	315	e 19 5	[0]	e 30 44	PS	e 20 58		PP	60·8
Galerazamba		129·7	59	e 21 18	PP	e 34 26	?	—		—	67·8
San Juan		132·1	45	e 19 19	[+ 3]	e 26 32	[+ 7]	e 21 38		PP	e 64·6
Bogota		132·8	66	e 19 25	[+ 8]	e 26 29	[+ 2]	e 22 50		SKP	63·8
Fort de France		138·0	44	i 23 29	SKP	e 26 59	[+23]	—		—	—
Huancayo		138·2	90	e 19 30	[+ 3]	e 28 20	{−50}	e 16 49		?	e 55·4
La Paz		145·8	95	i 19 42k	[+ 1]	i 33 19	PS	i 20 28		pPKP	66·1
Buenos Aires		150·4	132	e 19 53	[+ 5]	—	—	—		—	—
La Plata	E.	150·7	133	19 49	[0]	—	—	23 6		PP	49·2
	N.	150·7	133	19 55	[+ 6]	30 31	{+ 9}	—		—	53·8
	z.	150·7	133	19 52	[+ 3]	—	—	—		—	66·0

For Notes see next page.

NOTES TO JULY 2d. 19h. 57m. 11s.

Additional readings and notes :—
Owase SS =9m.19s.
Zi-ka,wei PPZ =6m.21s., iSZ =9m.57s.
Brisbane iPE =8m.12s., iSSE =18m.5s.
Riverview iP$_c$PZ =10m.15s., iPPN =10m.50s., iPPZ =10m.56s., iPPPZ =11m.53s., iPSE =16m.21s., iS$_c$SE =18m.44s., iSSE =19m.39s., iSSSE =21m.14s., eQE = 22·3m.
Honolulu eS? =15m.44s.
Calcutta isS?E =17m.46s., iSSE =21m.3s.
Auckland eP$_c$SN =13m.39s., eSSSN =24m.39s.
Wellington eSS? =22m.19s., Q =25m.49s.?
Christchurch iZ =12m.17s., PP =13m.7s., PPPN =14m.41s., iZ =16m.28s., S$_c$SEZ = 20m.34s., SS =23m.19s., QE =25m.54s.
College i =10m.56s. and 12m.13s., e =15m.27s., eSS =23m.18s.
New Delhi PPPN =14m.10s., iSN =19m.19s., SSSN =25m.25s., iN =26m.40s.
Hyderabad iPE =10m.54s., SSN =23m.56s.
Sitka ePPP =15m.19s., iS$_c$S =20m.59s., eSS =24m.39s., eSSS =27m.59s.
Bombay iSSN =25m.2s., SSE =25m.39s.
Victoria SSS =30m.49s.?
Seattle i =12m.23s., iP$_c$P =12m.36s., i =12m.41s., 13m.11s,. and 13m.37.s, iPPP=16m.31s.
Ferndale ePE =12m.14s., eSE =22m.21s.
Ukiah e =23m.58s., eSS? =27m.33s., eSSS? =31m.33s.
Berkeley iZ =12m.25s.k, 13m.19s.k, and 13m.45s.k, iPPZ =14m.53s. and 15m.22s., eSZ =22m.29s., eZ =23m.12s., iN =25m.36s., iSSE =27m.56s., eN =32m.43s. eE =34m.31s.
Lick iZ =12m.27s.k
Reno iN =12m.27s., iEZ =13m.46s., eN =18m.36s., eE =18m.42s. and 19m.21s., eN = 19m.28s., eSE =22m.41s., eEN =24m.11s.
Fresno iPN =12m.27s., eSE =22m.31s., eSZ =22m.54s., eSKP,PKPZ =42m.23s.
Hungry Horse e =14m.49s., ePKP,PKP =38m.49s., eSKP,PKP? =42m.14s., ePKP, PKP,PKP =59m.1s.
Tinemaha eSKP,PKPZ =42m.14s.
Pasadena iPPZ =15m.40s., iPPSE =24m.19s., eSSE =27m.49s., iSKP,PKPZ =42m.17s.
Butte eSSN =28m.21s., eN =31m.35s.
Riverside iSKP,PKPZ =42m.17s.
Palomar iPPZ =16m.2s., eZ =39m.24s.
Bozeman e =13m.1s., i =23m.22s., eSS =28m.40s., eSSS =32m.44s.
Logan e =15m.16s. and 16m.50s., eSS =28m.8s., eSSS =32m.3s.
Pierce Ferry ePKKP =30m.41s., ePKP,PKP =38m.35s.
Tucson e =14m.17s. and 16m.23s., ePPP =18m.30s., iPS =25m.20s., eSS =30m.4s., eSSS? =33m.53s.
Helsinki ePS =24m.55s., e =27m.31s.
Scoresby Sund 19m.43s., iSKS =23m.45s., PS =25m.31s., SS =30m.43s., SSS =36m.43s.
Upsala ePE =13m.24s., eN =16m.14s., PP?N =16m.48s., ePPP?E =19m.18s., eE = 21m.14s., SKSN =23m.40s., eSKSE =23m.44s., iE =23m.48s., S =24m.17s., ePSN =25m.20s., eN =28m.28s., and 31m.49s.?, eSSS?E =33m.49s.?
Bergen eZ =18m.33s., SKSEN =24m.12s., eE =31m.29s.
Lincoln iPSE =25m.22s., eSS?E =31m.33s.
Copenhagen 17m.11s., i =25m.5s., iS =25m.17s., 27m.33s., SS =31m.49s.
Raciborzu eN =17m.10s. and 18m.6s., QEN =19m.33s., eSKS?EN =25m.16s.?, ePKKS?N =33m.51s.
Potsdam iPZ =14m.0s.k, eE =15m.49s.?, eN =17m.9s., iPSZ =26m.54s., iN =32m.23s., iSSZ =32m.46s.
Budapest ePP?N =18m.1s., eSKS?N =24m.16s., eSKS?E =24m.22s.
Ivigtut SS =32m.7s., 32m.34s.
Collmberg eE =18m.4s. and 18m.14s., eSSE =31m.59s.
Kalossa eN =18m.24s. and 24m.46s.
Belgrade iP$_c$P =14m.4s., ePPS =27m.56s., eSS =32m.45s.
Aberdeen iE =24m.5s., iSKKSE =25m.34s., iPSE =27m.22s., iSSE =32m.43s., eSSSE = 37m.17s.
Jena ePZ =14m.5s., eSKSN =24m.29s., eS?N =25m.29s., eS?EN =25m.33s., eSS?N = 32m.44s.
Chicago eSKS =24m.30s., iPS =27m.20s., eSS =32m.32s., eSSS =36m.59s.
St. Louis ipPP =18m.40s., i =25m.44s., iS =25m.56s., iPS =27m.24s., ePKP,PKP = 37m.57s.
De Bilt iZ =14m.14s., iPP =18m.21s., iS =25m.53s., iPS =27m.30s., iSS =33m.6s., eSSS =37m.19s.
Durham iEN =18m.34s., iN =18m.51s. and 25m.54s., iEN =33m.11s.
Stuttgart iP =14m.13s.a, eZ =17m.25s., ePP =18m.33s., e =22m.29s., eS =26m.0s., ePS =27m.39s., ePPS =28m.28s., eSS =33m.0s., eSSSS? =41m.20s.
Tacubaya ePKKP =29m.58s.
Strasbourg i =14m.23s., ePPP =20m.49s., e =20m.57s., eSKP? =22m.36s., eSKP = 22m.44s., iS =26m.4s. and 26m.10s., iPS? =27m.48s., ePPS =28m.49s., iPPS = 28m.59s., iSS =33m.28s., eSSS =37m.31s., e =38m.55s., i =39m.3s., e =41m.43s.
Zürich eSKS =24m.47s., eSS =33m.37s.

Continued on next page.

Cleveland ePPZ =18m.32s., iPPE =18m.35s., iSKKSE =25m.54s., eN =27m.32s., ePSE =28m.5s., iEN =28m.27s., ePFSEN =28m.52s., eSSN =34m.11s.
Kew iZ =14m.27s. and 18m.59s., iPPP?Z =19m.42s., ePKSZ =24m.16s., eSKKSEN = 25m.7s., eSEN =25m.54s., eEN =26m.14s., eSP? =27m.54s., eSPP?Z =28m.38s., e =29m.5s., eSSEN =33m.40s., eEZ =43m.10s.
Ottawa e =18m.32s., PP =19m.15s., PS =28m.2s., SS =35m.37s.
Bologna eSKKS =26m.12s., eS =27m.18s., eSS =35m.9s.
Florence Arc. S =26m.22s., PS =28m.4s.?
Paris i =14m.39s., e =18m.5s., i =19m.7s. and 19m.18s., e =20m.48s., iPPP =21m.23s., eS =26m.25s.?, iPS =28m.3s., iPPS =29m.15s., SS =34m.1s., e =35m.1s.
Seven Falls PPE =18m.39s., eE =24m.17s., S?E =26m.33s., PPSE =29m.20s., SSE = 32m.49s., SSSE =38m.37s.
New Kensington ePPS?E =29m.17s.
Rome iPPZ =18m.55s., e =21m.7s., iS =26m.31s., iPSZ =28m.13s.
Pennsylvania iSEN =26m.38s., iE =29m.4s. and 31m.8s., eE =39m.9s.
Clermont-Ferrand iPP =19m.12s., iPFP =21m.39s., iSKP =22m.13s., iS =26m.45s., iSP =28m.37s., iSPP =29m.33s., iSS =34m.31s.
City College, N.Y. e =19m.3s., 20m.0s., and 24m.8s., eSSS? =39m.46s.
Harvard ePP =19m.4s., ePS =28m.39s., eSS =33m.49s.?, e =42m.49s.?, eQ =48·8m.
Philadelphia e =26m.25s., eSS? =34m.59s.
Fordham e =18m.56s., i =19m.11s.
Columbia e =23m.17s., eSS =34m.32s., eSSS =38m.49s.
Halifax SKP? =20m.58s., PPP =22m.6s., SSS =39m.19s.
Tortosa SKKSEN =26m.41s., PSE =29m.33s., PPS?N =30m.34s., SS?N =35m.33s., SSS?N =39m.49s.
Algiers Univ. ePPZ =20m.7s., eZ =21m.19s.
Alicante SKS =27m.24s., SKKS =29m.37s., PS =32m.55s., SS =39m.58s., Q =54m.39s., readings wrongly identified.
Toledo ePPN =22m.29s., eN =35m.41s., SSEN =36m.2s., eEN =36m.15s.
Almeria PFP =23m.31s., SKS =26m.25s., PS =30m.41s., SSS =41m.45s.
Granada PPP =22m.36s. a. SKKS =27m.39s., S =28m.18s., PS =29m.48s., iSS = 36m.39s., SSS =40m.48s.
Malaga iPPPZ =23m.5s. a, iZ =24m.23s.
Lisbon EN =21m.17s., PS?E =32m.19s., E =33m.2s., Z =36m.43s., 36m.55s., E = 56m.49s.?
Bermuda ePP =20m.40s., e =28m.30s.
Tamanrasset eZ =19m.27s. and 21m.9s., ePPPZ =23m.49s.
San Juan i =22m.42s., eSS =39m.14s., eSSS? =44m.28s.
Bogota eSN =28m.57s.
Huancayo e =18m.21s., ePP =22m.13s., eSKSP =31m.44s., ePPPS =36m.0s., i = 42m.9s., e =48m.6s.
La Paz iPPZ =23m.4s., iSS =43m.2s.
La Plata P_ePN =20m.43s., P_ePE =20m.52s., E =21m.43s., N =21m.49s., PPN = 22m.37s., PPPE =24m.6s., SN =29m.25s., N =32m.13s., SS?N =33m.37s., SSS?N =36m.1s., SSSN =37m.45s., SSSE =38m.43s., QE =41·7m., QN =42·0m. The times for some of the later phases appear to have been read 10 minutes too early.
Long waves were also recorded at Arapuni, Puebla, Vera Cruz, and Santa Lucia.

July 2d. Readings also at 0h. (Apia, College, Hungry Horse, Overton (2), Pierce Ferry (2), Shasta Dam, Tucson (2), Mount Wilson, Riverside, Palomar, Tinemaha, Istanbul, Rome, Stuttgart (2), Paris, Strasbourg, near Messina, near Zürich, and Basle), 1h. (Tananarive) and near Fort de France), 2h. (Tucson), 3h. (Columbia, College, Hungry Horse, Overton, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Riverside, Palomar, Tinemaha, Reno, La Paz, Santa Lucia, near Copiapo, near Murgab, and near Apia), 4h. (Mizusawa and College), 5h. (Bombay), 6h. (Alicante, near Obi-garm and near Stalinabad), 7h. (Andijan, Samarkand, near Obi-garm and Stalinabad), 8h. (Tucson, Stalinabad, Obigarm, Andijan, Murgab, near Samarkand, Tashkent, and near Tananarive), 9h. (Tacubaya, near La Paz, and near Zagreb), 11h. (Stuttgart, Algiers Univ., and Tamanrasset), 12h. (Overton (2) and Tucson), 13h. (Palomar and Balboa Heights), 14h. (near Alicante, Almeria, Toledo, and Malaga, near Zagreb and Triest, near Andijan, Murgab, Obi-garm (3), and Stalinabad), 15h. (Stalinabad, Obi-garm, Murgab, Andijan, near Copiapo, near Leninakan, near Jena, Collmberg, Stuttgart, and Zrüich, explosion), 17h. (La Paz and Columbia), 20h. (College, Tucson (2), and Overton), 22h. (Tuai, Wellington, Kaimata, Christchurch, College (2), Overton, Pierce Ferry, Shasta Dam, Tucson, and Palomar), 23h. (College, Hungry Horse, and Lick).

July 3d. 21h. 46m. 9s. Epicentre 12°·2S. 75°·3W. Depth of focus 0·005.
(as on 1940, Aug. 26d.).

A = +·2481, B = −·9457, C = −·2100 ; δ = 0 ; h = +6 ;
D = −·967, E = −·254 ; G = −·053, H = +·203, K = −·978.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		0·2	346	e 0 6	− 5	i 0 11	− 8	i 0 14	?	—
La Paz		8·1	123	i 2 3	+ 6	i 3 27	− 1	i 4 43	SS	5·4
Bogota		16·8	4	e 3 58	+ 6	e 7 42	SS	—	—	9·1
St. Louis		52·5	346	e 9 5	− 4	—	—	—	—	—
Tucson		55·7	324	e 9 30	− 2	—	—	—	—	—
Ottawa	z.	57·3	0	e 9 44	0	—	—	—	—	—
Palomar	z.	60·2	321	i 10 5	+ 1	—	—	—	—	—
Pierce Ferry		60·4	325	e 10 4	− 1	—	—	—	—	—
Overton	z.	60·9	325	e 10 5	− 3	—	—	—	—	—
Riverside	z.	60·9	321	i 10 9	+ 1	—	—	—	—	—
Pasadena	z.	61·5	321	i 10 13	+ 1	—	—	—	—	—
Tinemaha	z.	63·5	323	i 10 26	0	—	—	—	—	—
Lick	z.	65·7	322	i 10 41a	+ 1	—	—	—	—	—
Reno		66·0	323	e 10 43	+ 1	—	—	—	—	—
Shasta Dam		68·3	323	e 10 46	−10	—	—	—	—	—
Hungry Horse		69·4	334	e 11 3	0	—	—	—	—	—
Malaga	z.	82·4	50	i 12 14a	− 2	25 39	?	12 25	pP	—
Tamanrasset	z.	86·4	66	i 12 39k	+ 3	—	—	—	—	—
College		93·7	336	e 13 10	− 1	—	—	—	—	—

Additional readings :—
Overton i = 10m.8s.
Reno eE = 10m.53s., and 11m.18s., eZ = 11m.25s.
Tamanrasset eZ = 12m.45s.

July 3d. Readings also at 0h. (Collmberg, Harvard, and near Batavia), 1h. (Jena, Frunse, near Andijan, Murgab, Kulyab, Obi-garm, Samarkand, Stalinabad, Tashkent, and near Branner), 2h. (Pierce Ferry, Hungry Horse, College, Shasta Dam, Stuttgart, and near Apia), 4h. (Tucson, Overton, Pierce Ferry, Shasta Dam, Lick, Hungry Horse, College, and Granada), 5h. (Auckland, Wellington, Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Ksara, and Apia), 6h. (Clermont-Ferrand, Paris (2), Strasbourg, Stuttgart, Seven Falls, and near Leninakan), 7h. (Apia, Auckland, Wellington, Brisbane, Mount Wilson, Pasadena (2), Palomar, Riverside, Tinemaha (2), Tucson, Overton, Pierce Ferry (2), Shasta Dam (2), and Hungry Horse), 8h. (Christchurch, Kew, Potsdam, near Santa Lucia, and near Alicante), 9h. (Overton, near Alicante (3), near Apia, and near Fort de France), 11h. (Huancayo, and Tucson), 13h. (near College), 15h. (College, Overton, and near Apia), 16h. (Overton (2), Pierce Ferry (2), and Tucson (2)), 17h. (Basle and near Mizusawa), 18h. (College, Toledo, near Andijan, Murgab, and Stalinabad), 19h. (Tacubaya, Santa Lucia, Overton, and College), 20h. (Tacubaya), 21h. (Stuttgart, College, and near Huancayo), 22h. and 23h. (College).

July 4d. 3h. 40m. 38s. Epicentre 27°·2N. 56°·2E. (as on 1949, May 13d.).

A = +·4955, B = +·7401, C = +·4546 ; δ = −7 ; h = +3 ;
D = +·831, E = −·556 ; G = +·253, H = +·378, K = −·891.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad	10·9	9	2 38	− 2	4 44	0	—	—	—
Baku	14·2	340	e 3 26	+ 2	e 6 38	SS	—	—	—
Samarkand	15·2	33	3 36	− 2	—	—	—	—	—
Stalinabad	15·5	40	i 3 34	− 8	6 38	+ 3	—	—	—
Erevan	16·2	326	e 3 53	+ 3	7 1	+10	—	—	—
Leninakan	17·0	326	3 51?	−10	e 7 10?	0	—	—	—
Tiflis	17·2	329	i 4 4?	+ 1	i 7 36?	+22	—	—	—
Bombay	17·4	115	e 4 7	+ 1	i 7 29	+10	—	—	9·7
Tashkent	17·7	34	e 4 1	− 9	i 7 24	− 2	—	—	—
Grozny	18·2	335	4 18	+ 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Poona		18·4	113	i 4 20	+ 2	e 7 35	− 6	i 4 43	PPP	8·4
New Delhi		18·6	81	e 4 16	− 5	i 7 43	− 3	4 25	PP	9·3
Murgab		18·6	48	4 15	− 6	7 47	+ 1	—	—	—
Ksara		18·7	294	i 4 25 a	+ 3	i 7 52?	+ 4	—	—	—
Andijan		19·0	41	4 18	− 8	i 7 47	− 8	—	—	—
Piatigorsk		19·9	330	4 34	− 2	8 12	− 3	—	—	—
Sotchi		21·1	326	i 4 49	+ 1	i 8 43	+ 4	—	—	—
Hyderabad	N.	22·7	111	i 5 12	+ 8	i 9 18	+ 9	10 19	SSS	—
Theodosia		24·4	322	5 20	− 1	9 38	− 1	—	—	—
Yalta		24·7	320	5 24	0	9 41	− 3	—	—	—
Istanbul		26·3	309	i 5 39	0	i 10 23	+12	—	—	—
Calcutta	E.	29·5	92	e 6 40	+32	e 11 9	+ 7	e 12 15	SS	—
Bucharest		29·6	314	e 6 12	+ 3	e 11 5	+ 1	e 7 43	PPP	—
Semipalatinsk		29·6	32	e 6 5	− 4	—	—	—	—	—
Sverdlovsk		29·8	5	i 6 6	− 5	i 11 6	− 1	—	—	—
Colombo	E.	30·2	128	5 27	−47	11 27	+14	—	—	16·7
Moscow		31·5	340	i 6 24	− 2	i 11 30	− 4	—	—	—
Lwow		33·4	320	e 6 41	− 1	e 12 1	− 2	—	—	—
Belgrade		33·5	311	e 6 44 a	+ 1	e 12 4	− 1	—	—	e 16·4
Taranto		34·7	302	e 7 18	+24	12 52	+28	—	—	e 16·9
Kalossa	E.	35·1	314	e 7 0	+ 3	e 12 32	+ 2	—	—	e 18·4
	N.	35·1	314	e 7 2	+ 5	e 12 29	− 1	e 7 46	PP	e 18·9
Budapest		35·3	315	7 0	+ 1	12 31	− 2	e 8 12	PP	24·4
Skalnate Pleso		35·3	318	e 7 3	+ 4	e 12 33	0	—	—	—
Messina		35·7	300	e 7 5 a	+ 3	e 12 43	+ 4	—	—	—
Ogyalla		36·0	315	e 7 6	+ 1	e 12 42	− 2	—	—	—
Zagreb		36·8	311	e 7 12	+ 1	e 13 4	+ 8	—	—	—
Raciborzu		36·9	319	e 7 13	+ 1	e 9 25	?	—	—	—
Triest		38·3	310	e 7 24?	0	i 13 17	− 2	e 7 43	pP	—
Rome		38·5	304	i 7 26 a	0	13 15	− 7	—	—	i 20·1
Prague		39·1	317	i 7 27	− 4	e 13 22?	− 9	—	—	—
Helsinki		39·2	336	i 7 30 a	− 1	i 13 26	− 6	e 8 53	PP	e 16·4
Florence Arc.		39·6	307	e 7 36	+ 1	13 37	− 1	e 9 15	PP	—
Florence Xim.		39·6	307	i 7 39	+ 4	i 13 39	+ 1	—	—	—
Bologna		39·7	307	i 7 38 a	+ 2	e 13 42	+ 2	e 9 38	PP	—
Prato		39·8	307	i 7 40	+ 4	i 13 41	− 1	—	—	—
Cheb		40·4	316	e 7 41	0	e 13 55	+ 5	—	—	—
Collmberg		40·4	318	e 7 41	0	e 13 47	− 3	e 9 22	PP	e 21·4
Potsdam		40·7	320	i 7 45 a	+ 1	i 13 59	+ 4	i 9 26	PP	e 17·8
Jena		41·1	317	e 7 47	0	e 13 59	− 2	e 9 54	PPP	e 20·4
Pavia		41·3	309	i 8 58 a	+69	—	—	—	—	—
Chur		41·4	311	e 7 50 a	0	e 14 0	− 5	—	—	—
Upsala		41·9	332	i 7 52 a	− 2	i 14 5	− 8	e 9 30	PP	e 20·4
Stuttgart		42·0	314	e 7 54 a	0	e 14 11	− 3	e 9 36	PP	e 22·4
Zürich		42·1	312	i 7 56 a	+ 1	e 14 6	−10	—	—	—
Copenhagen		42·3	325	i 7 58 a	+ 1	i 14 17	− 2	9 38	PP	18·0
Basle		42·8	312	i 8 2 a	+ 1	e 14 23	− 3	—	—	—
Strasbourg		42·9	313	i 8 2	0	e 14 24	− 3	i 9 47	PP	e 24·8
Neuchatel		43·2	312	e 8 4	0	e 14 26	− 6	—	—	—
Irkutsk		43·6	41	8 5	− 3	14 31	− 7	—	—	—
De Bilt		45·3	318	i 8 22 a	+ 1	i 15 1	− 1	i 10 18	PP	e 22·4
Clermont-Ferrand		45·6	308	i 8 25	+ 1	i 15 12	+ 6	i 10 16	PP	20·9
Algiers, Univ.	Z.	45·6	295	i 8 19 a	− 5	e 15 0	− 6	e 10 6	PP	—
Tamanrasset	Z.	45·9	277	i 8 31 k	+ 5	i 15 13	+ 2	e 9 59	PP	24·9
Paris		46·4	312	i 8 30	0	i 15 10	− 8	e 11 4	PPP	e 27·4
Tortosa		47·4	301	8 40	+ 2	15 32	0	10 13	PcP	22·8
Bergen		47·7	329	8 37	− 3	15 32	− 4	18 52	SS	e 26·4
Alicante		48·3	298	i 8 46	+ 1	i 15 43	− 2	10 34	PP	e 23·1
Kew		48·5	316	i 8 47 a	+ 1	e 15 43	− 5	e 10 41	PP	e 25·4
Jersey	E.	49·4	313	e 8 53	0	e 16 21	+21	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Durham		49·8	319	i 8 57	+ 1	e 16 4	− 2	—	—	—
Almeria		50·0	296	e 9 1	+ 3	e 16 17	+ 8	10 21	PcP	27·5
Aberdeen	E.	50·5	323	i 9 0	− 2	i 16 11	− 5	e 11 0	PP	e 29·6
Granada		50·8	297	i 9 7k	+ 3	i 16 32	+12	10 8k	PcP	25·5
Toledo		50·9	300	i 9 6a	+ 1	i 16 20	− 1	19 54	SS	—
Malaga	Z.	51·5	297	i 9 9k	0	i 16 29	0	11 19	PP	30·4
Zi-ka-wei	Z.	56·4	68	—	—	e 17 46	+10	—	—	—
Scoresby Sund		60·7	338	i 10 15a	0	18 33	+ 1	12 27	PP	—
Grahamstown	Z.	66·4	206	i 13 0	PP	—	—	—	—	—
Ivigtut		73·1	330	i 11 31	− 3	e 21 5	+ 4	25 28	SS	37·4
College		86·4	10	e 11 43	−62	e 15 5	PP	—	—	—
Seven Falls	E.	92·0	326	—	—	e 23 46	[+ 2]	—	—	43·4
Ottawa	Z.	95·5	328	e 13 28	0	—	—	—	—	—
Sitka		95·5	6	e 13 12	−16	e 24 2	[− 2]	e 17 18	PP	e 46·9
City College, N.Y.		98·0	324	—	—	e 25 7	+ 3	—	—	e 43·8
Pennsylvania		100·0	326	—	—	e 25 22	+ 2	e 24 32	SKS	e 58·9
Hungry Horse		104·3	353	e 14 7	− 1	—	—	e 18 20	PP	—
St. Louis		107·4	333	e 18 35	PP	e 27 53	PS	e 37 48	SSS	—
Shasta Dam		112·4	358	e 18 8	[−30]	—	—	—	—	—
Tinemaha	Z.	115·9	354	e 18 46	[+ 1]	—	—	—	—	—
Overton	Z.	116·0	350	i 18 49	[+ 4]	—	—	—	—	—
Pierce Ferry		116·4	350	e 18 48	[+ 2]	—	—	—	—	—
Riverside	Z.	118·8	353	e 18 53	[+ 2]	—	—	—	—	—
Palomar	Z.	119·4	351	e 19 2	[+10]	—	—	—	—	—
Tucson		119·6	346	i 18 54	[+ 2]	—	—	—	—	—
La Paz		127·6	269	e 19 37	[+30]	—	—	—	—	61·4

Additional readings :—
Poona iSSEN =7m.56s.
New Delhi iSSN =8m.4s., S_cSN =16m.1s.
Lwow e =9m.47s.
Belgrade e =6m.56s. and 8m.46s.
Budapest SSN =14m.47s., SSE =15m.0s., SSSN =15m.11s., eSSSE =15m.28s., eE = 16m.42s., N =17m.12s.
Triest ePP =8m.46s., esS =13m.56s., eSS =15m.45s., eS_cS? =17m.35s.
Rome e =15m.55s., iN =16m.34s., eE =18m.20s.
Florence Arc. e =10m.9s.
Bologna eZ =8m.43s., e =10m.42s.
Collmberg eE =8m.2s., eZ =8m.6s. and 11m.3s., eE =13m.53s.
Potsdam iE =13m.42s., iN =13m.55s., iSSSZ =17m.12s.
Chur i =7m.59s.a.
Upsala PPPE =9m.59s., eSS?N =16m.46s., eSSE =17m.4s.
Stuttgart eP_cPZ =9m.50s., eSSS? =17m.28s.
Copenhagen 9m.38s., 17m.34s.
Strasbourg ePP =9m.51s., eS =14m.28s., eSS =17m.36s. and 17m.47s.
De Bilt eSS =18m.17s.
Clermont-Ferrand i =9m.7s., iPPP =11m.0s., eSS =18m.42s., eSSS =19m.31s.
Algiers Univ. eZ =11m.41s.
Tamanrasset iZ =8m.39s.a, eZ =9m.12s., iZ =9m.33s.k, eZ =10m.19s., iZ =11m.52s., eSSSZ =19m.24s.
Paris iP =8m.36s., i =9m.12s., i =11m.50s., ePS =15m.18s.
Tortosa PPN =10m.34s., PSEN =15m.42s., PPSE =15m.48s., S_cS?N =18m.32s.
Alicante PPP =11m.25s., PS =15m.51s., PPS =15m.54s., SS =18m.41s.
Kew ePSEZ =16m.17s., eEZ =16m.59s., eS_cS =18m.41s., eSSE =19m.40s., eSSSE = 20m.15s.
Durham iEN =16m.12s.
Almeria PP =11m.25s., PPP =11m.54s., SSS =21m.13s.
Aberdeen iE =14m.47s., iSSE =19m.53s.
Granada PP =11m.6s.
Toledo eSSEN =18m.56s.
Malaga PPPZ =12m.31s., sSZ =17m.23s.
Scoresby Sund 22m.28s., SSS =24m.52s.
Sitka ePS =26m.7s., eSS =30m.10s.
Pennsylvania eS_cS,S_cSEN =37m.43s., eSKP,PKPE =42m.32s.
St. Louis ePPPS? =29m.45s.
Long waves were also recorded at Huancayo and Wellington.

July 4d. 4h. 22m. 37s. Epicentre 27°·2N. 56°·2E. (as at 3h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Samarkand		15·2	33	e 3 53	+15	—	—	—	—	—
Leninakan		17·0	326	e 4 27	+26	—	—	—	—	—
Grozny		18·2	335	4 17	+ 1	—	—	—	—	—
Murgab		18·6	48	e 4 16	− 5	—	—	—	—	—
Ksara		18·7	294	—	—	e 8 23	+35	—	—	e 11·2
Yalta		24·7	320	5 24	0	9 51	+ 7	—	—	—
Collmberg	z.	40·4	318	e 7 41	0	—	—	—	—	—
Stuttgart	z.	42·0	314	e 7 54	0	—	—	—	—	—
Zürich		42·1	312	e 7 55a	0	e 14 9	− 7	—	—	—
Copenhagen		42·3	325	7 59	+ 2	—	—	—	—	—
Strasbourg		42·9	313	e 8 1	− 1	—	—	—	—	—
Algiers Univ.	z.	45·6	295	e 8 14	−10	—	—	—	—	—
Tamanrasset	z.	45·9	277	e 8 30	+ 4	—	—	e 10 25	PP	—
Paris		46·4	312	i 8 30	0	—	—	—	—	—
College		86·4	10	e 12 44	− 1	—	—	—	—	—

Tamanrasset gives also eZ = 8m.38s.
Long waves were also recorded at Ivigtut.

July 4d. 13h. 47m. 56s. Epicentre 19°·5S. 171°·5E.

Rough.

A = −·9330, B = +·1394, C = −·3318; δ = +1; h = +5;
D = +·148, E = +·989; G = +·328, H = −·049, K = −·943.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		17·0	74	e 4 12	+11	(e 7 4?)	− 6	—	—	e 7·1
Auckland	N.	17·5	171	e 3 28	−39	(e 7 4?)	−17	—	—	e 7·1
Brisbane		18·7	241	i 4 27	+ 5	i 8 8	+20	—	—	e 9·5
Wellington		21·9	174	i 4 45	−12	i 8 20	−34	—	—	e 10·4
Riverview		23·0	227	i 5 3k	− 4	e 9 18	+ 4	i 5 39	PP	e 10·8
Christchurch		24·0	177	e 5 18	+ 1	i 9 16	−16	i 8 56	P_cP	e 12·0
Lick	z.	84·5	47	i 12 35a	− 1	—	—	—	—	—
Fresno	z.	85·6	48	e 12 40	− 1	—	—	—	—	—
Mount Wilson	z.	85·6	52	e 12 33	− 8	—	—	—	—	—
Shasta Dam		85·7	44	e 12 33	− 9	—	—	—	—	—
Riverside	z.	86·0	52	e 12 34	− 9	—	—	—	—	—
Mineral		86·1	45	e 12 4?	−40	—	—	—	—	—
Palomar	z.	86·1	53	i 12 42	− 2	—	—	—	—	—
Reno		86·9	47	e 12 48	0	—	—	—	—	—
Overton	z.	89·3	50	e 12 51?	− 8	—	—	—	—	—
Pierce Ferry		89·5	51	e 12 50	−10	—	—	—	—	—
College		89·7	16	e 12 57	− 4	—	—	—	—	—
Tucson		90·3	56	e 12 52	−12	—	—	—	—	—
Hungry Horse		94·5	40	e 13 13	−10	—	—	—	—	—
Ksara		138·9	299	e 19 32	[+ 3]	—	—	—	—	—
Istanbul		141·5	313	e 19 28	[− 5]	—	—	e 19 34	PKP	—
Helwan	z.	142·5	294	e 19 31	[− 4]	—	—	—	—	—
Potsdam	z.	143·1	338	e 19 35	[− 1]	—	—	—	—	—
Collmberg	z.	144·0	337	e 19 36	[− 1]	—	—	—	—	—
Jena	E.	144·8	338	e 19 47	[+ 8]	—	—	—	—	—
Stuttgart	z.	147·5	338	e 19 44	[+ 1]	—	—	—	—	—
Strasbourg		148·2	340	i 19 53	[+ 8]	—	—	—	—	—
Paris		149·4	346	i 19 56	[+10]	—	—	—	—	—
Tamanrasset	z.	166·5	288	20 4	[− 3]	—	—	21 17	PKP_2	—

Additional readings :—
Brisbane iZ = 5m.28s.
Wellington eZ = 6m.55s., e = 7m.58s., eZ = 8m.30s.
Riverview isSN = 9m.33s., iSSN = 10m.12s., iS_cSE = 16m.6s.
Christchurch eZ = 7m.50s.
Mount Wilson eZ = 12m.41s.
Reno eE = 13m.28s.

Continued on next page.

College i =13m.5s.
Ksara e =18m.16s.
Istanbul readings given as for local shock.
Helwan eZ =20m.1s.
Collmberg eEZ =19m.42s.
Stuttgart iPKPZ =19m.52s.k.
Strasbourg i =20m.12s., e =20m.45s.
Paris $iPKP_2$ =20m.7s.
Tamanrasset Z =24m.23s.
Long waves were also recorded at Granada.

July 4d. Readings also at 0h. (College), 1h. (Palomar, Pasadena, Riverside, Tinemaha, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Collmberg, Copenhagen, Paris, Strasbourg, Stuttgart, Zi-ka-wei, Frunse, near Andijan, Murgab, Obi-garm, Samarkand, and Stalinabad), 2h. (Kew and Potsdam), 3h. (near Zürich (2)), 4h. (Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, and near Fort de France), 5h. (Batavia, Ksara, Tucson, and near La Paz), 6h. (Ksara, College, and near Apia (2)), 7h. (Pierce Ferry, Shasta Dam, College, and near Apia), 8h. (College, Ksara, Grozny, Semipalatinsk, Tashkent, near Andijan, Frunse, Murgab, Obi-garm, Samarkand, and Stalinabad), 9h. (College, Frunse, near Andijan, Murgab, Obi-garm, Samarkand, and Stalinabad), 10h. (Pasadena, Riverside, Tinemaha, Shasta Dam, Hungry Horse, College, Collmberg, Tamanrasset, Copiapo, La Paz, Mizusawa, near Grozny, Leninakan, and Tiflis), 12h. (near Fort de France), 13h. (La Paz), 14h. (Huancayo, Overton, Shasta Dam, Hungry Horse, and College), 15h. (College (2) and near Florence, Arc.), 16h. (College, Toledo, and Istanbul), 18h. (Mizusawa), 20h. (near Andijan, Murgab, Obi-garm, Stalinabad, and near Copiapo), 21h. (College), 22h. (Hungry Horse).

July 5d. 2h. 30m. 0s. Epicentre 27°·2N. 56°·2E. (as on July 4d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad		10·9	9	e 3 43	+63	—	—	—	—	—
Samarkand		15·2	33	3 37	− 1	—	—	—	—	—
Stalinabad		15·5	40	i 3 33	− 9	—	—	—	—	—
Obi-garm		16·1	41	i 3 53	+ 4	i 6 56	+ 7	—	—	—
Erevan		16·2	326	4 1?	+11	—	—	—	—	—
Leninakan		17·0	326	4 4	+ 3	—	—	—	—	—
Tiflis		17·2	329	4 4	+ 1	—	—	—	—	—
Bombay		17·4	115	e 0 25	?	e 7 29	+10	—	—	—
Tashkent		17·7	34	e 4 4	− 6	i 7 24	− 2	—	—	—
Grozny		18·2	335	i 4 17	+ 1	—	—	—	—	—
Poona		18·4	113	e 1 30	?	—	—	—	—	—
New Delhi		18·6	81	e 4 17	− 4	e 7 48	+ 2	—	—	—
Murgab		18·6	48	i 4 17	− 4	—	—	—	—	—
Ksara		18·7	294	e 4 24	+ 2	8 6	+18	—	—	—
Andijan		19·0	41	e 4 20	− 6	i 7 56	+ 1	—	—	—
Piatigorsk		19·9	330	4 37	+ 1	8 18	+ 3	—	—	—
Sotchi		21·1	326	e 4 50	+ 2	8 46	+ 7	—	—	—
Frunse		21·7	40	e 4 50	− 5	—	—	—	—	—
Helwan		22·0	282	e 5 2	+ 4	9 12	+16	—	—	e 12·6
Hyderabad	N.	22·7	111	—	—	9 17	+ 8	—	—	—
Theodosia		24·4	322	—	—	9 38	− 1	—	—	—
Yalta		24·7	320	5 24	0	9 48	+ 4	—	—	—
Istanbul		26·3	309	e 5 39	0	—	—	—	—	e 16·8
Sverdlovsk		29·8	5	i 6 6	− 5	11 6	− 1	—	—	—
Moscow		31·5	340	6 23	− 3	e 11 34	0	—	—	—
Lwow		33·4	320	e 6 45?	+ 3	e 11 59	− 4	—	—	—
Triest		38·3	310	i 7 28	+ 4	i 13 16	− 3	e 8 12	PP	—
Rome		38·5	304	e 7 24	− 2	13 19	− 3	e 8 16	PP	20·0
Collmberg	z.	40·4	318	e 7 41	0	—	—	e 9 25	PP	—
Potsdam	z.	40·7	320	e 7 43	− 1	i 13 58	+ 3	—	—	—
Chur		41·4	311	e 7 48	− 2	—	—	—	—	—
Stuttgart		42·0	314	e 7 54	0	e 14 8	− 6	—	—	e 23·0
Zürich		42·1	312	e 7 54a	− 1	—	—	—	—	—
Copenhagen		42·3	325	e 7 57	0	e 14 15	− 4	—	—	—
Basle		42·8	312	e 8 0	− 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Strasbourg		42·9	313	e 8 0	− 2	e 14 30	+ 3	e 9 45	PP	—
Irkutsk		43·6	41	e 8 4	− 4	—	—	—	—	—
De Bilt		45·3	318	e 8 28	+ 7	e 15 5	+ 3	e 10 18	PP	e 23·0
Algiers Univ.	z.	45·6	295	e 8 20?	− 4	—	—	—	—	—
Clermont-Ferrand		45·6	308	e 8 25	+ 1	e 15 15	+ 9	e 18 44	SS	29·0
Tamanrasset	z.	45·9	277	i 8 30k	+ 4	—	—	e 10 23	PP	24·0
Paris		46·4	312	i 8 30	0	e 15 12	− 6	—	—	e 26·0
Tortosa		47·4	301	8 41	+ 3	15 32	0	15 41	PS	—
Alicante		48·3	298	e 8 42	− 3	i 15 50	+ 5	10 32	PP	e 24·4
Kew		48·5	316	e 8 53	+ 7	—	—	—	—	e 26·0
Almeria		50·0	296	—	—	e 16 38	PS	—	—	e 20·6
Granada		50·8	297	(9 2a)	− 2	—	—	—	—	25·4
Malaga	z.	51·5	297	i 9 11a	+ 2	i 16 19	−10	9 33	pP	32·1
Scoresby Sund		60·7	338	10 16	+ 1	18 37	+ 5	25 12	SSS	—
Grahamstown		66·4	206	i 10 59	+ 6	—	—	—	—	—
College		86·4	10	e 12 42	− 3	—	—	—	—	—
Hungry Horse		104·3	353	e 14 10	+ 2	—	—	e 17 36	—	—
Overton		116·0	350	i 19 53?	PP	—	—	—	—	—
Tucson		119·6	346	e 18 54	[+ 2]	—	—	—	—	—

Additional readings and note :—
Helwan eN =7m.6s. and 7m.36s.
Triest iPP =9m.16s., esS =14m.34s., eSS =16m.24s.
Rome SS =16m.30s.
Collmberg eZ =8m.30s.
Potsdam eN =8m.0s.?
Copenhagen i =8m.1s., 8m.8s., and 14m.23s.
Strasbourg e =8m.41s., ePPP =10m.26s.
De Bilt eSS =18m.30s.
Tamanrasset iZ =8m.35s.k
Paris i =9m.0s.
Alicante PPP =11m.18s., PS =15m.53s., PPS =16m.4s.
Almeria e =17m.48s.
Granada P =6m.39s., true P is given as PP.
Long waves were also recorded at Belgrade.

July 5d. Readings also at 0h. (Overton), 1h. (Overton, College, Tananarive, Frunse, Tashkent, near Andijan, Murgab, Obi-garm, Samarkand, and Stalinabad), 3h. (Collmberg, Paris, Stuttgart, Apia, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Pierce Ferry, Hungry Horse, Shasta Dam, and near Lick), 4h. (Ivigtut, and near Apia), 5h. (College), 6h. (near Lick), 7h. (College), 8h. (Ivigtut and Scoresby Sund), 9h. (Overton), 10h. (Overton, Pierce Ferry, Hungry Horse, Tucson, and near Honolulu), 12h. (College and near Copiapo), 14h. (near College, Strasbourg, and Stuttgart), 15h. (College (2), Collmberg, and Potsdam), 16h. (College), 18h. (Victoria (3)), 20h. (Basle, Strasbourg, near Stuttgart, Chur, and Zürich), 22h. (Tucson and College), 23h. (near Stalinabad).

July 6d. 1h. 7m. 23s. Epicentre 7°·0N. 125°·3E.

A = −·5736, B = +·8101, C = +·1211 ; δ = −6 ; h = +7 ;
D = +·816, E = +·578 ; G = −·070, H = +·099, K = −·993.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		22·6	235	i 5 3k	0	i 7 19	?	—	—	—
Murgab		55·8	312	9 43	+ 2	e 17 33	+ 5	—	—	—
Andijan		57·8	314	e 9 57	+ 2	—	—	—	—	—
Stalinabad		59·7	311	i 10 11	+ 2	e 18 24	+ 5	e 11 33	PP	—
Samarkand		61·4	311	10 27	+ 7	—	—	—	—	—
Sverdlovsk		70·5	328	11 17	− 1	i 20 29	− 3	e 11 40	pP	—
Grozny		77·6	313	e 12 1	+ 1	21 51	0	—	—	—
Tiflis		78·3	311	12 3	0	21 57	− 2	—	—	—
Moscow		82·9	325	12 25	− 3	22 40	− 6	12 48	pP	—
Ksara		85·7	303	e 12 41	− 1	—	—	e 16 51	PP	—
Yalta		86·0	314	e 12 37	− 6	—	—	—	—	—
Scoresby Sund		99·6	350	—	—	24 19	[− 6]	—	—	—
Rome		101·9	316	—	—	e 24 24	[−12]	e 41 8	Q	e 55·8
Overton	z.	109·3	48	—	—	i 29 41	PPS	—	—	—
Ottawa	z.	124·5	18	e 18 51	[−10]	—	—	—	—	—

July 6d. Readings also at 4h. (Tucson, Overton, Pierce Ferry, College, Scoresby Sund, and Rome), 5h. (near College), 6h. (Tucson), 7h. (Santa Lucia, Yalta, near Istanbul, near Lwow, and near Murgab), 8h. (Apia and Overton (2)), 9h. (Tucson and near Mizusawa), 10h. (Apia, Palomar, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 12h. (Overton), 15h. (Collmberg and near Tamanrasset), 16h. (near Tamanrasset), 18h. (Istanbul and Overton), 19h. (Apia, Christchurch, Brisbane, Riverview, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Mineral, Logan, Hungry Horse, College, Berkeley, near Branner, and Lick), 20h. (Rome, Collmberg, Kew, Stuttgart, Triest, Alicante, Almeria, Granada, Malaga, Tamanrasset, Pennsylvania, Philadelphia, and near College), 21h. (Grahamstown and Potsdam), 22h. (Andijan, Samarkand, near Obi-garm, Murgab, and Stalinabad), 23h. (Erevan, Grozny, Leninakan, Moscow, Sverdlovsk, Yalta, Istanbul, Helwan, Ksara, Strasbourg, Stuttgart, Triest, Collmberg, Rome, and Tamanrasset).

July 7d. 4h. 32m. 19s. Epicentre 37°·0N. 36°·1W.

$A = +·6469$, $B = -·4717$, $C = +·5992$; $\delta = +2$; $h = -1$;
$D = -·589$, $E = -·808$; $G = +·484$, $H = -·353$, $K = -·801$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		23·9	268	e 5 11	− 5	(e 9 39)	+ 9	—	—	e 9·6
Toledo		25·2	75	e 5 27	− 2	9 53	+ 1	—	—	—
Malaga	z.	25·3	81	i 5 24k	− 6	i 9 52	− 2	6 16	PP	12·9
Granada		25·9	80	i 5 35a	0	i 10 1	− 3	—	—	—
Rathfarnham Castle		26·3	43	—	—	e 11 13	+62	—	—	13·3
Almeria		26·8	81	e 5 30	−14	10 6	−13	12 38	PcS	13·8
Alicante		28·1	77	e 4 45	?	10 3	−37	—	—	e 12·3
Tortosa		28·6	72	5 55	− 5	—	—	—	—	e 12·7
Kew		29·1	49	e 6 10	+ 6	e 11 15	+19	—	—	e 13·7
Paris		30·3	55	e 6 16	+ 1	—	—	—	—	e 13·7
Clermont-Ferrand		30·4	62	e 6 9	− 7	e 11 31	+15	—	—	15·2
Philadelphia		30·6	288	e 6 18	0	e 11 24	+ 4	—	—	e 12·6
San Juan		32·2	244	e 6 26	− 6	e 11 31	−14	—	—	e 13·4
Strasbourg		33·8	56	e 6 53	+ 7	e 12 23	+13	—	—	e 15·2
Scoresby Sund		34·4	8	—	—	12 43	+24	—	—	15·7
Stuttgart		34·7	56	e 6 52	− 2	e 12 31	+ 7	—	—	e 15·7
Cleveland		35·2	293	e 7 24	?	e 12 42	+11	e 8 16	PP	e 15·4
Collmberg	z.	37·3	53	e 7 17?	+ 1	—	—	—	—	—
Copenhagen		37·4	45	—	—	e 13 19	+14	16 11	SSS	17·7
Potsdam	z.	37·4	50	e 7 22	+ 6	—	—	—	—	e 18·6
Rome		37·4	68	e 7 11	− 5	e 13 5	0	—	—	—
Triest		37·9	61	e 7 24	+ 4	i 13 19	+ 6	e 8 51	PP	e 16·1
Tamanrasset	z.	38·4	100	i 7 18k	− 7	—	—	—	—	—
St. Louis		42·3	290	e 7 55	− 2	e 14 25	+ 6	e 9 46	PP	e 19·1
Hungry Horse		56·1	309	e 9 43	0	—	—	—	—	—
Logan		57·0	302	e 9 46	− 4	—	—	—	—	—
Ksara		57·4	71	e 9 55	+ 2	—	—	—	—	—
Tucson		60·2	290	e 10 11	− 1	—	—	—	—	—
Pierce Ferry		60·8	296	e 10 16	0	—	—	—	—	—
Overton	z.	61·0	297	i 10 18	0	—	—	—	—	—
La Paz		61·2	216	10 23	+ 4	i 18 29	− 9	—	—	—
Tinemaha		63·4	298	i 10 34	0	—	—	—	—	—
Palomar	z.	64·2	293	i 10 39	0	—	—	—	—	—
Riverside	z.	64·3	295	e 10 37	− 2	—	—	—	—	—
Shasta Dam		64·6	303	i 10 41	0	—	—	—	—	—
Pasadena	z.	64·8	295	e 10 47	+ 4	—	—	—	—	—
College		65·5	335	e 10 51	+ 4	—	—	—	—	—

Additional readings :—
Toledo eZ = 5m.35s., eE = 7m.58s., and 10m.37s.
Malaga PcPZ = 8m.42s.
Paris e = 6m.24s. and 7m.16s.
Philadelphia e = 11m.56s.
Collmberg eE = 7m.25s.
Rome e = 8m.2s., 14m.35s., and 15m.54s.
Triest ePPP = 9m.21s.
Tamanrasset iZ = 7m.26s.a, eZ = 7m.36s., 7m.59s., and 11m.30s.
St. Louis iP = 7m.58s., eSS = 17m.27s.
Ksara e = 5m.17s.
Long waves were also recorded at Pennsylvania, Seven Falls, Seattle, Ivigtut, De Bilt, Istanbul, aud Buenos Aires.

July 7d. 12h. 21m. 4s. Epicentre 35°·5N. 27°·2E. (as on 1949, Jan. 2d.).

A = +·7258, B = +·3730, C = +·5781; δ = +11; h = 0;
D = +·457, E = −·889; G = +·514, H = +·264, K = −·816.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		5·8	14	e 1 24	− 5	i 2 55	S*	—	—	—
Helwan		6·6	147	i 1 47	+ 6	e 3 2	+ 4	—	—	—
Ksara		7·4	101	e 1 36	−16	3 16	− 2	—	—	—
Bucharest		8·9	355	e 2 16	+ 4	e 4 1	+ 6	—	—	—
Yalta		10·4	28	2 30	− 4	—	—	—	—	—
Belgrade		10·6	333	e 2 35a	− 1	e 4 43	+ 6	—	—	e 5·4
Theodosia		11·4	31	e 2 46	− 1	—	—	—	—	—
Kalossa	N.	12·6	333	e 3 17	+14	—	—	—	—	e 7·6
Sotchi		12·6	46	e 3 16	+13	—	—	—	—	—
Rome		13·1	304	e 3 9a	− 1	5 44	+ 6	e 6 9	SS	e 7·1
Budapest		13·4	335	e 3 13	− 1	—	—	—	—	e 7·6
Zagreb		13·4	324	e 3 16	+ 2	—	—	—	—	e 7·5
Ogyalla		14·0	334	e 3 26	+ 4	e 6 9	+10	—	—	—
Leninakan		14·1	63	3 1	−22	—	—	—	—	—
Erevan		14·4	66	e 3 49?	+22	—	—	—	—	—
Triest		14·4	319	i 3 30	+ 3	e 6 20	+11	—	—	i 8·7
Skalnate Pleso		14·6	342	e 3 27	− 3	e 6 14	+ 1	—	—	—
Florence Arc.		14·8	309	e 3 34	+ 2	e 6 34	+16	—	—	—
Florence Xim		14·8	309	e 3 8	−24	6 4	−14	—	—	—
Piatigorsk		14·9	50	e 3 36	+ 2	—	—	—	—	—
Bologna		15·1	311	e 3 35	− 1	e 6 26	+ 1	e 4 14	PP	—
Tiflis		15·1	60	e 3 27	− 9	—	—	—	—	—
Raciborzu		16·0	338	e 3 49	+ 1	—	—	e 4 22	PP	e 8·9
Grozny		16·3	56	e 4 13?	+21	—	—	—	—	—
Prague		17·3	333	e 3 59	− 5	e 7 20	+ 4	—	—	—
Cheb		18·1	329	e 4 29	+15	e 7 53	+18	—	—	—
Zürich		18·3	317	e 4 13k	− 4	e 7 31	− 8	—	—	—
Baku		18·5	68	e 4 33	+14	e 7 51	+ 7	—	—	—
Stuttgart		18·7	322	e 4 19k	− 3	e 7 47	− 1	—	—	e 9·9
Basle		18·9	317	e 4 26	+ 2	e 7 38	−15	—	—	—
Collmberg		19·1	331	e 4 19	− 8	—	—	—	—	e 9·9
Jena		19·1	330	e 4 24	− 3	e 8 2	+ 5	—	—	—
Strasbourg		19·4	320	e 4 27	− 3	e 7 59	− 5	i 4 43	PP	10·3
Algiers Univ.	Z.	19·6	281	e 3 18?	?	—	—	e 3 41?	?	—
Potsdam		19·6	334	e 4 29	− 3	i 8 21	+13	—	—	—
Clermont-Ferrand		20·9	307	i 4 43	− 3	e 8 40	+ 5	i 4 58	PP	11·4
Moscow		21·5	16	4 46	− 6	e 8 37	−10	—	—	—
Tortosa		21·6	292	4 57	+ 3	8 48	− 1	—	—	e 12·9
Alicante		22·3	287	5 20	+19	9 52	+50	6 16	PP	13·0
Paris		22·5	314	e 5 1	− 1	e 9 17	+12	e 6 9	PP	e 11·9
Copenhagen		22·6	338	e 4 58	− 5	e 9 4	− 3	—	—	12·4
Tamanrasset	Z.	22·7	242	e 5 9	+ 5	—	—	e 5 39	PP	—
De Bilt		22·9	325	i 5 6	0	e 9 16	+ 3	—	—	e 10·9
Almeria		23·9	283	i 5 27	+11	9 41	+11	5 59	PP	13·4
Granada		24·8	284	5 40k	+15	10 22	+36	—	—	—
Ashkabad		25·0	75	e 5 30	+ 3	—	—	—	—	—
Toledo	Z.	25·0	290	e 5 25	− 2	9 58	+ 9	—	—	—
Upsala	N.	25·2	349	5 23	− 6	9 59?	+ 7	—	—	e 12·9
Kew		25·3	319	e 5 29	− 1	e 10 7	+13	e 11 4	SS	e 15·9
Jersey	E.	25·4	314	e 5 24	− 7	—	—	—	—	—
Malaga	Z.	25·5	284	i 5 36a	+ 4	i 10 12	+15	7 31	PP	13·5
Rathfarnham Castle		29·4	318	5 41	−26	e 10 49	−12	—	—	—
Sverdlovsk		31·0	36	e 6 24	+ 3	—	—	—	—	—
Scoresby Sund		43·6	339	9 44	PP	—	—	—	—	24·9
College		79·9	358	e 12 34	+22	—	—	—	—	—
Hungry Horse		89·6	335	e 13 27	+26	—	—	—	—	—

Additional readings :—
Bucharest eN = 3m.34s.
Kalossa eE = 3m.33s.
Budapest ePE = 3m.18s.
Triest i = 7m.50s., iS_gS_g = 8m.28s.

Continued on next page,

Tiflis e =3m.39s., 5m.43s.
Stuttgart iP =4m.24s.k.
Basle eP? =4m.8s.
Jena eS?N =8m.51s.
Strasbourg i =4m.36s., ePPP =4m.50s., iPPP =4m.54s., i =5m.19s., e =7m.28s., eS? = 8m.10s., eSS =8m.20s., e =8m.55s. and 9m.36s.
Algiers Univ. ePPPZ =3m.52s.?
Potsdam eN =4m.23s., iZ =4m.33s.
Clermont-Ferrand i =4m.55s., e =9m.33s.
Alicante P_cP =8m.36s.
Almeria P_cP =8m.43s.
Kew eEN =14m.19s. and 15m.23s.
College e =13m.9s.

July 7d. 22h. 30m. 3s. Epicentre 35°·5N. 27°·2E. (as at 12h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		5·8	14	e 1 27	− 2	i 2 34	− 4	—	—	—
Helwan		6·6	147	—	—	e 3 3	+ 5	—	—	e 3·7
Ksara		7·4	101	e 2 49	+57	—	—	—	—	e 5·7
Rome		13·1	304	e 4 41	?	—	—	—	—	—
Triest		14·4	319	e 3 41	PP	—	—	—	—	—
Stuttgart		18·7	322	e 4 22?	0	e 9 9	L	—	—	(e 9·2
Collmberg	z.	19·1	331	e 4 20	− 7	—	—	—	—	—)
Strasbourg		19·4	320	e 4 29	− 1	e 8 16	+12	e 8 30	SS	—
Paris		22·5	314	e 5 6	+ 4	—	—	—	—	—
Tamanrasset	z.	22·7	242	e 5 10	+ 6	—	—	e 6 0	PPP	—

Strasbourg gives also e =4m.34s. and 5m.23s.
Triest $eS_gS_gS_g$? =8m.8s.
Long waves were also recorded at De Bilt, Potsdam, and Clermont-Ferrand.

July 7d. Readings also at 0h. (Copenhagen, Potsdam, and Hungry Horse), 2h. (Tamanrasset and near Bogota), 3h. (near Bogota), 4h. (near College), 5h. (near Andijan), 6h. (Ksara), 9h. (Tucson), 10h. (Zürich and near Basle), 11h. (Tamanrasset, Tananarive, Palomar, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, and near Messina), 12h. (College and Tucson), 13h. (Palomar, Riverside, Tinemaha, and Tucson), 14h. (Clermont-Ferrand), 15h. (near Paris, near Rome, near College, and near Tucson), 16h. (Shawinigan Falls), 18h. (Santa Lucia, Overton, and near Andijan), 19h. (Andijan, Stalinabad, near Murgab, Obi-garm, Overton, and near Bogota), 20h. (Seven Falls, Victoria, Overton (2), and Mizusawa), 21h. (Alicante, Toledo, and Triest), 22h. (Alicante and Triest (2)), 23h. (near Andijan).

July 8d. 7h. 50m. 37s. I
8h. 2m. 15s. II } Epicentre 39°·2N. 70°·7E. (as on 1942, Feb. 28d.).

Forerunners of the large earthquake of July 10d.

A = +·2568, B = +·7334, C = +·6295 ; δ = +9 ; h = −1 ;
D = +·944, E = −·331 ; G = +·208, H = +·594, K = −·777.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Obi-garm	0·9	237	i 0 11?	− 9	i 0 29?	− 5	—	—	—
II		0·9	237	i 0 25?	+ 5	—	—	—	—	—
I	Stalinabad	1·6	247	i 0 35	+ 5	0 59	+ 8	—	—	—
II		1·6	247	i 0 33	+ 3	i 0 57	+ 6	—	—	—
I	Andijan	2·0	39	i 0 38	+ 3	1 4	+ 2	—	—	—
II		2·0	39	i 0 37	+ 2	i 1 3	+ 1	—	—	—
I	Tashkent	2·4	333	i 0 44	+ 3	i 1 17	+ 5	—	—	—
II		2·4	333	i 0 44	+ 3	i 1 11?	− 1	—	—	—
I	Murgab	2·7	108	e 0 49	+ 4	i 1 25	+ 6	—	—	—
II		2·7	108	0 48	+ 3	1 23	+ 4	—	—	—
I	Samarkand	2·9	279	e 0 55?	+ 7	i 1 29?	+ 5	i 1 41	P_g	—
II		2·9	279	0 53?	+ 5	1 27?	+ 3	—	—	—
I	Frunse	4·7	38	e 1 16	+ 2	e 2 10	0	—	—	—
II		4·7	38	e 1 12	− 2	e 2 6	− 4	—	—	—
I	Ashkabad	9·8	267	e 2 25	+ 1	4 16	− 1	—	—	—
I	Dehra Dun	N. 10·7	144	e 3 13	+35	—	—	—	—	—
II		N. 10·7	144	e 3 45	+67	—	—	—	—	—

Continued on next page.

			△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	New Delhi	N.	11·9	151	e 2 48	− 6	e 5 1	− 8	—	—	—
II		N.	11·9	151	e 2 48	− 6	e 5 1	− 8	—	—	—
I	Semipalatinsk		13·1	28	e 3 6	− 4	e 5 29	− 9	—	—	—
II			13·1	28	e 3 5	− 5	e 5 28	−10	—	—	—
I	Baku		16·0	281	—	—	e 6 43	− 3	—	—	—
I	Sverdlovsk		18·9	343	i 4 21	− 3	—	—	—	—	—
II			18·9	343	i 4 20	− 4	i 8 13	SS	—	—	—
I	Grozny		19·2	290	i 4 31	+ 3	—	—	—	—	—
I	Erevan		20·2	281	4 41	+ 2	—	—	—	—	—
I	Bombay	E.	20·3	175	e 4 30	−10	—	—	—	—	—
II			20·3	175	i 4 39	− 1	e 8 34	+11	—	—	—
I	Leninakan		20·6	284	i 4 43	0	—	—	—	—	—
I	Poona	E.	20·8	172	e 4 38	− 7	i 8 38	+ 5	—	—	—
II			20·8	172	i 4 41	− 4	i 8 51	+18	—	—	—
I	Piatigorsk		21·2	293	e 4 48	− 1	—	—	—	—	—
I	Calcutta	E.	22·4	133	e 9 12	S	(e 9 12)	+ 8	—	—	(i 12·7
II		E.	22·4	133	e 4 3	−59	e 9 3	− 1	i 10 48	SS	12·3)
I	Hyderabad	N.	22·7	161	e 9 18	S	(e 9 18)	+ 9	—	—	(13·7)
II		N.	22·7	161	e 5 3	− 1	9 20	+11	—	—	—
I	Sotchi		23·6	290	e 5 30	+17	—	—	—	—	—
I	Irkutsk		26·6	49	e 5 45	+ 3	—	—	—	—	—
I	Moscow		27·5	318	e 5 50	0	e 10 29	− 1	—	—	—
II			27·5	318	e 5 49	− 1	10 27	− 3	—	—	—
I	Yalta		27·6	293	5 50	− 1	—	—	—	—	—
II			27·6	293	5 55	+ 4	10 33	+ 1	—	—	—
II	Ksara		28·4	269	e 6 1	+ 3	12 10	SS	—	—	—
II	Istanbul		31·7	288	e 6 24	− 3	—	—	—	—	—
II	Bucharest		33·2	294	e 6 15	−25	e 12 10	+10	—	—	—
II	Helwan		33·5	266	e 6 45	+ 2	12 9	+ 4	7 54	PP	—
II	Skalnate Pleso		36·9	304	e 7 13	+ 1	e 12 51	− 7	—	—	—
II	Budapest		37·8	301	e 8 35	PP	e 13 16	+ 5	e 8 55	PPP	23·9
II	Raciborzu		38·2	305	—	—	e 15 53	SS	—	—	e 18·0
II	Upsala		38·8	320	e 7 23	− 5	13 24	− 2	e 9 9	PPP	e 19·5
II	Prague		40·6	305	e 7 56	+13	—	—	e 9 17	PP	—
II	Potsdam		41·2	309	e 7 51	+ 3	e 13 29	−33	e 9 25	PP	i 24·6
I	Collmberg		41·4	308	e 7 49	− 1	—	—	—	—	—
II			41·4	308	e 7 48	− 2	e 14 4	− 1	e 9 24	PP	—
I	Copenhagen		41·4	314	7 50	0	—	—	—	—	—
II			41·4	314	e 7 49	− 1	e 14 9	+ 4	9 27	PP	—
II	Triest		41·8	297	e 7 54	+ 1	i 14 12	+ 1	i 9 37	PP	—
II	Cheb		41·9	305	e 8 44?	?	—	—	—	—	e 23·8
II	Jena	E.	42·7	306	e 7 56	− 4	—	—	—	—	—
II	Rome		43·6	293	—	—	e 14 40?	+ 2	e 18 6	SS	—
I	Stuttgart	Z.	44·2	304	e 8 13	+ 1	—	—	—	—	—
II			44·2	304	e 8 11	− 1	e 14 47	+ 1	—	—	e 21·1
II	Zürich		44·9	303	e 8 16a	− 2	e 14 50	− 6	e 10 3	PP	—
II	Bergen	E.	45·0	321	—	—	e 15 45?	+47	—	—	—
I	Strasbourg		45·1	304	i 8 20	0	—	—	—	—	—
II			45·1	304	i 8 20	0	e 15 3	+ 4	i 10 9	PP	24·2
II	De Bilt		46·0	309	e 8 45	+18	e 15 17	+ 5	—	—	e 24·8
II	Paris		48·5	305	e 8 44	− 2	e 15 48	0	e 10 40	PP	e 27·8
II	Clermont-Ferrand		49·0	301	—	—	e 15 57	+ 2	e 19 31	SS	24·8
II	Kew		49·5	310	e 9 0	+ 6	e 16 2	0	e 18 46	SS	e 29·8
II	Durham		49·5	314	—	—	16 0	− 2	—	—	—
I	Algiers Univ.	Z.	52·2	290	e 9 27	+12	—	—	—	—	—
II			52·2	290	e 9 9	− 6	—	—	—	—	—
II	Tortosa		52·4	296	9 25	+ 9	16 42	0	—	—	e 27·8
II	Rathfarnham Castle		52·5	313	e 9 19	+ 2	16 42	− 1	—	—	—
II	Alicante		54·1	294	9 25	− 4	e 17 8	+ 3	—	—	e 25·4
II	Scoresby Sund		54·5	337	—	—	17 18	+ 8	20 21	SS	—
I	Toledo	Z.	56·0	296	e 9 41	− 2	—	—	—	—	—
II		Z.	56·0	296	e 9 40	− 3	e 17 30	0	e 22 12	SSP	—
II	Granada		56·9	294	10 9a	+20	e 17 56	+14	—	—	—
I	Tamanrasset	Z.	57·1	275	e 9 49	− 1	—	—	—	—	—
II		Z.	57·1	275	e 9 49	− 1	—	—	—	—	—
II	Malaga	Z.	57·6	294	i 9 58k	+ 4	i 17 52	+ 1	10 35	PcP	32·0
II	Pretoria	Z.	75·8	219	e 11 45	− 5	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
II Victoria	Z.	91·8	9	e 13 14	+ 3	—	—	—	—	—
II Pennsylvania		95·4	337	—	—	e 24 3	[0]	—	—	i 53·4
II Cleveland	N.	95·8	340	e 24 16	SKS	(e 24 16)	[+11]	e 24 51	S	—

Additional readings and notes :—
Frunse I i =1m.26s., 1m.46s., and 2m.15s.
Semipalatinsk I i =6m.48s.
Calcutta I, S is given as P and L as S.
Hyderabad I, S is given as P and L as S.
Helwan II eZ =7m.38s.
Budapest II eN =13m.35s., eE =15m.52s., eS?N =16m.1s.
Raciborzu II eN =16m.27s., eE =16m.37s., eN =16m.54s., eE =17m.12s.?
Upsala II ePPE =8m.45s.?, iSE =13m.27s., iSSN =16m.4s., eSSSN =16m.35s.
Potsdam II eE =16m.57s.
Collmberg I eZ =7m.55s., II eE =7m.53s., ePcPZ =9m.29s.
Copenhagen II 13m. 9s.
Triest II iPPP =10m.0s., eSS =17m.29s.
Stuttgart II e =8m.18s. and 17m.0s.
Strasbourg I e =9m.0s., II i =8m.26s., e =14m.37s. and 17m.38s., eSS =17m.45s.
Paris II e =17m.2s., eSS =19m.21s., e =19m.46s., SSS =20m.26s.
Clermont-Ferrand II eSSS =20m.14s.
Kew II eSSSNZ =21m.1s., e =22m.6s., eN =27m.42s.
Algiers Univ. II eZ =9m.20s.
Toledo II eZ =16m.18s. and 36m.45s.
Tamanrasset I eZ =10m.12s., II eZ =10m.1s.
Cleveland II eN =26m.32s.
Long waves to Shock II were also recorded at Jersey, Philadelphia, Seven Falls, Tucson, and Sitka.

July 8d. 12h. 40m. 43s. Epicentre 14°·7N. 91°·2W. (as on 1948, July 19d.).

A = −·0203, B = −·9674, C = +·2522 ; δ = −12 ; h = +6 ;
D = −1·000, E = +·021 ; G = −·005, H = −·252, K = −·968.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		6·4	13	2 26	S	(2 26)	−27	—	—	4·3
Vera Cruz		6·5	314	2 8	Pg	—	—	—	—	e 4·1
Puebla		8·0	304	2 23	P*	—	—	—	—	4·4
Tacubaya		9·0	303	e 2 32	P*	—	—	—	—	i 4·6
Galerazamba		16·1	102	e 6 7	?	—	—	—	—	e 10·9
Bogota	Z.	19·7	120	e 4 31	− 3	—	—	—	—	—
Lubbock		21·1	336	4 54	+ 6	5 17	?	—	—	—
Columbia		21·3	24	e 4 57	+ 7	e 9 4	+21	e 9 11	sS	e 11·3
St. Louis		23·9	2	i 5 18	+ 2	i 9 57	+27	—	—	—
San Juan		24·3	78	e 5 16	− 4	e 9 47	+10	—	—	i 11·2
Tucson		25·0	318	e 5 26	− 1	e 10 0	+11	e 6 30	PPP	e 11·9
Chicago		27·2	6	e 5 49	+ 2	e 10 34	+ 9	e 11 18	SS	e 11·8
New Kensington	E.	27·7	20	—	—	e 10 53	+20	—	—	e 13·6
Cleveland		28·0	16	e 5 56	+ 1	e 10 53	+15	e 6 52	PP	15·2
Pennsylvania		28·5	22	e 5 55	− 4	i 10 57	+11	i 6 43	PP	i 13·2
Philadelphia		28·8	28	—	—	e 11 4	+13	—	—	e 12·9
Pierce Ferry		29·5	321	e 6 7	− 1	—	—	—	—	—
Palomar		29·8	314	e 6 9	− 2	—	—	—	—	—
Overton	Z.	30·0	321	e 6 12	0	—	—	—	—	—
City College, N.Y.		30·1	27	e 6 16	+ 3	e 11 23	+11	e 12 22	SS	—
Fordham		30·1	27	e 6 16	+ 3	e 11 28	+16	—	—	—
Riverside	Z.	30·5	314	e 6 15	− 2	—	—	—	—	—
Huancayo		30·9	149	e 6 39	pP	—	—	e 7 19	PP	i 12·5
Rapid City	E.	31·0	344	e 6 29	+ 8	e 12 7	sS	—	—	e 15·4
Pasadena		31·1	314	e 6 20	− 2	i 11 37	+ 9	e 6 36	pP	e 15·0
Logan		32·3	332	e 7 30	+57	e 11 57	+11	e 7 52	pP	e 14·4
Harvard		32·5	28	e 6 35	+ 1	e 12 4	+15	e 13 11	SS	e 17·8
Tinemaha	Z.	32·8	318	e 5 37	−60	—	—	—	—	—
Ottawa		33·3	20	6 41	0	12 22	+20	—	—	15·1
Fresno	Z.	33·6	317	e 6 43k	− 1	—	—	e 8 9	PP	e 23·9

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bozeman		35·1	337	e 7 1	+ 4	e 12 46	+16	—	—	e 16·7
Reno		35·2	320	e 6 59a	+ 1	—	—	i 8 37	PP	e 20·3
Santa Clara	E.	35·4	317	—	—	e 12 51	+17	—	—	e 20·9
Berkeley		35·9	316	e 7 7k	+ 3	i 12 57	+15	i 8 35	PP	e 21·4
Butte		36·0	336	e 7 7	+ 2	e 12 57	+13	—	—	e 17·4
Seven Falls	E.	36·5	24	e 8 44	PP	—	—	—	—	16·0
Mineral		36·8	321	e 6 17?	?	—	—	—	—	—
Ukiah		37·2	317	e 7 27	+12	—	—	e 13 13	PeS	e 19·8
Shasta Dam		37·5	320	e 7 15	− 2	—	—	—	—	—
Halifax		37·9	33	e 7 56	+36	—	—	—	—	22·3
La Paz		38·5	142	7 45	+19	i 13 7	−15	i 15 9	SS	17·3
Saskatoon		39·3	345	—	—	e 17 47	Q	—	—	26·5
Victoria		42·9	329	8 0	− 2	14 39	+12	18 4	SS	23·8
Sitka		54·1	333	e 9 27?	− 2	e 17 12	+ 7	e 21 11	SS	e 30·5
College		62·9	337	10 31	+ 1	e 18 58	− 2	e 24 31	SS	e 26·4
Scoresby Sund		69·3	19	11 5	− 6	20 33	+16	—	—	35·3
Rathfarnham Castle		75·3	38	—	—	e 20 39	−47	—	—	e 37·6
Malaga	z.	78·8	55	e 12 6	0	e 21 22	−42	e 14 54	PP	37·7
Kew		79·2	40	e 12 11	+ 3	e 22 15	+ 7	e 16 54	PPP	e 40·3
Paris		81·5	42	e 12 18	− 3	e 22 43	+11	e 27 35	SS	e 38·3
Alicante		81·6	53	—	—	e 21 33	−60	—	—	—
Tortosa		81·8	50	—	—	22 50	+15	28 34	SS	e 39·3
De Bilt		82·4	38	e 12 17	− 8	e 22 50	+ 9	—	—	e 37·3
Strasbourg		84·9	41	e 12 37	− 1	e 23 1	− 5	—	—	—
Stuttgart		85·8	41	e 12 40	− 2	e 23 17	+ 2	—	—	e 44·3
Potsdam	z.	87·0	37	e 12 46	− 2	—	—	—	—	e 48·7
Triest		89·7	43	—	—	e 23 38	−14	e 28 29	SS	—
Rome		90·2	46	e 13 2	− 2	e 23 37	[+ 3]	—	—	—
Istanbul		101·8	41	e 16 17?	PP	—	—	—	—	—
Ksara		110·2	45	e 18 25	PP	e 29 17	PPS	—	—	—

Additional readings :—
St. Louis iSE =10m.21s.
Tucson e =5m.37s., esS =10m.13s.
Cleveland ePN =5m.59s., ePPPE =6m.55s., eSE =11m.2s., eSSE =11m.57s.
Pennsylvania iEN =12m.18s.
Huancayo e =7m.7s., i =10m.34s., e =10m.50s.
Logan esS =12m.13s.
Reno iN =7m.10s., eZ =7m.15s., iNZ =7m.57s.
Berkeley eZ =13m.7s., eN =17m.25s.
Ukiah e =10m.45s.
College e =12m.41s.
Kew eEN =19m.40s.
De Bilt eZ =12m.30s.
Long waves were also recorded at La Plata, Bermuda, Lincoln, Honolulu, Ivigtut, and Copenhagen.

July 8d. 13h. 53m. 24s. Epicentre 48°·2N. 9°·0E. (as on 1948, Jan. 27d.).

Intensity IV-V at head of Schmiecha Starzel and Eyach Valleys. Epicentre as adopted. Seismicher Bericht des Württembergischen Erdbebenbienstes, Stuttgart, Vierteljahr, 1949, p. 23.

$A = +·6609$, $B = +·1046$, $C = +·7432$; $\delta = +8$; $h = -5$;
$D = +·156$, $E = -·988$; $G = +·734$, $H = +·116$, $K = -·670$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ebingen	0·0	—	i 0 4a	− 3	i 0 6	− 5	—	—	—
Ravensburg	0·6	135	e 0 14?	− 1	e 0 23	− 3	—	—	—
Stuttgart	0·6	13	e 0 11	− 4	i 0 18	− 8	—	—	—
Strasbourg	0·9	295	i 0 20	0	i 0 31	− 3	—	—	i 0·7
Zürich	0·9	198	e 0 20	0	i 0 34	0	—	—	—
Basle	1·2	235	i 0 25k	+ 1	e 0 41	0	—	—	—
Chur	1·4	165	e 0 28	+ 1	e 0 48	+ 2	—	—	—
Neuchatel	1·8	229	e 0 37	+ 5	e 1 1	+ 5	—	—	—
Jena	3·2	32	—	—	e 1 29	− 3	—	—	e 1·6
Collmberg	4·0	38	e 1 16?	P_g	e 2 6	S*	e 2 15	S_g	—

For Notes see next page.

NOTES TO JULY 8d. 13h. 53m. 24s.

Additional readings :—
Stuttgart i = 15s. and 21s.
Collmberg ePZ = 1m.20s., eE = 2m.21s.
Long waves were also recorded at Clermont-Ferrand.

July 8d. 18h. 18m. 4s. Epicentre 72°·2N. 0°·5E. (as on 1949, April 14d.).

$A = +\cdot3075$, $B = +\cdot0027$, $C = +\cdot9515$; $\delta = -8$; $h = -12$;
$D = +\cdot009$, $E = -1\cdot000$; $G = +\cdot951$, $H = +\cdot008$, $K = -\cdot308$.

		Δ	Az.	P.	O−C.	S.	O−C.		Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Scoresby Sund		7·4	268	1 47	− 5	—	—	—	—	2·9
Bergen		12·0	168	2 56?	+ 1	e 4 47	−24	—	—	e 5·9
Upsala		14·1	142	i 3 22a	− 1	6 20	+18	—	—	7·3
Aberdeen	N.	15·2	185	i 3 32	− 6	e 6 24	− 4	—	—	—
Copenhagen		17·3	157	e 4 4	0	7 20	+ 4	—	—	8·7
Durham	N.	17·5	182	i 4 6	− 1	i 7 29	+ 8	—	—	—
De Bilt		20·3	172	i 4 40a	0	e 8 22	− 1	—	—	e 9·9
Potsdam		20·7	159	i 4 44k	0	i 8 53	+22	e 4 58	PP	e 10·4
Kew		20·8	181	i 4 47	+ 2	i 8 33	0	e 5 15	PP	e 9·9
Collmberg		21·7	157	e 4 55	0	e 8 57	+ 6	e 5 17	PP	e 11·9
Jena	N.	21·9	160	e 4 57	0	e 9 3	+ 9	—	—	—
Moscow		22·6	118	5 6	+ 3	9 16	+ 9	—	—	—
Cheb		22·8	161	e 4 53	−12	e 9 14	+ 3	e 5 59	PPP	—
Jersey	E.	23·1	184	e 6 16	PPP	—	—	—	—	—
Prague		23·1	157	5 11	+ 3	e 9 22	+ 6	e 5 25	PP	e 10·9
Paris		23·5	178	e 5 13	+ 1	i 9 15	− 8	5 44	PP	e 10·9
Raciborzu		23·6	150	e 5 14	+ 1	—	—	—	—	—
Strasbourg		23·9	168	e 5 18	+ 2	e 9 30	0	i 5 50	PP	10·9
Stuttgart		23·9	166	e 5 17	+ 1	e 9 40	+10	e 5 59	PP	e 11·9
Lwow		24·8	141	e 5 26	+ 1	9 51	+ 5	—	—	—
Skalnate Pleso		24·8	147	e 5 21	− 4	e 10 4	+18	e 5 50	PP	—
Basle		25·0	169	e 5 27	0	e 10 0	+11	—	—	—
Zürich		25·2	168	e 5 23a	− 6	e 9 54	+ 2	—	—	—
Ogyalla		25·7	151	e 6 44	PPP	—	—	—	—	—
Clermont-Ferrand		26·6	176	e 5 43	+ 1	e 10 19	+ 3	e 11 47	SS	13·9
Sverdlovsk		28·5	90	i 6 2	+ 3	10 50	+ 4	—	—	—
Florence Xim.		29·0	163	i 8 54	?	—	—	—	—	—
Belgrade		29·1	149	e 7 11k	PP	—	—	—	—	e 17·8
Rome		31·0	161	e 6 20	− 1	e 11 21	− 5	—	—	e 14·7
Tortosa		31·5	179	—	—	11 42	+ 8	13 12	SS	e 13·9
Istanbul		34·2	139	e 6 52	+ 3	e 12 21	+ 5	—	—	—
Malaga	z.	35·6	186	(i 7 1)	0	e 12 39	+ 1	8 27	PP	17·9
Grozny		36·1	118	e 7 13	+ 8	—	—	—	—	—
Tiflis		37·3	120	e 7 32	+16	e 13 10	+ 6	—	—	—
Ksara		42·6	135	e 7 56	− 3	14 33	+10	—	—	—
Ottawa		43·4	275	8 5	− 1	—	—	—	—	23·9
Ashkabad		44·6	107	e 8 19	+ 3	—	—	—	—	—
Harvard		44·7	269	i 8 16	0	—	—	—	—	—
Irkutsk		45·1	58	e 9 58	PP	e 18 2	ScS	—	—	—
Stalinabad		47·2	96	e 8 39	+ 3	e 15 38	+ 9	—	—	—
Cleveland		48·7	278	e 8 50	+ 2	e 15 59	+ 9	e 19 31	SS	—
Murgab		48·9	91	e 8 55	+ 5	—	—	—	—	—
Tamanrasset	z.	49·5	174	e 8 54	0	—	—	e 10 51	PP	—
Hungry Horse		51·4	309	e 9 8	− 1	—	—	—	—	—
Victoria	z.	53·4	316	e 9 23	− 1	—	—	—	—	—
St. Louis		53·9	285	e 9 26	− 1	e 17 8	+ 6	—	—	e 25·8
Logan		57·1	304	e 9 45	− 5	—	—	—	—	—
Shasta Dam		60·6	313	e 10 12	− 3	—	—	—	—	—
Lubbock		62·0	293	10 28	+ 4	—	—	—	—	—
Overton	z.	62·6	305	i 10 29	+ 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pierce Ferry		62·9	304	e 10 31	+ 1	—	—	—	—	—
Tinemaha	Z.	63·1	308	e 10 31	− 1	—	—	—	—	—
Fresno	Z.	63·8	310	e 10 36	0	—	—	—	—	—
Pasadena		65·8	307	e 10 49	0	—	—	—	—	—
Tucson		65·8	300	e 10 48	− 1	—	—	—	—	e 38·0
Palomar	N.	66·3	306	e 10 55	+ 3	—	—	—	—	—
La Paz	Z.	99·3	244	i 10 58	?	—	—	—	—	—

Additional readings :—
Upsala iE =6m.39s.
Aberdeen iN =5m.57s., eSE =6m.15s.
Potsdam ePN =4m.47s.?, eE =5m.34s.
Collmberg eE =5m.10s., and 9m.1s., eN =9m.6s.
Paris i =5m.17s., e =9m.24s.
Raciborzu eZ =6m.15s., eN =6m.31s.
Strasbourg ePPP =6m.4s., e =9m.47s.
Stuttgart e =5m.30s.
Belgrade e =7m.32s., 13m.22s., and 14m.38s.
Tortosa SSSN =13m.32s.
Malaga P is increased by 2 minutes.
Tamanrasset eZ =9m.1s.
Tinemaha iZ =11m.52s.
Long waves were also recorded at Alicante, Seven Falls, City College, N.Y., and Berkeley.

July 8d. Readings also at 1h. (Overton), 2h. (Andijan, Murgab, Samarkand, near Kulyab, Obi-garm, and Stalinabad), 3h. and 5h. (La Paz), 7h. (Ottawa and Stuttgart), 8h. (near Copiapo), 10h. (Durham, Tucson, Overton, Pierce Ferry, near Victoria, Tashkent, near Andijan, Kulyab, Murgab, Obi-garm, and Stalinabad), 11h. (Scoresby Sund, Collmberg, Strasbourg, near Ebingen, Stuttgart, Zürich, Tashkent, near Andijan, Kulyab, Murgab, and Stalinabad), 12h. (Samarkand, Tashkent, near Andijan (2), Murgab (2), and Stalinabad (2)), 13h. (Istanbul), 14h. (near Andijan, Murgab, and Stalinabad), 15h. (Frunse, Samarkand, near Andijan, Murgab, and Stalinabad), 18h. (Harvard, near Andijan, Murgab, and Stalinabad), 19h. (Overton (2), near Reno, near Tucson, near Apia, Grozny, Tiflis, near Erevan and Leninakan), 22h. (Overton, Andijan, Murgab, Moscow, Stalinabad, Sverdlovsk, and near Malaga), 23h. (De Bilt, Kew, Overton (2), Tucson, and near Mizusawa).

July 9d. 18h. 44m. 43s. Epicentre 32°·4N. 70°·5W.

$A = +\cdot2824$, $B = -\cdot7974$, $C = +\cdot5333$; $\delta = +1$; $h = +1$;
$D = -\cdot943$, $E = -\cdot334$; $G = +\cdot178$, $H = -\cdot503$, $K = -\cdot846$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		4·9	89	i 1 17	0	i 2 7	− 8	—	—	i 2·6
Georgetown		8·4	322	i 2 41	+35	i 4 9	SSS	—	—	—
Washington		8·4	322	i 2 6	0	e 3 30	−13	—	—	e 7·2
Philadelphia		8·4	335	i 2 5	− 1	(i 3 36)	− 7	e 3 31	?	i 3·6
City College, N.Y.		8·8	343	e 2 13	+ 2	i 3 50	− 3	—	—	e 4·8
Fordham		8·9	343	i 2 10	− 2	i 3 46	− 9	—	—	—
Columbia		9·0	283	e 2 7	− 6	e 3 30	−28	—	—	e 5·4
Harvard		10·1	356	i 2 27	− 1	i 4 11	−14	—	—	—
Pennsylvania		10·3	327	i 2 29	− 3	i 4 13	−17	i 2 38	PP	—
New Kensington	E.	11·0	320	e 2 43	+ 1	i 4 41	− 6	—	—	e 5·6
Cleveland		12·6	319	e 3 2	− 1	i 5 14	−12	i 3 17	PP	6·3
Cincinnati		13·2	304	e 3 10	− 1	i 5 27	−13	i 6 0	SS	—
Ottawa		13·6	344	3 14a	− 3	5 41	− 9	—	—	6·1
Shawinigan Falls	N.	14·2	354	3 25	+ 1	6 7	+ 3	3 36	PP	6·6
San Juan		14·5	163	i 3 32	+ 4	e 6 12	+ 1	—	—	e 7·0
Seven Falls	E.	14·7	359	3 43	+12	6 22	+ 6	4 2	PPP	8·6
Chicago		16·5	309	e 3 51	− 3	e 7 11	+13	—	—	e 7·9
St. Louis		17·2	297	i 4 2	− 1	i 7 0	−14	i 4 30	PPP	i 8·2
Fort de France		19·5	151	e 4 27	− 4	—	—	—	—	—
Lubbock		26·3	281	5 41	+ 2	—	—	—	—	—
Bogota		27·8	187	i 5 52	− 1	e 10 35	0	—	—	13·3
Rapid City	E.	28·0	304	i 5 55	0	e 10 41	+ 3	—	—	i 13·7
Tacubaya		28·8	250	i 6 6	+ 4	—	—	—	—	—
Bozeman		33·8	305	e 6 46	0	—	—	e 9 23	PcP	—
Tucson		33·9	281	i 6 47	0	e 12 14	+ 3	e 7 50	PP	e 16·5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Logan		34·0	298	i 6 45	− 3	e 12 12	− 1	e 17 18	ScS	e 14·4
Butte	N.	34·9	307	—	—	e 12 30	+ 3	e 17 18	ScS	e 15·0
Pierce Ferry		35·9	288	e 7 5	+ 1	—	—	e 8 25	PP	—
Hungry Horse		36·2	309	i 7 7	+ 1	—	—	i 9 32	PcP	—
Overton	z.	36·2	289	i 7 8	+ 2	—	—	—	—	i 18·0
China Lake	z.	38·9	289	i 7 29a	0	—	—	—	—	—
Riverside		39·0	286	i 7 31a	+ 1	—	—	i 9 40	PcP	—
Tinemaha		39·2	291	i 7 32a	+ 1	—	—	—	—	—
Pasadena		39·6	286	i 7 35a	0	—	—	—	—	—
Reno		40·0	294	e 7 39	+ 1	e 13 45	+ 1	—	—	e 20·7
Fresno	z.	40·5	291	i 7 41a	− 1	i 14 31	PPS	i 9 20k	PP	—
Mineral		41·4	296	e 7 17?a	−33	—	—	—	—	—
Lick	z.	41·8	292	i 7 54a	+ 1	—	—	—	—	—
Shasta Dam		42·0	297	i 7 52	− 2	—	—	—	—	—
Berkeley		42·2	292	i 7 58	+ 2	i 15 6	+49	—	—	e 22·8
Victoria		42·5	308	7 57	− 2	—	—	—	—	23·3
Scoresby Sund		46·3	20	8 32	+ 3	15 24	+ 8	—	—	22·3
La Paz		48·7	176	i 8 45a	− 3	16 9	PPS	i 10 57	PP	—
Toledo		53·1	62	10 20	PcP	—	—	e 11 29	PP	—
Kew		53·5	47	e 9 24	0	e 17 3	+ 6	e 11 21	PP	e 24·3
Malaga	z.	53·6	65	i 9 26a	+ 1	i 17 4	+ 6	11 24	PP	25·2
Almeria		55·1	65	e 9 38	+ 2	17 22	+ 4	11 50	PP	—
Paris		55·7	50	e 9 40	0	e 17 30	+ 4	13 4	PPP	e 25·3
Alicante		56·2	63	—	—	e 17 37	+ 4	—	—	—
De Bilt		56·7	45	e 9 47	− 1	e 17 53	+13	—	—	e 26·8
Clermont-Ferrand		56·8	53	i 9 49	+ 1	e 17 44	+ 3	e 11 53	PP	26·3
Strasbourg		59·1	49	i 10 6	+ 2	e 18 17	+ 6	—	—	30·3
Stuttgart		60·0	48	e 10 11	0	e 18 24	+ 1	—	—	e 29·3
Jena		60·9	46	e 10 18	+ 1	—	—	—	—	—
Potsdam	z.	61·3	43	e 10 22	+ 2	—	—	—	—	e 34·9
Collmberg		61·6	45	e 10 22	0	—	—	—	—	—
Triest		63·9	51	e 10 35	− 2	e 19 13	+ 1	—	—	—
Rome		64·4	55	e 10 41k	+ 1	e 19 18	0	—	—	—
Zagreb		65·3	50	—	—	e 19 32	+ 3	—	—	—
Tamanrasset	z.	66·8	77	i 10 56k	0	—	—	e 11 25	PcP	—
Moscow		73·1	34	11 34	0	—	—	—	—	—
Sverdlovsk		82·0	24	i 12 23	0	e 22 41	+ 4	—	—	—
Helwan	z.	83·5	59	i 12 33	+ 2	—	—	—	—	—
Ksara		84·4	53	i 12 39	+ 3	—	—	—	—	—
Tiflis		85·2	43	12 43	+ 4	—	—	—	—	—
Leninakan		85·3	44	e 12 53	+13	—	—	—	—	—

Additional readings :—
City College N.Y. i = 3m.42s.
Columbia e = 3m.40s.
St. Louis iSS = 7m.53s.
Bogota eSSEN = 11m.23s.
Tacubaya i = 7m.26s.
Tucson ePPP = 8m.11s., ePcP = 9m.2s.
Logan ePP = 7m.50s., e = 12m.36s.
Hungry Horse e = 11m.30s.
Riverside eZ = 7m.48s. and 8m.59s.
Tinemaha iZ = 7m.51s.
Reno eEZ = 7m.50s., eN = 8m.5s., iZ = 8m.9s.
Fresno iZ = 12m.9s.
Lick iZ = 8m.0s.k and 8m.4s.a.
Kew eSS = 20m.18s.
Malaga PcPZ = 10m.32s.
Clermont-Ferrand eSS = 21m.32s.
Strasbourg i = 10m.15s., e = 10m.34s.
Stuttgart e = 10m.21s.
Tamanrasset iZ = 11m.6s.k
Helwan eZ = 12m.43s. and 13m.7s.
Ksara e = 9m.33s. and 18m.5s.
Long waves were recorded at Bucharest, Istanbul, Sitka, College, and Santa Clara.

July 9d. Readings also at 0h. (Grahamstown, Pretoria, Tamanrasset, La Paz, Bogota, San Juan, Overton (2), Pierce Ferry, Shasta Dam, Lick, Riverside, Tinemaha, Hungry Horse, and Victoria), 1h. (Kew, De Bilt, Copenhagen, Paris, and Overton), 4h. (near College), 5h. (Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 7h. (near Lick), 8h. (Stuttgart), 10h. (Copiapo), 11h. (Mineral and near Reno), 15h. (Arapuni, Auckland, Apia, Christchurch, Wellington, Pasadena, Riverside, Tinemaha, Tucson, China Lake, Overton, Pierce Ferry, Shasta Dam, Berkeley, Fresno, Logan, near Lick (2), Helwan, Collmberg, Paris, Strasbourg, Stuttgart, Rome, Frunse, Tashkent, Tchimkent, near Andijan, Murgab, Obi-garm, Stalinabad, and near Leninakan), 16h. (near Lick, Branner, Berkeley, and near Collmberg), 19h. (Zagreb, Collmberg, Stuttgart, Rome, and near Bozeman), 20h. (Tashkent, Tchimkent, near Andijan, Murgab, Obi-garm, Stalinabad, Harvard, near Lick and near Tucson), 22h. (Apia, Copiapo, and near Bogota), 23h. (Mineral (2), near Lick (2), and Reno (2)).

July 10d. 3h. 53m. 36s. Epicentre 39°·2N. 70°·7E. (as on 8d.).

$A = +\cdot2568$, $B = +\cdot7334$, $C = +\cdot6295$; $\delta = +9$; $h = -1$;
$D = +\cdot944$, $E = -\cdot331$; $G = +\cdot208$, $H = +\cdot594$, $K = -\cdot777$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	0 22	+ 2	—	—	—	—	—
Stalinabad		1·6	247	i 0 34	+ 4	—	—	—	—	—
Andijan		2·0	39	i 0 38	+ 3	—	—	—	—	—
Tashkent		2·4	333	i 0 42	+ 1	i 1 10	− 2	—	—	—
Murgab		2·7	108	i 0 46	+ 1	—	—	—	—	—
Samarkand		2·9	279	0 52	+ 4	—	—	—	—	—
Tchimkent		3·1	345	i 0 53	+ 2	—	—	—	—	—
Frunse		4·7	38	i 1 16	+ 2	—	—	—	—	—
Ashkabad		9·8	267	i 2 25?	+ 1	—	—	—	—	—
Dehra Dun	N.	10·7	144	i 1 24	?	i 3 12	?	—	—	e 4·4
New Delhi	N.	11·9	151	i 2 46	− 8	i 4 58	−11	5 12	SS	—
Semip..latinsk		13·1	28	i 3 5	− 5	i 5 26	−12	—	—	—
Baku		16·0	281	i 3 54	+ 6	—	—	—	—	—
Sverdlovsk		18·9	343	i 4 19	− 5	i 7 53	0	—	—	—
Grozny		19·2	290	e 4 29	+ 1	e 7 43	−16	—	—	—
Tiflis		19·8	285	i 4 34	− 1	i 8 22	+ 9	—	—	—
Erevan		20·2	281	4 43	+ 4	8 36	+15	—	—	—
Bombay		20·3	175	i 4 39	− 1	i 8 26	+ 3	—	—	—
Leninakan		20·6	284	4 49	+ 6	8 51	+22	—	—	—
Poona		20·8	172	i 4 41	− 4	i 8 31	− 2	i 5 2	PP	—
Piatigorsk		21·2	293	i 4 48?	− 1	8 36?	− 5	—	—	—
Calcutta	E.	22·4	133	i 5 1k	− 1	i 9 7	+ 3	—	—	—
Hyderabad	N.	22·7	161	i 5 1	− 3	i 9 3	− 6	—	—	10·8
Irkutsk		26·6	49	i 5 41	− 1	10 7	− 9	—	—	—
Theodosia		26·7	295	5 45	+ 2	10 26	+ 9	—	—	—
Moscow		27·5	318	e 5 48	− 2	i 10 30	0	—	—	—
Simferopol		27·6	295	5 52	+ 1	e 10 39	+ 7	—	—	—
Yalta		27·6	293	i 5 51	0	e 10 41	+ 9	—	—	—
Ksara		28·4	269	i 5 58	0	11 4	+19	—	—	—
Kodaikanal	E.	29·5	167	e 5 35	−33	i 10 35	−27	6 30	PP	13·6
Istanbul		31·7	288	e 6 26	− 1	e 11 35	− 2	—	—	—
Bucharest		33·2	294	e 6 44	+ 4	i 12 10	+10	—	—	—
Cernauti		33·2	301	6 45	+ 5	12 7	+ 7	—	—	—
Helwan		33·5	266	i 6 42	− 1	12 12	+ 7	8 0	PP	—
Colombo	E.	33·6	164	6 24?	−20	12 0	− 6	(13 40)	SS	13·7
Campulung		34·0	296	e 6 53	+ 5	e 12 23	+10	i 14 19	SS	i 16·6
Lwow		34·4	304	—	—	i 12 4	−15	—	—	—
Helsinki		35·3	323	i 6 57k	− 2	i 12 31	− 2	i 8 12	PP	e 15·4
Skelnate Pleso		36·9	304	i 7 10	− 2	i 12 58	0	—	—	—
Belgrade		37·3	295	i 7 15k	− 1	i 13 12	+ 8	i 8 48	PP	e 17·5
Budapest		37·8	301	7 15	− 5	13 15	+ 4	8 43	PP	—
Kalossa		38·0	300	7 25	+ 4	e 13 24	+10	i 8 55	PP	e 16·4
Raciborzu		38·2	305	i 7 24	+ 1	e 16 3	SS	e 8 42	PP	e 18·1
Upsala		38·8	320	7 27?a	− 1	13 27?	+ 1	i 8 52	PP	e 17·4
Zagreb		40·2	298	e 7 41	+ 1	i 14 7	+19	i 9 25	PP	22·4

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		40·5	290	7 42	0	13 48	− 4	9 19	PP	21·3
Prague		40·6	305	i 7 44	+ 1	13 51	− 3	e 9 18	PP	e 19·4
Potsdam		41·2	309	i 7 46a	− 2	i 14 9	+ 7	i 9 29	PP	—
Collmberg		41·4	308	e 7 48	− 2	i 14 9	+ 4	i 9 28	PP	e 20·4
Copenhagen		41·4	314	i 7 48a	− 2	i 14 7	+ 2	9 30	PP	20·4
Cheb		41·9	305	e 7 54	0	14 14	+ 1	—	—	—
Messina		42·5	287	e 7 59a	0	i 14 32	+10	—	—	—
Jena		42·7	306	e 7 56	− 4	e 14 20	− 4	e 9 40	PP	e 20·6
Catania		43·1	286	e 7 59	− 5	e 14 28	− 2	e 9 50	PP	—
Rome		43·6	293	i 8 5a	− 3	i 14 43	+ 5	i 9 29	PP	i 21·8
Bologna		43·7	297	e 8 9	+ 1	i 14 49	+10	e 9 50	PP	e 25·4
Florence Arc.		43·9	297	e 8 11	+ 1	14 43	+ 1	9 45	PP	21·4
Florence Xim		43·9	297	e 8 10	0	14 48	+ 6	—	—	—
Prato		44·0	297	i 8 10	− 1	i 14 39	− 4	—	—	—
Ravensburg		44·1	302	e 8 13a	+ 1	e 14 59	+14	—	—	—
Stuttgart		44·2	304	i 8 12a	0	i 14 52	+ 6	i 10 2	PP	i 20·4
Chur		44·4	302	e 8 11	− 2	e 18 3	SS	—	—	—
Zürich		44·9	303	e 8 16	− 2	e 14 37	−19	e 10 5	PP	—
Pavia		45·0	299	i 9 25	+66	e 19 41	SSS	—	—	—
Bergen		45·0	321	i 8 20	+ 1	i 15 0	+ 2	9 43	PP	18·0
Strasbourg		45·1	304	i 8 19	− 1	i 14 51	− 8	i 9 57	PP	i 23·4
Basle		45·5	302	e 8 20a	− 3	e 18 39	SS	e 10 7	PP	—
Neuchatel		46·0	303	e 8 25	− 2	—	—	—	—	—
De Bilt		46·0	309	i 8 26a	− 1	i 15 18	+ 6	i 10 14	PP	e 22·4
Ituhara		46·5	77	8 34	+ 3	15 19	0	—	—	22·4
Tunis		47·0	287	e 8 42	+ 7	i 15 19	− 7	i 10 3	P_cP	e 24·1
Hukuoka		47·6	78	e 8 40	+ 1	15 31	− 4	—	—	25·1
Kumamoto		48·2	78	e 8 47	+ 3	15 40	− 3	—	—	25·5
Hamada		48·3	76	8 49	+ 4	15 46	+ 1	19 32	SS	26·3
Paris		48·5	305	i 8 44	− 2	i 15 38	−10	i 10 38	PP	e 23·4
Kagosima		48·6	80	8 53	+ 6	15 45	− 4	—	—	24·6
Hirosima		48·8	77	8 52	+ 3	16 18	+26	—	—	25·1
Clermont-Ferrand		49·0	301	e 8 49	− 1	e 16 0	+ 5	i 10 45	PP	24·4
Miyazaki		49·1	80	8 52	+ 1	15 56	0	—	—	23·6
Aberdeen		49·2	318	i 8 45	− 7	i 15 49	− 9	i 10 40	PP	26·0
Kew		49·5	310	e 8 52a	− 2	e 16 1	− 1	i 10 50	PP	e 24·9
Durham		49·5	314	i 8 54	0	16 2	0	11 5	PP	—
Edinburgh	E.	50·1	315	8 58	− 1	16 10	0	10 56	PP	—
Toyooka		50·1	74	9 1	+ 2	16 8	− 2	—	—	—
Sumoto		50·7	75	9 2	− 1	16 18	0	18 59	S_cS	22·6
Kobe		50·8	74	e 9 3	− 1	16 18	− 2	i 16 28	PS	30·7
Wazima		50·9	71	e 9 8	+ 3	16 29	+ 8	—	—	28·2
Osaka		51·0	74	e 9 7	+ 1	16 28	+ 6	10 46	PP	17·7
Kyoto		51·0	73	e 9 24	+18	16 39	+17	—	—	—
Barcelona		51·1	297	i 9 7	+ 1	i 16 27	+ 3	10 58	PP	24·2
Hikone		51·3	73	e 9 10	+ 2	16 23	− 3	11 8	PP	e 28·2
Jersey	E.	51·3	308	i 9 8	0	—	—	e 20 29	SS	25·4
Toyama		51·4	70	9 10	+ 1	16 28	0	—	—	—
Owase		51·8	74	e 9 4	− 8	16 32	− 1	10 26	P_cP	28·0
Nagoya		51·9	73	9 12	0	16 33	− 2	e 26 2	Q	e 30·5
Sapporo		51·9	62	9 15	+ 3	16 30	− 5	—	—	26·0
Matusiro		52·2	71	9 14	− 1	16 33	− 6	—	—	24·7
Algiers Univ.	z.	52·2	290	e 8 57	−18	e 16 26	−13	10 21	P_cP	—
Nagano		52·2	71	9 16	+ 1	16 31	− 8	—	—	25·8
Akita		52·3	66	9 21	+ 6	17 51	+71	—	—	—
Tortosa		52·4	296	i 9 17	+ 1	i 16 36	− 6	11 15	PP	24·8
Maebasi		52·9	70	e 9 22	+ 2	16 51	+ 3	—	—	—
Shizuoka		53·0	73	9 21	0	16 44	− 6	22 2	SSS	27·8
Hatinohe		53·0	65	9 24	+ 3	16 48	− 2	—	—	33·1
Hunatu		53·1	72	9 24	+ 3	16 57	+ 6	—	—	25·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Omaesaki		53·1	73	9 24	+ 3	16 48	− 3	—	—	—
Morioka		53·1	66	i 9 24	+ 3	16 48	− 3	—	—	—
Kumagaya		53·3	71	9 28	+ 5	16 54	0	—	—	29·7
Mizusawa		53·3	67	9 26	+ 3	16 50	− 4	—	—	e 27·2
Sendai		53·5	68	9 22	− 2	16 51	− 6	—	—	25·9
Tokyo		53·7	72	i 9 30	+ 4	16 58	− 1	10 21	P_cP	—
Miyako		53·7	66	9 25	− 1	16 53	− 6	—	—	25·3
Mito		53·9	70	9 24	− 3	16 59	− 3	—	—	—
Alicante		54·1	294	9 29	0	17 3	− 2	11 38	PP	26·4
Scoresby Sund		54·5	337	i 9 33	+ 1	17 15	+ 5	11 36	PP	—
Nemuro		54·7	60	e 9 28	− 5	16 59	−14	23 46	Q	30·5
Toledo		56·0	296	i 9 41	− 2	i 17 30	0	10 33	P_cP	26·5
Batavia		56·2	136	i 9 46a	+ 2	i 17 42	+ 9	—	—	29·4
Almeria		56·2	293	i 9 45	+ 1	i 17 30	− 3	i 10 50	P_cP	30·2
Reykjavik	E.	56·6	329	9 49	+ 2	e 17 52	+14	e 21 40	SS	e 27·2
Granada		56·9	294	i 9 51k	+ 2	i 17 48	+ 6	i 12 9	PP	i 28·9
Tamanrasset	Z.	57·1	275	i 9 49k	− 1	e 17 56	+11	e 10 37	P_cP	26·4
Malaga	N.	57·6	294	i 9 56	+ 2	i 18 2	+11	12 22	PP	27·6
Klyuchi		58·5	41	7 56	−124	—	—	—	—	—
Lisbon		60·1	298	10 10a	− 1	i 18 30	+ 6	22 27	SS	30·3
Tananarive		61·7	205	e 10 22	0	e 18 48	+ 4	10 52	P_cP	25·9
Ivigtut		68·4	333	i 11 4	− 2	i 20 9	+ 2	24 42	SS	33·0
College		72·0	17	i 11 22	− 6	i 20 45	− 4	i 14 3	PP	i 29·1
Sitka		81·1	15	i 12 24	+ 6	e 22 30	+ 2	e 15 34	PP	e 32·9
Grahamstown	Z.	82·9	217	i 11 59	−29	—	—	—	—	—
Halifax		86·9	330	12 52	+ 4	23 35	+ 9	16 28	PP	41·4
Seven Falls	E.	87·5	335	12 51	0	23 20	[+ 3]	16 18	PP	34·8
Shawinigan Falls	N.	88·6	336	12 55	− 1	23 46	+ 4	16 22	PP	36·1
Saskatoon		89·0	359	13 6	+ 8	23 32	[+ 5]	16 36	PP	40·4
Ottawa		90·5	338	13 6k	+ 1	23 37	[+ 1]	16 42	PP	38·9
Harvard		91·8	332	i 13 13	+ 2	e 23 39	[− 4]	e 16 34	PP	e 41·9
Victoria		91·8	9	13 9	− 2	24 13	+ 2	17 1	PP	37·4
Hungry Horse		92·7	3	i 13 13	− 2	e 23 43	[− 5]	e 30 24	PKKP	—
Spokane		93·2	5	e 13 19	+ 2	i 23 54	[+ 3]	i 24 31	S	—
Buffalo		93·7	337	i 13 20	0	i 24 31	+ 4	i 17 5	PP	—
Fordham		94·0	333	e 13 23	+ 2	i 23 58	[+ 2]	e 17 6	PP	—
City College, N.Y.		94·1	333	e 13 22	0	e 23 58	[+ 2]	e 17 11	PP	e 40·5
Butte	N.	95·1	1	e 13 29	+ 3	e 24 5	[+ 3]	e 17 19	PP	e 44·2
Philadelphia		95·3	334	e 13 26	− 1	i 24 40	− 1	e 17 14	PP	e 40·6
Pennsylvania		95·4	337	i 13 30	+ 2	i 24 6	[+ 3]	i 17 14	PP	—
Bozeman		95·5	1	e 13 30	+ 2	e 24 40	− 2	e 17 20	PP	e 43·2
Cleveland		95·8	340	e 13 30	+ 1	i 24 7	[+ 2]	e 17 27	PP	—
New Kensington	E.	96·1	338	e 13 53	+22	e 24 14	[+ 7]	—	—	e 45·5
Washington		96·8	335	e 13 36	+ 2	e 24 14	[+ 3]	e 17 18	PP	e 46·2
Georgetown		96·8	335	e 14 12	+38	—	—	—	—	—
Chicago		96·9	344	e 13 36	+ 2	e 24 50	− 4	e 17 27	PP	e 39·9
Bermuda		97·7	323	e 13 38	0	e 24 24	[+ 9]	e 17 1	PP	i 37·4
Cincinnati		98·8	341	e 13 44	+ 1	i 25 17	+ 7	i 17 49	PP	—
Logan		99·4	2	e 13 42	− 4	i 24 24	[0]	e 17 27	PP	e 39·7
Ferndale		99·5	11	e 13 2	−44	e 23 20	[−65]	e 32 2	SS	e 53·6
Lincoln	E.	99·5	350	e 13 55	+ 9	e 25 9	− 7	e 17 55	PP	e 43·6
Shasta Dam		99·6	9	i 13 45	− 1	e 24 24	[− 1]	e 17 45	PP	—
Mineral		100·0	9	i 13 24?k	−24	—	—	—	—	—
St. Louis		100·6	345	e 13 53	+ 2	i 25 22	− 3	e 17 58	PP	—
Ukiah		101·0	11	e 14 3	+10	e 25 35	+ 6	e 18 11	PP	e 42·6
Reno		101·1	8	e 13 54	+ 1	i 24 29	[− 3]	i 18 2	PKP	e 63·4
Brisbane		101·3	116	e 13 54	0	i 24 34	[+ 1]	i 18 3	PP	—
Berkeley		102·4	10	e 14 3	+ 4	i 24 43	[+ 4]	i 18 14	PP	e 56·2
Melbourne	E.	102·6	129	e 14 13	+13	i 25 54	+12	i 18 20	PP	—
Columbia		102·6	336	e 18 9	PP	e 25 42	0	e 20 24	PPP	e 44·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Branner		102·8	10	e 14 9	+ 8	e 24 41	[+ 1]	e 18 18	PP	e 51·1
Santa Clara		102·9	10	e 18 6	PP	i 24 45	[+ 4]	i 30 21	PKKP	e 50·9
Lick		103·0	10	i 14 14a	+12	e 24 44	[+ 3]	i 18 25	PP	e 53·6
Tinemaha	z.	103·6	7	e 14 8	+ 4	—	—	—	—	—
Fresno		103·8	9	e 14 12a	+ 7	e 24 45	[0]	i 18 23	PP	e 63·3
Riverview		104·0	122	14 7?	+ 1	i 24 50	[+ 4]	i 18 27	PP	e 47·7
Overton	z.	104·5	4	e 14 11	+ 3	—	—	i 18 36	PP	e 58·8
Honolulu		104·6	46	e 18 29	PP	e 24 40	[− 9]	e 25 56	S	e 42·0
Pierce Ferry		104·9	3	e 14 13	+ 3	e 24 56	[+ 6]	e 18 10	PP	—
Boulder City		105·0	4	i 14 14	+ 3	—	—	—	—	—
China Lake	z.	105·0	6	e 14 13	+ 2	—	—	e 30 14	PKKP	—
Pasadena		106·6	7	i 14 22	+ 4	e 24 52	[− 6]	e 18 33	PP	i 50·1
Riverside	z.	106·8	7	e 14 23	+ 3	—	—	—	—	—
Lubbock		107·3	353	17 43	?	25 21	[+20]	—	—	—
Palomar	z.	107·5	6	e 14 29	P	—	—	—	—	—
Loyola		108·9	342	e 14 32	P	e 25 13	[+ 5]	e 18 55	PP	—
Tucson		108·9	1	e 14 30	P	e 25 3	[− 5]	e 18 11	PKP	e 43·5
San Juan		109·9	316	e 14 28	P	e 25 8	[− 4]	e 19 8	PP	e 44·8
Fort de France		110·0	309	e 15 18	P	e 26 50	S	—	—	—
Chihuahua		112·4	357	e 19 28	PP	e 29 4	PS	e 21 44	PPP	e 55·7
Merida		117·4	339	e 19 52	PP	e 27 42	S	e 29 33	PS	—
Apia	E.	119·9	83	—	—	e 25 54	[+ 4]	—	—	—
Vera Cruz		120·6	345	e 22 12	PKS	—	—	—	—	e 55·6
Tacubaya		121·0	348	e 19 2	[+ 7]	e 25 30	[−23]	e 30 23	PS	e 55·7
Auckland		121·9	113	—	—	i 28 36	{+70}	e 29 44	PS	52·9
Arapuni	E.	123·0	114	—	—	e 26 24	[+24]	e 35 12	SS	e 59·9
Christchurch		123·3	121	i 20 41	PP	27 46	{+10}	e 23 8	PPP	63·4
Wellington		123·8	119	i 20 44	PP	i 25 45	[−17]	i 22 48	PKS	58·4
Bogota		125·6	315	e 19 8	[+ 4]	e 29 42	?	e 32 7	PPS	—
La Paz		137·6	290	i 19 17a	[− 9]	27 18	[+43]	i 19 29	pPKP	65·3
La Plata	E.	139·2	259	22 23	PP	26 24	[−14]	23 4	PKS	71·3
	N.	139·2	259	23 0	PKS	26 50	[+12]	25 8	PPP	70·8
Buenos Aires		139·5	260	e 22 22	PP	—	—	—	—	e 61·2
Huancayo		139·6	303	e 19 28	[− 2]	e 26 56	[+18]	i 22 28	PP	e 59·5
Copiapo	N.	145·6	278	e 19 35	[− 5]	e 22 36	PP	26 51	PPP	51·0
Santa Lucia	E.	148·6	268	19 54	[+ 9]	34 22	PS	23 28	PP	—
	N.	148·6	268	19 57	[+12]	35 15	PPS	23 36	PP	—
Punta Arenas	N.	150·4	230	e 22 36	?	26 30	[−24]	e 23 44	PP	—

Additional readings :—
New Delhi S_cS?N =15m.8s.
Bombay iSN =8m.31s.
Poona iPPPEN =5m.11s., iSSEN =9m.7s.
Irkutsk iP =5m.45s.
Moscow iP =5m.51s.
Kodaikanal PPPE =6m.46s., P_cPE =8m.39s.
Bucharest ePN =6m.47s.
Helsinki i =7m.6s., 7m.19s., and 8m.53s.
Belgrade iSS =15m.50s.
Budapest PN =7m.18s., PPN =8m.55s., PPPN =9m.12s., SKKSN =13m.24s., iE = 13m.51s., SSN =15m.47s., SSE =16m.2s.
Kalossa iE =9m.10s., eN =9m.19s., iE =9m.53s., iN =10m.34s.
Raciborzu i =8m.29s., e =9m.33s., eN =10m.20s., eZ =11m.52s., eN =17m.7s.
Upsala iN =7m.41s., 7m.50s., 11m.7s., and 15m.15s., SSE =16m.15s.
Zagreb i =9m.44s., iNW =13m.53s. and 16m.50s., i =17m.0s. and 18m.13s., iNW = 19m.11s.
Taranto e =16m.2s.
Prague e =8m.5s., ePPP =10m.30s., eSS =15m.54s.
Potsdam iPZ =7m.49s.a, iN =7m.57s., iE =8m.23s., iN =9m.37s., iEN =13m.1s., iN = 15m.56s., iE =16m.32s., iN =16m.35s.
Collmberg iPPZ =9m.32s., iPPPZ =10m.4s., eP_cSE =13m.25s., iSE =14m.28s., iSSE = 17m.32s., and many other unidentified readings.
Copenhagen i =9m.20s. and 9m.56s., S_cP =13m.39s., 14m.58s., and 15m.25s., iSS = 17m.3s.
Messina i =8m.18s. and 8m.37s.
Jena eE =8m.32s., eSSZ =17m.28s., eSSE =17m.42s.
Rome iZ =8m.9s., iSSN =17m.39s., i =18m.15s., SSS? =20m.39s.
Bologna iZ =8m.51s., iPPPZ =10m.13s., eSSN =17m.44s., eZ =18m.15s.

Continued on next page.

Florence Arc. i =8m.24s., iPPP? =10m.14s., SS =17m.17s., i =18m.9s.
Stuttgart iP =8m.15s. a, iSS =18m.4s.
Chur i =8m.15s. a.
Zürich eSS =18m.12s.
Bergen P_cPZ =10m.11s., eE =10m.16s. and 14m.38s., iEZ =15m.45s.
Strasbourg i =8m.24s., iPP =10m.4s. and 10m.8s., iPPP? =10m.34s., iPPP =10m.49s., iP_cS? =13m.47s., iS? =15m.6s., iSS =18m.24s., iSSS? =19m.55s.
De Bilt iP =8m.29s.
Tunis iPP =10m.13s., iPPP =11m.4s., i =12m.15s., iPS =15m.42s., i =16m.8s. and 18m.14s., eSS =18m.42s., iSSS =20m.3s.
Paris i =8m.47s., iPPP =11m.27s., iP_cS =14m.12s., i =14m.47s., iS? =15m.47s., iS_cS = 18m.41s., SS? =19m.19s., SS =19m.27s., i =21m.45s. and 22m.20s.
Clermont-Ferrand iP =8m.52s., iPPP =11m.40s., i =12m.7s., iS_cS =18m.46s., eSS = 19m.32s.
Aberdeen iN =10m.0s., iPPPN =11m.22s., iP_cSN =13m.9s., iN =15m.7s. and 16m.49s., iSSN =18m.45s., iN =19m.29s. and 22m.49s.
Kew iEZ =8m.56s., ePPPNZ =11m.31s., iZ =12m.37s., iPSNZ =16m.11s., eS_cSN = 18m.48s., iSSEZ =19m.53s., eSSSEZ =21m.13s., eE =22m.43s.
Durham i =10m.55s., N =11m.43s., PPPN =12m.15s., P_cSEN =14m.15s., SEN = 16m.25s., SS =20m.5s., with many other unidentified readings.
Edinburgh P_cSE =14m.12s., PSE =16m.23s.
Kobe Q? =25m.54s.
Barcelona PPP =11m.51s., SS =19m.43s.
Hikone SS =19m.44s.
Jersey eE =11m.1s., iE =15m.24s.
Owase PP =11m.46s., PPP =12m.35s., P_cS =14m.37s., S_cS =18m.34s.
Algiers Univ. iPZ =9m.2s., iZ =9m.52s., ePPZ =10m.53s., ePPPZ =11m.47s.
Tortosa P_cPEN =9m.31s., PPPEN =12m.17s., P_cSN =14m.29s., PSEN =16m.47s., PPS?N =16m.57s., S_cSEN =19m.7s., SSE =20m.7s., SSSEN =21m.46s.
Tokyo PPP =11m.48s., P_cS =15m.11s., PS =17m.23s., S_cS =19m.46s., SS =21m.2s.
Alicante pP =10m.4s., PPP =13m.1s., P_cS =13m.55s., PS =17m.15s., SS =21m.5s.
Scoresby Sund 15m.54s., 16m.18s., 17m.35s., 19m.30s., and 20m.54s.
Toledo PPE =11m.54s., PPPE =13m.11s., S_cSE =19m.21s., SSE =21m.21s., SSSE = 23m.32s., QE =24m.4s.
Almeria iPP =11m.54s., iPPP =13m.2s., P_cS =14m.46s., S_cS =19m.30s., SS =21m.6s., SSS =23m.6s.
Reykjavik iE =9m.55s., eE =15m.4s., 19m.45s., and 23m.16s.
Granada PPP =13m.18s., PS =18m.33s., iSS =21m.45s., SSS =23m.33s.
Tamanrasset iZ =9m.55s.k, ePPZ =11m.57s., ePPPZ =13m.23s.
Malaga PPPN =13m.42s., S_cPN =14m.46s.
Lisbon iPE =10m.16s.k, E =13m.41s., and 15m.13s., N =15m.21s., E =17m.58s., N = 18m.23s., PS?E =19m.10s., EN =20m.7s., SSS =25m.17s., Q?EN =26m.36s.
Tananarive PP =12m.44s., PPP =14m.21s., iPS =19m.5s., S_cS =20m.19s., SS =22m.56s., SSS =25m.38s.
Ivigtut 13m.37s. and 21m.9s., SSS =27m.36s.
College iPPP? =15m.55s., e =23m.11s., iSS? =26m.30s.
Sitka ePPP =17m.24s., iS =22m.39s., eSS =27m.59s., eSSS =31m.32s.
Grahamstown iZ =12m.32s. and 13m.51s.
Halifax PPP =18m.24s., e =23m.22s. and 24m.14s., PS =24m.30s., SS =29m.44s., SSS =33m.24s.
Seven Falls SE =24m.36s., PSE =25m.33s., SSE =30m.18s.
Shawinigan Falls iN =13m.3s., PPPN =18m.26s., SKSN =23m.16s., SN =24m.44s., SSN =29m.39s.
Saskatoon S =24m.24s., PS =25m.18s.
Ottawa i =13m.13s., e =15m.4s., 21m.56s., 22m.20s., and 23m.2s., S =24m.3s., e = 24m.41s., PS =25m.13s., SS =30m.14s., SSS =34m.0s.
Harvard ePPS =25m.21s., eSS =29m.59s.
Victoria SKKS =23m.44s., PS =24m.53s., SS =30m.36s., SSS =34m.48s.
Hungry Horse ePKP,PKP =38m.30s.
Spokane iP =13m.25s., i =24m.7s.
Buffalo iSKS =23m.53s., i =24m.7s., 24m.23s., 25m.46s., and 26m.9s.
Fordham iPPP =19m.10s.
City College, N.Y. ePS =25m.56s., eSS =30m.38s.
Butte ePPPN? =19m.31s., ePS?N =26m.1s., eSSN =31m.8s., eN =36m.5s.
Philadelphia e =23m.40s., iPS? =26m.5s., eSS =31m.3s., eSSS? =35m.14s., i =37m.4s.
Bozeman eSKS =24m.4s., eS_cS =24m.50s., ePS =26m.7s., iPS =26m.12s., eSS = 31m.25s., e =36m.12s.
Cleveland iPZ =13m.36s., iSKSN =24m.10s., iPSE =26m.9s., iN =26m.19s.
Washington iPS? =26m.25s., eSS? =32m.9s.
Chicago ePPP =19m.40s., eSKS =24m.9s., ePS =26m.23s., eSS =31m.14s., eSSS = 35m.42s.
Bermuda iS =24m.28s., iPS =25m.6s., i =26m.29s., 26m.54s., and 35m.34s.
Cincinnati iP =13m.50s., e =20m.59s., iSKS =24m.25s., iPS =26m.39s.
Logan iP =13m.46s., e =16m.25s., ePPP =19m.47s., e =23m.26s., ePSPS =32m.19s., i =37m.33s.
Ferndale eN =23m.29s. and 33m.22s.
Lincoln eSKSE =24m.19s., ePS? =36m.40s.
St. Louis eSKS =24m.23s., iSKS =24m.32s., ePPS =27m.18s., iSS =32m.26s.

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Ukiah eSKS? =24m,35s., ePS =26m.35s., e =32m.39s., and 36m.49s.
Reno ePN =13m.57s., iZ =14m.0s., iPPZ =18m.12s., eSKSZ =24m.48s., ePSZ = 26m.29s., eZ =40m.42s., eEN =40m.48s.
Brisbane iSKKSN =24m.40s., iSN =25m.31s., iPSN =26m.57s., eSSN =31m.43s., eN =32m.20s.
Berkeley iPPZ =18m.18s., iS_eSE =25m.43s., iPSZ =27m.26s., eQE =48·6m., and many other unidentified phases.
Melbourne iSKSE =24m.48s.
Columbia eSKS =24m.40s., ePS =27m.6s., e =27m.24s., eSS =32m.42s., eSSS =36m.44s.
Branner eZ =17m.32s.
Santa Clara iSSSE =40m.31s., iSSSSE =43m.57s.
Lick eE =14m.25s., iZ =17m.37s., eN =17m.43s., eE =17m.53s., eSKSE =24m.50s., ePSZ =27m.31s., eE =50·4m.
Fresno ePEN =14m.17s., iZ =17m.10s., iPPE =18m.27s., iPPN =18m.30s., eSE = 24m.55s., ePS?Z =27m.37s., eZ =53m.42s.
Riverview iPPZ =20m.41s., iEN =25m.4s., iSN =26m.1s., iPSE =27m.46s., iZ = 27m.49s. and 29m.43s., iSSE =33m.5s., iSSSN =37m.14s., eQEN =43·5m., and many other unidentified phases.
Overton i =14m.16s.
Honolulu ePS =27m.5s., eSS? =32m.35s., eSSS =37m.24s.
Pierce Ferry eS =26m.14s.
China Lake iZ =14m.20s.
Pasadena iPPNZ =18m.47s., ePPPZ =20m.58s., iSKSN =24m.59s., eSE =26m.19s., iPSN =27m.54s., ePPSN =28m.54s., iSSN =33m.48s., eSSS =38m.24s.
Logola iPP =19m.5s., ePPS =29m.3s.
Tucson e =17m.41s., ePP =18m.59s., ePPP =21m.22s., eSKKS =25m.58s., eS? = 26m.42s., ePS =27m.52s., iPKKP =29m.41s., eSS =33m.56s., i =34m.33s., e = 36m.17s., ePKP,PKP =38m.3s.
San Juan iPP =19m.12s., iS? =26m.52s., e =27m.46s., iPS =28m.39s., eSS =34m.8s., e =34m.18s., eSSS =38m.22s.
Tacubaya i =19m.23s., e =42m.29s., and 46m.25s.
Auckland PSN =32m.33s., eN =37m.2s., eSSN =40m.26s., eN =46m.24s.
Arapuni eE =41m.36s.
Christchurch eZ =21m.48s., PPP =26m.4s., SKKS =30m.16s., iZ =35m.42s., eE = 36m.52s., SKKSEN (Δ >180°) =37m.24s., SSEN =40m.49s., iZ =41m.49s., SSS = 45m.34s., QEN =56·1m.
Wellington iPPPZ =23m.30s., eSKKS =27m.41s., i =28m.37s., iPSZ =30m.41s., iPPSZ =32m.14s., iPPPSZ =32m.40s., ePPPZ (Δ >180°) =36m.16s., iSSZ = =38m.13s., e =40m.34s., iSSSZ =42m.10s., eZ =43m.58s., Q =54·4m.
Bogota ePS?EN =34m.6s.
La Paz iPPZ =22m.12s., PPP =25m.4s., iPPS =34m.40s., SS =40m.24s.
La Plata E. 22m.36s., PPP? =25m.15s., SKKS =30m.11s., PPS =35m.36s., SS = 40m.37s., SSS =46m.36s., 50m.18s., 56m.7s., Q =62·0m.
La Plata N. PKS? =24m.41s., SKSP (Δ >180°) =40m.39s., PSS =43m.50s., SSS = 48m.30s., 51m.0s., 56m.6s., Q =61·6m.
Huancayo i =23m.5s. and 25m.26s., eSKKS =29m.7s., eSKSP =32m.22s.
Copiapo eN =24m.38s., and 41m.38s.
Santa Lucia N. =22m.58s. and 38m.1s., SSN =42m.23s., SSE =43m.0s.
Punta Arenas eN =24m.32s. and 25m.54s., iN =27m.34s., N =45m.32s.
Long waves were also recorded at San Francisco and Rapid City.

July 10d. 7h. 18m. 51s. Epicentre 39°·2N. 70°·7E. (as at 3h.).

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Stalinabad	1·6	247	0 29	− 1	0 50	− 1
Andijan	2·0	39	0 38	+ 3	i 1 6	+ 4
Tashkent	2·4	333	i 0 42	+ 1	i 1 18	+ 6
Murgab	2·7	108	i 0 49	+ 4	1 26	+ 7
Frunse	4·7	38	e 1 17	+ 3	e 2 14	+ 4
Sverdlovsk	18·9	343	e 4 19	− 5	—	—
Grozny	19·2	290	e 4 26	− 2	—	—
Piatigorsk	21·2	293	4 46	− 3	8 40	− 1
Moscow	27·5	318	5 47	− 3	—	—
Stuttgart	44·2	304	e 8 10	− 2	—	—
College	72·0	17	e 11 22	− 6	—	—

College also gives i =11m,33s.

July 10d. 10h. 43m. 56s. I
10h. 57m. 30s. II
11h. 57m. 52s. III
Epicentre 39°·2N. 70°·7E. (as at 7h.).

			Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Obi-garm		0·9	237	i 0 23	+ 3	—	—	—	—	—
II			0·9	237	0 18	− 2	0 36	+ 2	—	—	—
III			0·9	237	i 0 18	− 2	—	—	—	—	—
I	Stalinabad		1·6	247	0 33	+ 3	0 57	+ 6	—	—	—
II			1·6	247	0 32	+ 2	0 56	+ 5	—	—	—
III			1·6	247	i 0 32	+ 2	0 54	+ 3	—	—	—
I	Andijan		2·0	39	i 0 36	+ 1	i 1 2	0	—	—	—
II			2·0	39	0 36	+ 1	1 4	+ 2	—	—	—
III			2·0	39	0 38	+ 3	1 6	+ 4	—	—	—
I	Tashkent		2·4	333	i 0 46?	+ 5	—	—	—	—	—
II			2·4	333	i 0 48	+ 7	i 1 30?	+18	—	—	—
I	Murgab		2·7	108	0 46	+ 1	i 1 22	+ 3	—	—	—
II			2·7	108	0 50	+ 5	—	—	—	—	—
III			2·7	108	i 0 42	+ 7	—	—	—	—	—
I	Samarkand		2·9	279	e 0 54?	P*	e 1 29?	S*	—	—	—
II			2·9	279	e 0 58	P_g	i 1 38	S_g	—	—	—
I	Tchimkent		3·1	345	i 0 51	0	e 1 27	− 2	—	—	—
II			3·1	345	e 0 56	+ 5	i 1 38	S_g	—	—	—
III			3·1	345	i 0 56	+ 5	i 1 33	+ 4	—	—	—
I	Frunse		4·7	38	e 1 13	− 1	i 2 9	− 1	—	—	—
II			4·7	38	e 1 15	+ 1	e 2 11	+ 1	—	—	—
III			4·7	38	e 1 16	+ 2	2 14	+ 4	—	—	—
I	New Delhi	N.	11·9	151	e 2 44	−10	e 4 54	−15	2 53	PP	—
II		N.	11·9	151	e 2 42	−12	e 4 50	−19	—	—	—
III		N.	11·9	151	e 2 44	−10	i 4 54	−15	2 52	PP	—
I	Baku		16·0	281	e 3 57	+ 9	e 6 58	+12	—	—	—
III			16·0	281	e 4 5	+17	7 1	+15	—	—	—
I	Sverdlovsk		18·9	343	i 4 20	− 4	e 7 46	− 7	—	—	—
II			18·9	343	i 4 22	− 2	e 7 51	− 2	—	—	—
III			18·9	343	i 4 21	− 3	7 52	− 1	—	—	—
I	Grozny		19·2	290	i 4 32	+ 4	8 8	+ 9	—	—	—
II			19·2	290	e 4 30	+ 2	i 8 12	+13	—	—	—
III			19·2	290	4 29	+ 1	8 8	+ 9	—	—	—
I	Tiflis		19·8	285	4 37	+ 2	8 29	+16	—	—	—
II			19·8	285	i 4 36	+ 1	8 23?	+10	—	—	—
III			19·8	285	4 35?	0	—	—	—	—	—
II	Erevan		20·2	281	e 4 45	+ 6	—	—	—	—	—
III	Bombay		20·3	175	e 4 38	− 2	e 8 28	+ 5	—	—	e 10·5
II	Leninakan		20·6	284	e 5 7	+24	—	—	—	—	—
III	Poona	N.	20·8	172	i 4 38	− 7	e 8 34	+ 1	—	—	—
I	Piatigorsk		21·2	293	4 45	− 4	8 45	+ 4	—	—	—
III			21·3	293	4 51	+ 1	8 52	+ 9	—	—	—
III	Hyderabad	N.	22·7	161	4 58	− 6	9 4	− 5	—	—	—
III	Sotchi		23·6	290	5 10	− 3	9 42	+17	—	—	—
I	Moscow		27·5	318	e 5 50	0	—	—	—	—	—
II			27·5	318	e 5 48	− 2	—	—	—	—	—
III			27·5	318	e 5 47	− 3	—	—	—	—	—
I	Ksara		28·4	269	e 5 20	−38	e 10 20	−25	—	—	—
II			28·4	269	e 6 2	+ 4	e 11 0	+15	—	—	—
III			28·4	269	e 6 16	+18	e 11 24	+39	—	—	—
III	Kodaikanal	E.	29·5	167	—	—	e 11 5	+ 3	—	—	—
II	Istanbul		31·7	288	e 4 30?	?	—	—	—	—	—
III			31·7	288	e 6 26	− 1	e 13 0	SS	—	—	—
II	Helwan	Z.	33·5	266	e 6 44	+ 1	—	—	—	—	—
III		Z.	33·5	266	e 6 47	+ 4	—	—	—	—	—
II	Budapest		37·8	301	e 8 46	PP	—	—	—	—	—
III			37·8	301	e 8 28	PP	—	—	—	—	—
III	Racîborzu		38·2	305	e 8 38	PP	—	—	—	—	17·1

Continued on next page.

			△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Upsala	N.	38·8	320	—	—	e 16 4?	SS	—	—	e 20·5
II			38·8	320	e 8 52	PP	e 15 46	SS	e 9 30	PPP	e 20·5
III			38·8	320	e 8 50	PP	e 15 8	SS	—	—	e 21·1
II	Taranto		40·5	290	e 9 30	PP	—	—	—	—	e 25·5
III	Prague		40·6	305	—	—	e 17 40	SSS	—	—	e 20·3
I	Potsdam	Z.	41·2	309	—	—	e 16 45	SS	—	—	—
III		Z.	41·2	309	e 7 47	− 1	—	—	—	—	—
III	Collmberg	E.	41·4	308	e 9 27	PP	—	—	—	—	—
II	Copenhagen		41·4	314	e 7 48	− 2	e 14 2	− 3	17 4	SS	—
III			41·4	314	e 7 48	− 2	e 14 9	+ 4	i 9 27	PP	—
I	Triest		41·8	298	e 4 21	?	e 10 37	PPP	—	—	—
II			41·8	298	e 8 49	+56	i 15 15	+64	i 10 36	PPP	—
III			41·8	298	e 8 50	+57	e 15 3	+52	i 10 33	PPP	—
III	Jena	N.	42·7	306	e 7 57	− 3	—	—	—	—	—
II	Rome		43·6	293	e 8 5	− 3	e 14 28	−10	—	—	—
III			43·6	293	e 8 6a	− 2	e 14 40	+ 2	—	—	—
I	Stuttgart		44·2	304	e 8 11	− 1	—	—	—	—	—
II			44·2	304	e 8 10	− 2	—	—	—	—	—
III			44·2	304	e 8 10	− 2	e 14 46	0	e 9 53	PP	—
III	Zürich	Z.	44·9	303	e 8 9	− 9	—	—	—	—	—
I	Strasbourg		45·1	304	i 8 17	− 3	—	—	—	—	e 24·1
II			45·1	304	e 8 14	− 6	—	—	e 9 15	PePe	—
III			45·1	304	i 8 19	− 1	e 18 31	SS	i 9 51	PP	—
I	Paris		48·5	305	e 8 45	− 1	—	—	—	—	e 29·1
II			48·5	305	e 8 43	− 3	—	—	—	—	—
III			48·5	305	i 8 43	− 3	—	—	e 10 39	PP	—
I	Clermont-Ferrand		49·0	301	e 8 32	−18	—	—	—	—	—
II			49·0	301	e 8 49	− 1	—	—	—	—	—
III			49·0	301	i 8 50	0	—	—	—	—	—
I	Kew	Z.	49·5	310	e 4 4?	?	—	—	—	—	—
II			49·5	310	e 8 49	− 5	—	—	—	—	e 16·5
III		Z.	49·5	310	i 8 51	− 3	—	—	e 10 49	PP	—
I	Tamanrasset	Z.	57·1	275	i 9 49a	− 1	—	—	—	—	—
II		Z.	57·1	275	e 9 48	− 2	—	—	—	—	—
III		Z.	57·1	275	i 9 53	+ 3	—	—	—	—	—
III	College		72·0	17	i 11 23	− 5	—	—	—	—	—
I	Hungry Horse		92·7	3	i 13 12	− 3	—	—	—	—	—
II			92·7	3	e 13 11	− 4	—	—	—	—	—
III			92·7	3	i 13 12	− 3	—	—	—	—	—
II	Overton	Z.	104·5	4	e 18 32	PP	—	—	—	—	—
III		Z.	104·5	4	e 18 29	PP	—	—	—	—	—
III	Tucson		108·9	1	e 29 49	PKKP	—	—	—	—	—

Additional readings :—
Stuttgart II e =13m.36s. and 15m.30s., III eSS =18m.14s.
Tamanrasset II e?Z =8m.5s. and 8m.8s., III e?Z =7m.38s., ePZ =9m.47s.
Overton III eZ =18m.44s. and 22m.48s.
Long waves were also recorded to Shock I at De Bilt, Kodaikanal, Aberdeen, Edinburgh, and Scoresby Sund ; II at Kodaikanal ; III at De Bilt, Aberdeen, and Scoresby Sund.

July 10d. 14h. 13m. 23s. Epicentre 39°·2N. 70°·7E. (as at 11h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	i 0 24?	+ 4	i 0 45?	+11	—	—	—
Stalinabad		1·6	247	0 35	+ 5	1 1	+10	—	—	—
Andijan		2·0	39	i 0 36	+ 1	i 1 2	0	—	—	—
Tashkent		2·4	333	i 0 47	+ 6	i 1 21	S_e	—	—	—
Murgab		2·7	108	i 0 40	− 5	—	—	—	—	—
Samarkand		2·9	279	i 0 59	P_e	—	—	—	—	—
Tchimkent		3·1	345	i 0 57	P•	i 2 35	S•	—	—	—
Dehra Dun	N.	10·7	144	e 3 31	+53	e 4 37	− 2	—	—	e 5·1
New Delhi	N.	11·9	151	e 2 43	−11	e 4 50	−19	2 52	PP	—
Semipalatinsk		13·1	28	e 3 5	− 5	—	—	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		16·0	281	e 3 57	+ 9	e 7 1	+15	—	—	—
Sverdlovsk		18·9	343	i 4 21	− 3	i 7 50	− 3	—	—	—
Grozny		19·2	290	i 4 32	+ 4	i 8 17	+18	—	—	—
Tiflis		19·8	285	e 4 37	+ 2	8 27	+14	—	—	—
Erevan		20·2	281	4 48	+ 9	—	—	—	—	—
Bombay		20·3	175	e 5 1	+21	e 8 24	+ 1	—	—	9·3
Leninakan		20·6	285	e 4 45	+ 2	—	—	—	—	—
Poona	N.	20·8	172	i 4 37	− 8	i 8 30	− 3	—	—	—
Piatigorsk		21·2	293	e 4 54	+ 5	8 53	+12	—	—	—
Hyderabad	N.	22·7	161	i 4 57	− 7	i 9 20	+11	—	—	11·8
Sotchi		23·6	290	e 5 17	+ 4	—	—	—	—	—
Irkutsk		26·6	49	5 37	− 5	—	—	—	—	—
Moscow		27·5	318	5 49	− 1	10 29	− 1	—	—	—
Simferopol		27·6	295	e 5 47	− 4	e 10 35	+ 3	—	—	—
Ksara		28·4	269	e 6 3	+ 5	e 11 5	+20	—	—	—
Kodaikanal	E.	29·5	167	—	—	e 10 54	− 8	—	—	—
Istanbul		31·7	288	i 6 36	+ 9	—	—	—	—	—
Bucharest		33·2	294	6 37?	− 3	—	—	—	—	—
Helwan	Z.	33·5	266	i 6 47	+ 4	e 12 13	+ 8	—	—	—
Lwow		34·4	304	e 6 53	+ 2	—	—	—	—	—
Helsinki		35·3	323	e 7 4	+ 5	e 12 28	− 5	—	—	e 16·6
Budapest		37·8	301	e 7 39	+19	e 15 17	SS	e 9 29	PP	i 18·6
Kalossa		38·0	300	e 8 11	+50	—	—	—	—	—
Raciborzu		38·2	305	e 7 27	+ 4	e 15 50	SS	e 8 58?	PP	e 19·5
Upsala		38·8	320	e 8 53	PP	e 15 20	SS	i 17 16	S_cS	e 20·2
Zagreb		40·2	298	e 7 34	− 6	e 9 28	PP	—	—	—
Prague		40·6	308	e 7 42	− 1	e 13 55	+ 1	e 9 23	PP	—
Potsdam		41·2	309	e 7 48	0	e 16 53	SS	i 9 31	PP	e 24·6
Collmberg	E.	41·4	308	e 9 28	PP	—	—	—	—	—
Copenhagen		41·4	314	e 7 50	0	e 14 7	+ 2	9 32	PP	—
Triest		41·8	298	e 7 52	− 1	e 14 12	+ 1	i 9 37?	PP	—
Jena	N.	42·7	306	e 7 59	− 1	—	—	—	—	—
Rome		43·6	293	e 8 6	− 2	e 14 39	+ 1	e 9 53	PP	e 22·4
Bologna		43·7	297	e 8 30	+22	e 14 57	+18	—	—	—
Stuttgart		44·2	304	e 8 13	+ 1	e 14 47	+ 1	e 10 2	PP	e 21·6
Zürich		44·9	303	e 8 17	− 1	—	—	—	—	—
Pavia		45·0	299	e 9 37?	PP	—	—	—	—	—
Strasbourg		45·1	304	i 8 18	− 2	e 15 0	+ 1	i 9 42	PP	e 23·1
De Bilt		46·0	309	i 8 31k	+ 4	e 15 15	+ 3	e 10 20	PP	e 23·6
Paris		48·5	305	i 8 45	− 1	e 15 40	− 8	e 10 40	PP	e 25·6
Clermont-Ferrand		49·0	301	e 8 50	0	—	—	—	—	—
Aberdeen		49·2	318	e 11 54	PPP	e 19 37	SS	—	—	e 29·1
Kew		49·5	310	i 8 54a	0	e 14 41	?	e 19 38	SS	e 20·6
Tortosa		52·4	296	e 9 16	0	e 16 15	−27	—	—	e 29·6
Scoresby Sund		54·5	337	9 35	+ 3	17 16	+ 6	12 47	PPP	—
Toledo	Z.	56·0	296	i 6 42	?	—	—	—	—	—
Tamanrasset	Z.	57·1	275	e 9 49	− 1	—	—	—	—	—
Victoria	Z.	91·8	9	e 12 58	−13	—	—	—	—	—
Hungry Horse		92·7	3	e 13 12	− 3	—	—	—	—	—

Additional readings :—
New Delhi SSN =5m.4s.
Budapest eE =11m.7s. and 15m.27s.
Kalossa ePE =8m.18s., eE =9m.45s., eN =11m.1s.
Raciborzu eN =7m.39s. and 9m.31s., eZ =16m.58s.?, eN =17m.31s. and 17m.48s.
Upsala ePN =9m.3s.
Prague eSS =16m.54s.
Potsdam eE =16m.58s., eZ =17m.7s., iZ =17m.21s., eE =18m.58s., eN =20m.2s., eE =21m.44s.
Copenhagen 7m.53s.
Triest iSS =17m.32s.
Rome eZ =8m.50s., eSS =17m.35s.
Stuttgart e =8m.45s.
Strasbourg ePPP =10m.57s., eSS =18m.17s.
De Bilt eSS =18m.37s.
Paris ePPP =11m.15s., eSS =19m.28s.
Aberdeen iN =26m.22s.
Long waves were also recorded at Bergen and Edinburgh.

July 10d. 15h. 7m. 50s. Epicentre 39°·2N. 70°·7E. (as at 14h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	i 0 20?	0	—	—	—	—	—
Stalinabad		1·6	247	0 32	+ 2	0 57	+ 6	—	—	—
Andijan		2·0	39	i 0 38	+ 3	1 7	+ 5	—	—	—
Tashkent		2·4	333	i 0 46	+ 5	i 1 20	+ 8	—	—	—
Samarkand		2·9	279	i 0 56	P_g	1 35	S_g	—	—	—
Tchimkent		3·1	345	i 0 57	P*	i 1 41	S_g	—	—	—
Frunse		4·7	38	e 1 16	+ 2	e 2 14	+ 4	—	—	—
Dehra Dun	N.	10·7	144	e 3 10	+32	e 5 0	+21	—	—	—
New Delhi	N.	11·9	151	e 2 43	−11	e 4 53	−16	—	—	—
Sverdlovsk		18·9	343	i 4 22	− 2	7 54	+ 1	—	—	—
Grozny		19·2	290	i 4 31	+ 3	i 8 12	+13	—	—	—
Tiflis		19·8	285	e 4 33	− 2	e 8 27	+14	—	—	—
Bombay		20·3	175	—	—	e 8 16	− 7	—	—	i 10·6
Leninakan		20·6	284	e 4 40	− 3	—	—	—	—	—
Poona		20·8	172	e 4 36	− 9	e 8 30	− 3	—	—	—
Piatigorsk		21·2	293	4 44	− 5	—	—	—	—	—
Sotchi		23·6	290	e 5 16	+ 3	—	—	—	—	—
Moscow		27·5	318	e 5 49	− 1	e 10 34	+ 4	—	—	—
Ksara		28·4	269	e 5 58	0	e 10 58	+13	—	—	—
Kodaikanal	E.	29·5	167	—	—	e 12 7	+65	—	—	—
Upsala		38·8	320	8 31	+63	e 14 40	+74	e 15 43	SS	e 21·5
Copenhagen		41·4	314	7 48	− 2	—	—	—	—	—
Triest		41·8	298	7 52	− 1	e 14 12	+ 1	i 9 38	PP	—
Stuttgart	z.	44·2	304	e 8 11	− 1	—	—	e 9 51	PP	—
Strasbourg		45·1	304	i 8 16	− 4	—	—	e 10 1	PP	—
Paris		48·5	305	e 8 45	− 1	—	—	—	—	—
Kew	z.	49·5	310	i 8 53	− 1	e 14 15	?	—	—	—
Tamanrasset	z.	57·1	275	i 9 48k	− 2	—	—	—	—	—
College		72·0	17	e 11 23	− 5	—	—	—	—	—

July 10d. 15h. 18m. 59s. Epicentre 39°·2N. 70°·7E. (as at 15h. 7m.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stalinabad		1·6	247	0 34	+ 4	0 58	+ 7	—	—	—
Andijan		2·0	39	i 0 37	+ 2	i 1 3	+ 1	—	—	—
Tashkent		2·4	333	i 0 49	P_g	i 1 35	S_g	—	—	—
Murgab		2·7	108	i 0 43	− 2	—	—	—	—	—
Samarkand		2·9	279	e 0 55	P_g	—	—	—	—	—
Tchimkent		3·1	345	i 0 58	P*	—	—	—	—	—
Frunse		4·7	38	i 1 16	+ 2	—	—	—	—	—
Dehra Dun	N.	10·7	144	e 3 1	+23	e 4 46	+ 7	—	—	—
New Delhi	N.	11·9	151	e 2 47	− 7	i 4 54	−15	—	—	—
Sverdlovsk		18·9	343	i 4 22	− 2	7 51	− 2	—	—	—
Tiflis		19·8	285	i 4 37	+ 2	c 8 26	+13	—	—	—
Erevan		20·2	281	4 42	+ 3	8 53	+32	—	—	—
Bombay		20·3	175	e 4 37	− 3	e 8 22	− 1	—	—	9·8
Leninakan		20·6	284	4 43	0	8 57	+28	—	—	—
Poona		20·8	172	i 4 42	− 3	i 8 35	+ 2	—	—	—
Piatigorsk		21·2	293	4 52	+ 3	—	—	—	—	—
Calcutta	N.	22·4	133	e 8 58	S	(e 8 58)	− 6	—	—	—
Hyderabad	N.	22·7	161	i 5 3	− 1	i 9 5	− 4	10 50	SS	—
Sotchi		23·6	290	i 5 15	+ 2	—	—	—	—	—
Irkutsk		26·6	49	e 5 39	− 3	e 10 9	− 7	—	—	—
Theodosia		26·7	295	5 42	− 1	—	—	—	—	—
Moscow		27·5	318	5 49	− 1	10 30	0	—	—	—
Simferopol		27·6	295	5 48	− 3	e 10 30	− 2	—	—	—
Ksara		28·4	269	i 6 0	+ 2	11 3?	+18	—	—	—
Kodaikanal	E.	29·5	167	—	—	e 11 38	+36	—	—	—

Continued on next page,

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		31·7	288	6 26	− 1	—	—	—	—	—
Bucharest		33·2	294	e 6 46	+ 6	e 14 4	SS	—	—	25·0
Helwan		33·5	266	i 6 43	0	e 12 21	+16	e 14 46	SSS	—
Colombo	E.	33·6	164	e 14 7	SS	17 7	L	—	—	19·2
Lwow		34·4	304	6 52	+ 1	—	—	—	—	—
Helsinki		35·3	323	e 6 58	− 1	e 11 18	−75	—	—	—
Belgrade		37·3	295	i 7 16a	0	e 13 21	+17	e 8 42	PP	e 25·6
Budapest		37·8	301	7 22	+ 2	e 14 23	+72	8 50	PP	21·0
Kalossa		38·0	300	e 7 25	+ 4	e 14 7	+53	e 9 7	PP	—
Raciborzu		38·2	305	e 7 48	+25	e 15 52	SS	—	—	e 20·7
Upsala		38·8	320	7 28a	0	i 13 32	+ 6	e 8 53	PP	e 18·5
Zagreb		40·2	298	e 7 41	+ 1	—	—	e 9 16	PP	—
Prague		40·6	305	i 7 42	− 1	e 13 54	0	i 7 56	pP	e 21·0
Potsdam	Z.	41·2	309	i 7 48	0	—	—	i 9 27k	PP	—
Collmberg	E.	41·4	308	e 7 49	− 1	—	—	e 9 29	PP	—
Copenhagen		41·4	314	i 7 50a	0	e 14 8	+ 3	9 28	PP	—
Triest		41·8	298	i 7 53a	0	i 14 13	+ 2	i 9 32	PP	—
Zi-ka-wei	Z.	41·8	85	i 7 51	− 2	17 17	SS	—	—	24·4
Jena	N.	42·7	306	e 7 56	− 4	—	—	—	—	—
Catania		43·1	286	e 8 3	− 1	—	—	—	—	—
Rome		43·6	293	e 8 7a	− 1	e 12 39	?	e 9 45	PP	e 20·6
Bologna		43·7	297	i 8 11a	+ 3	—	—	e 9 22	PP	—
Florence Arc.		43·9	297	8 10	0	—	—	9 57	PP	—
Stuttgart		44·2	304	i 8 13a	+ 1	e 14 46	0	i 9 55	PP	e 22·0
Chur		44·4	302	e 8 13	− 1	—	—	—	—	—
Zürich		44·9	303	e 8 12	− 6	—	—	e 9 55	PP	—
Pavia		45·0	299	e 9 29	PP	—	—	—	—	—
Strasbourg		45·1	304	i 8 20	0	e 14 37	−22	e 9 57	PP	21·5
Basle		45·5	302	e 8 22	− 1	—	—	i 10 20	PP	—
De Bilt		46·0	309	i 8 28a	+ 1	e 15 17	+ 5	e 10 17	PP	e 23·0
Neuchatel		46·0	303	i 8 26	− 1	—	—	—	—	—
Tunis		47·0	287	i 8 41	+ 6	—	—	i 10 19	PP	—
Paris		48·5	305	i 8 46	0	e 15 40	− 8	i 10 38	PP	e 25·0
Clermont-Ferrand		49·0	301	i 8 50	0	—	—	—	—	—
Aberdeen	N.	49·2	318	e 10 29	PP	e 15 39	−19	i 19 25	SS	27·1
Durham	E.	49·5	314	e 9 52	+58	—	—	i 11 27	PPP	i 19·6
Kew		49·5	310	i 8 53a	− 1	e 15 56	− 6	i 10 49	PP	e 23·0
Edinburgh	E.	50·1	315	9 13	+14	16 25	+15	11 11	PP	e 28·0
Jersey	E.	51·3	308	—	—	21 1?	SSS	—	—	—
Tortosa		52·4	296	i 9 17	+ 1	e 16 46	+ 4	11 16	PP	e 30·0
Alicante		54·1	294	i 9 29	0	i 17 6	+ 1	10 24	PcP	e 27·1
Scoresby Sund		54·5	337	—	—	17 18	+ 8	—	—	27·0
Toledo	Z.	56·0	296	i 9 40	− 3	—	—	—	—	—
Almeria		56·2	293	i 9 44	0	17 34	+ 1	11 56	PP	32·0
Granada		56·9	294	i 9 39k	−10	17 51	+ 9	11 45k	PP	33·4
Tamanrasset	Z.	57·1	275	i 9 50k	0	—	—	e 11 57	PP	—
Malaga	Z.	57·6	294	i 9 53k	− 1	i 17 49	− 2	10 45	PcP	31·8
Lisbon		60·1	298	10 10a	− 1	—	—	—	—	—
College		72·0	17	i 11 23	− 5	e 20 43	− 6	—	—	e 29·1
Seven Falls	E.	87·5	335	—	—	e 23 33	+ 2	—	—	—
Shawinigan Falls	N.	88·6	336	e 12 54	− 2	—	—	—	—	—
Ottawa	Z.	90·5	338	e 13 4	− 1	—	—	—	—	—
Victoria	Z.	91·8	9	i 13 9	− 2	e 24 19	+ 8	—	—	—
Hungry Horse		92·7	3	i 13 13	− 2	—	—	—	—	—
Spokane		93·2	5	e 13 17	0	e 23 51	[0]	e 24 16	S	—
Philadelphia		95·3	334	—	—	e 24 2	[− 1]	e 26 3	PS	e 37·6
Logan		99·4	2	e 13 42	− 4	—	—	e 17 33	PP	—
Shasta Dam		99·6	9	e 13 44	− 2	—	—	—	—	—
St. Louis		100·6	345	e 13 49	− 2	e 25 26	+ 1	e 17 45	PP	—
Tinemaha	Z.	103·6	7	e 17 58	PKP	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Overton	z.	104·5	4	e 14 16	+ 8	—	—	i 18 35	PP	—
Pierce Ferry		104·9	3	e 14 9	− 1	—	—	—	—	—
Pasadena	z.	106·6	7	e 18 38	PP	—	—	—	—	—
Riverside	z.	106·8	7	e 18 28	PP	—	—	—	—	—
Palomar	z.	107·5	6	i 18 36	PP	—	—	—	—	—
Tucson		108·9	1	e 17 44	?	—	—	e 18 59	PP	—
Huancayo		139·6	303	e 19 28	[− 2]	—	—	—	—	—

Additional readings :—
Bombay iSN =8m.35s.
Budapest ePPN =9m.6s., eN =11m.31s., eSN =14m.31s.
Kalossa eE =8m.59s., eSN =14m.31s.
Raciborzu eZ =7m.55s., eNZ =9m.40s., eN =15m.58s., eNZ =16m.22s.?, eZ =16m.37s.
Upsala eN =15m.1s.?, eSSN =16m.4s. ?
Zagreb eNE =9m.22s.
Prague iPP =9m.17s., eSS =16m.37s.
Potsdam ePN =7m.53s.?, iE =9m.40s., iZ =16m.0s. and 27m.4s.
Copenhagen 12m.17s.
Triest iSS =17m.28s.
Rome eSS =17m.23s.
Zürich i =8m.16s. a.
Strasbourg eSS =18m.24s.
De Bilt eSS =18m.31s.
Paris i =8m.52s. and 8m.56s., ePPP =11m.10s.
Aberdeen iN =25m.53s.
Kew e =13m.22s., eSS =19m.46s.
Edinburgh SSE =19m.57s.
Tortosa PPPEN =12m.20s., S_cS?E =19m.11s.
Alicante PP =11m.18s., PPP =12m.54s., PS =17m.42s., PPS =17m.51s., S_cS =19m.12s., Q =23m.40s.
Almeria P_cS =14m.42s.
Granada P_cS =14m.24s. a.
Malaga PPZ =12m.1s.
Lisbon Z =10m.55s. a.
St. Louis e =26m.53s., ePPS? =27m.36s.
Long waves were also recorded at Bergen.

July 10d. 15h. 49m. 16s. Epicentre 39°·2N. 70°·7E. (as at 15h. 18m.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	i 0 24	+ 4	—	—	—	—	—
Stalinabad		1·6	247	0 36	+ 6	—	—	—	—	—
Andijan		2·0	39	i 0 36	+ 1	—	—	—	—	—
Tashkent		2·4	333	i 0 44	+ 3	i 1 14	+ 2	—	—	—
Murgab		2·7	108	i 1 42?	+57	—	—	—	—	—
Samarkand		2·9	279	i 0 55	P_g	—	—	—	—	—
Tchimkent		3·1	345	i 0 54	P*	—	—	—	—	—
Frunse		4·7	38	i 1 13	− 1	—	—	—	—	—
Dehra Dun	N.	10·7	144	i 1 38	−60	i 3 32	−67	—	—	i 4·3
New Delhi	N.	11·9	151	i 2 43	−11	i 4 51	−18	—	—	—
Semipalatinsk		13·1	28	i 2 58	−12	—	—	—	—	—
Sverdlovsk		18·9	343	i 4 21	− 3	i 7 56	+ 3	—	—	—
Grozny		19·2	290	i 4 35	+ 7	—	—	—	—	—
Tiflis		19·8	285	i 4 37	+ 2	e 8 23	+10	—	—	—
Erevan		20·2	281	4 47	+ 8	8 41	+20	—	—	—
Bombay		20·3	175	i 4 38	− 2	8 20	− 3	—	—	9·6
Leninakan		20·6	284	4 45?	+ 2	8 47?	+18	—	—	—
Poona		20·8	172	i 4 39	− 6	i 8 35	+ 2	—	—	—
Piatigorsk		21·2	293	4 52	+ 3	8 50	+ 9	—	—	—
Calcutta	N.	22·4	133	e 6 31	?	i 8 59	− 5	—	—	—
Hyderabad	N.	22·7	161	i 4 54	−10	i 9 9	0	9 45	SS	11·0
Sotchi		23·6	290	i 5 14	+ 1	i 9 33	+ 8	—	—	—
Moscow		27·5	318	5 50	0	10 30	0	—	—	—
Simferopol		27·6	295	5 53	+ 2	10 33	+ 1	—	—	—
Ksara		28·4	269	i 6 2k	+ 4	10 56	+11	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kodaikanal	E.	29·5	167	e 6 31	+23	i 11 31	+29	9 35	PcP	14·5
Istanbul		31·7	288	i 6 26	− 1	—	—	—	—	—
Bucharest		33·2	294	e 6 48	+ 8	e 12 10	+10	—	—	—
Helwan		33·5	266	6 44	+ 1	i 12 8	+ 3	7 58	PPP	i 21·2
Colombo	E.	33·6	164	7 30	PP	(13 40)	SS	—	—	13·7
Helsinki		35·3	323	e 6 59	0	e 12 33	0	—	—	—
Skalnate Pleso		36·9	304	i 7 17	+ 5	e 13 14	+16	—	—	—
Belgrade		37·3	295	e 7 18a	+ 2	i 13 12	+ 8	i 17 21	ScS	—
Budapest		37·8	301	7 26	+ 6	13 18	+ 7	8 53	PP	—
Kalossa		38·0	300	e 7 27	+ 6	e 13 6	− 8	e 8 53	PP	e 16·7
Raciborzu		38·2	305	e 7 26	+ 3	e 13 36	+19	e 8 57	PP	e 16·2
Ogyalla		38·4	301	e 7 29	+ 4	—	—	e 9 26	PPP	—
Upsala		38·8	320	e 7 28	0	i 13 25	− 1	8 56	PP	e 19·4
Zagreb		40·2	298	e 7 41	+ 1	e 13 51	+ 3	e 9 31	PPP	e 23·7
Taranto		40·5	290	7 45	+ 3	13 57	+ 5	e 17 57	ScS	—
Prague		40·6	305	7 45	+ 2	e 13 54	0	e 7 58	pP	e 19·7
Potsdam		41·2	309	i 7 50k	+ 2	i 14 3	+ 1	i 9 30a	PPP	—
Collmberg	E.	41·4	308	e 7 53	+ 3	e 14 1	− 4	e 8 44?	PP	e 23·3
Copenhagen		41·4	314	i 7 49	− 1	i 14 7	+ 2	i 9 27	PP	—
Triest		41·8	298	i 7 56k	+ 3	i 14 13	+ 2	i 8 12k	pP	—
Zi-ka-wei	Z.	41·8	85	i 7 47	− 6	e 17 2	SS	—	—	—
Messina		42·5	287	e 8 1	+ 2	e 14 22	0	—	—	—
Jena		42·7	306	e 8 0	0	—	—	e 17 42	SS	—
Catania		43·1	286	e 8 4	0	e 14 30	0	—	—	—
Rome		43·6	293	i 8 8k	0	i 14 39	+ 1	i 17 32	SS	—
Bologna		43·7	297	e 8 9	+ 1	e 14 46	+ 7	—	—	—
Florence Arc.		43·9	297	8 10	0	—	—	9 56	PP	—
Florence Xim		43·9	297	e 8 12	+ 2	e 14 46	+ 4	—	—	—
Prato		44·0	297	i 8 14	+ 3	i 14 44	+ 1	—	—	—
Stuttgart		44·2	304	e 8 11	− 1	e 14 50	+ 4	e 9 59	PP	e 23·7
Chur		44·4	302	e 8 9	− 5	—	—	e 9 55	PP	—
Zürich		44·9	303	e 8 16	− 1	—	—	e 9 54	PP	—
Bergen	Z.	45·0	321	e 8 14	− 5	—	—	—	—	—
Pavia		45·0	299	e 9 24	+65	—	—	—	—	—
Strasbourg		45·1	304	i 8 20	0	e 14 57	− 2	e 9 40	PP	—
Basle		45·5	302	e 8 20	− 3	—	—	(e 18 0)	SS	e 18·0
De Bilt		46·0	309	i 8 30k	+ 3	e 15 17	+ 5	e 18 14	SS	e 22·7
Neuchatel		46·0	303	e 8 24	− 3	—	—	—	—	—
Tunis		47·0	287	e 8 44	+ 9	e 15 38	+12	i 10 13	PcP	—
Kumamoto		48·2	78	8 36	− 8	—	—	—	—	—
Paris		48·5	305	i 8 45	− 1	i 15 48	0	i 10 28	PcP	e 22·7
Clermont-Ferrand		49·0	301	i 8 54	+ 4	e 15 50	− 5	e 10 45	PP	23·7
Miyazaki		49·1	80	8 39	−12	15 36	−20	—	—	—
Aberdeen	N.	49·2	318	e 10 19	PP	i 15 54	− 4	i 19 16	SS	27·8
Durham		49·5	314	i 8 58	+ 4	i 16 0	− 2	i 19 50	SS	—
Kew		49·5	310	i 8 54	0	e 15 57	− 5	e 19 33	SS	e 23·7
Edinburgh	E.	50·1	315	12 40	?	19 52	SS	i 16 7	PS	e 24·8
Sumoto		50·7	75	i 8 56	− 7	e 16 7	−11	—	—	e 26·4
Osaka		51·0	74	e 9 0	− 6	16 54	+32	—	—	—
Barcelona		51·1	297	—	—	e 16 29	+ 5	—	—	—
Jersey	E.	51·3	308	e 9 6	− 2	e 16 29	+ 3	e 20 24	SS	22·7
Toyama		51·4	70	e 9 2	− 7	17 36	+68	—	—	25·7
Aikawa		51·6	68	e 9 14	+ 4	—	—	—	—	28·1
Mori		51·7	63	9 9	− 2	16 28	− 4	—	—	30·3
Siomisaki		51·7	75	e 9 12	+ 1	17 42	+70	—	—	—
Owase		51·8	74	9 4	− 8	15 54	−39	e 11 58	PP	28·7
Nagoya		51·9	73	9 7	− 5	—	—	—	—	28·3
Sapporo		51·9	62	e 9 6	− 6	—	—	—	—	29·2
Tortosa		52·4	296	9 17	+ 1	16 45	+ 3	11 23	PP	e 28·7
Rathfarnham Castle		52·5	313	i 9 19	+ 2	e 16 44	+ 1	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Maebasi		52·9	70	e 9 13	− 7	—	—	—	—	—
Mizusawa		53·3	67	9 16	− 7	16 44	−10	—	—	e 30·3
Sendai		53·5	68	9 18	− 6	16 45	−12	—	—	28·0
Kakioka		53·8	70	9 19	− 7	16 52	− 9	—	—	—
Yokohama		53·8	73	9 21	− 5	—	—	—	—	26·7
Alicante		54·1	294	9 35	+ 6	17 7	+ 2	10 5	pP	e 27·0
Scoresby Sund		54·5	337	9 30	− 2	17 16	+ 6	21 5	SS	—
Toledo	z.	56·0	296	i 9 41	− 2	—	—	—	—	—
Batavia		56·2	136	i 10 18	+34	i 18 46	+73	—	—	—
Almeria		56·2	293	i 9 43	− 1	i 17 33	0	10 33	PcP	30·7
Reykjavik		56·6	329	—	—	e 17 38	0	e 23 8	SSS	e 30·0
Granada		56·9	294	i 9 44a	− 5	i 17 46	+ 4	11 2k	PcP	32·1
Tamanrasset	z.	57·1	275	e 9 48	− 2	e 17 53	+ 8	e 10 36	PcP	—
Malaga	z.	57·6	294	i 9 58k	+ 4	i 17 52	+ 1	10 38	PcP	37·6
Klyuchi		58·5	41	9 22	−38	—	—	—	—	—
Lisbon		60·1	298	e 10 12k	+ 1	18 24	0	26 44	Q	—
Tananarive		61·7	205	e 10 19	− 3	e 18 42	− 2	20 7	ScS	—
Ivigtut		68·4	333	i 11 3	− 3	i 20 4	− 3	21 2	ScS	—
College		72·0	17	e 11 22	− 6	i 20 44	− 5	—	—	e 37·1
Sitka		81·1	15	i 12 18	0	e 22 30	+ 2	e 15 28	PP	e 37·8
Grahamstown	z.	82·9	217	i 12 25	− 3	—	—	—	—	i 47·2
Halifax		86·9	330	12 52	+ 4	23 12	[− 1]	—	—	—
Seven Falls	E.	87·5	335	e 12 48	− 3	e 23 14	[− 3]	e 23 34	S	40·7
Shawinigan Falls	N.	88·6	336	e 12 53	− 3	e 23 20	[− 4]	—	—	—
Ottawa		90·5	338	13 2	− 3	24 34▲	[+58]	—	—	—
Harvard		91·8	332	i 13 7	− 4	i 23 41	[− 2]	e 29 44?	SS	e 41·7
Victoria		91·8	9	13 7	− 4	24 14	+ 3	16 33	PP	—
Hungry Horse		92·7	3	e 13 11	− 4	—	—	—	—	—
Spokane		93·2	5	e 13 15	− 2	e 23 50	[− 1]	e 16 40	PP	—
Fordham		94·0	333	e 13 20	− 1	i 23 53	[− 3]	e 17 1	PP	—
City College, N.Y.		94·1	333	e 13 23	+ 1	e 23 54	[− 2]	e 25 55	PS	e 47·9
Butte	N.	95·1	1	e 13 25	− 1	e 23 57	[− 5]	e 17 15	PP	e 41·6
Philadelphia		95·3	334	—	—	i 23 59	[− 4]	e 24 52	S	e 43·6
Pennsylvania		95·4	337	e 13 26	− 2	i 24 1	[− 2]	i 26 0	PS	e 49·7
Bozeman		95·5	1	e 13 27	− 1	e 24 4	[0]	e 17 16	PP	—
Cleveland		95·8	340	e 13 32	+ 3	i 24 3	[− 2]	i 26 5	PS	—
New Kensington	E.	96·1	338	—	—	e 24 8	[+ 1]	—	—	e 46·0
Washington		96·8	335	—	—	i 24 10	[− 1]	—	—	—
Chicago		96·9	344	e 13 34	0	e 24 7	[− 4]	i 24 55	S	e 38·9
Rapid City	E.	96·9	355	—	—	i 24 10	[− 1]	i 24 58	S	—
Bermuda		97·7	323	—	—	i 24 15	[0]	i 25 9	S	e 46·6
Cincinnati		98·8	341	i 12 44	−59	—	—	i 16 43	PP	—
Logan		99·4	2	e 13 43	− 3	e 24 19	[− 5]	e 17 45	PP	—
Lincoln	E.	99·5	350	—	—	e 24 15	[−10]	—	—	e 36·0
Shasta Dam		99·6	9	e 13 43	− 3	—	—	—	—	—
Mineral		100·0	9	i 8 44?k	?	—	—	—	—	—
St. Louis		100·6	345	e 13 49	− 2	i 24 27	[− 3]	e 17 56	PP	—
Reno	z.	101·1	8	e 13 46	− 7	—	—	e 18 48	PP	—
Berkeley		102·4	10	e 13 55	− 4	i 24 30	[− 9]	e 18 13	PP	—
Columbia		102·6	336	—	—	e 23 35	[−65]	—	—	e 76·5
Lick	z.	103·0	10	e 17 58	PKP	—	—	i 18 21	PP	—
Tinemaha	z.	103·6	7	i 18 16	PKP	—	—	e 30 3	PKKP	—
Fresno	z.	103·8	9	e 18 22	PP	—	—	—	—	—
Overton	z.	104·5	4	e 14 7	− 1	e 29 49	PKKP	i 18 36	PP	—
Pierce Ferry		104·9	3	e 14 10	0	—	—	—	—	—
China Lake	z.	105·0	6	e 14 9	− 2	—	—	e 18 38	PP	—
Mount Wilson	z.	106·5	7	e 29 45	PKKP	—	—	—	—	—
Pasadena	z.	106·6	7	e 17 58	PKP	—	—	—	—	—
Riverside	z.	106·8	7	e 29 44	PKKP	—	—	—	—	—
Palomar	z.	107·5	6	i 17 51	PKP	e 29 38	PKKP	—	—	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
	°	°	m. s.	s.	m. s.	s.	m. s.			m.
Loyola	108·9	342	e 19 4?	PP	e 25 18	[+10]	—	—		—
Tucson	108·9	1	e 14 32	P	e 24 40	[−28]	e 18 57	PP		—
San Juan	109·9	316	e 18 49	[+17]	e 25 7	[− 5]	e 19 0	PP		e 47·3
Bogota	125·6	315	e 19 4	[0]	e 25 47	[−21]	e 20 58	PP		—
La Paz	137·6	290	i 19 26	[0]	i 22 53	PKS	i 22 16	PP		—
Huancayo	139·6	303	e 19 30	[0]	e 29 7	{−12}	i 23 2	PP		—

Additional readings :—
Bucharest iS?E =12m.15s.
Helwan iZ =7m.14s., iN =14m.42s.
Budapest PPPE =9m.6s., SSN =15m.49s., SSE =15m.56s., eSSSN =16m.2s., eSSSE =16m.54s.
Kalossa eN =9m.6s., eE =9m.27s. and 14m.0s.
Raciborzu eN =8m.18s., ePPP?NZ =9m.30s., eNZ =10m.2s.
Upsala eN =10m.23s., eE =12m.29s., eN =15m.20s., eSSE =15m.58s., eS_cS?E =17m.25s.
Zagreb e =14m.37s.a and 16m.44s.?
Prague ePP =9m.18s., ePPP =9m.44s., eSS =16m.36s.
Potsdam eN =7m.53s. and 9m.36s.?, iSE =14m.6s., iSS?Z =16m.42s., iSS?N =16m.54s., iSS?E =17m.4s.
Collmberg eSSE =17m.12s.
Triest iPP =9m.48s.k, ipPP =10m.8s.k, iSS =17m.30s.
Stuttgart iP =8m.16s., i =8m.40s., eSS =18m.2s.
Zürich iP =8m.21s.a.
Strasbourg iS =15m.5s., eSS =18m.5s.
Tunis iPP =10m.24s.
Paris PP =10m.40s., iSS =19m.22s.
Clermont-Ferrand ePPP =11m.37s., eS_cS =18m.42s.
Aberdeen iN =18m.39s. and 26m.19s.
Durham iN =20m.10s., iEN =20m.15s., 20m.20s., and 20m.23s.
Kew iZ =9m.1s., eSSSNZ =19m.55s., eZ =22m.53s.
Edinburgh PS =20m.5s., S_cS =22m.46s.
Owase P_cP =9m.51s.
Tortosa PPPN =12m.26s., PSEN =16m.56s., SS?N =20m.25s.
Alicante P_cP =10m.29s., PP =11m.39s., PPP =12m.55s., P_cS =14m.5s., PS =17m.22s., PPS =17m.43s., S_cS =18m.43s., SS =20m.57s.
Scoresby Sund 19m.20s. and 22m.8s.
Almeria PP =11m.55s., PPP =13m.9s., P_cS =14m.41s., S_cS =19m.29s., SS =21m.25s., SSS =23m.33s.
Reykjavik eE =26m.14s.
Granada iPP =12m.1s., PPP =12m.52s., P_cS =14m.4s., PS =18m.28s., SS =21m.16s., SSS =24m.10s.
Tamanrasset iPZ =9m.53s.k, ePPZ =12m.6s.
Malaga PPZ =12m.22s.
Tananarive SSS =25m.31s., e =26m.2s.
Sitka ePPP =17m.24s., iS =22m.33s., eSS =27m.54s., eSSS =31m.34s., e =32m.10s.
Victoria SKKS =23m.42s., PS =25m.21s.
Spokane eP =13m.20s., e =24m.10s., eSKKS =24m.23s.
Philadelphia eSKKS =24m.15s., ePS? =26m.8s.
Pennsylvania eN =16m.33s., iE =29m.29s.
Bozeman eSS =30m.27s.
Cleveland iSKKSN =24m.45s.
Chicago e =30m.2s. and 35m.40s.
Rapid City eE =29m.0s.
Bermuda e =32m.53s.
Logan ePPP =19m.47s., eSS =31m.58s.
St. Louis iS =25m.27s.
Reno iZ =14m.20s., eN =17m.5s. and 19m.3s., eE =19m.23s.
Berkeley iE =20m.14s. and 25m.44s., iN =28m.12s.
Tucson ePKP =18m.35s., ePS =28m.21s., ePKKP =29m.37s.
San Juan ePS =28m.40s.
Bogota eSKKSEN =27m.53s.
La Paz iZ =32m.16s.
Huancayo iPKS =23m.53s., i =24m.23s., eSS? =41m.44s.
Long waves were also recorded at Honolulu.

July 10d. 16h. 24m. 0s. Epicentre 39°·2N. 70°·7E. (as at 15h. 49m.).

A = +·2568, B = +·7334, C = +·6295 ; δ = +9 ; h = −1 ;
D = +·944, E = −·331 ; G = +·208, H = +·594, K = −·777.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	i 0 25?	+ 5	—	—	—	—	—
Stalinabad		1·6	247	0 36	+ 6	1 1	+10	—	—	—
Andijan		2·0	39	i 0 37?	+ 2	—	—	—	—	—
Tashkent		2·4	333	i 0 55	+14	—	—	—	—	—
Samarkand		2·9	279	i 0 56	P_g	i 1 34	S_g	—	—	—
Tchimkent		3·1	345	i 0 56	P*	—	—	—	—	—
Frunse		4·7	38	i 1 15	+ 1	—	—	—	—	—
Dehra Dun	N.	10·7	144	i 1 44	−54	i 3 36	−63	—	—	i 4·3
New Delhi	N.	11·9	151	i 2 49	− 5	i 4 59	−10	—	—	—
Semipalatinsk		13·1	28	i 3 3	− 7	e 5 28	+10	—	—	—
Sverdlovsk		18·9	343	4 25	+ 1	—	—	—	—	—
Grozny		19·2	290	i 4 32	+ 4	—	—	—	—	—
Tiflis		19·8	285	i 4 37	+ 2	e 8 25	+12	—	—	—
Bombay		20·3	175	i 4 40	0	i 8 25	+ 2	—	—	9·9
Leninakan		20·6	284	4 41	− 2	8 39	+10	—	—	—
Poona		20·8	172	i 4 42	− 3	i 8 39	+ 6	—	—	—
Piatigorsk		21·2	293	4 52	+ 3	—	—	—	—	—
Calcutta	N.	22·4	133	e 4 59	− 3	i 8 53	−11	—	—	—
Hyderabad		22·7	161	i 4 59	− 5	i 9 4	− 5	—	—	11·0
Sotchi		23·6	290	i 5 16	+ 3	i 9 37	+12	—	—	—
Irkutsk		26·6	49	5 28	−14	—	—	—	—	—
Theodosia		26·7	295	5 6	−37	—	—	—	—	—
Moscow		27·5	318	5 49	− 1	10 29	− 1	—	—	—
Simferopol		27·6	295	5 51	0	10 33	+ 1	—	—	—
Ksara		28·4	269	i 6 1a	+ 3	e 11 2?	+17	—	—	—
Kodaikanal	E.	29·5	167	e 6 7	− 1	i 11 7	+ 5	9 11	P_cP	14·1
Istanbul		31·7	288	6 26	− 1	—	—	—	—	—
Helwan		33·5	266	i 6 43	0	12 12	+ 7	7 58	PP	—
Colombo	E.	33·6	164	7 0?	+16	—	—	—	—	13·5
Lwow		34·4	304	e 6 52	+ 1	—	—	—	—	—
Helsinki		35·3	323	i 6 59	0	i 12 33	0	e 8 15	PP	—
Skalnate Pleso		36·9	304	i 7 15	+ 3	e 13 0	+ 2	—	—	—
Belgrade		37·3	295	i 7 17a	+ 1	i 17 2	SSS	i 8 47	PP	e 22·5
Budapest		37·8	301	7 24	+ 4	13 22	+11	e 8 58	PP	—
Kalossa		38·0	300	7 26	+ 5	—	—	e 8 57	PP	17·5
Raciborzu		38·2	305	e 7 21?	− 2	e 12 59	−18	i 9 1	PP	e 18·0
Ogyalla		38·4	301	7 28	+ 3	e 13 24	+ 4	—	—	—
Upsala		38·8	320	i 7 28a	0	i 13 24	− 2	9 3?	PP	e 20·4
Zagreb		40·2	298	e 7 40	0	e 17 3	SS	i 9 18	PP	—
Taranto		40·5	290	7 39	− 3	13 31	−21	9 13	PP	—
Prague		40·6	305	i 7 42	− 1	e 13 50	− 4	e 9 19	PP	e 20·0
Potsdam		41·2	309	i 7 50a	+ 2	i 16 50	SS	i 9 22a	PP	—
Collmberg		41·4	308	7 49	− 1	e 14 48	+43	9 26	PP	e 20·0
Copenhagen		41·4	314	i 7 50	0	i 14 8	+ 3	i 9 30	PP	—
Triest		41·8	298	i 7 54	+ 1	i 14 15	+ 4	i 8 17	pP	—
Zi-ka-wei	Z.	41·8	85	i 7 54	+ 1	—	—	—	—	—
Cheb		41·9	305	e 7 55	+ 1	e 14 15	+ 2	—	—	—
Messina		42·5	287	e 7 59a	0	e 14 27	+ 5	—	—	—
Jena		42·7	306	e 7 57	− 3	e 14 22	− 2	e 9 42	PP	e 21·0
Catania		43·1	286	e 8 3	− 1	e 14 30	0	—	—	—
Rome		43·6	293	i 8 7a	− 1	e 14 48	+10	i 9 51	PP	—
Bologna		43·7	297	i 8 11	+ 3	i 15 4	+25	e 10 3	PP	—
Florence Arc.		43·9	297	i 8 12	+ 2	—	—	10 2	PP	—
Florence Xim		43·9	297	i 8 12	+ 2	i 14 52	+10	—	—	—
Prato		44·0	297	i 8 12	+ 1	i 14 42	− 1	—	—	—
Stuttgart		44·2	304	i 8 14k	+ 2	e 14 41	− 5	e 9 55	PP	e 22·0
Chur		44·4	302	e 8 14	0	e 10 3	PP	—	—	—
Zürich		44·9	303	e 8 18a	0	e 17 58	SS	e 9 58	PP	—
Pavia		45·0	299	i 9 24a	+65	e 11 14	?	—	—	—
Strasbourg		45·1	304	e 8 20	0	i 15 2	+ 3	i 10 11	PP	22·5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Basle		45·5	302	e 8 23	0	—	—	e 10 14	PP	e 20·0
De Bilt		46·0	309	i 8 18	− 9	e 15 18	+ 6	—	—	e 24·0
Neuchatel		46·0	303	e 8 27	0	—	—	—	—	—
Tunis		47·0	287	i 8 42	+ 7	i 15 40	+14	i 10 34	PP	—
Kumamoto		48·2	78	8 39	− 5	—	—	—	—	—
Hamada		48·3	76	8 43	− 2	15 44	− 1	10 40	PP	—
Paris		48·5	305	e 8 46	0	i 15 43	− 5	i 10 39	PP	e 23·0
Kagosima		48·6	80	8 41	− 6	—	—	—	—	28·6
Clermont-Ferrand		49·0	301	e 8 50	0	i 15 59	+ 4	i 10 45	PP	24·0
Miyazaki		49·1	80	e 8 54	+ 3	15 44	−12	—	—	27·5
Aberdeen	N.	49·2	318	e 8 45	− 7	i 15 50	− 8	i 10 38	PP	23·9
Durham		49·5	314	e 8 55	+ 1	i 16 1	− 1	i 10 56	PP	—
Kew		49·5	310	i 8 53s	− 1	e 16 3	+ 1	i 10 51	PP	e 24·0
Simidu		49·9	77	10 10	+73	17 29	+82	—	—	29·7
Edinburgh	E.	50·1	315	8 58	− 1	16 10	0	10 16	PcP	—
Sumoto		50·7	75	9 2	− 1	16 17	− 1	—	—	22·8
Kobe		50·8	74	e 9 1	− 3	16 44	+24	—	—	27·9
Kyoto		51·0	73	8 46	−20	16 8	−14	—	—	—
Osaka		51·0	74	i 9 10	+ 4	16 58	+36	—	—	28·3
Barcelona		51·1	297	i 9 7	+ 1	i 16 29	+ 5	—	—	—
Jersey	E.	51·3	308	e 9 6	− 2	e 16 27	+ 1	—	—	24·0
Mori		51·7	63	9 17	+ 6	16 31	− 1	—	—	32·0
Siomisaki		51·7	75	i 9 15	+ 4	i 16 36	+ 4	—	—	—
Owase		51·8	74	9 28	+16	16 34	+ 1	—	—	29·1
Nagoya		51·9	73	e 9 9	− 3	16 30	− 5	—	—	28·1
Sapporo		51·9	62	9 9	− 3	—	—	—	—	29·4
Matusiro		52·2	71	e 9 10	− 5	16 23	−16	—	—	e 26·4
Tortosa		52·4	296	i 9 18	+ 2	i 16 47	+ 5	10 27	PcP	e 25·0
Rathfarnham Castle		52·5	313	i 9 16	− 1	e 16 42	− 1	—	—	—
Maebasi		52·9	70	e 9 16	− 4	—	—	—	—	30·1
Hunatu		53·1	72	9 17	− 4	—	—	—	—	—
Kumagaya		53·3	71	9 18	− 5	—	—	—	—	30·2
Mizusawa		53·3	67	9 20	− 3	16 48	− 6	—	—	e 30·4
Sendai		53·5	68	e 9 24	0	16 52	− 5	—	—	28·0
Tukubasan		53·7	70	9 20	− 6	16 28	−31	—	—	33·6
Kakioka		53·8	70	9 22	− 4	16 28	−33	—	—	—
Yokohama		53·8	73	9 26	0	17 50	+49	—	—	—
Mito		53·9	70	9 27	0	17 15	+13	—	—	—
Onahama		54·0	69	e 9 26	− 2	16 25	−38	—	—	—
Alicante		54·1	294	9 42	+13	17 15	+10	12 19	PP	23·7
Scoresby Sund		54·5	337	i 9 33	+ 1	17 10	0	11 38	PP	—
Toledo	Z.	56·0	296	i 9 41	− 2	—	—	—	—	—
Almeria		56·2	293	i 9 45	+ 1	i 17 36	+ 3	10 47	PcP	31·0
Batavia		56·2	136	i 10 26	+42	i 18 58	?	—	—	—
Reykjavik		56·6	329	—	—	e 17 49	+11	e 22 0	SS	e 29·3
Granada		56·9	294	i 9 47k	− 2	i 17 38	− 4	10 26	PcP	32·0
Tamanrasset	Z.	57·1	275	i 9 50k	0	e 17 48	+ 3	i 11 59k	PP	—
Malaga	Z.	57·6	294	i 9 58k	+ 4	i 17 56	+ 5	10 56	PcP	31·8
Lisbon		60·1	298	e 10 10s	− 1	18 37	+13	26 48	Q	35·2
Tananarive		61·7	205	e 10 21	− 1	e 18 42	− 2	12 38	PP	—
Ivigtut		68·4	333	—	—	i 20 9	+ 2	24 42	SS	32·0
College		72·0	17	e 11 20	− 8	i 20 43	− 6	e 26 48	SSP	e 36·9
Halifax		86·9	330	12 50	+ 2	23 32	+ 6	—	—	36·0
Seven Falls	E.	87·5	335	e 12 50	− 1	e 23 25	[+ 8]	e 28 36	SS	37·0
Shawinigan Falls	N.	88·6	336	e 12 55	− 1	e 22 29	[−55]	e 15 24	?	—
Ottawa		90·5	338	13 4	− 1	23 42	[+ 6]	—	—	—
Harvard		91·8	332	i 13 10	− 1	e 23 49	[+ 6]	—	—	—
Victoria		91·8	9	13 10	− 1	24 18	+ 7	16 39	PP	—
Hungry Horse		92·7	3	i 13 12	− 3	—	—	—	—	—
Spokane		93·2	5	e 13 17	0	e 23 52	[+ 1]	e 16 40	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
City College, N.Y.		94·1	333	e 19 14	PPP	e 24 4	[+ 8]	e 25 58	PS	e 47·2
Butte	N.	95·1	1	e 13 27	+ 1	i 24 53	+14	e 17 15	PP	e 45·3
Philadelphia		95·3	334	e 16 17	?	i 24 9	[+ 6]	e 17 18	PP	e 44·2
Bozeman		95·5	1	e 13 32	+ 4	e 24 30	−12	e 17 10	PP	e 46·2
Cleveland		95·8	340	e 13 25	− 4	e 24 4	[− 1]	e 17 26	PP	—
Washington		96·8	335	—	—	i 24 20	[+ 9]	e 26 24	PS	e 46·9
Chicago		96·9	344	e 13 36	+ 2	i 24 16	[+ 5]	e 26 21	PS	e 43·7
Rapid City	E.	96·9	355	i 13 36	+ 2	e 24 20	[+ 9]	e 17 30	PP	e 45·0
Lincoln	E.	99·5	350	—	—	e 24 31	[+ 6]	—	—	e 40·2
Shasta Dam		99·6	9	e 13 45	− 1	—	—	—	—	—
St. Louis		100·6	345	e 13 49	− 2	e 24 36	[+ 6]	e 27 1	PS	—
Ukiah		101·0	11	—	—	e 24 41	[+ 9]	e 29 43	PKKP	e 47·2
Reno		101·1	8	e 13 54	+ 1	e 24 42	[+10]	e 18 7	PP	—
Berkeley		102·4	10	e 14 2	+ 3	e 24 24	[−15]	e 18 11	PP	e 68·5
Santa Clara	E.	102·9	10	—	—	e 24 41	[0]	—	—	—
Lick	Z.	103·0	10	e 17 25	?	—	—	i 18 26	PP	—
Fresno		103·8	9	e 14 5a	0	e 24 46	[+ 1]	i 17 37	PP	—
Riverview		104·0	122	i 14 10a	+ 4	e 24 48	[+ 2]	i 18 25	PP	e 47·7
Overton	Z.	104·5	4	e 14 10	+ 2	e 26 26	+28	i 18 13	PP	—
Pierce Ferry		104·9	3	e 14 11	+ 1	—	—	—	—	—
China Lake	Z.	105·0	6	e 14 11	0	—	—	—	—	—
Mount Wilson	Z.	106·5	7	e 14 22	P	—	—	—	—	—
Riverside	Z.	106·8	7	e 17 57	PKP	—	—	—	—	—
Lubbock		107·3	353	17 50	PKP	—	—	—	—	—
Palomar	Z.	107·5	6	e 14 25	P	—	—	e 17 29	PKP	—
Tucson		108·9	1	e 14 30	P	i 26 12	{+15}	i 19 6	PP	e 50·1
San Juan		109·9	316	e 19 11	PP	e 28 32	PS	—	—	e 49·9
Fort de France		110·0	309	e 22 58	PKS	e 28 44	PS	—	—	—
Bogota		125·6	315	e 19 5	[+ 1]	e 21 18	?	e 20 58	PP	—
La Paz		137·6	290	i 19 26a	[0]	i 23 3	PKS	i 22 10	PP	66·4
Huancayo		139·6	303	e 19 29	[− 1]	e 40 45	SS	i 23 10	PP	e 60·0

Additional readings :—
Helwan iZ =7m.12s. and 7m.36s., eN =9m.28s.
Budapest eE =8m.47s., PPPN =9m.12s., PPPE =9m.17s., SSN =16m.0s., SSE = 16m.12s., SSSE =16m.37s., SSSN =16m.42s.
Kalossa eE =8m.44s., iN =9m.4s., and 9m.22s., iE =9m.57s., eN =10m.4s., iE = 10m.19s., eN =11m.33s., eE =11m.38s.
Racíborzu eNZ = =8m.43s., eZ =9m.42s. and 10m.12s., eN =14m.51s.
Upsala iP?E =7m.35s., iN =8m.42s., iE =11m.21s., iN =11m.31s., SSN =16m.3s.?, iSS?E =16m.16s.
Taranto eSS =16m.13s.
Prague ePPP =10m.6s., eSS =16m.29s.
Potsdam iE =9m.27s., iN =9m.34s. and 16m.16s., iZ =16m.47s.
Collmberg Z =7m.52s., 7m.55s., 8m.0s., 8m.8s., 8m.12s., and 8m.26s., eEZ =9m.33s., PPPZ =10m.5s., Z =10m.22s. and 11m.14s., eN =14m.53s., eSSE =17m.6s., eN = 18m.26s.
Copenhagen 16m.57s.
Triest iPP =9m.37s., ipPP =9m.56s., iPPP =10m.19s., isS? =14m.42s., iSS? =17m.21s.
Jena ePN =8m.0s., eSSE =17m.43s., eSSN =17m.48s.
Rome i =10m.59s., iSS =17m.56s., SSS? =19m.30s.
Bologna iE =8m.33s., ePPPE =10m.30s., eE =14m.41s., eSS =20m.0s.?
Stuttgart eSS =18m.15s.
Zürich e =12m,34s.
Strasbourg iSS =18m.25s.
Tunis i =9m.40s. and 9m.58s.
Paris i =9m.6s. and 9m.19s., iPPP? =11m.21s., iP_cS =14m.30s., iS_cS = 18m.39s., SS = 19m.14s., e =19m.48s.
Clermont-Ferrand iPPP? =11m.42s., iP_cS? =13m.48s., eS_cS =18m.36s., eSS =19m.36s.
Aberdeen iPPPN =11m.25s., i =19m.41s., iSSS =20m.35s.
Durham iEN =19m.46s., 20m.16s., and 20m.21s.
Kew iPPP =11m.55s., eSS =19m.49s.
Edinburgh PPE =10m.56s., P_cSE =14m.12s., PSE =16m.23s., iE =18m.0s., eS_cSE = 19m.4s., SSE =19m.42s., SSSE =21m.16s.
Tortosa PPN =11m.18s., PPPEN =12m.22s., P_cSE =14m.27s., PSE =17m.2s., $S_cS?E$ = 19m.19s.
Mizusawa eSN =16m.52s.
Scoresby Sund 12m.39s., 16m.5s., 18m.54s., 19m.24s., and 20m.54s.
Almeria PP =11m.57s., PPP =13m.11s., P_cS =14m.48s., SS =21m.29s.
Reykjavik eN =23m.12s.

Continued on next page.

Granada iPP =11m.59s., PPP =13m.20s., P_cS =14m.24s., S_cS =20m.8s., iSS =22m.14s.
Tamanrasset ePPP?Z =13m.38s.
Malaga PPZ =12m.14s., iPPPZ =13m.24s.
Lisbon Z =10m.56s., iSE =18m.44s.
Tananarive e =18m.30s., S_cS =20m.14s., SS =22m.41s.
Ivigtut 21m.1s.
College iP =11m.24s.
Seven Falls eE =23m.33s.
Victoria SKKS =23m.51s., PS =25m.17s., SSS =32m.0s.
Spokane eP =13m.22s., i =24m.1s., iS =24m.30s.
Butte ePPP?N =19m.39s., eSKSN =24m.7s., eSSS?N =33m.9s.
Philadelphia ePPP =19m.21s., iPS =26m.5s.
Bozeman eSKS =23m.50s.
Cleveland eN =13m.31s. and 17m.30s., eE =17m.56s., ePPPN =19m.21s., eE =24m.13s., eSKKSN =24m.29s., eN =24m.57s., ePSN =26m.11s.
Rapid City ePS?E =26m.22s., eSS?E =31m.24s.
Reno eE =14m.10s., and 24m.48s., eZ =25m.6s.
Berkeley iZ =20m.26s.
Santa Clara eE =30m.15s. and 35m.6s.
Lick eZ =18m.16s.
Fresno iPPN =17m.42s., ePPE =17m.49s., eE =24m.55s., eZ =25m.54s.
Riverview iPSE =27m.35s., eQN =43·6m.
Overton iPZ =14m.14s.
Tucson iPKP? =18m.39s., ePPP? =21m.32s., iPS =28m.29s., ePKKP =29m.40s., eSS =34m.13s.
San Juan iPS =28m.40s.
Huancayo e =33m.38s.
Long waves were also recorded at Auckland, Christchurch, Wellington, and Honolulu.

July 10d. 17h. 40m. 48s. I
18h. 3m. 12s. II
18h. 31m. 2s. III
18h. 45m. 12s. IV
18h. 54m. 48s. V
Epicentre 39°·2N. 70°·7E. (as at 16h.).

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
I	Obi-garm	0·9	237	i 0 22	+ 2	—	—
II		0·9	237	i 0 22	+ 2	—	—
III		0·9	237	i 0 21	+ 2	0 41	+ 7
IV		0·9	237	i 0 15	− 5	—	—
V		0·9	237	i 0 17	− 3	i 0 34	0
I	Stalinabad	1·6	247	i 0 35	+ 5	i 1 2	+11
II		1·6	247	0 32	+ 2	0 58	+ 7
III		1·6	247	0 33	+ 3	0 57	+ 6
IV		1·6	247	0 30	0	i 0 52	+ 1
V		1·6	247	0 32	+ 2	0 56	+ 5
I	Andijan	2·0	39	e 0 35	0	e 1 1	− 1
II		2·0	39	e 0 29	− 6	i 0 56	− 6
III		2·0	39	e 0 28?	− 7	0 54?	− 8
IV		2·0	39	0 34?	− 1	i 1 3?	+ 1
V		2·0	39	e 0 34?	− 1	i 1 48?	?
III	Tashkent	2·4	333	i 0 38	− 3	i 1 13?	+ 1
IV		2·4	333	e 0 41	0	i 1 18	+ 6
V		2·4	333	e 0 58?	P_g	i 1 31	S_g
I	Murgab	2·7	108	i 0 43	− 2	i 1 17	− 2
II		2·7	108	i 0 43	− 2	i 1 17	− 2
III		2·7	108	0 44	− 1	1 20	+ 1
IV		2·7	108	i 0 51	+ 6	i 1 29	+10
V		2·7	108	i 0 44	− 1	—	—
III	Samarkand	2·9	279	e 0 52	+ 4	—	—
IV		2·9	279	i 0 48	0	1 22	− 2
V		2·9	279	e 0 56	P_g	—	—
I	Tchimkent	3·1	345	i 0 55	+ 4	i 1 36	+ 7
II		3·1	345	—	—	i 1 41	+12
III		3·1	345	e 0 54	+ 3	—	—
IV		3·1	345	i 0 53	+ 2	i 1 31	+ 2
V		3·1	345	e 0 56	+ 5	i 1 32	+ 3

Continued on next page.

		Δ	Az.	P.	O – C.	S.	O – C.
		°	°	m. s.	s.	m. s.	s.
I	Frunse	4·7	38	e 1 12	– 2	—	—
II		4·7	38	e 1 16	+ 2	—	—
III		4·7	38	—	—	e 2 11	+ 1
IV		4·7	38	1 15	+ 1	—	—
V		4·7	38	—	—	i 2 7	– 3
I	Sverdlovsk	18·9	343	3 27	–57	—	—
IV		18·9	343	e 4 17	– 7	—	—
I	Grozny	19·2	290	i 4 30	+ 2	—	—
II		19·2	290	e 4 30	+ 2	—	—
IV		19·2	290	4 28	0	—	—
I	Tiflis	19·8	285	e 4 35	0	e 8 23	+10
IV		19·8	285	e 4 37	+ 2	e 8 17	+ 4
V		19·8	285	e 4 35	0	e 8 15	+ 2
I	Leninakan	20·6	284	e 4 43	0	—	—
I	Piatigorsk	21·2	293	4 48	– 1	8 51	+10
V		21·2	293	(e 4 49)	0	e 4 49	P
I	Sotchi	23·6	290	e 5 13	0	—	—
I	Moscow	27·5	318	e 5 53	+ 3	e 10 33	+ 3
II		27·5	318	e 6 28	+38	—	—
IV		27·5	318	e 5 46	– 4	—	—
I	Kalossa	38·0	300	8 50	PP	—	—
V	Upsala	38·8	320	e 6 54	–34	e 9 12?	PP
I	Copenhagen	41·4	314	7 48	– 2	—	—
V		41·4	314	7 45	– 5	—	—
V	Triest	41·8	298	e 6 45	–68	—	—
I	Jena N.	42·7	306	e 7 56	– 4	—	—
I	Stuttgart	44·2	304	e 8 10	– 2	e 9 53	PP
V		44·2	304	e 8 7	– 5	—	—
I	Strasbourg	45·1	304	i 8 18	– 2	e 10 13	PP
V		45·1	304	e 8 14	– 6	—	—
I	Paris	48·5	305	e 8 43	– 3	—	—
V		48·5	305	e 8 41	– 5	—	—
I	Clermont-Ferrand	49·0	301	i 8 48	– 2	—	—
I	Tamanrasset Z.	57·1	275	i 9 47k	– 3	—	—
V	Z.	57·1	275	e 9 45	– 5	—	—

Kalossa I gives also eE =10m.21s., eN =10m.31s., eE =11m.13s., eN =11m.31s.

July 10d. Many aftershocks from the above epicentre are recorded which do not appear to have been noticed outside the group of stations in the Pamir region. A list of the earliest recorded phase, usually P, for each of these additional shocks is appended for the eight recording stations located in this area.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	15	26	6	17	54	11	20	20	19	5	8
6	1	52	6	23	36	11	29	4	19	27	42
6	7	28	6	28	37	18	51	30	20	28	52
6	8	22	9	10	40?						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	15	33	7	39	15	11	20	32	19	27	56
5	28	38	7	54	42	11	29	19	19	46	40
5	42	26	7	55	12	12	28	42	20	22	6
5	51	54?	7	59	30	13	7	45	20	29	6
6	2	1	8	29	38	13	29	54	20	29	30
6	7	40	8	38	18	13	34	30	20	31	29
6	8	38	8	53	45?	13	35	42	20	38	50
6	18	8	9	4	26	13	39	6	21	9	13
6	23	48	9	6	52	13	57	2	21	46	34
6	39	0	9	10	52	14	6	35	22	0	4
6	46	10	9	38	56	14	41	18	22	5	58
6	54	34	9	55	25	17	29	0	22	47	27?
7	14	14	10	28	5	17	55	8	22	49	12?
7	26	50	10	34	12	18	51	43	23	48	22
7	34	19	11	12	28	19	5	22			

Continued on next page.

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	43	44	6	54	40	10	8	55	17	29	57
4	47	29	7	14	16	10	31	5	17	56	9
5	1	53	7	37	19	11	20	41	18	52	8?
5	2	7	7	59	45	11	29	27	19	5	19
5	15	58?	8	2	38	11	38	2	19	27	58
5	27	25	8	32	45	11	54	23	20	29	1
5	42	27	8	51	26	12	31	50	20	53	6
5	51	50	8	53	53	12	38	44	21	0	35
6	2	7	9	9	55	13	30	2	21	10	7
6	8	39	9	10	58	16	56	13	21	46	50?
6	28	56	9	21	8	17	2	28	22	5	17
6	35	26	9	25	29	17	12	1	22	56	49
6	46	12	9	41	57	17	14	29	23	40	25

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	16	54	7	59	45	9	25	36	19	5	28?
5	28	48?	8	15	8	10	28	15	19	28	52
6	39	14?	8	29	51	11	20	44	19	48	10?
6	46	24?	8	48	30	11	29	37?	20	23	2
6	54	48	8	54	1	13	30	10	20	31	48
7	14	26	9	4	40	13	36	0	20	39	46?
7	55	0	9	7	6	18	53	8?	23	9	51
7	56	34?	9	11	11						

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	11	2?	13	2	44	14	32	10	19	14	24
10	34	2	13	24	40	14	40	58	20	22	20
11	20	54	13	29	43?	18	52	2	20	29	16
11	29	31	13	38	52	19	5	29	21	46	48
12	28	31	13	56	52						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	44	8	6	8	50	7	59	55	18	52	8
5	2	20	6	9	49	8	17	40	19	5	35?
5	43	34	6	47	3	11	29	39?	19	29	12

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	11	18	13	31	10	19	5	42?	20	23	15
9	25	53	18	53	24	19	29	6	21	47	44
11	20	56									

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	2	42?	6	56	34	9	26	59	18	52	43
5	16	37	7	16	10	11	31	4	19	29	40
5	29	2	8	30	18	13	31	36	20	33	18
5	44	20	8	55	33	13	37	33	23	10	11
6	10	16	9	11	42	14	34	14			

July 10d. Readings also at 1h. (Overton), 4h. (Collmberg (2), Strasbourg (2), Stuttgart (2), Paris (2), Tamanrasset (3), and College (3)), 5h. (Simferopol, Grozny (2), Leninakan, Tiflis, Piatigorsk, Semipalatinsk, Ksara, Helsinki (2), Upsala, Copenhagen, Strasbourg, Stuttgart, Paris, Clermont-Ferrand, Jena, Tamanrasset (2), Tucson, Hungry Horse, and College (3)), 6h. (near College), 9h. (Paris, Strasbourg, Stuttgart, and Tamanrasset), 11h. (Tortosa and near College), 12h. (near Lick), 13h. (Mineral), 14h. (Strasbourg and near Fort de France), 15h. (near Berkeley, Branner, Fresno, Lick, Reno, and San Francisco), 16h. (Budapest, Almeria (2), and Granada (2)), 17h. (Klyuchi), 18h. (near College (2)), 19h. (College, near Basle, and Zürich), 21h. (Stuttgart), 23h. (Copenhagen, De Bilt, Kew, Paris, Potsdam, Strasbourg, Stuttgart, Ksara, Tamanrasset, and College).

July 11d. 1h. 7m. 38s. Epicentre 50°·8N. 6°·9E.

Intensity V at Cologne, Bonn, Berg, Gladbach, Kerpen, etc. Felt also at Siegen, Wuppertal, Düsseldorf, Aachen, etc.
Epicentre 50°49'N. 6°53'E. (2km. from Bruhl). Depth 30-40km.

H. Schwarzbach and H. Berg.
Das Rheinische Erdbeben, Vom. II, Juli, 1949 (Neues Jährbuch für Geologie und Palaontologie, Monatshefte, 1950, Heft. 4, pp. 99-113.

A = +·6300, B = +·0762, C = +·7728 ; δ = −7 ; h = −6 ;
D = +·120, E = −·993 ; G = +·767, H = +·093, K = −·635.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Heerlen	0·6	278	i 0 10	P_g	i 0 15	S_g	—	—
De Bilt	1·7	322	i 0 10	−21	i 0 15	−39	—	—
Strasbourg	2·3	166	e 0 42	+ 2	e 1 10	+ 1	e 0 47	P_g
Stuttgart	2·5	143	e 0 45	+ 2	e 1 17	+ 3	e 0 50	P_g
Jena	3·0	85	e 1 0	P_g	e 1 30	+ 3	i 1 41	S_g
Paris	3·4	237	i 1 4	P*	e 1 36	− 1	e 1 8	P_g
Zürich	3·6	161	e 1 0	+ 2	e 1 42	0	—	—
Collmberg	3·9	82	0 59	− 3	2 0	S*	1 16	P_g
Potsdam	4·1	65	—	—	e 2 22?	S_g	—	—
Kew	4·6	282	—	—	e 2 25	S*	—	—
Clermont-Ferrand	5·6	208	e 1 32	+ 5	e 2 25	− 8	e 1 51	P_g

Additional readings :—
Strasbourg eP_g = 52s., iS = 1m.17s., iS_g = 1m.21s.
Stuttgart eP_g = 57s., eS_g? = 1m.29s., eS_g? = 1m.32s., e = 1m.40s.
Jena eP*EN = 1m.5s., eP_gN = 1m.13s., iEN = 1m.36s.
Paris e = 1m.12s., eS = 1m.41s., iS_g? = 1m.46s.?, e = 1m.49s.
Collmberg E = 1m.4s., Z = 1m.8s., EZ = 1m.34s., E = 1m.40s., Z = 2m.5s., S_gE = 2m.9s., E = 2m.14s.
Clermont-Ferrand eS = 2m.41s., eS_g = 2m.49s., i = 3m.5s.

July 11d. 1h. 12m. 23s. Epicentre 39°·2N. 70°·7E. (as on 10d.).

A = +·2568, B = +·7334, C = +·6295 ; δ = +9 ; h = −2.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	0 24	+ 4	0 40	+ 6	—	—	—
Stalinabad		1·6	247	0 35	+ 5	1 2	S_g	—	—	—
Andijan		2·0	39	i 0 28?	− 7	0 53?	− 9	—	—	—
Tashkent		2·4	333	e 0 41	0	i 1 17	S_g	—	—	—
Murgab		2·7	108	0 43?	− 2	1 18?	− 1	—	—	—
Samarkand		2·9	279	e 0 51	+ 3	i 1 37	S_g	—	—	—
Tchimkent		3·1	345	e 0 55	+ 4	i 1 45	S_g	—	—	—
Frunse		4·7	38	e 1 14	0	i 2 16	+ 6	—	—	—
New Delhi	N.	11·9	151	e 2 47	− 7	e 4 56	−13	—	—	—
Sverdlovsk		18·9	343	4 20	− 4	7 51	− 2	—	—	—
Tiflis		19·8	285	e 4 36	+ 1	e 8 24	+11	—	—	—
Moscow		27·5	318	e 5 50	0	—	—	—	—	—
Ksara		28·4	269	5 37?	−21	—	—	—	—	—
Upsala		38·8	320	i 8 7	+39	e 13 37?	+11	e 16 1	SS	e 20·6
Stuttgart		44·2	304	e 8 14	+ 2	—	—	—	—	e 24·6
Strasbourg		45·1	304	e 8 19	− 1	—	—	i 8 23	P	—
De Bilt		46·0	309	—	—	e 15 37?	+25	—	—	e 24·6
Paris		48·5	305	i 8 49	+ 3	—	—	—	—	—
Clermont-Ferrand		49·0	301	e 8 47	− 3	—	—	e 9 23	?	30·6
Tamanrasset	z.	57·1	275	e 9 50	0	—	—	—	—	—
College		72·0	17	e 11 25	− 3	—	—	—	—	—

July 11d. 3h. 55m. 35s. Epicentre 39°·2N. 70°·7E. (as at 1h.12m.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Obi-garm		0·9	237	0 27?	+ 7	0 55?	+21	—	—	—
Stalinabad		1·6	247	i 0 27	− 3	i 0 53	+ 2	—	—	—
Andijan		2·0	39	0 28?	− 7	i 0 54?	− 8	—	—	—
Tashkent		2·4	333	i 0 26?	−15	i 1 0?	−12	—	—	—
Murgab		2·7	108	i 0 39	− 6	1 12	− 7	—	—	—
Samarkand		2·9	279	0 54	+ 6	1 33	S_e	—	—	—
Tchimkent		3·1	345	i 0 57	+ 6	i 1 40	S_e	—	—	—
Frunse		4·7	38	e 1 18	+ 4	e 2 13	+ 3	—	—	—
New Delhi	N.	11·9	151	e 2 51	− 3	e 4 58	−11	—	—	—
Sverdlovsk		18·9	343	i 4 28	+ 4	—	—	—	—	—
Grozny		19·2	290	i 4 33	+ 5	—	—	—	—	—
Tiflis		19·8	285	e 4 40	+ 5	—	—	—	—	—
Bombay	N.	20·3	175	(e 4 38)	− 2	(e 8 38)	+15	—	—	—
Irkutsk		26·6	49	5 31	−11	—	—	—	—	—
Moscow		27·5	318	e 5 52	+ 2	—	—	—	—	—
Ksara		28·4	269	e 5 45	−13	—	—	—	—	—
Upsala		38·8	320	—	—	e 16 25?	SS	—	—	e 20·9
Copenhagen		41·4	314	7 51	+ 1	—	—	—	—	—
Stuttgart		44·2	304	e 8 13	+ 1	—	—	—	—	e 25·4
Strasbourg		45·1	304	i 8 21	+ 1	—	—	e 10 14	PP	—
De Bilt		46·0	309	e 5 55	?	—	—	—	—	e 22·4
Paris		48·5	305	8 47	+ 1	—	—	—	—	—
Clermont-Ferrand		49·0	301	e 8 51	+ 1	—	—	—	—	—
Tamanrasset	z.	57·1	275	9 50	0	—	—	—	—	—
College		72·0	17	i 11 25	− 3	—	—	—	—	—

Bombay readings have been reduced by 4 minutes.
Long waves were also recorded at Poona, Potsdam, and Kew.

July 11d. 9h. Undetermined shock.

Pasadena ePZ =42m.19s.
Palomar iPZ =42m.22s.
Riverside ePZ =42m.22s.
Tinemaha iPZ =42m.29s.
Boulder City iP =42m.38s.
Overton iPZ =42m.42s.
Pierce Ferry iP =42m.42s.
Tucson eP =42m.44s.
College iP =43m.6s.
Hungry Horse iP =43m.13s.
Wellington e =45m.?
De Bilt ePKP =50m.24s., eSS =73m.
Copenhagen P =50m.44s., 50m.54s., and 51m.6s.
Triest e =68m.15s., eSS? =74m.13s., eL =94m.?
Long waves were also recorded at Apia.

July 11d. 9h. 43m. 7s. Epicentre 39°·2N. 70°·7E. (as at 3h.).

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Obi-garm	0·9	237	0 22	+ 2	0 39	+ 5
Stalinabad	1·6	247	0 34	+ 4	0 57	+ 6
Andijan	2·0	39	i 0 36	+ 1	i 1 3	+ 1
Tashkent	2·4	333	i 0 22?	−19	i 0 52?	−20
Murgab	2·7	108	0 42	− 3	1 13	− 6
Samarkand	2·9	279	0 53	+ 5	1 31	S•
Tchimkent	3·1	345	e 0 58	P•	i 1 40	S_e
Frunse	4·7	38	i 1 14	0	e 2 10	0
Sverdlovsk	18·9	343	4 19	− 5	—	—
Grozny	19·2	290	e 4 28	0	e 8 6	+ 7
Tiflis	19·8	285	e 4 26	− 9	—	—
Leninakan	20·6	284	e 4 48	+ 5	—	—
Piatigorsk	21·2	293	e 4 49	0	—	—
Moscow	27·5	318	e 5 48	− 2	—	—
Ksara	28·4	269	e 3 13	?	e 7 14	?

Long waves were recorded at Stuttgart.

July 11d. 16h. 10m. 45s. Epicentre 34°·0N. 132°·5E.

Intensity VII-VIII at Hirao, Tokusa (Yamaguchi Pref.), Hisatomo (Hirosima Pref.), and Imabari (Ehime Pref.); V at Simidu, Hirosima, Siomisaki, Kôti, Uwazima, Hamada, Takamatu, Tottori, Yonago, Hukuoka, and Matuyama; II-III at Sumoto, Kobe, Saigo, Wakayama, Osaka, Izuhara, Owase, and Hikone. Two killed and 2 injured at Kure (Hirosima Pref.). Damage to buildings and fissures in roads. Macroseismic radius 300km.
Epicentre as adopted. Depth 40km.

The Seismological Bulletin of the Cent. Met. Obs., Japan, for the year 1949, Tokyo, 1950, pp. 19-21, with macroseismic chart.

$A = -\cdot5613$, $B = +\cdot6125$, $C = +\cdot5566$; $\delta = +2$; $h = 0$;
$D = +\cdot737$, $E = +\cdot676$; $G = -\cdot376$, $H = +\cdot410$, $K = -\cdot831$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hirosima		0·4	352	0 15k	+ 2	0 22	+ 1	—	—	—
Hamada		1·0	343	0 25k	+ 4	0 37	+ 1	—	—	—
Kôti		1·0	117	0 22a	+ 1	0 33	− 3	—	—	—
Simidu		1·3	156	0 17	− 8	—	—	—	—	—
Hukuoka		1·8	256	0 36a	+ 4	0 52	− 4	—	—	—
Kumamoto		1·9	232	0 38a	+ 4	0 53	− 6	—	—	—
Sumoto		2·0	80	0 36a	+ 1	1 9	S_g	—	—	—
Kobe		2·3	73	0 40a	0	1 18	S_g	—	—	—
Unzendake		2·3	236	0 55	+15	—	—	—	—	—
Toyooka		2·4	51	0 43a	+ 2	1 19	S_g	—	—	—
Osaka		2·6	76	0 46a	+ 2	—	—	—	—	—
Kashiwara		2·8	79	0 47a	0	1 23	+ 1	—	—	—
Siomisaki		2·8	101	0 55	P_g	1 29	S*	—	—	—
Kyoto		2·9	69	0 50	+ 2	1 26	+ 2	—	—	—
Owase		3·1	88	0 50a	− 1	1 36	S*	—	—	—
Hikone		3·3	66	0 57a	+ 4	—	—	—	—	—
Kameyama		3·4	74	0 55a	0	—	—	—	—	—
Tomie		3·4	248	1 9	P_g	2 8	S_g	—	—	—
Gihu		3·8	67	1 4	+ 3	2 10	S_g	—	—	—
Nagoya		3·9	71	1 3a	+ 1	1 56	S*	—	—	—
Yakusima		3·9	207	2 15	?	3 6	?	—	—	—
Toyama		4·7	53	1 17a	+ 3	—	—	—	—	—
Omaesaki		4·8	81	1 15	0	2 24	S*	—	—	—
Wazima		4·9	45	1 17a	0	—	—	—	—	—
Shizuoka		5·0	77	1 17a	− 1	2 40	S_g	—	—	—
Matusiro		5·3	60	1 22a	0	2 29	+ 4	—	—	—
Hunatu		5·4	72	1 24a	0	2 50	S*	—	—	—
Misima		5·4	76	1 25k	+ 1	2 48	S*	—	—	—
Osima		5·7	80	1 27	− 1	2 40	+ 5	—	—	—
Maebasi		5·9	63	1 32a	+ 1	2 38	− 2	—	—	—
Kumagaya		6·0	67	1 35a	+ 3	3 6	S*	—	—	—
Aikawa		6·1	47	1 35	+ 1	—	—	—	—	—
Mera		6·1	79	1 33	− 1	—	—	—	—	—
Yokohama		6·1	74	1 38k	+ 4	2 1	−44	—	—	—
Tokyo		6·2	72	1 37	+ 2	2 58	+10	—	—	—
Tukubasan		6·6	68	1 41	0	3 23	S*	—	—	—
Kakioka		6·7	68	1 42	0	3 27	S*	—	—	—
Mito		6·9	67	1 46	+ 1	2 48	−17	—	—	—
Onahama		7·4	64	1 54	+ 2	—	—	—	—	—
Hukusima		7·5	57	1 53a	0	—	—	—	—	—
Sendai		8·0	55	2 1a	+ 1	—	—	—	—	—
Mizusawa		8·6	51	2 10	+ 1	3 49	+ 1	3 54	S	—
Morioka		9·0	48	2 14	+ 1	3 55	− 3	—	—	—
Aomori		9·5	42	2 26	+ 6	4 33	+23	—	—	—
Hatinohe		9·7	45	2 26	+ 4	4 31	+16	—	—	—
Zi-ka-wei	z.	9·7	257	i 2 26a	+ 4	i 4 25	+10	—	—	i 4·7
Mori		10·3	36	2 27	− 5	4 38	+ 8	—	—	—
Sapporo		11·4	35	2 44	− 3	4 55	− 1	—	—	—
Nanking		11·7	264	i 2 53	+ 2	5 56	+52	i 6 8	Q	6·2
Irkutsk		27·2	320	i 5 58	+11	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	40·3	266	e 9 33	P_cP	e 13 43	− 6	e 16 53	SS	—
Frunse		45·4	299	e 8 22	0	—	—	—	—	—
Batavia		46·8	216	i 8 41	+ 8	i 15 33	+ 9	—	—	—
Murgab		46·8	297	8 30	− 3	—	—	—	—	—
New Delhi	N.	47·1	279	i 8 30	− 5	e 15 22	− 6	15 36	PS	—
Tchimkent		49·2	299	i 8 47	− 5	—	—	—	—	—
Tashkent		49·6	298	i 8 53	− 2	—	—	i 9 6	pP	—
Obi-garm		49·9	295	i 8 54	− 3	—	—	—	—	—
Hyderabad	N.	50·8	265	—	—	e 16 13	− 7	—	—	—
Sverdlovsk		52·6	320	i 9 14	− 4	i 16 37	− 7	i 9 27	pP	—
Bombay		54·8	270	—	—	e 17 8	− 6	—	—	—
College		55·5	31	i 9 35	− 4	e 17 16	− 8	i 9 50	?	e 26·2
Kodaikanal	E.	55·5	259	e 17 11	S	(e 17 11)	−13	—	—	e 26·2
Ashkabad		58·7	297	10 0	− 2	18 2	− 4	—	—	—
Sitka		63·1	38	i 10 31	− 1	i 19 3	+ 1	e 23 25	SS	e 26·3
Baku		63·8	302	e 10 38	+ 2	19 10	− 1	—	—	—
Brisbane	N.	64·2	160	i 10 33	− 6	i 24 21	?	—	—	—
Moscow		65·2	322	10 42	− 3	19 19	− 9	10 55	pP	—
Grozny		65·5	307	i 10 46	− 1	i 19 25	− 7	—	—	—
Tiflis		66·8	305	i 10 53	− 3	i 19 42	− 6	i 11 6	pP	—
Piatigorsk		67·0	308	e 10 54	− 3	19 41	− 9	—	—	—
Sotchi		69·3	309	e 11 10	− 1	20 14	− 3	—	—	—
Riverview		69·7	163	i 11 12k	− 2	i 20 45	PS	i 11 21	pP	—
Theodosia		71·4	312	e 11 20	− 4	—	—	—	—	—
Upsala		72·3	332	i 11 25k	− 4	e 20 42	−10	e 20 39	S	e 33·2
Yalta		72·4	312	11 27	− 3	20 45	− 8	i 11 40	pP	—
Victoria		73·7	42	i 11 35	− 3	e 21 5	− 3	i 11 50	?	—
Scoresby Sund		74·2	352	11 38k	− 2	21 8	− 6	16 21	PPP	37·2
Ksara		76·8	302	11 54	− 1	21 39	− 3	12 8	pP	—
Copenhagen		77·1	330	i 11 53	− 4	e 21 37	− 9	e 12 7	?	—
Istanbul		77·4	311	e 11 53	− 5	e 21 43	− 6	—	—	—
Skalnate Pleso		77·7	322	e 12 10	+10	e 21 22	−30	—	—	—
Raciborzu		78·1	323	e 11 59	− 3	e 25 2	?	e 12 5	?	—
Shasta Dam		78·6	48	i 12 3	− 2	—	—	—	—	—
Hungry Horse		78·8	39	i 12 5	− 1	—	—	—	—	—
Potsdam		79·1	328	i 12 5	− 3	e 22 0	− 7	i 12 19	P_cP	e 35·9
Budapest		79·3	321	12 20	+11	e 22 15?	+ 6	—	—	e 42·7
Collmberg		79·8	326	e 12 9	− 3	e 22 6	− 8	e 12 22	pP	e 44·0
Prague		80·0	325	i 12 11	− 2	e 22 8	− 9	—	—	—
Belgrade		80·3	318	i 12 13a	− 1	i 22 14	− 6	i 12 27	P_cP	e 48·8
Jena		80·7	326	e 12 14	− 2	—	—	e 12 29	P_cP	—
Reno		80·9	48	e 12 16k	− 1	e 22 55	+29	i 15 27	PP	e 35·7
Lick	Z.	81·1	51	i 12 16k	− 2	—	—	i 13 16a	?	—
Aberdeen		81·4	337	i 12 34	+14	i 22 25	− 6	—	—	e 40·6
Helwan		82·2	301	12 22	− 2	22 30	− 9	i 12 34	P_cP	—
Fresno	Z.	82·6	50	i 12 25k	− 1	e 21 7	−96	e 13 53	?	—
De Bilt		82·7	331	i 12 24k	− 3	e 22 36	− 8	e 15 49	PP	e 42·2
Durham		83·2	335	i 21 48	?	i 22 45	− 4	—	—	—
Triest		83·3	321	e 12 42	+12	i 22 42	− 8	i 23 7	S_cS	—
Tinemaha	Z.	83·4	50	i 12 28k	− 2	i 12 54	sP	i 12 45	pP	—
Stuttgart		83·4	326	i 12 27k	− 3	e 22 41	−10	i 12 41a	pP	e 43·2
Strasbourg		84·2	327	i 12 31	− 3	e 22 50	− 9	i 12 45	pP	e 41·2
Logan		84·3	43	i 12 31	− 4	e 22 52	− 8	—	—	e 36·3
Chur		84·6	324	e 12 33k	− 3	—	—	e 12 47k	pP	—
China Lake	Z.	84·6	50	i 12 34k	− 2	i 12 54	sP	i 12 48	pP	—
Zürich		84·7	326	e 12 33k	− 4	e 22 49	−15	e 12 45	pP	—
Basle		85·0	326	e 12 35	− 3	—	—	e 12 49k	pP	—
Pasadena		85·2	51	i 12 38k	− 1	i 23 21	+12	i 12 53	pP	e 39·8
Kew		85·3	333	i 12 37k	− 3	i 22 35	[−28]	i 16 9	PP	e 42·2
Bologna		85·4	322	e 12 39k	− 1	e 23 7	− 4	i 12 54	pP	—
Neuchatel		85·7	326	e 12 39k	− 3	—	—	—	—	—
Riverside	Z.	85·9	51	i 12 40k	− 3	i 13 5	sP	i 12 55	pP	—
Prato		85·9	322	e 12 39	− 4	e 23 57	PS	—	—	—
Florence Arc.		85·9	322	e 12 58	+15	e 23 11	[+ 4]	—	—	—
Florence Xim		85·9	322	e 12 41	− 2	e 22 52	[−15]	—	—	—

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pavia		86·0	324	e 12 41	− 2	—	—	—	—	—
Overton	Z.	86·1	48	i 12 43	− 1	—	—	i 13 7	?	—
Boulder City		86·2	48	i 12 44	0	—	—	—	—	—
Paris		86·3	330	i 12 41	− 4	e 23 0	[− 9]	i 15 59	PP	e 44·2
Palomar		86·6	52	i 12 45k	− 1	i 13 7	sP	i 13 0	pP	—
Rome		86·6	320	i 12 42k	− 4	i 23 18	{+ 1}	i 12 57	pP	41·1
Pierce Ferry		86·7	48	i 12 45	− 2	e 23 22	− 2	—	—	—
Messina		87·4	315	e 12 21	−29	—	—	e 13 0	pP	—
Clermont-Ferrand		88·4	327	i 12 53	− 2	e 23 36	− 4	i 13 7	pP	44·2
Tucson		91·2	49	i 13 7	− 1	—	—	e 17 2	PP	e 45·5
Tortosa	E.	93·4	325	e 13 13	− 5	e 23 23	[−29]	—	—	e 48·2
Lubbock		95·6	43	13 30	+ 2	—	—	—	—	—
Alicante		95·8	325	—	—	e 26 37	PPS	—	—	e 43·5
Toledo	Z.	96·2	328	e 17 33	PP	—	—	—	—	—
Seven Falls	E.	96·6	16	—	—	(34 15)?	?	—	—	34·2
Ottawa		96·9	20	13 31	− 3	—	—	—	—	50·2
St. Louis		97·6	33	i 13 36	− 2	i 24 59	− 1	e 13 50	pP	—
Almeria		98·0	326	e 17 56	PP	—	—	—	—	e 41·2
Granada		98·2	326	13 51k	+11	e 25 17	+12	i 17 47a	PP	49·6
Malaga	Z.	99·0	326	i 19 53k	PPP	e 26 49	PS	—	—	53·6
Pennsylvania		100·5	23	—	—	e 24 40	[+11]	i 25 22	S	e 46·2
Philadelphia		102·1	21	—	—	e 24 27	[−10]	e 27 4	PS	e 47·7
Tamanrasset	Z.	104·3	311	14 31	sP	—	—	i 18 22a	PP	—
San Juan		125·0	22	—	—	e 38 39	SSP	—	—	e 62·2
Bogota		134·1	39	e 19 23	[+ 3]	e 22 53	PKS	—	—	—
Huancayo		146·5	56	e 19 43	[+ 1]	—	—	e 23 21	PP	—
La Paz		154·6	51	i 19 53	[− 1]	i 37 15	PPS	i 23 55	PP	73·2

Additional readings and note :—
New Delhi SSN =18m.22s., SSSN =19m.10s.
Kodaikanal SSE =33m.26s., L is given as S.
Sitka e =19m.20s., i =19m.29s., e =23m.35s.
Scoresby Sund 11m.50s.
Collmberg ePcP?Z =12m.11s., eZ =12m.26s., esPE =12m.37s., esPS?E =23m.58s.
Reno iZ =12m.30s., iE =12m.50s. and 13m.24s., iN =13m.29s., eSE =22m.58s.
De Bilt iP =12m.38s.a
Stuttgart ePP =15m.40s., eSS =28m.15s.
Strasbourg esP? =12m.58s., i =13m.17s., ePP =16m.0s., eSS =28m.33s.
Logan i =12m.53s., e =23m.13s.
Zürich ePP =15m.43s.
Pasadena isPZ =12m.59s., iSN =22m.49s.
Kew iZ =12m.50s., ePPPZ =17m.56s., e =26m.52s., eSSS?Z =36m.54s., eZ =37m.21s
Bologna e =23m.34s.
Paris ipP? =12m.57s. and 13m.1s.
Rome ePP =16m.18s., SKS? =23m.1s., e =23m.43s., eSS =29m.3s.
Messina e =14m.46s.
Clermont-Ferrand epPP =16m.34s., eSKS =23m.18s., ePS =24m.33s.?
St. Louis ePP =17m.36s., eSKS =24m.8s.
Granada PPP =19m.43s.a
Pennsylvania ePSN =26m.46s., eE =30m.1s., eSSE =32m.35s., eN =39m.58s., eSKP,PKPE =42m.38s.
Philadelphia ePPS =28m.16s., e =39m.51s.
Tamanrasset eZ =17m.5s. and 18m.9s., ipPP?Z =18m.39s.a
Long waves were also recorded at Bergen.

July 11d. 16h. 27m. 58s. Epicentre 0°·5S. 128°·0E.

$A = -·6157$, $B = +·7880$, $C = -·0087$; $\delta = +11$; $h = +7$;
$D = +·788$, $E = +·616$; $G = +·005$, $H = -·007$, $K = -1·000$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia	21·9	255	i 4 55a	− 2	e 8 52	− 2	—	—	—
Riverview	39·6	149	i 7 33a	− 2	e 13 37	− 1	i 9 14	PP	—
Christchurch	58·4	144	—	—	e 18 16	PS	e 22 17	SS	28·9
Wellington	58·6	140	—	—	e 18 24	PPS	e 24 32	SSS	e 32·0
Stalinabad	66·7	314	i 10 52	− 3	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		67·3	316	i 13 2?	PP	—	—	—	—	—
Samarkand		68·4	314	e 11 4	− 2	—	—	—	—	—
Sverdlovsk		78·2	329	12 8	+ 5	21 50	− 7	—	—	—
Grozny		84·7	314	e 12 36	− 1	—	—	—	—	—
Tiflis		85·2	312	12 43	+ 4	—	—	—	—	—
Leninakan		85·9	311	13 6?	P_eP	—	—	—	—	—
Piatigorsk		86·7	315	e 12 49	+ 2	—	—	—	—	—
College		88·0	25	e 12 51	− 2	—	—	e 15 58	PP	—
Moscow		90·6	326	e 13 5	0	e 23 47	{+ 1}	—	—	—
Ksara		92·0	303	e 13 22	+10	e 24 33	+21	—	—	—
Helwan	z.	96·0	300	e 17 20	PP	e 26 13	PS	—	—	—
Shasta Dam		105·1	48	e 18 36	PP	—	—	—	—	—
Collmberg	z.	105·8	323	e 18 39?	PP	—	—	—	—	—
Jena	n.	106·8	323	e 18 41	PP	—	—	—	—	—
Hungry Horse		108·6	38	e 18 2	[−28]	—	—	—	—	—
Stuttgart		109·0	322	e 18 59?	PP	—	—	e 21 21	PPP	e 57·0
Rome		109·1	315	e 19 35	PP	e 29 8	PPS	—	—	—
Tinemaha	z.	109·1	51	e 19 5	PP	—	—	—	—	—
China Lake	z.	109·9	52	e 19 15	PP	—	—	—	—	—
Pasadena	z.	109·9	54	e 19 14	PP	—	—	—	—	—
Strasbourg		109·9	323	e 19 12	PP	—	—	e 20 9	?	—
Riverside	z.	110·6	54	e 19 19	PP	—	—	i 19 30	?	—
Palomar	z.	111·1	55	i 19 20	PP	—	—	—	—	—
Boulder City		112·1	51	e 19 18	PP	—	—	—	—	—
Overton	z.	112·2	50	i 19 23	PP	—	—	i 20 43	?	—
Pierce Ferry		112·7	51	e 18 34	[− 4]	—	—	e 19 24	PP	—
Clermont-Ferrand		114·0	321	e 19 30	PP	—	—	e 22 5	PPP	—
Tucson		116·3	54	e 19 58	PP	—	—	—	—	—
Tamanrasset	z.	119·9	296	e 18 53	[0]	—	—	e 20 9	PP	—
Toledo	z.	121·4	318	20 29	PP	e 22 27	PKS	e 23 26	PPP	—
Almeria		121·7	314	20 28	PP	—	—	20 57	pPP	70·0
Granada		122·4	315	e 19 35k	[+38]	—	—	20 52a	PP	—
Ottawa		130·6	22	e 19 16	[+ 3]	—	—	—	—	—
Shawinigan Falls	n.	130·7	18	—	—	e 22 39	PKS	—	—	—

Additional readings :—
Riverside iZ =8m.12s., iPS?N =13m.50s., iE =14m.4s., iSS?E =16m.23s., iZ =16m.36s., iE =16m.55s., iS_eS?N =17m.39s.
College e =19m.49s.
Helwan eZ =19m.17s. and 25m.29s.
Jena ePKP?E =18m.45s.
Stuttgart e =19m.5s.
Clermont-Ferrand e =19m.42s., epPP? =19m.55s. and 20m.10s.
Tamanrasset eZ =19m.56s., iZ =20m.18s.k, eZ =23m.42s., 24m.16s., and 30m.48s.
Toledo eZ =35m.32s.
Almeria i =48m.53s.
Granada PPP =23m.30s.k
Long waves were also recorded at Honolulu, Ukiah, and Auckland.

July 11d. 23h. 38m. 14s. Epicentre 39°·2N. 70°·7E. (as at 9h.).

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Obi-garm	0·9	237	0 19	− 1	0 39	+ 5
Stalinabad	1·6	247	0 32?	+ 2	0 58?	+ 7
Andijan	2·0	39	0 26	− 9	0 53	− 9
Tashkent	2·4	333	e 0 39?	− 2	i 1 17?	+ 5
Murgab	2·7	108	e 0 37	− 8	1 11	− 8
Samarkand	2·9	279	e 0 49	+ 1	1 28	+ 4
Tchimkent	3·1	345	i 0 54	+ 3	—	—
Frunse	4·7	38	e 1 13	− 1	e 2 7	− 3
Sverdlovsk	18·9	343	—	—	e 7 54	+ 1
Grozny	19·2	290	e 4 25	− 3	—	—

July 11d. Continuation of list of aftershocks from the epicentre of the large earthquake on July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	32	2	5	22	45	7	44	21	12	2	33
2	1	12	5	46	30	7	52	53	12	12	19
2	6	26	5	53	7	7	56	43	13	59	44
3	18	50	6	9	24	8	36	17	15	8	9
3	41	7	6	15	27	8	57	44	15	25	31
3	47	45	6	34	46	9	20	10	16	25	26
4	23	48	6	39	57	10	35	17	20	0	13
4	25	7	6	57	50	10	52	52	21	2	23
4	50	21	7	16	28	11	26	9	22	55	26

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	0	44	3	47	55?	7	44	33	15	8	23
0	10	55	4	14	42	7	53	4	15	14	25
0	21	12	4	20	18	7	55	21	15	25	44
0	30	34	4	24	1	7	56	55	17	33	12
0	33	25	4	25	20	8	36	30	18	35	33
1	7	10	4	50	34	8	57	56	18	44	0
1	32	15	5	22	58	9	20	26	20	0	26
2	1	30	5	46	44	10	35	31	20	3	59
2	6	38	5	48	36	10	53	5	20	8	12
2	39	40	5	53	18	11	10	58	20	12	56
2	59	6	6	9	36	11	26	23	20	24	40
3	5	10	6	15	39	12	2	45	20	30	50
3	13	55	6	34	58	12	12	32	21	2	36
3	19	6	6	40	2?	12	44	30	21	38	16
3	41	30?	6	58	0	13	59	56	22	55	34
3	46	54	7	16	40	14	36	34	22	59	34

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	31	29	5	23	11	7	53	12	12	12	35
1	1	35	5	46	57	7	57	45	14	0	0
1	32	20?	5	53	57	9	20	25	14	37	10
2	1	31?	6	9	38	10	35	31	15	9	4
2	6	40?	6	15	38	10	53	5	16	25	49
3	41	21	6	35	6	11	11	31	20	0	30
3	47	51?	6	40	6	11	26	30?	20	4	12
4	24	0	6	57	57	11	38	29	20	13	2
4	25	16	7	16	46	12	2	48	21	2	39
4	50	46	7	44	33	12	9	31			

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	1	4	4	50	25?	7	44	25?	12	12	45
0	30	34?	5	22	41?	7	52	57?	12	45	25?
2	1	24?	5	46	39?	8	36	21?	12	54	52?
2	6	35?	5	53	12?	9	20	15?	14	0	11
3	19	0	6	10	19?	10	53	18	14	37	27?
3	47	27?	6	34	52?	11	11	44	15	15	13?
3	47	51	6	39	51?	11	26	39?	16	25	52
4	24	25?	6	57	48?	12	2	59?	20	0	40?
4	25	10?	7	16	32?	12	9	57?	20	8	21?
									21	2	48?

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	0	59	6	9	47	10	30	20	14	59	21
0	30	54	6	15	45	10	35	40	15	8	40
2	1	43	6	35	10	10	53	11	15	14	34
2	6	50	6	40	15	11	11	10	15	25	59?
3	19	10	6	58	5	11	24	6	15	42	46
3	41	44	7	16	53	11	26	34	16	25	57
3	47	50	7	37	51	11	56	27	18	40	30
4	20	29	7	44	43	12	2	52	20	0	40
4	24	8	7	53	20	12	8	33	20	4	9
4	25	29	8	6	45	12	12	44	20	13	15
4	36	54	8	17	30	12	34	25	20	24	14
4	40	30	8	25	34	12	35	17	20	53	23
4	44	53	8	30	50	12	54	17	21	2	47
4	50	57	8	34	2	13	3	54	21	20	50
5	17	33	8	36	43	13	11	8	21	34	9
5	38	58	8	58	15	13	20	4	21	40	32
5	47	2	9	20	33	14	0	8	21	47	49
5	53	28	9	30	16	14	16	40			

Continued on next page.

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	50	56?	19	0	20	20	5	11	20	13	20
6	58	20	20	0	50	20	8	35	21	2	58

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	51	1	7	44	58	12	13	35	20	9	26
6	16	3	10	54	15	14	1	0	20	14	6
6	40	26	12	3	8	16	26	7	21	3	48
6	58	20									

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	3	33	6	58	36	7	57	27	12	14	14
4	52	20	7	17	25	8	38	37	14	1	37
5	48	33	7	46	10	11	28	29	16	27	32
6	36	41	7	55	7	12	4	22	20	2	9
6	41	41									

July 11d. Readings also at 0h. (Mineral, Mount Wilson, Riverside, Palomar, China Lake, Tinemaha, Boulder City, Hungry Horse, Logan, Overton, Pierce Ferry, Tucson, Huancayo, San Juan, near Balboa Heights, and near College), 2h. and 3h. (College), 4h. (Mineral), 6h. (Palomar, Tinemaha, Boulder City, Hungry Horse, Overton, Pierce Ferry, Shasta Dam, Tucson, and Ksara), 7h. (College, Hungry Horse, and Shasta Dam), 9h. (near Overton), 10h. (near College), 12h. (Overton), 13h. (Poona), 14h. (Hungry Horse and Overton (2)), 15h. (College, Overton, Calcutta, Bucharest, and Copiapo), 17h. (Stuttgart, Jena, and near Collmberg), 18h. (Wellington), 19h. (Istanbul, Bucharest, and near Ottawa), 21h. (Overton).

July 12d. 8h. 1m. 36s. Epicentre 23°·7S. 65°·7W. Depth of focus 0·010.
(as on 1947, June 11d.).

Intensity IV between Latitudes 24° and 25° S. Suggested epicentre 23°·5S. 68°·5W. (Strasbourg). Depth of focus 100km Macroseismic radius 275km.

F. Greve.
Boletin de Año, 1949, segundo semestre. Instituto Sismológico, Santiago, p. 4.

A = +·3772, B = −·8355, C = −·3996 ; δ = +2 ; h = +4 ;
D = −·911, E = −·412 ; G = −·164, H = +·364, K = −·917.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copiapo	N.	5·4	229	e 1 18	− 2	—	—	—	—	—
La Paz		7·5	341	i 1 47	− 1	i 3 32	+20	i 3 56	SS	i 4·9
Santa Lucia	N.	10·7	203	—	—	e 4 12	−18	—	—	5·4
Huancayo		14·8	320	e 3 21	− 4	(e 5 47)	−20	—	—	e 5·8
Bogota		29·3	344	e 5 57	+ 2	e 10 30	−10	—	—	—
Fort de France		38·4	8	e 7 22	+ 9	—	—	—	—	—
Weston		65·9	357	i 10 37	− 1	—	—	—	—	—
Ottawa	Z.	69·4	354	e 11 4	+ 4	—	—	—	—	—
Tucson		70·4	321	e 11 3	− 3	—	—	i 11 29	pP	—
Palomar		74·8	318	i 11 31k	0	—	—	i 11 56	pP	—
Pierce Ferry		75·0	321	i 11 58	pP	—	—	i 12 10	sP	—
Boulder City		75·4	321	e 11 59	pP	—	—	—	—	—
Riverside	Z.	75·5	318	i 11 34	− 1	—	—	i 12 1	pP	—
Overton	Z.	75·5	321	i 12 2	pP	—	—	—	—	—
Pasadena		76·1	318	i 11 38	− 1	—	—	i 12 4	pP	—
China Lake	Z.	76·9	319	e 11 42	− 1	—	—	e 12 7	pP	—
Tinemaha	Z.	78·1	320	i 11 52	+ 2	—	—	i 12 16	pP	—
Shasta Dam		82·9	320	i 12 14	− 1	—	—	i 12 40	pP	—
Tamanrasset	Z.	83·2	62	i 12 40	pP	—	—	e 13 2	sP	—
Hungry Horse		83·7	331	i 12 22	+ 3	—	—	i 12 48	pP	—

Additional readings :—
Huancayo e = 3m.50s.
Palomar eZ = 12m.8s.
Riverside iZ = 12m.12s.
Pasadena iZ = 12m.15s.
Tinemaha iZ = 12m.29s.
Shasta Dam isP? = 12m.52s.
Long waves were also recorded at San Juan.

July 12d. Continuation of list of aftershocks from the epicentre of the large earthquake of July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	48	58	5	4	47	9	58	49	13	43	56
1	17	47	5	40	16	10	16	48	14	9	13
1	47	48	5	44	50	10	25	51	16	34	43
2	28	24	7	48	3	10	43	35	19	42	15
2	31	17	8	37	54	11	32	38	19	59	29
3	19	54	9	3	1	11	36	36	21	18	1
3	52	22	9	17	11	12	43	55	21	59	35
4	17	7	9	25	20	12	47	14	22	14	0

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	49	14	6	30	4	10	27	39	14	9	28
0	53	26	7	48	16	10	43	48	14	24	16
1	18	1	7	53	59	11	32	53	15	7	2
1	48	2	8	38	6	11	36	52	15	14	13
1	49	52	9	3	14	12	25	3	15	29	20
2	28	40?	9	17	25	12	44	12	16	34	56?
2	31	30	9	25	33	12	47	54?	19	59	43
5	5	0	9	59	2	13	6	2	21	18	14
5	40	30	10	17	2	13	19	17			
5	45	3	10	26	4	13	44	10			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	28	36	5	45	12	10	43	56	16	34	52
2	31	30	9	25	40	11	37	1	19	59	53
2	47	16	9	59	1	13	19	30	21	18	21
3	52	34	10	17	8	14	9	37	21	59	56
4	17	28	10	26	2	14	24	18	22	14	16
5	4	59									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	31	38	9	25	50	10	44	2?	21	18	27?
3	52	43?	9	59	15?	12	44	38	22	14	31?
4	17	36?	10	17	21?	13	19	39?	23	14	31

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	19	30	2	46	53	9	59	11	13	19	13
0	21	29	3	52	40	10	17	13	14	9	44
0	23	41	4	17	34	10	26	12	14	24	34
1	17	56	4	33	3	10	44	5	15	17	36
1	21	40	4	39	17	11	33	9	15	20	50
1	26	55	5	5	12	11	37	7	16	0	8
1	48	25	5	45	25	12	0	1	16	35	9
1	50	9	5	56	56	12	16	0	17	57	30
2	12	25	6	19	15	12	27	21	21	18	27
2	28	48	7	48	29	12	44	27	22	0	3
2	31	39	8	3	0	12	47	35	22	14	36
2	41	59	8	38	22	13	18	1			
2	45	40	9	25	51						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	29	44	5	6	8	10	17	20	12	44	36
2	32	28	5	45	26	10	27	10	14	9	54
3	52	52	9	26	28	10	44	6	21	18	36
4	17	45	9	59	22	12	25	48	22	14	36

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	49	58	2	29	43	5	5	30	10	44	34
2	1	45	3	52	54	9	26	48			

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	30	27	3	54	11	10	18	59	22	15	59
2	33	9	10	0	34						

July 12d. Readings also at 0h. (Overton), 1h. (Copiapo and near College), 2h. (College, Sverdlovsk, Jena, and near Collmberg), 3h. (Grozny and Sverdlovsk), 4h. (Santa Lucia, Harvard, Pennsylvania, Philadelphia, Cleveland, Ottawa, Seven Falls, Shawinigan Falls, Bozeman, Butte, Tucson, Hungry Horse, College (3), Scoresby Sund, and Potsdam), 5h. (Christchurch, Tuai, near Kaimata, Wellington, Collmberg, and near Triest), 7h. (Santa Lucia and near College), 9h. (Pierce Ferry and Tucson), 10h. (Kew), 11h. (7) and 13h. (Mineral), 14h. (College (2) and Toledo), 15h. (Toledo), 16h. (near College (2) and near Ottawa), 17h. (Santa Clara and Scoresby Sund), 18h. (Mineral), 19h. (Ksara, Tucson, Pierce Ferry, near Boulder City, Fresno, and near Ottawa), 21h. (Overton and near Harvard), 22h. (College), 23h. (Algiers Univ.).

July 13d. 8h. 50m. 35s. Epicentre 39°·2N. 70°·7E. (as on 11d.).

$A = +\cdot2568$, $B = +\cdot7334$, $C = +\cdot6295$; $\delta = +9$; $h = -1$;
$D = +\cdot944$, $E = -\cdot331$; $G = +\cdot208$, $H = -\cdot594$, $K = -\cdot777$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	i 0 15	− 5	i 0 31	− 3	—	—	—
Stalinabad		1·6	247	i 0 28	− 2	i 0 49	− 2	—	—	—
Andijan		2·0	39	0 43	+ 8	i 1 15	+13	—	—	—
Tashkent		2·4	333	i 0 46	+ 5	e 1 21	+ 9	—	—	—
Murgab		2·7	108	i 0 49	+ 4	1 25	+ 6	—	—	—
Samarkand		2·9	279	e 0 49	+ 1	e 1 25	+ 1	—	—	—
Tchimkent		3·1	345	i 0 58	P*	i 1 43	S_g	—	—	—
Frunse		4·7	38	e 1 21	P*	e 2 22	S*	—	—	—
New Delhi		11·9	151	e 2 48	− 6	i 5 2	− 7	—	—	e 6·4
Sverdlovsk		18·9	343	i 4 24	0	e 7 55	+ 2	—	—	—
Grozny		19·2	290	e 4 30	+ 2	—	—	—	—	—
Tiflis		19·8	285	e 4 42	+ 7	—	—	—	—	—
Ksara		28·4	269	e 5 20	−38	e 11 36	+51	—	—	—
Collmberg	z.	41·4	308	e 7 51	+ 1	—	—	—	—	—
Salo		44·0	300	e 8 12	+ 1	—	—	e 9 41	PP	—
Stuttgart		44·2	304	e 8 13	+ 1	—	—	—	—	—
Strasbourg		45·1	304	e 8 19	− 1	—	—	—	—	—
College		72·0	17	e 11 26	− 2	—	—	—	—	—

College gives also iP = 11m.29s.
Long waves were also recorded at De Bilt, Potsdam, and Scoresby Sund.

July 13d. 9h. 59m. 16s. Epicentre 3°·4S. 80°·6W.

$A = +\cdot1630$, $B = -\cdot9849$, $C = -\cdot0589$; $\delta = +7$; $h = +7$;
$D = -\cdot987$, $E = -\cdot163$; $G = -\cdot010$, $H = +\cdot058$, $K = -\cdot998$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		10·0	149	e 2 32	+ 5	e 4 7	−15	i 4 32	SS	e 5·0
Bogota		10·3	39	e 2 42	PP	i 5 59	L	e 2 55	PPP	(i 6·0)
La Paz		17·9	137	i 4 12	0	i 7 36	+ 6	—	—	9·2
San Juan		25·9	33	e 5 31	− 4	e 9 56	− 8	—	—	e 11·3
St. Louis		42·8	347	e 7 56	− 5	e 17 54	SSS	—	—	—
Tucson		45·6	324	e 8 24	0	—	—	i 8 36	?	—
Ottawa	z.	48·8	5	e 8 44	− 5	—	—	—	—	—
Palomar	z.	50·0	321	i 9 0	+ 2	—	—	i 9 17	?	—
Pierce Ferry		50·2	325	i 9 0	0	—	—	—	—	—
Boulder City		50·6	324	e 9 2	0	—	—	—	—	—
Overton	z.	50·7	325	i 9 3	0	—	—	—	—	—
Riverside	z.	50·8	321	i 9 7	+ 3	—	—	—	—	—
Mount Wilson	z.	51·4	321	i 9 9	0	—	—	—	—	—
China Lake	z.	52·1	331	i 9 15	+ 1	—	—	i 9 34	?	—
Tinemaha	z.	53·3	322	i 9 24	+ 1	—	—	i 9 42	?	—
Lick	z.	55·6	321	e 9 40s	0	—	—	—	—	—
Shasta Dam		58·2	324	i 9 55	− 3	—	—	—	—	—
Hungry Horse		59·2	335	i 10 3	− 2	—	—	—	—	—
College		83·6	337	e 12 30	− 1	—	—	—	—	—

Additional readings :—
Huancayo i = 2m.47s.
Bogota iSSEN = 6m.14s., iSSSEN = 6m.38s.

July 13d. 10h. 14m. 1s. Epicentre 39°·2N. 70°·7E. (as at 8h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Obi-garm		0·9	237	i 0 22	+ 2	0 41	+ 7	—	—	—
Stalinabad		1·6	247	0 33	+ 3	0 58	+ 7	—	—	—
Andijan		2·0	39	i 0 34	− 1	i 1 0	− 2	—	—	—
Tashkent		2·4	333	i 0 42	+ 1	i 1 14	+ 2	—	—	—
Murgab		2·7	108	e 0 39	− 6	e 1 13	− 6	—	—	—
Samarkand		2·9	279	e 0 52	+ 4	e 1 29	+ 5	—	—	—
Tchimkent		3·1	345	i 0 55	+ 4	i 1 34	+ 5	—	—	—
Frunse		4·7	38	e 1 14	0	e 2 10	0	—	—	—
New Delhi		11·9	151	e 2 44	−10	e 4 52	−17	—	—	—
Baku		16·0	281	e 3 50	+ 2	—	—	—	—	—
Sverdlovsk		18·9	342	i 4 19	− 5	i 7 55	+ 2	—	—	—
Grozny		19·2	290	i 4 32	+ 4	i 8 10	+11	—	—	—
Tiflis		19·8	285	i 4 36	+ 1	e 8 22	+ 9	—	—	—
Erevan		20·2	281	4 50	+11	—	—	—	—	—
Leninakan		20·6	284	4 47	+ 4	—	—	—	—	—
Piatigorsk		21·2	293	e 4 53	+ 4	8 52	+11	—	—	—
Calcutta	E.	22·4	133	—	—	e 9 5	+ 1	—	—	i 13·2
Sotchi		23·6	290	5 16	+ 3	—	—	—	—	—
Irkutsk		26·6	49	e 5 36	− 6	—	—	—	—	—
Moscow		27·5	318	e 5 48	− 2	10 29	− 1	—	—	—
Yalta		27·6	293	e 5 52	+ 1	—	—	—	—	—
Ksara		28·4	269	e 5 59	+ 1	e 11 26	+41	—	—	—
Istanbul		31·7	288	e 5 59?	−28	—	—	—	—	—
Helwan	Z.	33·5	266	e 6 44	+ 1	—	—	—	—	—
Raciborzu		38·2	305	e 8 56	PP	e 15 53	SS	—	—	—
Upsala		38·8	320	i 7 28a	0	i 13 27	+ 1	e 16 53	SSS	e 20·7
Prague		40·6	305	e 9 21	PP	e 17 7	SS	e 10 10	PPP	—
Potsdam		41·2	309	e 7 48	0	e 17 7	SS	e 9 29	PP	—
Collmberg		41·4	308	e 7 47	− 3	—	—	e 9 28	PP	—
Copenhagen		41·4	314	e 7 49	− 1	e 14 11	+ 6	9 28	PP	—
Jena	E.	42·7	306	e 7 56	− 4	—	—	e 9 44	PP	—
Salo		44·0	300	e 8 14	+ 3	e 14 49	+ 6	e 9 54	PP	—
Stuttgart		44·2	304	e 8 11	− 1	e 14 49	+ 3	e 18 8	SS	e 24·0
Zürich	Z.	44·9	303	e 8 15	− 3	—	—	—	—	—
Strasbourg		45·1	304	i 8 19a	− 1	e 15 13	+14	e 18 20	SS	e 24·0
De Bilt		46·0	309	i 8 27	0	e 15 17	+ 5	—	—	e 25·0
Paris		48·5	305	i 8 43	− 3	—	—	—	—	—
Clermont-Ferrand		49·0	301	e 8 50	0	e 18 21	SeS	—	—	27·0
Kew		49·5	310	i 8 53	− 1	e 19 59	SS	—	—	e 26·0
Tamanrasset	Z.	57·1	275	e 9 42	− 8	e 17 43	− 2	e 11 23	PP	—
College		72·0	17	i 11 22	− 6	—	—	—	—	—
Ottawa	Z.	90·5	338	e 13 2	− 3	—	—	—	—	—
Hungry Horse		92·7	3	e 13 10	− 5	e 24 30	+12	—	—	—
Shasta Dam		99·6	9	i 13 28	−18	—	—	—	—	—
St. Louis		100·6	345	23 3	?	—	—	—	—	—
Tinemaha	Z.	103·6	7	e 25 18	SKKS	(e 25 18)	{− 2}	—	—	—
Overton	Z.	104·5	4	i 25 5	SKS	(i 25 5)	[+17]	—	—	—
Pierce Ferry		104·9	3	e 25 3	SKS	(e 25 3)	[+13]	—	—	—
Boulder City		105·0	4	e 25 7	SKS	(e 25 7)	[+16]	—	—	—
China Lake	Z.	105·0	6	e 25 19	SKKS	(e 25 19)	{−11}	—	—	—
Mount Wilson	Z.	106·5	7	e 25 22	SKS	(e 25 22)	[+25]	—	—	—
Riverside	Z.	106·8	7	e 25 22	SKS	(e 25 22)	[+23]	—	—	—
Tucson		108·9	1	e 25 0	SKS	(e 25 0)	[− 8]	—	—	—
La Plata	N.	139·2	259	—	—	27 5	[+27]	30 23	SKKS	—

Additional readings :—
Raciborzu eZ =16m.45s., eEN =16m.55s.
Upsala eN =15m.31s. aud 17m.17s.
Prague e =10m.59s. and 18m.41s.
Potsdam eN =9m.23s., eZ =16m.45s., eN =17m.14s.
Collmberg eZ =9m.31s., eE =12m.33s.
Strasbourg eSS =18m.26s.
Tamanrasset ePZ =9m.48s., eZ =17m.5s.
La Plata N =34m.17s.
Long waves were also recorded at Aberdeen, Scoresby Sund, and Logan.

July 13d. 18h. 28m. 25s. Epicentre 39°·2N. 70°·7E. (as at 10h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	i 0 21	+ 1	—	—	—	—	—
Stalinabad		1·6	247	i 0 33	+ 3	i 0 58	+ 7	—	—	—
Andijan		2·0	39	i 0 36	+ 1	i 1 2	0	—	—	—
Tashkent		2·4	333	i 0 45	+ 4	i 1 15	+ 3	—	—	—
Murgab		2·7	108	i 0 45	0	1 20	+ 1	—	—	—
Samarkand		2·9	279	e 0 52	+ 4	e 1 28	+ 4	—	—	—
Tchimkent		3·1	345	i 0 50	− 1	i 1 27	− 2	—	—	—
Frunse		4·7	38	e 1 15	+ 1	e 2 9	− 1	—	—	—
Ashkabad		9·8	267	e 2 25	+ 1	—	—	—	—	—
New Delhi	N.	11·9	151	i 2 46	− 8	i 4 54	−15	—	—	—
Baku		16·0	281	e 3 53	+ 5	—	—	—	—	—
Sverdlovsk		18·9	343	4 21	− 3	7 46	− 7	—	—	—
Grozny		19·2	290	4 31	+ 3	8 10	+11	—	—	—
Tiflis		19·8	285	4 36	+ 1	e 8 22	+ 9	—	—	—
Erevan		20·2	281	4 48	+ 9	—	—	—	—	—
Leninakan		20·6	284	4 47	+ 4	—	—	—	—	—
Piatigorsk		21·2	293	4 48	− 1	8 49	+ 8	—	—	—
Calcutta	E.	22·4	133	—	—	i 8 32	−32	—	—	i 10·4
Irkutsk		26·6	49	e 5 35	− 7	e 10 0?	−16	—	—	—
Moscow		27·5	318	e 5 49	− 1	e 10 32	+ 2	—	—	—
Ksara		28·4	269	e 5 41	−17	e 11 25	+40	—	—	—
Raciborzu		38·2	305	e 8 17	?	e 15 26	SS	e 8 52	PP	e 19·1
Upsala		38·8	320	e 8 59	PP	e 15 35?	SS	—	—	e 20·6
Potsdam		41·2	309	e 7 49	+ 1	—	—	e 9 28?	PP	e 20·5
Collmberg		41·4	308	7 48	− 2	—	—	e 9 26	PP	—
Copenhagen		41·4	314	7 50	0	e 14 9	+ 4	9 30	PP	—
Triest		41·8	298	e 7 53	0	e 17 10	SS	e 9 23	PP	e 19·6
Jena		42·7	306	e 7 57	− 3	—	—	—	—	—
Salo		44·0	300	e 8 21	+10	—	—	e 10 4	PP	—
Stuttgart		44·2	304	e 8 12	0	e 14 41	− 5	e 9 54	PP	e 24·6
Strasbourg		45·1	304	i 8 20	0	—	—	e 10 5	PP	e 23·6
Paris		48·5	305	e 9 35	+49	—	—	—	—	e 29·6
Clermont-Ferrand		49·0	301	e 8 49	− 1	—	—	e 10 46	PP	—
Tamanrasset	Z.	57·1	275	e 9 48	− 2	—	—	—	—	—
College		72·0	17	i 11 23	− 5	—	—	—	—	—
Hungry Horse		92·7	3	e 13 13	− 2	—	—	—	—	—
Shasta Dam		99·6	9	e 13 44	− 2	—	—	—	—	—

Additional readings :—
New Delhi iN = 3m.9s.
Upsala eN = 17m.35s.?
Potsdam eE = 19m.0s.
Triest eP_cP = 9m.40s.
Long waves were also recorded at De Bilt, Kew, and Scoresby Sund.

July 13d. Continuation of the list of aftershocks from the epicentre of the large earthquake of July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	58	41	8	45	50	17	43	13	21	3	40
1	27	43	9	27	58	19	54	37	21	37	35
1	34	57	14	59	12	19	55	38	22	34	30
3	34	41	15	30	10	20	40	10	23	35	33

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	58	53	3	51	37	17	43	25	21	3	53
1	27	55	8	45	3	19	54	44	21	37	47
1	35	11	9	28	10	19	56	56	22	34	40
3	1	25	15	30	22	20	40	27	23	35	45

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	58	57	11	56	46	17	43	31	19	55	59
1	27	58	16	3	58	18	17	5	21	4	3
1	35	11	17	3	22	19	54	44	21	37	54

Continued on next page.

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	28	6	19	56	9?	21	4	16?	22	35	30?
19	55	34	20	41	28?						

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	59	1	9	33	36	15	30	31	21	4	11
1	28	0	11	3	59	16	52	11	21	35	58
1	35	28	12	22	41	17	43	38	21	37	55
4	22	1	12	29	50	19	42	18	22	34	54
4	55	48	14	14	0	19	54	56	22	53	8
6	0	14	14	31	40	19	56	6	23	24	47
6	38	1	14	42	14	20	25	0	23	35	54
7	48	58	14	51	8	21	3	5	23	41	38

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	59	18	19	55	10	21	38	12	23	36	8
1	28	18	21	4	17	22	35	3			

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	29	1	16	5	7	21	38	17	23	36	11
1	36	16	17	44	15	22	35	43			

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	29	29	21	6	9	21	39	49	23	37	33
19	56	45									

July 13d. Readings also at 2h. (near Lick), 5h. (Basle and near Zürich), 7h. (near Batavia and near Ashkabad), 9h. (Strasbourg, Boulder City, Overton, Pierce Ferry, Tucson, Ottawa, near Puebla, Tacubaya, and Vera Cruz), 10h. (Ottawa), 13h. (Overton), 14h. (College and Strasbourg), 15h. (Pretoria), 16h. (Collmberg, Mizusawa, Overton, Ottawa, and near College (2)), 20h. (Collmberg, Stuttgart, Rome, Lick, and Overton), 21h. (Overton and near San Juan), 22h. (near College).

July 14d. 0h. 18m. 39s. (I)
3h. 27m. 14s. (II)
3h. 35m. 35s. (III)
} Epicentre 39°·2N. 70°·7E. (as on 13d. 18h.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
I	Obi-garm	0·9	237	0 15	− 5	0 30	− 4	—
II		0·9	237	i 0 18	− 2	—	—	—
III		0·9	237	0 19	− 1	—	—	—
I	Stalinabad	1·6	247	i 0 28	− 2	i 0 49	− 2	—
II		1·6	247	i 0 30	0	i 0 52	+ 1	—
III		1·6	247	i 0 32	+ 2	i 0 54	+ 3	—
I	Andijan	2·0	39	0 40	+ 5	i 1 9	S_g	—
II		2·0	39	i 0 37	+ 2	i 1 3	+ 1	—
III		2·0	39	i 0 37	+ 2	i 1 3	+ 1	—
I	Tashkent	2·4	333	i 0 41	0	i 1 12	0	—
II		2·4	333	i 0 42	+ 1	e 1 13	+ 1	—
III		2·4	333	i 0 47	P_g	i 1 19	S_g	—
I	Murgab	2·7	108	i 0 51?	P*	1 23?	+ 4	—
II		2·7	108	0 45	0	1 18	− 1	—
III		2·7	108	i 0 48	+ 3	1 22	+ 3	—
I	Samarkand	2·9	279	0 47	− 1	i 1 23	− 1	—
II		2·9	279	e 0 50	+ 2	e 1 26	+ 2	—
III		2·9	279	e 0 51	+ 3	—	—	—
I	Tchimkent	3·1	345	e 0 51	0	i 1 35	S*	—
II		3·1	345	i 0 49	− 2	i 1 27	− 2	—
III		3·1	345	i 0 54	+ 3	i 1 34	S*	—
I	Frunse	4·7	38	e 1 18	+ 4	e 2 18	+ 8	—
II		4·7	38	e 1 14	0	e 2 10	0	—
III		4·7	38	e 1 17	+ 3	e 2 13	+ 3	—

Continued on next page.

			△	Az.	P.	O−C.	S.	O−C.	L.
			°	°	m. s.	s.	m. s.	s.	m.
II	Ashkabad		9·8	267	—	—	e 4 15	− 2	—
III	New Delhi	N.	11·9	151	e 2 48	− 6	e 4 57	−12	—
I	Baku		16·0	281	—	—	e 6 50	+ 4	—
I	Grozny		19·2	290	4 24	− 4	7 58	− 1	—
II			19·2	290	e 4 23	− 5	—	—	—
I	Tiflis		19·8	285	e 4 32	− 3	e 8 14?	+ 1	—
II			19·8	285	e 4 45	+10	—	—	—
I	Leninakan		20·6	284	4 47	+ 4	i 8 39	+10	—
III	Piatigorsk		21·2	293	e 4 50	+ 1	—	—	—
I	Moscow		27·5	318	e 5 45	− 5	—	—	—
II			27·5	318	e 6 8	+18	e 10 48	+18	—
III			27·5	318	e 6 15	+25	—	—	—
II	Ksara		28·4	269	e 6 17	+19	—	—	—
III			28·4	269	e 5 43	−15	e 12 9	SS	—
III	Upsala	E.	38·8	320	e 8 55	PP	—	—	e 18·4
III	Potsdam	Z.	41·2	309	e 9 25	PP	—	—	—
I	Collmberg	z.	41·4	308	e 7 48	− 2	—	—	—
II		z.	41·4	308	e 7 48	− 2	—	—	—
III			41·4	308	e 7 47	− 3	e 9 23	PP	—
III	Copenhagen		41·4	314	7 49	− 1	e 14 6	+ 1	—
III	Triest		41·8	298	e 9 31	PP	e 14 7	− 4	e 20·1
I	Stuttgart	z.	44·2	304	e 8 12	0	—	—	—
II		z.	44·2	304	e 8 9	− 3	—	—	—
III		z.	44·2	304	e 8 11	− 1	e 10 1	PP	e 20·6
I	Strasbourg		45·1	304	e 8 20	0	—	—	—
II			45·1	304	e 8 18	− 2	—	—	e 22·8
III			45·1	304	e 8 19	− 1	—	—	—
II	Paris		48·5	305	e 8 40	− 6	—	—	—
III	Clermont-Ferrand		49·0	301	e 8 49	− 1	—	—	—
III	Tamanrasset	z.	57·1	275	e 9 47	− 3	—	—	—
III	College		72·0	17	i 11 23	− 5	—	—	—
III	Hungry Horse		92·7	3	e 13 12	− 3	—	—	—
III	Tucson		108·9	1	e 15 11	P	—	—	—

Strasbourg III gives also 8m.42s.
Long waves were also recorded for I De Bilt, Kew, Potsdam, Triest, and Scoresby Sund, II De Bilt and Scoresby Sund, III at Kew.

July 14d. 3h. Undetermined shock, Central America.

Lubbock eP = 6m.11s.
St. Louis eP = 7m.11s., eS? = 11m.21s., eSS? = 12m.29s.
Tacubaya i = 7m.17s. and 7m.53s.
Tucson eP = 7m.21s., iP = 7m.25s.
Pierce Ferry eP = 8m.1s.
Boulder City iP = 8m.5s.
Riverside iPZ = 8m.10s., iP_cPZ = 10m.47s., iZ = 11m.2s.
Ottawa eZ = 8m.11s.
Mount Wilson iPZ = 8m.16s., iP_cPZ = 10m.49s.
Palomar iP?Z = 8m.17s., iP_cPZ = 10m.46s.
China Lake iPZ = 8m.20s., iP_cPZ = 10m.51s., eZ = 11m.6s.
Lick ePZ = 8m.23s., iZ = 8m.50s., iPPZ = 11m.2s.
Tinemaha iPZ = 8m.30s., iP_cPZ = 10m.54s., iZ = 11m.9s.
Shasta Dam e = 9m.6s.
Hungry Horse iP = 9m.13s.
Victoria eZ = 9m.49s.
Pasadena eZ = 11m.3s.

July 14d. 11h. 9m. 55s. Epicentre 44°·1N. 21°·0E. (given by Strasbourg).

Intensity VII at Raca (44°14′N. 20°58′E.), Kragujevac ; VI at Rekova ; V at Rudnik, Nis, and Belgrade. Macroseismic radius 108km.

M. D. Uzelac.
Annuaire Microséismique et Macroséismique de l'Institut Séismologique de Beograd, 1949, Nouvelle Série No. 9, Belgrade, 1950, pp. 60-64.

$A = +\cdot6726$, $B = +\cdot2582$, $C = +\cdot6935$; $\delta = 0$; $h = -3$;
$D = +\cdot358$, $E = -\cdot934$; $G = +\cdot647$, $H = +\cdot249$, $K = -\cdot720$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		0·8	332	i 0 15	− 3	i 0 30	− 1	i 0 24	P_g	—
Kalossa		2·8	330	i 0 47	0	i 1 18	− 4	1 42	S_g	—
Budapest		3·6	340	1 0	+ 2	2 3	S_g	1 13	P_g	2·7
Bucharest		3·7	84	e 0 59	− 1	i 1 58	S_g	i 1 27	P_g	—
Zagreb		3·9	297	1 2	0	i 1 46	− 4	i 2 8	S_g	—
Ogyalla		4·3	333	e 1 12	+ 4	e 2 2	+ 2	—	—	—
Taranto		4·6	219	1 25	P*	2 28	S_g	1 53	PP	—
Skalnate Pleso		5·1	355	1 17	− 3	e 2 16	− 4	—	—	—
Triest		5·4	290	i 1 21	− 3	i 2 20	− 8	i 1 41	P_g	i 3·0
Raciborzu		6·3	343	e 1 34	− 2	e 2 42	− 8	e 2 15	P_g	—
Rome		6·6	253	i 1 37k	− 4	i 2 48	−10	i 2 6	P_g	i 3·5
Istanbul		6·7	114	e 1 38	− 4	e 3 26	S*	—	—	—
Bologna		6·9	277	e 2 30	?	e 3 36	S_g	—	—	—
Florence Arc.		7·0	271	e 2 9	P*	3 34	S*	—	—	—
Florence Xim		7·0	271	e 2 0	P*	e 3 32	S*	—	—	—
Prato		7·1	272	e 1 51	+ 3	i 3 18	+ 8	e 2 31	P_g	—
Prague		7·4	326	e 1 51	− 1	i 3 18	0	—	—	—
Salo		7·6	285	e 1 54	− 1	i 3 47	S*	i 4 12	S_g	—
Cheb		8·4	318	e 1 41	−25	e 4 29	S_g	—	—	—
Chur		8·5	293	e 2 6	− 1	e 4 33	S_g	—	—	—
Collmberg		9·0	326	e 2 10	− 3	e 3 48?	−10	—	—	e 4·7
Jena		9·3	320	e 2 15	− 2	e 3 39	?	—	—	e 5·0
Zürich		9·3	295	e 2 12k	− 5	e 4 6	+ 1	—	—	—
Stuttgart		9·4	304	e 2 15	− 3	e 3 55	−12	—	—	e 5·0
Potsdam		9·8	330	e 2 26	+ 2	e 4 34	+17	e 4 56	S*	—
Basle		10·0	295	e 2 22	− 5	—	—	—	—	e 5·5
Strasbourg		10·2	301	e 2 30?	− 1	e 4 38	+11	—	—	e 5·4
Neuchatel		10·3	292	e 2 29	− 3	—	—	—	—	e 5·5
Clermont-Ferrand		12·8	284	e 3 7	+ 1	e 5 33	+ 3	—	—	e 6·5
De Bilt		13·2	313	—	—	e 6 35	+55	—	—	e 7·3
Paris		13·6	297	e 3 13	− 4	—	—	e 3 28	PP	e 6·1
Ksara		15·5	126	e 3 10	−32	e 6 36	+ 1	—	—	—
Upsala		15·9	354	e 3 47	0	e 8 5?	?	4 2	PP	e 8·8
Jersey	E.	16·6	296	e 3 8	?	—	—	e 4 15	PP	—
Alicante		17·1	260	e 0 11	?	—	—	—	—	e 5·6
Almeria		19·2	258	e 2 7	?	—	—	—	—	e 10·0
Aberdeen		19·5	322	—	—	e 8 7	+ 1	—	—	e 12·1
Granada		19·9	260	e 4 48k	+12	e 7 45	−30	—	—	—
Malaga	Z.	20·7	260	e 5 6	PP	e 9 25	SS	—	—	—
Hungry Horse		79·8	332	i 12 10	− 2	—	—	—	—	—
Pierce Ferry		90·3	326	e 13 2	− 2	—	—	—	—	—
Tucson		92·2	321	e 13 12	− 1	—	—	—	—	—

Additional readings :—
Kalossa $P_gN = 1m.2s.$, $P_gEN = 1m.5s.$, $P_gP_gE = 1m.10s.$, $eE = 1m.28s.$, $iE = 1m.33s.$, $iN = 1m.37s.$, $S_gN = 2m.0s.$, $S_gS_gN = 2m.6s.$, $S_gS_gE = 2m.10s.$
Budapest $P_gP_gN = 1m.23s.$, $P_gP_gE = 1m.27s.$, $iE = 2m.10s.$, $iN = 2m.13s.$, $S_gEN = 2m.29s.$, $S_gS_gN = 2m.35s.$
Bucharest $iS^*E = 2m.14s.$, $iS^*N = 2m.18s.$, $iS_gN = 2m.32s.$
Zagreb $i = 1m.19s.$ and $1m.39s.$
Triest $iS_g = 2m.48s.$
Raciborzu $eEN = 3m.3s.$ and $3m.31s.$, $e = 3m.53s.$, $eEN = 6m.6s.$
Bologna $e = 3m.51s.$ and $4m.5s.$
Prato $e = 3m.40s.$, $eS^* = 3m.52s.$, $eS_g = 4m.5s.$
Salo $iN = 2m.15s.$, $i = 3m.7s.$, $iN = 4m.6s.$, $i = 4m.35s.$

Continued on next page.

Stuttgart iP = 2m.19s.
Zürich i = 2m.15s.
Potsdam eEN = 4m.5s.?, eN = 5m.39s., iZ = 5m.44s. and 6m.21s.
Strasbourg eP = 2m.34s.
Paris ePPP = 3m.36s.
Upsala ePE = 3m.50s.?
Long waves were also recorded at Scoresby Sund, Pavia, Copenhagen, and Tortosa.

July 14d. 19h. 40m. 5s. Epicentre 32°·8S. 178°·1W. (as on 1949, February 13d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	7·1	233	i 2 31	?	e 3 17	+ 7	—	—	e 3·6
Tuai	N.	7·1	211	e 2 3	P*	i 3 8	− 2	—	—	—
Wellington		10·2	212	2 31	0	4 17	−10	—	—	7·3
Kaimata	N.E.	12·8	217	e 3 6	0	5 17	−13	—	—	—
Christchurch		13·0	212	—	—	e 5 22	−13	—	—	—
Apia		19·8	20	—	—	e 7 52	−21	—	—	—
Riverview		25·7	258	e 5 42	+ 9	e 10 3	+ 2	e 11 3	SS	e 12·7
Pasadena	Z.	87·2	46	i 12 48	− 1	—	—	—	—	—
Lick	Z.	87·4	41	i 12 48k	− 2	—	—	i 13 54k	PP	—
Palomar	Z.	87·5	47	i 12 51	0	—	—	—	—	—
Riverside	Z.	87·6	46	e 12 50	− 1	—	—	—	—	—
China Lake	Z.	88·7	45	i 12 56	− 1	—	—	—	—	—
Shasta Dam		89·4	39	i 12 58	− 2	—	—	—	—	—
Boulder City		90·5	47	e 13 4	− 1	—	—	—	—	—
Tucson		90·6	51	i 13 5	0	—	—	i 13 21	pP	—
Overton	Z.	91·1	46	e 13 8	0	—	—	—	—	—
Pierce Ferry		91·1	47	e 13 7	− 1	—	—	—	—	—

Additional readings :—
Kaimata i = 3m.9s.
Tucson i = 13m.10s.
Long waves were recorded at Bermuda.

July 14d. 20h. 35m. 56s. Epicentre 0°·0. 98°·0E. (as on 1941, October 29d.).

$A = -·1392$, $B = +·9903$, $C = ·0000$; $\delta = +7$; $h = +7$;
$D = +·990$, $E = +·139$; $G = ·000$, $H = ·000$, $K = -1·000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		10·7	125	e 2 35	− 3	i 5 18	L	—	—	(i 5·3)
Calcutta	E.	24·3	337	—	—	i 9 49	+12	—	—	—
Poona	N.	30·0	310	—	—	i 11 19	+ 9	—	—	16·6
Bombay	N.	31·0	308	e 9 56	?	—	—	—	—	—
Zi-ka-wei		38·2	33	e 7 20	− 3	e 16 34	SSS	—	—	—
Murgab		44·1	332	8 14	+ 2	14 49	+ 4	—	—	—
Obi-garm		46·5	330	e 8 30	− 1	15 18	− 1	—	—	—
Andijan		46·8	332	8 35	+ 2	15 30	+ 6	—	—	—
Stalinabad		46·8	328	i 8 35?	+ 2	15 25?	+ 1	—	—	—
Frunse		47·6	336	e 8 42	+ 3	—	—	—	—	—
Tashkent		48·7	331	i 8 50	+ 2	i 15 55	+ 5	—	—	—
Irkutsk		52·4	5	9 16	0	e 16 45	+ 3	—	—	—
Tiflis		63·4	318	i 10 33	− 1	19 9	+ 3	—	—	—
Grozny		63·5	320	e 10 27?	− 7	—	—	—	—	—
Sverdlovsk		63·5	338	i 10 36	+ 2	—	—	—	—	—
Leninakan		63·6	317	e 10 46?	+11	19 14	+ 6	—	—	—
Piatigorsk		65·5	320	e 10 50	+ 3	—	—	—	—	—
Ksara		67·1	306	e 10 49	− 8	e 20 3	+12	—	—	—
Helwan		69·9	302	11 13	− 2	20 26	+ 2	—	—	—
Yalta		71·6	317	e 11 27	+ 2	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Moscow		73·8	330	11 36	− 2	21 7	− 2	—	—	—
Istanbul		74·2	313	e 11 38	− 2	—	—	—	—	—
Rome		86·7	312	i 12 44a	− 3	i 23 23	− 1	—	—	—
Collmberg	z.	86·9	321	e 12 47	− 1	—	—	—	—	—
Potsdam	z.	86·9	323	e 12 48	0	—	—	—	—	—
Copenhagen		87·5	326	—	—	i 23 33	+ 2	—	—	—
Salo		88·2	316	e 12 57	+ 3	e 23 44	+ 6	—	—	—
Stuttgart		89·2	319	e 12 58	− 1	e 23 47	0	e 15 30	PP	—
Strasbourg		90·2	318	—	—	e 28 41	SS	—	—	—
Granada		99·2	307	13 53a	+ 8	—	—	—	—	47·7
College		100·1	22	e 17 21	PP	—	—	—	—	—
Hungry Horse		124·4	25	i 18 54	[− 7]	—	—	—	—	—
Shasta Dam		125·4	36	i 18 57	[− 6]	—	—	—	—	—
Logan		130·5	28	e 22 29	PKS	—	—	—	—	—
China Lake	z.	131·4	38	e 19 14	[− 1]	i 22 36	PKS	—	—	—
Pasadena	z.	132·0	41	e 19 14	[− 2]	e 22 36	PKS	—	—	—
Overton	z.	132·8	35	e 19 16	[− 1]	i 22 41	PKS	i 21 33	PP	—
Boulder City		133·0	36	e 19 17	[− 1]	—	—	—	—	—
Pierce Ferry		133·4	35	e 19 17	[− 1]	—	—	—	—	—
Tucson		137·9	37	e 19 16	[−11]	e 22 54	PKS	i 22 11	PP	—

Additional readings :—
Poona iN = 13m.54s.
Bombay eN = 10m.3s.
Helwan iZ = 11m.22s.
Collmberg eZ = 12m.55s.
Stuttgart ePPS = 27m.46s.
Long waves were also recorded at Wellington, Paris, Scoresby Sund, and Harvard.

July 14d. 23h. 21m. 13s. Epicentre 30°·6N. 139°·7E. Depth of focus 0·060.
(as on 1944, June 3d.).
Intensity IV at Kakioka ; II-III at Kumagaya, Yokohama, and Tsu.
Macroseismic radius : >300km.

The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1949, Tokyo, 1950, p. 21-22. Epicentre 30°·2N. 139°·8E. Depth : 350km.

$A = -·6576$, $B = +·5577$, $C = +·5065$; $\delta = +1$; $h = +1$;
$D = +·647$, $E = +·763$: $G = -·386$, $H = +·328$, $K = -·862$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Omaesaki	4·2	342	1 18	+ 3	2 19	+ 5	—	—	—
Osima	4·2	357	1 18	+ 3	2 17	+ 3	—	—	—
Mera	4·3	2	1 18	+ 2	—	—	—	—	—
Siomisaki	4·4	311	1 2a	−15	1 59	−19	—	—	—
Shizuoka	4·5	344	1 19	+ 1	2 22	+ 2	—	—	—
Owase	4·6	320	1 18a	− 1	1 56	−26	—	—	—
Misima	4·6	352	1 20a	+ 1	2 24	+ 2	—	—	—
Yokohama	4·8	359	1 41	+20	2 48	+23	—	—	—
Hunatu	4·9	351	1 13	− 9	2 32	+ 5	—	—	—
Kameyama	5·0	328	1 24a	+ 1	2 26	− 3	—	—	—
Tokyo	5·1	1	1 26	+ 2	2 33	+ 3	—	—	—
Nagoya	5·1	334	1 26	+ 2	2 33	+ 3	—	—	—
Osaka	5·4	320	1 27	0	2 37	+ 1	—	—	—
Gihu	5·4	334	1 27	0	2 37	+ 1	—	—	—
Kyoto	5·5	324	1 26	− 2	2 37	− 1	—	—	—
Sumoto	5·5	314	1 26	− 2	2 36	− 2	—	—	—
Kumagaya	5·5	357	1 31a	+ 3	2 41	+ 3	—	—	—
Hikone	5·5	329	1 28	0	2 40	+ 2	—	—	—
Kobe	5·6	318	1 28a	− 2	2 38	− 2	—	—	—
Tukubasan	5·6	4	1 31	+ 1	2 41	+ 1	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Kakioka		5·6	4	1 30 a	0	2 44	+ 4	—	—	—
Mito		5·8	6	2 13 a	+41	—	—	—	—	—
Maebasi		5·8	355	1 32	0	2 48	+ 4	—	—	—
Kôti		6·0	301	1 29 a	− 5	3 2	+15	—	—	—
Nagano		6·2	349	1 42	+ 6	2 55	+ 4	—	—	—
Toyooka		6·4	322	1 36 a	− 2	2 54	− 1	—	—	—
Onahama		6·4	9	1 41 a	+ 3	2 55	0	—	—	—
Toyama		6·4	342	1 37 a	− 1	3 8	+13	—	—	—
Hirosima		7·1	5	1 44	− 2	3 5	− 5	—	—	—
Miyazaki		7·2	283	1 42	− 5	3 2	−10	—	—	—
Wazima		7·3	341	1 46 a	− 2	3 13	− 1	—	—	—
Hamada		7·5	305	1 50	0	3 17	− 1	—	—	—
Sendai		7·7	7	1 57	+ 4	3 25	+ 3	—	—	—
Kagosima		7·9	279	1 56	+ 1	3 16	−10	—	—	—
Kumamoto		8·0	288	1 50	− 6	3 20	− 8	—	—	—
Hukuoka		8·4	293	1 59	− 2	3 34	− 2	—	—	—
Mizusawa	E.	8·6	8	2 6	+ 3	3 45	+ 5	—	—	—
Akita		9·1	2	2 12	+ 3	4 0	+10	—	—	—
Morioka		9·1	7	2 12 a	+ 3	4 0	+10	—	—	—
Hatinohe		10·0	8	2 24	+ 5	4 16	+ 7	—	—	—
Mori		11·5	3	2 33	− 3	3 54	−46	—	—	—
Sapporo		12·5	7	2 49	+ 2	4 13	−48	—	—	—
Irkutsk		33·7	320	6 3	− 3	10 56	− 3	—	—	—
Frunse		52·4	303	e 8 29	− 5	e 15 20	− 7	—	—	—
New Delhi		53·8	284	i 7 35	−69	i 15 31	−14	17 35	S_cS	—
Murgab		53·8	297	i 8 38	− 6	15 36	− 9	—	—	—
Andijan		54·4	300	8 43	− 5	15 46	− 7	—	—	—
College		55·3	29	e 8 54	− 1	e 16 11	+ 6	e 10 18	pP	—
Tashkent		56·6	302	i 8 59	− 5	i 16 15	− 7	—	—	—
Obi-garm		56·9	299	i 9 1	− 5	16 18	− 8	—	—	—
Stalinabad		57·6	299	i 9 6	− 5	16 30	− 5	—	—	—
Samarkand		58·7	300	9 11	− 7	—	—	—	—	—
Sverdlovsk		59·1	321	i 9 16	− 5	i 16 49	− 5	—	—	—
Riverview		65·0	169	e 9 43	−16	i 18 5	− 2	i 11 18	pP	—
Moscow		71·6	324	10 36	− 3	19 18	− 6	e 12 10	pP	—
Victoria	Z.	72·0	44	i 10 44	+ 2	—	—	e 12 13	pP	—
Grozny		72·4	310	i 10 41	− 3	19 26	− 7	—	—	—
Tiflis		73·7	309	i 10 48	− 3	i 19 42	− 6	i 12 18	pP	—
Piatigorsk		73·8	311	10 48	− 4	19 38	−11	—	—	—
Erevan		74·6	307	11 4?	+ 7	—	—	—	—	—
Leninakan		74·8	308	10 58	0	i 19 59	− 1	—	—	—
Shasta Dam		76·1	51	i 11 8	+ 3	—	—	i 12 42	pP	—
Hungry Horse		77·5	41	i 11 15	+ 2	e 20 34	+ 6	i 12 47	pP	—
Berkeley	Z.	77·6	54	i 11 16	+ 3	—	—	i 12 50	pP	—
Branner	Z.	77·9	54	i 11 24 k	+ 9	—	—	i 12 53	pP	—
Upsala		78·1	334	—	—	i 20 27	− 8	—	—	—
Scoresby Sund		78·3	354	11 18	+ 1	20 42	+ 5	12 49	pP	—
Lick	Z.	78·3	54	i 11 20 a	+ 3	—	—	i 12 55	pP	—
Reno		78·5	51	e 11 22	+ 4	e 20 47	+ 8	i 12 57	pP	—
Yalta		79·1	315	e 11 18	− 3	—	—	—	—	—
Butte	N.	79·6	42	—	—	i 20 57	+ 7	—	—	—
Tinemaha	Z.	80·8	53	i 11 33	+ 3	—	—	e 13 5	pP	—
China Lake	Z.	81·9	53	i 11 40	+ 4	—	—	e 13 15	pP	—
Logan		82·4	46	e 11 39	+ 1	i 21 20	+ 1	e 13 13	pP	—
Pasadena	Z.	82·4	55	i 11 41	+ 3	—	—	i 13 19	pP	—
Riverside	Z.	83·0	55	i 11 43	+ 2	—	—	i 13 19	pP	—
Copenhagen		83·0	333	i 11 39	− 2	i 21 21	− 4	—	—	—
Ksara		83·7	305	i 11 42 k	− 3	e 21 32?	0	—	—	—
Overton	Z.	83·7	51	e 11 47	+ 2	e 21 34	+ 2	i 13 23	pP	—
Palomar	Z.	83·7	54	i 11 48	+ 3	—	—	i 13 23	pP	—
Boulder City		83·7	52	e 11 48	+ 3	e 21 33	+ 1	e 13 22	pP	—
Pierce Ferry		84·2	51	i 11 51	+ 4	—	—	e 13 23	pP	—
Istanbul		84·2	314	e 11 43	− 4	e 21 31	− 5	—	—	—
Potsdam	Z.	85·1	330	e 11 50	− 2	e 21 42	− 3	—	—	—
Collmberg		85·9	329	e 11 53	− 3	—	—	e 13 31	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Jena	N.	86·8	329	e 11 56	− 4	—	—	—	—	—
Tucson		88·5	53	e 12 10	+ 2	e 22 4	−13	e 13 49	pP	—
Stuttgart		89·5	329	e 12 9	− 3	e 22 26	0	e 13 48	pP	—
Triest		89·7	325	—	—	e 21 58	[− 5]	e 22 17	S	—
Strasbourg		90·2	330	i 12 14	− 2	e 22 28	− 4	e 15 58	PP	—
Basle		91·1	330	e 11 17	−63	—	—	—	—	—
Salo		91·3	326	e 12 21	0	e 22 37	− 4	—	—	—
Paris		92·2	333	i 12 22	− 3	—	—	e 14 5	pP	—
Rome		93·0	323	e 12 24	− 5	e 24 4	SP	e 29 22	SS	—
Clermont-Ferrand		94·4	331	i 12 34	− 1	e 29 31	SS	e 24 20	SP	48·8
Algiers Univ.	Z.	101·6	325	13 6	− 1	—	—	18 19	?	—
Granada		104·3	330	13 28a	+ 8	23 5	[−13]	14 17	pP	60·6
Tamanrasset	Z.	111·1	315	e 17 45	[0]	—	—	e 18 27	PP	—
La Paz		151·0	66	i 19 4	[+ 6]	—	—	—	—	—

Additional readings :—
New Delhi iPPN =7m.43s., iN =8m.2s.
Riverview iE =19m.15s., isS?E =20m.43s.
Moscow esS =21m.57s.
Scoresby Sund 23m.20s.
Lick iZ =11m.25sa.
Reno eE =11m.26s., iN =13m.30s. and 14m.29s., iNZ =21m.31s.
Tinemaha iZ =11m.39s. and 13m.9s.
Overton iP_cPZ =11m.49s.
Palomar iZ =14m.37s.
Tucson iPP =15m.49s.
Stuttgart ePPZ =15m.46s., eSKS =21m.57s., ePS =23m.22s.
Triest eSP =23m.31s., esS =23m.47s.
Strasbourg eSP =23m.38s., eSS =28m.52s.
Rome eSSSN =32m.12s.
Clermont-Ferrand e =24m.1s.
Granada ePP =17m.41s., S =25m.7s., SS =31m.41s.
Long waves were recorded at De Bilt and Kew.

July 14d. Continuation of the list of aftershocks from the epicentre of the large Earthquake of July 10d., recorded at stations of the Pamir group.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	1	44	13	49	35	16	13	38	19	57	26
7	45	15	14	6	15	17	9	20	23	47	52

Stalinabad

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	9	0	8	38	5	14	6	35	19	57	39
6	15	27	13	49	49	17	9	31	23	48	5
7	6	56									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
6	49	42	13	49	58	19	57	44	23	35	44
7	45	37	16	13	56						

Tashkent.

h.	m.	s.
13	50	2

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	30	36	11	3	10	16	28	43	19	57	49
2	3	28	13	34	37	16	47	36	20	14	20
6	49	14	13	50	12?	16	48	12	20	42	20
7	45	46	15	44	35	17	9	54	21	47	58
9	36	37	16	14	14	18	13	43	23	48	35

Samarkand.

h.	m.	s.	h.	m.	s.
13	50	14	19	58	5

Tchimkent.

h.	m.	s.	h.	m.	s.
16	14	59	23	49	32

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
13	50	35	14	7	36	19	59	36

July 14d. Readings also at 2h. (Rome), 3h. (Tucson), 4h. (Collmberg (2), Stuttgart, and near College), 6h. (Rome), 8h. (Overton), 10h. (Mizusawa, Mount Wilson, Riverside, Tinemaha, Shasta Dam, Hungry Horse, College, Malaga, and Kew), 11h. (Copiapo and near Mizusawa), 13h. (Sverdlovsk and near Mizusawa), 14h. (College and near Ottawa), 17h. (Jena, near Collmberg, Stuttgart, near Malaga, near Belgrade, and near Ottawa), 18h. (Salo, Collmberg, and near Stuttgart), 19h. (Wellington, Palomar, Pasadena, Riverside, Tinemaha, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Reno, Hungry Horse, College, Cleveland, Seven Falls, and Scoresby Sund), 20h. (near Ottawa), 22h. (Boulder City, Pierce Ferry, Branner, Hungry Horse, and near Ottawa.

July 15d. 6h. 57m. 32s. Epicentre 44°·1N. 21°·0E. (as on 14d.).

Intensity V at Kragujevac ; IV at Raca, Belica, Vodice, etc. Macroseismic radius 57km. Epicentre as adopted (Strasbourg).

M. D. Uzelac.
Annuaire Microséismique et Macroséismique de l'Institut Séismologique de Béograd, 1949, Nouvelle Série No. 9, Béograd, 1950, pp. 64-65.

$A = +\cdot6726$, $B = +\cdot2582$, $C = +\cdot6935$; $\delta = 0$: $h = -3$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		0·8	332	e 0 16	P_g	i 0 20	S_g	i 0 21	?	—
Bucharest	E.	3·7	84	e 1 19	P_g	e 2 4	S_g	—	—	—
Triest		5·4	290	e 1 44	P_g	i 2 44	S*	i 3 4	S_g	—
Rome		6·6	253	—	—	e 3 30	S_g	—	—	—
Istanbul		6·7	114	e 1 40	− 2	e 3 37	S_g	—	—	—
Salo		7·6	285	—	—	e 3 20	− 3	e 4 1	S_g	i 4·6
Collmberg	Z.	9·0	326	—	—	e 5 0	S_g	—	—	—
Stuttgart		9·4	304	e 2 17	− 1	e 4 58	S_g	—	—	—

Additional readings :—
Bucharest iN = 2m.12s., eE = 2m.15s., iEN = 2m.58s.
Rome eE = 4m.11s., eZ = 4m.29s.

July 15d. 9h. Undetermined shock.

Riverview eP?Z = 21m.21s., eS?N = 26m.14s., eN = 26m.24s., eLZ = 29·2m.
Brisbane iE = 24m.37s.
College iP = 27m.56s., i = 28m.15s.
Andijan P = 28m.24s., S = 39m.2s.
Shasta Dam eP? = 28m.30s., e = 28m.51s.
Obi-garm P = 28m.32s., S = 39m.17s.
Tashkent iP = 28m.36s., iS = 39m.25s.
Mount Wilson ePZ = 28m.43s., iZ = 29m.4s., 29m.8s., and 29m.13s.
Tinemaha ePZ = 28m.48s., iZ = 29m.4s. and 29m.9s.
Riverside ePZ = 28m.50s., iZ = 29m.12s.
Lick ePZ = 28m.56s.
Pierce Ferry e = 28m.58s. and 29m.21s.
Palomar iZ = 29m.0s. and 29m.8s.
Hungry Horse eP = 29m.1s. and 29m.25s.
Overton ePZ = 29m.2s., eZ = 29m.20s.
Sverdlovsk eP = 29m.3s.
China Lake eZ = 29m.5s.
Reno iPZ = 29m.5s.s, eN = 29m.18s.
Boulder City eP = 29m.18s.
Tucson e = 29m.36s. and 33m.15s.
Tamanrasset iPKPZ = 35m.15s.k, eZ = 35m.25s., iZ = 35m.47s.k, ePPZ = 38m.27s,
Scoresby Sund 45m.12s., L = 72m.
Long waves were also recorded at Wellington.

July 15d. 11h. 0m. 3s. Epicentre 24°·0N. 93°·0E.
Approximate.

A = −·0479, B = +·9133, C = +·4045; δ = +3; h = +4;
D = +·999, E = +·052; G = −·021, H = +·404, K = −·915.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Calcutta	E.	4·5	252	e 2 43	+92	i 3 56	S*	i 4 35	S_g
Murgab		21·7	316	4 54	− 1	8 57	+ 6	—	—
Andijan		24·0	318	5 19	+ 2	i 9 45	+13	—	—
Frunse		24·2	325	e 5 22	+ 3	—	—	—	—
Obi-garm		24·6	312	i 5 24	+ 1	—	—	—	—
Stalinabad		25·2	311	5 20	+ 1	—	—	—	—
Tashkent		26·3	317	i 5 40	+ 1	e 10 17	+ 6	—	—
Irkutsk		29·5	14	e 6 3?	− 5	—	—	—	—
Sverdlovsk		40·3	333	i 7 35	− 5	13 39	−10	—	—
Grozny		43·2	308	e 8 4	0	—	—	—	—
Tiflis		43·6	306	e 8 13	+ 5	—	—	—	—
Ksara		50·4	294	e 9 6	+ 5	e 20 22	SS	—	—
Moscow		51·1	323	9 2	− 4	e 16 17	− 7	—	—
Collmberg	z.	65·5	317	e 10 43	− 4	—	—	—	—
Strasbourg		69·3	315	e 11 8	− 3	—	—	e 11 21	?
Paris		72·7	316	e 11 28	− 4	—	—	—	—
Clermont-Ferrand		73·1	313	e 11 48	+14	—	—	—	—
Algiers Univ.	z.	76·0	304	11 49	− 2	—	—	—	—
Tamanrasset	z.	78·9	290	e 14 7	?	—	—	e 15 16	PP
College		79·9	22	e 11 54	−18	—	—	—	—
Pretoria	z.	79·9	236	i 12 16	+ 4	i 25 25	?	—	—
Overton	z.	114·5	23	e 19 25	PP	—	—	—	—
Bogota	z.	148·9	334	i 19 49	[+ 3]	—	—	—	—

Tamanrasset gives also eZ = 14m.24s. and 15m.38s.

July 15d. 11h. 22m. 41s. Epicentre 29°·0N. 98°·0E.

A = −·1219, B = +·8675, C = +·4823; δ = +3; h = +2;
D = +·990, E = +·139; G = −·067, H = +·478, K = −·876.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	10·8	236	(e 2 41)	+ 2	(i 4 7)	−35	—	—	—
Murgab		22·1	301	e 4 55	− 4	8 57	− 1	—	—	—
Frunse		23·4	312	e 5 9	− 2	—	—	—	—	—
Irkutsk		23·7	9	e 5 14	0	9 27	0	—	—	—
Andijan		24·0	305	e 5 14	− 3	i 9 30	− 2	—	—	—
Bombay	E.	25·1	252	e 8 56	P_cP	—	—	—	—	—
Obi-garm		25·3	300	5 29	− 1	—	—	—	—	—
Stalinabad		26·0	300	5 35	− 1	10 4	− 2	—	—	—
Tashkent		26·4	306	i 5 47	+ 7	10 24	+12	—	—	—
Sverdlovsk		38·2	328	7 49	+26	—	—	—	—	—
Upsala		60·6	326	—	—	e 23 2	SS	—	—	e 32·3
Copenhagen		64·2	322	15 1	PPP	—	—	—	—	31·3
Potsdam	z.	64·6	318	—	—	e 19 19?	− 2	—	—	—
Collmberg	z.	65·0	316	e 10 43	− 1	—	—	—	—	—
Stuttgart		68·1	315	e 11 4	0	e 19 59	− 4	—	—	—
De Bilt		69·3	319	e 17 19?	?	—	—	—	—	e 38·3
Scoresby Sund		72·1	342	—	—	20 49	− 1	—	—	43·3
College		73·6	24	e 11 35	− 2	—	—	i 11 39	P	—
Algiers Univ.	z.	76·9	305	11 58	+ 2	—	—	—	—	—
Tamanrasset	z.	81·3	291	e 14 19	?	—	—	e 15 41	PP	—
Hungry Horse		97·7	21	e 13 38	0	—	—	—	—	—
Overton	z.	108·0	27	i 18 55	PP	—	—	—	—	—
Bogota	z.	145·7	345	i 19 43	[+ 3]	—	—	—	—	—

Additional readings and note :—
Calcutta iP_gE = (3m.18s.), iS^*E = (4m.35s.), iS_gE = (4m.56s.); readings reduced by 2m.
Tamanrasset eZ = 14m.23s.
Long waves were also recorded at Strasbourg, Paris, and Rome.

July 15d. 18h. 21m. 30s. Epicentre 50°·2N. 6°·4E.

Accidental explosion of 400,000 kg. of explosives.

A = +·6387, B = +·0716, C = +·7661 ; δ = −3 ; h = −5 ;
D = +·111, E = −·994 ; G = +·761, H = +·085, K = −·643.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Heerlen	0·7	338	e 0 14	P_g	—	—	—	—
Strasbourg	1·8	150	i 0 32	0	i 0 49	− 7	i 0 34	P*
De Bilt	2·1	338	e 0 14	−23	—	—	—	—
Stuttgart	2·3	129	e 0 34	− 6	e 1 10	+ 1	e 0 42	P*
Basle	2·8	164	e 0 49	+ 2	e 1 26	+ 4	—	—
Paris	2·9	240	e 0 51	+ 3	i 1 26	+ 2	1 2	P_g
Neuchatel	3·2	173	e 0 48	− 4	e 1 40	S*	e 0 57	P*
Ravensburg	3·2	137	—	—	e 1 47	S_g	—	—
Zürich	3·2	151	e 0 46	− 6	e 1 22	−10	e 0 56	P*
Jena	3·4	75	e 0 50	− 5	e 1 33	− 4	—	—
Chur	3·9	146	e 0 59k	− 3	e 2 0	S*	—	—
Collmberg	4·3	72	e 1 3	− 5	e 1 59	− 1	e 1 16	P*
Prague	5·2	88	—	—	e 2 16	− 6	i 2 45	S_g

Additional readings :—
Strasbourg iS_g? = 57s.
Stuttgart eP*?Z = 37m. and 40s., iS?Z = 56s., e = 1m.4s., i = 1m.13s., iS_g = 1m.15s., i = 1m.25s.
Basle eS_g = 1m.38s.
Paris e = 1m.5s., iS = 1m.31s., iS_g? = 1m.34s. and 1m.42s.
Zürich eS_g = 1m.37s.
Collmberg eE = 1m.37s., iS_gEZ = 2m.6s., iE = 2m.10s. and 2m.13s.

July 15d. Continuation of list of aftershocks from the epicentre of the large earthquake on July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	6	3	11	1	56	13	52	50	15	5	3
2	4	5	12	3	50	15	1	18	20	58	36
10	10	9	12	32	0						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	6	16	10	10	22	12	32	8	15	20	4
2	4	18	11	2	8	13	53	3	20	18	29
2	35	33	11	50	39	15	1	22	20	58	42
3	8	41	12	4	2	15	5	18	21	19	15
9	41	41									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	6	23?	10	10	30	11	2	14?	12	32	17?
2	4	20	10	47	12	11	50	32	15	2	16

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	6	32	2	4	31?	12	33	2

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	6	36	8	43	59	12	4	8	15	5	42
1	14	43	9	41	15	12	32	25	15	19	22
1	30	6	9	47	31	12	54	45	20	18	8
2	4	30	9	57	12	13	38	10	21	19	5
2	30	20	10	10	40	13	53	12	21	21	8
4	54	28	11	2	21	15	2	11	22	16	59
5	47	7									

Samarkand.

h.	m.	s.	h.	m.	s.
1	6	36?	2	4	38

Tchimkent.

h.	m.	s.	h.	m.	s.
1	7	28	2	4	40

Frunse.

h.	m.	s.
2	5	54

July 15d. Readings also at 2h. (Calcutta), 4h. (Mineral and near College), 5h. (Overton, Pierce Ferry, Tucson, La Paz, Bogota, near Huancayo, and near College), 7h. (La Paz), 8h. (College), 9h. (College and Hungry Horse), 10h. (Overton), 11h. (College), 12h. (Ottawa, near College and near Overton), 13h. (near College), 14h. (College (3)), 15h. (near Copiapo, College, near Overton, near Fresno and Lick), 16h. (Klyuchi, Lick, and near Fresno), 17h. (Santa Lucia), 18h. (Boulder City, Hungry Horse, Overton, Pierce Ferry, Shasta Dam, and Tucson), 20h. (near College), 22h. (Collmberg), 23h. (Mount Wilson, Riverside, Palomar (2), Boulder City (2), Hungry Horse, Overton, Pierce Ferry (2), Tucson (2), Bogota, and near Balboa Heights).

July 16d. 9h. 57m. 22s. Epicentre 14°·0N. 92°·2W. (as on 1948, April 20d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		7·3	19	1 53	+ 3	—	—	—	—	3·7
Puebla		7·6	312	1 58	+ 3	—	—	—	—	3·9
Tacubaya		8·6	310	i 2 15	+ 6	i 4 14	S*	—	—	i 4·5
Bogota	Z.	20·2	116	i 4 39	0	e 8 42	+21	—	—	—
Lubbock		21·4	338	4 55	+ 4	—	—	—	—	—
Columbia		22·3	25	e 5 1	0	e 9 13	+11	—	—	e 11·8
St. Louis		24·6	4	i 5 22	− 1	e 9 48	+ 6	e 10 32	SS	—
Tucson		24·9	320	e 5 27	+ 1	e 10 6	+19	—	—	e 12·8
San Juan		25·4	77	e 5 28	− 3	e 9 35	−21	—	−	e 11·7
Georgetown		28·2	26	e 5 59	+ 3	e 9 55	−46	—	—	—
Cleveland	E.	28·9	16	e 6 17	+14	e 12 10	SS	—	—	—
	N.	28·9	16	e 6 13	+10	e 12 6	SS	—	—	17·7
Pierce Ferry		29·4	323	e 6 8	+ 1	—	—	—	—	—
Pennsylvania		29·5	338	i 6 10	+ 2	i 11 44	+42	i 7 41	PPP	e 13·6
Palomar	Z.	29·5	316	i 6 9	+ 1	—	—	—	—	—
Boulder City		29·8	322	i 6 12	+ 1	—	—	—	—	—
Philadelphia		29·9	27	e 6 10	− 2	e 11 7	− 2	e 6 58	PP	e 13·2
Overton	Z.	30·0	323	i 6 14	+ 2	—	—	—	—	—
Riverside	Z.	30·3	316	e 6 14	− 1	—	—	—	—	—
Pasadena		30·9	316	e 6 21	+ 1	—	—	—	—	e 17·5
China Lake	Z.	31·5	319	e 6 34	+ 8	—	—	—	—	—
Logan		32·5	333	e 6 32	− 2	e 11 52	+ 3	—	—	e 18·9
Tinemaha	Z.	32·7	320	e 6 39	+ 3	—	—	—	—	—
Harvard		33·5	28	e 6 41	− 2	—	—	—	—	e 20·1
Ottawa		34·3	21	6 47	− 3	12 26	+ 9	—	—	16·6
Reno		35·1	322	e 6 50	− 7	—	—	i 8 24	PP	e 21·0
Bozeman		35·4	338	e 6 58	− 2	e 12 44	+10	—	—	e 19·9
Berkeley		35·7	318	i 7 17 a	+15	i 12 45	+ 6	—	—	e 18·8
Shasta Dam		37·4	321	e 7 22	+ 6	—	—	—	—	—
Seven Falls	E.	37·5	24	e 8 50	PP	e 13 44?	+37	—	—	22·6
La Paz		38·5	141	7 25	− 1	i 12 10	−72	(16 38)	SSS	16·6
Hungry Horse		38·7	337	i 7 28	+ 1	—	—	—	—	—
Victoria		43·0	330	—	—	e 14 32	+ 3	—	—	27·6
Sitka		54·2	333	e 9 31	+ 2	e 17 12	+ 6	—	—	e 29·9
Scoresby Sund		70·3	19	11 17	0	—	—	—	—	37·6
Stuttgart		86·9	40	e 12 43	− 5	—	—	—	—	e 48·6

Additional readings :—
Tucson i = 5m.36s., e = 6m.25s.
Cleveland eN = 11m.20s.
Overton iZ = 6m.22s.
Ottawa e = 6m.55s.
Reno eE = 6m.58s.
Berkeley iSN = 12m.50s.
Long waves were also recorded at College, Huancayo, Rapid City, Saskatoon, and Triest.

July 16d. Continuation of list of aftershocks from the epicentre of the large earthquake July 10th, recorded at stations of the Pamir group.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	44	12	8	0	7	15	26	33?	19	26	29
2	22	40	13	44	16	15	57	47	21	50	2
7	59	59	14	50	45	18	4	5			

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	22	55	8	0	17	14	50	49	16	27	59
8	0	12	13	44	31	15	26	45	18	4	30

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	0	14?	13	44	29	15	26	44	18	4	38
8	0	19	14	51	10	15	58	0	21	50	0

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	1	3	14	51	15?	15	58	11	18	4	51
13	45	11?	15	26	56?						

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	38	10	8	0	25	13	44	47	15	26	52
0	46	11	8	0	32	14	46	15	15	58	14
1	44	37	12	28	21	14	50	53	17	21	49
1	51	56	12	38	14	15	22	7	18	4	52
5	21	54	13	15	39						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	0	40	13	45	35	15	27	10	18	4	54
8	1	16	14	51	8	15	58	18			

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
14	51	26	15	27	13	15	58	20	18	4	58

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
14	52	58	15	28	20	15	58	47

July 16d. Readings also at 0h. (near Galerazamba), 3h. (Overton), 4h. (Overton and Tucson), 5h. (Stuttgart, Hungry Horse, College, Palomar, Tinemaha, Tucson, near Tacubaya and near Balboa Heights), 9h. (Bogota, Copiapo, and Fort de France), 11h. (Mineral, Budapest, and near Belgrade), 12h. (near Apia), 16h. (Boulder City, Overton, Pierce Ferry, College, Ottawa, and near Tucson), 17h. (Boulder City, Overton, Pierce Ferry, and near Tucson), 18h. (Kaimata, Tuai, Ottawa, Victoria, Overton, and near Hungry Horse), 19h. (Kaimata, Tuai, Wellington, Ottawa, and Overton), 22h. (near Mizusawa), 23h. (Ottawa and near Istanbul).

July 17d. 18h. 27m. 23s. Epicentre 37°·8N. 4°·9W.

$A = +\cdot7893$, $B = -\cdot0677$, $C = +\cdot6103$; $\delta = +4$; $h = -1$;
$D = -\cdot085$, $E = -\cdot996$; $G = +\cdot608$, $H = -\cdot052$, $K = -\cdot792$.

		△	Az.	P.	O−C.	S.	O−C.		Supp.
		°	°	m. s.	s.	m. s.	s.	m.	s.
Malaga		1·1	160	i 0 24	+ 2	i 0 44	+ 5	0 30	SP
Granada		1·2	121	0 15	− 9	i 0 32	− 9	0 19	P
Almeria		2·2	116	e 0 41	+ 3	i 1 9	+ 3	0 47	P_g
Toledo	z.	2·2	18	i 0 35	− 3	i 1 0	− 6	—	—
Alicante		3·5	80	1 5	P*	1 49	S*	—	—
Tortosa		5·2	52	e 2 34	S*	2 53	S_g	—	—

Additional readings :—
Granada S = 51s.
Almeria P_gS_g = 1m.1s. and 1m.5s., S_g = 1m.20s.
Alicante S? = 2m.8s.
Tortosa iS_gN = 2m.41s., iS_gE = 2m.46s.

July 17d. 19h. 15m. 26s. Epicentre 46°·2N. 7°·9E. (as on 1949, March 24d.).

Intensity scale IV in the Miscbabel group, Grachen, and Saas-Fee. Epicentre 46°5′N. 7°50′E. Macroseismic radius 5km.

E. Wanner.
Jahresbericht des Erdbebendienstes der Schweiz in Jahre, 1949. Zürich, 1950, p.2, with Macroseismic chart Fig. 3.

$A = +·6880$, $B = +·0955$, $C = +·7194$; $\delta = 0$; $h = -4$;
$D = +·137$, $E = -·991$; $G = +·713$, $H = +·099$, $K = -·695$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Neuchatel	1·0	321	i 0 20	− 1	e 0 36	0	—	—
Chur	1·3	60	e 0 25	0	i 0 44	0	—	—
Zürich	1·3	22	i 0 24a	− 1	i 0 44	0	i 0 26	P_g
Basle	1·4	351	e 0 27	0	e 0 45	− 1	—	—
Salo	1·9	108	e 0 50	?	1 7	S_g	—	—
Ravensburg	2·0	36	e 0 38	+ 3	e 1 1	− 1	e 1 6	S_g
Strasbourg	2·4	358	i 0 47a	P_g	—	—	—	—
Stuttgart	2·7	19	e 0 51	+ 6	i 1 31	S_g	e 0 53	P_g
Clermont-Ferrand	3·4	264	e 1 5	P_g	i 2 2	S_g	—	—
Collmberg	6·1	32	e 1 59	P_g	e 3 20	S_g	—	—

Additional readings :—
Stuttgart e = 1m.26s.
Clermont-Ferrand i = 2m.14s.
Collmberg eE = 2m.2s., eZ = 2m.22s., eE = 3m.14s., and 3m.17s.

July 17d. Continuation of the list of after-shocks from the epicentre of the large earthquake of July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	56	41	5	53	48	13	7	33	19	1	56
2	18	8	8	7	59	17	32	45	20	37	34
2	46	19	11	59	4	18	32	0	23	4	12
5	22	6									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	42	42	5	22	8	13	8	7	19	2	8
1	56	55	8	8	10	17	16	7	20	37	43
2	18	21	11	59	17	17	32	56	23	4	25
2	46	33									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	57	8	5	54	11	13	7	58	18	32	12
2	18	30	8	8	14	15	15	21	19	2	10
2	46	47	11	59	23	17	32	57	23	4	25
5	22	29									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	22	37	19	2	20?	20	37	58	23	4	35
17	33	9									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	44	0	1	57	16?	2	18	39	2	46	49
1	41	33									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	57	22	11	59	41	20	38	8	23	4	42
2	47	0	13	8	8						

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	57	23	5	22	44	17	33	19	20	38	11
2	47	7	15	15	49	19	3	16	23	4	45

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	48	27	17	34	32	20	38	34	23	5	3
15	16	12									

July 17d. Readings also at 3h. (Reno), 7h. (Wellington and Tucson), 9h. (near La Paz), 10h. (Tucson, Overton, Pierce Ferry, College, Stuttgart, and near Apia), 12h. (Santa Lucia), 13h. (Basle), 14h. (Riverview, De Bilt, and near Bogota), 15h. (Puebla, Tacubaya (2), Philadelphia, Mount Wilson, Palomar, Tinemaha, Tucson, Overton, Pierce Ferry, College (3), Scoresby Sund, and Collmberg), 16h. (Huancayo and near La Paz), 17h. (Sverdlovsk), 19h. (Mineral, near Istanbul, and near Zürich), 20h. (College (2) and Ksara), 21h. (near Istanbul), 23h. (New Delhi, Grozny, Tiflis, Sverdlovsk, Potsdam, De Bilt, Collmberg, Paris, Ottawa, and College).

July 18d. 0h. 32m. 59s. Epicentre 0°·6S. 122°·3E. (as on 1947, April 21d.).

$A = -\cdot5343$, $B = +\cdot8452$, $C = -\cdot0104$; $\delta = -5$; $h = +7$;
$D = +\cdot845$, $E = +\cdot534$; $G = +\cdot006$, $H = -\cdot009$, $K = -1\cdot000$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		16·4	250	i 3 55	+ 2	i 7 17	+21	—	—	—
Brisbane	Z.	39·8	135	e 7 26	−10	—	—	—	—	—
Calcutta	E.	40·3	308	e 9 38	PP	e 13 45	− 4	i 15 11	?	—
Riverview		42·7	143	e 8 0	0	i 14 24	0	i 17 34	SS	—
Hyderabad	N.	46·7	294	—	—	15 20	− 2	—	—	25·0
Poona		51·2	295	—	—	i 16 29	+ 4	—	—	—
Bombay		52·3	294	e 9 19	+ 4	e 16 35	− 5	e 11 6	PP	—
Irkutsk		54·8	346	e 9 33	− 1	17 13	− 1	—	—	—
Auckland		60·4	133	—	—	17 32	?	e 25 56	SSS	e 28·0
Frunse		60·8	322	e 10 14?	− 2	e 18 36?	+ 3	—	—	—
Andijan		61·2	318	e 10 21	+ 2	i 18 43	+ 5	—	—	—
Obi-garm		62·1	315	e 10 25	0	—	—	—	—	—
Wellington		62·2	138	i 10 11	−15	i 18 43	− 8	e 26 7	SSS	31·0
Stalinabad		62·6	315	i 10 28	0	e 18 58	+ 2	—	—	—
Tashkent		63·5	318	i 10 36?	+ 2	i 19 6?	− 1	—	—	—
Tchimkent		63·7	320	i 10 37	+ 1	i 19 9	− 1	—	—	—
Sverdlovsk		75·4	330	11 44	− 3	21 20	− 7	—	—	—
Grozny		80·6	315	12 40?	+24	—	—	—	—	—
Tiflis		81·1	313	12 19	+ 1	22 27	− 1	—	—	—
Ksara		87·3	304	e 12 52	+ 2	—	—	16 13	PP	—
Moscow		87·5	326	e 12 49	− 2	e 23 25	− 6	—	—	—
Yalta		89·1	315	13 1	+ 3	—	—	—	—	—
College		90·5	26	e 12 58	− 7	—	—	e 15 59	PP	—
Helwan		91·1	300	e 13 8	0	e 24 9	+ 5	e 16 55	PP	—
Istanbul		92·8	311	e 12 1?	?	—	—	—	—	—
Upsala		97·9	331	—	—	e 39 37	Q	—	—	e 50·0
Copenhagen		101·6	328	e 18 11	PP	e 24 34	[− 1]	—	—	48·0
Prague		101·9	322	e 18 23	PP	e 22 25	?	—	—	—
Potsdam	Z.	102·1	324	e 18 7	PP	—	—	—	—	e 55·0
Collmberg		102·5	322	e 17 33?	PKP	—	—	—	—	e 55·0
Triest		103·3	317	e 18 16	PP	e 24 38	[− 5]	e 20 14	PPP	—
Rome		105·1	314	e 18 17	PP	e 24 46	[− 5]	e 28 20	PS	—
Florence Ximenian		105·5	316	e 18 21	PP	—	—	e 30 13	PKKP	—
Salo		105·5	318	e 18 34	PP	—	—	—	—	—
Stuttgart		105·5	320	e 17 34	PKP	e 25 1	[+ 8]	e 18 33	PP	e 53·0
Scoresby Sund		106·4	349	—	—	25 1	[+ 4]	29 9	PPS	51·0
Strasbourg		106·5	322	e 17 35	PKP	e 28 31	PS	e 18 37	PP	e 50·0
De Bilt		106·8	326	i 18 49	PP	e 26 21	+ 4	28 41	PPS	e 51·0
Aberdeen		108·5	332	—	—	e 26 41	S	e 28 39	PS	e 53·5
Shasta Dam		109·4	47	e 18 58	PP	—	—	—	—	—
Paris		109·7	323	e 18 48	[+15]	e 29 46	PPS	e 19 8	PP	e 55·0
Kew		110·2	326	i 18 58	[+24]	e 25 19	[+ 6]	e 19 14	PP	e 55·0
Clermont-Ferrand		110·4	320	e 19 18	PP	e 28 46	PS	—	—	53·0
Tinemaha	Z.	113·6	49	e 19 27	PP	—	—	—	—	—
Mount Wilson	Z.	114·6	53	e 19 43	PP	—	—	—	—	—
Tamanrasset	Z.	114·8	295	18 46	[+ 3]	—	—	—	—	—
Overton	Z.	116·6	49	e 19 11	[+25]	—	—	i 20 3	PP	—
Pierce Ferry		117·1	49	e 19 52	PP	—	—	—	—	—
Granada		118·3	313	23 14 a	PPP	30 23	PS	30 58	PPS	63·5
Pennsylvania	E.	136·0	23	e 22 25	PP	e 30 31	?	e 45 13	SSS	e 62·0
Philadelphia		137·7	20	e 22 59	PP	e 40 18	SS	—	—	e 67·1
La Paz		160·1	151	i 20 23	[+22]	—	—	i 25 1	PP	82·0
San Juan		160·5	24	e 24 44	PP	—	—	—	—	e 47·8

For Notes see next page.

NOTES TO JULY 18d. 0h. 32m. 59s.

Additional readings :—
Riverview iE =14m.30s., iS$_c$SN =17m.55s., iSSSE =18m.18s.
Bombay eN =16m.41s.
Wellington iZ =19m.20s.
Triest iSPP =27m.40s., eSS? =33m.18s.
Rome e =26m.30s., eS =30m.7s., e =32m.48s.
Stuttgart ePPP =21m.10s., ePPS =28m.40s., eSS =33m.49s.
Strasbourg e =20m.12s., ePPP =21m.11s., e =31m.49s., eSS? =33m.49s.
De Bilt epPP =19m.36s., eSS =34m.1s.?
Paris e =18m.55s., ePPP =21m.32s.
Kew e =20m.2s., 27m.26s., 29m.6s., 31m.2s., 36m.21s., 38m.40s., and 45m.31s.
Clermont-Ferrand e =31m.21s.
Granada PPS =34m.51s., SS =42m.31s.
Long waves were also recorded at Honolulu, Tucson, Harvard, Alicante, Almeria, and Malaga.

July 18d. 4h. 42m. 2s. Epicentre 5°·5N. 126°·0E. Depth of focus 0·010.
(as on 1949, February 26d.).

A = −·5851, B = +·8054, C = +·0952 ; δ = +7 ; h = +7 ;
D = +·809, E = +·588 : G = −·056, H = +·077, K = −·996.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		22·4	240	i 4 56a	+ 5	i 9 0	+14	—	—	—
Calcutta	E.	40·1	299	e 10 12	?	i 13 30	+ 4	—	—	—
Brisbane		41·9	142	i 7 38	− 4	e 13 43	−10	i 9 16	PP	—
Riverview		45·8	150	i 8 14k	0	i 14 51	+ 2	i 8 41	pP	—
Irkutsk		49·9	342	8 45	− 1	15 45	− 2	—	—	—
New Delhi	E.	51·6	302	e 8 57	− 1	i 16 7	− 3	—	—	—
Frunse		58·6	318	e 9 49	0	—	—	—	—	—
Andijan		59·3	315	e 9 54	0	17 53	0	—	—	—
Obi-garm		60·6	312	i 10 3	0	18 8	− 2	—	—	—
Stalinabad		61·2	312	i 10 7?	0	—	—	—	—	—
Tashkent		61·7	315	i 10 11	+ 1	i 18 23	0	—	—	—
Tchimkent		61·8	316	i 10 11	0	i 18 23	− 2	—	—	—
Sverdlovsk		72·1	329	11 15	− 1	i 20 23	− 6	e 21 9	sS	—
Baku		75·9	311	—	—	e 21 13	+ 2	—	—	—
Grozny		79·2	313	11 57	+ 1	21 43	− 3	—	—	—
Tiflis		79·8	312	i 12 0	+ 1	21 50	− 3	—	—	—
College		83·4	25	e 12 15	− 3	i 22 27	− 2	e 27 30	SS	—
Moscow		84·6	325	12 23	− 1	22 34	− 7	e 12 51	pP	—
Ksara		87·1	303	i 12 37a	+ 1	—	—	14 12	PP	—
Sitka		90·1	32	—	—	i 23 11	[+ 1]	e 23 34	S	—
Skalnate-Pleso		96·1	320	—	—	e 23 40	[− 4]	e 25 19	SP	—
Prague		99·3	323	—	—	e 23 42	[−18]	e 25 10	S	—
Potsdam		99·4	325	e 13 33	0	—	—	—	—	—
Collmberg		99·8	323	e 13 34	− 1	—	—	—	—	—
Scoresby Sund		101·2	349	—	—	24 11	[+ 1]	25 9	S	—
Triest		101·3	318	e 13 39	− 2	i 24 10	[0]	e 14 23	pP	—
Shasta Dam		102·5	47	e 13 44	− 3	—	—	e 30 8	PKKP	—
Stuttgart		103·0	322	e 13 48	− 1	e 24 15	[− 3]	e 17 59	PP	e 53·0
Bologna		103·4	317	e 14 17	+27	—	—	e 18 24	PP	—
Rome		103·5	315	e 18 8	PP	e 24 19	[− 1]	e 32 39	SS	e 52·0
De Bilt		103·9	328	e 13 52	− 1	i 24 24	[+ 2]	e 18 58	PP	e 51·0
Strasbourg		104·0	323	—	—	e 24 13	[−10]	e 33 32	sSS	51·0
Zürich		104·0	321	e 13 54	+ 1	e 24 20	[− 3]	e 18 14	PP	—
Lick	Z.	104·1	49	i 18 22	PP	e 30 3	?	—	—	—
Reno		104·8	46	i 14 36a	?	e 25 13	−25	e 18 16	PP	—
Tinemaha		106·8	49	i 18 17	PP	—	—	i 29 52a	PKKP	—
Paris		107·0	325	e 28 39	PPS	—	—	—	—	e 52·0
Kew		107·1	328	e 18 59	PP	e 24 38	[+ 2]	e 28 23	PS	—
Butte	N.	107·1	38	—	—	e 24 38	[+ 2]	—	—	—
Pasadena		107·8	51	i 18 20a	PKP	—	—	i 29 47	PKKP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Riverside	Z.	108·5	51	i 18 20	PKP	—	—	i 29 42 PKKP	—
Clermont-Ferrand		108·7	322	e 18 39	PP	e 28 48	PPS	e 29 56 PKKP	43·0
Palomar	Z.	109·1	52	e 18 21	[+ 3]	—	—	i 29 46a PKKP	—
Boulder City		109·8	48	i 18 23	[+ 3]	—	—	e 29 38 PKKP	—
Overton	Z.	109·8	48	i 18 24	[+ 4]	—	—	i 21 47 PPP	—
Pierce Ferry		110·3	49	e 18 23	[+ 2]	—	—	e 29 36 PKKP	—
Algiers Univ.	Z.	112·2	312	18 23	[− 1]	—	—	— —	—
Tucson		114·3	50	i 18 32	[+ 3]	—	—	e 30 2 PKKP	—
Tamanrasset	Z.	115·4	298	e 18 33	[+ 2]	—	—	e 18 51 pPKP	—
St. Louis		124·7	34	i 18 57	pPKP	e 27 29	SKKS	i 19 24 pPKP	—
Seven Falls	E.	125·5	13	e 18 51	[+ 1]	—	—	— —	—
Ottawa	Z.	125·7	18	e 18 52	[+ 2]	—	—	— —	—
Harvard		129·6	15	i 18 59	[+ 1]	—	—	e 22 11 PP	—
Weston		129·8	15	i 19 8	[+10]	—	—	i 19 20 pPKP	—
Georgetown		130·9	24	i 19 2	[+ 2]	i 22 15	SKP	i 19 29 pPKP	—
Bogota		157·6	64	i 19 48	[+ 3]	—	—	i 20 20 PKP_2	—
Huancayo		157·9	110	i 19 50	[+ 5]	—	—	e 20 20 pPKP	—
La Paz		162·4	129	i 19 51a	[+ 1]	—	—	i 24 25 PP	74·0

Additional readings :—
Riverview iZ = 8m.50s., iPPNZ = 10m.2s.. iSE = 14m.56s., isSN = 15m.41s., iSSN = 18m.13s., iSSE = 18m.17s.
College i = 13m.13s., e = 30m.26s.
Sitka e = 24m.23s.
Prague i = 24m.1s., e = 26m.11s.
Scoresby Sund 27m.25s.
Triest ePP? = 18m.3s., epPP? = 18m.50s., esPP = 19m.4s., eS = 25m.24s., iSPP? = 27m.43s., eSS = 32m.9s.
Stuttgart ePPS = 28m.10s.
Bologna e = 23m.4s.
Strasbourg e = 25m.35s.
Reno eZ = 16m.6s. and 18m.5s., eN = 18m.37s., eZ = 18m.41s., eE = 23m.38s., eZ = 24m.27s., eSKSN = 25m.20s., iZ = 30m.1s., eN = 30m.6s., eE = 30m.16s.
Kew ePPZ = 19m.55s., eSSEZ = 25m.19s.
Pasadena eZ = 18m.43s. and 19m.18s.
Clermont-Ferrand e = 29m.28s.
Palomar eZ = 18m.36s., iZ = 18m.46s.
Overton ePZ = 29m.32s., iPZ = 29m.38s., eS?Z = 33m.35s., given as separate shock.
Tucson iP = 29m.19s.
Tamanrasset ePPZ = 19m.34s.
St. Louis ePP = 20m.38s., e = 34m.56s., eSS? = 38m.9s.
Georgetown e = 22m.59s.
Long waves were also recorded at Almeria, Alicante, and Malaga.

July 18d. 8h. 28m. 20s. Epicentre 13°·0S. 171°·5E. Depth of focus 0·090.

A = −·9640, B = +·1441, C = −·2235 ; δ = +1 ; h = +6 ;
D = +·148, E = +·989 ; G = +·221, H = −·033, K = −·975.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		16·3	95	e 3 21	+ 1	—	—	—	—
Brisbane	Z.	22·5	227	i 12 33	?	—	—	—	—
Tuai	N.	26·2	170	e 4 49	− 1	—	—	—	—
Riverview		27·8	218	i 5 5a	+ 1	i 9 9	+ 2	i 14 50	ScS
Wellington		28·3	175	e 5 9	+ 1	—	—	e 12 40?	?
Kaimata	N.E.	29·4	180	e 5 19	+ 1	—	—	—	—
Batavia		64·0	270	—	—	17 26	− 2	19 2	PS
Lick	Z.	80·2	48	i 11 8a	− 2	—	—	i 13 17k	pP
Shasta Dam		81·1	45	e 11 12	− 2	—	—	—	—
Mineral	Z.	81·5	46	i 11 16a	0	—	—	—	—
Pasadena	Z.	81·5	53	i 11 16	0	—	—	e 13 25	pP
Riverside	Z.	82·1	53	i 11 19	0	—	—	e 13 28	pP
Palomar	Z.	82·3	54	i 11 20	0	—	—	i 13 28	pP
Reno		82·4	47	e 11 21	0	—	—	e 13 2	pP
Tinemaha		82·6	50	i 11 21	− 1	—	—	e 13 30	pP

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.
		°	°	m. s.	s.	m. s.	s.	m. s.
College		83·5	16	i 11 21	− 5	—	—	—
Boulder City		84·8	52	e 11 32	− 1	—	—	e 13 42 pP
Overton	z.	85·2	51	i 11 35	0	—	—	i 13 44 pP
Pierce Ferry		85·4	52	e 11 35	− 1	—	—	—
Tucson		86·7	56	e 11 48	+ 6	—	—	e 13 53 pP
Ksara		134·7	305	i 19 46	pPKP	—	—	e 23 0 PPP
Stuttgart	z.	141·4	341	e 18 18	[− 5]	—	—	e 21 3 PP
Strasbourg		142·0	343	e 18 21	[− 5]	—	—	e 21 5 PP
Triest		142·4	335	—	—	—	—	—
Zürich		142·9	342	e 18 21k	[− 6]	—	—	—
Basle		143·0	342	e 18 24	[− 3]	—	—	—
Paris		143·1	348	i 18 23	[− 4]	—	—	e 21 8 pPKP
Neuchatel		143·7	342	e 18 25	[− 3]	—	—	—
Salo		143·7	338	e 18 27	[− 1]	—	—	e 21 9 pPKP
Bologna		144·3	336	i 18 29a	[0]	—	—	e 22 15 PP
Clermont-Ferrand		145·9	346	e 18 32	[+ 1]	—	—	—
Rome		145·9	332	i 18 31k	[0]	—	—	e 21 56 PP

Additional readings :—
Pasadena iZ = 13m.41s.
Palomar eZ = 12m.57s.
Reno eZ = 12m.23s. and 13m.43s., eE = 17m.48s.
Stuttgart ePKPZ = 18m.26s.
Strasbourg e = 18m.27s.
Bologna iE = 18m.37s.
Rome eE = 19m.29s.

July 18d. 9h. 53m. 12s. Epicentre 41°·2N. 142°·5E. Depth of focus 0·010.
(as on 1948, Aug. 22d.).

Intensity V at Urakawa ; IV at Hakodate, Hatinohe, and Muroran : II-III at Kusiro, Morioka, Miyako, Nemuro.
Macroseismic radius 200-300km. Depth 730km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1949, Tokyo, 1950, p. 22.

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.
		°	°	m. s.	s.	m. s.	s.	m. s.
Hatinohe		1·0	228	0 29a	+ 9	0 48	+12	— —
Miyako		1·6	194	0 32	+ 4	0 55	+ 6	— —
Mori		1·7	302	0 27	− 2	0 50	− 1	— —
Morioka		1·8	214	0 30a	0	0 59	+ 6	— —
Sapporo		2·1	335	0 30	− 4	0 57	− 3	— —
Mizusawa	E.	2·3	207	0 37	0	1 5	0	— —
Nemuro		3·1	47	0 38	−10	1 5	−19	— —
Sendai		3·2	203	0 49	− 1	1 35	+ 8	— —
Hukusima		3·8	206	0 57	− 1	1 53	+11	— —
Onahama		4·4	197	1 11a	+ 5	2 2	+ 6	— —
Mito		5·1	199	1 14	− 2	2 13	− 1	— —
Kakioka		5·3	201	1 17	− 1	—	—	— —
Tukubasan		5·4	203	1 14	− 6	2 54	+33	— —
Maebasi		5·5	210	1 23	+ 2	2 43	+20	— —
Kameyama		5·6	207	1 25	+ 3	2 50	+24	— —
Nagano		5·6	218	1 28	+ 6	2 59	+33	— —
Matusiro		5·7	217	1 18	− 6	—	—	— —
Tokyo		5·9	202	1 25	− 1	2 55	+22	— —
Toyama		6·1	224	1 36	+ 7	3 2	+24	— —
Hunatu		6·4	208	1 44	+11	—	—	— —
Gihu		7·4	220	1 49	+ 2	—	—	— —
Nagoya		7·4	218	1 50	+ 3	3 41	+31	— —
Hikone		7·7	222	1 52	+ 1	—	—	— —
Kameyama		7·9	219	2 2	+ 8	3 34	+12	— —
Owase		8·7	217	2 7	+ 2	—	—	— —

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
College		45·2	35	e 8 5	− 4	—	—	—	—
Victoria	Z.	63·0	48	e 10 16	− 3	—	—	—	—
Shasta Dam		68·0	55	i 10 49	− 2	—	—	—	—
Reno		70·3	54	i 11 5a	0	—	—	e 11 14	pP
Lick	Z.	70·4	57	e 11 2	− 4	—	—	e 11 20a	pP
Fresno		72·0	56	e 11 14	− 1	—	—	e 11 24	pP
Tinemaha	Z.	72·7	55	e 11 19	0	—	—	i 11 34	pP
Pasadena		74·6	58	i 11 30	0	—	—	i 11 46	pP
Riverside	Z.	75·2	58	i 11 32	− 2	—	—	i 11 48	pP
Overton	Z.	75·4	54	i 11 36	+ 1	—	—	e 11 50	pP
Boulder City		75·6	55	e 11 36	0	—	—	e 11 51	pP
Palomar	Z.	76·0	57	i 11 37	− 1	—	—	i 11 52	pP
Pierce Ferry		76·0	54	i 11 38	0	—	—	—	—
Jena	N.	78·7	330	—	—	e 24 9	?	—	—
Tucson		80·5	55	e 12 3	0	—	—	e 12 19	pP
Stuttgart	Z.	81·4	331	e 12 9	+ 1	—	—	—	—

Additional readings :—
Mizusawa SN =1m.8s.
Reno eZ =11m.18s., eN =11m.22s., iE =11m.40s., eN =13m.15s., eE =14m.36s.
Fresno eZ =11m.30s. and 11m.43s.
Tinemaha iZ =11m.48s.
Pasadena i =11m.57s.
Palomar iZ =12m.3s.
Jena eEN =24m.16s., eE =24m.24s.
Long waves were recorded at Kew.

July 18d. 17h. 41m. 10s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030.
(as on 1949, May 10d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Obi-garm		2·1	342	i 0 41	− 1	i 1 12	− 2	—	—
Stalinabad		2·3	323	i 0 44	0	i 1 18	+ 1	—	—
Samarkand		4·1	319	i 1 2	− 2	i 1 51	− 3	—	—
Andijan		4·3	20	i 1 8	+ 1	i 2 0	+ 1	—	—
Tashkent		4·7	349	e 1 14	+ 2	—	—	—	—
Tchimkent		5·6	354	i 1 25	+ 2	i 2 29	+ 1	—	—
Frunse		6·9	26	e 1 43	+ 3	e 3 2	+ 4	—	—
Ashkabad		9·8	281	e 2 16?	− 1	—	—	—	—
New Delhi		9·8	143	i 2 14	− 3	i 3 54	−11	2 44	pP
Poona	N.	18·3	170	e 3 56	− 4	—	—	—	—
Grozny		20·0	297	i 4 21	+ 4	7 54	+10	—	—
Tiflis		20·5	293	e 4 24	+ 2	—	—	—	—
Sverdlovsk		21·2	345	4 31	+ 2	i 8 17	+11	i 5 8	pP
Moscow		29·2	322	5 43	0	—	—	e 6 25	pP
Stuttgart	Z.	45·5	306	e 7 58	− 1	—	—	—	—

Additional readings :—
New Delhi P_gN =3m.11s., S^*N =4m.27s., S_gN =4m.53s.
Poona iN =3m.59s., 8m.11s., and 9m.42s.

July 18d. Continuation of the list of aftershocks from the epicentre of the large earthquake of July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	24	55	7	12	58	13	34	10	16	47	55
2	54	13	9	38	36	16	36	11	22	11	33
6	3	13									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	25	8	6	3	26	9	38	49	22	11	46
2	54	26	7	13	9	16	36	25			

Continued on next page.

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	25	20	9	39	1	16	36	27	22	11	49
2	54	28	13	34	28	16	48	7	23	18	2
7	13	12									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	25	21	9	39	9	16	48	22	22	11	57
2	54	39	16	36	37						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	26	5	9	39	15	16	49	18	22	12	5
2	55	34	16	36	46						

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	26	20	16	36	47	16	48	35	22	12	12
2	55	36									

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	26	15	16	37	9	16	49	59	22	12	29

July 18d. Readings also at 0h. (Ottawa), 2h. (Ashkabad and Grozny), 3h. (Santa Lucia and College), 6h. (Strasbourg and Kew), 7h. (Apia, Tuai, Wellington, Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Mineral (2), Reno, College, Victoria (2), Logan, Strasbourg, and Stuttgart). 8h. (Triest and near Istanbul), 9h. (Brisbane, Bogota, and near Istanbul), 12h. (Auckland, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, and near Lick), 13h. (College), 15h. (near Lick), 16h. (Ashkabad, Sverdlovsk, Grozny, and Ottawa), 17h. (near Mizusawa), 18h. (College and near Copiapo), 19h. (Victoria), 20h. (near Obi-garm, Samarkand, Stalinabad, Tchimkent, and near Batavia), 21h. (near Malaga), 22h. (Copiapo, College, Ashkabad, Grozny, Tiflis, Sverdlovsk, Moscow, and Copenhagen).

July 19d. 9h. Mexico.
Puebla 43m.43s., L =44m.0s.
Tacubaya P =43m.45s., L =44m.5s.
Oaxaca P =43m.58s., L =44m.29s.
Vera Cruz P =44m.11s., L =44m.55s.
Tucson iP =47m.9s., eL =51m.55s.
Palomar ePZ =47m.57s., iZ =48m.0s., ipP?Z =48m.18s.
Pierce Ferry eP =48m.1s.
Riverside ePZ =48m.4s., epP?Z =48m.23s.
St. Louis iP =48m.5s., eS =52m.9s.
Overton iPZ =48m.7s., iZ =48m.58s.
Pasadena ePZ =48m.11s., epP?Z =48m.31s.
Tinemaha iPZ =48m.30s., eZ =48m.44s.
Lick iPZ =48m.52s.a, iZ =49m.12s.
Boulder City iP =49m.4s.
Hungry Horse iP =49m.36s.
Ottawa eZ =49m.52s.
Santa Lucia iE =56m.48s.

July 19d. 13h. 28m. 56s. Epicentre 39°·2N, 70°·7E. (as on 14d.).

A = +·2568, B = +·7334, C = +·6295 ; δ = +9 ; h = −1.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Obi-garm		0·9	237	i 0 22	+ 2	i 0 40	+ 6	—	—
Stalinabad		1·6	247	i 0 35	+ 5	i 0 59	+ 8	—	—
Andijan		2·0	39	i 0 36	+ 1	i 1 1	− 1	—	—
Tashkent		2·4	333	i 0 47	+ 6	i 1 18	+ 6	—	—
Frunse		4·7	38	e 1 15	+ 1	e 2 10	0	—	—
Ashkabad		9·8	267	2 26	+ 2	—	—	—	—
New Delhi	E.	11·9	151	e 2 50	− 4	i 4 54	−15	—	—
Sverdlovsk		18·9	343	i 4 21	− 3	7 45	− 8	—	—
Grozny		19·2	290	i 4 31	+ 3	—	—	—	—
Tiflis		19·8	285	4 36	+ 1	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Leninakan		20·6	284	e 4 49	+ 6	—	—	—	—	—
Moscow		27·5	318	e 4 48	−62	—	—	—	—	—
Upsala		38·8	320	—	—	e 17 4?	SSS	e 20 36	Q	e 23·1
Collmberg		41·4	308	e 7 49	− 1	—	—	e 9 26	PP	—
Triest		41·8	298	e 8 1	+ 8	—	—	e 9 42	PP	—
Jena	E.	42·7	306	e 7 56	− 4	—	—	—	—	—
Stuttgart		44·2	304	e 8 12	0	e 17 40	SS	e 9 54	PP	e 23·1
Clermont-Ferrand		49·0	301	e 8 50	0	—	—	—	—	—
Kew		49·5	310	—	—	e 21 4?	SSS	—	—	—
Tamanrasset	Z.	57·1	275	i 9 50k	0	—	—	e 10 37	PcP	—
College		72·0	17	i 11 23	− 5	—	—	i 11 31	P	—
Hungry Horse		92·7	3	i 13 12	− 3	—	—	—	—	—

Tamanrasset also gives eZ = 10m.8s., ePPZ = 11m.6s., ePPPZ = 13m.37s.
Long waves were also recorded at Poona, Ksara, Potsdam, and De Bilt.

July 19d. 15h. Undetermined Shock.

Batavia iPEZ = 3m.56s.k, iSEN = 6m.18s.
Brisbane iPZ = 4m.56s., eN = 11m.28s., eE = 11m.34s.
Riverview iP?Z = 5m.26s.k, iN = 13m.8s., iE = 13m.11s., iZ = 13m.49s., iN = 15m.46s., iE = 16m.54s.
Irkutsk eP = 9m.4s., epP = 9m.38s., S = 17m.20s., sS = 18m.37s.
College eP = 9m.25s., e = 12m.32s.
Stalinabad iP = 10m.7s., pP = 10m.40s., S = 19m.16s., PS = 19m.58s.
Tashkent iP = 10m.13s., pP = 10m.49s., iS = 19m.25s.
Sverdlovsk P = 11m.11s., S = 21m.16s.
Moscow ePP = 16m.6s., epPP = 16m.38s., eSKS = 22m.32s., eS = 23m.8s.
Shasta Dam e = 17m.18s.
Stuttgart ePP?Z = 17m.18s., ePPS?Z = 28m.4s.
Collmberg eZ = 17m.19s.
Hungry Horse e = 18m.3s.
Pierce Ferry e = 18m.14s.
Tucson e = 18m.29s.
Ksara e = 21m.2s. and 24m.28s.
Ottawa eZ = 21m.13s.
Tiflis S = 22m.28s.
De Bilt = 28m.
Wellington eZ = 31m.?

July 19d. 17h. 42m. 12s. Epicentre 39°·2N. 70°·7E. (as at 13h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	0 23	+ 3	—	—	—	—	—
Stalinabad		1·6	247	i 0 35	+ 5	—	—	—	—	—
Andijan		2·0	39	i 0 34	− 1	—	—	—	—	—
Tashkent		2·4	333	i 0 45	+ 4	i 1 21	S_g	—	—	—
Murgab		2·7	108	i 0 42	− 3	—	—	—	—	—
Samarkand		2·9	279	0 54	P*	—	—	—	—	—
Tchimkent		3·1	345	i 0 58	P*	i 1 42	S_g	—	—	—
Frunse		4·7	38	i 1 14	0	2 10	0	—	—	—
New Delhi		11·9	151	e 2 50	− 4	i 4 56	−13	i 3 43	?	—
Sverdlovsk		18·9	343	i 4 21	− 3	i 7 53	0	—	—	—
Grozny		19·2	290	i 4 29	+ 1	—	—	—	—	—
Tiflis		19·8	285	i 4 36	+ 1	8 20	+ 7	—	—	—
Bombay		20·3	175	e 4 38	− 2	i 8 23	0	—	—	10·2
Leninakan		20·6	284	e 4 50	+ 7	—	—	—	—	—
Poona		20·8	172	i 4 41	− 4	i 8 28	− 5	i 5 13	PPP	9·8
Piatigorsk		21·2	293	4 50	+ 1	—	—	—	—	—
Calcutta	E.	22·4	133	e 5 0	− 2	i 9 0	− 4	e 5 26	PP	10·4
Hyderabad	N.	22·7	161	e 5 0	− 4	i 9 10	+ 1	9 50	SS	11·2
Sotchi		23·6	290	6 2	PPP	—	—	—	—	—
Irkutsk		26·6	49	5 37	− 5	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Moscow		27·5	318	5 49	− 1	10 27	− 3	—	—	—
Yalta		27·6	293	5 49	− 2	—	—	—	—	—
Ksara		28·4	269	i 6 0a	+ 2	11 32	+47	—	—	—
Kodaikanal	E.	29·5	167	—	—	e 11 17	+15	—	—	—
Istanbul		31·7	288	e 6 39	+12	—	—	i 7 50	PPP	—
Bucharest		33·2	294	e 6 43	+ 3	e 12 12	+12	—	—	—
Helwan		33·5	266	i 6 44	+ 1	e 12 15	+10	—	—	—
Colombo	E.	33·6	164	13 48	?	17 43	?	—	—	20·6
Lwow		34·4	304	e 6 50	− 1	—	—	—	—	—
Helsinki		35·3	323	e 6 59	0	e 12 33	0	—	—	e 15·8
Skalnate Pleso		36·9	304	e 7 2	−10	—	—	e 8 58	PPP	—
Belgrade		37·3	295	e 7 16a	0	e 13 11	+ 7	e 8 36	PP	i 19·2
Budapest		37·8	301	7 23	+ 3	13 49	+38	e 8 51	PP	22·8
Raciborzu		38·2	305	e 7 25	+ 2	e 13 24	+ 7	e 9 0	PP	e 22·6
Ogyalla		38·4	301	e 7 30	+ 5	—	—	e 9 5	PP	—
Upsala		38·8	320	7 27a	− 1	i 13 24	− 2	8 55	PP	e 19·7
Zagreb		40·2	298	e 7 35	− 5	—	—	e 9 22?	PP	—
Potsdam		41·2	309	i 7 49	+ 1	i 16 47	SS	i 9 27	PP	i 20·6
Collmberg		41·4	308	e 7 49	− 1	e 13 54	−11	e 9 25	PP	e 23·3
Copenhagen		41·4	314	e 7 50	0	17 13	SS	9 29	PP	—
Triest		41·8	298	i 7 54	+ 1	i 14 15	+ 4	i 9 43a	PP	—
Jena		42·7	306	e 7 58	− 2	e 16 56	SS	e 9 37	PP	—
Rome		43·6	293	i 8 7a	− 1	e 14 33	− 5	i 9 51	PP	e 22·0
Bologna		43·7	297	i 8 10	+ 2	e 15 1	+22	e 10 11	PP	—
Florence, Arc.		43·9	297	e 8 4	− 6	—	—	e 10 14?	PP	—
Florence, Xim.		43·9	297	e 8 12	+ 2	e 14 50	+ 8	—	—	—
Salo		44·0	300	e 8 12	+ 1	—	—	e 10 4	PP	—
Stuttgart		44·2	304	i 8 12a	0	e 14 48	+ 2	e 9 54	PP	e 22·8
Zürich		44·9	303	e 8 16a	− 2	e 14 55	− 1	e 9 57	PP	—
Bergen	E.	45·0	321	e 10 9	PP	e 17 56	SS	—	—	—
Pavia		45·0	299	e 8 20	+ 1	—	—	—	—	—
Strasbourg		45·1	304	i 8 20a	0	e 15 3	+ 4	i 10 10	PP	23·0
Basle		45·5	302	e 8 22	− 1	e 15 47	+42	—	—	—
De Bilt		46·0	309	i 8 27a	0	e 15 16	+ 4	e 18 15	SS	e 23·8
Neuchatel		46·0	303	e 8 26	− 1	—	—	—	—	—
Paris		48·5	305	i 8 40	− 6	—	—	e 10 38	PP	25·8
Clermont-Ferrand		49·0	301	i 8 51	+ 1	e 15 59	+ 4	i 10 44	PP	24·3
Aberdeen		49·2	318	i 8 51	− 1	e 16 13	+15	i 10 45	PP	i 27·3
Durham		49·5	314	i 9 2	+ 8	i 20 9	SS	—	—	i 27·2
Kew		49·5	310	i 8 54a	0	e 16 3	+ 1	i 10 45	PP	e 25·8
Edinburgh		50·1	315	11 5	PP	16 13	+ 3	19 48	SS	—
Tortosa		52·4	296	9 17	+ 1	16 52	PS	11 17	PP	24·6
Alicante		54·1	294	9 32	+ 3	—	—	—	—	e 28·1
Scoresby Sund		54·5	337	9 31a	− 1	17 15	+ 5	12 42	PPP	—
Toledo	Z.	56·0	296	i 9 42a	− 1	17 18	−12	11 47	PP	—
Almeria		56·2	293	e 9 40	− 4	17 24	− 9	11 45	PP	28·3
Granada		56·9	294	10 13k	+24	17 47	+ 5	12 5	PP	—
Tamanrasset	Z.	57·1	275	e 9 50	0	—	—	e 11 52	PP	—
Malaga	Z.	57·6	294	e 10 9	+15	—	—	—	—	34·0
Lisbon		60·1	298	10 10	− 1	—	—	—	—	—
Ivigtut		68·4	333	i 11 2	− 4	—	—	—	—	35·8
College		72·0	17	i 11 24	− 4	—	—	i 11 29	P	—
Pretoria	Z.	75·8	219	i 11 48	− 2	—	—	—	—	—
Sitka		81·1	15	e 12 20	+ 2	e 22 27	− 1	e 15 30	PP	e 43·3
Grahamstown	Z.	82·9	217	i 11 57	−31	—	—	—	—	—
Ottawa	Z.	90·5	338	e 13 5k	0	—	—	—	—	47·8
Victoria		91·8	9	e 12 50	−21	—	—	—	—	55·8
Hungry Horse		92·7	3	i 13 13	− 2	—	—	—	—	—
Butte	N.	95·1	1	—	—	e 24 2	[0]	—	—	e 55·3
Philadelphia		95·3	334	—	—	e 24 3	[0]	e 26 7	PS	e 49·2

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Bozeman		95·5	1	—	—	e 24 7	[+ 3]	e 26 0	PS	e 53·0
Logan		99·4	2	e 13 42	− 4	e 24 21	[− 3]	e 17 7	PP	e 57·9
Shasta Dam		99·6	9	e 13 44	− 2	—	—	—	—	—
Mount Wilson	z.	106·5	7	e 18 41	PP	—	—	—	—	—
Pasadena	z.	106·6	7	e 18 45	PP	—	—	—	—	—
Palomar	z.	107·5	6	e 18 46	PP	—	—	—	—	—
Tucson		108·9	1	e 18 9	[−22]	—	—	e 18 50	PP	e 64·4
La Paz		137·6	290	19 25	[− 1]	—	—	22 16	PP	65·3

Additional readings :—
Calcutta iSSE =9m.38s.
Helwan iZ =12m.33s.
Budapest PPPE =9m.16s., eN =9m.53s., SE =14m.0s., eSSEN =16m.11s., eSSSE = 17m.18s.
Raciborzu eN =7m.35s., eE =8m.56s. and 9m.34s., eN =10m.46s. and 15m.16s.
Upsala PPPE =9m.27s., iN =15m.17s., SSN =16m.9s., iSSE =16m.16s.
Potsdam iEZ =9m.32s., eN =9m.36s. and 16m.19s., eE =16m.21s., iSSN =17m.4s.
Collmberg eZ =7m.54s., eSSN =17m.36s.
Copenhagen 9m.54s.
Triest iPPP =10m.20s.a, iSS =17m.29s.
Jena eE =8m.4s., eN =9m.34s. and 9m.40s.
Rome e =11m.37s., eSS =18m.3s., e =18m.47s.
Bologna iZ =8m.16s.a, and 8m.40s.
Salo e =11m.0s.
Stuttgart iZ =8m.18s., e =11m.54s., eSS =17m.58s.
Zürich eSS =18m.27s.
Strasbourg i =8m.26s., eSS =18m.17s.
Paris iP =8m.46s., e =22m.6s., e =23m.6s.
Clermont-Ferrand i =8m.56s. and 10m.50s., eP_cS =14m.2s., eSS =19m.32s., eSSS = 20m.59s.
Aberdeen eN =19m.18s., iSSE =19m.39s.
Kew eSS =19m.27s., iSSSEZ =19m.51s.
Tortosa PPPEN =12m.21s., S_cS?N =19m.4s., SS?N =20m.11s., SSSE =21m.59s.
Scoresby Sund 19m.18s.
Toledo eZ =13m.10s.
Almeria PPP =12m.58s., SSS =23m.12s.
Granada PPP =13m.14s.
Tamanrasset iZ =9m.57s.k.
Logan ePPS =25m.26s.
Long waves were also recorded at Harvard.

July 19d. Continuation of the list of aftershocks from the epicentre of the large earthquake on July 10d.

Obi-garm

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	8	23	1	32	54	7	27	53

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	8	37	1	33	7	7	28	7

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	8	40	5	35	27	7	28	13	11	13	44
1	33	10									

Tashkent.

h.	m.	s.	h.	m.	s.
1	8	47?	7	28	28

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
12	28	6	14	6	12	16	57	49	23	39	1
12	29	41	14	9	43	18	10	9	23	47	23
13	44	14	14	31	42	21	0	48	23	49	16
13	58	53	14	49	56						

Samarkand.

h.	m.	s.
1	9	4

Tchimkent.

h.	m.	s.	h.	m.	s.
1	9	5	1	33	34

Frunse.

h.	m.	s.
1	10	37

July 19d. Readings also at 0h. (Hungry Horse and Shasta Dam), 2h. (near College), 4h. (near Mizusawa), 5h. (La Paz, Auckland, Christchurch, and Wellington), 7h. (near Reno and Lick), 8h. (College, Hungry Horse (2), Shasta Dam (2), Mineral, Pasadena, Riverside, Palomar, and Tinemaha), 9h. (Tucson), 11h. (near Tamanrasset), 12h. (College), 15h. (Hungry Horse), 16h. (College and Ottawa (2)), 17h. (near Collmberg, Jena, and Stuttgart), 19h. (College), 20h. (Istanbul), 21h. (Tucson and Kew), 22h. (Istanbul and near Ottawa).

July 20d. 22h. 20m. 4s. Epicentre 10°·7S. 101°·5E.

$A = -\cdot1959$, $B = +\cdot9631$, $C = -\cdot1845$; $\delta = -2$; $h = +6$;
$D = +\cdot980$, $E = +\cdot199$; $G = +\cdot037$, $H = -\cdot181$, $K = -\cdot983$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		6·9	50	i 1 44a	− 1	i 2 56	− 9	—	—	—
Perth		25·0	150	i 5 36	+ 9	i 8 40	−69	—	—	—
Colombo	E.	27·7	308	5 56	+ 4	10 42	+ 9	—	—	14·4
Kodaikanal	E.	31·7	311	6 26	− 1	e 11 42	+ 5	—	—	15·1
Calcutta	E.	35·4	339	—	—	e 12 30	− 4	—	—	—
Hyderabad	N.	36·1	321	7 6	+ 1	12 46	+ 1	e 8 27	PP	—
Poona		39·8	317	i 7 39	+ 3	i 13 39	− 3	i 9 11	PP	—
Bombay		40·8	316	e 7 55	+10	i 14 0	+ 4	e 9 27	PP	20·0
Riverview		50·8	126	i 9 11k	+ 7	i 16 20	0	i 19 54	SS	e 24·0
Brisbane		51·1	117	e 9 5	− 1	—	—	—	—	e 26·4
Murgab		55·2	334	e 9 33	− 4	17 12	− 8	—	—	—
Obi-garm		57·4	331	e 9 55	+ 2	17 46	− 3	—	—	—
Stalinabad		57·7	330	i 9 57	+ 2	i 17 49	− 4	—	—	—
Andijan		57·8	334	9 53?	− 2	17 50?	− 4	—	—	—
Samarkand		59·5	329	—	—	e 18 9	− 7	—	—	—
Tashkent		59·7	332	i 10 7	− 2	—	—	—	—	—
Irkutsk		62·8	2	10 28	− 2	18 57	− 1	—	—	—
Baku		69·7	320	—	—	i 20 24	+ 2	—	—	—
Pretoria	Z.	70·5	247	i 11 16	− 2	—	—	—	—	—
Grahamstown	Z.	71·6	238	i 11 25	0	—	—	—	—	—
Tiflis		73·6	319	11 36	− 1	21 6	− 1	—	—	—
Grozny		73·9	321	e 11 38	− 1	e 21 4	− 6	—	—	—
Sverdlovsk		75·3	339	i 11 44	− 3	21 21	− 5	—	—	—
Ksara		76·4	308	e 11 54	+ 1	21 43	+ 5	—	—	—
Helwan		78·6	303	e 12 4	− 1	21 56	− 6	12 29	pP	—
Moscow		84·7	329	12 34	− 3	22 57	− 7	—	—	—
Triest		96·0	315	e 17 40	PP	i 24 4	[− 3]	—	—	—
Prague		96·2	320	e 15 26	?	—	—	—	—	—
Rome		96·3	311	17 34	PP	24 4	[− 4]	26 54?	PPS	—
Collmberg	Z.	97·3	321	e 13 34?	− 2	—	—	e 17 41?	PP	—
Potsdam		97·4	322	e 17 39	PP	—	—	—	—	—
Copenhagen		98·2	325	—	—	25 1	− 4	24 22	SKS	41·9
Stuttgart		99·5	318	e 17 55	PP	—	—	e 30 32	PKKP	—
Tamanrasset	Z.	99·6	292	17 51	PP	—	—	—	—	—
Strasbourg		100·4	318	e 18 6	PP	e 24 27	[− 2]	e 27 17	PS	49·9
De Bilt		102·2	321	e 17 56?	PP	e 24 32	[− 6]	e 27 26	PS	e 49·9
Clermont-Ferrand		103·4	314	e 18 42	PP	e 28 25	PPS	e 33 18	SSP	48·9
Paris		103·9	318	e 18 38?	PP	e 26 56?	PS	—	—	e 63·9
Tortosa		105·2	309	—	—	25 34	{+ 3}	27 51	PS	e 65·9
Kew		105·7	321	e 18 39	PP	e 24 51	[− 3]	e 37 37	SSS	e 55·9
College		108·4	25	e 18 21	[− 9]	—	—	e 17 55	?	—
Granada		108·4	306	19 14k	PP	26 26	S	21 46	PPP	59·2
Scoresby Sund		110·8	343	19 25	PP	29 44	PPS	34 44	SS	—
Victoria		126·9	36	e 19 4	[− 2]	—	—	—	—	—
Shasta Dam		131·2	44	e 19 13	[− 1]	—	—	i 21 26	PP	—
Hungry Horse		132·2	31	i 19 14	[− 2]	—	—	e 21 28	PP	—
Lick	Z.	133·1	47	e 19 18	[0]	—	—	i 19 23k	PKP_2	—
Reno	N.	132·5	45	e 19 26	[+ 7]	—	—	e 21 48	PP	—
Tinemaha	Z.	135·7	47	e 19 12	[−11]	—	—	i 21 56	PP	—
Pasadena	Z.	136·9	50	e 19 15	[−10]	—	—	i 19 27	PKP_2	—

Continued on next page.

		Δ	Az.	P	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside	z.	137·6	50	e 19 17	[− 9]	—	—	i 19 34	PKP_1	—
Palomar	z.	138·2	51	i 19 37	[+10]	—	—	i 19 48	PKP_1	—
Boulder City		138·6	46	e 19 22	[− 6]	—	—	—	—	—
Overton	z.	138·6	45	e 19 36	[+ 8]	—	—	—	—	—
Pierce Ferry		139·1	45	e 19 27	[− 2]	—	—	—	—	—
Seven Falls	E.	143·1	352	—	—	e 41 20	SS	—	—	60·9
Tucson		143·3	48	i 19 34	[− 2]	—	—	e 22 19	PP	—
Ottawa		145·4	356	i 19 39a	[− 1]	—	—	—	—	82·9
Lubbock		148·7	38	19 46	[+ 1]	—	—	—	—	—
Cleveland		149·2	4	i 19 49	[+ 3]	—	—	i 23 20	PP	—
Fordham		149·7	352	i 19 51	[+ 4]	—	—	—	—	—
St. Louis		150·3	18	e 19 47	[− 1]	e 36 33	PPS	i 19 52	PKP_1	—
Philadelphia		150·7	353	—	—	e 42 48	SS	—	—	e 75·5
La Paz		151·1	202	19 51	[+ 2]	42 44	SS	—	—	—
Georgetown		151·9	356	e 19 50	[0]	—	—	—	—	—

Additional readings :—
Poona ePPPE =9m.32s., eSSN =15m.58s., eSSSN =16m.58s.
Bombay SSN =17m.17s.
Helwan P_cPZ =12m.11s., PPZ =15m.14s., SPZ =22m.44s.
Rome SKKS =24m.44s., SS? =33m.9s.
Strasbourg e =24m.18s., ePKKS =32m.28s.
Clermont-Ferrand e =29m.7s.
Tortosa S?N =26m.9s., SSN =33m.24s., SSPEN =33m.40s.?
College e =18m.44s.
Granada ePP =19m.48s., S =28m.8s., SS =40m.44s.
Scoresby Sund 21m.45s.
Reno eE =21m.40s., iN =23m.1s., eE =23m.12s.
Tinemaha iZ =19m.20s.
Pasadena iZ =19m.37s.
Tucson i =19m.58s. ePPP =25m.29s.
St. Louis i =19m.59s.
Long waves were also recorded at Auckland, Arapuni, Wellington, Almeria, Malaga, and City College, N.Y.

July 20d. Continuation of list of after-shocks from the epicentre of the large earthquake on July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	3	56	12	0	36	16	53	18	19	56	53
8	56	31	16	46	36	19	29	46			

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	4	9	14	16	45	16	53	42	19	57	5
0	8	51	16	47	2	19	30	1			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	4	11	12	0	51	19	30	14	19	57	14
8	56	51									

Tashkent

h.	m.	s.
0	4	23?

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	4	18	1	48	41	19	30	9?	19	57	8?

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	4	32	19	30	26	19	57	30

Tchimkent.

h.	m.	s.
0	5	17

Frunse.

h.	m.	s.
0	5	45

July 20d. Readings also at 0h. (Triest), 2h. (College and Hungry Horse), 3h. (Wellington and Puebla), 4h. (College), 9h. (Tucson), 10h. (near College), 13h. (Vera Cruz, Puebla, and near Tacubaya), 14h. (near College), 15h. (Ksara), 19h. (Overton), 20h. (Rome and Brisbane), 21h. (Auckland, Wellington, Strasbourg, Stuttgart, and Collmberg).

July 21d. 8h. 1m. 32s. Epicentre 15°·6S. 73°·2W. Depth of focus 0·005.

Intensity IV-V at Arequipa ; IV between latitudes 18° and 19° South in Chili.

E. Silgado.
Datos Sismologico del Peru, 1949-1950, Instituto Sismologica del Peru, Lima, 1952, Bol. No. 4, p. 13.

F. Greve.
Boletin del año, 1949, Segundo semestre, Instituto Sismologico, Santiago, p. 5.

$A = +·2785$, $B = -·9225$, $C = -·2673$; $\delta = +2$; $h = +6$;
$D = -·957$, $E = -·289$; $G = -·077$, $H = +·256$, $K = -·964$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·1	329	i 1 5	+ 3	i 1 32	−17	i 1 14	pP	i 3·5
La Paz		5·0	101	i 1 20a	+ 6	i 2 13	+ 1	—	—	—
Copiapo	N.	12·0	168	2 51	+ 1	—	—	—	—	7·0
Santa Lucia	E.	17·9	173	e 4 1	− 5	7 44	+24	—	—	—
Bogota	Z.	20·1	358	i 4 32	+ 1	e 8 15	+ 7	i 4 38	pP	—
La Plata		23·6	147	5 9	+ 3	9 10	− 2	—	—	9·9
Fort de France		32·4	24	e 6 21	− 5	—	—	—	—	e 13·6
San Juan		34·5	13	e 6 40	− 4	i 11 56	−11	e 8 3	PP	e 20·6
Tacubaya		43·2	323	i 8 0a	+ 4	e 14 33	+15	i 8 42	PP	—
Georgetown		54·3	357	i 9 23	+ 1	e 16 47	− 6	i 9 49	pP	—
Philadelphia		55·3	359	i 9 28	− 1	e 17 1	− 5	i 10 8	pP	e 27·9
Cincinnati		55·5	350	i 9 28	− 3	i 18 3	+54	e 9 55	pP	—
Lubbock		56·0	332	9 33	− 1	—	—	e 10 1	pP	—
Pennsylvania		56·3	356	i 9 35	− 1	i 17 18	− 2	i 9 59	pP	i 23·7
St. Louis		56·3	345	i 9 34	− 2	i 17 14	− 6	i 10 3	pP	—
Cleveland		57·3	353	i 9 42	− 2	e 17 26	− 7	i 10 23	pP	—
Harvard		57·8	3	i 9 46	− 1	—	—	i 10 13	pP	e 31·5
Tucson		59·7	324	i 10 0	0	e 18 5	+ 1	i 10 27	pP	e 28·8
Ottawa		60·8	359	10 6k	− 2	18 15	− 3	e 10 35	pP	—
Shawinigan Falls	N.	61·9	2	e 10 14	− 1	—	—	—	—	—
Seven Falls	E.	62·5	3	e 10 18	− 1	e 19 22	+42	—	—	—
Palomar		64·1	320	i 10 30k	0	—	—	i 10 58	pP	—
Pierce Ferry		64·3	324	e 10 30	− 1	—	—	e 12 9	pP	—
Boulder City		64·7	324	i 10 33	0	—	—	e 11 13	pP	—
Overton	Z.	64·8	324	i 10 34	0	—	—	i 11 2	pP	—
Riverside		64·8	320	i 10 34k	0	—	—	i 11 4	pP	—
Pasadena		65·4	320	i 10 38k	0	e 19 58	+42	e 11 4	pP	—
Logan		67·3	330	e 10 47	− 3	e 19 37	− 2	i 11 10	pP	—
Tinemaha		67·4	323	i 10 51k	0	—	—	i 11 18	pP	—
Fresno		68·1	322	e 10 54	− 1	—	—	e 11 22	pP	—
Lick	Z.	69·6	321	i 11 5k	+ 1	—	—	i 11 45k	pP	—
Bozeman		69·9	334	e 11 7	+ 1	e 20 2	− 8	e 11 40	pP	—
Branner	Z.	70·0	321	i 11 7k	0	—	—	i 11 57	pP	—
Reno		70·0	324	e 11 9	+ 2	—	—	i 11 23	pP	—
Berkeley		70·4	321	i 11 7	− 2	i 20 17	+ 2	i 11 37k	pP	—
Mineral	Z.	71·5	323	i 11 16k	0	—	—	i 11 35a	pP	—
Shasta Dam		72·2	323	i 11 18	− 2	—	—	—	—	—
Hungry Horse		73·3	334	i 11 32	+ 6	—	—	e 12 3	pP	—
Saskatoon		73·4	340	e 11 31	+ 4	i 20 53	+ 3	i 21 37	PS	—
Victoria		77·9	329	i 11 52a	0	e 21 43	+ 4	i 12 21	pP	—
Malaga	Z.	83·1	49	i 12 13a	− 7	i 22 30	− 3	—	—	—
Granada		83·8	49	12 25	+ 1	22 22	−18	—	—	—
Almeria		84·5	50	12 49	pP	i 23 21	SP	16 3	PP	—
Toledo		84·7	47	i 12 29	+ 1	i 22 47	− 2	i 12 56	pP	—
Tamanrasset	Z.	85·9	65	e 12 34	0	—	—	e 13 4	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Alicante		86·6	49	12 39	+ 2	i 23 8	+ 1	15 40	PP	e 39·0
Tortosa	E.	88·2	47	e 12 45	0	i 23 8	[+ 2]	18 5	PPP	—
Clermont-Ferrand		91·8	43	e 13 32	pP	e 23 32	[+ 5]	—	—	—
Kew		91·8	37	e 13 11	+ 9	e 24 55	SP	e 13 29	pP	e 46·5
Paris		92·5	40	e 13 5	0	—	—	e 13 37	pP	—
Scoresby Sund		92·8	13	13 6k	− 1	24 4	0	13 36	pP	—
De Bilt		95·2	37	e 13 18	0	e 24 28	+ 4	e 13 48	pP	e 42·5
Strasbourg		95·7	41	e 13 19	− 1	e 24 0	[+11]	e 13 47	pP	—
Stuttgart		96·7	41	e 13 23	− 1	e 23 51	[− 3]	e 13 51	pP	—
Rome		97·1	49	e 21 59	?	e 23 48	[− 8]	—	—	—
Triest		98·9	44	e 17 34	PP	e 24 3	[− 2]	e 24 55	S	—
Collmberg	Z.	99·7	39	e 13 38	0	—	—	e 14 5?	pP	—
Prague		100·3	40	i 17 27	PP	—	—	—	—	—
Yalta		113·1	48	e 18 28	[− 2]	—	—	—	—	—
Ksara		114·2	59	e 19 25	PP	28 45	SP	19 55	pPP	—
Moscow		114·5	35	e 19 22	PP	e 29 0	SP	e 19 53	pPP	—
Sverdlovsk		126·2	29	18 56	[+ 1]	—	—	i 19 25	pPKP	—
Tashkent		138·7	44	i 19 22	[+ 3]	—	—	i 19 50	pPKP	—
Murgab		143·3	45	19 15	[−12]	—	—	—	—	—
Irkutsk		143·4	3	19 26	[− 1]	e 27 53	?	e 19 54	pPKP	—

Additional readings :—
La Paz iS_g =2m.52s.
Santa Lucia N =4m.10s., eE =5m.4s., N =7m.48s.
Bogota eSSZ =9m.16s.
La Plata EN =5m.18s., Z =5m.23s., N =9m.18s., SE =9m.26s., SN =9m.29s.
San Juan e =8m.8s., isS =12m.43s., e =15m.15s., i =17m.46s.
Georgetown i =10m.2s. and 16m.51s.
Philadelphia esS =17m.45s.
Cincinnati i =10m.7s.
Pennsylvania iN =10m.14s., eE =14m.19s., iEN =18m.6s., iE =19m.16s., 20m.3s., 21m.7s., and 22m.54s.
St. Louis i =10m.13s., iPP =11m.45s., eS =17m.10s., iPS =17m.49s., isS =18m.4s., i =20m.6s.
Cleveland ePS?E =18m.14s., esSE =19m.21s., isPSE =20m.12s.
Tucson e =10m.17s., isP =10m.38s., ePP =11m.52s., esS =19m.1s.
Ottawa i =19m.5s. and 20m.38s.
Palomar isPZ =11m.8s., iZ =11m.33s., iPP?Z =13m.23s., iPKP,PKPZ =39m.27s., eZ =39m.52s.
Pierce Ferry eP(PKP,PKP) =39m.23s.
Boulder City eP(PKP,PKP) =39m.23s.
Overton isPZ =11m.15s.
Riverside isPZ =11m.14s.
Pasadena eZ =10m.49s., isP =11m.16s., eZ =11m.28s., ePPZ =13m.1s., iZ =13m.33s., ePKP,PKPZ =39m.22s.
Logan ePP =13m.49s.
Tinemaha isPZ =11m.33s., ePKP,PKPZ =39m.14s.
Fresno eNZ =11m.54s., eE =12m.2s., eN =13m.53s., eE =13m.57s.
Lick iZ =11m.34s.
Bozeman esS =20m.42s.
Reno iE =11m.40s., iN =11m.51s., iE =11m.57s., eE =21m.2s. and 21m.12s.
Berkeley iPZ =11m.10s., isPN =11m.46s., isPZ =11m.49s., isSN =20m.32s.
Mineral iZ =11m.20s., 11m.45s., and 11m.54s.
Victoria e =22m.21s.
Toledo iZ =12m.43s. and 13m.7s., eZ =17m.34s., eE =23m.17s.
Tamanrasset iP_ePZ =12m.41s.k, iZ =12m.48s.k, eZ =13m.9s., esP?Z =13m.21s.
Alicante PPP =17m.42s., PS =23m.50s., SS =28m.45s.
Tortosa S_eSEN =23m.25s., PSN =24m.7s., PPS?E =24m.40s., SSN =29m.13s.
Clermont-Ferrand i =13m.41s.
Kew eZ =25m.41s.
Scoresby Sund 23m.34s. and 24m.56s.
De Bilt eSKS =23m.48s.
Strasbourg esP =13m.59s., e =17m.38s., ePS =25m.48s.
Stuttgart ePS =25m.56s., e =32m.46s.
Triest ePS? =26m.9s., eSS =31m.43s.
Irkutsk PP =22m.34s.
Long waves were also recorded at Sitka.

July 21d. 12h. 52m. 16s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030. (as on 18d.).

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Obi-garm		2·1	342	i 0 42	0	1 13	− 1
Stalinabad		2·3	323	i 0 43	− 1	i 1 16	− 1
Murgab		3·2	59	i 0 47	− 7	1 29	− 6
Samarkand		4·1	319	e 1 3	− 1	1 50	− 4
Andijan		4·3	20	i 1 10	+ 3	2 2	+ 3
Tashkent		4·7	349	i 1 14	+ 2	i 2 8	0
Tchimkent		5·6	354	i 1 25	+ 2	i 2 28	0
Frunse		6·9	26	e 1 42	+ 2	e 3 2	+ 4
New Delhi	E.	9·8	143	e 2 14	− 3	i 3 55	−10
Grozny		20·0	297	e 4 17	0	—	—
Tiflis		20·5	293	e 4 24	+ 2	—	—
Sverdlovsk		21·2	345	e 4 33	+ 4	8 24	+18
College		74·4	17	e 11 17	+ 2	—	—

July 21d. 15h. 10m. 59s. Epicentre 40°·1S. 173°·8E. Depth of focus 0·010.

Given by the New Zealand Stations.

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

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
New Plymouth	E.	1·0	11	i 0 23	+ 3	i 0 41	+ 5
Cobb River	E.	1·3	219	i 0 26	+ 2	i 0 47	+ 5
Wellington		1·4	148	i 0 28	+ 3	i 0 49	+ 5
Tuai	N.	2·9	63	0 43	− 2	1 15	− 4
Kaimata		3·0	217	e 0 45	− 2	i 1 20	− 2
Christchurch		3·5	194	0 52	− 2	1 31	− 3

July 21d. 21h. 26m. 0s. Epicentre 26°·3N. 58°·7E.

A = +·4664, B = +·7670, C = +·4407 ; δ = +3 ; h = +3 ;
D = +·854, E = −·520 ; G = +·229, H = +·377, K = −·898.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stalinabad		14·9	32	i 3 35	+ 1	6 34	+14	—	—	—
Obi-garm		15·5	34	e 3 38	− 4	e 6 35	0	—	—	—
Tashkent		17·4	27	i 4 0	− 6	e 7 15	− 4	—	—	—
Murgab		17·6	43	4 15	+ 7	7 36	+13	—	—	—
Andijan		18·3	34	e 4 18	+ 1	7 37	− 2	—	—	—
Tchimkent		18·3	26	e 4 15	− 2	—	—	—	—	—
Grozny		20·0	331	i 4 30?	− 7	i 7 46?	−31	—	-	-
Frunse		21·0	33	e 4 50	+ 3	—	—	—	—	—
Ksara		21·1	295	i 4 50	+ 2	i 8 36	− 3	—	—	—
Helwan	z.	24·4	284	e 5 33	+12	i 9 44	+ 5	6 10	PPP	—
Istanbul		28·5	308	—	—	e 11 9	+23	—	—	—
Sverdlovsk		30·5	2	—	—	e 11 1?	−17	—	—	—
Moscow		33·2	338	e 6 34?	− 6	—	—	—	—	—
Rome		40·8	304	e 14 24	PPS	—	—	—	—	e 22·0?
Collmberg	z.	42·6	318	e 7 59	0	—	—	—	—	—
Potsdam	z.	42·9	320	—	—	e 17 24	SS	—	—	—
Copenhagen		44·4	324	—	—	14 30	−19	17 50	SS	—
Strasbourg		45·2	314	—	—	e 18 12	SS	20 0	SSS	e 23·0
De Bilt		47·5	318	—	—	e 19 0?	SS	—	—	e 29·0
Tamanrasset	z.	48·2	278	e 8 53	+ 9	—	—	e 10 47	PP	—
Paris		48·6	313	e 8 49	+ 2	—	—	e 9 11	pP	e 24·0
Pretoria	z.	59·5	212	i 10 7	0	—	—	—	—	—

Additional reading :—
Paris e = 8m.56s.
Long waves were also recorded at Bombay and Clermont-Ferrand.

July 21d. Continuation of list of local shocks from epicentre of July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	18	55	11	9	33	20	20	18	22	3	32
8	3	7									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	19	7	8	3	20	20	20	30	22	3	45
7	33	27	11	9	43	21	13	23			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	19	19	8	3	30	20	20	29	22	3	50
7	43	37	11	9	47						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	19	20?	8	4	21?	11	9	57?	22	4	40?

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	19	34	11	9	51	18	15	12	21	13	28
7	19	22?	16	31	54	20	20	45	22	3	52
8	3	22									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	19	28	11	10	8?	20	21	40	22	4	9
8	3	45									

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
7	19	34	11	9	57	20	20	52

Frunse.

h.	m.	s.
11	11	18

July 21d. Readings also at 0h. (near Irkutsk), 8h. (Tucson), 9h. (near Irkutsk and near Tacubaya), 10h. (Tacubaya), 11h. (Alicante, near Rekjavik and near Ashkabad), 14h. (near Ashkabad (2)), 17h. (Palomar (2), Pasadena (2), Riverside (2), Tinemaha (2), Tucson, Pierce Ferry, Shasta Dam, Lick, Hungry Horse, Ottawa, Clermont-Ferrand, and Tamanrasset), 18h. (Ksara and Istanbul), 20h. (Basle, Collmberg, and near Lick), 21h. (Granada, Stuttgart, and near Ashkabad (3)), 22h. (Logan).

July 22d. 12h. 21m. 18s. Epicentre 46°·2N. 7°·9E. (as on July 17d.).

Intensity V-VI in the Matter Valley ; V in Saas Valley ; IV-V in Rhone Valley ; IV in Bernese Oberland ; III in the Cantons of Zug, Zürich, and St. Gallen.
Epicentre as adopted. Macroseismic radius 100km.

E. Wanner.
Jähresbericht des Erdhebendienstes der Schweiz in Jähre, 1949. Zürich, 1950, p.2, with macroseismic chart.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Neuchatel	1·0	321	i 0 20	− 1	i 0 37	+ 1	—	—
Chur	1·3	60	e 0 25k	0	e 0 43	− 1	—	—
Zürich	1·3	22	i 0 24s	− 1	e 0 44	0	e 0 26	P_g
Pavia	1·3	139	e 0 32	+ 7	i 0 48	+ 4	—	—
Basle	1·4	351	e 0 26s	− 1	e 0 46	0	—	—
Salo	1·9	108	0 38	+ 4	1 3	+ 4	0 43	P_g
Ravensburg	2·0	36	e 0 36?	+ 1	e 1 0	− 2	i 0 38k	P_g
Strasbourg	2·4	358	e 0 41	0	i 1 10	− 2	i 0 48	P_g
Stuttgart	2·7	19	e 0 43?	− 2	i 1 17	− 2	i 0 51k	P_g
Clermont-Ferrand	3·4	264	e 1 4	P*	i 1 34	− 3	i 1 8	P_g
Triest	4·1	96	—	—	e 1 58	+ 3	e 2 21	S_g
Paris	4·5	308	e 1 9	− 2	e 2 4	− 1	e 1 32	P_g
Jena	5·3	26	e 1 36	P*	i 2 50	S_g	i 1 47	P_g
Rome	5·4	141	—	—	e 3 32	S_g	e 4 59	?
Prague	5·8	46	i 1 51	P_g	e 3 5	S_g	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Collmberg		6·1	32	e 1 34	0	e 3 20	S_g	e 1 48	P*
Potsdam	Z.	7·0	27	—	—	e 3 45	S_g	—	—
Tortosa	N.	7·6	228	—	—	i 4 22	S_g	—	—
Raciborzu		7·9	57	—	—	e 3 37	+ 7	e 4 20	S_g
Skalnate Pleso		8·9	66	e 1 53	−19	—	—	e 2 23	P*

Additional readings :—
Zürich e = 41s.
Salo iS_g = 1m.6s.
Ravensburg i = 1m.5s., iS_g = 1m.12s., i = 1m.20s.
Strasbourg i = 56s., iS = 1m.6s. and 1m.18s., iS_g = 1m.21s.
Stuttgart i = 54s., iS* ? = 1m.26s., iS_g = 1m.30s. and 1m.33s.
Paris i = 1m.12s., iP = 1m.17s., e = 1m.43s., i = 1m.50s., eS = 2m.15s., eS_g = 2m.28s.
Jena ePN = 1m.39s.
Collmberg eE = 1m.54s., eZ = 1m.57s., and 3m.2s., eS_g?Z = 3m.12s.
Potsdam eEN = 3m.48s.
Tortosa iEN = 4m.36s.
Raciborzu eE = 4m.47s., eN = 5m.31s.

July 22d. Continuation of list of aftershocks from the epicentre of the large Earthquake of July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	38	14	15	56	50	20	6	56	21	6	28
15	6	59	17	18	29	20	44	9	21	34	25
15	17	22	17	47	2						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	52	3	15	7	14	16	50	46	20	44	23
5	38	23	15	57	3	17	47	15	21	34	35
12	37	42									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	51	38	7	28	46	15	17	43	20	44	30
5	38	20?	15	7	23	20	7	17	21	6	50

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	39	29?	15	17	50	17	19	38?	21	35	26?
15	7	30									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	32	52	15	7	31?	17	47	24	20	7	27
5	38	4	15	57	22	18	1	23	21	7	0
7	28	30	16	51	2	18	56	42	21	34	48
10	18	12	17	19	0	19	31	22			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
15	7	36	15	57	28	21	7	6	21	35	2
15	18	0									

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
5	38	47?	15	7	43	15	18	2

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
15	8	5	15	19	21	17	20	34

July 22d. Readings also at 3h. (Tucson), 4h. (Overton and Basle), 9h. (Messina, Hungry Horse and near Overton), 12b. and 13h. (Strasbourg), 14h. (San Juan and near Reno), 15h. (Ashkabad, Sverdlovsk, and near Istanbul), 17h. (Ottawa, near Basle, Zürich, and Stuttgart), 21h. (Shasta Dam, Hungry Horse, College, and near Mizusawa), 22h. (College).

July 23d. 5h. 30m. 58s. Epicentre 1°·1N. 126°·4E. Depth of focus 0·005.
(as on 1948, Jan. 28d.).

$A = -\cdot5933$, $B = +\cdot8047$, $C = +\cdot0190$; $\delta = -9$; $h = +7$;
$D = +\cdot805$, $E = +\cdot593$; $G = -\cdot011$, $H = +\cdot015$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	z.	38·3	140	i 7 17	+ 1	—	—	i 8 52	PP	—
Murgab		60·6	314	10 5	− 1	—	—	—	—	—
Andijan		62·7	315	e 10 20	0	e 18 42	0	—	—	—
Obi-garm		63·8	313	10 25	− 3	—	—	—	—	—
Stalinabad		64·4	313	10 31	− 1	e 18 57	− 6	—	—	—
Tashkent		65·1	315	i 10 36	0	e 19 10?	− 2	—	—	—
Samarkand		66·1	313	e 10 43	+ 1	—	—	—	—	—
Tiflis		83·0	312	e 12 22?	+ 2	—	—	—	—	—
College		87·2	25	e 12 40	0	—	—	—	—	—
Moscow		88·4	326	12 47	+ 1	23 28	+ 4	e 13 17	pP	—
Ksara		89·8	303	e 12 56	+ 3	e 23 21?	[+ 5]	—	—	—
Shasta Dam		105·2	47	e 17 30	PKP	—	—	—	—	—
Stuttgart		106·7	322	e 20 37	PPP	—	—	—	—	—
Rome		106·9	315	—	—	e 24 50	[+ 7]	—	—	—
Strasbourg		107·7	323	e 39 52	P′P′	—	—	—	—	—
Hungry Horse		108·4	37	e 17 47	PKP	—	—	—	—	—
Kew		111·0	328	e 29 17	PKKP	—	—	—	—	e 55·0
Tamanrasset	z.	117·8	297	e 39 2	P′P′	—	—	—	—	—

Additional readings :—
College e = 10m.0s.
Strasbourg e = 39m.55s.
Long waves were also recorded at Clermont-Ferrand, De Bilt and Bermuda.

July 23d. 10h. 26m. 48s. Epicentre 19°·0S. 169°·2E. Depth of focus 0·020.
(as on 1946, July 9d.).

$A = -\cdot9294$, $B = +\cdot1773$, $C = -\cdot3236$; $\delta = -6$; $h = +5$;
$D = +\cdot187$, $E = +\cdot982$; $G = +\cdot318$, $H = -\cdot061$, $K = -\cdot946$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		17·1	237	i 3 50	− 1	i 7 5	+11	—	—	—
Auckland	N.	18·5	166	i 4 7	+ 1	i 7 38	+14	i 8 40	sS	—
Apia		19·0	79	e 4 9	− 3	e 7 42	+ 8	e 4 42	pP	—
Arapuni	E.	19·8	165	e 5 12?	PPP	i 8 0	+11	i 15 42	ScS	—
New Plymouth	E.	20·4	168	e 4 32	+ 6	i 8 12	+12	i 5 7	pP	—
Tuai	N.	20·9	164	4 32	+ 1	i 8 17	+ 8	i 15 32	ScS	—
Riverview		21·8	223	i 4 42k	+ 2	i 8 31	+ 5	i 5 16	pP	—
Cobb River	E.	22·2	173	e 4 46	+ 2	e 8 39	+ 7	—	—	—
Wellington		22·7	169	i 4 48	0	i 8 42	+ 1	i 5 20	pP	i 10·1
Kaimata	N.E.	23·5	176	e 4 59	+ 3	8 59	+ 4	e 5 43	PP	—
Christchurch		24·6	174	i 5 8	+ 1	i 9 13	0	i 5 30	pP	—
Melbourne	E.	28·3	224	i 5 42	+ 1	i 10 16	+ 2	i 9 43	?	—
Perth		49·4	244	7 17	?	15 37	+ 9	—	—	—
Honolulu		51·4	40	i 8 50	0	e 15 42	−14	—	—	e 20·8
Yokohama		61·0	333	10 0	+ 1	18 7	+ 5	—	—	—
Tokyo		61·1	333	9 59	0	18 6	+ 2	—	—	—
Hunatu		61·4	332	9 59	− 2	18 6	− 2	—	—	—
Owase		61·4	329	9 45	−16	16 54	−74	19 25	ScS	—
Kakioka		61·4	335	10 0	− 1	18 7	− 1	—	—	—
Kameyama		61·9	330	10 4	− 1	18 16	+ 2	—	—	—
Batavia		61·9	274	i 10 2k	− 3	i 18 11	− 3	—	—	—
Maebasi		62·0	334	i 10 5	0	18 15	0	—	—	—
Nagoya		62·0	331	10 7	+ 2	18 14	− 1	—	—	—
Miyazaki		62·2	324	e 9 37	−30	—	—	—	—	—
Osaka		62·2	329	e 9 57	−10	—	—	12 18	PP	21·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sumoto		62·3	329	10 8	+ 1	18 17	− 2	19 46	S_cS	20·4
Nagano		62·6	332	10 7	− 2	18 22	− 1	—	—	—
Sendai		62·9	336	10 10	− 1	18 26	0	—	—	—
Kumamoto		63·3	325	10 12	− 2	18 30	− 1	—	—	—
Mizusawa		63·5	336	10 13	− 2	18 35	+ 1	e 10 19	P	—
Miyako		63·6	337	i 10 16	0	18 32	− 3	—	—	—
Morioka		64·0	336	i 10 16	− 3	18 39	− 1	—	—	—
Hukuoka		64·1	325	e 10 16	− 3	18 30	−11	—	—	—
Hamada		64·2	327	10 19	− 1	18 42	− 1	—	—	—
Akita		64·4	336	i 10 22	+ 1	i 18 47	+ 2	—	—	—
Sapporo		66·9	339	10 38	+ 1	—	—	—	—	—
Klyuchi		75·4	356	11 26	− 2	20 56	+ 3	—	—	—
Branner		85·5	48	i 12 21 a	0	—	—	i 15 40	PP	—
San Francisco		85·5	48	e 12 21	0	—	—	—	—	—
Ukiah		85·6	46	e 12 23	+ 2	e 23 42	PS	e 12 56	pP	e 35·4
Berkeley		85·6	48	e 12 20 a	− 1	i 22 28	[0]	i 13 12	pP	—
Santa Clara		85·6	48	i 12 22	+ 1	e 22 29	[+ 1]	e 24 20	PPS	e 41·2
Ferndale		85·6	45	i 12 24	+ 3	e 23 56	PS	e 24 0	PS	—
Lick		85·8	48	i 12 23 a	+ 1	e 22 30	[+ 1]	i 13 11	pP	—
Pasadena		86·9	53	i 12 28 a	0	i 22 36	[0]	i 13 3	pP	—
Fresno	Z.	86·9	49	i 12 28	0	—	—	e 15 53	PP	—
Mineral	Z.	87·3	46	i 12 28 a	− 2	i 30 19	SSP	i 15 56	PP	—
Riverside		87·5	53	i 12 29 a	− 2	i 22 31	[− 9]	i 13 3	pP	—
Palomar		87·6	54	i 12 31 a	0	i 22 42	[+ 1]	i 15 57	PP	—
Reno		88·1	48	e 12 34	0	e 22 30	[−14]	i 13 13	pP	—
Tinemaha		88·1	50	i 12 23 a	−11	e 22 14	[−30]	i 13 14	pP	—
Calcutta	E.	89·1	294	12 56	+18	22 50	[− 1]	24 12	SP	40·0
Sitka		89·1	27	i 12 36	− 2	e 22 48	[− 3]	i 16 6	PP	e 36·6
College		89·8	17	e 12 38	− 4	e 22 48	[− 7]	i 13 30	pP	—
Victoria		90·0	39	12 43 a	+ 1	22 59	[+ 3]	i 13 21	pP	37·7
Seattle		90·2	40	i 12 44 a	+ 1	i 22 58	[+ 1]	i 13 25	pP	e 33·2
Irkutsk		90·5	326	12 43	− 2	23 22	− 2	i 22 57	SKS	—
Overton	Z.	90·7	52	i 12 46	0	—	—	—	—	—
Pierce Ferry		90·9	52	i 12 46	− 1	—	—	—	—	—
Colombo	E.	91·6	277	12 56	+ 6	23 2	[− 3]	—	—	26·6
Tucson		91·8	57	i 12 52	+ 1	e 23 7	[0]	i 13 39	pP	e 38·0
Logan		94·6	47	i 12 59	− 5	i 24 1	+ 2	i 16 47	PP	e 38·6
Kodaikanal	E.	94·9	280	e 13 22	+17	23 21	[− 3]	25 34	SP	—
Butte	N.	95·6	43	e 13 9	+ 1	e 23 26	[− 2]	e 25 36	SP	e 39·8
Hyderabad	N.	96·2	287	—	—	24 30	+17	25 52	PS	43·7
Bozeman		96·5	44	e 13 12	0	i 23 30	[− 2]	e 17 6	PP	e 42·1
Tacubaya		97·6	72	e 14 57?	?	—	—	—	—	—
Lubbock		99·4	57	e 13 24	− 1	23 41	[− 6]	17 20	PP	—
New Delhi	N.	100·6	297	e 17 53	PP	i 24 50	0	e 19 55	PPP	—
Poona		100·7	286	e 13 49	+18	23 45	[− 9]	e 27 29	PPS	45·5
Saskatoon		101·3	39	13 37	+ 3	23 55	[− 1]	17 47	PP	39·6
Rapid City	E.	101·3	47	i 13 34	0	i 23 54	[− 2]	i 17 44	PP	e 48·4
Bombay	E.	101·8	286	e 13 51	+15	i 25 25	+25	—	—	—
Lincoln	E.	105·2	51	e 13 52	P	e 27 32	PS	e 18 17	PP	—
Murgab		105·6	306	e 13 47	P	i 24 12	[− 4]	e 14 34	pP	—
Frunse		106·0	310	—	—	i 24 17	[− 1]	—	—	—
Andijau		107·2	307	e 18 30	PP	i 24 24	[+ 1]	—	—	—
Obi-garm		108·9	306	—	—	i 24 29	[− 1]	27 52	PS	—
Huancayo		109·3	111	e 14 30	P	e 24 24	[− 8]	e 18 42	PP	e 45·8
Stalinabad		109·6	306	e 14 9	P	e 24 32	[− 1]	e 28 4	PS	—
Tashkent		109·6	309	i 17 49	[−22]	i 24 35	[+ 2]	e 18 32	PP	—
St. Louis		109·7	55	i 14 12	P	e 24 10	[−24]	i 18 45	PP	—
Tananarive		111·4	240	20 31	sPP	28 6	. SP	29 23	PPS	53·2
Chicago		112·1	52	e 19 2	PP	e 24 40	[− 3]	e 29 31	PPS	e 52·4
La Paz		113·5	119	i 14 29 a	P	i 26 40	SKKS	i 19 14	PP	52·2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Cincinnati		114·2	54	i 14 26	P	i 28 58	PS	i 19 16	PP	—
Columbia		116·5	60	—	—	e 28 35	sS	—	—	e 50·5
Cleveland		116·6	52	e 18 24	[− 1]	i 24 56	[− 5]	e 19 32	PP	—
Bogota	z.	116·8	94	—	—	i 33 25	?	e 34 38	SSP	—
Grahamstown	z.	116·9	215	i 18 26	[0]	i 28 51	PS	—	—	—
Pennsylvania		119·4	53	e 18 28	[− 3]	i 25 8	[− 3]	i 19 53	PP	—
Georgetown		120·0	55	e 14 57	P	—	—	i 18 31	PKP	—
Ottawa		120·8	48	18 31 a	[− 2]	25 8	[− 6]	e 20 0	PP	53·2
Philadelphia		121·4	55	e 18 34	[0]	i 25 16	[0]	i 20 9	PP	e 59·4
Pretoria	z.	121·6	223	i 18 34	[0]	i 28 36	?	i 19 25	pPKP	—
City College, N.Y.		122·4	53	e 18 39	[+ 3]	e 25 17	[− 3]	e 20 10	PP	—
Fordham		122·4	53	i 18 36	[0]	e 25 18	[− 2]	i 20 13	PP	—
Shawinigan Falls	N.	122·8	46	e 18 37	[0]	—	—	—	—	—
Seven Falls	E.	124·0	46	18 36	[− 3]	30 17	PS	e 20 21	PP	46·2
Harvard		124·0	51	i 18 39	[0]	e 38 18	SSP	i 20 24	PP	e 50·7
Baku		124·2	307	e 18 13	[−26]	—	—	—	—	—
San Juan		127·8	81	e 18 46	[− 1]	e 26 10	[+34]	e 20 48	PP	e 48·6
Tiflis		127·9	309	18 50	[+ 3]	—	—	i 21 48	pPP	—
Scoresby Sund		128·1	5	i 18 46 a	[− 1]	25 38	[+ 1]	i 20 51 a	PP	—
Erevan		128·4	307	18 55	[+ 7]	—	—	—	—	—
Moscow		128·5	328	e 18 46	[− 2]	i 22 5	PKS	e 20 47	PP	—
Piatigorsk		128·8	312	18 48	[0]	—	—	22 17	PKS	—
Leninakan		128·8	308	18 50	[+ 2]	—	—	—	—	—
Bermuda		130·1	64	e 21 12	PP	e 33 8	sPS	e 39 33	sSS	e 58·3
Ivigtut		130·3	23	i 18 48	[− 3]	i 22 14	PKS	e 21 4	PP	—
Sotchi		131·3	312	e 18 52	[− 1]	—	—	i 22 19	PKS	—
Helsinki		131·6	338	i 18 55	[+ 1]	—	—	e 19 43	pPKP	e 53·2
Theodosia		133·8	315	i 18 58	[0]	i 22 30	PKS	—	—	—
Upsala		134·4	341	i 18 58	[− 1]	e 26 2	[+10]	e 21 30	PP	e 56·2
Yalta		134·8	314	i 19 8?	[+ 8]	i 22 36?	PKS	—	—	—
Ksara		136·0	299	i 19 2	[0]	—	—	i 19 51	pPKP	—
Bergen		137·1	349	15 5	P	—	—	21 47	PP	—
Copenhagen		139·4	341	i 19 2	[− 6]	23 35	pPKS	32 18	PS	—
Istanbul		139·5	312	e 18 59	[−10]	—	—	i 22 3	PP	—
Bucharest		140·2	318	e 19 6	[− 4]	i 22 49	PKS	—	—	—
Helwan	z.	140·3	294	i 19 3	[− 7]	22 48	PKS	19 57	pPKP	—
Skalnate Pleso		140·9	327	e 19 9	[− 2]	i 22 51	PKS	—	—	—
Raciborzu		141·3	330	e 19 5	[− 7]	e 23 0	PKS	—	—	—
Aberdeen		141·3	352	i 19 11	[− 1]	i 22 50	PKS	i 32 32	PS	40·6
Potsdam		141·8	337	e 19 10	[− 3]	i 22 52	PKS	i 22 25	PP	—
Budapest		142·6	327	19 11	[− 3]	26 22	[+ 16]	22 52	PKS	e 68·2
Collmberg		142·7	335	i 19 8	[− 6]	e 40 48	SS	e 20 6	pPKP	—
Ogyalla		142·8	327	e 19 14	[0]	—	—	e 22 28	PP	—
Prague		143·0	334	19 10	[− 5]	—	—	21 20	PP	—
Kalocsa		143·2	326	e 19 14	[− 1]	—	—	—	—	—
Belgrade		143·4	322	i 19 13 a	[− 2]	i 22 55	PKS	e 40 55	SS	72·0
Jena		143·5	335	e 19 14	[− 2]	e 22 54	PKS	e 20 53	?	—
Durham		143·6	351	i 12 32	?	i 22 52	PKS	i 19 12	PKP	—
Cheb		143·9	336	i 19 14	[− 2]	—	—	22 5	PP	—
De Bilt		144·7	343	i 22 39	PP	e 41 18	SS	i 25 46	PPP	e 61·2
Stuttgart		146·2	336	i 19 20 a	[0]	e 41 12	SS	i 20 2	pPKP	e 61·2
Triest		146·5	328	i 19 21	[0]	i 33 4	PS	i 19 47	pPKP	—
Kew		146·6	348	i 19 20 a	[− 1]	e 26 13	[+ 2]	i 22 47	PP	e 40·2
Strasbourg		146·9	337	i 19 21 a	[0]	i 26 17	[+ 5]	i 20 8	pPKP	e66·2
Chur		147·6	334	e 19 23	[+ 1]	—	—	i 19 26	PKP	—
Zürich		147·6	335	e 19 21 a	[− 1]	—	—	e 20 20	pPKP	—
Basle		147·8	336	i 19 26	[+ 4]	—	—	e 20 13	pPKP	—
Salo		148·1	331	e 19 25 k	[+ 2]	—	—	20 12	pPKP	—
Paris		148·4	343	i 19 24	[0]	e 26 14	[0]	i 20 13	pPKP	—
Neuchatel		148·5	336	e 19 23	[− 1]	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Bologna		148·6	329	i 19 25a	[+ 1]	e 42 33	SS	e 23 29	PP		—
Prato		149·1	328	i 19 25	[0]	—	—	i 23 52	PP		—
Pavia		149·1	332	e 19 24	[− 1]	—	—	i 19 29	PKP		—
Jersey	E.	149·1	348	e 19 28	[+ 3]	—	—	e 21 17	—		—
Florence, Arc.		149·1	328	19 34a	[+ 9]	—	—	i 23 4	PP		—
Florence, Xim.		149·1	328	e 19 23	[− 2]	i 42 32	SS	—	—		—
Rome		149·8	325	i 19 25a	[− 1]	e 42 13	SS	i 19 33	PKP_2		—
Messina		150·1	316	e 19 25a	[− 1]	—	—	i 21 14	sPKP		—
Catania		150·8	315	i 19 27	[0]	—	—	i 20 23	pPKP		—
Clermont-Ferrand		150·9	340	i 19 29	[+ 2]	—	—	i 23 14	PP		—
Tunis		154·5	318	e 19 38	[+ 5]	—	—	e 23 38	PP		—
Barcelona		155·1	337	e 19 38	[+ 5]	—	—	e 23 36	PP		—
Tortosa		156·2	338	i 19 36	[+ 1]	31 24	SKKS	i 23 42	PP	e	48·2
Toledo	z.	158·4	346	i 19 37	[− 1]	—	—	23 54	PP		—
Algiers Univ.	z.	158·5	328	i 19 42a	[+ 4]	—	—	e 20 18	pPKP		—
Alicante		158·7	338	19 42	[+ 4]	27 16	[+50]	24 16	PP	e	75·4
Lisbon		160·3	356	i 19 38a	[− 2]	—	—	—	—		—
Granada		160·8	343	i 19 41	[+ 1]	26 32	[+ 4]	20 26	PKP_2		—
Almeria		160·8	339	i 19 41	[+ 1]	44 11	SS	i 20 25	pPKP		76·5
Malaga		161·5	344	i 19 40	[− 1]	—	—	i 20 28	pPKP		—
Tamanrasset	z.	164·3	287	i 19 45k	[+ 1]	—	—	i 20 32	pPKP		74·2

Additional readings :—
Auckland isP =5m.2s., iS_cS =15m.36s.
Apia i =4m.13s., e =8m.30s.
Riverview iN =5m.8s., iE =5m.23s. and 5m.47s., iN =6m.15s., iE =8m.39s., iN = 8m.43s., isSN =9m.25s., iE =9m.33s., iS_cSE =15m.41s.
Wellington i =5m.23s., 6m.16s., and 9m.50s., iP_cS =11m.40s., iS_cS =15m.38s.
Kaimata eS_cSNE =15m.43s.
Christchurch iPP =5m.43s., iNZ =6m.3s., eN =7m.27s., eZ =7m.56s., P_cPZ =8m.44s., iEN =9m.42s.
Perth S =12m.18s., SSS =16m.42s.
Honolulu i =9m.0s. and 10m.6s., ePPP? =11m.22s., eSS =17m.14s.
Owase P_cP =10m.28s.
Branner ePPN =15m.44s.
Ukiah ePP? =22m.30s.
Berkeley iPPZ =15m.42s.
Santa Clara eSSSSE =35m.54s.
Lick iP_cPZ =12m.55s.a, iZ =14m.16s.a, iPPZ =15m.44s., eZ =18m.3s.
Pasadena eZ =13m.22s., iPP =15m.51s., eZ =16m.28s., eS =22m.54s., eEN =23m.48s., eQN =35·1m., iPKP,PKPZ =38m.30s., eZ =39m.2s., iZ =39m.19s., iSKP,PKPZ = 41m.32s., ePKP,PKP,PKPZ =58m.55s.
Mineral iN =12m.33s., iE =12m.40s., iZ =13m.46s., 30m.30s., 38m.26s., 38m.29s., and 38m.33s.
Riverside iZ =13m.17s., iPPZ =15m.56s., eZ =23m.18s., eSKP,PKPZ =41m.51s., ePKP,PKP,PKPZ =59m.4s.
Palomar iS?E =23m.5s., iPKP,PKP =38m.30s., eSKP,PKPZ =41m.23s., iPKP,PKP, PKPZ =59m.6s.
Reno iEN =12m.46s., ipPE =13m.20s., iE =14m.15s and 19m.18s., eN =23m.14s. and 24m.14s., eE =24m.26s.
Tinemaha iPPZ =16m.1s., iPKP,PKPZ =38m.26s., ePKP,PKP,PKPZ =59m.8s.
Calcutta iSE =23m.37s., PPSE =24m.27s., SSE =28m.40s., QE =36m.42s.
Sitka ePPP? =17m.59s., epS =24m.12s., eSS? =27m.57s., e =28m.22s.
College e =15m.10s., iPP =16m.9s.
Victoria pP =14m.5s., PP =16m.17s., eN =23m.19s., PS =24m.46s., PPS =25m.42s., SS =29m.42s.
Seattle i =13m.12s., esP =13m.42s., i =14m.8s., iPP =16m.44s., e =17m.18s., ePPP = 18m.8s., isS =23m.52s., iPS =24m.36s., iPPS =24m.48s., i =25m.52s., eSS = 29m.52s.
Tucson i =16m.19s., iPP =16m.31s. e =23m.51s., ePKP.PKP =38m.14s.
Logan e =20m.41s. and 22m.58s., iSKS =23m.19s., ePS =25m.28s., esPS =25m.43s., esSS =31m.50s., ePKP,PKP =38m.12s.
Kodaikanal iSE =24m.31s., SSE =30m.30s.
Butte ePPN =16m.34s., eN =18m.31s., eSSN =30m.44s.
Hyderabad eN =25m.10s., SS?N =30m.51s., SSSN =36m.59s.
Bozeman eS? =24m.21s., e =24m.56s.
New Delhi iN =23m.48s. and 27m.43s.
Saskatoon S =25m.3s., PS =26m.22s., PPS =26m.48s., SS =32m.7s., SSS =35m.42s.
Rapid City iE =15m.58s., iS?E =24m.31s., eE =25m.22s.
Poona iSEN =25m.19s., eSN =26m.12s., SSN =31m.42s., SSSN =35m.37s., QN = 41m.32s.
Lincoln eE =23m.16s. and 33m.27s.
Murgab ePP =18m.13s., S =25m.23s., eSP =27m.11s.

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Huancayo iPP =18m.47s., eS =26m.21s., eSP =27m.44s., e =30m.18s., iSS =33m.59s. isSS =35m.12s.
Tashkent ipPP =19m.20s., iS =25m.31s., iPS =28m.4s.
St. Louis iSKP =20m.49s., e =26m.2s., iPS? =28m.34s.
Tananarive SKKS =25m.43s., SS =34m.17s.
Chicago eSS =34m.40s., iSSS =39m.39s.
La Paz iZ =19m.26s., iPS =28m.55s., iPPSZ =30m.5s., iSS =34m.52s., iSSS =39m.6s. Q =48m.0s.
Cincinnati e =17m.58s., i =29m.42s. and 39m.24s.
Cleveland eE =18m.42s., eSKKSE =26m.12s., eSE =27m.40s., ePSE =29m.17s. and 29m.23s., ePPSE =30m.16s., eSSE =36m.16s.
Pennsylvania eE =21m.12s., iSKSE =26m.37s., iE =29m.37s., 30m.52s., 31m.54s., 37m.23s., 39m.7s., and 42m.48s., iSSSE =45m.29s., iE =58m.47s. and 61m.0s.
Georgetown iPP =19m.57s.
Ottawa e =26m.40s., S =29m.54s., PS =30m.52s., PPS =33m.42s.
Philadelphia i =26m.47s., eSPP =31m.8s., iPKP,PKP =38m.52s.
City College, N.Y. eS =28m.6s., eSS =37m.18s.
Fordham eSS =38m.12s.?
Seven Falls PPPE =21m.9s., PSE =31m.21s., eE =34m.27s.
San Juan ipP =20m.50s., isPP =22m.5s., ePS =30m.56s., eSS? =38m.26s.
Scoresby Sund 22m.8s., SS =37m.54s.
Moscow epPP =21m.37s., eSP =30m.25s.
Bermuda isPP =22m.22s.
Helsinki ePP =21m.19s., ipPP =22m.19s.
Upsala eN =21m.13s.?, iPKS =22m.27s., epPKS =23m.13s.?, ePPPE =24m.34s., e =29m.32s., eSS =39m.12s.?
Ksara PP? =21m.45s.
Bergen PKPZ =17m.50s., eZ =18m.9s., PPZ =21m.7s.?
Copenhagen i =21m.59s., 22m.46s., 29m.48s., and 30m.18s., PPP(Δ >180°) =34m.28s., 35m.28s., and 40m.13s.
Helwan SKPZ =22m.30s., SS?N =40m.12s.
Raciborzu eEN =19m.15s. and 19m.56s., eN =20m.21s., ePP?N =21m.21s., eE =21m.52s., eEZ =24m.46s., eN =31m.45s.
Budapest PKS =23m.5s., eSKKS =28m.54s., PS =32m.27s., SS =40m.48s., eSSS =48m.35s.
Collmberg eEZ =19m.14s., 19m.28s., and 19m.54s., eE =21m.22s., eZ =21m.57s., ePPZ =22m.27s., eE =41m.0s., eSSSE =42m.24s.
Belgrade e =19m.24s., i =19m.59s., e =29m.43s. and 42m.48s.
De Bilt iPS =33m.54s., eSSS =46m.42s.
Stuttgart iPP =22m.44s., ePSKS =22m.48s., ePS =34m.12s.
Triest i =20m.23s., iPP =23m.1s., ePKP,PKP? =41m.25s., iSS =43m.25s., i =44m.3s.
Kew eZ =20m.8s., iZ =20m.23s., e =20m.45s., eS?EZ =29m.57s.
Strasbourg isPKP =20m.21s. and 20m.25s., iPP =22m.51s., ipPP =23m.36s., isPP? =23m.53s., eSKKS =30m.35s., ePKKS =30m.51s., eSS =41m.45s., eSSS =47m.12s., and many other unidentified readings.
Zürich e =19m.32s.a, ePP =22m.42s.
Basle ePKP =19m.28s.a.
Salo iPKPZ =19m.28s., PP =23m.1s.
Paris iPKP =19m.28s., i =19m.53s. and 19m.58s., isPKP =20m.33s., i =21m.0s. and 21m.24s., ePP =22m.51s., epPP =23m.45s., eSKKP? =30m.42s., eSS? =41m.42s., e =45m.12s.?
Bologna iPKP$_2$Z =19m.31s.
Florence Arc. i =19m.40s., e =31m.28s.
Rome iZ =21m.50s., ePP =23m.13s., eSKKS?N =29m.23s., ePSKSN =33m.10s.
Messina iE =19m.32s., iZ =19m.40s.
Catania iPKP$_2$ =19m.35s.
Clermont-Ferrand i =19m.36s. and 19m.56s., epPP =23m.57s.
Tunis i =19m.52s. and 20m.10s., isPKP =20m.41s., i =22m.14s., epPP =24m.14s., e =25m.11s.
Tortosa iEN =20m.5s., PKP$_2$?N =20m.24s., PPP?N =28m.3s., SKSP?N =38m.39s., iSSE =43m.26s.
Toledo iZ =20m.14s. and 21m.0s.
Algiers Univ. ePKP$_2$Z =20m.33s., epPKP$_2$Z =21m.7s., ePPZ =23m.56s., eZ =24m.11s. and 29m.59s.
Alicante PKP$_2$ =20m.20s., PKS =23m.41s., PPP =27m.59s., SKKS =31m.6s., Q =66m.2s.
Granada iPP =23m.53s., pPP =24m.11s., iSS =44m.5s.
Almeria iPP =24m.5s., PPP =27m.55s., PPS =37m.17s., SSS =50m.25s.
Malaga iPP =24m.19s.
Tamanrasset iPKP$_2$Z =20m.42s.k, ipPKP$_2$Z =21m.30s., iZ =22m.45s., ePPZ =24m.33s., iPPZ =24m.38s., epPPZ =25m.8s., isPP?Z =25m.20s., eZ =30m.33s.

July 23d. 15h. 3m. 30s. Epicentre 38°·6N. 26°·3E.

Casualties and much damage in Turkey. Intensity VII at Karaburm, Mordogan, Eglencehoca, and Saip iskelesi, less strong at Izmir. Damage and casualties in the northern part of Chios, especially at Marmaron, Kardamyla, Kampia Phyta, Karyac, Tholo-Potami, Patrika, Valissos, and Neocholion. Intensity VII in the town of Chios; V-VI in the Islands of Lesbos and Samos (press report from Athens).

N. Pinar.
Etude Géologique et Séismologique du tremblement de terre de Karaburun (Izmir) du Juillet, 1949. Rev. Fac. Sci. Univ. Istanbul, Série A, 1950, t. 15, No. 4, pp. 362-375, with map.

Mme. Labrouste, N. Pinar.
Etude Microséismique des Tremblements de terre du 23 Juillet, 1949, et du 13 Août, 1951, en Turquie Bull. d'Information de l'U.G.G.I, 2e année, No. 2, 1952, pp. 267-269. Epicentre 38°33′N. 26°21′E.

A. G. Galanopoulos.
Die Seismizität der Insel Chios.
Gerland's Beitrage zur Geophysik Bd. 63, 1954, pp. 253-264, with Isoseismic chart of this shock. Epicentre 38°33′N. 26°15′E.

H. Kemal Erkman.
Le tremblement de terre de Karaburun (Smyrna), Pub. Istanbul-Kandilli Rasathanesi, Jeofizik, Bölümü, Sismik yayinlari I, 13 pages. One Isoseismic chart and 2 photographs. Epicentre 38° 34′·4N. 26° 14′·5E. Depth 20-25km.

$A = +·7024$, $B = +·3472$, $C = +·6213$; $\delta = -7$; $h = -1$;
$D = +·443$, $E = -·896$; $G = +·557$, $H = +·275$, $K = -·784$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul	3·3	40	e 0 53	0	i 1 47	S_g	—	—	—
Sofia	4·7	332	i 1 11	− 3	i 2 7	− 3	i 1 20	P*	—
Bucharest	5·8	358	e 1 31	+ 2	i 2 52	S*	i 1 45	P*	—
Campulung	6·7	352	e 1 41	− 1	e 2 43	−17	—	—	—
Taranto	7·2	288	1 49	0	3 13	0	2 29	P_g	5·2
Belgrade	7·6	327	e 1 54k	− 1	i 3 38	+15	i 2 34	P_g	i 4·1
Yalta	8·3	42	i 1 58?	− 6	—	—	—	—	—
Messina	8·4	271	e 2 3	− 3	i 3 46	+ 3	i 2 21	P*	—
Catania	8·9	267	e 2 12	0	e 3 57	+ 2	—	—	e 4·4
Ksara	9·1	119	i 2 12	− 2	4 1?	+ 1	—	—	—
Theodosia	9·3	44	e 2 17?	0	—	—	—	—	—
Cernauti	9·5	359	2 30	+10	—	—	—	—	—
Kalossa	9·6	328	2 25	+ 4	4 33	+21	—	—	4·9
Helwan	9·7	153	i 2 19	− 3	i 4 6	− 9	—	—	—
Budapest	10·4	332	2 29	− 5	4 39	+ 7	i 4 52	SS	—
Zagreb	10·5	317	e 3 31	− 4	i 4 40	+ 5	i 2 42	PP	i 5·7
Ogyalla	11·0	330	e 2 40	− 2	e 4 47	0	—	—	—
Rome	11·1	292	i 2 40k	− 3	i 4 54	+ 5	—	—	i 6·5
Sotchi	11·3	59	2 45	− 1	—	—	—	—	—
Skalnate Pleso	11·4	340	i 2 47	0	5 2	+ 6	—	—	—
Triest	11·7	311	e 2 49k	− 2	i 5 13	+ 9	i 3 12	PPP	i 6·1
Florence Arc.	12·5	299	e 2 59	− 3	e 5 27	+ 4	—	—	e 7·0
Florence Xim	12·5	299	i 3 3	+ 1	i 5 52	SSS	—	—	—
Prato	12·6	300	e 3 3	0	i 6 11	L	—	—	(i 6·2)
Bologna	12·7	303	e 3 3	− 2	e 5 33	+ 5	i 3 25	PPP	e 7·3
Tunis	12·9	267	e 3 15	+ 8	i 5 39	+ 6	i 5 52	SSS	e 8·0
Raciborzu	12·9	336	e 3 6	− 1	—	—	e 3 24	PPP	e 7·3
Leninakan	13·7	75	e 3 24?	+ 6	—	—	—	—	—
Salo	13·7	306	e 3 16	− 2	5 26	−26	i 3 29	PP	—
Piatigorsk	13·7	61	e 3 17	− 1	—	—	—	—	—
Prague	14·2	328	i 3 21	− 3	i 6 0	− 4	i 3 31	PP	e 7·0
Erevan	14·2	77	3 29	+ 5	—	—	—	—	—
Pavia	14·3	303	e 3 29	+ 3	—	—	i 3 35	PP	e 8·4
Tiflis	14·5	71	i 3 30	+ 2	—	—	—	—	—
Chur	14·8	309	e 3 31	− 1	e 6 31	SS	—	—	e 7·9
Ravensburg	15·2	312	e 3 39	+ 1	e 6 45	SS	i 3 49	PP	e 7·4
Cheb	15·2	324	3 40	+ 2	i 6 46	SS	—	—	—
Zürich	15·6	310	e 3 40a	− 3	e 6 35	− 2	—	—	—
Collmberg	15·8	328	e 3 42	− 3	e 6 53	+11	i 3 58	PP	e 7·8
Stuttgart	16·0	315	e 3 44a	− 4	i 6 53	+ 7	i 3 54	P	i 7·5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Jena		16·1	325	e 3 52	+ 3	e 6 59	+10	—	—	e 7·8
Neuchatel		16·5	307	e 3 52	− 2	e 7 8	+10	—	—	—
Potsdam		16·6	331	e 3 52	− 4	i 7 10	+10	i 4 8	PP	—
Strasbourg		16·7	313	e 3 54 a	− 3	i 6 57	− 6	i 4 8	PP	i 8·4
Baku		18·3	76	i 4 19	+ 2	—	—	—	—	—
Algiers Univ.	z.	18·5	271	i 4 24 a	+ 5	i 8 8	SS	i 4 43	PPP	—
Clermont-Ferrand		18·6	300	e 4 20	− 1	i 8 3	SS	i 4 27	PP	9·5
Barcelona		18·7	288	i 4 21	− 1	i 7 57	+ 9	4 37	PP	e 9·5
Moscow		18·8	20	e 4 17	− 6	i 7 31	−19	—	—	—
Copenhagen		19·5	336	e 4 27	− 4	i 8 3	− 3	8 29	SS	9·8
Paris		19·9	309	e 4 33	− 3	i 8 18	+ 3	i 4 55	PP	e 10·3
Tortosa		20·0	285	i 4 36	− 1	8 23	+ 6	4 57	PP	11·4
De Bilt		20·0	321	i 4 34	− 3	i 8 25	+ 8	—	—	e 9·5
Alicante		21·0	279	i 4 49	+ 2	i 8 47	+10	5 11	pP	e 11·2
Helsinki		21·6	357	e 4 52	− 2	e 8 45	− 4	—	—	e 10·5
Upsala		22·0	348	i 4 54 a	− 4	i 8 52	− 4	i 5 20	PP	e 11·1
Kew		22·6	316	e 5 1	− 2	e 9 13	+ 6	e 9 45	SS	e 10·5
Almeria		22·8	275	i 5 5	0	i 9 20	+ 9	5 38	PP	14·3
Jersey	E.	22·9	308	e 5 8	+ 2	e 9 18	+ 5	e 5 30	PP	e 10·8
Toledo	Z.	23·5	283	i 5 13	+ 1	9 24	+ 1	5 46	PP	11·8
Granada		23·6	277	i 5 13 a	0	i 9 31	+ 6	—	—	i 13·6
Tamanrasset	Z.	23·8	235	i 5 15 e	0	i 9 45	+17	e 5 45	PP	11·5
Malaga	N.	24·3	277	i 5 22	+ 2	i 9 47	+10	—	—	13·6
Durham		24·8	320	i 5 26	+ 1	i 9 55	+ 9	i 6 12	PPP	i 12·0
Ashkabad		25·1	81	5 28	0	10 6	+15	—	—	—
Bergen		25·5	336	5 32	0	9 57	0	e 6 6	PP	11·3
Edinburgh	E.	26·2	322	5 35	− 3	10 15	+ 6	6 46	PPP	—
Aberdeen		26·3	325	i 5 40	+ 1	i 10 20	+ 9	i 6 20	PP	13·8
Lisbon		27·6	282	5 49	− 2	10 26	− 6	9 11	PcP	13·1
Sverdlovsk		29·0	39	i 6 4	0	i 10 50	− 4	—	—	—
Tashkent		32·8	71	i 6 37	0	—	—	—	—	—
Stalinabad		33·0	75	i 6 38	− 1	—	—	—	—	—
Obi-garm		33·7	75	i 6 39	− 6	—	—	—	—	—
Andijan		35·2	72	e 6 58	0	—	—	—	—	—
Frunse		36·4	68	e 7 8	0	—	—	—	—	—
Murgab		37·0	75	i 7 18	+ 5	i 12 56	− 3	—	—	—
Reykjavik		38·1	328	e 7 21	− 1	e 13 25	+ 9	e 9 3	PP	e 18·2
Scoresby Sund		40·5	337	7 42	0	i 13 57	+ 5	9 22	PP	—
Dehra Dun	N.	43·0	85	e 8 58	+55	—	—	e 11 40	?	—
New Delhi		43·1	88	e 8 4	0	i 14 26	− 4	9 48	PP	—
Bombay		44·7	103	8 24	+ 8	e 15 8	+14	i 10 8	PP	24·5
Poona	N.	45·7	102	i 8 26	+ 2	i 14 16	−52	i 10 9	PP	20·5
Ivigtut		49·8	322	i 8 54	− 2	i 16 4	− 2	21 24	SSS	22·5
Hyderabad	N.	49·9	100	i 8 55	− 2	16 14	+ 7	10 43	PP	25·5
Kodaikanal	E.	53·6	108	e 9 21	− 4	i 17 4	+ 6	11 31	PP	25·2
Irkutsk		53·8	48	9 27	+ 1	—	—	—	—	—
Colombo	E.	57·6	109	9 51	− 3	18 1	+10	—	—	33·5
Tananarive		60·6	157	e 10 20	+ 5	18 34	+ 4	18 48	PS	28·8
Pretoria	Z.	64·0	178	i 10 38	0	—	—	—	—	—
Halifax		64·1	308	11 13	+35	19 15	+ 1	—	—	29·7
Seven Falls	E.	67·2	313	11 3	+ 5	19 53	+ 1	24 31	SS	31·1
Harvard		70·2	308	i 11 16	− 1	e 20 35	+ 7	i 13 51	PP	e 36·0
Ottawa		71·0	313	11 22	0	20 44	+ 7	15 40	PPP	32·5
Bermuda		71·4	297	e 11 32	+ 8	e 20 55	+13	i 21 37	ScS	e 31·9
Grahamstown	Z.	71·5	180	i 11 24	0	—	—	—	—	—
Fordham		72·6	308	i 11 35	+ 4	i 21 1	+ 5	—	—	—
Philadelphia		73·9	308	e 11 41	+ 2	e 21 11	+ 1	e 14 25	PP	32·2
Pennsylvania		75·0	311	i 11 47	+ 2	i 21 30	+ 7	—	—	e 36·0
Georgetown		75·7	308	i 11 50	+ 1	i 21 31	+ 1	—	—	—
Washington		75·7	308	11 49	0	—	—	—	—	e 41·5
Cleveland		76·7	313	i 11 57	+ 2	i 21 47	+ 6	i 22 19	PS	34·7
College		76·8	358	e 11 52	− 3	e 21 42	0	e 14 51	PP	—
Fort de France		79·0	280	e 11 56	−11	e 23 1	PPS	—	—	—
Chicago		79·9	317	e 12 13	+ 1	i 22 18	+ 2	e 24 23	PPS	e 34·3
Cincinnati		80·0	313	i 12 18	+ 5	i 22 21	+ 4	i 15 16	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		80·6	286	i 12 20	+ 4	i 22 26	+ 3	e 15 39	PP	e 36·7
Saskatoon		80·8	333	12 20	+ 3	22 31	+ 6	15 31	PP	36·9
Columbia		81·3	307	e 12 28	+ 8	e 22 38	+ 8	e 27 40	SS	e 39·7
Sitka		83·0	350	i 12 34	+ 6	e 22 51	+ 4	e 15 49	PP	e 37·8
St. Louis		83·6	315	e 12 29	− 2	e 22 51	− 2	i 22 55	S	—
Lincoln	E.	85·3	321	e 12 41	+ 1	—	—	—	—	e 38·9
Rapid City	E.	85·9	326	e 12 42	− 1	e 23 4	−12	—	—	e 38·6
Batavia		86·5	101	12 44 a	− 2	i 23 18	− 4	—	—	—
Hungry Horse		86·5	335	i 12 45	− 1	e 23 9	−13	e 16 14	PP	—
Bozeman		87·8	332	e 12 54	+ 2	i 23 40	+ 6	e 16 22	PP	e 40·8
Butte	N.	88·0	333	—	—	e 23 22	[+ 1]	e 29 25	SS	e 40·8
Victoria		89·2	340	12 57	− 2	23 33	[+ 5]	16 22	PP	40·5
Seattle		89·7	339	e 13 4	+ 3	e 23 34	[+ 4]	e 23 58	S	—
Logan		91·4	329	e 13 6	− 3	e 24 11	+ 4	e 16 37	PP	e 38·9
Shasta Dam		96·1	336	i 13 29	− 2	—	—	—	—	—
Mineral		96·1	335	e 13 29	− 2	—	—	—	—	e 56·8
Reno		96·3	333	e 13 32	0	e 24 8	[0]	e 17 25	PP	e 47·8
Overton	Z.	96·9	329	e 13 36	+ 2	—	—	e 17 24	PP	—
Pierce Ferry		97·1	328	e 13 33	− 2	—	—	e 17 30	PP	—
Boulder City		97·6	329	e 13 37	− 1	—	—	—	—	—
Tinemaha	Z.	97·9	332	i 13 36	− 3	—	—	e 17 43	PP	—
Berkeley		98·6	335	—	—	i 24 26	[+ 6]	e 31 18	SS	—
Fresno		98·8	333	e 13 51	+ 8	e 24 24	[+ 3]	e 17 43	PP	—
Lick		98·9	335	e 13 45	+ 2	—	—	e 17 40	PP	e 53·5
Tucson		99·0	324	i 13 42	− 2	e 24 10	[−12]	e 17 46	PP	e 42·8
Santa Clara		99·0	335	—	—	i 24 28	[+ 6]	—	—	e 50·1
Riverside	Z.	100·3	330	e 13 52	+ 2	—	—	i 17 58	PP	—
Pasadena		100·5	330	e 13 50	− 1	e 26 53	PS	e 17 45	PP	e 41·8
Palomar		100·7	329	e 13 54	+ 2	e 26 56	PS	i 18 0	PP	—
La Paz		103·5	260	e 13 58	− 6	i 24 37	[− 7]	i 18 6	PP	49·9
Huancayo		106·5	267	e 18 32	PP	e 26 23	+ 8	e 28 17	PS	e 42·5
La Plata	E.	106·8	239	—	—	—	—	51 47	Q	58·6
	N.	106·8	239	—	—	—	—	52 0	Q	56·9
Copiapo	N.	111·4	252	—	—	—	—	41 25	Q	e 71·1
Riverview		135·8	102	e 19 27	[+ 4]	e 29 7	{+11}	e 22 1	PP	e 62·0
Wellington		155·7	106	i 19 56	[+ 1]	e 37 20	PPS	i 20 29	PKP_2	e 81·5

Additional readings :—
Bucharest iP_gEN =2m.5s., N =3m.5s., E =3m.21s.
Belgrade i =3m.1s.
Messina iE =2m.7s.
Kalossa iN =3m.9s., iE =3m.18s.
Budapest iN =2m.37s., P_gP_gEN =3m.23s., eSE =4m.43s.
Zagreb iE =2m.53s., i =3m.45s., 4m.5s., and 5m.36s.
Triest iP_gP_g =3m.43s., i =4m.51s.
Bologna iZ =3m.8s.
Tunis i =3m.37s. and 4m.1s., e =6m.4s.
Raciborzu e =3m.45s., i =6m.24s.
Salo iZ =4m.29s.
Prague e =3m.49s., iPP =4m.20s., i =4m.39s., ePPP =5m.6s., iS =6m.13s.
Ravensburg e =3m.46s.
Collmberg iE =3m.46s., iPPZ =3m.50s., eE =4m.15s., and 6m.56s., iSS?N =7m.3s.
Stuttgart i =4m.25s.
Jena eSE =7m.2s.
Potsdam eE =3m.55s., iE =4m.1s., iPPN =4m.4s., iN =5m.28s.?, E =11m.0s.
Strasbourg iPPP =4m.18s., iSS =7m.16s., iSSS =7m.34s. and 7m.38s., and many other unidentified i readings.
Algiers Univ. iZ =4m.51s.k and 5m.14s.a, eZ =6m.4s.
Clermont-Ferrand iP =4m.24s., i =4m.56s., 5m.13s. and 8m.47s.
Paris iP =4m.39s.?, i =4m.45s., e =6m.19s. and 6m.42s., i =7m.7s., iS =8m.21s., iP_cP = 8m.39s., eSS =9m.0s., eQ =9·5m.
Tortosa SSE =8m.54s., SSSEN =9m.17s.
Alicante PP =5m.24s., PPP =5m.32s., P_cP =8m.38s., SS =9m.34s., SSS =9m.53s., P_cS =12m.4s.
Helsinki i =4m.59s., e =8m.53s.
Upsala eN =10m.16s., eE =10m.22s.
Kew iPP =5m.6s., eEZ =7m.1s., e =7m.39s.
Almeria P_cP =8m.40s., SS =10m.12s., P_cS =12m.22s.
Jersey eE =8m.9s.

Continued on next page.

Toledo PPPZ =5m.50s., P_cPZ =8m.45s., SSZ =10m.19s., SSSZ =10m.35s.
Granada iPP =7m.7s., SS =11m.14s., SSS =11m.55s.
Tamanrasset iZ =5m.20s.k, ePPPZ =5m.57s., eZ =6m.8s., iZ =6m.21s., 6m.24s. and 9m.15s.
Durham iEN =5m.22s., iE =6m.8s., iEN =6m.37s., iE =7m.39s., iEN =7m.49s., iE = 10m.0s. and 10m.8s., iN =10m.19s., iEN =10m.37s., iN =11m.28s.
Bergen eZ =10m.15s.
Edinburgh P_cP =9m.38s.
Aberdeen iE =11m.20s.
Lisbon iPZ =5m.53s., P_cP? =18m.52s., E =10m.0s., SNZ =10m.43s., N =11m.21s., Q =11m.42s., S_cS? =16m.30s.
Reykjavik eN =16m.6s.
Scoresby Sund 7m.46s., 11m.6s.
New Delhi iN =14m.52s., 15m.57s., and 17m.48s.
Bombay iSSE =18m.39s.
Poona iPPPEN =11m.10s., iSSEN =17m.40s., QEN =18·5m.
Ivigtut i =9m.1s. and 20m.6s.
Hyderabad SSN =20m.14s.
Kodaikanal P_cPE =10m.26s., PPPE =12m.46s., P_cSE =14m.26s., SSSE =22m.32s.
Tananarive SS =22m.34s.
Halifax e =11m.39s., PPP =13m.53s., S =18m.45s., e =20m.37s. and 22m.25s.
Seven Falls SKSE =20m.58s.
Harvard eS_cS =21m.24s., eQ =31·5m.
Ottawa e =12m.57s., PS =21m.29s., SSS =28m.0s.?
Bermuda iS =21m.0s.
Philadelphia ePPP? =16m.27s., eSSS =29m.7s.
Cleveland iN =22m.9s., eE =24m.1s.
College i =12m.4s.
Chicago eS =22m.10s.
San Juan eSS =27m.48s., eSSS? =30m.48s.
Saskatoon PPP =17m.12s., PS =23m.13s.
Columbia e =24m.45s.
Sitka eSS? =28m.40s.
Lincoln eE =22m.1s. and 30m.48s.
Bozeman eSS? =28m.58s.
Butte eN =33m.50s.
Victoria i =23m.57s., PPS =25m.42s.
Logan e =17m.50s., eSKS =23m.36s., ePS =25m.20s., eSS? =30m.40s.
Reno ePN =13m.37s., eEN =21m.21s., eE =26m.12s.
Tinemaha iZ =13m.47s.
Tucson ePS =26m.50s.
Riverside ePKKP =30m.9s., iZ =30m.30s.
Pasadena iZ =18m.2s., ePKKPZ =30m.52s.
Palomar iPKKP =30m.9s.
La Paz PPP =21m.16s., SS =32m.50s.
Huancayo ePP =18m.48s., i =19m.30s., e =20m.9s., eSKS =24m.56s., eSS? =33m.44s., eSSS? =38m.18s.
Riverview iE =23m.3s., iZ =23m.7s. and 26m.59s., eSKSP?E =32m.19s., iPPSZ = 34m. 14s., iPPSE =34m.21s.
Wellington ePKS =24m.21s., iZ =25m.35s., eZ =27m.7s., ePPPSZ =38m.42s.
Long waves were also recorded at Honolulu and Auckland.

July 23d. 17h. 41m. 33s. Epicentre 39°·2N. 70°·7E. (as on 19d.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Obi-garm	0·9	237	0 19	− 1	0 37	+ 3	—
Stalinabad	1·6	247	i 0 35	+ 5	0 59	+ 8	—
Andijan	2·0	39	i 0 35	0	i 1 2	0	—
Tashkent	2·4	333	e 0 45?	+ 4	i 1 16?	+ 4	—
Murgab	2·7	108	0 45	0	1 21	+ 2	—
Samarkand	2·9	279	e 0 48	0	—	—	—
Tchimkent	3·1	345	i 0 57	+ 6	e 1 35	+ 6	—
Frunse	4·7	38	e 1 14	0	e 2 11	+ 1	—
Ashkabad	9·8	267	e 2 27	+ 3	e 4 20	+ 3	—
Sverdlovsk	18·9	343	4 20	− 4	—	—	—
Moscow	27·5	318	e 5 50	0	—	—	—
Collmberg	41·4	308	e 7 49	− 1	—	—	—
Stuttgart	44·2	304	e 8 12	0	—	—	e 30·4
Strasbourg	45·1	304	e 8 20	0	—	—	—
College	72·0	17	i 11 23	− 5	—	—	—

Strasbourg gives also eP =8m.26s.
Long waves also recorded at Copenhagen and Paris.

July 23d. 22h. 33m. 59s. Epicentre 46°·2N. 7°·9E. (as on 22d.).

Intensity IV in the Michabel range.

E. Wanner.
Jähresbericht des Erdbebendienstes der Schweiz im Jähre, 1949. Zürich, 1950, p. 3., with Macroseismic Chart. Suggested Epicentre 46°5′N. 7°50′E. Macroseismic radius 5km.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel	1·0	321	i 0 21	0	i 0 47	?	e 0 24	P_g	—
Chur	1·3	60	e 0 26	+ 1	e 0 44	0	—	—	—
Zürich	1·3	22	e 0 25	0	e 0 44	0	—	—	—
Pavia	1·3	139	—	—	e 0 48	+ 4	—	—	—
Basle	1·4	351	e 0 27 s	0	e 0 46	0	—	—	—
Salo	1·9	108	e 0 45	P_g	1 5	S_g	—	—	—
Strasbourg	2·4	358	i 0 48	P_g	e 1 19	S_g	—	—	—
Stuttgart	2·7	19	0 46?	+ 1	e 1 17	− 2	e 0 52	P_g	—
Clermont-Ferrand	3·4	264	e 1 3	P*	—	—	—	—	i 2·0
Paris	4·5	308	e 1 15?	+ 4	—	—	e 1 25	P*	—
Collmberg z.	6·1	32	e 1 57	P_g	—	—	—	—	—

Additional readings :—
Stuttgart e = 1m.21s., eZ = 1m.29s., iS_g = 1m.31s.
Paris e = 1m.32s. and 1m.42s.

July 23d. Continuation of the list of after-shocks from the epicentre of the large earthquake of July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	10	33	6	16	23	9	22	14	14	58	15
5	51	18	7	22	19	12	56	35	21	2	19

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	10	23	6	16	39	9	22	49	14	58	28
2	20	26	7	22	35	12	56	50	21	2	37
5	51	32									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	11	4	5	51	37	12	56	48	19	47	28
2	20	52	6	16	50	14	58	28	21	2	44

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	10	36?	6	17	34?	12	56	40?	21	3	28?
5	52	23									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	4	30	6	16	59	14	58	37	19	47	40
2	12	27	12	57	5	18	53	20	21	2	50
5	51	44									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	9	52	6	17	46	14	58	52	21	3	0
5	52	43									

Tchimkent.

h.	m.	s.
2	10	38

July 23d. After-shocks of Turkish earthquake at 15h. recorded at Istanbul.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
16	20	52	18	30	9	20	17	48	21	25	35
16	24	5	18	32	59	20	21	18	21	30	30
16	40	38	18	45	27	20	33	8	21	57	10
16	54	15	19	8	44	20	35	17	22	45	40
17	9	29	19	11	32	20	49	53	23	5	39
17	19	0	19	21	34	20	53	15	23	22	42
17	48	40	19	30	42	20	54	36	23	24	1
18	7	1	19	32	3	21	2	35	23	39	35
18	8	15	20	13	50	21	4	6	23	41	45
18	9	28									

July 23d. Readings also at 0h. (College), 1h. (Tortosa), 2h. (Clermont-Ferrand, Stuttgart, and Kew), 3h. (College), 4h. (Copiapo and Tucson), 5h. (Huancayo), 6h. (Tucson), 7h. (Palomar (2), Riverside (2), Tinemaha, Tucson, Overton, Lick, Mineral (2), San Juan, Tamanrasset, Kew, De Bilt, Paris, Clermont-Ferrand, Strasbourg, Rome, and near Ashkabad), 8h. (College, Hungry Horse, Ksara, Strasbourg, Collmberg, Basle, near Zürich, Stuttgart, near Copiapo, and near Ashkabad), 9h. (Pasadena, Tucson, Overton (2), Mineral, Reno, Butte, Bozeman, Victoria, Seattle, Hungry Horse, Sitka, Logan, Saskatoon, Pennsylvania, Ottawa (2), Seven Falls, Shawinigan Falls, Harvard, Philadelphia, Rapid City, Chicago, Cleveland, Columbia, Halifax, Scoresby Sund, and Strasbourg), 10h. (Lisbon (2), Collmberg, near Basle, Zürich, and Stuttgart), 11h. (Fresno, Lick, Tucson, Victoria, and near Ashkabad), 12h. (Stuttgart), 13h. (near Lick, San Francisco, Berkeley, Branner, and near Tananarive), 15h. (near Reykjavik and near College (2)), 16h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Pierce Ferry, Shasta Dam, Hungry Horse, College, near Mineral, and Reno), 17h. (College (2)), 18h. (Belgrade, Strasbourg, and Santa Lucia), 19h. (Brisbane, Mount Wilson, Palomar, Riverside, Tinemaha, Overton, College, also explosion in Bay of Lubeck recorded at Collmberg, Jena, Prague, Paris, Strasbourg, Stuttgart, Basle, and Zürich), 20h. (near Ashkabad (2)), 21h. (Paris, and Triest (2)), 22h. (Triest and Tucson), 23h. (Paris, Strasbourg, Stuttgart, Ksara, and near Ashkabad).

July 24d. 0h. 19m. 57s. Epicentre 46°·2N. 7°·9E. (as on 23d.).

Intensity V at Grachen: IV at Zermatt and Saas-Fee. Macroseismic radius 10km. Epicentre 46°5′N. 7°50′E.

E. Wanner.
Jährесbericht des Erdbebendienstes der Schweiz im Jähre, 1949, Zürich, 1950, p. 3, with macroseismic chart.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel	1·0	321	e 0 17	− 4	e 0 33	− 3	—	—	—
Chur	1·3	60	e 0 25	0	e 0 40	− 4	—	—	—
Zürich	1·3	22	e 0 21	− 4	e 0 41	− 3	—	—	—
Pavia	1·3	139	e 1 3?	?	—	—	—	—	—
Basle	1·4	351	e 0 23$_a$	− 4	e 0 42	− 4	—	—	—
Salo	1·9	108	e 0 42	P_g	1 2	+ 3	—	—	—
Strasbourg	2·4	358	i 0 44	+ 3	e 1 6	− 6	i 1 17	S_g	—
Stuttgart	2·7	19	e 0 43?	− 2	e 1 23	+ 4	e 0 48	P_g	—
Clermont-Ferrand	3·4	264	e 1 0	P*	e 1 29	− 8	e 1 10	P_g	i 1·9
Paris	4·5	308	e 1 8?	− 3	—	—	e 1 30	P_g	—
Collmberg	6·1	32	1 55?	P_g	e 3 10	S*	e 3 20	S_g	—

Additional readings :—
Strasbourg eS = 1m.3s.
Stuttgart eZ = 1m.9s., iS_g = 1m.29s., i = 1m.33s.
Paris e = 1m.46s.
Collmberg eE = 3m.13s., eZ = 3m.25s.

July 24d. Continuation of list of local shocks from neighbourhood of the epicentre of July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	35	49	11	12	57	13	26	39	14	13	34

Stalinabad.

h.	m.	s.	h.	m.	s.
0	36	4	13	26	55

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	36	7?	3	21	42	11	13	21	14	13	49

Tashkent.

h.	m.	s.	h.	m.	s.
0	36	16	22	35	55

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	36	22	7	51	42	23	21	8

Samarkand.

h.	m.	s.
0	36	30?

Tchimkent.

h.	m.	s.
0	36	33

Frunse.

h.	m.	s.
0	37	59

Continuation of list of after-shocks of the Turkish earthquake on 23d.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	3	16	4	9	20	6	57	26	9	10	44
0	45	28	4	11	54	7	2	28	9	35	14
1	29	57	4	58	45	7	35	46	12	21	37
1	58	4	6	46	55	8	6	49	13	39	42
1	59	57	6	49	52	8	18	34	15	17	25

July 24d. Readings also at 0h. (Stuttgart), 2h. (College and Tacubaya), 3h. (Hungry Horse, near Fresno, Lick, and near Bogota), 4h. (Tananarive, near Basle, and Zürich), 6h. (near Fresno and Lick), 9h. (Wellington), 10h. (Paris, Tamanrasset (2)), Tucson, Pierce Ferry, and Hungry Horse), 14h. (Palomar, Tinemaha, Tucson, Boulder City, Hungry Horse, Tacubaya, Ottawa, near Ashkabad, and near La Paz), 15h. (College and La Paz), 17h. (La Paz and near Huancayo), 18h. (Ksara (2), Paris, Strasbourg, Stuttgart, Tamanrasset, Pretoria, La Paz, Bogota, Overton, and near Tucson), 19h. (Stuttgart), 20h. (Overton and Scoresby Sund), 21h. (near Santa Lucia), 22h. (near Reno), 23h. (Overton and near Tucson (2)).

July 25d. 3h. 50m. 41s. Epicentre 16°·4N. 147°·6E. Depth of focus 0·025.
(as on July 2d.).

A = −·8104, B = +·5143, C = +·2806 ; δ = −1 ; h = +5 ;

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		64·5	26	i 10 11	− 7	—	—	i 11 6	pP	—
Victoria	z.	77·2	43	e 11 34	0	—	—	—	—	—
Shasta Dam		79·5	51	i 11 47	0	—	—	—	—	—
Mineral	z.	80·2	51	i 11 49k	− 1	—	—	i 12 46a	pP	—
Lick	z.	80·8	54	i 11 53a	0	—	—	—	—	—
Reno	z.	81·7	52	i 12 59k	pP	—	—	—	—	—
Fresno	z.	82·4	54	i 12 2k	0	—	—	—	—	—
Hungry Horse		83·4	42	i 12 5	− 2	e 22 0	−10	e 12 55	pP	—
Tinemaha		83·5	54	i 12 9k	+ 1	—	—	i 13 6	pP	—
Pasadena		84·4	56	i 12 12k	0	i 22 22	+ 2	e 13 6	pP	—
Riverside	z.	85·1	56	i 12 16k	+ 1	—	—	i 13 22	pP	—
Palomar		85·6	57	i 12 11	− 7	i 22 36	+ 4	i 13 15	pP	—
Boulder City		86·5	54	i 12 23	+ 1	—	—	—	—	—
Overton	z.	86·6	53	i 12 24	+ 1	—	—	—	—	—
Logan		86·9	47	i 12 21	− 3	e 22 42	− 2	e 15 50	PP	—
Pierce Ferry		87·1	54	i 12 25	0	—	—	—	—	—
Tucson		90·8	56	i 12 43	0	—	—	e 16 24	PP	—
St. Louis		103·4	43	e 17 35	PP	—	—	e 17 49	PP	—
La Paz	z.	145·8	95	17 55	[−81]	—	—	—	—	—

Additional readings :—
Mineral iZ = 11m.54s.
Lick iZ = 13m.46s.
Hungry Horse ePP = 15m.9s.
Tinemaha iPPZ = 15m.28s.
Pasadena eZ = 13m.37s.
Riverside iPP = 15m.39s.
Boulder City e = 12m.43s.
St. Louis e = 17m.43s.

July 25d. 9h. 32m. 35s. Epicentre 38°·9N. 71°·0E. (given by the stations of U.S.S.R.).
A = +·2540, B = +·7378, C = +·6254 ; δ = −1 ; h = −1 ;
D = +·946, E = −·326 ; G = +·204, H = +·591, K = −·780.

	Δ	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Obi-garm	1·0	259	0 23?	+ 2	0 44	+ 8	—
Stalinabad	1·8	259	i 0 35	+ 3	1 2	+ 6	—
Andijan	2·1	30	i 0 39?	+ 2	i 1 9	+ 5	—
Tashkent	2·8	331	i 0 50	+ 3	i 1 27	+ 5	—
Samarkand	3·2	284	e 1 0?	P_e	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Tchimkent		3·6	343	i 0 58	0	i 1 43	+ 1	—
Frunse		4·8	33	i 1 16	+ 1	i 2 13	+ 1	—
Ashkabad		10·0	268	2 26	− 1	4 17	− 5	—
New Delhi	E.	11·5	151	e 2 47	− 1	e 4 59	0	—
Sverdlovsk		19·2	343	i 4 24	− 4	—	—	—
Stuttgart		44·5	304	e 8 11	− 4	—	—	e 24·4
Strasbourg		45·5	304	e 8 22?	− 1	—	—	—
College		72·2	17	i 11 23	− 6	—	—	—

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

July 25d. 11h. 24m. 27s. Epicentre 34°·0S. 112°·0W.

A = −·3179, B = −·7676, C = −·5566; δ = +7; h = 0;
D = −·924, E = +·383; G = +·213, H = +·514, K = −·831.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia	N.	34·6	101	—	—	e 12 29	+ 7	e 14 37	SS	—
Huancayo		40·3	66	i 7 40	0	e 13 46	− 3	i 9 7	PP	i 18·7
La Paz		43·4	77	i 8 7a	+ 1	i 14 35	0	i 9 53	PP	20·8
Bogota	Z.	52·8	51	i 9 20	+ 1	—	—	—	—	—
Tacubaya		54·6	16	—	—	i 12 35	PPP	—	—	e 21·4
Tucson		65·9	1	i 10 48	− 2	i 19 40	+ 3	e 14 2	PPP	e 28·7
Palomar		67·1	356	i 10 57a	0	—	—	—	—	—
Riverside		67·8	355	i 11 1a	− 1	—	—	—	—	—
Pasadena		68·0	355	i 11 2a	− 1	i 20 5	+ 3	i 13 31	PP	e 28·0
Lubbock		68·0	10	e 11 1	− 2	—	—	—	—	—
San Juan		68·3	48	e 11 8	+ 3	e 20 2	− 4	—	—	e 35·7
Boulder City		69·6	358	i 11 12	− 1	e 20 25	+ 4	—	—	—
Pierce Ferry		69·8	359	i 11 12	− 2	—	—	—	—	—
Honolulu		69·9	315	—	—	e 20 39	+15	—	—	e 31·7
Overton	Z.	70·2	358	i 11 16	− 1	—	—	—	—	—
Fresno		70·7	354	e 11 19a	− 1	e 20 30	− 4	—	—	—
Tinemaha		70·9	355	i 11 19a	− 2	—	—	—	—	—
Lick	Z.	71·5	352	i 11 25	+ 1	—	—	i 14 4	PP	—
Santa Clara		71·5	352	e 11 25	+ 1	e 20 47	+ 4	—	—	e 34·2
Berkeley		72·1	352	e 11 27a	− 1	i 20 52	+ 2	e 25 30	SS	e 34·0
Ukiah		73·4	351	—	—	e 21 13	+ 8	—	—	e 32·0
Reno	Z.	73·5	354	i 11 36a	0	—	—	—	—	—
Mineral	Z.	74·5	353	e 11 41a	− 1	—	—	—	—	—
Shasta Dam		74·9	352	i 11 43	− 1	—	—	—	—	—
St. Louis		75·2	18	i 11 44	− 2	i 21 27	+ 2	i 26 8	SS	—
Logan		75·4	0	i 11 45	− 2	—	—	e 14 57	PP	—
Bozeman		79·3	1	e 12 10	+ 1	e 22 13	+ 4	e 15 15	PP	e 36·0
Butte	N.	79·6	0	e 12 11	+ 1	e 22 15	+ 3	e 15 11	PP	e 38·8
Georgetown		79·6	27	i 12 9	− 1	e 22 13	+ 1	—	—	—
Cleveland		80·3	23	—	—	e 21 22	−58	e 23 14	PS	36·2
Pennsylvania	E.	81·0	26	e 11 12	−66	e 22 21	− 6	i 27 43	SS	—
Philadelphia		81·3	28	—	—	e 22 32	+ 2	e 23 35	PS	e 42·5
Hungry Horse		82·0	359	i 12 22	− 1	—	—	e 15 21	PP	—
City College, N.Y.		82·5	29	i 12 23	− 3	—	—	—	—	e 37·9
Victoria		82·7	353	12 26	− 1	22 50	+ 6	—	—	—
Harvard		84·9	29	i 12 40	+ 2	—	—	—	—	—
Ottawa		85·8	25	i 12 40	− 2	e 23 3	[− 3]	—	—	e 45·6
College		102·3	345	e 13 59	0	e 24 41	[+ 3]	e 18 2	PP	e 48·3
Scoresby Sund		121·8	23	20 27	PP	—	—	—	—	53·6
Malaga	Z.	122·6	65	i 20 7k	PP	—	—	—	—	59·4
Almeria		124·1	66	20 10	PP	27 16	{−26}	22 38	PKS	—
Tamanrasset	Z.	125·1	84	e 19 5	[+ 2]	—	—	e 20 51	PP	—
Alicante		126·1	64	—	—	e 27 45	{−10}	—	—	e 41·8
Tortosa	E.	127·5	62	e 21 8	PP	26 1	[−12]	22 53	PKS	—
Clermont-Ferrand		130·5	57	e 19 16?	[+ 3]	e 27 33?	?	e 21 43	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Paris		130·5	52	e 19 12	[− 1]	—	—	e 21 25	PP	e 65·6
De Bilt		132·5	47	i 19 19	[+ 2]	i 22 50	PKS	e 39 33?	SS	e 60·6
Strasbourg		134·0	52	i 19 21	[+ 1]	e 2 , 45	[+16]	e 21 45	PP	e 60·6
Stuttgart		134·9	52	e 19 23	[+ 2]	e 22 56	PKS	e 21 55	PP	e 69·6
Jena	N.	136·5	50	e 19 23	[− 1]	—	—	e 22 8	PP	—
Rome		136·5	62	e 19 27	[+ 3]	e 25 36	PPP	e 21 55	PP	—
Triest		137·8	57	e 19 45	[+18]	i 30 17	?	i 22 13	PP	e 53·2
Prague		138·4	50	e 19 10	[−18]	—	—	e 22 14	PP	—
Irkutsk		148·0	317	19 49	[+ 5]	28 0	?	—	—	—
Helwan	Z.	149·1	88	i 19 48	[+ 2]	—	—	—	—	—
Moscow		150·1	34	19 53	[+ 5]	—	—	—	—	—
Yalta		152·3	58	19 54	[+ 3]	—	—	i 23 34	PP	—
Ksara		153·8	81	e 19 28	[−25]	—	—	i 19 58	pPKP	—
Sverdlovsk		156·7	11	i 19 59	[+ 2]	e 44 2	SS	e 24 4	PP	—
Tiflis		160·5	60	20 6	[+ 5]	—	—	i 24 26	PP	—
Ashkabad		171·6	—	20 4	[− 6]	—	—	—	—	—
Andijan		172·2	—	20 15	[+ 4]	32 21	{+ 7}	e 25 32	PP	—
Tashkent		172·6	—	i 20 13	[+ 2]	i 27 7	[− 5]	i 25 27	PP	—
Stalinabad		175·3	—	e 20 15	[+ 3]	—	—	e 25 42	PP	—

Additional readings :—
Huancayo i =9m.34s., iS =13m.55s., e =16m.52s.
La Paz iP_cP =10m.5s., iPPP =10m.39s., PS? =15m.2s., iSS =17m.57s., iS_cS =18m.9s.
Tucson e =15m.30s.
Pasadena eSSN =24m.21s.
Lick iZ =11m.31s.
Berkeley iZ =11m.35s., eN =19m.55s.
Reno iE =11m.44s., iZ =11m.51s., iN =11m.55s.
Mineral iZ =11m.48s., and 11m.59s.
Logan i =12m.2s.
Cleveland eSSE =27m.35s.
Pennsylvania iE =22m.54s., eE =24m.16s., iE =34m.13s.
Almeria PPP =25m.30s., PPS =34m.30s., SS =40m.38s.
Paris i =19m.33s.
Strasbourg eSKP =22m.53s. and 23m.3s., e =24m.1s., ePPP? =24m.46s., ePS =31m.59s., ePPS =33m.43s., eSS =39m.45s., eSSS =44m.33s.
Jena eE =22m.3s.
Rome e =35m.6s.
Helwan eZ =16m.44s., 21m.4s., 21m.48s., 22m.9s., and 22m.30s.
Ksara PP? =22m.42s.
Sverdlovsk $ePKP_2$ =20m.26s.
Ashkabad gives P as P_g for a local shock for which S_g =20m.10s.
Andijan PKP_2 =21m.37s.
Tashkent $ePKP_2$ =21m.32s.
Long waves were also recorded at Apia, Auckland, Wellington, Bermuda, and Sitka.

July 25d. 15h. 31m. 49s. Epicentre 46°·2N. 7°·9E. (as on 24d.).

Intensity V at Grachen, IV at Saas-Fee.

E. Wanner.
Jährесbericht des Erdbebendienstes der Schweiz im Jähre, 1949, Zürich, 1950, p.3, with macroseismic chart.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Neuchatel		1·0	321	i 0 19	− 2	i 0 34	− 2	—	—
Chur		1·3	60	e 0 25	0	e 0 43	− 1	—	—
Zürich		1·3	22	0 23	− 2	e 0 43	− 1	e 0 25	P_g
Basle		1·4	351	e 0 26	− 1	e 0 45	− 1	—	—
Salo		1·9	108	e 0 43	P_g	1 6	S_g	—	—
Ravensburg		2·0	36	e 0 37	+ 2	e 1 3	+ 1	—	—
Strasbourg		2·4	358	e 0 46	+ 5	e 1 2	−10	—	—
Stuttgart		2·7	19	e 0 45	0	e 1 25	S*	e 0 51	P*
Clermont-Ferrand		3·4	264	i 0 57	+ 2	—	—	i 1 2	P*
Collmberg	E.	6·1	32	—	—	e 3 17	S*	e 3 24	S_g

Additional readings :—
Pavia (Δ =1°·3), e =15h.31m.39s.
Stuttgart e =1m.17s., eS_g =1m.29s.
Clermont-Ferrand e =18s.
Collmberg E =3m.28s.

July 25d. Continuation of list of after-shocks from origin in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	9	19	5	56	35?	18	19	44?	23	22	7?
4	29	27?	17	39	7	19	7	33?	23	57	10

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	5	45	17	39	33	19	7	57	23	57	58
5	56	6	18	19	38	23	22	54			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	10	59	4	53	28	17	44	40	19	8	2
2	9	39	7	56	22	18	19	41	23	22	30
4	5	13	10	14	4	18	38	34	23	57	41
4	30	1	11	25	23						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
4	7	4?	18	19	53	19	8	10

Murgab.

h.	m.	s.
0	35	32

Samarkand.

h.	m.	s.
18	20	2
19	8	20

Tchimkent.

h.	m.	s.
4	5	48
18	20	48

Frunse.

h.	m.	s.
4	5	5
18	20	32

July 25d. Readings also at 0h. (Triest), 1h. (Pavia), 3h. (near Istanbul), 5h. (College), 6h. (College (2), Overton, near Harvard, and near Istanbul), 8h. (Overton, and near Ashkabad), 11h. (Helwan, near Ashkabad, and near Piatigorsk (3)), 12h. (Overton), 13h. (near Tacubaya), 14h. (Algiers Univ.), 18h. (near Ashkabad (2) and near Victoria (2)), 20h. (Overton), 22h. (near Ottawa and near Ashkabad), 23h. (near Alicante, Toledo, Tortosa, and near Fort de France).

July 26d. Continuation of the list of Turkestan after-shocks.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	59	9?	8	48	15	19	28	16?	22	40	26

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	59	31	8	48	32	10	10	35	22	39	54

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	59	41	10	10	24	19	28	41	22	39	38
8	48	29									

Tashkent.

h.	m.	s.	h.	m.	s.
2	59	49	22	40	16?

Murgab.

h.	m.	s.	h.	m.	s.
8	48	39	22	40	19

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	59	56	8	49	39	22	41	4

Tchimkent.

h.	m.	s.	h.	m.	s.
2	59	59	22	40	2

July 26d. Readings also at 0h. (College and near Tucson (2)), 1h. (Tucson and near Mineral), 2h. (Mineral), 4h. (College and Tucson), 5h. (College and Overton), 7h. (Ottawa, Hungry Horse, and College), 8h. (Overton (2)), 9h. (near Tacubaya), 14h. (Copiapo and near Ashkabad), 15h. (near Mizusawa), 16h. (Algiers Univ.), 18h. (Copiapo), 19h. (Logan, near Strasbourg, and near Mizusawa), 20h. (Overton and near Tucson), 21h. (Algiers Univ., Bogota, and College), 22h. (near Taranto).

July 27d. 6h. 46m. 0s. Epicentre 48°·6N. 7°·9E.

Felt near Strasbourg, at La Wantzenau, Bischeim, and Schiltigheim. Adopted epicentre according to Strasbourg.

J. P. Rothé and N. Dechevoy.
La Séismicitè en France de 1940 à 1950. Annales de I'Institut de Physique du Globe de Strasbourg. 3e partie, Géophysique. Nouvelle Série T. VII. Le Puy, 1954, p.56.

$A = +·6575$, $B = +·0912$, $C = +·7479$; $\delta = -2$; $h = -5$;
$D = +·137$, $E = -·991$; $G = +·741$, $H = +·103$, $K = -·664$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Strasbourg		0·1	—	i 0 5a	− 3	i 0 7	− 6	—	—	—
Stuttgart		0·9	79	e 0 19?	− 1	e 0 31	− 3	e 0 20	P_g	—
Basle		1·1	191	e 0 24	+ 2	e 0 39	0	—	—	—
Zürich		1·3	160	e 0 27	+ 2	e 0 47	+ 3	—	—	—
Ravensburg	Z.	1·4	126	—	—	e 0 51	+ 5	—	—	e 1·1
Besançon		1·9	224	—	—	e 1 5	S_g	—	—	e 1·3

Additional reading :—
Stuttgart $iS_g = 32s.$, $i = 36s.$

July 27d. 11h. 1m. 29s. Epicentre 8°·5S. 126°·0E. (as on 1937, Dec. 28d.).

$A = -·5814$, $B = +·8003$, $C = -·1468$; $\delta = +6$; $h = +7$;
$D = +·809$, $E = +·588$; $G = +·086$, $H = -·119$, $K = -·989$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		19·1	276	i 4 32	+ 5	i 8 7	+10	—	—	—
Perth		25·2	200	—	—	i 10 41	SS	—	—	i 12·9
Brisbane		31·8	130	i 6 28	0	c 11 3	−35	i 7 41	PP	e 15·5
Melbourne		33·9	152	e 8 21	PP	i 14 33	SS	—	—	—
Riverview		34·2	141	i 6 57k	+ 8	i 12 22	+ 6	i 14 47	SS	e 17·3
Calcutta	E.	48·1	311	e 8 46	+ 3	i 15 36	− 6	—	—	—
Colombo	E.	48·5	287	e 8 48	+ 2	15 57	+ 9	—	—	25·9
Hyderabad	N.	53·6	299	—	—	16 57	− 1	—	—	—
Bombay		59·1	297	e 10 4	0	e 18 17	+ 6	—	—	—
New Delhi		59·8	310	e 10 6	− 3	i 18 14	− 6	i 21 51	SS	i 26·0
Irkutsk		63·3	345	10 28	− 5	18 47	−17	—	—	—
Frunse		69·3	322	e 11 10	− 1	e 20 14	− 3	—	—	—
Andijan		69·5	319	11 11	− 1	e 20 19	− 1	—	—	—
Stalinabad		70·8	317	i 11 18	− 2	i 20 31	− 4	—	—	—
Tashkent		71·8	319	i 11 25	− 1	i 20 38	− 8	—	—	—
Ashkabad		78·0	312	12 2	0	—	—	—	—	—
Sverdlovsk		84·0	330	i 12 31	− 2	22 50	− 7	—	—	—
Baku		85·0	312	e 12 41	+ 3	—	—	—	—	—
Grozny		88·7	314	e 12 56	− 1	i 23 44	+ 1	—	—	—
Tiflis		89·1	312	i 12 58	0	i 23 46	0	—	—	—
Ksara		94·8	303	e 13 27	+ 2	27 2	PPS	—	—	—
Moscow		96·0	325	13 26	− 4	24 48	+ 1	17 21	PP	—
College		96·0	25	e 17 50	PP	—	—	—	—	—
Helwan	Z.	98·2	299	e 17 43	PP	—	—	e 19 43	PPP	—
Istanbul		100·7	310	e 13 50	− 2	e 17 51	PP	—	—	—
Collmberg		110·9	321	e 18 52	PP	e 28 31	PS	—	—	—
Triest		111·6	316	e 19 12	PP	e 28 52	PS	—	—	—
Rome		113·1	312	e 19 28	PP	e 29 10	PS	e 46 31?	Q	—
Stuttgart		113·9	320	e 19 34	PP	e 25 25	[− 3]	e 21 56	PPP	e 64·5
Strasbourg		114·9	320	e 18 1?	[−42]	e 29 29	PS	e 19 27	PP	e 56·0
Scoresby Sund		115·0	348	19 40	PP	29 12	PS	—	—	—
De Bilt		115·3	325	e 19 56	PP	e 22 20	PKS	e 27 31?	SKKS	e 48·5
Hungry Horse		116·0	39	e 18 28	[−17]	—	—	—	—	—
Besançon		116·4	318	e 19 39	PP	—	—	—	—	—
Paris		118·1	321	e 19 58	PP	e 29 43	PS	e 22 28	PPP	e 52·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Overton	z.	118·7	53	i 18 54	[+ 4]	—	—	—	—	—
Kew		118·8	325	e 19 46	PP	e 29 52	PS	e 22 38	PPP	e 68·5
Clermont-Ferrand		118·8	318	e 19 10	[+19]	e 29 9	PS	e 31 18	PPS	—
Tortosa	E.	122·1	313	20 32	PP	e 36 34	SS	—	—	e 78·5
Tucson		122·5	56	e 18 59	[+ 1]	—	—	—	—	—
Alicante		123·6	311	—	—	e 26 13	[+11]	—	—	e 52·0
Malaga	z.	127·1	310	20 58	PP	—	—	25 22	PPP	79·0
Pennsylvania		141·5	29	i 22 29	PP	i 32 42	PS	i 23 12	PKS	—

Additional readings :—
Perth i =10m.46s.
Riverview iSE =12m.36s.
Triest ePP =19m.42s., ePPP =23m.17s.
Stuttgart ePS? =29m.16s., ePPS? =30m.9s., eSSS? =39m.1s.
Strasbourg ePP =19m.36s., e =21m.2s., ePPP =21m.58s. and 22m.11s., ePPS =30m.32s., eSS =35m.41s., eSSS =39m.41s., e =43m.31s.?, 46m.31s.?, and 50m.31s.?
De Bilt e =29m.31s.?
Paris e? =19m.52s., ePP =20m.7s., i =20m.20s., e =24m.32s., ePS =29m.48s., ePPS =31m.5s., eSSS? =41m.31s.?
Kew e =20m.3s. and 20m.48s., ePS =30m.12s.
Tortosa eE =38m.34s., iE =39m.19s.
Malaga PKP_2Z =21m.38s., PPPZ =29m.16s.
Pennsylvania iEN =34m.50s. and 40m.57s.
Long waves were also recorded at Auckland and Wellington.

July 27d. 15h. 11m. 35s. Epicentre 28°·2S. 176°·9W.

$A = -·8813$, $B = -·0477$, $C = -·4701$; $\delta = -4$; $h = +2$;
$D = -·054$, $E = +·999$; $G = +·469$, $H = +·025$, $K = -·883$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	11·1	217	i 2 45	+ 2	i 4 52	+ 3	—	—	—
Arapuni	E.	11·7	210	2 31	−20	e 5 25?	+21	—	—	—
Tuai	N.	11·7	204	e 2 46	− 5	i 4 52	−12	—	—	—
New Plymouth	E.	13·2	212	e 3 21	PP	e 5 48	+ 8	—	—	—
Wellington		14·7	205	i 3 24	− 7	i 6 3	−13	i 8 10	P_cP	6·9
Apia		15·1	20	e 3 32	− 4	e 6 10	−15	e 8 41	P_cP	e 6·4
Cobb River	E.	15·4	211	e 3 44	+ 4	6 19	−13	—	—	—
Kaimata	N.E.	17·2	210	e 3 55	− 8	e 6 59	−15	—	—	—
Christchurch		17·5	205	4 5	− 2	i 7 30	+ 9	—	—	—
Brisbane		26·6	265	i 5 41	− 1	i 10 17	+ 1	i 6 30	PP	i 13·2
Riverview		27·9	251	i 6 1a	+ 7	i 10 45	+ 8	i 6 11	pP	e 13·0
Melbourne	E.	33·2	244	i 6 49	+ 9	i 12 11	+11	e 7 46	PP	—
Honolulu		52·6	23	e 9 19	+ 1	e 16 45	+ 1	—	—	e 20·7
Perth		57·5	249	—	—	17 57	+ 7	18 21	PPS	i 27·1
Batavia		75·0	272	e 11 44	− 1	i 21 24	+ 1	—	—	—
Misima		75·5	325	e 11 56	+ 8	—	—	—	—	—
Kakioka		75·8	326	e 12 1	+11	—	—	—	—	—
Kumagaya		76·1	326	e 11 59	+ 8	—	—	—	—	—
Owase		76·2	322	11 52	0	21 40	+ 4	—	—	—
Maebasi		76·5	326	e 12 13	+19	21 43	+ 4	—	—	—
Kameyama		76·6	323	e 12 4	+10	—	—	—	—	—
Nagoya		76·6	324	e 12 10	+16	21 50	+10	—	—	—
Punta Arenas	N.	76·8	144	—	—	e 31 19	SSS	—	—	35·2
Matusiro		77·0	325	e 12 3	+ 7	—	—	—	—	—
Osaka		77·0	322	12 7	+11	21 52	+ 7	—	—	—
Sendai		77·0	328	e 11 58	+ 2	21 51	+ 6	22 23	S_cS	—
Sumoto		77·1	322	e 11 53	− 4	—	—	—	—	—
Kagosima		77·7	317	e 12 8	+ 8	21 59	+ 7	17 3	PPP	—
Nemuro		79·1	334	e 12 9	+ 1	22 21	+14	—	—	—
Branner		83·0	42	i 12 29k	+ 1	—	—	—	—	—
Santa Clara		83·1	42	e 13 42	+73	i 22 53	+ 5	e 24 0	PPS	e 37·6
Lick	z.	83·3	42	i 12 30a	0	—	—	—	—	e 39·0
Pasadena		83·3	46	i 12 28a	− 2	i 22 46	− 4	i 15 39	PP	e 33·1
Palomar		83·6	47	i 12 31a	0	e 22 58	+ 5	i 15 31	PP	—
Ukiah		83·6	40	e 12 34	+ 3	e 22 58	+ 5	e 27 46	SS	e 34·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside		83·7	46	i 12 30 a	− 2	—	—	i 12 50	pP	—
Fresno	z.	84·0	43	e 12 33 a	0	—	—	e 38 55	Q	e 39·8
Tinemaha		85·1	44	i 12 40 a	+ 1	e 23 14	+ 6	i 12 57	pP	—
Shasta Dam		85·2	39	i 12 40	+ 1	—	—	—	—	—
Mineral	z.	85·4	40	e 12 40 a	0	—	—	i 15 34	PP	—
Reno		85·8	42	i 12 43 a	+ 1	e 23 22	+ 7	e 15 57	PP	e 40·6
Boulder City		86·5	47	i 12 47	+ 1	e 23 27	+ 5	e 38 52	P′P′	—
Tucson		86·9	51	i 12 49	+ 1	e 23 29	+ 3	e 16 18	PP	e 37·3
Overton	z.	87·1	46	i 12 50	+ 1	—	—	e 38 48	P′P′	—
Pierce Ferry		87·2	47	i 12 49	0	e 23 31	+ 3	e 38 38	P′P′	e 40·1
Tacubaya		88·7	68	i 13 6	+ 9	e 23 44	+ 1	i 13 27	pP	—
Victoria		90·1	33	13 4 k	+ 1	23 37	[+ 4]	16 46	PP	42·4
Salt Lake City		91·3	44	i 12 59	−10	e 23 49	[+ 9]	—	—	e 39·2
Logan		91·9	43	i 13 9	− 2	e 23 57	[+13]	e 16 26	PP	e 37·7
Sitka		92·3	21	—	—	e 22 40	[−66]	i 25 35	PS	e 37·3
Butte	N.	94·1	39	e 13 23	+ 1	e 24 49	+18	e 24 9	SKS	e 40·4
Huancayo		94·3	106	e 13 23	0	i 24 35	+ 3	i 25 47	PS	e 37·8
Bozeman		94·7	40	e 13 27	+ 3	e 24 10	{− 6}	e 17 13	PP	e 41·6
Hungry Horse		94·7	37	e 13 22	− 2	e 24 8	{− 8}	i 17 12	PP	—
La Plata	E.	94·8	134	13 54	+29	23 53	[− 7]	31 39	SS	50·4
College		95·5	12	e 13 25	− 3	i 24 2	[− 2]	e 17 19	PP	e 39·2
La Paz		98·0	114	i 13 45 k	+ 6	i 25 1	− 3	i 17 55	PP	40·8
Rapid City	E.	98·5	45	i 14 43	+ 1	e 25 23	+15	—	—	e 46·6
Calcutta	E.	104·3	288	—	—	e 24 59	[+12]	i 26 10	S	—
St. Louis		104·6	54	e 14 9	0	e 24 49	[0]	i 18 25	PP	—
Irkutsk		105·4	322	e 22 11	PKS	24 54	[+ 2]	26 15	S	—
Chicago		107·7	52	e 18 56	PP	e 26 34	?	e 28 9	PS	e 44·6
Hyderabad	N.	110·7	279	—	—	27 3	S	—	—	—
Cleveland		111·9	54	e 19 16	PP	e 27 6	S	e 28 47	PS	e 50·4
New Kensington		112·9	55	i 18 47	[+ 8]	e 28 57	PS	e 19 33	PP	e 47·0
Georgetown		114·3	57	i 19 36	PP	—	—	—	—	—
Pennsylvania		114·3	55	i 19 38	PP	i 25 42	[+13]	i 29 14	PS	e 52·5
Grahamstown	z.	114·9	202	i 18 43	[0]	—	—	—	—	—
Poona	N.	115·1	278	(18 25?)	[−18]	—	—	—	—	18·4
New Delhi	N.	115·9	290	—	—	e 27 39	{+53}	e 29 54	PS	—
Philadelphia		116·0	57	e 19 47	PP	e 25 49	[+13]	e 26 58	SKKS	e 49·8
Bombay	E.	116·2	278	e 14 21	?	—	—	—	—	—
San Juan		116·4	83	e 19 55	PP	e 25 33	[− 4]	e 27 45	SKKS	e 46·8
Tananarive		116·4	227	—	—	e 29 48	PS	—	—	53·6
Ottawa		117·0	51	18 37	[−10]	29 33	PS	19 55	PP	53·4
City College, N.Y.		117·1	57	e 19 59	PP	e 25 54	[+14]	e 29 42	PS	e 50·8
Fordham		117·2	57	e 20 5	PP	i 25 57	[+17]	e 29 15	PS	58·4
Fort de France		119·3	89	—	—	e 27 39	{+30}	—	—	—
Harvard		119·3	55	i 20 10	PP	e 25 55	[+ 7]	e 29 53	PS	e 60·9
Weston		119·4	55	i 19 23	[+31]	i 30 55	PS	i 20 45	PP	—
Seven Falls	E.	120·7	50	20 7	PP	30 8	PS	37 16	SS	60·4
Pretoria	Z.	121·2	207	i 18 57	[+ 2]	—	—	i 20 24	PP	—
Bermuda		122·2	68	e 20 43	PP	e 27 18	{−10}	e 30 30	PS	e 55·5
Andijan		122·9	303	19 3	[+ 5]	—	—	—	—	—
Obi-garm		124·5	300	19 4?	[+ 3]	—	—	—	—	—
Stalinabad		125·2	300	i 19 5	[+ 2]	—	—	—	—	—
Tashkent		125·3	303	i 19 7	[+ 4]	e 26 11	[+ 4]	i 21 5	PP	—
Halifax		125·3	53	20 50	PP	29 10	?	30 50	PS	56·1
Sverdlovsk		130·8	322	i 19 16	[+ 2]	22 39	PKS	21 41	PP	—
Ivigtut		132·7	31	e 22 44	PKS	e 29 2	{+26}	32 0	PS	66·4
Scoresby Sund		135·4	12	19 25	[+ 3]	26 37	[+ 6]	21 58	PP	54·4
Moscow		143·0	328	19 35	[− 1]	29 41	{+ 2}	22 45	PP	—
Tiflis		143·6	303	i 19 39	[+ 2]	—	—	—	—	—
Erevan		144·0	301	19 42	[+ 5]	—	—	—	—	—
Leninakan		144·4	302	19 44	[+ 6]	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helsinki		144·8	342	i 19 41	[+ 2]	—	—	—	—	e 55·4
Upsala		146·8	347	19 45a	[+ 3]	29 59	{− 2}	e 23 54	PKS	e 65·4
Sotchi		146·9	308	e 19 40	[− 2]	—	—	—	—	—
Bergen		147·8	358	19 48	[+ 4]	e 24 40	?	—	—	61·4
Theodosia		149·4	313	19 52	[+ 6]	—	—	—	—	—
Yalta		150·4	312	19 54	[+ 6]	—	—	—	—	—
Aberdeen		150·8	6	e 20 2	[+13]	i 30 22	{− 1}	e 22 54	PP	e 76·4
Ksara		151·4	289	i 19 53	[+ 4]	—	—	23 42	PP	—
Copenhagen		151·7	350	i 19 52	[+ 2]	30 31	{+ 3}	23 41	PP	—
Edinburgh	E.	151·9	7	e 33 25	PS	—	—	—	—	—
Lwow		153·1	329	e 19 56	[+ 4]	—	—	—	—	—
Potsdam		154·7	347	e 20 7	[+13]	—	—	—	—	e 75·7
Istanbul		155·2	308	e 19 56	[+ 1]	—	—	i 24 12	PP	—
Helwan	Z.	155·3	281	19 58	[+ 3]	23 34	PKS	20 25	PKP_2	—
Bucharest		155·5	318	e 20 39	PKP_2	—	—	43 25?	SS	—
Collmberg		155·7	345	e 19 57	[+ 2]	e 34 36?	SKSP	e 20 25	PKP_2	e 65·4
De Bilt		156·1	356	i 19 58a	[+ 2]	e 34 55	SKSP	e 24 7	PP	e 73·4
Jena	E.	156·4	346	e 20 1	[+ 5]	—	—	e 20 28	PKP_2	—
Prague		156·5	342	e 19 57	[0]	—	—	e 24 16	PP	—
Kew		156·6	5	i 19 57a	[0]	e 26 54	[− 7]	i 20 29	PKP_2	e 70·4
Budapest		157·1	332	20 48	PKP_2	27 50	[+48]	23 24	PKS	e 73·4
Kalossa		157·8	331	e 20 38	PKP_2	—	—	—	—	—
Belgrade		158·4	324	e 20 0a	[+ 1]	e 33 34	PS	i 20 39	PKP_2	e 85·9
Jersey	E.	158·7	9	—	—	e 31 25?	{+19}	e 38 5	PPS	—
Stuttgart		158·9	349	i 20 1a	[+ 1]	e 31 55	{+48}	e 20 39	PKP_2	78·4
Strasbourg		159·3	352	i 20 4	[+ 4]	e 26 59	[− 5]	i 20 43	PKP_2	e 73·4
Paris		159·4	2	i 20 1	[+ 1]	e 27 24	[+20]	e 20 52	PKP_2	e 61·9
Zagreb		159·7	334	e 20 3	[+ 3]	—	—	—	—	—
Basle		160·4	351	e 20 4	[+ 3]	e 24 30	PP	e 20 47	PKP_2	—
Zürich		160·4	350	e 20 1	[0]	e 24 26	PP	e 20 45	PKP_2	—
Triest		160·6	338	i 41 46	?	e 44 38	SS	e 50 38	SSS	e 72·6
Chur		160·7	348	e 20 3a	[+ 1]	—	—	e 24 24	PP	—
Besançon		160·8	353	i 20 4	[+ 2]	e 26 26	[−39]	i 20 46	PKP_2	—
Neuchatel		161·0	352	e 20 3	[+ 1]	—	—	—	—	—
Salo		161·7	343	20 6a	[+ 3]	e 24 48	PP	e 20 56	PKP_2	—
Bologna		162·4	340	e 20 6a	[+ 3]	e 45 15?	SS	e 20 57	PKP_2	—
Clermont-Ferrand		162·5	0	e 20 5	[+ 2]	e 46 12	SS	i 20 22	pPKP	76·4
Florence Arc.		163·1	339	e 20 58	PKP_2	e 31 30	{+ 1}	—	—	—
Florence Xim.		163·1	339	e 20 12	[+ 8]	i 45 46	SS	—	—	—
Prato		163·1	339	e 20 7	[+ 3]	—	—	e 25 3	PP	—
Rome		164·3	333	i 20 7	[+ 2]	e 31 37	{+ 2}	e 24 46	PP	e 70·4
Lisbon	E.	165·4	41	20 7	[+ 1]	—	—	24 55	PP	—
Tortosa		167·2	8	20 11	[+ 3]	27 12	[+ 2]	21 18	PKP_2	e 67·4
Alicante		169·4	16	20 15	[+ 6]	27 19	[+ 8]	21 35	PKP_2	e 78·6
Granada		169·4	32	20 16	[+ 7]	i 31 32	{−28}	21 35	PKP_2	80·6
Malaga	Z.	169·4	35	i 20 12k	[+ 3]	—	—	i 21 18	PKP_2	82·5
Algiers Univ.	Z.	170·0	0	e 20 11	[+ 2]	—	—	e 21 33	PKP_2	—
Almeria		170·2	27	i 20 13	[+ 4]	27 10	[− 2]	21 32	PKP_2	81·9
Tamanrasset	Z.	174·2	—	i 20 15k	[+ 4]	—	—	i 21 46	PKP_2	78·4

Additional readings and notes :—
Apia e =3m.38s., eS? =6m.4s., e =13m.32s., and 16m.49s.
Cobb River eP?E =3m.47s.
Kaimata eNE =4m.2s.
Christchurch iP =4m.9s., eE =4m.49s., iE =5m.43s., e =6m.17s., eSEZ =6m.55s.
Brisbane iZ =11m.5s., iSSZ =11m.17s., iSSN =11m.20s.
Riverview iEZ =6m.32s., iZ =6m.46s., iPPE =6m.52s., iZ =6m.57s., iN =7m.0s. and 7m.40s., iE =11m.17s., iN =12m.27s.
Perth i =18m.53s.
Lick iZ =12m.33s.
Pasadena i =12m.47s., iPPPEN =17m.16s., iN =23m.51s., eSSN =28m.20s., iPKP,PKPZ =38m.55s.
Riverside iZ =13m.9s., ePKP,PKPZ =38m.55s.
Tinemaha ePKP,PKPZ =38m.56s.
Mineral iZ =12m.43s.k, 12m.59s., 15m.15s., and 15m.26s.
Reno iZ =13m.12s.a, iE =13m.22s., iZ =13m.31s., iN =13m.37s., eSEZ =23m.29s.
Boulder City e =27m.12s.

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Tucson e =16m.2s., ePPP =18m.10s., eSS =29m.22s., e =38m.48s.
Tacubaya iPP =16m.54s., ipPP =17m.6s., e =26m.15s., eSSS =33m.18s.
Victoria e =13m.25s.
Logan i =13m.30s.. e =15m.41s., eS =24m.30s., iPS =25m.29s., e =29m.9s., eSS = 30m.28s., e =33m.37s.
Sitka eSS =30m.17s.
Butte eN =30m.7s.
Huancayo e =16m.3s., iSS =30m.42s.
Bozeman ePS =25m.51s., e =29m.19s. and 29m.39s.
Hungry Horse eP (=PKP,PKP) = 38m.29s.
La Plata PPE =15m.13s., SKSPE =25m.36s., PPSN =25m.48s., SSN =30m.13s. SSSE =38m.19s., QN =45m.13s., Q?E =46m.9s.
College ePPP =19m.29s., iPS? =26m.5s., e =30m.10s., eS =33m.57s., e =36m.28s. and 38m.28s.
La Paz iSKS =24m.13s., iPS =27m.1s., iSS =32m.5s.
St. Louis iS =26m.7s., iPS =27m.36s., iSS =33m.7s.
Irkutsk PS =28m.1s.
Chicago eSS =34m.4s.
Cleveland eEN =20m.21s., eE =28m.37s., ePSN =28m.52s., ePPSEN =29m.53s., eSSN =35m.7s., eE =35m.16s., eSSSN =39m.18s., eE =39m.40s., iE =40m.20s., eN =43m.9s.
Pennsylvania iN =27m.25s., iSSE =34m.55s., iE =36m.38s.
Poona iN =8m.32s.
New Delhi eN =31m.28s.
Philadelphia ePS =29m.36s., eSS =35m.47s.
San Juan e =19m.45s., ePS =29m.45s.
Ottawa PPP =22m.26s., e =27m.49s., e =29m.16s., SS =36m.25s.?.
City College eSS =36m.20s.
Fordham eSS =36m.43s.
Harvard eSS =36m.42s., eSSS =40m.35s.
Weston SS =37m.17s.
Bermuda eSS =37m.37s., eSSS =41m.25s.
Tashkent ePKS =22m.30s., eSKKS =27m.51s., iSSS =43m.13s.
Halifax e =26m.52s., PPS =32m.20s., SS =37m.55s.?.
Sverdlovsk iPS =31m.54s., iSS =40m.1s.
Ivigtut e =35m.4s.
Scoresby Sund 22m.51s., 28m.13s., 32m.7s. and 34m.13s., SS =39m.49s.
Upsala iE =20m.35s., iN =22m.42s., eE =29m.40s., PKKSE =32m.13s., eSKSPN = 33m.27s.?, eN =34m.56s., eSS =41m.58s., eQE =60·4m.
Aberdeen iEN =34m.2s., eEN =60m.7s.
Copenhagen i =19m.59s., 27m.46s., SKSP =33m.32s., SKKS (Δ >180°) =35m.2s., SS (Δ >180°) =43m.12s.
Helwan eZ =21m.42s., PPZ =24m.2s., eZ =25m.10s., eN =44m.55s.
Collmberg ePKPE =20m.10s., eZ =20m.45s., and 21m.3s., ePPZ =24m.22s., ePPSE = 37m.45s.?, eSSE =44m.6s.?, eSSSN =49m.43s.
De Bilt iZ =32m.57s., eSS =43m.55s., eSSS =49m.55s.
Kew iZ =20m.51s., e =24m.2s., 25m.57s., and 34m.20s., eNZ =37m.23s. and 45m.10s., e =49m.50s., eEN =64m.34s.
Budapest ePP =24m.53s., PPP =28m.18s., i =29m.26s., SKKS =31m.18s., P_cS,PKP = 32m.34s., i =33m.45s., PPS =37m.38s., SS =44m.2s., SSS =49m.48s.
Belgrade e =22m.3s. and 24m.31s.
Stuttgart eZ =21m.10s., ePP =24m.25s., eZ =25m.42s., ePPP =27m.58s., eSZ =32m.44s., ePSKS =34m.50s., ePPS =37m.43s., eSS =44m.37s., eSSS =50m.43s., eQ =64·4m.
Strasbourg i =21m.10s., iSKP =23m.25s., ePP =24m.25s., i =25m.35s., ePP (Δ >180°) = 27m.33s., ePPP =28m.10s., eSKKS =31m.8s. and 31m.15s., ePPP(Δ >180°) = 32m.42s., eSKKS (Δ >180°) =35m.4s., ePPS =37m.42s., eSS =44m.25s., e = 44m.50s. and 49m.45s., eSSS =50m.25s. and 50m.35s.
Paris i =20m.17s., e =20m.39s. and 20m.42s., i =21m.3s. and 23m.19s., ePKS =23m.36s., ePP =24m.38s., ePPP =28m.12s., ePPP (Δ >180°) =32m.25s., ePPS =37m.52s., eSS =45m.14s., eSSS =51m.25s.?, e =57m.13s., eSSS =59m.25s.?.
Besançon e =23m.22s., ePP =24m.25s., i =30m.1s., ePPP (Δ >180°) =32m.31s.
Bologna eE =21m.28s.
Clermont-Ferrand iPKP$_2$ =20m.57s., ipPKP$_2$? =21m.18s., ePP =24m.37s., ipPP? = 25m.13s., ePPP =28m.34s., ePPS =38m.17s., eSSS =51m.48s.
Florence, Arc. e =35m.47s.
Rome ePPP =28m.37s., ePSKSN =35m.35s., iSS =45m.42s., SSS? =51m.29s.
Tortosa SKPN =23m.53s., PPE =25m.6s., SKKSEN =31m.52s., SSE =45m.50s., SSSE =57m.50s.
Alicante PKS =23m.43s., PP =25m.21s., PPP =29m.15s., SKKS =31m.55s., SKSP = 35m.49s., SS =46m.31s.?.
Granada PP =25m.19s., PPP =29m.8s., SKSP =35m.53s., ePPS =38m.35s., SS = 46m.14s., SSS =52m.56s.
Malaga PPZ =25m.16s., PPPZ =29m.12s., QZ =73m.58s.
Algiers University eZ =20m.32s., 21m.52s. and 24m.6s., ePPZ =25m.24s., ePPPZ = 29m.26s., ePPPZ (Δ >180°) =31m.16s.
Almeria PP =25m.18s., PPP =29m.28s., SKKS =32m.8s., SKSP =35m.52s., PPS = 39m.16s., SS =46m.20s., SSS =53m.8s.
Tamanrasset iZ =20m.24s., and 21m.33s., iPPZ =25m.34s., iZ =28m.54s., ePPPZ = 30m.2s.
Long waves were also recorded at Colombo and Barcelona.

July 27d. Continuation of the list of after-shocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	36	16	3	3	33	16	51	17	20	19	4?

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	3	38	3	31	42	12	1	46	16	51	32
0	36	34	8	51	30	12	10	24	20	19	20
3	3	48	11	11	50						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	36	34	8	51	33	12	9	58	20	53	20
3	4	30	11	12	15	20	19	31	23	16	9
3	31	3	12	2	10						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	36	46	8	52	20	16	51	46	20	19	34
3	4	28?									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	5	24	3	31	17	16	51	45	20	19	46

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	37	2	8	52	42	16	51	56	20	19	41
3	4	20									

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
3	31	36	16	52	3	20	19	46

Frunse.

h.	m.	s.
8	53	8

July 27d. Readings also at 2h. (Klyuchi), 5h. (Overton, Shasta Dam, Mineral, Hungry Horse, and College), 6h. (Strasbourg), 8h. (Besançon and Ksara), 12h. (Andijan, Frunse, Samarkand, Stalinabad, Tashkent, Tchimkent, New Delhi, Strasbourg, Reno, Overton, San Francisco, Lick, near Berkeley, Branner, and Santa Clara), 13h. (College), 15h. (Tananarive and College). 16h. (Collmberg), 17h. (Overton), 19h. (near Branner and Reno).

July 28d. 3h. Undetermined Shock. Off the coast of Peru.

Huancayo iP =37m.27s., i =37m.35s., 38m.4s., and 38m.12s., iL =39m.30s.
La Paz iPZ =38m.27s., iPP =38m.37s., iS =40m.28s., SS =40m.46s., L =41m.18s.
Bogota iPZ =41m.11s., i =41m.19s., iS =45m.11s., eLEN =48m.
Harvard iP =46m.23s.
Tucson eP =46m.27s.
Ottawa eZ =46m.42s.
Palomar iPZ =46m.56s., iZ =47m.2s.
Pierce Ferry eP =46m.59s.
Riverside ePZ =47m.2s., eZ =47m.9s.
Pasadena ePZ =47m.6s., iZ =47m.13s. and 47m.28s.
Overton ePZ =47m.9s.
Tinemaha iPZ =47m.19s., iZ =47m.26s.
Reno ePZ =47m.44s., eN =47m.52s.
Shasta Dam e =47m.48s.
Hungry Horse iP =47m.58s.
Tamanrasset e?Z =49m.0s., iPZ =49m.35s.k, e =49m.32s.
College eP =50m.2s.
Long waves were also recorded at Granada, Clermont-Ferrand, De Bilt, and Kew.

July 28d. Continuation of the list of after-shocks from the origin in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.
4	24	23	4	33	31	8	9	36

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	37	50	4	10	40	4	24	38	8	9	54

Continued on next page.

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	37	47	4	24	46	4	33	59	4	24	51

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	37	56	4	25	0	17	29	18	23	16	32
3	42	0	8	10	15	21	12	40			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	38	10	4	25	2	8	10	21?	4	25	2

Tashkent.

Tchimkent.

July 28d. Readings also at 1h. (Bogota (2) and near Balboa Heights), 4h. (Palomar, Pasadena, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, San Juan, Strasbourg, and Calcutta), 5h. (Clermont-Ferrand, De Bilt, Kew, Stuttgart, Scoresby Sund, and La Paz), 7h. (Weston and near Mizusawa), 8h. (Scoresby Sund), 9h. (Clermont-Ferrand, Overton, and near Mizusawa), 10h. (near Mizusawa), 11h. (Sofia and Istanbul), 13h. (Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Scoresby Sund, and Besançon), 15h. (Mineral (2), and Strasbourg), 19h. (College, Victoria, near Branner, and Lick), 20h. (Granada, Seven Falls, Ottawa, Harvard, Pennsylvania, Philadelphia, Saskatoon, Bozeman, Butte, Logan, Salt Lake City, Pasadena, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Reno, Hungry Horse, Berkeley, College (2), Victoria, and near Sitka), 22h. (Istanbul, College and Santa Lucia).

July 29d. Continuation of list of after-shocks from the neighbourhood of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	30	20?	10	33	32	13	46	12	22	26	14
10	25	31	11	40	12						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	31	20	10	33	46	11	40	26	22	26	26

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	31	56	10	25	53	12	15	49	21	53	40
9	52	57	10	33	49	13	46	26	22	26	31
10	1	7	11	40	26						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
10	34	35?	11	40	38	22	26	44

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	32	0	5	9	46	10	33	58	13	46	26
1	30	24	5	41	16	11	40	33	15	49	36
5	7	13									

Samarkand.

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
10	34	15	11	41	40	10	35	26	11	42	17

July 29d. Readings also at 6h. (Brisbane, Riverview, Auckland, Christchurch, Cobb River, Kaimata, Tuai, and Wellington), 7h. (Riverview, Tucson (2), Boulder City, Pierce Ferry, Mineral, Hungry Horse (2), College (2), Ottawa (2), Ksara, Besançon, and Rome), 8h. (Clermont-Ferrand, Kew, Paris, Strasbourg, Stuttgart, Tortosa, Scoresby Sund, Overton, and near Mizusawa), 10h. (Auckland, Christchurch, Wellington, Riverview, Istanbul, and Ksara), 11h. (Clermont-Ferrand, De Bilt, Kew, Paris, Strasbourg, Stuttgart, Alicante, Almeria, Malaga, Logan, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Mineral, China Lake, Hungry Horse, Sitka, and near Victoria), 13h. (Copiapo, near Tacubaya, and near Overton (2)), 17h. (Pierce Ferry, Hungry Horse (2), College (3), and near Mizusawa), 19h. (Overton and College), 20h. (La Paz, Butte, Bozeman, Logan, Salt Lake City, Pasadena (2), Berkeley, Santa Clara, Boulder City (2), Overton, Pierce Ferry (2), Hungry Horse (2), and near Tucson (2)), 21h. (Harvard, Pennsylvania, Philadelphia (2), Butte, Bozeman (2), Logan (2), Salt Lake City (2), Pasadena, Boulder City, Overton, Pierce Ferry, Santa Clara, Reno, Fresno, Ukiah, Hungry Horse, Tacubaya, Honolulu, and near Tucson), 22h. (Copiapo, Santa Lucia, Harvard (2), Ottawa, Pennsylvania (2), Seven Falls, Chicago (2), Butte, Bozeman, Salt Lake City, Pasadena, Boulder City, Overton (2), Pierce Ferry, Santa Clara, Ukiah, Hungry Horse, and near Tucson (2)), 23h. (Overton, Ukiah, and College).

July 30d. 6h. 30m. 6s. Epicentre 44°·1N. 150°·1E. Depth of focus 0·040.

Intensity II-III at Nemuro. Epicentre as adopted. Depth of focus 180km. Seismo. Obs., Cent. Met. Obs., Japan, 1949, Tokyo, 1950, p.23.

$A = -·6246$, $B = +·3592$, $C = +·6935$; $\delta = +9$; $h = -3$;
$D = +·498$, $E = +·867$; $G = -·601$, $H = +·346$, $K = -·720$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.	
Nemuro		3·3	246	0 30a	−28	1 12	−32	—	—
Sapporo		6·4	264	1 29a	− 5	2 40	− 8	—	—
Hatinohe		7·3	244	2 16	+30	—	—	—	—
Mori		7·3	257	1 40	− 6	2 58	−10	—	—
Miyako		7·5	236	1 50	+ 2	3 12	− 1	—	—
Aomori		7·6	248	2 21	+32	3 14	− 1	—	—
Morioka		8·0	240	1 55	+ 1	3 25	+ 1	—	—
Mizusawa		8·4	237	e 2 1	+ 2	3 35	+ 2	—	—
Sendai		9·1	233	2 17	+ 9	3 48	0	—	—
Hukusima		9·7	232	2 24	+ 9	4 10	+ 8	—	—
Onahama		10·0	228	3 50	S	(3 50)	−19	—	—
Mito		10·7	227	4 24	S	(4 24)	0	—	—
Kakioka		10·9	227	2 38	+ 8	4 41	+12	—	—
Tukubasan		11·0	227	4 43	S	(4 43)	+12	—	—
Kumagaya		11·4	230	3 14	+38	—	—	—	—
Maebasi		11·4	231	2 47	+11	4 53	+13	—	—
Tokyo		11·6	227	4 23	S	(4 23)	−21	—	—
Mera		12·1	224	5 16	S	(5 16)	+20	—	—
Hunatu		12·2	229	1 44	−62	—	—	—	—
Nagoya		13·5	233	3 13	+11	4 55	−31	—	—
Kameyama		14·0	233	5 44	S	(5 44)	+ 7	—	—
College		39·5	36	i 6 56	− 9	—	—	e 8 30	PP
Victoria	z.	56·8	52	i 9 14a	− 2	—	—	—	—
Hungry Horse		62·1	48	i 9 50	− 2	—	—	—	—
Mineral	z.	62·4	59	i 9 54a	0	—	—	e 12 13	PP
Branner	z.	63·7	62	i 10 3a	0	—	—	—	—
Reno		64·0	59	i 10 6k	+ 1	—	—	i 10 53	pP
Lick	z.	64·1	62	i 10 6a	0	—	—	i 10 10	pP
Fresno		65·7	61	e 10 16a	0	—	—	—	—
Tinemaha		66·4	61	i 10 20a	0	—	—	i 10 38	pP
Logan		67·4	53	i 10 23	− 3	—	—	—	—
China Lake	z.	67·6	61	e 10 28a	0	—	—	i 10 45	pP
Pasadena		68·3	63	i 10 32a	0	—	—	—	—
Riverside		68·9	63	i 10 36a	0	—	—	i 10 53	pP
Overton	z.	69·2	59	i 10 38	+ 1	—	—	—	—
Boulder City		69·3	60	i 10 39	+ 1	—	—	—	—
Palomar		69·7	63	i 10 41a	+ 1	—	—	—	—
Pierce Ferry		69·7	59	i 10 40	0	—	—	—	—
Ivigtut		74·0	9	e 10 58	− 8	—	—	—	—
Tucson		74·2	60	i 11 8	+ 1	—	—	—	—
Collmberg	z.	78·0	334	e 11 20	− 8	—	—	—	—
Stuttgart	z.	81·4	335	e 11 40	− 6	—	—	—	—
Strasbourg		82·0	336	e 11 47	− 2	—	—	—	—
Ottawa		82·1	31	e 11 45	− 5	—	—	16 54?	PP
Besançon		83·7	336	e 11 51	− 7	—	—	—	—
Harvard		86·1	29	i 12 8	− 2	—	—	—	—
Weston		86·3	29	i 12 9	− 2	—	—	—	—

Additional readings :—
Mizusawa PE = 2m.4s.
College e = 8m.0s.
Mineral iZ = 10m.0s., 10m.11s., and 10m.34s.
Reno eN = 10m.21s., iZ = 10m.32s.
Tinemaha iZ = 10m.50s.
Stuttgart eZ = 11m.43s.

July 30d. 17h. 47m. 7s. Epicentre 38°·6N. 26°·3E. (as on 23d.).

A = +·7024, B = +·3472, C = +·6213; δ = −7; h = −1;
D = +·443, E = −·896; G = +·557, H = +·275, K = −·784.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		3·3	40	e 0 51	− 2	i 1 46	S_g	—	—	—
Sofia		4·7	332	e 1 12	− 2	2 14	+ 4	2 44	L	(2·7)
Bucharest	N.	5·8	358	e 1 32	+ 3	i 2 26	−12	i 1 59	P_g	—
Belgrade		7·6	327	2 5a	+10	e 3 41	+18	i 4 19	S_g	—
Messina		8·4	271	e 2 4	− 2	e 3 54	+11	e 4 18	S*	—
Ksara		9·1	119	e 2 21	+ 7	(e 5 26)	L	—	—	e 5·4
Kalossa	N.	9·6	328	e 2 57	?	—	—	—	—	e 5·3
Helwan	Z.	9·7	153	i 2 23	+ 1	i 4 8	− 7	—	—	e 5·3
Budapest		10·4	332	2 39	+ 5	4 52	+20	3 40	P_gP_g	i 5·6
Zagreb		10·5	317	e 2 35	0	—	—	—	—	e 6·0
Rome		11·1	292	e 2 48	+ 5	e 4 31	−18	e 5 38	Q	e 6·1
Skalnate Pleso		11·4	340	e 3 5	PPP	e 5 6	+10	—	—	—
Triest		11·7	311	e 2 37	−14	e 4 47	−17	e 3 21	PPP	e 6·1
Bologna		12·7	303	e 3 43	?	e 6 8	SSS	—	—	e 7·8
Salo		13·7	306	e 3 19	+ 1	e 5 53	+ 1	—	—	e 7·8
Prague		14·2	328	e 3 24	0	e 5 56	− 8	—	—	—
Pavia		14·3	303	e 3 18	− 8	—	—	—	—	—
Zürich		15·6	310	e 3 43	0	e 6 20	−17	—	—	e 8·3
Collmberg		15·8	328	e 3 43?	− 2	—	—	e 3 46	P	e 7·6
Stuttgart		16·0	315	e 3 43	− 5	e 6 59	+13	e 4 23	PP	e 7·9
Jena		16·1	325	e 3 50	+ 1	—	—	—	—	e 9·0
Basle		16·3	309	e 3 50	− 2	—	—	—	—	e 8·9
Potsdam		16·6	331	e 5 7	?	—	—	e 5 11	?	e 9·2
Strasbourg		16·7	313	i 3 57	0	e 7 6	+ 3	i 4 7	PP	e 8·4
Besançon		17·2	307	i 4 2	− 1	—	—	e 4 17	PP	—
Clermont-Ferrand		18·6	300	e 4 22	+ 1	e 8 26	SSS	e 4 41	PPP	11·4
Paris		19·9	309	e 4 31?	− 5	—	—	e 4 36	P	e 10·9
De Bilt		20·0	321	e 4 29	− 8	e 8 23	+ 6	—	—	e 10·4
Tortosa		20·0	285	4 35	− 2	—	—	—	—	e 11·9
Upsala		22·0	348	4 48	−10	9 5	+ 9	5 22	PP	e 11·9
Kew		22·6	316	e 4 54	− 9	e 9 12	+ 5	—	—	e 11·9
Almeria		22·8	275	3 16	?	7 33	?	—	—	12·4
Granada		23·6	277	i 5 17k	+ 4	i 9 38	+13	—	—	11·8
Tamanrasset	z.	23·8	235	e 5 13	− 2	—	—	e 5 44	PP	—
Malaga	z.	24·3	277	i 5 20k	0	e 9 38	+ 1	—	—	15·2
Aberdeen		26·3	325	—	—	e 10 30	+19	—	—	e 15·0
Scoresby Sund		40·5	337	9 29	PP	—	—	—	—	21·9
Ottawa	z.	71·0	313	11 26	+ 4	—	—	11 29	P_cP	—
Hungry Horse		86·5	335	i 12 42	− 4	—	—	—	—	—
Tucson		99·0	324	e 13 40	− 4	—	—	—	—	—

Additional readings :—
Bucharest eN = 1m.46s.
Kalossa eE = 3m.38s.
Budapest S_gS_g = 6m.8s.
Salo e = 4m.3s.
Strasbourg i = 4m.1s., iPPP = 4m.24s., i = 4m.37s., eS = 7m.13s.
Besançon e = 4m.35s.
Clermont-Ferrand eP? = 4m.0s.
Paris e = 4m.43s. and 6m.22s.
Upsala eSSN = 10m.11s.
Kew ePZ = 3m.33s., eSSEZ = 11m.14s.
Almeria PP = 3m.50s., P_cP = 6m.51s.
Tamanrasset iPZ = 5m.18s.a, ePPPZ = 5m.54s., eZ = 6m.6s.
Ottawa SZ = 11m.58s. and 12m.11s., readings given as for local shock.
Long waves were also recorded at Copenhagen, Bergen, and Alicante.

July 30d. Continuation of list of after-shocks recorded in Turkeston.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	31	8	14	12	35	14	45	30	16	27	37
6	23	22	14	42	14?						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.
14	45	48	16	27	52	19	51	0

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	31	23	14	42	44	16	27	49	19	51	43
6	23	37	14	45	52						

Tashkent.

h.	m.	s.	h.	m.	s.
14	46	5	16	28	5

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.
6	46	58	14	45	55	16	27	50?

Samarkand.

h.	m.	s.	h.	m.	s.
14	47	0	16	28	18

Tchimkent.

h.	m.	s.
14	46	13

Frunse.

h.	m.	s.
14	47	40

July 30d. Readings also at 0h. (Istanbul, Honolulu, Overton, and Tucson (2)), 1h. (College), 2h. (Tucson), 3h. (Istanbul), 6h. (Copiapo, near Mizusawa, and near Balboa Heights), 13h. (Victoria), 14h. (Hungry Horse and Istanbul), 15h. (Ksara, Helwan, Ottawa, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, China Lake, Hungry Horse, College (2), and near Balboa Heights (2)), 16h. (Ottawa, Victoria, Hungry Horse, College, Collmberg, Jena, Strasbourg, and Stuttgart), 18h. (Belgrade, Ksara, Strasbourg, and Tamanrasset, and near Istanbul), 19h. (Istanbul (2)), 20h. (Helwan, Overton, and Tucson), 21h. (Tucson, Boulder City, Overton (2), Pierce Ferry, Shasta Dam, Hungry Horse, Logan, Tacubaya and Scoresby Sund), 22h. (Istanbul, Triest, and College), 23h. (Tacubaya).

July 31d. 4h. 13m. 48s. Epicentre 33°·8S. 70°·5W. (as on 1945, September 13d.).
Intensity IV between 32° and 33° S. Lat. Macroseismic radius 150km.

F. Greve.
Boletin del año., 1949, Segundo Semestre Instituto Sismologico, Santiago, p. 6.

$A = +\cdot2780$, $B = -\cdot7850$, $C = -\cdot5537$; $\delta = +9$; $h = +1$;
$D = -\cdot943$, $E = -\cdot334$; $G = -\cdot185$, $H = +\cdot522$, $K = -\cdot833$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia		0·4	334	i 0 39	?	—	—	—	—	i 1·0
Copiapo	N.	6·4	1	i 1 15	−23	3 41	S_e	—	—	—
La Plata	E.	10·4	99	3 17	+43	5 20	S_e	3 42	PP	6·4
	N.	10·4	99	3 19	+45	5 0	S*	—	—	6·3
La Paz		17·4	8	i 4 6a	0	i 7 22	+ 3	i 4 28	PP	9·2
Huancayo		22·1	348	i 4 59	0	i 9 0	+ 2	—	—	e 19·8
San Juan		52·1	6	e 9 31	+17	e 16 37	− 1	e 20 11	SS	e 24·4
Weston		75·8	0	i 11 55	+ 5	—	—	—	—	—
Harvard		75·9	0	i 11 54	+ 4	—	—	—	—	—
Tucson		75·9	326	e 11 51	+ 1	—	—	—	—	—
Grahamstown	Z.	77·5	122	i 11 57	− 2	—	—	—	—	—
Palomar		79·7	323	i 12 14	+ 3	—	—	—	—	—
Riverside	Z.	80·5	322	i 12 17	+ 2	—	—	—	—	—
Boulder City		80·8	326	e 12 12	− 5	—	—	—	—	—
Pasadena		81·0	322	i 12 20	+ 2	—	—	—	—	—
China Lake	Z.	82·1	324	i 12 27	+ 3	—	—	—	—	—
Pretoria	Z.	82·8	116	i 12 50	+23	—	—	—	—	—
Tinemaha	Z.	83·4	323	i 12 32	+ 2	—	—	—	—	—
Logan		84·2	331	e 12 33	− 1	—	—	—	—	—
Lick	Z.	85·3	322	e 12 42k	+ 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Berkeley	z.	86·0	322	i 12 57k	+14	—	—	—	—	—
Reno	z.	86·0	324	i 12 48k	+ 5	—	—	—	—	—
Mineral	z.	87·6	324	e 12 54a	+ 3	—	—	—	—	—
Hungry Horse		90·6	333	e 13 7	+ 2	—	—	—	—	—
Tamanrasset	z.	91·6	64	e 13 28	+18	—	—	—	—	—

Additional readings :—
Santa Lucia iN = 52s.
Copiapo iN = 2m.19s.
La Paz i = 4m.20s.
Palomar iZ = 12m.21s.
Pasadena iZ = 12m.27s. and 12m.37s.
Tinemaha iZ = 12m.40s.
Lick iZ = 12m.49s. and 12m.59s.
Reno eN = 12m.52s.
Tamanrasset eP?Z = 13m.34s.
Long waves were also recorded at Rome and Stuttgart.

July 31d. Continuation of the list of repetitions from the neighbourhood of the Turkestan earthquake.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	24	22	12	46	26	22	13	36	23	38	40
10	32	1	19	30	21						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.
3	24	40	22	13	50	23	38	56

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	6	46	10	32	20	19	30	46	22	13	50
3	7	3	12	46	36	21	35	15	23	39	5
3	24	51	17	41	30						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
19	30	53	22	14	0	23	39	12

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
10	32	31	12	49	15	22	13	58	23	39	15
12	46	47	19	30	53						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	25	2	10	33	20	22	14	7	23	39	16

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
19	32	24	22	14	30	23	40	44

July 31d. Readings also at 0h. (La Paz, Tacubaya, San Juan, Pasadena, Riverside, Tinemaha, Boulder City, Overton, Pierce Ferry, Reno, Mineral, Tucson, Hungry Horse, Victoria, College, Logan, Bozeman, Ottawa, Seven Falls, Harvard, Philadelphia, Christchurch, Wellington, Scoresby Sund, Kew, Clermont-Ferrand, Paris, Stuttgart, and Granada), 1h. and 2h. (near Overton), 4h. (near Berkeley, Branner, and Lick), 6h. (Hungry Horse and Tacubaya), 7h. (Palomar, Pasadena, Riverside, Tinemaha, Mineral, Berkeley, China Lake, Hungry Horse, College, and Ottawa), 8h. (Alicante and Tucson), 10h. (near Alicante), 11h. (near Apia), 13h. (near Zürich), 17h. (near Chur), 21h. (College), 22h. (Ksara, Sverlovsk, Tiflis, and College), 23h. (near Bogota).

Aug. 1d. 7h. 39m. 51s. Epicentre 35°·8N. 74°·2E.

Suggested by bulletin of U.S.S.R.

$A = +·2214$, $B = +·7822$, $C = +·5823$; $\delta = -7$; $h = 0$;
$D = +·962$, $E = -·272$; $G = +·159$, $H = +·560$, $K = -·813$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Murgab		2·6	355	e 0 49	+ 5	i 1 29	S_g	—	—	—
Stalinabad		5·1	304	i 1 22	+ 2	e 2 56?	S_g	—	—	—
Andijan		5·2	344	e 1 25	+ 4	1 3 1	S_g	—	—	—
Tashkent		6·7	327	e 1 45	+ 3	e 3 5	+ 5	—	—	—
Samarkand		6·9	306	e 1 51	+ 6	—	—	—	—	—
Frunse		7·1	2	i 1 52	+ 4	—	—	—	—	—
Tchimkent		7·4	333	1 56	+ 4	—	—	—	—	—
New Delhi	E.	7·6	160	e 1 44	−11	3 24	+ 1	3 45	S*	—
Almata		7·7	15	i 2 0	+ 4	i 3 33?	+ 8	—	—	—
Bombay		16·9	185	—	—	e 7 7	0	8 39	Q	9·2
Poona		17·2	182	3 54	− 9	i 7 29	+15	7 57	SS	8·6
Hyderabad	N.	18·7	168	e 4 1	−21	7 34	−14	—	—	9·2
Baku		19·7	290	e 4 37	+ 3	—	—	—	—	—
Sverdlovsk		23·0	340	i 5 7	0	—	—	—	—	—
Grozny		23·1	297	e 5 11	+ 3	—	—	—	—	—
Tiflis		23·6	293	i 5 15	+ 2	—	—	—	—	—
Erevan		23·8	289	5 18	+ 3	—	—	—	—	—
Leninakan		24·3	291	5 24	+ 4	—	—	—	—	—
Piatigorsk		25·2	299	e 5 59?	+30	e 10 13?	+21	—	—	—
Kodaikanal	E.	25·6	174	—	—	e 10 27	+28	—	—	—
Irkutsk		27·0	42	e 5 42	− 3	e 9 16	P_cP	—	—	—
Ksara		31·4	277	e 6 23	− 2	e 12 19	+47	—	—	—
Yalta		31·6	298	e 6 24	− 2	—	—	—	—	—
Moscow		31·8	320	6 26	− 2	—	—	—	—	—
Istanbul		35·5	292	10 11	?	12 28	− 8	—	—	—
Helwan		36·3	273	i 7 5	− 2	12 51	+ 3	e 9 39	P_cP	e 18·4
Budapest	E.	42·0	304	e 7 55	+ 1	—	—	i 9 23	P_cP	—
Raciborzu	E.	42·4	308	e 7 59	+ 1	—	—	e 9 35	P_cP	—
Upsala	N.	43·2	322	—	—	e 16 27	?	—	—	e 23·2
Prague		44·8	308	i 8 17a	0	e 11 24	?	—	—	—
Collmberg		45·7	309	e 8 21	− 3	—	—	e 10 18	PP	—
Triest		45·9	302	i 8 23	− 3	e 15 1	−10	e 9 56	P_cP	e 21·2
Rome		47·5	297	8 35	− 3	15 45	+11	10 35	PP	—
Bologna	Z.	47·8	300	e 8 39a	− 2	—	—	e 10 35	PP	—
Stuttgart		48·4	306	e 8 43	− 3	e 15 49	+ 3	e 10 37	PP	e 27·2
Strasbourg		49·4	306	i 8 51	− 2	e 16 9	+ 9	e 10 51	PP	e 25·6
Clermont-Ferrand		53·1	303	e 9 23	+ 2	e 17 0	+ 9	e 11 24	PP	31·2
Kew		53·8	312	e 9 12	−14	—	—	e 25 20	Q	e 28·2
Alicante		58·1	297	(e 9 31)	−27	e 9 31	P	(e 11 32)	PP	e 11·5
Scoresby Sund		58·7	337	10 0	− 2	18 15	+ 9	—	—	—
Almeria		60·1	295	i 10 7	− 4	20 27	S_cS	—	—	43·2
Tamanrasset	Z.	60·2	278	e 10 7	− 5	—	—	e 12 23	PP	—
Malaga	Z.	61·6	296	i 10 13k	− 9	e 18 13	−30	13 43	PPP	39·4
College		74·4	17	i 11 36	− 6	—	—	—	—	e 50·7
Sitka		83·7	15	e 12 30	− 2	e 23 2	+ 8	—	—	e 50·2
Tucson		112·2	4	e 18 45	[+ 7]	—	—	e 19 15	PP	—
Apia		117·4	87	e 17 42	?	—	—	e 18 59	PKP	—

Additional readings :—
New Delhi gives S as S* and S* as S_g, also iSE = 3m.4s.
Poona iE = 7m.9s., QE = 7m.35s.
Helwan eZ = 7m.33s.
Budapest ePN = 8m.24s.
Triest eP_cP = 10m.10s.?
Rome e = 9m.38s., SS? = 19m.23s.
Strasbourg eSS = 19m.49s., eSSS = 21m.22s., e = 25m.33s.
Malaga iZ = 20m.45s.
Long waves were also recorded at Paris.

Aug. 1d. 8h. 3m. 47s. Epicentre 19°·6N. 95°·8W.

A = −·0953, B = −·9379, C = +·3334; δ = −11; h = +5;
D = −·995, E = +·101; G = −·034, H = −·332, K = −·943.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vera Cruz		0·5	218	0 11	− 3	—	—	—	—	0·3
Puebla		2·3	256	0 38	− 2	—	—	—	—	1·1
Tacubaya		3·2	266	0 53	+ 1	1 35	+ 3	—	—	1·7
Tucson		18·5	316	i 4 19	0	e 7 58	+14	e 4 51	PP	e 10·2
St. Louis		19·6	12	e 4 31	− 1	e 8 16	+ 8	—	—	—
Chicago		23·2	14	e 5 14	+ 5	e 9 16	− 2	—	—	e 10·7
Palomar		23·3	311	i 5 11	+ 1	—	—	—	—	—
Boulder City		23·4	318	i 5 12	+ 1	—	—	—	—	e 13·0
Overton	z.	23·5	320	i 5 13	+ 1	—	—	—	—	—
Riverside	z.	24·0	312	i 5 17	0	—	—	—	—	—
Pasadena		24·6	312	i 5 22	− 1	—	—	—	—	e 11·4
Cleveland		25·0	25	e 5 30	+ 3	e 9 59	+10	e 11 1	SS	—
China Lake	z.	25·1	316	e 5 26	− 2	—	—	—	—	—
Logan		25·9	332	e 5 47	+12	e 10 13	+ 9	—	—	e 14·6
Tinemaha		26·3	316	i 5 37	− 2	—	—	—	—	—
Philadelphia		27·0	37	—	—	e 10 41	+19	—	—	e 11·1
Fresno	z.	27·1	315	e 5 45a	− 1	—	—	—	—	—
San Juan		28·1	87	e 6 57	PP	e 10 32	− 8	—	—	e 12·2
City College, N.Y.		28·2	37	—	—	e 10 44	+ 3	—	—	e 11·4
Lick	z.	28·7	314	i 5 59a	− 2	—	—	i 6 5	pP	—
Reno		28·7	319	e 6 1a	0	—	—	—	—	—
Branner	z.	29·1	314	i 6 5a	+ 1	—	—	—	—	—
Berkeley		29·3	314	i 6 6	0	—	—	—	—	e 14·7
Mineral	z.	30·3	319	e 6 14a	− 1	—	—	—	—	—
Bermuda		30·6	58	—	—	e 11 43	+23	—	—	e 13·2
Ottawa		30·6	27	e 6 15	− 3	—	—	—	—	16·2
La Paz		45·0	140	e 8 19	0	14 53	− 5	—	—	22·2
Malaga	z.	79·6	55	i 11 57a	−13	e 22 13	+ 1	i 23 21	PPS	44·6
Almeria		81·1	54	e 12 19	+ 1	22 27	− 1	15 25	PP	—
Strasbourg		84·1	41	i 12 32	− 2	—	—	—	—	e 46·2
Stuttgart	z.	84·9	40	e 12 35	− 3	—	—	—	—	—

Additional readings :—
Palomar iZ = 5m.28s.
Pasadena iZ = 5m.35s.
Cleveland eN = 8m.24s., eE = 10m.25s.
Tinemaha iZ = 5m.52s.
Lick iZ = 6m.10s. and 6m.29s.
Reno eN = 6m.19s.
Mineral iZ = 6m.53s.
Almeria PPP = 17m.17s., SS = 27m.43s.
Stuttgart eP?Z = 11m.4s.
Long waves were also recorded at Santa Clara, Ukiah, Salt Lake City, Victoria, Seven Falls, and Scoresby Sund.

Aug. 1d. 15h. Undetermined shock.

Istanbul eP = 29m.29s.?, S? = 31m.43s.
Helwan ePZ = 30m.16s., eZ = 32m.0s. and 32m.46s.
Tamanrasset eZ = 30m.30s., ePZ = 31m.44s.
Ksara e = 30m.38s. and 34m.12s.
Triest eP? = 30m.52s., eS? = 33m.53s.
Algiers Univ. ePZ = 31m.12s.
Stuttgart ePZ = 31m.27s., eQ = 38m.0s.
Strasbourg eP = 31m.34s., ePP = 31m.42s., e = 32m.0s. and 35m.28s., eL = 37m.
Prague eP = 31m.36s.?, eS? = 33m.25s.?
Collmberg eZ = 31m.37s.
Clermont-Ferrand eP = 31m.38s., L = 35m.
Paris eP = 32m.7s., e = 32m.13s., ePP = 32m.26s., ePPP = 32m.36s., e = 32m.49s.
Malaga iPZ = 32m.17s.?, eSZ = 36m.21s., LZ = 38m.13s.
Almeria P = 32m.22s., PPP = 33m.11s., S = 36m.38s.
Alicante eP? = 32m.25s., e = 36m.39s., eL = 39m.35s.
Granada iP = 32m.26s., S = 36m.50s., L = 42·0m.
Belgrade e = 33m.50s., 34m.27s., 34m.46s., and 35m.30s.
Rome e = 34m.15s. and 35m.50s.
Ottawa eZ = 38m.45s.
College eP = 39m.37s.
Hungry Horse eP = 40m.18s.

Aug. 1d. Continuatiou of list of after-shocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	3	34	17	15	51	18	49	16	20	50	32
17	8	4	17	18	54	19	58	16	21	18	16

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	3	48	6	38	2	13	24	50	18	49	21
5	26	32	8	41	58	17	8	36	19	58	27
6	10	40	10	22	40	17	16	6			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	3	41	8	42	3	17	8	21	20	50	34
6	10	49	10	22	50	18	49	25	21	18	25
6	38	8	14	37	47	19	58	25			

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
6	11	23	17	16	49?	17	19	53?	18	50	13?
8	42	14									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	3	45	8	42	11	17	16	24	19	58	25
6	38	53	9	43	16	17	19	28	20	50	50
7	59	17	10	23	29	18	48	52	21	18	27
8	21	37	14	37	40						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	5	10	18	51	35	20	52	5	21	19	0
8	42	30	19	59	2						

Tchimkent.

h.	m.	s.	h.	m.	s.
6	11	49	8	43	15

Frunse.

h.	m.	s.	h.	m.	s.
8	43	39	18	49	49

Aug. 1d. Readings also at 0h. (Reno, Berkeley, near Branner, Fresno, and Lick), 1h. (College, Tucson, La Plata, near Copiapo, and Santa Lucia), 2h. (Ksara and College), 3h. (College), 4h. (Mount Wilson, Riverside, Tinemaha, China Lake, Tucson, Overton, Mineral, Fresno, Lick, Hungry Horse, College, and near Apia), 5h. (Auckland, Christchurch, Wellington, and Strasbourg), 7h. (San Francisco, near Berkeley, Branner, and Lick), 8h. (Arapuni, Auckland, Christchurch, Wellington, Riverview, Nanking, Honolulu, Mount Wilson, Riverside, Tinemaha, Tucson, Overton, Lick, Mineral, Fresno, College, Ksara, and Istanbul), 9h. (College and Rome), 10h. (Overton and near Bogota), 11h. (La Paz, near Tacubaya, Vera Cruz, and near Reno), 12h. (near Algiers Univ.), 13h. (Tacubaya, near Vera Cruz, and near Algiers Univ. (2)), 14h. (near Reykjavik), 15h. and 16h. (Pierce Ferry), 17h. (Bucharest), 18h. (Auckland), 19h. (Pierce Ferry and Shasta Dam), 22h. (Pierce Ferry, Hungry Horse, Kew, De Bilt, Strasbourg, Upsala, Paris, Collmberg, Stuttgart, Triest, Tamanrasset, Belgrade, Bucharest, Ksara, Sofia, and near Istanbul), 23h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and near La Paz).

Aug. 2d. 23h. South Pacific.

Auckland eN =7m.48s.
La Paz ePNZ =10m.55s., iS?N =20m.36s.
Wellington e =12m., eZ =16m., e =30m.
Lick iPZ =12m.46s.k, iZ =12m.49s. and 13m.5s.
Tucson eP =13m.8s., eL =33m.10s.
Palomar iPZ =13m.17s.
Riverside iPZ =13m.20s.
Pasadena ePNZ =13m.21s.
China Lake ePZ =13m.32s.
Boulder City iP =13m.33s.
Pierce Ferry iP =13m.33s.
Overton ePZ =13m.37s., eLZ =30m.36s.
Tinemaha ePZ =13m.41s.
Reno ePNZ =13m.59s., eE =14m.8s.
Shasta Dam eP =14m.1s., iP =14m.5s.
Hungry Horse eP =14m.47s.
Bogota eP =14m.51s.
Tacubaya e =28m.51s.
Christchurch 30m.
Long waves were also recorded at Granada, Scoresby Sund, Huancayo, and Apia.

Aug. 2d. Continuation of list of Turkestan after-shocks.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	13	59	2	35	30	12	50	43	15	43	38
1	8	57	6	15	28	13	28	2	15	54	26
1	44	23									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	9	9	6	30	34	16	29	53	21	3	7
1	44	37	12	50	43	17	6	3	21	10	55
2	35	41	13	28	15	19	49	33	22	5	32
6	15	37	15	43	51	19	53	3			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	14	5	13	6	8	16	37	32	21	11	10
1	9	4	13	43	23	19	28	39	22	5	33
1	44	47	15	58	50	21	3	19	23	1	46
2	35	50	16	14	50						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	9	24	15	44	3	21	11	49

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	14	7	12	50	55	16	30	0	21	4	15
1	9	6	12	58	50	19	11	38	21	11	19
1	41	36	13	28	29	19	28	47	22	5	43
1	45	0	15	44	0	19	49	35?	22	11	48
6	15	35									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	9	33	6	16	0	16	30	12	21	3	34
1	45	1	12	51	49	19	30	3	21	11	55
2	36	6	15	44	13	19	50	43	22	6	39

Tchimkent.

h.	m.	s.	h.	m.	s.
15	44	13	21	12	4

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
12	53	4	15	45	43	16	31	24	21	5	14

Aug. 2d. Readings also at 2h. (Harvard), 3h. (La Paz, Santa Lucia, Tucson, near Berkeley, Branner, and Lick), 4h. (Pavia, Bologna, Rome, Taranto, Strasbourg, Stuttgart, Collmberg, Sofia, Istanbul, and Belgrade), 5h. (Hungry Horse), 6h. (Overton and near Huancayo), 7h. (Scoresby Sund, Branner, Reno, near Berkeley, Fresno, and Lick), 9h. (College and Strasbourg), 10h. (Istanbul), 11h. (La Paz, Pierce Ferry, Shasta Dam, and Hungry Horse), 12h. (Boulder City, Overton, Pierce Ferry, and near Tucson), 15h. (Hungry Horse,, Tucson, Oaxaca, and Tacubaya), 16h. (Hungry Horse), 17h. (Hungry Horse, Tucson, and near Ottawa), 19h. (Copiapo), 21h. (Belgrade, near Istanbul, and near Tacubaya), 22h. (Hungry Horse).

Aug. 3d. 15h. 44m. 25s. Epicentre 41°·9N. 143°·6E. Focus at base of superficial layers.
(as on 1947, May 8d.).

Intensity IV at Tomakomai and Urakawa; II-III at Hatinohe. Epicentre 42°·0N. 143°·1E. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs., Japan, 1949, Tokyo, 1950, pp. 23, 24, with macroseismic chart.

$A = -\cdot6009$, $B = +\cdot4430$, $C = +\cdot6653$; $\delta = -5$; $h = -2$;
$D = +\cdot593$, $E = +\cdot805$; $G = -\cdot536$, $H = +\cdot395$, $K = -\cdot747$.

	△	Az.	P.	O−C.	S.	O−C.		Supp.
	°	°	m. s.	s.	m. s.	s.	m.	s.
Nemuro	2·0	46	0 34	+ 2	1 1	+ 5	—	—
Hatinohe	2·1	229	0 35	+ 2	0 57	− 2	—	—
Mori	2·3	275	0 30	− 6	0 51	−13	—	—
Aomori	2·4	243	0 39	+ 1	1 5	− 1	—	—
Miyako	2·6	208	0 43	+ 2	1 13	+ 2	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Morioka		2·9	220	0 47	+ 2	1 21	+ 2	—	—
Akita		3·4	232	1 2	+10	—	—	—	—
Mizusawa	E.	3·4	216	0 58	+ 6	1 30	− 2	—	—
Sendai		4·2	211	1 9	+ 6	1 53	+ 1	—	—
Hukusima		4·8	212	1 16	+ 4	—	—	—	—
Onahama		5·4	204	1 41	+21	2 23	+ 1	—	—
Mito		6·0	205	1 46	+17	—	—	—	—
Kakioka		6·3	207	1 41	+ 8	2 45	0	—	—
Maebasi		6·5	214	1 45	+ 9	2 38	−12	—	—
Kumagaya		6·6	211	2 32	S	(2 32)	−20	—	—
Tokyo		6·8	207	2 55	S	(2 55)	− 2	—	—
Hunatu		7·4	213	1 50	+ 2	—	—	—	—
Nagoya		8·5	220	2 20	+16	—	—	—	—
Hungry Horse		67·1	45	e 10 51	− 1	—	—	—	—
Boulder City		74·5	56	e 11 37	0	—	—	—	—
Pierce Ferry		74·9	55	e 11 39	0	—	—	i 11 53	pP

Mizusawa gives also eSN = 1m.37s.

Aug. 3d. 20h. Undetermined shock. Southern Ocean.

Grahamstown eZ = 25·9m.
Pretoria iZ = 29m.32s.
Tananarive ePP = 32m.50s., eL? = 42m.27s.
Tamanrasset ePZ = 35m.28s., iZ = 35m.32s.a, eZ = 35m.37s., ePcPZ = 35m.45s., PP?Z = 38m.16s.
La Paz iPNZ = 35m.32s.
Helwan iPZ = 36m.10s., eZ = 37m.13s., PPZ = 39m.22s., eSN = 46m.36s.
Ksara eP = 36m.33s., eS? = 46m.23s.
Algiers Univ. ePZ = 36m.46s.
Rome eP? = 37m.20s., ePP? = 40m.50s., eSKS? = 47m.34s.
Ottawa eZ = 42m.44s.
Tucson ePKP = 43m.9s.
Pierce Ferry iPKP = 43m.11s.
Boulder City ePKP = 43m.14s.
Overton ePKPZ = 43m.16s.
Riverside ePKPZ = 43m.16s.
Logan ePKP = 43m.17s.
Pasadena ePKPZ = 43m.17s.
China Lake ePKPZ = 43m.19s.
Tinemaha iPKPZ = 43m.22s.
Fresno ePKPZ = 43m.25s., ePKPN = 43m.28s.
Hungry Horse iPKP = 43m.27s., i = 43m.39s. and 45m.31s.
Shasta Dam ePKP = 43m.29s., i = 43m.44s.
Lick ePZ = 43m.30s.a, iZ = 43m.46s.
Mineral ePZ = 43m.30s., iZ = 43m.36s. and 43m.58s.
Reno ePZ = 43m.30s., iZ = 43m.34s., iN = 44m.5s., iE = 44m.28s.
Berkeley iPZ = 43m.31s.k, iZ = 43m.38s.
Branner eZ = 43m.31s.
College iPKP? = 44m.48s., e = 45m.29s. and 46m.9s.
Long waves were also recorded at Christchurch, Wellington, Scoresby Sund, and other European stations.

Aug. 3d. Continuation of list of after-shocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	16	27	8	26	31	13	45	19	20	52	30
1	7	50	10	57	53	15	17	19	21	16	48
4	42	33	11	19	15	17	55	29	22	8	42
6	7	3	13	23	31						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	16	39	4	42	46	8	26	43	13	24	11
1	8	2	6	7	17	10	58	3	21	16	59

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	16	44	6	7	15	10	58	4	21	16	54
1	8	11	8	26	53	13	24	5	22	8	54
4	42	52									

Continued on next page.

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
6	**7**	**58?**	**8**	**26**	**58**	**10**	**58**	**16**	**22**	**9**	**45**

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	**16**	**50**	**6**	**7**	**29**	**10**	**58**	**15**	**22**	**9**	**3**
4	**42**	**53**	**8**	**27**	**7**						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	**17**	**51**	**6**	**8**	**10**	**8**	**27**	**47**

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
4	**44**	**28**	**10**	**59**	**38**	**22**	**10**	**44**

Aug. 3d. Readings also at 0h. (Harvard, Bogota, Galerazamba, La Paz, and Hungry Horse), 3h. (College, Shasta Dam, Collmberg, Stuttgart, and near Sofia), 4h. (Hungry Horse and Scoresby Sund), 5h. (Hungry Horse and Shasta Dam), 8h. (Auckland, Tucson, College, and Ottawa), 10h. (Logan), 12h. (Strasbourg and Stuttgart), 14h. (Strasbourg, College, and near San Juan), 15h. (Tamanrasset and near Algiers Univ.), 20h. (Hungry Horse and near Granada), 22h. (near Ottawa), 23h. (Shasta Dam).

Aug. 4d. 1h. 39m. 36s. Epicentre 34°·2N. 140°·6E. Depth of focus 0·010.

Intensity IV at Mera; II-III at Misima, Osima, Ito, Tokyo, Kohu, Kakioka, Titibu, and Kumagaya. Macroseismic radius 200-300km. Epicentre as adopted. Depth 80km.

Seismo. Bull. Cent. Met. Obs., Japan, 1949, Tokyo, 1950, p. 24, with macroseismic chart.

$A = -\cdot6405$, $B = +\cdot5261$, $C = +\cdot5595$; $\delta = +6$ $h = 0$;
$D = +\cdot635$, $E = +\cdot773$; $G = -\cdot432$, $H = +\cdot355$, $K = -\cdot829$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.
		°	°	m. s.	s.	m. s.	s.	m. s.
Mera		**1·0**	**319**	**0 23**	**+ 3**	**0 37**	**+ 1**	**— —**
Osima		**1·2**	**299**	**0 20k**	**− 3**	**0 36**	**− 4**	**— —**
Yokohama		**1·4**	**328**	**0 29**	**+ 4**	**0 48**	**+ 4**	**— —**
Tokyo		**1·6**	**335**	**0 29**	**+ 1**	**0 50**	**+ 1**	**— —**
Misima		**1·7**	**307**	**0 28k**	**− 1**	**0 47**	**− 4**	**— —**
Hunatu		**2·0**	**311**	**0 33**	**0**	**0 55**	**− 2**	**— —**
Omaesaki		**2·0**	**282**	**0 33**	**0**	**0 56**	**− 1**	**— —**
Shizuoka		**2·0**	**293**	**0 32**	**− 1**	**0 55**	**− 2**	**— —**
Tukubasan		**2·0**	**349**	**0 34**	**+ 1**	**0 59**	**+ 2**	**— —**
Kakioka		**2·1**	**350**	**0 35**	**+ 1**	**0 57**	**− 3**	**— —**
Kumagaya		**2·2**	**333**	**0 39**	**+ 3**	**1 3**	**+ 1**	**— —**
Mito		**2·2**	**357**	**0 38**	**+ 2**	**1 3**	**+ 1**	**— —**
Maebasi		**2·5**	**330**	**0 41**	**+ 1**	**1 8**	**− 2**	**— —**
Onahama		**2·7**	**5**	**0 45**	**+ 2**	**1 14**	**0**	**— —**
Matusiro		**3·1**	**320**	**0 44a**	**− 4**	**1 15**	**− 9**	**— —**
Nagoya		**3·2**	**288**	**0 46**	**− 4**	**1 23**	**− 4**	**— —**
Hukusima		**3·5**	**358**	**0 54**	**0**	**1 34**	**0**	**— —**
Kameyama		**3·5**	**282**	**0 54**	**0**	**1 30**	**− 4**	**— —**
Owase		**3·6**	**269**	**0 56**	**+ 1**	**1 36**	**− 1**	**— —**
Hikone		**3·8**	**288**	**0 57**	**− 1**	**1 38**	**− 4**	**— —**
Sendai		**4·0**	**3**	**1 2**	**+ 2**	**1 45**	**− 1**	**— —**
Kyoto		**4·1**	**283**	**1 1**	**− 1**	**1 41**	**− 8**	**— —**
Osaka		**4·2**	**278**	**1 5**	**+ 2**	**1 45**	**− 6**	**— —**
Kobe		**4·5**	**278**	**1 7**	**0**	**1 56**	**− 3**	**— —**
Sumoto		**4·7**	**274**	**1 10**	**0**	**2 10**	**+ 6**	**— —**
Mizusawa	E.	**4·9**	**5**	**(1 16)**	**+ 3**	**(2 8)**	**− 1**	**— —**
Muroto		**5·4**	**262**	**3 4**	**S**	**(3 4)**	**+43**	**— —**
Morioka		**5·5**	**5**	**1 20**	**− 1**	**2 18**	**− 5**	**— —**
Miyako		**5·5**	**11**	**1 21**	**0**	**2 18**	**− 5**	**— —**
Hukuoka		**8·5**	**269**	**2 10**	**+ 8**	**4 14**	**+37**	**— —**

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
College	51·8	31	e 9 1	+ 1	—	—	—	—
Shasta Dam	73·4	52	e 11 26	+ 3	—	—	i 11 54	pP
Hungry Horse	74·3	42	e 11 31	+ 3	—	—	i 11 59	pP
Boulder City	80·9	53	e 12 3	− 2	—	—	—	—
Pierce Ferry	81·4	52	e 12 9	+ 1	—	—	—	—

Additional readings and note :—
Mizusawa readings have been increased by 5m.
Muroto S = 3m.38s.
Hungry Horse i = 11m.48s.

Aug. 4d. 7h.-8h. Undetermined shock. S.W. Pacific.

Brisbane iPZ = 57m.3s.k, iZ = 57m.12s., iSNZ = 61m.2s.
Riverview iPZ = 57m.18s.a, S?N = 61m.30s., esS?N = 61m.47s., eZ = 62m.1s., eQN = 62m.12s.
College iP = 63m.45s., ePP? = 67m.15s., elPP? = 68m.53s.
Shasta Dam eP = 64m.25s.
Palomar ePZ = 64m.41s., iZ = 65m.10s. and 65m.44s.
Tinemaha ePZ = 64m.41s.
Pasadena ePZ = 64m.43s., iZ = 65m.4s., eLN = 91·2m.
China Lake ePZ = 64m.44s.
Riverside ePZ = 64m.45s.
Hungry Horse eP = 64m.57s., e = 89m.11s.
Pierce Ferry eP = 65m.0s.
Auckland eS?N = 67m.31s., eLN = 69m.?
Christchurch 70m.?
Stuttgart ePKP?Z = 70m.19s., eZ = 70m.29s., elt = 123m.
Harvard i = 70m.24s., eL = 118m.36s.
Fort de France ePKP = 71m.8s.
Wellington e = 72m.12s.
Arapuni eS?E = 73m.12s.
La Paz e = 74m.16s.
Scoresby Sund 80m.48s., L = 108m.
Long waves only were also recorded at Honolulu, Bermuda, and other stations in N. America and Europe.

Aug. 4d. Continuation of the list of after-shocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	13	31	11	26	15	16	56	1	21	23	24
2	5	27?	14	34	12	20	42	23	23	12	49
9	26	26	15	28	59						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	14	5	14	34	25	16	56	15	21	23	23
9	26	39	15	29	15	20	42	37	23	13	3
11	26	27									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	6	9	8	54	25	14	34	45	20	42	36
5	22	20	9	26	36	15	29	28	22	48	20
8	3	51	11	26	26	16	56	21	23	13	12

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	26	54	14	34	49	16	56	31	20	42	45
11	26	40									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	13	40	9	26	37	15	29	35	21	23	42
2	6	19	11	26	33	16	56	24	23	13	27
8	55	17	14	34	51	20	42	46			

Continued on next page.

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	14	44	11	27	38	15	29	42	20	43	0
2	6	10	14	34	52	16	56	38	23	14	4
9	27	4									

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	15	17	11	26	54	15	30	32	21	25	28
9	27	6	14	35	0	16	56	42	23	14	13

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	27	16	11	28	17	14	36	38	16	57	12

Aug. 4d. Readings also at 0h. (La Plata), 1h. (Pierce Ferry, Tucson, and Stuttgart), 3h. (La Paz), 5h. (Mount Wilson, Palomar, China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 6h. (near Copiapo), 7h. (Ottawa), 8h. (Seven Falls), 10h. (Apia, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Pierce Ferry, Fresno, Mineral, Reno, Shasta Dam, Hungry Horse, and College), 11h. (Paris, Stuttgart, and Collmberg), 18h. (Reno), 19h. (near Almata), 20h. (near Basle, Neuchatel, and Zürich), 21h. (New Delhi, Alicante, Clermont-Ferrand, Tamanrasset, and near Algiers Univ.), 23h. (near Vera Cruz).

Aug. 5d. 7h. 14m. 39s. Epicentre 27°·2N. 56°·2E. (as on July 5d.).

$A = +\cdot4955$, $B = +\cdot7401$, $C = +\cdot4546$; $\delta = -7$; $h = +3$;
$D = +\cdot831$, $E = -\cdot556$; $G = +\cdot253$, $H = +\cdot378$, $K = -\cdot891$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Samarkand		15·2	33	e 3 39	+ 1	—	—	—	—	—
Stalinabad		15·5	40	i 3 37	− 5	e 6 40	+ 5	—	—	—
Obi-garm		16·1	41	e 3 52	+ 3	i 7 0	+11	—	—	—
Leninakan		17·0	326	e 4 0	− 1	—	—	—	—	—
Tiflis		17·2	329	e 4 3	0	—	—	—	—	—
Tashkent		17·7	34	i 4 4?	− 6	e 7 26?	0	—	—	—
Murgab		18·6	48	4 16	− 5	7 45	− 1	—	—	—
New Delhi		18·6	81	e 4 15	− 6	—	—	—	—	e 11·7
Ksara		18·7	294	i 4 28	+ 6	i 8 7	+19	4 40	PP	—
Andijan		19·0	41	e 4 25	− 1	e 8 3	+ 8	—	—	—
Frunse		21·7	40	e 4 59	+ 4	—	—	—	—	—
Helwan	z.	22·0	282	e 5 1	+ 3	e 9 13	+17	—	—	e 10·4
Almata		23·2	41	e 5 10	+ 1	e 9 16	− 2	—	—	—
Theodosia		24·4	322	e 5 21	0	—	—	—	—	—
Yalta		24·7	320	5 24	0	9 43	− 1	—	—	—
Sverdlovsk		29·8	5	—	—	e 11 10	+ 3	—	—	—
Moscow		31·5	340	e 6 25	− 1	—	—	—	—	—
Rome		38·5	304	—	—	e 16 44	SSS	—	—	—
Collmberg	z.	40·4	318	e 7 42?	+ 1	—	—	—	—	—
Stuttgart	z.	42·0	314	e 7 54	0	—	—	—	—	—
Algiers Univ.	z.	45·6	295	e 8 27	+ 3	—	—	—	—	—
Tamanrasset	z.	45·9	277	i 8 31k	+ 5	—	—	—	—	—
Pretoria	z.	59·2	209	i 10 12	+ 7	—	—	—	—	—

Additional readings :—
Helwan eZ = 5m.23s. and 5m.51s., eN = 10m.4s.
Collmberg eZ = 7m.49s.?
Tamanrasset iP = 8m.36s.a, e = 8m.57s.
Long waves were also recorded at Paris.

Aug. 5d. 19h. 2m. 57s. Epicentre 1°·2S. 78°·5W.

(Fore-shock of destructive earthquake at 19h. 8m.).

$A = +·1993$, $B = -·9797$, $C = -·0208$; $\delta = -3$; $h = +7$;
$D = -·980$, $E = -·199$; $G = -·004$, $H = +·020$, $K = -1·000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		7·3	38	i 1 57	+ 7	i 3 18	+ 3	i 2 40	P_g	—
Huancayo		11·2	164	i 2 42	− 2	e 4 41	−11	—	—	i 5·4
Galerazamba		12·4	15	i 3 33?	+32	i 4 53?	−28	—	—	—
La Paz		18·3	145	i 4 18	+ 1	i 7 46	+ 7	4 37	PP	—
San Juan		23·0	31	i 5 8	+ 1	e 9 22	+ 8	—	—	e 10·1
Fort de France		23·4	48	i 5 11	0	—	—	—	—	—
Tacubaya		28·9	317	e 6 11	+ 8	—	—	i 6 53	PP	—
Bermuda		35·9	21	e 7 5	+ 1	—	—	e 8 34	PP	—
Georgetown		39·9	3	i 7 38	+ 1	—	—	—	—	—
Washington		39·9	3	i 7 36	− 1	—	—	—	—	—
Lubbock		41·0	331	7 46	0	—	—	—	—	—
Philadelphia		41·1	5	i 7 46	− 1	—	—	—	—	—
St. Louis		41·1	346	i 7 46	− 1	—	—	—	—	—
City College, N.Y.		42·0	7	e 7 55	+ 1	—	—	e 9 25	PP	—
Weston		43·9	8	e 7 58	−12	—	—	—	—	—
Harvard		44·0	8	i 8 11	0	—	—	—	—	—
Tucson		45·2	321	i 8 21	+ 1	—	—	e 10 9	PP	—
Ottawa		46·5	354	8 29	− 2	15 41	+22	10 21	PP	—
Shawinigan Falls	N.	47·8	7	8 40	− 1	—	—	—	—	—
Seven Falls	E.	48·6	8	8 49	+ 2	—	—	—	—	—
Pierce Ferry		49·7	322	i 8 55	− 1	—	—	—	—	—
Palomar		49·9	318	i 8 58a	+ 1	—	—	—	—	—
Boulder City		50·1	322	e 8 58	− 1	—	—	—	—	—
Overton	Z.	50·2	322	e 9 0	0	—	—	—	—	—
Rapid City	E.	50·2	337	i 9 0	0	—	—	—	—	—
Riverside	Z.	50·6	317	i 9 2a	0	—	—	—	—	—
Pasadena		51·2	317	i 9 6a	− 1	—	—	—	—	—
Salt Lake City		51·6	328	e 8 38	−32	(e 21 36)	SSS	—	—	e 21·6
China Lake	z.	51·8	320	e 9 12	0	—	—	—	—	—
Logan		52·3	329	e 9 11	− 4	—	—	—	—	—
Tinemaha		53·0	320	i 9 22	+ 1	—	—	—	—	—
Fresno	z.	53·8	319	i 9 25k	− 1	—	—	—	—	—
Lick	z.	55·3	318	i 9 37a	− 1	—	—	—	—	—
Reno	z.	55·4	322	e 9 39a	+ 1	—	—	—	—	—
Branner	z.	55·7	318	e 9 39a	− 1	—	—	—	—	—
Berkeley	z.	56·0	318	i 9 43	0	—	—	—	—	—
Mineral	z.	57·0	322	i 9 48a	− 2	—	—	—	—	—
Shasta Dam		57·7	322	e 9 51	− 4	—	—	—	—	—
Hungry Horse		58·2	333	e 9 57	− 1	—	—	—	—	—
Victoria		62·9	329	i 10 29a	− 1	—	—	—	—	—
Tamanrasset	z.	84·9	67	e 12 36	− 2	—	—	—	—	—
Clermont-Ferrand		85·0	41	e 12 39	+ 1	—	—	—	—	—
Stuttgart	z.	89·4	41	e 12 58	− 2	—	—	—	—	—

Additional readings :—
Bogota i = 2m.1s., iS* ? = 3m.44s., iS_g = 4m.0s.
Huancayo iS = 4m.44s.
San Juan iS? = 9m.27s.
Lick iZ = 9m.42s.
Tamanrasset eZ = 12m.40s. and 12m.56s.
Long waves were also recorded at Honolulu.

Aug. 5d. 19h. 8m. 46s. Epicentre 1°·2S. 78°·5W. (as at 19h. 2m.).

Destructive in the province of Tungurahua at the foot of Chimborazo, causing very many casualties. The villages of Guano, Pelileo, Patate, and Pillaro disappeared entirely, and one-third of the town of Ambato, previously affected by the earthquake of 1797, was destroyed. Severe damage was sustained also at Peteljo, San Miguel, Latacunga, Guaro, Banos, and Quero. Crevasses appeared, accompanied by rock falls, destroying communications, bridges, and water courses. Reports were received of the outbreak of sulphurous springs. Macroseismic area 2000sq. km.

Suggested epicentres : 1°·5S. 78°·5W. (R. P. Semanate).
1°20′S. 78°30′W. (E. Ramirez).
0°·9S. 78°·3W. (J.S.A.).

E. Ramirez, S. J.
El gran terremoto ecuatoriano de Pelileo. Revista Acad. Colombiana, Ciencias Exactas, fis. nat., 1951, Vol. 8, No. 29, pp. 126-136, with four plates.

H. Gerth.
Die geologischen Verhaltnisse des vernichtenden Erdbebens in Ecuador im August, dieses Jahres, 1949. Geologische Rundschau, Deutchland, 1949, No. 37, p. 83-85, with figure.

R. P. Semanate.
Seismologia del terremoto de Pelileo, Casa de la Cultura Ecuatoriano, Quito, 1950, 103 pages with maps.

J. Martelly.
Détermination des accélérations lors du tremblement de terre de Pelileo (Ecuador, 1949). Publication de l'Association de Séismologie et de Physique de l'Interieur de la terre, Série A. Travaux Scientifiques. Fasc. 18, Toulouse, 1952, pp. 153-166.

J. Martelly.
Une méthode d' évaluation de la profondeur de l'hypocentre. Application au tremblement de terre de Pelileo (Ecuador, 1949). l'Association de Séismologie et de Physique de l'Interieur de la terre. Série A, Traveaux Scientifiques, Fasc. 18, Toulouse, 1952, pp. 167-182.

$A = +\cdot1993$, $B = -\cdot9797$, $C = -\cdot0208$; $\delta = -3$; $h = +7$;
$D = -\cdot980$, $E = -\cdot199$; $G = -\cdot004$, $H = +\cdot020$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chinchina		6·8	25	e 1 42	− 2	i 2 54	− 9	—	—	—
Bogota		7·3	38	i 1 55	+ 5	i 3 16	+ 1	i 2 30	P_g	—
Balboa Heights		10·2	354	i 2 33	+ 2	e 4 35	+ 8	—	—	e 5·4
Huancayo		11·2	164	i 2 39	− 5	i 4 34	−18	—	—	—
Galerazamba		12·4	15	i 3 24	+23	i 4 54?	−27	—	—	—
La Paz		18·3	145	i 4 20a	+ 3	i 7 50	+11	i 4 45	PP	9·4
San Juan		23·0	31	i 5 9	+ 2	i 9 21	+ 7	—	—	i 11·1
Fort de Franco		23·4	48	i 5 11	0	i 9 29	+ 8	5 31	PP	e 13·5
Antofagasta	E.	23·7	160	i 5 17	+ 3	e 9 34	+ 7	5 39	PP	—
Merida		24·6	335	6 22	+59	i 9 44	+ 2	—	—	—
Oaxaca		25·5	319	e 6 0	+28	—	—	—	—	—
Vera Cruz		26·7	322	i 5 49	+ 6	i 10 36	+19	i 6 45	PPP	—
Copiapo	N.	27·2	163	i 5 46	− 1	10 27	+ 2	6 20	PP	—
Puebla		27·9	318	e 5 59	+ 5	e 11 1	+24	—	—	—
Tacubaya		28·9	317	e 6 6k	+ 3	e 10 44	− 9	e 12 9	SS	—
Manzanillo		32·4	310	i 6 36	+ 2	e 12 6	+18	—	—	—
Guadalajara		32·6	314	e 7 58	PPP	—	—	—	—	15·2
Pensacola		32·6	345	e 6 28	− 7	e 12 13	+22	i 7 54	PPP	—
Santa Lucia		32·9	167	i 6 41	+ 3	e 11 58	+ 2	7 41	PP	—
Columbia		35·1	357	e 6 58	+ 1	e 12 36	+ 6	e 8 28	PPP	e 14·5
Bermuda		35·9	21	i 7 3	− 1	—	—	e 8 59	PPP	—
Buenos Aires		38·1	152	e 7 19	− 3	e 13 15	− 1	—	—	—
La Plata	E.	38·6	152	7 28	+ 2	13 23	0	8 55	PP	20·1
	N.	38·6	152	7 28	+ 2	13 27	+ 4	8 56	PP	20·5
	Z.	38·6	152	7 30	+ 4	13 27	+ 4	8 55	PP	22·0
Georgetown		39·9	3	i 7 38	+ 1	—	—	—	—	—
Washington		39·9	3	i 7 36	− 1	e 13 37	− 6	i 9 15	PP	e 17·1
Cincinnati		40·5	354	i 7 40	− 2	—	—	i 9 27	PP	—
Lubbock		41·0	331	7 47	+ 1	—	—	—	—	—
Philadelphia		41·1	5	i 7 46	− 1	e 14 4	+ 3	e 9 31	PP	i 17·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
St. Louis		41·1	346	i 7 46	− 1	i 13 54	− 7	i 9 21	PP	—
New Kensington	E.	41·6	359	e 7 52	+ 1	e 14 16	+ 8	e 9 35	PP	e 17·3
Pennsylvania	E.	41·8	2	i 7 56	+ 3	i 14 7	− 4	e 9 21	PP	—
City College, N.Y.		42·0	7	i 7 54	0	e 14 28	+14	e 9 36	PP	—
Fordham		42·1	7	i 7 56	+ 1	i 14 30	+14	i 17 58	SS	—
Cleveland		42·6	357	e 7 58	− 1	e 14 11	−12	e 9 45	PP	—
Chicago		43·6	350	i 8 14	+ 6	e 14 43	+ 5	i 9 55	PP	e 17·9
Weston		43·9	8	i 7 58	−12	—	—	—	—	—
Harvard		44·0	8	i 8 10	− 1	i 14 41	− 2	i 9 55	PP	e 21·7
Lincoln	E.	45·0	341	e 8 17	− 2	e 14 31	−27	e 9 57	PP	e 21·5
Tucson		45·2	321	i 8 22	+ 2	i 15 16	+15	e 10 12	PP	e 19·4
Ottawa		46·5	354	i 8 30a	− 1	15 42	+23	10 26	PP	23·9
Halifax		47·5	15	8 39	+ 1	14 39	−55	10 39	PP	23·3
Shawinigan Falls	N.	47·8	7	8 41	0	15 38	0	10 29	PP	—
Seven Falls	E.	48·6	8	8 47	0	15 52	+ 3	11 1	PPP	20·4
Pierce Ferry		49·7	322	i 8 56	0	e 16 14	+10	—	—	—
Palomar		49·9	318	i 8 59a	+ 2	i 16 19	+12	—	—	—
Boulder City		50·1	322	i 9 0	+ 1	e 16 17	+ 7	—	—	—
Overton	Z.	50·2	322	i 9 2	+ 2	—	—	—	—	—
Rapid City	E.	50·2	337	i 9 2	+ 2	i 16 18	+ 7	i 10 56	PP	e 24·0
Riverside		50·6	317	i 9 3a	+ 1	e 16 32	+15	—	—	—
Pasadena		51·2	317	i 9 8a	+ 1	e 16 22	− 3	i 11 8	PP	e 21·1
Salt Lake City		51·6	328	i 9 41	+31	—	—	e 11 37	PP	—
China Lake	Z.	51·8	320	i 9 12a	0	—	—	—	—	—
Punta Arenas	N.	52·2	173	e 8 37	−38	16 18	−21	20 50	SSS	26·8
Logan		52·3	329	i 9 14	− 1	e 16 50	+10	i 11 34	PP	i 21·3
Tinemaha		53·0	320	i 9 21a	0	e 17 6	+16	—	—	—
Fresno	Z.	53·8	319	e 9 26a	0	e 17 14	+13	—	—	e 30·6
Bozeman		54·8	333	i 9 35	+ 1	e 17 24	+10	e 11 39	PP	e 26·2
Lick		55·3	318	i 9 38a	0	e 17 36	+15	—	—	—
Reno		55·4	322	i 9 40a	+ 2	i 17 36	+14	i 12 8	PP	e 29·5
Santa Clara		55·5	318	e 9 33	− 6	e 17 34	+10	e 25 41	SSS	e 28·4
Branner		55·7	318	i 9 41a	+ 1	e 17 40	+14	—	—	e 28·2
Butte	N.	55·8	332	i 9 42	+ 1	e 17 36	+ 8	e 13 14	PPP	e 22·6
Berkeley		56·0	318	i 9 43a	0	e 17 45	+15	i 10 43	PcP	e 28·4
San Francisco		56·1	318	8 14?	?	—	—	—	—	—
Mineral		57·0	322	i 9 49a	− 1	e 19 0	?	i 12 6	PP	e 34·3
Ukiah		57·4	320	e 9 50	− 3	e 17 51	+ 2	e 22 1	SS	e 25·3
Shasta Dam		57·7	322	e 9 52	− 3	—	—	i 39 53	P′P′	—
Saskatoon		58·2	340	10 1	+ 3	18 12	+13	12 15	PP	29·2
Hungry Horse		58·2	333	i 9 58	0	e 18 4	+ 5	i 38 17	P′P′	—
Ferndale	E.	58·8	321	e 10 4	+ 2	e 17 26	−41	—	—	e 29·1
	N.	58·8	321	e 10 8	+ 6	e 17 28	−39	—	—	e 24·8
Victoria		62·9	329	i 10 30a	0	19 3	+ 3	19 13	PS	31·2
Sitka		73·9	331	i 11 37	− 2	i 21 19	+ 9	e 14 24	PP	e 33·6
Lisbon		74·8	49	e 11 42a	− 2	21 18	− 2	26 8	SS	33·0
Malaga		78·0	52	i 12 9	+ 7	e 22 25	+30	i 15 31	PP	35·4
Granada		78·7	52	i 12 7k	+ 1	i 22 5	+ 2	15 11	PP	i 36·6
Toledo		78·9	49	i 12 7	0	—	—	—	—	—
Almeria		79·6	52	i 12 13	+ 3	22 17	+ 5	12 19	PcP	36·7
Scoresby Sund		80·5	16	i 12 15a	0	22 22	0	15 16	PP	—
Alicante		81·4	51	12 21	+ 1	22 25	− 6	15 26	PP	39·3
College		82·4	336	e 12 23	− 2	i 22 47	+ 6	i 15 53	PP	e 40·0
Tortosa		82·5	48	12 26	0	i 22 40	− 2	12 30	PcP	39·8
Durham		83·4	35	—	—	i 23 17	PS	—	—	—
Aberdeen		83·6	32	—	—	i 22 55	+ 2	—	—	40·3
Kew		83·6	38	e 12 30	− 1	e 22 52	− 1	e 15 26	PP	e 34·2
Barcelona		83·7	47	12 36	+ 4	22 57	+ 3	—	—	e 38·2
Algiers Univ.	Z.	83·9	53	e 12 32	− 1	—	—	e 15 51	PP	—
Tamanrasset	Z.	84·9	67	e 12 38	0	e 23 12	+ 6	e 12 42	PcP	40·2
Paris		85·0	41	e 12 38	0	i 23 6	− 1	i 16 0	PP	e 39·2
Clermont-Ferrand		85·0	41	i 12 39	+ 1	e 29 20	SSP	i 16 1	PP	40·2
De Bilt		87·1	38	i 12 50a	+ 1	i 23 32	+ 4	i 16 13	PP	e 35·2
Besançon		87·2	43	i 12 47	− 2	—	—	e 15 57	PP	—
Neuchâtel		87·8	43	e 12 51	− 1	e 23 24	−10	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Basle		88·2	43	e 12 55	+ 1	e 23 45	+ 7	e 23 10	SKS	—
Strasbourg		88·4	41	i 12 55a	0	i 23 42	+ 2	i 13 32	pP	i 42·2
Zürich		88·9	43	e 12 56	− 2	e 23 43	− 1	e 16 18	PP	—
Pavia		89·2	45	e 13 14?	+15	—	—	—	—	—
Stuttgart		89·4	41	i 12 58a	− 2	e 23 47	− 2	e 16 28	PP	41·2
Florence Xim		90·6	47	e 13 22	+17	—	—	—	—	—
Bologna		90·7	46	e 13 12a	+ 6	e 24 27	+26	e 16 36	PP	e 45·0
Jena		91·0	40	e 13 6	− 1	e 24 3	0	e 16 16	PP	—
Cheb		91·5	40	e 13 14	+ 4	e 24 48	+40	—	—	—
Copenhagen		91·5	34	e 13 14	+ 4	i 24 14	+ 6	e 23 49	SKS	44·2
Rome		91·5	49	i 13 7	− 3	i 24 7	− 1	i 16 51	PP	—
Potsdam		91·9	38	e 13 13?	+ 2	i 24 16	+ 5	—	—	e 36·8
Collmberg		91·9	39	e 13 11	0	e 23 50	[+ 6]	e 16 54	PP	e 39·7
Triest		92·4	44	e 13 19	+ 5	i 24 44	+28	i 13 59	pP	e 44·3
Prague.		92·8	40	13 16	0	e 24 23	+ 4	e 19 21	PPP	e 39·2
Zagreb		94·0	45	e 14 13	+52	—	—	—	—	e 50·5
Upsala		94·1	31	e 13 14?	− 8	i 24 36	+ 5	e 17 3	PP	e 37·2
Taranto		95·2	50	e 13 8	−19	24 2	[0]	17 8	PP	—
Raciborzu	z.	95·2	40	e 13 29	+ 2	—	—	—	—	—
Ogyalla		95·4	43	e 13 37	+ 9	e 24 49	+ 7	—	—	—
Budapest		96·0	43	e 14 4	+34	24 27	{+ 2}	i 17 34	PP	e 42·2
Belgrade		97·2	46	e 13 41k	+ 5	e 24 30	{− 4}	i 17 33	PP	e 49·7
Bucharest		101·3	45	e 14 26	+32	e 24 42	[+ 9]	—	—	—
Wellington		101·7	228	e 13 53	− 3	e 25 45	+10	i 27 26	PPS	e 47·2
Christchurch		102·8	225	e 15 18	P	27 9	PS	e 19 24	PP	48·4
Istanbul		104·0	48	e 22 48?	?	e 26 8?	+14	—	—	—
Pretoria	z.	104·5	117	e 18 26	PP	—	—	—	—	—
Moscow		105·4	32	e 18 34	PP	26 2	− 3	e 25 0?	SKS	—
Yalta		106·9	44	e 18 42	PP	—	—	—	—	—
Helwan		107·8	59	e 14 29	P	26 32	S	18 48	PP	—
Ksara		110·7	54	e 14 41	P	28 51	PS	19 15	PP	—
Leninakan		114·8	46	e 19 49?	PP	—	—	—	—	—
Tiflis		115·1	44	i 18 44	[+ 1]	—	—	—	—	—
Grozny		115·2	42	20 11	PP	—	—	—	—	—
Sverdlovsk		115·7	23	i 19 44	PP	e 25 34	[− 1]	e 27 32	S	—
Baku		119·2	43	e 19 8	[+17]	e 27 12	{+ 4}	—	—	—
Riverview		121·8	228	e 20 33	PP	e 28 49	S	e 30 50	PS	e 56·6
Tananarive		123·4	113	—	—	e 42 43	SSS	—	—	e 63·2
Ashkabad		126·1	42	e 19 3	[− 1]	—	—	—	—	—
Irkutsk		129·0	358	19 39	[+29]	30 31	PS	21 26	PP	—
Samarkand		130·5	36	e 19 20	[+ 7]	—	—	e 22 38	PKS	—
Tashkent		130·6	32	e 19 12	[− 1]	e 26 38	[+17]	i 21 26	PP	—
Frunse		132·0	27	e 19 28	[+12]	—	—	—	—	—
Stalinabad		132·3	34	i 19 17	[+ 1]	—	—	—	—	—
Andijan		132·6	31	e 19 18	[+ 1]	e 31 54	PS	i 22 50	PKS	—
Obi-garm		132·7	34	i 19 18	[+ 1]	—	—	e 21 43	PP	—
Murgab		135·2	31	e 19 25	[+ 3]	—	—	21 50	PP	—
New Delhi		144·2	38	e 19 38	[0]	e 29 49	{+ 4}	e 41 38	SS	e 90·0
Bombay		146·8	56	e 19 46	[+ 4]	—	—	—	—	80·1
Poona	N.	147·9	56	19 32	[−12]	i 42 29	SS	20 0	PKP_2	72·2
Hyderabad	N.	152·2	53	e 19 47	[− 4]	—	—	—	—	—
Kodaikanal	E.	154·5	68	e 22 23	PKS	—	—	—	—	—
Calcutta	E.	155·3	30	e 19 29	[−26]	e 46 50	SS	e 25 24	PP	—
Colombo	E.	157·7	75	e 20 4	[+ 6]	—	—	—	—	76·6

Additional readings :—
Bogota iS_eNZ = 3m.58s.
La Paz iSS = 8m.18s., iP_cPZ = 9m.0s., iS_cS? = 15m.38s.
Antofagusta E = 7m.29s., 11m.5s., and 14m.36s.
Tacubaya e = 10m.16s., eS = 11m.8s., e = 12m.58s.
Pensacola e = 10m.32s.
Santa Lucia ePE = 6m.52s., E = 7m.46s., N = 8m.17s. and 14m.13s., E = 14m.17s., N = 24m.9s.
La Plata E. P_cP = 9m.45s., 12m.19s., and 12m.46s., SS = 15m.38s., S_cS = 17m.24s., Q = 18m.14s.
La Plata N. 12m.14s., SS = 15m.56s., SSS = 16m.26s., Q = 18m.17s.

Continued on next page.

La Plata z. P_cP? =9m.54s., 13m.21s., S_cS =18m.32s.
Cincinnati i =8m.14s.
Philadelphia i =8m.9s., iS =14m.18s.
St. Louis i =8m.29s., iPPP =9m.57s., i =13m.28s.
Pennsylvania eE =10m.10s., 11m.25s., 12m.4s., 12m.31s., 13m.30s., 15m.31s., and 17m.32s.
City College, N.Y. eS_cS? =17m.58s., eSSSS =19m.3s.
Cleveland iN =8m.3s., eE =8m.6s., eSSSE =17m.26s.
Chicago ePPP? =10m.35s.
Harvard iPPP =11m.15s., iSS =18m.11s., eQ =19·7m.
Lincoln ePPPE =10m.43s., eSSE =18m.1s.
Tucson epP? =10m.3s., ePPP =10m.50s., eSS? =18m.38s.
Ottawa i =8m.35s., SS =18m.50s.
Halifax e =10m.5s. and 18m.31s., SS =19m.23s.
Shawinigan Falls eN =8m.46s.
Seven Falls eE =16m.47s.
Rapid City eSSE =19m.43s.
Pasadena eSEN =16m.26s.
Punta Arenas N =9m.36s.
Logan i =9m.38s., iS =16m.54s., iSS =20m.20s.
Fresno eNZ =9m.48s., eSN =17m.18s.
Bozeman ePPP =13m.0s., eSS? =21m.20s.
Lick iZ =9m.43s. and 10m.30s., eSN =17m.40s.
Reno iE =10m.0s., iN =10m.5s. and 10m.52s., eSE =17m.48s.
Branner iZ =9m.44s., eSE =17m.43s.
Butte eN =12m.32s.
Berkeley iZ =9m.47s. and 9m.50s., iNZ =10m.40s., iE =13m.22s., iN =13m.29s., iSE =17m.49s., eSZ =17m.55s., iE =19m.20s., iN =19m.43s., iZ =20m.51s., eQEN =25·3m.
Mineral iNZ =9m.54s.
Shasta Dam e =37m.53s.
Saskatoon PPP =13m.34s., e =18m.0s., eNE =18m.22s., PS =18m.52s., SS =22m.12s.
Victoria e =12m.37s., 18m.54s., 20m.28s., and 22m.19s.
Sitka ePPP =16m.19s., eSS =26m.9s.
Lisbon iPZ =11m.48s.a, E =21m.38s., N =23m.0s.
Granada PPS =23m.31s., SS =27m.38s., SSS =30m.47s.
Almeria pP =12m.33s., sP =12m.43s., PP =15m.17s., P_cS =16m.4s., PPP =17m.8s., iS =22m.48s., PS =23m.11s., PPS =23m.24s., SS =27m.17s., SSS =31m.1s.
Scoresby Sund 23m.11s. and 27m.38s.
Alicante PPP =17m.22s., S_cS =22m.41s., PS =23m.28s., PPS =23m.40s., SS =28m.15s., Q =34m.16s.
Tortosa PPN =15m.41s., S_cSEN =22m.54s., PSEN =23m.36s., PPS =23m.51s., SSN =28m.2s., SSS?N =31m.10s.
Aberdeen iEN =25m.45s., eN =34m.53s.
Kew e =12m.36s., eZ =21m.5s., eSS =28m.26s., e =30m.58s.
Algiers Univ. iZ =12m.37s., 12m.53s., and 13m.22s., eZ =13m.37s. and 16m.13s.
Tamanrasset iZ =12m.51s., ePPZ =15m.51s., ePPPZ =17m.59s., eSSZ =29m.14s.?, eSSSZ =32m.14s.?
Paris i =12m.43s., 13m.8s., 13m.42s., and 15m.36s., eSKS =23m.2s.?, iPS? =24m.22s., ePPS? =24m.42s., e =25m.1s. and 25m.18s., eSS =28m.50s., eSSS =31m.34s. eQ =35·2m.
Clermont-Ferrand i =12m.44s. and 13m.47s., ePPP =17m.50s., e =29m.20s.
De Bilt ePPP =17m.51s., iPS? =24m.52s.
Besançon e =13m.47s. and 16m.30s.
Strasbourg isP? =13m.57s., iPP =16m.27s., ePPP =18m.22s., eSKS? =23m.31s., iS =23m.46s., iPS =24m.47s. and 24m.56s., iPPS =25m.18s., iSS =29m.48s., eSSS =33m.8s. and 33m.20s., iQ =37m.24s. and other e and i readings without phase.
Zürich e =13m.0s.
Stuttgart iZ =13m.2s., e =13m.26s. and 16m.2s., eSS =29m.8s., eQ =37·2m.
Jena eNZ =17m.34s., eE =17m.39s., eSKS?N =23m.37s., eSKS?E =23m.46s., eSKS?N =23m.50s., eSN =24m.6s.
Copenhagen 25m.8s., SS =30m.51s., SSS =34m.20s.
Rome iZ =21m.19s., PS =25m.9s., SS =30m.24s., SSS =33m.29s.
Potsdam ePE =13m.20s., eN =13m.25s., eE =22m.18s., iE =24m.13s.?
Collmberg eZ =13m.16s., eE =14m.53s., eZ =16m.49s., ePSE =25m.24s., eE =33m.26s.
Triest iPP =16m.59s., ipPP? =17m.28s., iPPP =19m.1s., iSKS =23m.57s., iPS =25m.41s., iPPS =26m.29s., iSS =30m.40s.
Prague iP =13m.20s., e =13m.41s. and 16m.20s., eSKS =23m.56s., ePS =25m.25s., ePPS =26m.6s., eSS =30m.20s., eSSS =34m.44s.
Upsala eSKSN =23m.49s., eSKSE =23m.58s., ePSE =25m.32s., ePPSN =26m.14s., eE =28m.14s.?, eSSN =30m.41s., eN =33m.3s.
Belgrade e =27m.44s. and 37m.27s.
Wellington i =19m.39s., e =31m.25s., iSS =32m.51s., ePKP,PKP =37m.46s., eQ =42m.34s.
Christchurch SKSEN =25m.59s., SSEN =33m.10s., SSSEN =37m.34s., QN =42m.59s.
Moscow ePS =27m.50s., eSS =33m.20s.
Helwan eZ =18m.0s., 20m.58s., and 21m.23s., PSE =28m.2s.
Sverdlovsk iPS =29m.30s., SS =35m.44s.

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Riverview eZ =21m.9s., iZ =22m.26s., ePPSZ =32m.26s., eN =37m.20s., eSSZ = 37m.31s., eN =37m.45s., eQN =51m.32s.
Tananarive e =53m.2s. and 59m.58s.
Irkutsk ePPP =24m.32s.
Tashkent iPKS =22m.43s., iPPP =24m.25s.
Bombay eE =18m.24s.
Poona PPN =23m.24s., PPPN =26m.51s., QN =63·2m.
Calcutta ePPPE =29m.28s., eSSSE =51m.40s.
Long waves were also recorded at Auckland and Honolulu.

Aug. 5d. Continuation of the list of after-shocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	12	25	7	31	35	19	50	16	22	9	1
6	7	34	9	58	34	20	32	8	23	42	3
6	13	31	11	24	0						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	29	23	7	31	45	11	24	9	19	50	31
4	12	37	9	58	45						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	29	14	7	31	55	11	24	57	22	9	11
4	12	44	9	58	57	19	50	26	23	42	16

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
19	50	44	22	9	28	23	43	7

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	12	47?	7	31	59	11	24	0	22	9	12
6	43	5	9	58	56	19	50	28	23	42	19

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	13	1	9	59	10	11	25	14	22	10	29
7	32	10									

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
7	32	56	19	50	51	22	10	19

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
4	14	45	7	32	44	19	51	6

Aug. 5d. Readings also at 0h. (Strasbourg, Stuttgart, Kew, Rome, Triest, Almeria, Granada, Helwan, Ksara, Tamanrasset, Overton, Shasta Dam, Hungry Horse (2), Bogota, Huancayo, and La Plata), 1h. (Clermont-Ferrand, Paris (2), De Bilt, Shasta Dam, and Hungry Horse), 2h. (Paris (2), Stuttgart, Shasta Dam, and Hungry Horse), 3h. (De Bilt, Paris, Granada, Reno, Hungry Horse, and near Mizusawa), 4h. (Hungry Horse), 6h. (Auckland and Brisbane), 7h. (Mount Wilson (2), Palomar (2), Riverside (2), China Lake (2), Tinemaha (2), Tucson (2), Boulder City (2), Overton (2), Pierce Ferry (2), Mineral, Shasta Dam (2), Hungry Horse, La Paz, and near Huancayo), 8h. (Bogota and near Tamanrasset), 9h. (Hungry Horse), 12h. (Hungry Horse and Upsala), 13h. (Reno and Strasbourg), 14h. (Overton), 15h. (near Ottawa), 17h (Copiapo), 18h. (Harvard and near Reno), 19h. (Harvard and Galerazamba), 20h. (Istanbul, Reno, Tucson (2), Hungry Horse, and near Victoria), 21h. (Bogota and near Tacubaya), 22h. (Helwan, Alicante, Algiers Univ., Almeria, Granada, Tamanrasset, Pretoria, Grahamstown, La Paz (2), Bogota (2), Harvard, Weston, Shasta Dam, Hungry Horse (2), and near Victoria (2)), 23h. (Wellington, Ksara, Rome, Upsala, Kew, Strasbourg, and Clermont-Ferrand).

Aug. 6d. 0h. 35m. 37s. Epicentre 19°·0S. 174°·2W. Depth of focus 0·005.

Intensity V at Nukualofa; III at Apia. Suggested epicentre 18°·5S. 174°·5W. Depth 70km.

Apia Observatory, Western Samoa, Preliminary Seismological Bulletin, July-September, 1949, p. 3.

$A = -·9414$, $B = -·0956$, $C = -·3236$; $\delta = +9$; $h = +5$;
$D = -·101$, $E = +·995$; $G = +·322$, $H = +·033$, $K = -·946$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		5·7	25	e 1 16	− 8	e 2 15	−14	e 15 36	S_cS	—
Auckland	N.	20·2	207	i 4 32	0	i 8 15	+ 5	i 4 55	PP	—
Arapuni	E.	21·0	204	i 4 35	− 5	i 8 23	− 2	—	—	—
New Plymouth	E.	22·4	205	e 4 58	+ 4	e 9 0	+ 9	—	—	—
Wellington		24·1	202	i 5 7	− 3	i 9 20	− 1	i 5 29	pP	—
Cobb River	E.	24·7	205	e 5 16	0	i 9 32	+ 1	—	—	—
Kaimata	N.E.	26·4	205	e 5 25	− 7	i 10 10	+11	e 5 32	P	—
Christchurch		26·9	202	i 5 34	− 3	i 10 1	− 6	i 6 7	pP	13·0
Brisbane		31·2	248	(i 6 4k)	−11	(e 10 57)	−19	(i 12 41)	SS	(e 13·8)
Riverview		34·2	237	i 6 39k	− 2	i 11 54	− 8	i 6 54	pP	e 15·7
Melbourne	E.	40·1	233	i 7 33	+ 2	—	—	i 9 43	P_cP	—
Honolulu		43·1	23	i 7 53	− 2	e 14 15	− 1	i 8 16	pP	e 18·3
Perth		63·5	243	i 10 36	+10	i 18 59	+ 7	i 19 55	S_cS	—
Mera		69·1	321	10 51	−10	—	—	—	—	—
Yokohama		69·6	321	11 16	+12	22 3	+117	—	—	—
Tokyo		69·7	321	11 11	+ 6	20 6	− 1	13 49	PP	—
Kakioka		69·8	322	11 3	− 2	18 54	−74	—	—	—
Misima		69·8	321	11 6	+ 1	—	—	—	—	—
Omaesaki		69·9	320	11 5	− 1	20 10	0	—	—	—
Shizuoka		70·0	320	11 12	+ 5	—	—	—	—	e 28·8
Hunatu		70·2	322	11 13	+ 5	—	—	—	—	—
Kumagaya		70·2	322	e 11 10	+ 2	—	—	—	—	—
Maebasi		70·6	322	e 11 11	+ 1	20 14	− 4	—	—	—
Sendai		70·8	324	11 12	0	20 18	− 2	—	—	29·0
Nagoya		71·0	320	e 11 14	+ 1	20 25	+ 3	—	—	29·0
Kameyama		71·1	319	11 16	+ 3	20 30	+ 7	—	—	27·4
Miyako		71·2	326	11 7	− 7	20 22	− 3	—	—	32·8
Mizusawa	E.	71·3	325	e 11 15	0	20 24	− 2	—	—	—
	N.	71·3	325	e 11 45	pP	e 20 28	+ 2	—	—	e 29·1
Nagano		71·3	321	11 9	− 6	20 29	+ 3	—	—	—
Osaka		71·6	318	e 11 17	+ 1	20 32	+ 3	—	—	—
Sumoto		71·8	318	e 11 19	+ 1	i 20 33	+ 1	—	—	—
Hikone		71·9	319	e 11 17	− 1	20 29	− 4	—	—	33·6
Kobe		71·9	318	e 11 18	0	e 20 33	0	—	—	e 32·4
Akita		72·3	324	e 11 25	+ 5	20 25	−12	—	—	33·5
Wazima		72·6	321	e 11 26	+ 4	—	—	—	—	—
Kagosima		73·0	313	11 26	+ 1	20 46	+ 1	—	—	—
Mori		73·8	327	e 11 38	+ 9	21 2	+ 8	—	—	—
Sapporo		74·0	329	11 33	+ 3	20 55	− 1	—	—	30·7
Hukuoka		74·3	314	e 11 32	0	20 59	− 1	—	—	34·9
Branner		74·5	41	e 11 32	− 1	e 21 7	+ 5	i 11 52	pP	e 30·9
San Francisco		74·5	41	10 23?	−70	19 56?	−66	—	—	—
Santa Clara		74·6	41	i 11 37	+ 3	i 21 12	+ 9	e 30 37	Q	e 34·4
Berkeley		74·7	41	i 11 34a	0	i 21 7	+ 3	i 11 53	P_cP	e 30·5
Lick	Z.	74·8	41	i 11 35a	0	e 21 16	+11	i 11 55	pP	—
San Diego		74·9	47	e 11 30	− 6	e 26 43	SS	—	—	—
Ukiah		74·9	39	i 11 31	− 5	i 21 7	+ 1	e 14 31	PP	e 33·5
Pasadena		75·1	46	i 11 36a	− 1	i 21 14	+ 5	i 11 53	pP	e 33·5
Ferndale		75·3	37	i 11 41	+ 3	i 21 19	+ 8	—	—	e 34·3
Palomar		75·5	47	i 11 39a	0	i 21 18	+ 5	e 21 38	PS	—
Riverside		75·5	46	i 11 39a	0	e 21 11	− 2	i 11 56	pP	—
Fresno		75·6	43	e 11 39a	− 1	e 21 19	+ 5	i 11 51	P_cP	e 34·0
China Lake	Z.	76·4	44	i 11 44a	0	—	—	—	—	—
Shasta Dam		76·4	38	i 11 48	+ 4	e 21 29	+ 6	e 58 46	P′P′P′	—
Mineral		76·7	39	i 11 45a	− 1	e 21 29	+ 3	e 22 3	PS	e 35·3

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha		76·7	43	i 11 46a	0	i 21 30	+ 4	i 12 3	pP	—
Reno		77·2	41	e 11 49a	0	i 21 39	+ 7	i 12 10	pP	—
Batavia		77·6	268	i 11 50k	− 1	i 21 53	+17	—	—	—
Manzanillo		78·3	65	e 11 59	+ 4	e 22 0	+17	—	—	—
Boulder City		78·4	46	e 11 55	0	e 21 47	+ 3	i 12 14	pP	—
Overton	Z.	78·9	46	i 11 59	+ 1	e 22 0	+10	—	—	—
Pierce Ferry		79·0	46	i 11 57	− 2	e 21 54	+ 3	e 22 27	pS	—
Tucson		79·2	50	i 12 0	0	i 22 0	+ 7	i 12 23	pP	e 33·3
Victoria		81·0	32	i 12 8a	− 1	22 15	+ 3	15 13	PP	36·4
Punta Arenas	N.	82·7	144	—	—	i 22 37	+ 8	i 35 32	Q	—
Sitka		82·9	20	i 12 15	− 4	i 22 25	− 6	i 12 42	pP	e 34·2
Salt Lake City		82·9	43	i 12 18	− 1	i 22 36	+ 5	e 12 40	pP	e 34·3
Tacubaya		82·9	67	i 12 22	+ 3	e 22 40	+ 9	i 15 40	PP	—
Logan		83·5	42	i 12 21	− 1	e 22 39	+ 2	i 12 47	pP	e 34·8
Puebla		83·6	67	e 12 54	sP	e 22 48	+10	—	—	—
Butte	N.	85·3	38	i 12 32	+ 1	i 22 56	+ 1	i 13 9	sP	e 35·4
Vera Cruz		85·5	68	12 23	− 9	i 22 49	[+ 1]	—	—	—
Hungry Horse		85·8	36	e 12 33	− 1	e 22 48	[− 2]	e 12 56	pP	—
College		86·0	11	i 12 32	− 3	i 22 52	[0]	e 16 8	PP	e 35·3
Bozeman		86·1	39	i 12 37	+ 2	i 22 57	[+ 5]	i 13 3	pP	e 39·6
Lubbock		86·5	53	12 37	0	22 50	[− 5]	15 58	PP	—
Rapid City	E.	90·1	43	i 12 55	+ 1	i 23 23	[+ 6]	e 16 21	PP	e 39·8
Santa Lucia		90·4	126	e 12 58	+ 3	23 21	[+ 2]	23 49	S	—
Merida		91·8	69	e 12 59	− 3	e 23 26	[− 1]	—	—	—
Saskatoon		91·8	35	13 9	+ 7	i 24 1	+ 6	16 45	PP	42·4
Copiapo	N.	93·1	120	e 12 34	−34	24 5	− 1	16 31	PP	—
Lincoln	E.	93·2	48	i 13 8	0	i 23 36	[+ 1]	i 13 30	pP	e 43·1
Huancayo		94·3	105	i 13 17	+ 4	e 23 36	[− 5]	i 24 23	S	e 38·5
Antofagasta	E.	94·5	117	—	—	e 23 53	[+11]	—	—	—
Pensacola		96·9	60	e 13 40	pP	—	—	—	—	—
St. Louis		97·1	52	e 13 24	− 2	i 23 59	[+ 3]	i 13 49	pP	—
La Paz		99·2	111	i 13 38a	+ 2	i 24 51	− 7	i 17 41	PP	46·2
La Plata		99·2	132	17 11	PP	24 7	[0]	26 37	PS	32·5
Chinchina		99·7	88	—	—	e 23 39	[−30]	e 27 43	PPS	—
Irkutsk		99·7	322	e 13 34	− 4	i 24 12	[+ 3]	17 51	PP	—
Chicago		100·0	49	e 13 39	0	i 24 20	[+ 9]	i 17 52	PP	e 41·5
Bogota		101·1	89	e 13 49	+ 5	e 24 21	[+ 5]	e 17 57	PP	47·4
Cincinnati		101·5	52	i 13 47	+ 1	—	—	i 14 9	pP	—
Columbia		102·9	58	e 13 50	− 2	i 24 28	[+ 3]	e 18 7	PP	e 43·9
Calcutta	E.	103·7	289	e 17 52	PP	i 24 35	[+ 6]	i 27 20	PS	—
Cleveland	E.	104·3	51	e 13 59	+ 1	i 24 34	[+ 3]	e 18 14	PP	—
Guantanamo Bay		104·5	74	e 13 55	− 3	—	—	—	—	—
New Kensington	E.	105·4	52	e 14 1	− 2	i 25 48	− 2	i 18 22	PP	e 48·0
Pennsylvania	E.	106·9	52	i 14 13	+ 4	e 24 48	[+ 5]	i 18 33	PP	—
Georgetown		107·1	54	i 14 11	+ 2	—	—	i 18 32	PP	—
Washington		107·1	54	e 18 35	PP	—	—	e 19 1	pPP	e 52·1
Colombo	E.	107·2	272	19 3	PP	30 23?	?	—	—	53·2
Philadelphia		108·7	53	e 14 18	+ 2	e 24 45	[− 6]	e 14 44	pP	e 46·1
Ottawa		109·2	48	14 20	0	24 53	[0]	18 53	PP	50·4
City College, N.Y.		109·8	52	e 14 25	+ 2	e 24 51	[− 4]	e 18 56	PP	e 48·1
Fordham		109·8	52	i 14 24	+ 1	i 25 0	[+ 5]	i 18 57	PP	54·4
Kodaikanal	E.	110·5	275	e 16 32	?	28 53	PPS	18 47	PP	—
Hyderabad	N.	111·4	282	e 19 2	PP	24 56	[− 6]	28 32	PS	48·6
Harvard		111·8	51	i 14 30	P	e 25 8	[+ 5]	i 18 51	pPKP	e 51·9
Weston		111·9	51	e 14 18	P	i 24 55	[− 9]	i 14 43	pP	—
San Juan		112·4	77	i 19 16	PP	i 25 10	[+ 4]	i 28 45	SP	e 48·8
Seven Falls	E.	112·7	46	14 39	P	25 9	[+ 2]	18 15	PKP	52·4
Roosevelt Roads		112·8	78	e 14 34	P	—	—	—	—	—
New Delhi	N.	114·8	294	e 16 25	?	i 25 14	[− 1]	e 19 25	PP	—
Poona	N.	116·0	282	e 19 31	PP	25 22	[+ 3]	i 30 40	PPS	54·4
Bermuda		116·1	63	e 14 48	P	i 25 28	[+ 8]	i 19 43	PP	e 52·0
Fort de France		116·1	83	e 18 43	[+ 7]	—	—	—	—	—
Bombay		117·0	282	e 18 11	[−27]	i 25 25	[+ 2]	i 29 43	PS	49·9
Halifax		117·7	48	18 53	pPKP	25 29	[+ 3]	22 25	PPP	57·7
Frunse		118·1	309	e 18 44	[+ 5]	e 25 29	[+ 2]	e 20 5	PP	—

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		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Murgab		118·5	304	e 18 45	[+ 5]	25 33	[+ 5]	—	—	—
Andijan		119·8	306	18 45	[+ 3]	i 25 36	[+ 3]	20 7	PP	—
Obi-garm		121·8	304	e 18 46	[− 1]	i 25 41	[+ 1]	—	—	—
Tchimkent		121·8	309	e 18 50	[+ 3]	i 25 41	[+ 1]	—	—	—
Tashkent		122·1	307	e 18 50	[+ 3]	i 25 45	[+ 5]	i 20 16	PP	—
Stalinabad		122·5	304	18 47	[− 1]	i 25 52	[+10]	—	—	—
Samarkand		123·9	305	e 18 53	[+ 2]	—	—	—	—	—
Grahamstown	z.	124·3	201	i 18 53	[+ 1]	—	—	—	—	—
Tananarive		124·3	230	e 20 32	PP	25 51	[+ 3]	30 24	PS	e 58·6
Sverdlovsk		124·7	327	e 15 51?	P	i 25 53	[+ 4]	e 19 11	PKP	—
Scoresby Sund		125·9	12	18 57k	[+ 2]	25 59	[+ 6]	30 55	PS	—
Pretoria	z.	130·5	207	i 19 6	[+ 2]	i 22 24	PKS	i 21 19	PP	—
Ashkabad		130·8	304	e 19 8	[+ 4]	—	—	21 23	PP	—
Moscow		136·2	335	e 19 16	[+ 2]	e 22 45	PKS	e 21 55	PP	—
Helsinki		136·6	347	e 24 6	PPP	—	—	e 40 52	SS	e 64·4
Baku		136·7	310	e 19 47?	pPKP	—	—	22 17?	PP	—
Upsala		138·3	352	e 19 23?	[+ 5]	e 26 23?	[+ 3]	e 22 44	PKS	e 50·4
Grozny		138·6	315	19 21	[+ 3]	29 1?	SKKS	e 22 53	PKS	—
Tiflis		139·9	313	19 13	[− 8]	i 29 7	SKKS	i 22 21	PP	—
Piatigorsk		140·1	318	e 19 19?	[− 2]	—	—	22 27?	PP	—
Erevan		140·7	311	19 32	[+10]	—	—	—	—	—
Leninakan		140·9	312	19 13	[−10]	—	—	i 23 14	PKS	—
Aberdeen		141·4	7	i 22 34	PP	i 40 51	SS	i 41 23	SSP	66·7
Sotchi		142·5	318	19 22	[− 4]	29 20	SKKS	—	—	—
Copenhagen		143·0	354	19 25	[− 1]	29 16	SKKS	23 7	PP	—
Theodosia		144·3	323	e 19 31	[+ 2]	29 34	SKKS	—	—	—
Yalta		145·3	324	19 31	[0]	—	—	—	—	—
Lwow		146·0	340	e 19 33	[+ 1]	—	—	e 19 45	PKP_2	—
Potsdam		146·2	352	e 19 34	[+ 2]	—	—	i 19 53	PKP_2	e 82·4
De Bilt		147·0	1	i 19 36	[+ 3]	i 41 53	SS	e 23 53	PKS	e 68·4
Kew		147·2	7	i 19 36	[+ 3]	i 30 2	SKKS	e 42 1	SS	e 70·4
Collmberg		147·3	351	e 19 35	[+ 1]	e 42 5	SS	i 19 42	PKP_2	e 62·4
Raciborzu		147·4	346	e 19 39	[+ 5]	e 26 32	[− 2]	e 26 25	PPP	—
Skalnate Pleso		147·7	343	e 19 44	[+ 9]	—	—	e 23 37	PP	—
Jena		147·8	353	e 19 38	[+ 3]	e 41 55	SS	i 19 57	pPKP	—
Prague		148·3	349	i 19 39	[+ 4]	e 42 3	SS	i 19 57	pPKP	e 63·4
Cheb		148·6	352	e 19 41	[+ 5]	——		e 23 23	PP	—
Ksara		149·4	305	i 19 40	[+ 3]	—	—	23 0?	PP	—
Bucharest		149·5	331	e 19 53	pPKP	e 30 5	SKKS	i 22 55	PKS	52·4
Ogyalla		149·5	344	e 19 46	[+ 9]	—	—	e 22 53	PKS	—
Budapest	E.	149·6	343	19 43	[+ 5]	26 59	[+22]	20 1	PKP_2	e 65·4
	N.	149·6	343	19 43	[+ 5]	26 54	[+17]	20 7	PKP_2	e 70·4
Paris		150·1	5	i 19 40	[+ 2]	e 29 51	SKKS	i 23 24	PP	e 69·4
Stuttgart		150·2	356	e 19 39	[+ 1]	e 29 28	SKKS	e 41 53	SS	e 70·4
Strasbourg		150·4	358	i 19 41	[+ 2]	i 26 37	[− 1]	i 20 6	PKP_2	70·9
Kalossa	N.	150·5	343	e 19 49	[+10]	—	—	e 20 38	pPKP	—
Belgrade		151·5	238	i 19 49k	[+ 9]	i 30 12	SKKS	i 20 22	pPKP	e 76·9
Basle		151·5	358	e 19 44	[+ 4]	—	—	—	—	—
Zürich		151·6	357	e 19 41	[0]	e 29 50	SKKS	e 23 19	PP	—
Besançon		151·8	359	i 19 43	[+ 2]	—	—	—	—	—
Zagreb		152·0	338	e 19 40	[− 1]	—	—	i 19 56	pPKP	—
Neuchatel		152·1	358	e 19 41	[0]	—	—	—	—	—
Trieste		152·6	348	e 19 49	[+ 7]	e 29 36	SKKS	i 19 56	pPKP	e 70·1
Clermont-Ferrand		153·2	5	e 19 45	[+ 2]	i 43 11	SS	i 20 7	PKP_2	71·4
Pavia		153·7	355	e 19 53	[+10]	—	—	—	—	—
Bologna		154·2	352	e 19 50	[+ 6]	e 42 40	SS	e 24 27	pPP	—
Helwan	z.	154·4	300	i 19 45	[+ 1]	26 38	[− 5]	20 9	PKP_2	—
Prato		154·8	351	e 19 39	[− 6]	30 3	SKKS	—	—	—
Florence, Xim.		154·9	351	e 19 46	[+ 1]	i 43 46	SS	—	—	—
Lisbon		156·4	31	19 49a	[+ 2]	30 8	SKKS	i 20 19	PKP_2	—
Taranto		156·4	339	19 57	[+10]	43 27	SS	—	—	—
Rome		156·5	348	i 19 47	[0]	i 43 32	SS	i 20 4	pPKP	—
Barcelona		157·4	8	e 20 27	PKP_2	43 53	SS	—	—	e 75·9
Toledo		157·5	22	i 19 51	[+ 3]	—	—	—	—	—
Tortosa		157·8	11	19 57	[+ 8]	27 7	[+21]	20 31	PKP_2	e 71·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Catania		159·8	339	e 19 48	[− 3]	—	—	— —	—
Alicante		160·0	16	19 54	[+ 3]	27 0	[+12]	20 34 PKP_2	e 76·9
Granada		160·1	24	i 19 55k	[+ 4]	i 30 12 SKKS		20 14 pPKP	i 73·7
Malaga		160·2	25	i 20 22	pPKP	—	—	e 20 28 PKP_2	65·0
Almeria		160·8	22	i 19 55	[+ 3]	26 59	[+10]	20 39 PKP_2	66·2
Algiers Univ.	z.	162·1	8	e 19 55	[+ 1]	—	—	e 20 26 pPKP	—
Tamanrasset	z.	176·2	—	i 20 5k	[+ 3]	26 46	[−11]	e 20 23 pPKP	82·4

Additional readings :—
Apia e =1m.21s. and 15m.30s.
Auckland iSSN =8m.41s.
Wellington iPP =5m.45s., iScS =16m.9s.
Brisbane ePPN =(6m.59s.), iE =(7m.13s.), iZ =(7m.35s.), iE =(7m.39s.), iN =(7m.47s.), iSN =(11m.2s.). All readings have been decreased by 2m.
Riverview iPPEZ =7m.50s., i =7m.59s., iPPP =8m.10s., iNZ =8m.30s., iE =8m.34s. and 12m.6s., isSN =12m.20s., iZ =12m.59s., iN =13m.42s., iS_cSEN =17m.4s.
Melbourne iE =10m.38s.
Honolulu isS =14m.45s., eSS =17m.39s.
Perth i =14m.3s., 26m.8s., 27m.59s., 30m.52s., and 34m.23s.
Tokyo PPP =14m.39s., PS =20m.35s.
Branner eE =11m.35s., iE =12m.0s., e =12m.26s., eE =15m.25s. and 16m.5s.
Berkeley iZ =11m.47s., iPPZ =14m.32s. and 15m.0s., iN =21m.38s., eS_cSEZ =22m.10s., iS_cSZ =22m.16s., iZ =22m.39s. and 22m.44s.
Lick iZ =11m.43s. and 11m.59s., ePPZ =14m.19s., eSN =21m.19s., eE =21m.41s., eZ =21m.44s., iZ =24m.54s.
Ukiah iPS =21m.41s., esSS =26m.37s., eSSS =29m.46s.
Pasadena isP? =12m.4s., iZ =12m.15s. and 13m.35s., ePPZ =14m.14s., iEN =21m.37s., iE =22m.17s.
Palomar iZ =13m.40s., iN =22m.30s.
Riverside iZ =11m.50s.
Fresno iPN =11m.42s., eN =17m.31s.
Shasta Dam i =25m.7s. and 31m.18s.
Mineral iN =12m.17s., iZ =13m.37s.
Tinemaha iZ =11m.53s. and 12m.10s.
Reno iE =12m.2s., iZ =12m.14s., iE =15m.22s. and 22m.5s.
Boulder City ipS =22m.9s., iPS =22m.43s.
Pierce Ferry iP_cP =12m.0s., ePS =22m.49s., eS? =25m.17s., iPKP,PKP =38m.53s., eSKP,PKP =42m.23s.
Tucson ePP =14m.58s., i =16m.5s., e =16m.15s., ipS =22m.16s., esS =22m.38s., iPS =22m.52s., eSS =27m.23s., ePKP,PKP =38m.55s.
Victoria e =22m.39s., PS? =23m.44s.
Sitka ePP =15m.23s., ipPP =15m.50s., ePPP =17m.42s., isS =23m.2s., eSS =27m.59s., esSS =28m.23s., eSSS =31m.47s.
Salt Lake City ePP =15m.38s., ePPP =17m.36s., epPPP =18m.2s., eSS =27m.48s., eSSS? =31m.50s.
Logan iPP =15m.29s., ipPP =16m.0s., isPP =16m.13s., isS =23m.12s., iPS =23m.55s., eSS? =27m.51s., eSSS? =32m.31s.
Butte epPPN =16m.27s., ipSN =23m.25s., eSS?N =28m.26s., eSSS?N =32m.14s.
Hungry Horse ePP =15m.52s., iS =22m.56s., epS =23m.26s., iPKKP =30m.36s., iPKP,PKP =38m.37s., e =45m.59s. and 46m.28s., ePKP,PKP,PKP? =59m.9s.
College i =28m.0s.
Bozeman e =14m.0s., ePP =15m.59s., ePPP? =18m.42s., ipS =23m.36s., eSS =28m.39s., esSS =29m.22s., e =33m.56s.
Santa Lucia N =13m.28s.
Saskatoon SKS =23m.38s., i =24m.31s., iPS =25m.18s., PPS =25m.43s., SS =30m.3s.
Copiapo N =23m.3s., eN =27m.7s., N =30m.11s.
Lincoln ePPE =16m.46s., ePPPE =19m.4s., eSS?E =30m.11s.
Huancayo i =14m.12s., iPP =17m.12s., iSKKS =23m.52s., iPS =25m.55s., iSS =30m.51s.
La Paz iZ =14m.1s., iSKSN =24m.15s., iSKKS =24m.39s., iS_cSNZ =25m.35s., iPSN =27m.7s., iSSN =32m.23s.
St. Louis isP =13m.55s., e =16m.37s., iPP =17m.38s., ipPP =17m.56s., i =21m.9s., iS =24m.33s., iSP =25m.58s., i =29m.19s., iSS =31m.20s.
La Plata E. =17m.39s., P_cPN =18m.21s., P_cPE =18m.47s., PPPN =21m.17s., P_cSN =22m.33s., SN =24m.10s., PSN =24m.44s., PSE =24m.39s., S_cSN =26m.53s., Q?N =30m.53s.
Irkutsk iSKKS =24m.48s., PS =26m.41s., eSS =31m.22s., SSS =35m.47s.
Chicago e =17m.2s., ePPP =20m.2s., iS? =24m.52s., eSS =32m.10s.
Bogota eSNZ =25m.37s., ePS?NZ =28m.14s.
Cincinnati ePP =17m.55s.
Columbia eSKKS? =24m.58s., eS? =25m.46s., ePS =27m.9s., eSS =32m.38s., eSSS =36m.28s.
Calcutta ePPPE =19m.10s., iSSE =31m.5s., iSSSE =34m.40s.
Cleveland eE =14m.2s., iE =14m.5s., ePPE =18m.17s., eSKSE =24m.37s., iE =25m.6s., eE =25m.10s. and 25m.50s., ePSE =27m.27s. and 27m.31s., eE =31m.15s., eSSE =33m.34s.

Continued on next page.

New Kensington eE =19m.52s., iSKSE =24m.32s., iSKKS?E =25m.5s., eSSE =33m.4s.
Pennsylvania iE =14m.38s., 15m.0s., 17m.39s., 18m.1s., and 23m.52s.
Philadelphia ePKP? =17m.50s., iPP =18m.48s., ipPP =19m.8s., eSKKS =25m.24s., iS =26m.28s., ipS =26m.55s., eSP =28m.7s., ipPS =28m.38s., esSS =34m.37s.
Ottawa e =21m.45s., SKKS =25m.25s., S =26m.20s., PS =28m.18s., PPS =28m.35s., e =29m.41s., SS =32m.58s., SSS =38m.23s.?.
City College, N.Y. ePKP? =18m.2s., sSKS =25m.29s., e =28m.23s.
Kodaikanal SSE =32m.58s.
Hyderabad SKKSN =25m.59s., SSN =34m.13s.
Harvard iPP =19m.12s., e =25m.35s., eSKKS =26m.8s., eS =26m.43s., ePS =28m.35s., e =28m.55s., ePPS =29m.30s., eSS =34m.13s., e =36m.20s., eSSS =38m.43s., eQ = 49m.49s.
Weston iPP =18m.59s., SS =35m.5s.
San Juan iSKKS =25m.45s., iPS =29m.3s., e =33m.55s.
Seven Falls PPE =19m.17s., eE =25m.43s., SKKSE =26m.13s., SE =26m.42s., PSE = 28m.47s., PPSE =30m.27s., SSE =33m.23s.
New Delhi iSKKSN =26m.22s., ePSN =29m.13s.
Poona PPN =20m.8s., iSKKSN =25m.59s., iPSN =29m.31s., iSSN =35m.45s., QN = 48m.53s.
Bermuda esP =15m.29s., ipPP =20m.5s., iSKKS =25m.59s., i =26m.39s., iSP =29m.24s., eSS =35m.44s., eSSS? =40m.48s.
Bombay eE =19m.48s.
Halifax SKKS =26m.49s., e =27m.25s., PS =29m.33s., SS =35m.37s., SSS =39m.35s.
Frunse PS =29m.40s.
Andijan SKS =27m.3s., PS =29m.54s.
Tashkent iSKKS =27m.11s., iPS =30m.10s., iSS =36m.18s.
Tananarive PPP =23m.33s., SKKS =27m.28s., SS =37m.23s.
Sverdlovsk PP =20m.35s., PKS =22m.25s., ePPP =23m.39s.?, SKKS =27m.30s., iS =28m.33s., iSKSP =30m.33s., eSS =36m.31s.
Scoresby Sund 20m.43s., 22m.8s., S? =28m.47s., 31m.31s., SS =37m.41s., 40m.31s.
Pretoria iZ =19m.28s.
Moscow eSKKS =28m.45s., eSS =39m.47s.
Upsala ePKPN =19m.33s., ePKSE =22m.40s., eN =23m.9s., iN =23m.54s., eN = 29m.23s.? and 29m.54s., eE =30m.23s., ePSN =32m.23s.?, eN =33m.2s., iPPSN = 34m.15s., eSSN =39m.53s., eSSE =40m.3s., e =43m.23s.?.
Leninakan i =20m.59s. and 23m.38s.
Aberdeen iE =35m.42s., eEN =59m.23s.
Copenhagen 19m.36s., 28m.0s., 31m.51s., 34m.12s., 37m.28s., and 40m.23s.
Lwow e =20m.9s.
Potsdam eE =19m.39s., 40m.23s., and 61m.53s.
De Bilt eSSS =47m.23s.?.
Kew eEN =19m.55s., iPPZ =20m.41s., iPKSEN =24m.7s., iZ =30m.41s., iSSS?E = 48m.9s., eN =48m.49s., eQEN =61·4m.
Collmberg eE =19m.38s. and 19m.45s., iZ =20m.0s., and 20m.19s., eE =20m.49s., 21m.6s., and 21m.17s., eZ =22m.40s., ePPZ =22m.56s., eZ =23m.53s., eE = 28m.32s., eSKSPE =33m.49s.
Raciborzu eE =19m.20s., eEN =19m.44s., eE =20m.20s., eEN =21m.25s., eE =21m.32s., eN =21m.48s. and 25m.28s.
Jena iPKPEN =19m.41s., iPKP$_2$N =20m.6s., eN =29m.31s., and 42m.3s.
Prague epPKP =20m.3s., esPKP =20m.18s., i =22m.48s., ePP? =23m.31s., epPP = 23m.46s., e =25m.41s., eSKKS =29m.37s., e =32m.35s., ePSKS =33m.29s., eSPP = 35m.37s., ePPS =36m.23s., eSSS =47m.17s.
Bucharest iE =22m.39s., eSKS?E =30m.41s., eSKKS?N =31m.35s., ePS?EN =33m.27s.
Budapest iE =21m.17s., ePPE =23m.6s., PPN =23m.42s., PPPN =27m.17s., SKKSN = 30m.34s., SKKSE =30m.43s., PPSN =36m.37s., PPSE =36m.55s., SSN =42m.10s., SSE =42m.17s., SSSN =48m.49s., SSSE =49m.36s.
Paris iPKP =19m.45s., i =20m.6s. and 21m.21s., e =23m.17s., i =23m.45s., e =26m.4s., ePPP? =26m.21s., cP$_c$P,PKP? =28m.1s., eSKSP =33m.24s., ePPS =36m.5s., i =37m.43s., iSS =42m.33s., i =42m.58s., eSSS =48m.1s., e =56m.23s., eSSS$_2$? = 62m.23s.?
Stuttgart iPKPZ =19m.45s., iPKP =19m.49s., i =20m.20s., ePP =22m.19s., e = 28m.1s., ePSKS =33m.23s., eSS =43m.5s., eSSS =48m.11s.
Strasbourg iSKP =23m.6s., iPP? =23m.35s., iSKS =26m.53s., iSKKS? =30m.42s., iPPP$_2$? =33m.41s., eSKKS$_2$? =34m.33s., ePPS? =36m.40s., eSS? =42m.19s., eSSS? =48m.21s., and many other readings given without phase.
Kalossa eE =19m.55s., 20m.42s., and 21m.38s.
Belgrade e =23m.1s., 24m.43s., and 34m.5s.
Zürich e =19m.46s.
Triest iN =20m.28s., iPP =24m.7s., ePKS =25m.3s., eSKP =25m.34s., eSKKKS? = 30m.55s., iPSKS =33m.24s.?, iSKSP =33m.34s., iSS =42m.49s., iPSS =43m.24s.?.
Clermont-Ferrand i =19m.58s., 20m.23s., and 20m.33s., ePKS =23m.15s., iPP =23m.40s., i =24m.12s. and 24m.27s., e =35m.36s., ePPS =37m.26s., iSSP =43m.46s., eSSS = 59m.1s., Q =60·4m.
Bologna e =35m.29s.
Helwan iZ =20m.37s., SKSZ =23m.17s., PPZ =23m.44s., SKKSE =30m.27s., iE = 31m.4s., PSKSE =34m.2s.
Lisbon iZ =20m.43s., PKS?EZ =23m.19s., PP =23m.54s.a, SKKSN =30m.43s., EN = 43m.46s., E =59m.23s. and 64m.5s., 74m.11s.

Continued on next page.

Rome PP? =24m.18s., eN =28m.38s.
Tortosa SKPE =23m.29s., PPEN =24m.7s., PPPE =27m.52s., SKKSE =31m.11s., PPPEN =33m.13s., PSN =34m.19s., PPSN =37m.19s., SKSPN =38m.35s., SSN =43m.58s., SSPN =44m.49s. and 52m.49s., SSSEN =59m.26s.
Alicante PKS =23m.38s., PP =24m.45s., SSP =45m.18s., SSS =50m.31s.
Granada pPKP =20m.34s., iPP =24m.28s., pPP =25m.14s., PPP =28m.1s., sSKKS =31m.46s., SKSP =34m.43s., lSS =43m.43s., sSS =44m.52s., SSS =50m.19s.
Malaga PKS =24m.50s., PP? =29m.42s.
Almeria PKS =23m.23s., PP =24m.19s., PPP =28m.5s., SKKS =31m.5s., PPS =37m.41s., SS =44m.31s., SSS =50m.41s.
Algiers Univ. iZ =20m.1s., iPKP$_2$Z =20m.42s., iZ =20m.48s., ePPZ =24m.26s., iZ =24m.55s., ePPPZ =27m.58s. and 32m.29s., e =32m.47s.
Tamanrasset iZ =20m.10s., iPKP$_2$Z =21m.44s., iPPZ =25m.42s., eZ =29m.2s., ePPP?Z =29m.37s., eSKKSZ =32m.44s.
Long waves were also recorded at Seattle.

Aug. 6d. 11h. 57m. 1s. Epicentre 19°·0S. 174°·2W. (as at 0h.). Depth of focus 0·005.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		5·7	25	1 20	− 4	2 13	−16	—	—
Wellington		24·1	202	e 5 10	0	—	—	—	—
Kaimata	N.E.	26·4	205	e 5 36	+ 4	—	—	—	—
Christchurch		26·9	202	e 5 43	+ 6	—	—	—	—
Berkeley	Z.	74·7	41	e 11 35	+ 1	—	—	i 11 54	pP
Lick	Z.	74·8	41	i 11 36$_a$	+ 1	—	—	i 11 58	pP
Pasadena	Z.	75·1	46	e 11 37	0	—	—	i 11 57	pP
Palomar	Z.	75·5	47	i 11 39	0	—	—	i 11 58	pP
Riverside	Z.	75·5	46	i 11 39	0	—	—	i 12 1	pP
Fresno		75·6	43	e 11 39$_a$	− 1	—	—	e 12 2	pP
China Lake	Z.	76·4	44	e 11 45	+ 1	—	—	e 12 3	pP
Shasta Dam		76·4	38	i 11 45	+ 1	—	—	i 12 3	pP
Mineral		76·7	39	e 11 45$_a$	− 1	—	—	e 11 51	P$_c$P
Tinemaha	Z.	76·7	43	e 11 46	0	—	—	e 12 6	pP
Reno		77·2	41	e 11 51	+ 2	—	—	—	—
Boulder City		78·4	46	i 11 55	0	—	—	—	—
Pierce Ferry		79·0	46	i 11 59	0	—	—	—	—
Tucson		79·2	50	e 12 1	+ 1	—	—	e 12 22	pP
Victoria	Z.	81·0	32	e 12 9	0	—	—	—	—
Hungry Horse		85·8	36	i 12 33	− 1	—	—	—	—
College		86·0	11	i 12 33	− 2	—	—	e 15 7	PP
La Paz		99·2	111	13 59	+23	—	—	—	—
Collmberg	Z.	147·3	351	e 19 37	[+ 3]	—	—	e 19 56	pPKP
Ksara		149·4	305	e 20 14	PKP$_2$	e 30 24	?	—	—
Paris		150·1	5	i 19 47	[+ 9]	—	—	e 20 6	PKP$_2$
Stuttgart	Z.	150·2	356	e 19 40	[+ 2]	—	—	—	—
Strasbourg		150·4	358	e 19 46	[+ 7]	—	—	e 20 13	PKP$_2$
Besançon		151·8	359	e 20 17	PKP$_2$	—	—	—	—

Additional readings :—
Tinemaha iZ =11m.52s.
Reno eE =12m.33s., iN =12m.45s.
Paris e =20m.21s. and 20m.40s.
Stuttgart ePKPZ =19m.45s.
Strasbourg e =21m.7s.
Besançon e =20m.45s.

Aug. 6d. 14h. 34m. 17s. (I) / **15h. 30m. 13s. (II)** Epicentre 38°·9N. 71°·0E. (as on July 25d.).

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
I Obi-garm	1·0	259	i 0 17	− 4	i 0 30	− 6
II	1·0	259	i 0 16	− 5	i 0 34	− 2
I Stalinabad	1·8	259	i 0 30	− 2	i 0 56	0
II	1·8	259	i 0 30	− 2	i 0 54	− 2
I Andijan	2·1	30	i 0 39	+ 2	i 1 11	S$_e$
II	2·1	30	0 38	+ 1	i 1 6	+ 2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
I	Murgab	2·4	103	e 0 45	+ 4	1 26	S_g
II		2·4	103	e 0 45	+ 4	1 19	S_g
I	Tashkent	2·8	331	i 0 46	− 1	i 1 25	+ 3
II		2·8	331	i 0 47	0	i 1 20	− 2
I	Samarkand	3·2	284	e 0 51	− 1	1 29	− 3
II		3·2	284	i 0 56?	+ 4	i 1 33?	+ 1
I	Tchimkent	3·6	343	i 0 57	− 1	i 1 49	S*
II		3·6	343	i 0 56	− 2	i 1 36	− 6
I	Frunse	4·8	33	i 1 18	+ 3	e 2 48	S_g
II		4·8	33	i 1 15	0	e 2 12	0
I	Almata	6·3	44	e 1 38	+ 2	i 3 13	S*
II		6·3	44	e 1 35	− 1	—	—
I	Ashkabad	10·0	268	e 2 29	+ 2	—	—
I	New Delhi E.	11·5	151	e 2 54	+ 6	e 4 54	− 5
II	E.	11·5	151	e 2 50	+ 2	e 4 50	− 9
I	Sverdlovsk	19·2	343	e 4 22	− 6	e 7 58	− 1

Aug. 6d. 15h. 51m. 4s. Epicentre 19°·0S. 174°·2W. (as at 11h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		5·7	25	e 1 27	− 1	e 2 19	−16	—	—
Wellington		24·1	202	i 5 18	0	e 9 31	− 3	—	—
Cobb River	E.	24·7	205	e 5 24	0	e 9 47	+ 3	—	—
Kaimata	N.E.	26·4	205	e 5 40	0	e 10 15	+ 3	—	—
Christchurch		26·9	202	e 5 53	+ 8	—	—	—	—
Brisbane	Z.	31·2	248	(i 6 13 a)	−11	—	—	—	—
Berkeley	Z.	74·7	41	i 11 42 a	− 1	—	—	—	—
Lick	Z.	74·8	41	i 11 43 a	− 1	—	—	i 11 48	PcP
Pasadena	Z.	75·1	46	i 11 44	− 2	—	—	i 12 1	pP
Palomar	Z.	75·5	47	i 11 47	− 1	—	—	i 12 4	pP
Riverside	Z.	75·5	46	i 11 46	− 2	—	—	i 12 4	pP
Fresno	Z.	75·6	43	i 11 48 a	0	—	—	—	—
Mineral	Z.	76·7	39	i 11 54 k	− 1	—	—	—	—
Tinemaha	Z.	76·7	43	i 11 54	− 1	—	—	e 12 13	pP
Reno	Z.	77·2	41	e 11 58	+ 1	—	—	—	—
Boulder City		78·4	46	i 12 4	0	—	—	—	—
Pierce Ferry		79·0	46	i 12 6	− 1	—	—	—	—
Tucson		79·2	50	i 12 8	0	—	—	—	—
Victoria	Z.	81·0	32	e 12 16	− 2	—	—	—	—
Hungry Horse		85·8	36	e 12 40	− 2	—	—	—	—
College		86·0	11	e 12 42	− 1	—	—	—	—
La Paz	N.	99·2	111	e 12 36	−69	—	—	—	—
Collmberg		147·3	351	e 19 45	[+ 2]	—	—	—	—
Jena		147·8	353	e 19 48	[+ 4]	—	—	—	—
Ksara		149·4	305	i 19 53	[+ 7]	—	—	23 43	PP
Paris		150·1	5	i 19 54	[+ 6]	—	—	—	—
Stuttgart	Z.	150·2	356	e 19 48	[0]	—	—	—	—
Strasbourg		150·4	358	i 19 54	[+ 6]	—	—	—	—
Besançon		151·8	359	i 20 5	PKP_2	—	—	—	—

Additional readings :—
Brisbane reading has been reduced by 2m.
Berkeley iZ = 11m.47s. and 12m.1s.
Lick iZ = 12m.1s. and 12m.10s.
Pasadena iZ = 12m.6s.
Riverside eZ = 12m.0s.
Fresno iZ = 12m.6s.
Mineral iZ = 11m.58s., 12m.11s., and 12m.15s.
Reno eN = 12m.10s., eE = 12m.14s.
Tucson i = 12m.24s., e = 13m.18s.
College iP = 12m.45s.
Collmberg eE = 19m.49s., eZ = 20m.3s.
Ksara i = 20m.11s.
Paris e = 20m.14s.
Stuttgart ePKPZ = 19m.53s.
Strasbourg i = 20m.0s., 20m.29s., and 20m.51s.

Aug. 6d. 18h. 53m. 26s. Epicentre 18°·1N. 95°·1W. (as on 1943, May 3d.).

Doubtful identification.

A = −·0846, B = −·9474, C = +·3088; δ = +8; h = +5;
D = −·996, E = +·089: G = −·027, H = −308, K = −·951.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vera Cruz		1·5	318	0 33	+ 5	—	—	—	—	1·0
Oaxaca		1·9	236	0 29	− 5	—	—	—	—	0·8
Puebla		3·1	288	0 53	+ 2	—	—	—	—	1·6
Tacubaya		4·1	288	1 8	+ 3	1 57	+ 2	—	—	2·2
Merida		5·9	61	1 32	+ 1	—	—	—	—	3·0
Tucson		20·0	319	e 4 30	− 7	e 8 4	−13	—	—	e 10·1
Pierce Ferry		24·5	322	i 5 17	− 5	—	—	—	—	—
Palomar	z.	24·7	313	i 5 20	− 4	—	—	—	—	—
Boulder City		24·9	320	i 5 22	− 4	—	—	—	—	—
Riverside	z.	25·4	314	i 5 27	− 4	—	—	—	—	—
Pasadena		26·1	314	i 5 32	− 5	—	—	—	—	—
China Lake	z.	26·6	317	e 5 37	− 5	—	—	—	—	—
Lick	z.	30·2	316	i 6 9a	− 5	—	—	i 6 14	pP	—
Ottawa	z.	31·6	26	e 6 25	− 1	—	—	—	—	—
Hungry Horse		33·9	338	e 6 41	− 6	—	—	—	—	—

Additional readings:—
Tucson e = 5m.20s.
Pierce Ferry i = 5m.23s.
Long waves were also recorded at Bermuda.

Aug. 6d. Continuation of the list of after-shocks from epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	9	7	3	50	26	7	32	26?	14	57	13
3	23	18	5	50	18	10	32	59	22	39	25
3	39	45	6	33	10	12	26	15	22	49	26

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
5	50	37	7	32	57	12	26	29	22	49	37
6	33	26	10	33	10	14	57	25			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	9	30	10	33	1	14	57	36	22	41	13
6	33	26	12	26	31	15	51	12	22	49	44
7	33	16									

Tashkent.

h.	m.	s.
10	33	21

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	9	45	6	33	35	10	32	48	14	57	47
5	44	29	6	42	35	12	26	38	22	49	53
5	50	55	7	33	22						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	9	48	10	34	38	14	58	33	22	50	6
6	33	52	12	27	42						

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	10	33	10	33	25	12	27	25	14	58	39

Frunse.

h.	m.	s.	h.	m.	s.
10	33	41	12	28	6

Aug. 6d. Readings also at 0h. (Granada), 1h. (Tucson, Victoria, Collmberg, Stuttgart, Granada, and Tananarive), 2h. (near Berkeley), 3h. (Tucson), 4h. (Guadalajara), 5h. (Tucson, Bogota, La Paz, and near Reno), 7h. (Copiapo), 8h. (Pennsylvania), 9h. (Tucson, Pierce Ferry (2), Hungry Horse, College, Stuttgart, and near Catania), 10h. (Strasbourg), 12h. (Ksara), 14h. (Collmberg, Stuttgart, Hungry Horse, and near Reno), 16h. (Apia, China Lake, Pasadena, Riverside, Palomar, Tinemaha, Tucson, Pierce Ferry, Shasta Dam, Hungry Horse, and near Ottawa), 18h. (Tucson, and near Tacubaya), 19h. (Tucson and near Reno), 21h. (Tacubaya and Tucson), 22h. (Tucson, Collmberg, Stuttgart, and near Catania), 23h. (Boulder City and Pierce Ferry).

Aug. 7d. 8h. Undetermined Shock. Pasadena and U.S.C.G.S. suggest off Coast of California.

Seattle iP = 16m.51s., iS = 18m.19s., eL = 18·5m.
Hungry Horse iP = 17m.52s., eS = 20m.43s.
Shasta Dam iP = 18m.2s.
Mineral iPZ = 18m.10s.a.
Reno eP = 18m.30s.k, iE = 18m.44s. and 18m.54s., iZ = 19m.8s.
Lick iPZ = 18m.46s.k, iPPZ = 18m.51s., iZ = 18m.56s. and 19m.36s.
Logan eP = 18m.57s., e = 22m.16s., eL = 22m.53s.
Fresno iPZ = 19m.1s.k, eE = 19m.3s., eN = 19m.6s., iE = 19m.21s., iZ = 19m.27s., eS?Z = 22m.38s.
Tinemaha iP = 19m.9s.
China Lake ePZ = 19m.20s.
College eP = 19m.23s., e = 26m.14s.
Overton iPZ = 19m.36s.
Pierce Ferry eP = 19m.36s.
Pasadena iPEZ = 19m.37s.
Riverside iPZ = 19m.42s.
Palomar iP = 19m.52s.
Tucson iP = 20m.27s., e = 21m.45s.
St. Louis eP = 21m.32s., eL = 31m.17s.
Saskatoon e = 22m.12s., i = 23m.31s.
Ottawa e = 22m.21s., L = 34·5m.
Long waves were also recorded at Sitka, Philadelphia, Bozeman, Butte, Chicago, and Harvard.

Aug. 7d. Continuation of the list of aftershocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	13	29	8	39	11	15	1	56	19	17	5
1	36	37	9	27	0	16	37	22	22	54	33
2	28	23									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	13	43	8	39	23	15	2	14	22	54	49
2	28	39	9	26	59	16	37	37			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	13	50	8	39	20?	15	2	37	16	56	38
1	37	4	9	27	29	16	37	57	22	54	56
2	29	3?									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	13	57	1	37	14?	9	28	28	22	55	10

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	13	56	8	39	30	15	2	44	22	55	4?
1	37	4?	9	27	17	16	38	45	23	0	28
2	29	10	10	18	11	16	56	28			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	14	7?	2	29	6	9	28	5	16	38	6
1	37	14	8	39	46	15	2	38	22	55	14

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	14	7	1	37	20	16	38	33	22	55	30

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	15	28	9	29	22	16	39	39	22	56	34
1	38	50	15	4	42	16	57	28			

Aug. 7d. Readings also at 0h. (near Reno), 1h. (near Berkeley, Branner, Lick, and near Vera Cruz), 2h. (Reno), 3h. (near Berkeley, Branner, and Lick), 4h. (Zürich), 5h. (Santa Lucia, La Paz, Bogota, and Tucson), 6h. (near Irkutsk), 7h. (Copenhagen and Klyuchi), 9h. (near Reno (2)), 10h. (Sofia, Seattle, Saskatoon, Bozeman, Butte, Logan, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Pierce Ferry, Reno, Mineral, Shasta Dam, Fresno, Lick, Hungry Horse, and College), 11h. (Harvard, Chicago, and Sitka), 14h. (Bogota, Bologna, and near Rome), 15h. (near Reno), 16h. (Collmberg and Stuttgart), 17h. (Apia, Mount Wilson, Riverside, China Lake, Tinemaha, Tucson, Shasta Dam, Hungry Horse, College, and near Mizusawa), 18h. (Ksara and Shasta Dam), 19h. (Hungry Horse, College (2), and near Mizusawa), 20h. (Columbia and near La Paz), 21h. (Columbia and near Victoria), 22h. (Tucson, Christchurch, Cobb River, Kaimata, near New Plymouth, and Wellington), 23h. (Columbia and near La Paz).

Aug. 8d. 7h. 9m. 4s. Epicentre 18°·5S. 66°·5E. (as on 1947, Jan. 29d.).
$A = +·3784$, $B = +·8703$, $C = -·3154$; $\delta = +9$; $h = +5$;
$D = +·917$, $E = -·399$; $G = -·126$, $H = -·289$, $K = -·949$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		18·0	266	i 4 1	−12	e 7 22	−10	i 4 16	PP	e 8·0
Kodaikanal	E.	30·5	21	—	—	e 11 17	− 1	i 13 9	SSS	13·7
Pretoria	Z.	36·1	252	e 7 2	− 3	—	—	—	—	—
Poona	N.	37·5	13	e 7 24	+ 7	i 13 6	− 1	—	—	17·9
Hyderabad	N.	37·6	19	e 7 7	−11	e 12 53	−15	—	—	18·4
Bombay	E.	37·7	9	e 6 30	−49	e 13 8	− 2	—	—	—
Grahamstown	Z.	38·6	240	i 7 17	− 9	—	—	—	—	—
Calcutta	E.	46·0	29	—	—	e 15 27	+15	—	—	—
New Delhi	N.	47·9	13	e 9 6	+24	i 15 43	+ 4	—	—	e 23·2
Stalinabad		56·8	3	i 9 51	+ 3	e 17 42	+ 1	—	—	—
Obi-garm		57·0	4	i 9 49?	− 1	e 17 42?	− 1	—	—	—
Samarkand		57·9	0	e 10 2	+ 6	—	—	—	—	—
Helwan	Z.	58·8	324	e 10 2	0	—	—	e 12 44	PP	—
Andijan		59·2	6	e 9 56	− 9	—	—	—	—	—
Tashkent		59·6	3	i 10 11	+ 3	e 18 21?	+ 4	—	—	—
Ksara		59·7	330	e 9 56	−13	e 17 14	−65	—	—	—
Baku		60·6	346	e 10 22	+ 7	e 18 48	PS	—	—	—
Frunse		61·5	8	e 11 3	PcP	—	—	—	—	—
Almata		62·2	10	e 10 32	+ 6	—	—	—	—	—
Leninakan		62·6	341	e 10 23	− 5	—	—	—	—	—
Tiflis		63·2	342	e 10 32	0	—	—	—	—	—
Yalta		69·3	336	e 11 11	0	e 20 13	− 4	—	—	—
Tamanrasset	Z.	72·3	302	e 19 4	?	e 20 59	+ 7	—	—	34·9
Sverdlovsk		75·2	357	e 11 44	− 2	e 21 17	− 8	15 9	PP	—
Moscow		77·9	345	e 11 57	− 4	—	—	i 12 4	PcP	—
Rome		78·1	322	e 11 2	−60	e 20 49	−67	—	—	—
Bologna	Z.	80·4	324	e 12 18	+ 3	—	—	—	—	—
Raciborzu		80·5	331	e 12 15	0	—	—	—	—	—
Prague		82·3	329	e 12 2?	−23	e 22 33	− 7	—	—	—
Chur		82·8	324	e 12 30	+ 3	—	—	—	—	—
Collmberg		83·7	329	e 12 34	+ 2	e 22 56	+ 2	e 14 40	?	—
Basle		84·3	324	e 12 37	+ 2	—	—	e 18 52	?	—
Alicante		84·4	314	e 12 41	+ 5	e 23 9	+ 8	—	—	e 38·6
Stuttgart		84·7	326	e 12 35	− 2	e 22 50	−14	—	—	—
Strasbourg		84·8	326	i 12 40	+ 3	e 23 3	− 2	e 16 3	PP	—
Besançon		85·0	324	e 12 39	+ 1	—	—	e 13 12	?	—
Tortosa		85·0	316	12 51	+13	23 4	− 3	16 10	PP	e 40·9
Almeria		85·1	311	12 39	0	23 10	+ 2	13 5	pP	40·9
Clermont-Ferrand		85·9	321	e 12 48	+ 5	e 23 22	+ 6	e 25 11	PPS	44·9
Granada		86·1	311	14 1k	+77	—	—	———	—	43·3
Malaga		86·5	311	e 12 17	−29	e 22 36	−46	i 12 55	pP	37·9
Copenhagen		86·8	333	—	—	23 25	0	29 9	SS	—
Toledo		87·6	313	e 12 53	+ 2	—	—	—	—	—
Paris		87·8	324	e 12 53	+ 1	—	—	e 13 11	PcP	e 46·9
Kew		90·7	325	e 11 48	−78	e 30 16	SSP	e 36 54	Q	e 43·9

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		106·8	340	19 14	PP	27 57	PS	—	—	50·9
La Paz		123·4	235	e 20 36	PP	—	—	54 56	Q	60·8
College		128·3	18	e 19 15	[+ 6]	—	—	—	—	—
Bermuda		134·2	297	—	—	e 37 31	?	e 39 36	SS	e 62·4
Ottawa		138·8	319	e 19 37	[+ 9]	—	—	—	—	72·9
Philadelphia		140·8	311	—	—	e 42 46	SSP	—	—	e 69·6
Cleveland		144·4	317	e 23 31	SKP	e 33 20	PSKS	e 48 23	SSS	—
Victoria	z.	149·0	13	e 19 56	[+10]	—	—	—	—	—
Hungry Horse		150·2	0	i 19 59	[+11]	—	—	e 20 33	PKP_2	—
Seattle		150·4	11	e 20 6	[+18]	—	—	e 20 39	PKP_2	—
St. Louis		151·5	320	e 19 53	[+ 3]	e 30 54	{+28}	e 43 55	SSP	—
Shasta Dam		156·6	18	e 20 0	[+ 3]	—	—	e 20 14	PKP_2	—
Logan		156·8	356	e 20 7	[+10]	—	—	—	—	—
Mineral	z.	157·1	16	e 20 10	[+13]	—	—	—	—	—
Reno		158·3	13	i 20 32	PKP_2	—	—	e 24 58	PP	—
Tinemaha	z.	161·1	11	e 20 19	[+17]	—	—	—	—	—
China Lake	z.	162·4	10	e 20 15	[+12]	—	—	—	—	—
Pierce Ferry		162·5	0	e 20 1	[− 2]	—	—	—	—	—
Mount Wilson	z.	163·8	14	e 20 21	[+16]	—	—	—	—	—
Pasadena	z.	163·9	14	e 20 9	[+ 4]	—	—	—	—	—
Palomar	z.	164·9	11	e 20 55	PKP_2	—	—	—	—	—
Tucson		166·1	350	e 20 15	[+ 8]	—	—	e 21 17	PKP_2	e 85·4

Additional readings :—
Tananarive i =4m.4s., e =7m.10s., SS? =7m.38s., iSSS? =7m.52s.
Helwan eZ =11m.35s.
Strasbourg i =13m.4s., e =16m.56s. and 18m.6s., ePPS =24m.8s., e =24m.34s. and 26m.14s.
Tortosa SSN =28m.14s., Q?N =35m.5s.
Almeria PP =16m.7s., PS =24m.5s., PPS =24m.36s., SS =25m.41s.
Clermont-Ferrand Q =40·9m.
Malaga PP =15m.32s., PPP =17m.27s.
Kew eSPEN =24m.22s.
St. Louis i =21m.34s., ePPP? =27m.59s., eSSS =48m.37s.
Reno eN =20m.51s. and 25m.14s.
Palomar iZ =21m.9s. and 21m.34s.
Tucson i =20m.25s., e =25m.6s., ePP =25m.46s.
Long waves were also recorded at Berkeley, Harvard, Weston, Seven Falls, Chicago, and San Juan.

Aug. 8d. 11h. 0m. 3s. Epicentre 38°·0N. 122°·3W.

Intensity VI at Pinole, Richmond, and Vallejo ; V at Berkeley and Lafayette. Macroseismic area 300 sq. miles. Epicentre 37°57′N. 122°19′W.

L. M. Murphy and F. P. Ulrich : United States Earthquakes, 1949, Serial No. 748, Washington 1951, pp. 15-16.

$A = -·4221$, $B = -·6678$, $C = +·6131$; $\delta = +2$; $h = -1$;
$D = -·845$, $E = +·534$; $G = -·328$, $H = -·518$, $K = -·790$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Berkeley	0·1	—	i 0 2k	P_g	i 0 3	S_g	—	—
Branner	0·6	170	i 0 11	P_g	i 0 18	S_g	—	—
Santa Clara	0·7	156	—	—	0 22	S_g	—	—
Lick	0·8	143	i 0 16k	P*	i 0 27	S*	i 0 29	S_g
Fresno	2·4	128	i 0 37	− 4	e 1 5	− 7	e 0 44	P_g
Mineral	2·4	14	i 0 41a	0	i 1 10	− 2	i 0 45	P*
Reno	2·5	52	i 0 54	P_g	i 1 16	+ 2	i 1 19	S_g
Shasta Dam	2·7	359	e 0 54	P_g	—	—	—	—

Additional readings :—
San Francisco (Δ =0°·3, Az. =207°) gives an unidentified reading at 10h. 59m.?.
Lick iE =25s.
Fresno eE =56s., iS*E =1m.13s., iS_gEN =1m.17s.
Mineral eE =43s., eEN =1m.12s.
Reno iN =1m.11s.

Aug. 8d. 13h. South-West Pacific, perhaps repetition of Aug. 6d. 0h.

Apia ePEN =13m.20s., eS?EN =14m.15s.
Lick iPZ =23m.38s. a.
Pasadena ePZ =23m.38s.
Riverside ePZ =23m.40s.
Fresno iPZ =23m.41s. k, iZ =23m.56s., iN =23m.59s., iZ =25m.17s.
Palomar iPZ =23m.41s., iEZ =23m.58s., iZ =24m.35s.
China Lake ePZ =23m.43s.
Shasta Dam iP =23m.44s., i =24m.2s., 25m.10s., 25m.21s., and 25m.26s.
Mineral iPZ =23m.47s.
Tinemaha iP =23m.48s.
Overton iPZ =24m.1s.
Tucson iP =24m.2s., e =24m.19s.
Reno ePZ =24m.7s., eN =24m.12s.
Victoria eZ =24m.11s.
Pierce Ferry eP? =24m.13s.
Logan eP =24m.21s.
Hungry Horse iP =24m.33s., i =24m.51s.
College iP =24m.34s.
Collmberg eZ =31m.38s.
Stuttgart ePKPZ =31m.42s.
Paris iPKP =31m.46s., i =32m.5s., e =32m.24s.
Strasbourg ePKP =31m.47s., i =32m.7s.
Besançon e =32m.34s.
Ksara e =31m.58s. and 43m.22s.
Long waves were recorded at Weston.

Aug. 8d. 14h. 10m. 36s. Epicentre 14°·9N. 93°·6W. Depth of focus 0·005.
(as on 1946, February 22d.).

A = −·0607, B = −·9649, C = +·2555; δ = 0; h = +6;
D = −·998, E = +·063; G = −·016, H = −·255, K = −·967.

		△	Az.	P.	O−C.	S.	O−C.		Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Oaxaca		3·7	305	0 57	+ 1	—	—	—	—		1·9
Vera Cruz		4·9	331	1 14	+ 1	2 18	+ 9	—	—		—
Puebla		6·0	314	1 30	+ 2	2 48	+11	—	—		—
Tacubaya		6·9	311	1 45	+ 4	—	—	—	—		3·6
Merida		7·1	31	1 42	− 2	—	—	—	—		3·4
Miami		16·6	47	e 3 44	− 6	e 7 26	SSS	—	—		—
Pensacola		16·6	20	e 4 5	PP	e 6 55	+ 4	e 12 6	PcS		—
Bogota		21·8	117	i 4 43	− 5	e 8 47	+ 7	i 5 11	PP		—
Tucson		23·3	321	i 5 6	+ 3	e 9 31	+24	i 5 17	pP		e 12·3
St. Louis		23·8	7	e 5 7	− 1	e 9 33	+18	e 10 30	SSS		—
San Juan		26·5	79	e 5 54	pP	—	—	—	—		e 14·5
Pierce Ferry		27·9	323	e 5 48	+ 2	—	—	e 5 55	pP		—
Palomar		28·0	316	i 5 48	+ 1	—	—	i 6 2	pP		—
Boulder City		28·3	322	e 6 1	pP	—	—	—	—		—
Overton	z.	28·4	323	i 5 53	+ 3	—	—	—	—		—
Cleveland		28·5	20	i 6 16	pP	e 9 39	−54	e 6 28	PP		e 13·3
Riverside	z.	28·7	316	e 5 54	+ 1	—	—	i 6 6	pP		—
Pennsylvania	E.	29·2	25	e 7 5	PPP	i 11 55	SS	i 12 54	SSS		i 14·4
Pasadena		29·3	316	i 6 0	+ 2	—	—	—	—		e 13·8
China Lake	z.	30·7	320	e 6 3	− 8	—	—	—	—		—
Logan		31·1	334	e 6 13	− 1	—	—	—	—		e 19·5
Tinemaha	z.	31·1	320	e 6 17	+ 3	—	—	i 9 8	PcP		—
Bermuda		31·5	52	e 8 39	?	—	—	—	—		e 13·1
Fresno	z.	31·9	319	i 6 22a	+ 1	—	—	—	—		—
Harvard		33·4	31	e 6 38	+ 4	—	—	—	—		e 20·0
Lick	z.	33·4	318	i 6 38a	+ 4	—	—	i 7 51	PP		—
Reno		33·6	323	i 6 39a	+ 3	—	—	e 6 50	pP		—
Ottawa		33·9	23	e 6 43	+ 4	—	—	—	—		18·4
Mineral	z.	35·2	323	i 6 51	+ 1	—	—	—	—		—
Shasta Dam		35·9	322	i 6 55	− 1	—	—	i 9 19	PcP		—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hungry Horse		37·4	339	e 7 9	+ 1	—	—	—	—	—
Victoria		41·5	331	e 7 43	+ 1	—	—	—	—	25·4
College		61·8	338	e 10 13	− 1	—	—	e 12 15	PP	—
Granada		81·2	54	13 12a	+62	23 14	+60	—	—	—
Almeria		82·1	54	e 12 13	− 2	22 16	− 7	15 19	PP	45·0
Stuttgart	z.	87·1	41	e 12 36	− 4	—	—	—	—	—
Tamanrasset	z.	91·2	66	e 13 3	+ 4	—	—	—	—	—

Additional readings :—
Bogota iPPP =5m.18s.
Tucson e =6m.5s.
Palomar iZ =6m.59s.
Riverside iP$_c$PZ =9m.1s.
Tinemaha iZ =6m.24s.
Fresno ePEN =6m.28s., iZ =6m.53s. and 8m.18s.
Reno eN =7m.12s.
Shasta Dam e =7m.2s. and 7m.17s., i =7m.26s.
Almeria PPS =23m.27s.
Long waves were also recorded at numerous other North American and European stations, and at Scoresby Sund.

Aug. 8d. 17h. South-west Pacific, perhaps another repetition of Aug. 6d. 0h.

Apia eP?E =14m.56s., eSE =15m.47s.
Shasta Dam iP =25m.9s.
Pasadena iPZ =25m.13s.
Palomar iPZ =25m.14s.a.
Riverside ePZ =25m.14s.
China Lake iPZ =25m.19s.
Tinemaha iPZ =25m.23s.a.
Reno ePZ =25m.26s.a.
Tucson iP =25m.31s.
Boulder City eP =25m.32s.
Pierce Ferry i =25m.34s.
Overton iPZ =25m.35s.
Logan eP =25m.57s.
College iP =26m.9s.
Hungry Horse iP =26m.9s.
Collmberg eZ =33m.13s.
Stuttgart eZ =33m.16s. and 33m.21s.
Paris iPKP =33m.22s., i =33m.27s.
Strasbourg iPKP =33m.23s.
Besançon ePKP =33m.24s.
Clermont-Ferrand ePKP =33m.40s., e =34m.13s.

Aug. 8d. 19h. 7m. 15s. Epicentre 16°·0S. 76°·0W.

Epicentre as adopted, depth of focus 100km. (U.S.C.G.S.).

A = +·2327, B = −·9332, C = −·2739 ; δ = +3 ; h = +6 ;
D = −·970, E = −·242 ; G = −·066, H = +·266, K = −·962.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·0	9	i 1 2	− 2	i 1 47	− 5	i 1 11	P*	i 2·1
La Paz		7·6	95	i 1 53k	− 2	i 3 19	− 4	i 2 29	P_g	—
Bogota		20·6	5	i 4 42	− 1	i 8 34	+ 5	i 4 51	PP	11·8
Fort de France		33·9	28	e 5 17	−90	—	—	—	—	—
St. Louis		56·0	347	e 9 39	− 4	e 17 25	− 5	—	—	—
Harvard		58·4	4	i 9 57	− 3	—	—	—	—	e 32·1
Tucson		58·4	326	e 10 0	0	—	—	e 10 29	pP	e 29·9
Ottawa	z.	61·1	0	e 10 16	− 2	—	—	—	—	—
Palomar	z.	61·6	322	i 10 31	+ 9	—	—	i 10 40	pP	—
Pierce Ferry		63·1	326	e 10 31	− 1	—	—	—	—	—
Riverside	z.	63·4	322	e 10 36	+ 2	—	—	i 10 43	pP	—
Overton	z.	63·6	326	e 10 37	+ 2	—	—	—	—	—
Pasadena	z.	64·0	322	e 10 42	+ 4	—	—	i 10 50	pP	—
China Lake	z.	64·9	324	e 10 44	+ 1	—	—	—	—	—
Tinemaha	z.	66·1	324	i 10 55	+ 4	—	—	i 11 2	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Logan		66·3	332	e 10 53	+ 1	—	—	—	—	—
Lick	z.	68·3	322	i 11 9k	+ 4	—	—	—	—	—
Reno		68·7	325	e 11 18	+11	—	—	e 11 29	pP	—
Shasta Dam		70·9	324	e 11 17	− 4	—	—	e 11 38	pP	—
Hungry Horse		72·5	335	e 11 30	0	—	—	e 11 54	P_cP	—
Victoria	z.	76·8	330	e 10 59	−56	—	—	—	—	—
Granada		86·1	50	12 44a	0	23 20	+ 2	—	—	45·4
Almeria		86·8	50	12 43	− 4	23 16	[+ 3]	16 3	PP	48·4
Tamanrasset	z.	88·5	66	e 12 56	0	e 24 8	+27	e 18 58	PPP	43·8
Kew		93·7	37	—	—	—	—	e 37 45?	Q	—
Paris		94·5	40	—	—	—	—	i 40 0	Q	e 43·8
Ksara		116·7	60	—	—	e 29 38	PS	e 41 11	SSS	—

Additional readings :—
La Paz iS_g = 4m.6s.
Bogota iSS? = 9m.13s.
Shasta Dam e = 11m.49s.
Almeria SS = 29m.7s.
Long waves were also recorded at Seattle, San Juan, and Clermont-Ferrand.

Aug. 8d. Continuation of list of after-shocks from the epicentre of the large earthquake on July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	26	22	8	53	32	11	46	40	17	47	41
7	6	50	10	30	52	12	54	54	22	17	30

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	7	3	10	31	9	17	47	44	22	18	9
8	53	49	12	55	9						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	26	37	9	37	36	13	25	20	22	12	51
7	7	3	10	31	7?	17	48	3	22	17	44
8	53	45	11	46	38	21	26	53			

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	27	24	10	31	19	17	49	7

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	26	48	8	53	48?	12	55	21	22	17	54
7	7	15	9	36	49	17	47	48			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	27	3	10	31	32	12	55	36	22	18	14
7	8	12									

Tchimkent.

h.	m.	s.	h.	m.	s.
10	32	14	17	49	24

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	8	38	9	36	21	10	32	50	17	49	52

Almata.

h.	m.	s.
9	36	9

Aug. 8d. Readings also at 0h. (Bogota, Harvard, Mount Wilson, Riverside, Palomar, Tinemaha, College, Hungry Horse, Shasta Dam, and Tucson), 1h. (Pretoria), 2h. (College, Mineral, Erevan, near Leninakan, Tiflis, and Grozny), 3h. (Hungry Horse and near La Paz), 4h. (Brisbane, College, Hungry Horse, and Shasta Dam), 6h. (Bermuda (2), Bogota, near Fort de France (2), San Juan (2), Reno, Hungry Horse, Shasta Dam, and Tucson (2)), 8h. (near Sofia), 9h. (Shasta Dam and Reno), 11h. (College, Hungry Horse, Shasta Dam, Tucson, and Belgrade), 12h. (College (2) and Hungry Horse), 13h. (Copenhagen), 14h. (College (2) and Cleveland), 19h. (Reno), 20h. (La Paz), 21h. (Istanbul, Sotchi, and near Tortosa), 23h. (Belgrade, Triest, Bucharest, and near Victoria).

Aug. 9d. 16h. 26m. 35s. Epicentre 35°·3N. 135°·6E.

Intensity VI at Suyama (Kyoto Prefecture) ; V at Maizuru and Kameyama ; IV at Kyoto, Hikone, Tsuruga, Osaka, Kobe, Nagoya, and Tottori ; II-III at Saigo, Tu, Gihu, Hukui, Sumoto, Iida, Takamatsu, and Wazima. Epicentre as adopted. Shallow.

Seismo. Bull. Cent. Met. Obs., Japan, 1949, Tokyo, 1950, p. 25 with macroseismic chart.

$A = -\cdot5844$, $B = +\cdot5723$, $C = +\cdot5752$; $\delta = -9$; $h = 0$;
$D = +\cdot700$, $E = +\cdot714$; $G = -\cdot411$, $H = +\cdot403$, $K = -\cdot818$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Kyoto	0·3	159	−0 1a	−12	0 3	−15
Hikone	0·5	94	0 10k	− 4	0 17	− 6
Osaka	0·7	185	0 11	− 6	0 19	− 9
Kobe	0·7	209	0 13	− 4	0 22	− 6
Toyooka	0·7	290	0 12a	− 5	0 21	− 7
Kameyama	0·9	122	0 15a	− 5	0 28	− 6
Gihu	1·0	84	0 16	− 5	0 28	− 8
Nagoya	1·1	97	0 19	− 3	0 34	− 5
Sumoto	1·1	212	0 20k	− 2	0 33	− 6
Owase	1·3	158	0 20	− 5	0 38	− 6
Toyama	1·9	43	0 31	− 3	0 59	0
Omaesaki	2·2	108	0 44	+ 6	1 13	+ 7
Muroto	2·3	210	0 44a	+ 4	1 14	+ 5
Shizuoka	2·3	98	0 42	+ 2	1 4	− 5
Wazima	2·3	27	0 38	− 2	1 12	+ 3
Matusiro	2·4	59	0 43a	+ 2	1 16	+ 4
Nagano	2·5	57	0 46	+ 3	—	—
Hunatu	2·6	86	0 46	+ 2	—	—
Hirosima	2·8	250	0 45	− 2	1 26	+ 4
Misima	2·8	94	0 51	+ 4	1 25	+ 3
Hamada	2·9	262	0 54	+ 6	1 30	+ 6
Maebasi	3·0	69	0 49	− 1	1 31	+ 4
Kumagaya	3·2	75	0 54	+ 2	1 32	0
Yokohama	3·3	88	2 13	?	—	—
Tokyo	3·4	83	1 3	P_g	1 45	+ 8
Aikawa	3·5	38	0 53	− 4	1 45	+ 5
Mera	3·5	95	1 5	P_g	1 42	+ 2
Kakioka	3·8	75	1 7	P*	—	—
Tukubasan	3·8	75	1 7	P*	1 55	S*
Mito	4·1	74	1 14	P*	2 4	S*
Hukuoka	4·6	249	1 21a	P*	2 25	S*
Onahama	4·6	68	1 27	P_g	—	—
Kumamoto	4·8	240	1 10	− 5	2 32	S_g
Miyazaki	4·8	227	1 23	P*	2 27	S*
Sendai	5·2	54	1 22	+ 1	2 41	S*
Kagosima	5·6	230	2 53	S*	—	—
Akita	5·7	38	2 27	S	(2 27)	− 8

Aug. 9d. 21h. 32m. 1s. Epicentre 38°·9N. 71°·0E. (as on 6d.).

$A = +\cdot2540$, $B = +\cdot7378$, $C = +\cdot6254$; $\delta = -1$; $h = -1$;

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Obi-garm		1·0	259	i 0 32	P_g	i 0 49	S_g	—
Stalinabad		1·8	259	i 0 36	+ 4	i 1 6	+10	—
Andijan		2·1	30	0 35	− 2	i 1 1	− 3	—
Murgab		2·4	103	e 0 41	0	1 16	+ 4	—
Tashkent		2·8	331	i 0 44?	− 3	i 1 25?	+ 3	—
Samarkand		3·2	284	e 0 56	+ 4	i 1 42	+10	—
Tchimkent		3·6	343	i 0 57	− 1	i 1 40	− 2	—
Frunse		4·8	33	i 1 15	0	i 2 8	− 4	—
Almata		6·3	44	i 1 32	− 4	—	—	—
Ashkabad		10·0	268	e 2 28	+ 1	—	—	—
New Delhi	E.	11·5	151	e 2 50	+ 2	e 4 55	− 4	—
Baku		16·3	282	—	—	e 7 22?	+29	—
Sverdlovsk		19·2	343	e 4 22	− 6	e 7 57?	− 2	—
Bombay	E.	20·0	176	—	—	e 8 22	+ 5	—
Tiflis		20·2	287	e 4 46	+ 7	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Poona	N.	20·4	173	—	—	(e 8 44)	+19	(13·0)
Leninakan		20·9	285	e 4 53?	+ 7	—	—	—
Piatigorsk		21·5	294	4 54?	+ 2	—	—	—
Calcutta	E.	22·0	133	—	—	e 8 56	0	e 13·9
Moscow		27·8	319	e 5 48	− 5	—	—	—
Ksara		28·6	271	e 5 19?	−41	e 11 25	+37	—
Collmberg	Z.	41·7	307	e 7 49	− 3	—	—	—
Stuttgart	Z.	44·5	304	e 8 12	− 3	—	—	—
Strasbourg		45·5	304	e 8 20	− 3	—	—	—
Paris		48·8	306	e 8 45	− 4	—	—	—
College		72·2	17	e 11 8	−21	—	—	—

Poona readings have been increased by 20m.
Strasbourg gives also e = 8m.46s.
Long waves were also recorded at Copenhagen, De Bilt, and Kew.

Aug. 9d. Continuation of the list of aftershocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	0	53	9	25	50?	13	22	30	19	5	28
8	35	37	10	5	59	16	52	40	21	43	32
9	13	33?	12	49	35						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	0	51	9	43	35	12	49	39?	19	5	35
8	35	43	10	6	1	16	52	43	21	43	35
9	25	53									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	1	19	9	26	2	13	29	36	19	5	55
8	35	54	10	6	0	16	52	54	21	43	36
9	14	2	12	49	51						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	8	42	12	50	33	13	22	46	16	53	35
8	35	57									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	0	34	9	14	8	10	6	16	13	22	46
8	36	8	9	26	9	12	49	57			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	36	5	12	50	4	16	53	18	19	6	3
9	14	4	13	22	54						

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
10	7	7	13	23	43	16	53	54	19	6	22

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	37	34	9	16	8	12	51	58	13	24	25

Aug. 9d. Readings also at 0h. (Santa Clara, Reno, SanFrancisco, Branner (2), Lick, Mineral, near Berkeley, Fresno, Shasta Dam, and near Istanbul), 1h. (Tucson, Overton, College, and near Victoria), 2h. (Bogota, Reno, and Collmberg), 3h. (Ashkabad, Murgab, Ksara, Collmberg, Stuttgart, Mount Wilwon, Riverside, Tinemaha, Tucson, Overton, Shasta Dam, Hungry Horse, Antofagasta, Copiapo, Santa Lucia, and La Paz), 4h. (Bogota, La Paz, Ukiah, and Helwan), 5h. (Mount Wilson, Riverside, Tinemaha, China Lake, and Overton), 7h. (Theodosia, Yalta, Erevan, Grozny, near Leninakan, Piatigorsk, and Tiflis), 8h. (Bogota, Reno, and Hungry Horse), 9h. (Christchurch, Cobb River, Kaimata, Wellington, and Reno), 10h. (Reno and Tucson) 11h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Reno (3), Shasta Dam, Hungry Horse, College, Catania, Messina, Rome, and near Apia), 12h. (Antofagasta and Reno), 14h. (Hungry Horse (2), and near Victoria), 15h. (Brisbane), 16h. (Berkeley), 23h. (Reno).

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Aug. 10d. 20h. 33m. 42s. Epicentre 86°·0N. 82°·0E.

$A = +·0098$, $B = +·0695$, $C = +·9975$; $\delta = -7$; $h = -14$;
$D = +·990$, $E = -·139$; $G = +·139$, $H = +·988$, $K = -·070$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		Z.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		28·0	45	e 5 59	+ 4	—	—	—	—	—
Sverdlovsk		29·6	204	e 6 10	+ 1	e 11 13	+ 9	—	—	—
Collmberg	Z.	37·6	254	e 7 16	− 2	—	—	—	—	—
Jena	N.	38·1	256	e 7 21	− 1	—	—	—	—	—
Stuttgart	Z.	40·4	258	e 7 40	− 1	—	—	—	—	e 23·3
Strasbourg		40·7	259	e 7 43a	− 1	—	—	—	—	—
Paris		40·8	266	i 7 44	− 1	—	—	—	—	—
Besançon		42·1	261	i 7 54	− 1	—	—	—	—	—
Clermont-Ferrand		43·8	263	e 8 9	0	—	—	—	—	—
Tashkent		45·0	194	e 9 5?	+46	—	—	—	—	—
Victoria		45·3	24	e 8 22	+ 1	—	—	—	—	—
Hungry Horse		45·7	16	i 8 25	+ 1	—	—	i 10 20	PP	—
Ottawa	Z.	48·5	339	e 8 43	− 3	—	—	—	—	—
Logan		52·4	4	e 9 14	− 2	—	—	—	—	—
Shasta Dam		53·2	24	e 9 7	−15	—	—	—	—	—
Mineral	Z.	53·5	23	e 9 24a	0	—	—	—	—	—
Ksara		53·6	229	e 4 13	?	e 9 44	?	—	—	—
Reno		54·4	21	e 9 58	+27	—	—	—	—	—
Tinemaha	Z.	56·9	20	e 9 50	+ 1	—	—	—	—	—
Overton	Z.	57·5	17	i 9 54	+ 1	—	—	—	—	—
Pierce Ferry		57·9	16	i 9 57	+ 1	—	—	—	—	—
Boulder City		58·1	17	e 9 58	0	—	—	—	—	—
China Lake	Z.	58·2	19	e 9 58	0	—	—	—	—	—
Pasadena	Z.	59·8	20	e 10 8	− 1	—	—	—	—	—
Riverside	Z.	60·0	20	e 10 9	− 2	—	—	—	—	—
Palomar	Z.	60·6	18	i 10 15	0	—	—	—	—	—
Tucson		61·9	12	i 10 23	− 1	—	—	—	—	—

Additional readings :—
Stuttgart eZ = 7m.48s.
Strasbourg i = 7m.50s., 7m.58s., and 8m.36s.
Paris i = 7m.51s. and 7m.56s., e = 8m.3s.
Besançon i = 8m.2s., e = 8m.11s.
Clermont-Ferrand e = 8m.16s.
Hungry Horse i = 8m.32s.
Shasta Dam i = 9m.39s.
Tinemaha eZ = 10m.1s.
Pierce Ferry i = 10m.2s.
Riverside eZ = 10m.15s.
Long waves were also recorded at De Bilt, Triest, Almeria, and Granada.

Aug. 10d. Continuation of the list of aftershocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	52	20	5	17	20	15	42	7	22	25	18
2	16	43	15	4	56						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	52	23?	5	17	25	15	5	1	22	25	10
2	16	51?									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	52	31	5	17	41	15	4	58	22	25	53
2	16	55	13	16	27	15	42	16			

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	52	40	5	17	42?	15	42	27	22	26	45
1	17	6									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	52	38	5	17	47	15	42	21?	22	25	47
2	17	0									

Continued on next page,

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	52	50	5	17	49	15	42	34	22	25	43
2	17	14	15	5	30						

Tchimkent.

h.	m.	s.	h.	m.	s.
5	17	57	15	42	38

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	54	8	5	18	19	15	44	5	22	28	37

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	54	4	2	19	5	15	43	30

Ashkabad.

h.	m.	s.
5	19	28

Aug. 10d. Readings also at 3h. (Granada, Basle, Besançon, Paris, Strasbourg, Stuttgart, Collmberg, Algiers Univ., Helwan, Ksara, near Messina, Ottawa, Hungry Horse, and near Bogota : several shocks), 4h. (Palomar, Tucson, Tinemaha, and College), 7h. (Tacubaya, Tucson, and near La Paz), 8h. (Hungry Horse), 9h. (Tucson, near Boulder City, Pierce Ferry, Fresno, near Berkeley, Branner, and Lick : two shocks), 13h. (Mount Wilson, Pasadena, Riverside, China Lake (2), Tinemaha (2), Tucson (2), Boulder City, Overton (2), Pierce Ferry, Shasta Dam, Hungry Horse (2), Mineral, Lick, Victoria, Logan, College (2), Bergen, Upsala, and Paris), 14h. (Hungry Horse and College), 15h. (Harvard), 16h. (Pasadena, Riverside, China Lake, Tinemaha, Tucson, Overton, Mineral, Hungry Horse, Kew, Collmberg, Clermont-Ferrand, Paris, and Stuttgart), 18h. (near Ottawa), 20h. (Lick and Stuttgart), 21h. (Stuttgart).

Aug. 11d. 3h. 13m. 17s. Epicentre 1°·2S. 78°·5W. (as on 5d.).

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chinchina	6·8	25	(e 1 56)	+12	(e 3 20)	+17	—	—	(i 4·0)
Bogota	7·3	38	e 1 58	+ 8	e 3 29	+14	e 2 37	P_g	—
Huancayo	11·2	164	e 2 42	− 2	i 4 51	− 1	—	—	e 5·4
La Paz	18·3	145	i 3 56	−21	7 27	−12	—	—	i 11·2
Tucson	45·2	321	e 8 21	+ 1	—	—	—	—	—
Pierce Ferry		49·7	322	i 8 56		0	—	—	—	—	—
Palomar	z.	49·9	318	i 8 58	+ 1	—	—	—	—	—
Boulder City		50·1	322	e 9 0	+ 1	—	—	—	—	—
Overton	z.	50·2	322	i 9 1	+ 1	—	—	—	—	—
Riverside	z.	50·6	317	i 9 3	+ 1	—	—	—	—	—
Pasadena	z.	51·2	317	i 9 7		0	—	—	—	—	—
China Lake	z.	51·8	320	i 9 11	− 1	—	—	—	—	—
Tinemaha	z.	53·0	320	i 9 21		0	—	—	—	—	—
Lick	z.	55·3	318	i 9 38k		0	—	—	i 9 41	pP	—
Shasta Dam		57·7	322	i 9 51	− 4	—	—	—	—	—
Hungry Horse		58·2	333	i 9 57	− 1	—	—	—	—	—
Victoria	z.	62·9	329	e 10 29	− 1	—	—	—	—	—
College		82·4	336	e 12 20	− 5	—	—	—	—	—

Additional readings and notes :—
Chinchina readings have been reduced by 10m.
Bogota iS^* = 3m.50s., eS_g = 4m.10s.
Palomar iZ = 9m.15s.

Aug. 11d. 13h. 50m. 1s. Epicentre 14°·9N. 93°·6W. Depth of focus 0·005. (as on 8d.).
A = −·0607, B = −·9649, C = +·2555 ; δ = 0 ; h = +6.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca	3·7	305	1 1	+ 5	2 1	SS	—	—	—
Vera Cruz	4·9	331	1 18	+ 5	2 22	sS	—	—	—
Puebla	6·0	314	1 34	+ 6	2 52	SS	—	—	—
Tacubaya	6·9	311	1 46	+ 5	3 14	sS	—	—	3·5
Merida	7·1	31	1 46	+ 2	3 13	sS	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lubbock		20·0	341	4 31	+ 1	—	—	—	—	—
Bogota	z.	21·8	117	i 5 41	+53	—	—	—	—	—
Tucson		23·3	321	i 5 5	+ 2	e 9 31	sS	i 5 35	pP	e 12·5
Pierce Ferry		27·9	323	e 5 44	− 2	—	—	e 5 53	pP	—
Palomar	z.	28·0	316	i 5 47	0	—	—	—	—	—
Boulder City		28·3	322	e 5 51	+ 1	—	—	e 6 15	pP	—
Overton	z.	28·4	323	e 5 51	+ 1	—	—	—	—	—
Riverside	z.	28·7	316	e 5 52	− 1	—	—	—	—	—
Pasadena		29·3	316	e 5 58	0	—	—	—	—	e 14·4
China Lake	z.	30·7	320	e 6 5	− 6	—	—	—	—	—
Logan		31·1	334	e 6 12	− 2	—	—	—	—	—
Tinemaha	z.	31·1	320	e 6 16	+ 2	—	—	—	—	—
Lick	z.	33·4	318	i 6 36a	+ 2	—	—	i 6 48	pP	—
Reno		33·6	323	e 6 43	+ 7	—	—	i 6 59	pP	e 19·6
Santa Clara		33·7	318	—	—	e 12 59	+65	—	—	e 18·2
Branner	z.	33·8	318	e 6 35	− 3	—	—	e 7 43	PP	—
Ottawa		33·9	23	e 6 39	0	—	—	—	—	20·0
Shasta Dam		35·9	322	e 6 54	− 2	—	—	—	—	—
Hungry Horse		37·4	339	i 7 6	− 2	—	—	i 7 20	pP	—
Victoria	z.	41·5	331	e 7 42	0	—	—	—	—	—
College		61·8	338	e 10 13	− 1	—	—	e 11 4	PcP	e 34·4
Bergen	E.	81·5	30	—	—	24 59?	?	—	—	—
Stuttgart		87·1	41	e 12 39	− 1	—	—	—	—	e 46·0
Istanbul		103·1	42	e 20 59?	pPPP	e 28 53	?	—	—	—

Additional readings :—
Tucson ePP? =6m.10s., e =9m.49s.
Pierce Ferry e =6m.33s.
Boulder City e =5m.58s.
Reno eN =6m.51s., iN =7m.2s.
Hungry Horse i =7m.15s.
College e =11m.53s.
Long waves were also recorded at Bermuda, Scoresby Sund, Ksara, and at numerous other North American and European Stations.

Aug. 11d. 14h. 40m. 27s. Epicentre 43°·6N. 29°·2W. (as on 1942, April 27d.).

A = +·6342, B = −·3544, C = +·6872 ; δ = +5 ; h = −3 ;
D = −·488, E = −·873 ; G = +·600, H = −·335, K = −·726.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lisbon	E.	15·9	101	(3 39)	− 8	3 39	P	—	—	7·2
Rathfarnham Castle		18·0	49	e 4 9	− 4	—	—	—	—	i 8·8
Toledo		19·1	92	e 4 19	− 8	—	—	—	—	—
Malaga	z.	20·1	101	i 4 32k	− 6	e 7 44	−35	—	—	9·3
Granada		20·5	100	i 4 42a	0	8 10	−17	—	—	9·8
Kew		20·9	58	e 4 41	− 5	e 8 37	+ 2	e 4 58	PP	e 11·6
Durham	E.	21·1	49	i 4 52	+ 4	i 8 44	+ 5	—	—	—
Almeria		21·4	99	4 48	− 3	8 33	−12	5 16	PP	12·2
Tortosa		22·1	87	i 5 1	+ 2	e 8 58	0	—	—	10·4
Alicante		22·2	94	e 5 4	+ 4	e 9 13	+13	5 42	PP	e 10·7
Paris		22·4	67	e 5 2?	0	e 9 6	+ 2	e 5 29	PP	e 10·6
Clermont-Ferrand		23·0	73	i 5 9	+ 2	i 9 20	+ 6	—	—	10·6
De Bilt		24·4	57	e 5 28	+ 7	e 9 39	0	—	—	e 11·6
Besançon		24·8	68	e 5 22	− 3	—	—	e 5 51	PP	—
Strasbourg		25·9	65	e 5 35	0	e 9 38	−26	e 6 11	PP	e 12·2
Stuttgart		26·9	65	e 5 46	+ 1	e 10 21	+ 1	—	—	e 12·6
Bologna		28·9	75	e 5 56	− 7	—	—	—	—	—
Copenhagen		29·1	50	—	—	e 10 57	+ 1	12 39	SS	14·0
Florence, Xim.		29·1	76	e 6 3	− 1	e 10 52	− 4	—	—	—
Collmberg	z.	29·2	60	e 6 8?	+ 3	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		30·1	260	e 7 3	PP	e 11 23	+11	—	—	e 13·3
Prague		30·2	62	—	—	e 11 27	+14	e 13 15	SSS	e 14·8
Rome		30·4	79	e 6 7	− 9	e 11 13	− 3	—	—	e 15·2
Triest		30·4	71	e 6 3?	−13	e 11 6	−10	—	—	—
Upsala		32·4	45	—	—	e 11 33?	−15	i 13 3	SS	e 16·3
Ottawa		32·9	291	e 6 43	+ 5	—	—	—	—	17·6
Istanbul		42·4	73	—	—	e 12 33?	?	—	—	e 22·6
St. Louis		45·3	287	e 8 27	+ 6	e 15 15	+13	—	—	e 22·4
Helwan		49·4	85	e 8 51	− 2	e 16 0	0	e 10 46	PP	—
Ksara		50·5	79	e 9 3	+ 1	e 16 21	+ 5	—	—	—
Hungry Horse		56·2	308	e 9 46	+ 2	—	—	—	—	—
Logan		58·3	301	e 9 59	0	—	—	—	—	—
College		61·8	336	e 10 23	0	e 18 44	− 2	—	—	e 34·6
Overton	z.	62·9	297	e 10 33	+ 3	—	—	—	—	—
Tucson		63·0	290	e 10 36	+ 5	—	—	—	—	e 35·6
Reno	E.	64·5	302	e 10 30	−11	—	—	—	—	—
Tinemaha	z.	65·0	299	e 10 49	+ 5	—	—	—	—	—
Mineral	z.	65·2	304	—	—	e 25 48	?	—	—	—
Shasta Dam		65·4	305	e 10 46	− 1	—	—	—	—	—
Palomar	z.	66·4	295	i 10 57	+ 4	—	—	—	—	—
Mount Wilson	z.	66·6	296	e 11 9	+15	—	—	—	—	—
La Paz		69·6	221	e 11 25	+12	—	—	—	—	—
Pretoria	z.	86·8	131	i 13 17	+30	—	—	—	—	—

Additional readings :—
Kew eSS?EN =10m.4s., eE =10m.45s.
Durham eE =0m.47s., iE =5m.2s.
Almeria P_cP =9m.4s., P_cS =12m.40s.
Alicante SS =10m.4s.
Paris ePPP? =5m.46s., e =9m.10s.
Besançon ePPP =6m.10s., e =7m.13s.
Strasbourg e =5m.48s., and 7m.12s., eSS? =10m.21s.
Bologna e =6m.35s.
Helwan eZ =10m.5s.
Tucson e =10m.57s.
Reno eE =11m.5s.
La Paz iZ =11m.53s. and 18m.21s.
Long waves were also recorded at Seven Falls, Chicago, Bozeman, Ukiah, Ivigtut, and Belgrade.

Aug. 11d. 15h. 0m. 39s. Epicentre 15°·6S. 173°·6W. (as on 1947, April 29d.).

Intensity III at Apia.

Preliminary Seismological Bulletin, Apia, Western Samoa, July—September, 1949, p.3. Suggested focus 15°S. 173°·5W. Depth 60km.

$A = -·9576$, $B = -·1074$, $C = -·2673$; $\delta = -2$; $h = +6$;
$D = -·111$, $E = +·994$; $G = +·266$, $H = +·030$, $K = -·964$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		2·5	45	i 0 39	− 4	1 0	−14	—	—	—
Wellington		27·5	200	e 5 56	+ 6	e 8 9	?	e 13 33?	Q	e 15·2
Kaimata	N.E.	29·8	203	e 6 16	+ 5	—	—	—	—	—
Christchurch		30·2	200	—	—	—	—	e 12 46	SS	e 15·8
Branner	z.	71·5	42	i 11 25k	+ 1	—	—	—	—	—
Berkeley		71·8	42	i 11 26k	0	—	—	—	—	e 33·0
Lick	z.	71·8	42	i 11 27k	+ 1	—	—	—	—	—
Pasadena		72·3	46	i 11 30k	+ 1	—	—	e 11 48	pP	e 36·4
Palomar		72·8	48	i 11 32k	0	—	—	—	—	—
Riverside	z.	72·8	46	i 11 32k	0	—	—	—	—	—
Shasta Dam		73·4	38	i 11 35	− 1	—	—	—	—	—
China Lake	z.	73·6	45	i 11 37k	0	—	—	—	—	—
Mineral	z.	73·7	40	i 11 37k	− 1	—	—	—	—	—
Tinemaha	z.	73·9	44	i 11 39k	0	—	—	i 11 56	pP	—
Reno	E.	74·3	42	i 11 42	+ 1	—	—	—	—	—

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		75·6	46	i 11 48	0	—	—	—	—	—
Overton	z.	76·1	45	i 11 56	+ 5	—	—	—	—	—
Pierce Ferry		76·2	46	i 11 53	+ 1	—	—	—	—	—
Tucson		76·6	51	i 11 55	+ 1	—	—	—	—	—
Victoria	z.	77·8	33	e 11 59	− 2	—	—	—	—	—
Logan		80·6	42	i 12 15	− 1	—	—	—	—	—
College		82·6	11	i 12 25	− 1	—	—	e 17 28	PPP	e 38·4
Hungry Horse		82·7	36	i 12 26	− 1	—	—	—	—	—
Collmburg	z.	144·0	354	e 19 37	[0]	—	—	—	—	—
Paris		146·7	5	i 19 46	[+ 4]	e 27 9	[+20]	e 23 17	PP	e 76·4
Stuttgart	z.	146·8	357	e 19 46	[+ 4]	—	—	—	—	—
Strasbourg		147·1	358	i 19 48	[+ 5]	i 30 0	{− 2}	—	—	—
Basle		148·1	0	e 19 55	[+11]	—	—	—	—	—
Zürich		148·3	359	e 19 52a	[+ 7]	—	—	—	—	—
Besançon		148·4	1	i 19 52	[+ 7]	—	—	—	—	—
Triest		149·4	351	e 23 41	PP	e 32 22	PSKS	e 42 21?	SS	e 61·4
Clermont-Ferrand		149·8	5	i 19 56	[+ 9]	—	—	—	—	79·8

Additional readings :—
Branner iZ =11m.37s.
Lick iZ =11m.53s.
Palomar iZ =12m.3s.
Shasta Dam i =11m.53s.
Mineral iZ =11m.42s.
Reno iN =11m.59s.
Boulder City i =11m.54s.
Pierce Ferry i =12m.4s.
Tucson e =12m.13s., and 12m.20s.
Hungry Horse i =12m.52s., e =13m.10s., 13m.34s., and 13m.58s.
Paris i =19m.58s.
Stuttgart e =19m.59s.
Basle e =20m.45s.
Besançon e =20m.1s.
Triest ePKS =23m.55s.
Long waves were also recorded at Auckland, Alicante, Almeria, Granada, and Kew.

Aug. 11d. 20h. 59m. 5s. Epicentre 31°·0N. 89°·0E.

$A = +·0150$, $B = +·8586$, $C = +·5125$; $\delta = +8$; $h = +1$;
$D = +1·000$, $E = -·017$; $G = +·009$, $H = +·512$, $K = -·859$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Murgab		14·4	305	3 27	0	—	—	—	—	—
Almata		15·6	325	i 3 38	− 5	i 6 38?	+ 1	—	—	—
Frunse		16·5	320	e 4 2	+ 8	e 7 8	+10	—	—	—
Andijan		16·6	310	e 3 57	+ 1	e 7 2	+ 2	i 4 15	PP	—
Obi-garm		17·6	302	i 4 6	− 2	e 7 16	− 7	—	—	—
Stalinabad		18·2	302	i 4 20	+ 4	e 7 34	− 3	—	—	—
Poona	E.	18·5	231	8 25	SSS	—	—	e 9 23	Q	11·1
Tashkent		18·9	309	e 4 25	+ 1	i 7 52	− 1	e 5 5	PPP	—
Bombay		19·0	234	e 7 19	?	e 7 42	−13	—	—	—
Samarkand		19·9	302	e 4 40	+ 4	—	—	—	—	—
Irkutsk		24·0	23	e 5 9?	− 8	e 9 30	− 2	—	—	—
Sverdlovsk		32·5	331	i 6 31	− 3	—	—	—	—	—
Ksara		44·5	288	e 8 1	−14	e 15 59	?	—	—	—
Istanbul		48·6	300	e 17 55?	S_eS	—	—	—	—	—
Upsala		54·5	324	e 18 25	S_eS	—	—	—	—	e 26·9
Collmberg	z.	58·0	314	e 9 54	− 3	—	—	—	—	—
Stuttgart		61·0	312	e 10 20	+ 2	—	—	—	—	e 32·9

Tashkent gives also eP_cP =8m.49s.
Long waves were also recorded at other European stations.

Aug. 11d. Continuation of the list of aftershocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	22	32	2	43	41	7	12	55	7	46	3
0	40	17	7	4	53	7	37	23	19	43	19

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	22	38	7	4	57?	7	46	5	10	2	55
0	40	23	7	13	0	8	22	1	12	44	1
2	43	49	7	37	27						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	22	41	2	44	0	7	13	15	10	3	33
0	40	21	7	4	52?	7	37	37	12	43	59

Tashkent.

h.	m.	s.	h.	m.	s.
0	22	52	0	40	34?

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	22	49	7	5	4	7	46	16	21	43	35
0	40	28	7	13	21	12	44	9			

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	23	1	7	5	26?	7	37	53	12	44	27
0	40	43	7	13	29	7	47	12			

Tchimkent.

h.	m.	s.
7	5	24

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	24	39	0	42	11	7	6	42	7	14	53

Almata.

h.	m.	s.
0	42	54

Aug. 11d. Readings also at 0h. (Boulder City, near Pierce Ferry, Tucson, and near Algiers Univ.), 3h. (Pretoria), 4h. (Tananarive), 8h. (Strasbourg), 10h. (near Rome (2)), 11h. (Boulder City, Pierce Ferry, Reno, Shasta Dam, near Collmburg, and Prague), 12h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Overton (2), Mineral, Almeria, Malaga, Paris, Clermont-Ferrand, De Bilt, Strasbourg, and Stuttgart), 14h. (Strasbourg, Granada, near Almeria, Malaga, and near Ottawa), 16h. (Tucson, Erevan, near Grozny, Leninakan, and Tiflis), 17h. (Alicante, Murgab, Hungry Horse, College, and near Mizusawa), 19h. (Hungry Horse and Tucson), 20h. (Reno, Shasta Dam and New Delhi), 21h. (Calcutta and Shasta Dam), 22h. Bogota and Kodaikanal), 23h. (Rome, Shasta Dam, Reno, and Hungry Horse).

Aug. 12d. 7h. 38m. 12s. Epicentre 39°·1N. 78°·0E. Given by U.S.S.R.

$A = +\cdot1618$, $B = +\cdot7611$, $C = +\cdot6281$; $\delta = -4$; $h = -1$;
$D = +\cdot978$, $E = -\cdot208$; $G = +\cdot131$, $H = +\cdot614$, $K = -\cdot778$.

	△	Az.	P.		O−C.	S.		O−C.	Supp.		L.
	°	°	m.	s.	s.	m.	s.	s.	m.	s.	m.
Murgab	3·2	257	1	0	P*	1	38	S*	—	—	—
Almata	4·2	350	i 1	9	+ 2	i 1	58	+ 1	—	—	—
Andijan	4·6	272	1	11	− 1	2	5	− 2	—	—	—
Frunse	4·6	327	e 1	11	− 1	i 2	4	− 3	—	—	—
Obi-garm	6·5	267	1	36	− 3	—		—	—	—	—
Tashkent	7·0	291	e 1	41?	− 5	e 3	4	− 4	—	—	—
Tchimkent	7·1	299	e 1	51	+ 3	e 3	16	+ 6	—	—	—
Stalinabad	7·2	269	i 1	51	+ 2	e 3	17	+ 4	—	—	—
Samarkand	8·5	276	e 2	3	− 4	—		—	—	—	—
Ashkabad	15·4	272	e 3	37	− 3	—		—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	18·7	149	—	—	e 8 27	+39	—	—	—
Bombay		20·6	194	—	—	e 8 47	+18	—	—	—
Poona		20·8	191	e 5 2	+17	—	—	—	—	e 11·8
Sverdlovsk		21·1	333	4 46	− 2	e 8 37?	− 2	—	—	—
Irkutsk		22·5	45	e 4 49?	−13	—	—	—	—	—
Grozny		24·6	291	e 5 50?	+27	—	—	—	—	—
Tiflis		25·3	287	5 31	+ 1	—	—	—	—	—
Leninakan		26·1	285	e 5 38	+ 1	—	—	—	—	—
Moscow		31·4	315	e 6 23	− 2	e 11 23	− 9	—	—	—
Ksara		34·1	275	e 2 11	?	e 9 43	PcP	—	—	—
Collmberg	Z.	46·0	307	e 8 26	− 1	—	—	—	—	—
Stuttgart		48·9	305	e 8 49	− 1	—	—	—	—	e 24·8
College		70·4	19	e 11 23	+ 5	—	—	—	—	—
Hungry Horse		92·3	8	i 13 20	+ 7	—	—	—	—	—
Shasta Dam		98·4	16	e 13 46	+ 5	—	—	—	—	—

Long waves were also recorded at Bergen, Upsala, Potsdam, De Bilt, Strasbourg, Kew, and Rome.

Aug. 12d. 23h. 15m. 44s. Epicentre 14°·7S. 167°·3E. Depth of focus 0·005.
(as on 1947, July 6d.).

$A = -·9440$, $B = +·2127$, $C = -·2522$; $\delta = -2$; $h = +6$;
$D = +·220$, $E = +·976$; $G = +·246$, $H = -·055$, $K = -·968$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		18·4	224	i 4 16k	+ 4	i 7 42	+10	i 4 40	pP	—
Apia		20·3	90	e 4 37	+ 4	—	—	—	—	—
Auckland	N.	23·1	164	i 5 7	+ 6	e 9 20	+17	—	—	—
Riverview		24·0	215	e 5 12	+ 2	i 9 23	+ 4	i 5 42	PP	e 11·4
Wellington		27·3	168	e 6 27	PP	i 10 8	− 6	e 6 35	PPP	—
Christchurch		29·1	173	e 4 36	?	e 6 41	PP	e 9 26	Q	e 13·3
Honolulu		49·5	44	—	—	e 16 30	+43	e 20 54	SSS	e 21·8
Berkeley	Z.	84·1	49	i 12 23a	− 2	e 23 25	PS	e 24 18	PPS	e 38·7
Lick	Z.	84·4	49	i 12 26a	− 1	—	—	i 12 55	pP	—
Shasta Dam		85·2	46	e 12 29	− 2	—	—	e 15 48	PP	—
Fresno	N.	85·5	50	e 12 30	− 2	—	—	e 15 51	PP	—
Pasadena	Z.	85·8	53	i 12 31	− 3	—	—	e 15 54	PP	—
College		86·3	17	e 12 33	− 3	—	—	e 12 59	pP	—
Riverside	Z.	86·4	53	i 12 34a	− 2	—	—	—	—	—
Palomar		86·5	55	i 12 36a	− 1	—	—	i 13 2	pP	—
China Lake	Z.	86·8	52	i 12 37	− 1	—	—	—	—	—
Tinemaha		86·8	51	i 12 39	+ 1	—	—	—	—	—
Victoria		87·8	38	—	—	e 22 52	[−11]	—	—	—
Boulder City		89·0	52	i 12 48	− 1	—	—	i 13 6	pP	—
Overton	Z.	89·5	52	i 12 51	0	—	—	—	—	—
Pierce Ferry		89·7	52	e 12 50	− 2	—	—	e 16 25	PP	—
Tucson		91·0	57	e 12 58	0	—	—	e 16 34	PP	e 41·3
Logan		93·0	48	e 13 23	+15	—	—	e 16 47	PP	—
Hungry Horse		93·5	41	e 13 7	− 3	—	—	e 16 57	PP	—
La Paz		117·1	117	e 18 48	[+10]	—	—	—	—	—
Scoresby Sund		123·8	4	—	—	27 22	SKKS	—	—	—
Ksara		132·3	302	e 17 21	?	—	—	e 21 31	PP	—
Istanbul		135·3	314	e 19 16?	[+ 3]	e 22 16?	PP	—	—	—
Helwan	Z.	136·8	298	e 19 13	[− 2]	—	—	e 22 21	PP	—
Collmberg		138·0	335	e 19 16	[− 1]	e 30 8	SKKS	e 22 42	PP	e 68·6
Jena	E.	138·9	336	e 19 18	[− 1]	—	—	—	—	—
De Bilt		140·0	343	e 22 46	PP	—	—	—	—	—
Stuttgart		141·6	337	e 19 17	[− 7]	e 29 52	SKKS	e 22 48	PP	e 41·3
Triest		142·0	330	i 22 59	PP	e 29 8	SKKS	i 23 29	PKS	—
Strasbourg		142·2	338	i 19 24	[− 1]	e 41 16?	SS	e 22 54	PP	—
Paris		143·8	343	i 19 25	[− 3]	e 23 7	PKS	i 19 54	pPKP	—
Besançon		144·0	338	i 19 25	[− 3]	e 22 54	PKS	e 23 30	PP	—
Clermont-Ferrand		146·3	340	i 19 34	[+ 2]	—	—	i 23 23	PP	—
Toledo		153·8	345	e 19 52	[+ 8]	—	—	—	—	—

For Notes see next page.

NOTES TO AUGUST 12d. 23h. 15m. 44s.

Additional readings :—
Brisbane iSZ =7m.47s.
Apia eP? =3m.12s., e =4m.44s.
Auckland iN =6m.1s., eN =9m.58s.
Riverview iNZ =5m.49s., iZ =6m.7s., iN =9m.30s., iEZ =9m.35s., eQN =10m.10s., iSSZ =10m.13s., iE =10m.19s., iS_cSE =16m.10s.
Wellington eZ =11m.16s. and 11m.57s., e =17m.14s.
Berkeley iZ =12m.58s., eN =23m.31s. and 34m.57s.
Lick ipPZ =12m.30s., ePPZ =15m.42s.
Shasta Dam e =13m.3s., 13m.34s., and 13m.56s.
College i =13m.10s.
Palomar iPPZ =16m.2s.
Boulder City i =13m.19s., ePP =16m.20s.
Pierce Ferry i =12m.59s., e =14m.4s.
Tucson e =13m.27s.
Hungry Horse ePKKP =30m.9s., ePKP,PKP =38m.25s.
Helwan iZ =22m.34s. and 23m.28s.
Stuttgart ePKPZ =19m.22s., eZ =19m.51s., e =23m.39s.
Triest ePSKS =32m.34s., ePPS =35m.12s., eSS =41m.28s.
Strasbourg $ePKP_2$? =20m.2s., e =20m.31s. and 23m.34s.
Paris i =19m.29s., e =20m.22s., ePP? =22m.46s., ePS? =33m.6s.?
Besançon e =19m.45s., $iPKP_2$ =19m.52s., e =20m.7s., 20m.56s., 21m.30s., 22m.42s., and 23m.16s.
Clermont-Ferrand $iPKP_2$ =20m.0s.
Long waves were also recorded at Harvard, Seattle, and Seven Falls.

Aug. 12d. Continuation of the list of after-shocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	8	42	7	59	23	15	16	17	18	27	42
5	15	56	8	19	15	15	54	57	19	31	39
6	11	52	14	40	14						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	41	5	11	40	25	15	16	33	18	27	57
6	11	57	14	40	23	15	55	13	19	31	55
7	59	39									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	59	36	15	16	37	18	27	56	19	32	7
14	40	22									

Tashkent.

h.	m.	s.	h.	m.	s.
15	55	25	18	28	8?

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
14	41	15	15	55	30?	18	28	11	23	8	8

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	0	2	15	17	0	18	28	25	19	33	12
14	41	14	15	55	37?						

Tchimkent.

h.	m.	s.	h.	m.	s.
15	55	42	18	28	20

Frunse.

h.	m.	s.	h.	m.	s.
15	56	56	18	29	46

Aug. 12d. Readings also at 0h. (Bogota, Alicante, Almeria, Granada, and Upsala), 2h. (near Leninakan), 3h. (Nanking), 7h. (Auckland, Wellington, Riverside, China Lake, Tinemaha, Tucson, Overton, Shasta Dam, Mineral, and College), 8h. (La Paz), 9h. (near Messina), 10h. (Istanbul), 11h. (Paris and Sofia), 12h. (Tucson), 13h. (near Pierce Ferry and Boulder City), 15h. (Tucson, Boulder City, Pierce Ferry, and College), 16h. (College (2) and Hungry Horse), 17h. (Auckland, Tucson, Overton, Shasta Dam, and Zurich), 19h. (Antofagasta, La Paz, Mount Wilson, Palomar, Riverside, Tucson, Boulder City, Overton (2), Pierce Ferry, Shasta Dam, Hungry Horse, College, Bermuda, and Istanbul), 20h. (Istanbul, near Algiers Univ., and near Victoria), 21h. (La Paz), 22h. (near Messina and near Victoria), 23h. (Pretoria, Ottawa, Hungry Horse (2), and Shasta Dam).

Aug. 13d. 18h. 24m. 52s. Epicentre 0°·0 146°·0E.

A = −·8290, B = +·5592, C = ·0000 ; δ = −5 ; h = +7 ;
D = +·559, E = +·829 ; G = ·000, H = ·000, K = −1·000.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		28·2	167	e 5 54k	− 2	i 10 38	− 3	i 6 54	PP	—
Riverview		34·0	173	e 6 43	− 5	e 12 6	− 7	i 8 1	PP	e 15·3
Kagosima		34·6	337	e 6 57	+ 4	—	—	—	—	15·8
Muroto		34·9	343	6 55	0	—	—	—	—	15·1
Omaesaki		35·2	350	6 48	−10	—	—	—	—	—
Shizuoka		35·5	350	e 7 0	0	12 30	− 6	—	—	—
Sumoto		35·7	346	i 7 4	+ 2	12 37	− 2	—	—	15·2
Kameyama		35·8	347	7 3	0	—	—	—	—	—
Osaka		35·8	346	7 4	+ 1	—	—	—	—	15·6
Hunatu		36·0	351	i 7 4	− 1	12 42	− 2	—	—	18·0
Kobe		36·0	346	e 7 3	− 2	e 12 42	− 2	e 8 13	PP	e 19·0
Nagoya		36·0	348	7 4	− 1	12 44	0	—	—	—
Tokyo		36·0	352	e 7 15	+10	12 16	−28	—	—	15·2
Kyoto		36·1	346	7 57	+52	—	—	—	—	—
Hikone		36·3	347	7 8	+ 1	12 46	− 2	—	—	19·5
Hiroshima		36·5	341	6 51	−18	—	—	i 8 37	PP	—
Hukuoka		36·5	338	i 7 9	0	12 50	− 1	—	—	—
Kakioka		36·5	353	e 7 10	+ 1	12 44	− 7	—	—	—
Nagano		37·2	350	7 12	− 3	—	—	—	—	—
Toyama		37·4	349	7 17	+ 1	13 19	+14	—	—	16·2
Wazima		38·1	349	e 7 24	+ 2	—	—	—	—	—
Sendai		38·4	355	7 20	− 5	13 49	+29	8 16	PP	18·0
Mizusawa	N.	39·2	355	e 7 30	− 1	13 25	− 7	—	—	—
Batavia		39·6	261	i 7 34a	− 1	i 13 39	+ 1	—	—	20·1
Miyako		39·6	356	e 7 29	− 6	—	—	—	—	—
Akita		39·9	354	e 7 37	0	—	—	—	—	16·6
Mori		42·2	355	8 0	+ 4	—	—	—	—	—
Perth		42·7	219	i 9 34	PP	14 32	+ 8	i 10 36	PPP	19·9
Apia		44·0	110	8 12	+ 1	e 14 38	− 5	—	—	e 18·1
Auckland	N.	45·4	147	—	—	e 15 4	0	e 18 22	SS	e 19·4
Arapuni	E.	46·7	148	—	—	e 15 38	+16	—	—	e 20·1
Tuai	N.	48·0	148	e 8 45	+ 2	—	—	—	—	—
Wellington		48·7	151	i 8 47	− 1	i 15 40	−10	e 18 28	SS	e 20·8
Christchurch		49·4	155	e 9 28	+35	i 15 56	− 4	20 8	SSS	e 23·5
Klyuchi		57·4	10	e 9 38?	−15	17 38?	−11	—	—	—
Honolulu		58·7	65	e 10 10	+ 8	e 17 53	−13	—	—	e 23·8
Calcutta	E.	60·4	296	e 10 14	+ 1	i 18 35	+ 7	i 12 26	PP	—
Irkutsk		62·7	333	10 29	0	i 18 59	+ 2	19 27	PS	—
Colombo	E.	66·3	277	10 54	+ 2	19 47	+ 5	—	—	—
Hyderabad	N.	68·6	289	—	—	20 8	− 1	—	—	—
Kodaikanal	E.	68·9	282	i 11 9	0	i 20 10	− 3	13 41	PP	32·6
New Delhi	N.	71·5	301	e 11 30	+ 6	i 20 49	+ 6	—	—	—
Poona		73·1	290	e 11 32	− 2	i 21 1	0	25 51	SS	—
Bombay		74·1	290	e 11 38	− 2	i 21 14	+ 2	26 3	SS	35·5
Almata		74·9	316	i 11 45	+ 1	i 21 25	+ 3	—	—	—
Murgab		76·0	310	e 11 52	+ 1	21 36	+ 2	—	—	—
Frunse		76·4	314	e 11 55	+ 2	e 21 43	+ 5	—	—	—
Andijan		77·6	312	e 12 1	+ 1	i 21 55	+ 4	e 22 32	PS	—
Obi-garm		79·3	310	i 12 14	+ 5	i 22 18	+ 9	—	—	—
Stalinabad		80·0	310	i 12 15	+ 2	i 22 22	+ 5	—	—	—
Tashkent		80·0	312	i 12 16	+ 3	i 22 22	+ 5	i 15 9?	PP	—
Tchimkent		80·0	313	i 12 13	0	i 22 18	+ 1	—	—	—
College		80·1	24	e 12 7	− 6	—	—	—	—	—
Samarkand		81·5	310	i 12 22	+ 1	i 22 33	+ 1	—	—	—
Sitka		83·9	33	e 12 31	− 2	i 22 55	− 1	e 23 45	PS	e 34·3
Ashkabad		88·1	308	e 13 0	+ 6	i 23 46	+ 9	—	—	—
Victoria		90·4	42	13 0	− 4	24 0	+ 2	23 35	SKS	41·1
Ukiah		90·6	52	—	—	e 24 2	+ 2	—	—	e 36·8
Seattle		91·1	43	e 13 6	− 2	e 23 40	[+ 1]	e 16 48	PP	e 38·1
Shasta Dam		91·2	50	e 13 5	− 3	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Berkeley		91·4	53	e 13 6a	− 3	i 23 40	[− 1]	e 16 47	PP	—
Santa Clara		91·6	53	e 13 26	+16	e 24 14	+ 5	e 30 26	SS	e 42·9
Mineral	z.	91·8	53	e 13 8	− 3	—	—	—	—	—
Lick	z.	91·9	53	i 13 9a	− 2	—	—	e 16 48	PP	—
Reno	E.	93·3	51	e 13 16	− 2	e 23 50	[− 2]	—	—	—
Fresno		93·4	54	i 13 16	− 2	e 24 22	− 2	e 23 45	SKS	e 43·5
Tinemaha		94·6	54	e 13 22	− 2	e 23 38	[−21]	—	—	—
Pasadena		94·8	56	e 13 21	− 4	i 23 55	[− 5]	i 17 12	PP	e 38·2
China Lake	z.	95·2	54	e 13 22	− 5	—	—	—	—	—
Riverside	z.	95·5	56	e 13 24	− 4	—	—	—	—	—
Palomar	z.	96·0	57	e 13 27	− 3	—	—	—	—	—
Hungry Horse		96·6	41	i 13 30	− 3	—	—	—	—	—
Boulder City		97·4	54	e 13 35	− 2	—	—	e 17 36	PP	—
Grozny		97·5	313	e 13 39	+ 2	—	—	—	—	—
Overton	z.	97·7	53	e 13 35	− 3	—	—	—	—	—
Butte	N.	97·9	43	e 17 33	PP	e 24 17	[+ 1]	—	—	e 40·0
Tananarive		98·0	251	—	—	e 24 25	[+ 8]	e 26 49	PS	43·7
Pierce Ferry		98·1	54	e 13 37	− 3	—	—	e 17 52	PP	—
Tiflis		98·4	312	e 13 41	0	25 11	+ 4	—	—	—
Bozeman		99·0	44	e 17 46	PP	e 25 12	0	e 24 21	SKS	e 39·6
Salt Lake City		99·2	49	e 17 44	PP	e 24 20	[− 3]	e 26 37	PS	e 41·8
Moscow		100·3	327	e 17 59	PP	24 29	[+ 1]	e 25 19	S	—
Tucson		101·1	57	e 14 1	+ 8	e 24 28	[− 4]	e 18 4	PP	e 41·6
Rapid City	E.	104·8	44	e 14 5	− 5	e 24 48	[− 2]	e 36 48	SSS	—
Yalta		105·4	316	e 14 14	+ 1	—	—	e 18 36	PP	—
Ksara		106·6	305	e 14 19	P	28 8	PS	18 39	PP	—
Upsala		108·3	335	—	—	e 26 8	{+15}	e 33 23	SS	e 47·6
Scoresby Sund		109·2	356	19 2	PP	28 38	PS	34 14	SS	—
Istanbul		110·0	314	15 27	P	26 7	{+ 2}	—	—	—
Bucharest		110·9	318	e 19 20	PP	e 28 47	PS	—	—	—
Helwan		111·2	302	e 16 26	?	25 17	[0]	i 19 18	PP	—
Skalnate Pleso		112·5	325	e 19 41	PP	e 29 1	PS	—	—	—
Bergen		112·6	340	—	—	e 29 58	PPS	—	—	e 43·1
Copenhagen		113·0	334	19 30	PP	26 34	{+ 8}	29 7	PS	—
Raciborzu		113·3	327	e 20 8?	PP	e 26 26	{− 2}	e 28 52?	PS	—
Budapest		114·1	323	e 19 50	PP	e 24 13	?	e 29 8?	PS	e 58·1
Grahamstown	z.	114·3	233	e 18 38	[− 4]	—	—	—	—	—
Belgrade		114·4	320	e 18 51a	[+ 9]	e 29 36	PS	e 19 42	PP	e 60·2
Ogyalla		114·4	324	e 18 33	[− 9]	—	—	e 19 46	PP	—
Potsdam		114·7	331	e 23 56	?	—	—	—	—	e 58·8
Pretoria	z.	114·9	242	e 18 44	[+ 1]	—	—	—	—	—
Prague		115·3	328	e 18 31	[−13]	e 25 9	[−24]	e 19 47	PP	e 49·1
Collmberg		115·4	329	18 48	[+ 4]	e 29 24	PS	e 22 13	PKS	—
St. Louis		115·8	46	i 19 41	PP	e 25 29	[− 6]	e 26 46	SKKS	e 51·2
Chicago		116·3	42	e 18 26	[−20]	e 30 22	PPS	e 36 42	SSP	e 48·2
Jena		116·3	329	e 19 20?	[+34]	—	—	e 19 54	PP	—
Aberdeen		117·6	341	—	—	e 27 49	{+51}	e 30 28	PS	e 48·8
Triest		118·1	324	e 22 52	PPP	e 26 59	{− 2}	—	—	e 52·1
Taranto		118·5	317	—	—	e 35 8?	SS	—	—	—
De Bilt		118·6	333	i 20 12a	PP	i 29 55	PS	i 22 41	PPP	e 55·1
Stuttgart		118·8	329	e 18 51	[+ 1]	e 28 56	S	e 20 10	pPKP	e 55·1
Strasbourg		119·7	329	e 19 4	[+12]	e 26 21	[+32]	e 20 18	PP	e 51·9
Chur		119·8	327	e 19 38	[+46]	—	—	—	—	e 59·8
Zürich		120·0	328	e 19 1	[+ 8]	—	—	e 20 21	PP	—
Bologna		120·2	323	e 20 36	PP	—	—	e 23 2	PPP	—
Basle		120·5	328	e 20 16	PP	e 22 26	PKS	—	—	—
Cleveland	E.	120·5	40	e 20 15	PP	e 25 56	[+ 4]	—	—	—
Rome		120·9	321	e 19 33	[+38]	e 35 57	SS	—	—	—
Kew		121·4	336	e 18 59	[+ 4]	e 22 17	PKS	e 32 35	PPS	e 54·1
Besançon		121·5	329	e 19 2	[+ 6]	e 22 18	PKS	e 20 8	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Ottawa		121·7	33	18 54	[− 2]	30 13	PS	36 26	SS		53·6
Paris		122·1	332	e 18 56	[− 1]	i 30 32	PS	i 20 35	PP		61·1
Rathfarnham Castle		122·1	341	i 19 8	[+11]	—	—	i 20 46	PP		—
Seven Falls	E.	123·1	29	e 23 8?	PPP	e 30 25	PS	e 36 42	SS		57·1
Pennsylvania	E.	123·2	39	i 15 19	?	e 25 57	[− 3]	i 20 29	PP		i 56·5
Clermont-Ferrand		123·9	329	e 19 11	[+11]	e 30 44	PS	i 20 50	PP		51·3
Philadelphia		125·3	39	e 18 53	[−10]	e 27 57	{+ 8}	e 20 48	PP		e 51·8
City College, N.Y.		125·6	36	e 19 3	[− 1]	e 27 58	{+ 7}	e 20 48	PP		e 50·9
Fordham		125·6	36	e 20 49	PP	—	—	—	—		—
Harvard		125·9	33	i 19 5	[+ 1]	i 28 12	{+19}	i 20 49	PP		e 61·1
Weston		126·1	33	i 19 8	[+ 4]	—	—	—	—		—
Halifax		128·4	27	—	—	e 28 50	{+41}	e 31 10	PS		50·7
Tortosa		128·7	326	19 31	[+21]	29 13	?	41 36	SSS		e 53·1
Alicante		131·0	325	18 45	[−29]	25 49	[−33]	20 58	PP		e 70·4
Toledo		131·8	328	e 19 22	[+ 7]	—	—	—	—		—
Granada		133·5	326	i 15 44	?	24 53	PPP	38 31	SS		65·3
Lisbon		135·2	332	19 27	[+ 5]	23 21	?	39 53	SS		65·2
Bermuda		136·7	39	e 22 10	PP	e 27 12	[+38]	e 39 23	SS		e 55·6
Huancayo		137·3	108	e 19 21	[− 5]	i 28 24	{−41}	i 22 13	PP		e 57·6
Chinchina		138·1	82	e 19 22	[− 5]	i 22 18	PP	i 19 28	PKP		—
Bogota	z.	139·7	83	i 19 32	[+ 2]	—	—	—	—		—
La Paz		142·6	118	e 19 35	[0]	26 40	[− 3]	i 22 46	PP		67·8
San Juan		143·5	58	e 19 47	[+10]	e 41 6	SS	e 22 48	PP		—
Fort de France		149·4	61	e 19 54	[+ 8]	—	—	—	—		—

Additional readings :—
Brisbane iZ =6m.58s., iN =7m.31s., iSSE =12m.9s.
Riverview iZ =6m.51s., iNZ =8m.6s. and 13m.9s., iSSE =14m.15s., iSSSE =14m.39s., iE =14m.45s. and 15m.11s.
Kobe ePPP? =9m.28s.
Sendai PPP =8m.32s., Q =15m.59s.
Perth SS =17m.24s.
Wellington iSSS =19m.28s.
Christchurch iZ =16m.28s., iE =18m.48s., eQEN =20m.38s.
Calcutta iE =19m.2s.
Irkutsk SS =23m.32s.?
Kodaikanal SSE =24m.49s.
Bombay SSN =26m.14s.
Tashkent iS_cS =22m.44s., iSS =27m.14s.?
Sitka eSS =28m.23s., eSSS? =32m.19s.
Victoria PS =25m.4s.
Seattle e =13m.35s. and 13m.44s., eS =24m.7s., ePS =25m.23s., e =26m.24s. and 29m.38s., eSS =30m.16s., ePKKS =33m.43s.
Berkeley ePZ =13m.10s., iZ =13m.22s. and 13m.53s., eZ =24m.6s., eE =30m.14s., iN =37m.57s., eE =38m.14s., eZ =39m.20s.
Santa Clara ePPSEN =25m.33s., eSSSEN =34m.58s.
Mineral iZ =13m.23s.
Lick iZ =13m.25s., 13m.32s., and 13m.55s.
Reno eN =13m.18s., iN =13m.29s., iE =13m.40s., eN =24m.12s.
Fresno eSE =23m.50s., eZ =25m.36s.
Tinemaha iZ =13m.38s.
Pasadena iE =24m.0s., eSPNZ =25m.51s., eSSN =30m.56s.
China Lake eZ =13m.46s.
Palomar iZ =13m.42s.
Hungry Horse i =13m.46s., and 13m.54s., e =15m.11s.
Boulder City e =13m.56s.
Overton eZ =13m.39s.
Butte eN =29m.53s.
Tananarive eSS? =31m.8s.
Pierce Ferry e =13m.53s. and 16m.35s.
Bozeman ePS =26m.35s., eSS =31m.41s.
Salt Lake City eSS =31m.57s.
Moscow ePS =26m.53s.
Tucson e =15m.4s., and 17m.29s., ePPP? =20m.36s., ePS? =26m.58s., e =27m.9s.
Upsala eE =27m.26s., eN =29m.8s.?, eSSN =33m.43s., eSSSE =38m.8s.?, eN =41m.8s.?, eE =44m.26s., eN =44m.44s.
Helwan eZ =16m.53s., PSEZ =28m.50s.
Copenhagen PPS =30m.2s., SS =35m.17s., SSS =38m.26s.
Belgrade e =25m.31s.
Prague e =17m.25s., 20m.14s., ePPP =22m.14s., e =24m.11s., ePS =29m.22s., eSKSP =29m.43s., ePPS =30m.39s., eSS? =36m.14s., eSSS =40m.26s.
Collmberg ePPSE =32m.43s.

Continued on next page.

St. Louis iPP =19m.47s., eS =27m.37s., iPS =29m.28s., iSS =35m.36s., eSSS =39m.57s., e =46m.36s.
Aberdeen iN =36m.47s., iE =39m.40s., eN =39m.56s.
De Bilt eSS =36m.8s.
Stuttgart ePP =20m.29s., eSKP =21m.22s. and 22m.32s., ePS =31m.13s., e =34m.32s., eSSS? =41m.20s., e =48m.8s.
Strasbourg e =19m.37s., 20m.34s., 21m.20s., and 21m.23s., eSKP? =22m.33s., ePPP =22m.45s., e =25m.14s., eSKS? =26m.26s., eS =28m.8s., ePS =29m.53s. and 30m.0s., cPPS =31m.21s., eSS =36m.49s., e =40m.37s., eSSS =41m.21s. and 41m.29s., e =43m.38s. and 44m.28s., eQ =48m.36s.
Kew eEN =48m.16s. and 50m.39s.
Besançon ePP =20m.42s., e =21m.30s.
Ottawa i =20m.20s., e =29m.18s.
Paris iPKP =18m.59s., i =21m.6s. and 22m.6s., eSKKS($\triangle > 180°$) =36m.14s., iSS =37m.10s., iPKP,PKP =37m.56s., iSSS =41m.36s., eQ =57·1m.
Seven Falls eE =42m.8s.?.
Pennsylvania eE =27m.33s., 30m.23s., and 42m.8s.
Clermont-Ferrand e =20m.32s., ePKS =22m.26s., iPPP =23m.26s., eSPP =32m.14s., eSS =37m.27s., eSSS =42m.11s.
Philadelphia ePS =30m.47s., eSS =37m.22s., e =37m.49s.
City College, N.Y. ePS =30m.48s., eSSS =42m.41s.
Alicante PKS =21m.58s., PPP =23m.56s., SKKS =27m.59s., SS =38m.27s., SSP =38m.59s., SSS =43m.26s.
Granada SSS =43m.13s.
Lisbon E =54m.8s.?.
Bermuda ePP =22m.16s., eSSS =44m.29s.
Huancayo e =27m.48s., 30m.53s., and 31m.40s., ePPS =34m.38s., eSS =39m.38s., e =40m.11s., eSSS =44m.58s., e =47m.13s.
La Paz iPKPZ =19m.40s., iSKKSEN =29m.40s., PSN =33m.24s., iSSN =41m.40s., iPPS =42m.0s.
San Juan e =21m.20s.
Long waves were also recorded at Columbia and Ivigtut.

Aug. 13d. Continuation of the list of aftershocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	55	10	9	42	47	12	28	21	13	18	4
9	25	4									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	25	15	12	28	31	13	47	1	22	58	58
9	42	43	13	18	1						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	21	57	9	25	21	12	10	31	15	5	31
4	8	0	9	44	27	12	28	34	22	58	54
4	35	30	11	35	36	13	19	44			

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
9	25	30?	12	28	44	13	19	33

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	25	32	12	28	43	13	18	15	22	59	10
9	43	27									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
9	25	38?	9	43	55	12	28	57	13	19	10

Frunse.

h.	m.	s.	h.	m.	s.
9	26	2	12	30	13

Aug. 13d. Readings also at 0h. (Harvard, Ottawa, near Victoria (2), and near College), 1h. (Bombay, Istanbul, Ksara, Samarkand, Stalinabad, Tashkent, and near Irkutsk), 2h. (Istanbul, Upsala, Shasta Dam, Hungry Horse, and near Tacubaya), 4h. (near College), 5h. (Strasbourg, Overton, and near Tacubaya), 6h. (near College), 9h. (Tucson (2), Overton (2), Hungry Horse (2), and near Tacubaya), 10h. (College and Shasta Dam), 11h. (Ksara), 12h. (Mineral (2)), 14h. (Stuttgart), 16h. (Tucson, near Ottawa, and near Mizusawa), 17h. (Mount Wilson, Pasadena, Palomar, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, and near Tacubaya), 18h. (Hungry Horse and Mineral), 19h. (Kew), 22h. (near Istanbul), 23h. (Paris, Stuttgart and Tucson).

Aug. 14d. Continuation of the list of aftershocks from Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	31	57	10	18	34	11	50	16	23	38	57
8	47	50									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	32	29	8	32	20	10	18	49	23	38	58
1	41	19?	9	12	25	11	50	19			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	16	8	1	59	34	8	48	17	19	29	30
0	32	31	8	32	27	10	19	8	23	39	6
1	41	16									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	33	16	8	32	32?	8	48	22

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	32	41	8	32	42	8	48	27	23	39	14
1	41	42									

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	33	0	8	48	30	10	19	16	11	51	22
8	32	42									

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	42	23	8	48	33	11	52	4	23	40	7

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
0	37	47	8	34	22	8	49	0

Aug. 14d. Readings also at 0h. (Seattle), 1h. (La Paz), 2h. (near Almata), 3h. (Hungry Horse, and near Mineral), 5h. (Tucson), 7h. (Hungry Horse), 8h. (Reno, near Berkley, Branner, Lick, and near Alicante), 9h. (Alicante), 10h. (Alicante (2), and Tucson), 11h. (Tucson), 12h. (Hungry Horse), 15h. (College), 16h. (near Yalta), 17h. (Overton, Pierce Ferry, Tucson (2), and Tacubaya), 18h. (Grahamstown, Pretoria, Tananarive, Helwan, Ksara, Rome, Strasbourg, Clermont-Ferrand, Prague, Tucson, and Hungry Horse), 19h. (De Bilt, Paris, Tortosa, Clermont-Ferrand, Alicante, near Granada (2), and near Istanbul (2)), 20h. (Ottawa, Tucson, Oaxaca, near Puebla, Tacubaya, and Vera Cruz), 22h. (Tacubaya, Tucson, and Malaga).

Aug. 15d. Continuation of the list of aftershocks from the epicentre in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	56	18	3	30	34	21	52	20	23	19	59?
2	47	9	17	21	31	22	4	33			

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	43	34	3	30	50	22	4	10	23	50	34
2	47	22	17	21	34						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	43	41	3	30	58	17	21	58	23	19	48
2	47	28	15	2	37						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	43	51?	3	31	42	17	22	59?

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	43	47	3	31	6	17	21	43	23	19	28
2	47	36	9	50	54	22	3	56			

Continued on next page.

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	43	47?	3	31	2	22	5	22	23	21	16
2	47	47	17	21	55?						

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	43	51?	2	47	56	17	22	16	22	5	32

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	45	22	3	32	36	17	23	50

Almata.

h.	m.	s.	h.	m.	s.
1	46	20?	17	24	22?

Aug. 15d. Readings also at 0h. (Tucson and near Istanbul), 2h. (La Paz), 4h. (Tacubaya), 5h. (Antofagasta), 7h. (Arcata, Tucson, Shasta Dam, Paris, and Istanbul), 8h. (Hungry Horse), 10h. (near Istanbul), 12h. (Tucson, Catania, and near Messina), 14h. (Tacubaya), 15h. (near College), 16h. (Hungry Horse, and near Victoria), 17h. (near Alicante), 20h. (Huancayo, Pasadena, Tinemaha, Tucson, Shasta Dam, Lick, and Hungry Horse), 21h. (Batavia, Kodaikanal, Ksara, Istanbul, Tucson, Shasta Dam, and Hungry Horse), 23h. (near Istanbul, near Berkeley, Branner, and Lick).

Aug. 16d. 1h. 6m. 59s. Epicentre 46°·3N. 7°·5E. (as on 1947, Sept. 19d.).

Intensity IV at Montana.

E. Wanner.
Jahreshericht des Erdbebendienstes der Schweiz im Jahre, 1949. Zürich, 1950, p.3. Macroseismic chart fig. 6. Epicentre as adopted.

$A = +\cdot6874$, $B = +\cdot0905$, $C = +\cdot7206$; $\delta = -3$; $h = -4$;
$D = +\cdot131$, $E = -\cdot991$; $G = +\cdot714$, $H = +\cdot094$, $K = -\cdot693$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Neuchâtel		0·8	332	i 0 17	− 1	i 0 28	− 3	—	—
Basle		1·3	3	e 0 26	+ 1	e 0 44	0	—	—
Zürich		1·3	35	e 0 18	− 7	—	—	—	—
Besançon		1·4	312	i 0 28	+ 1	e 0 49	+ 3	e 0 52	S_g
Ravensburg	z.	2·1	44	e 0 42	P_g	e 1 17	S_g	—	—
Strasbourg		2·3	5	e 0 49	P_g	e 1 21	S_g	—	—
Stuttgart		2·7	24	e 0 54	P_g	e 1 27	S*	e 1 35	S_g
Clermont-Ferrand		3·1	260	e 1 1	P_g	—	—	—	—

Strasbourg gives also e? =58s.

Aug. 16d. 11h. 49m. 6s. Epicentre 29°·4N. 67°·1E.

$A = +\cdot3396$, $B = +\cdot8039$, $C = +\cdot4884$; $\delta = +12$; $h = +2$;
$D = +\cdot921$, $E = -\cdot389$; $G = +\cdot190$, $H = +\cdot450$, $K = -\cdot873$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
New Delhi	N.	8·9	93	e 2 25	+13	e 3 54	− 1	—	—	—
Stalinabad		9·3	8	2 18	+ 1	i 4 9	+ 4	—	—	—
Obi-garm		9·5	12	i 2 19	− 1	i 4 9	− 1	—	—	—
Samarkand		10·3	0	e 2 30	− 2	—	—	—	—	—
Murgab		10·6	31	2 38?	+ 2	4 27?	−10	—	—	—
Bombay	E.	11·7	152	—	—	e 5 35	+31	—	—	e 6·9
Tashkent		12·0	8	i 2 52?	− 3	i 5 16?	+ 5	—	—	—
Andijan		12·1	19	e 2 55	− 2	5 5	− 9	—	—	—
Tchimkent		13·0	8	e 3 18	+ 9	—	—	—	—	—
Frunse		14·7	22	e 3 31	0	e 6 6	−10	—	—	—
Almata		15·9	27	i 3 47	0	e 6 48?	+ 4	—	—	—
Baku		17·8	313	4 20?	+ 9	—	—	—	—	—
Calcutta	E.	20·3	104	e 8 43	S	(e 8 43)	+20	—	—	(i 11·2)
Tiflis		21·8	310	e 4 55	− 1	e 8 37	−15	—	—	—
Grozny		22·0	315	e 4 56	− 2	e 11 24	SSS	e 5 50	PPP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Leninakan		22·1	308	5 5	+ 6	—	—	i 5 38	PP	—
Sotchi		26·0	311	e 5 32	− 4	—	—	—	—	—
Ksara		26·9	287	e 5 45	0	e 11 15	+55	—	—	—
Sverdlovsk		27·8	353	5 51	− 2	10 35	0	—	—	—
Yalta		30·1	309	e 5 31?	−42	—	—	—	—	—
Helwan		31·0	280	e 6 26	+ 5	e 13 12	SS	e 7 36	PP	—
Istanbul		32·9	301	e 6 50	+12	—	—	7 49	PP	—
Moscow		33·6	330	e 6 44	0	—	—	—	—	—
Triest		44·5	307	e 8 15	0	e 14 58	+ 7	e 17 29	SS	—
Upsala		44·9	327	—	—	e 18 12	SS	—	—	e 28·9
Rome		45·4	301	e 8 19	− 3	e 15 5	+ 1	e 18 25	SS	—
Collmberg	Z.	45·5	314	e 8 23	0	—	—	—	—	—
Bologna		46·2	305	e 8 54	+26	—	—	—	—	—
Jena	N.	46·3	313	e 9 31	+62	—	—	—	—	—
Copenhagen		46·5	321	e 8 30	− 1	e 15 21	+ 2	—	—	—
Stuttgart		47·7	311	e 8 40	0	e 15 31	− 5	—	—	e 28·9
Strasbourg		48·6	311	e 8 47	0	e 16 30	PS	e 10 44	PP	e 23·0
Besançon		49·9	309	e 8 54	− 3	—	—	—	—	—
De Bilt		50·4	315	i 9 2a	+ 1	e 16 14	0	—	—	e 25·9
Clermont-Ferrand		51·9	307	e 9 13	+ 1	—	—	—	—	35·9
Paris		52·1	311	i 9 25	+11	e 16 44	+ 6	e 10 27	PcP	—
College		82·2	14	i 12 27	+ 3	—	—	e 15 32	PP	—

Additional readings :—
Tiflis i = 5m.3s., e = 9m.1s.
Helwan eZ = 6m.51s.
Upsala eE = 18m.19s. and 23m.25s., eN = 24m.54s.?
Strasbourg e = 20m.7s., iSSS = 20m.31s.
Besançon e = 9m.20s.
Clermont-Ferrand e = 9m.30s.
Paris e = 9m.29s.
Long waves were also recorded at Poona, Kew, Bergen, and Scoresby Sund.

Aug. 16d. Continuation of the list of after-shocks from the Turkestan epicentre.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	7	17	16	31	11	17	35	1	20	22	52
12	1	46									

Stalinabad.

h.	m.	s.	h.	m.	s.
8	7	32	17	35	18

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	7	42	16	31	37	17	35	26	20	23	5

Tashkent.

h.	m.	s.	h.	m.	s.
16	32	14?	17	36	4?

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.
8	7	49	17	35	38	20	23	10

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
8	7	58	17	35	40	20	23	37

Tchimkent.

h.	m.	s.	h.	m.	s.
8	8	42	16	32	39

Frunse.

h.	m.	s.	h.	m.	s.
8	9	38	16	33	39

Almata.

h.	m.	s.
8	10	20?

Aug. 16d. Readings also at 0h. (near Istanbul), 1h. (Antofagasta, Tucson, and Hungry Horse), 2h. (Batavia and Istanbul), 3h. (near Istanbul and near Victoria), 5h. (near Berkeley, Branner, Fresno, Lick, and near Victoria), 7h. (Santa Lucia), 8h. (Hungry Horse), 9h. (Hungry Horse and Strasbourg), 11h. (Paris, Pretoria, Tananarive, and near Erevan), 15h. (near Tacubaya), 16h. (Huancayo, Bogota, and near Tacubaya), 19h. (Branner), 20h. (Bogota and College), 21h. (Mount Wilson, Riverside, Tucson, Shasta Dam, Hungry Horse, College, Chicago, La Paz, and Calcutta), 22h. (Overton, and near Tortosa).

Aug. 17d. 18h. 34m. 11s. Epicentre 42°·7N. 145°·5E. Depth of focus 0·010.

Intensity VI at Nisibetu, Otiisi, and Hokkaido; V at Nemuro, Kusiro, and Hatinohe; IV at Abasiri, Urakawa, and Miyako ; II-III at Aomori, Mizusawa, Sapporo, Hakodate, Sapporo, Isinomaki, and Hukusima. Macroseismic radius >300km. Epicentre as adopted. Depth 80km.

The Seismological Bulletin of the C.M.O., Japan, for the year 1949, Tokyo, 1950, p. 26, with macroseismic chart.

$A = -\cdot 6075$, $B = +\cdot 4176$, $C = +\cdot 6757$; $\delta = +2$; $h = -3$;
$D = +\cdot 566$, $E = +\cdot 824$; $G = -\cdot 557$, $H = +\cdot 383$, $K = -\cdot 737$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	0·6	6	0 13	− 4	—	—	—	—	—
Sapporo	3·1	278	0 47	− 1	1 21	− 3	—	—	—
Hatinohe	3·7	235	0 45a	−11	1 25	−14	—	—	—
Mori	3·7	262	0 59a	+ 3	—	—	—	—	—
Aomori	4·0	243	1 3a	+ 3	1 48	+ 2	—	—	—
Morioka	4·4	229	1 7a	+ 1	1 56	0	—	—	—
Mizusawa	4·9	224	1 15	+ 2	2 7	− 2	2 10	S	—
Akita	5·0	236	1 18k	+ 4	2 13	+ 2	—	—	—
Sendai	5·6	220	1 23a	+ 1	2 26	0	—	—	—
Hukusima	6·3	219	1 33	+ 1	2 39	− 4	—	—	—
Onahama	6·7	213	1 39	+ 2	2 53	0	—	—	—
Aikawa	7·3	232	1 46	0	3 3	− 5	—	—	—
Mito	7·4	213	1 50	+ 3	3 8	− 2	—	—	—
Kakioka	7·7	214	1 50	− 1	3 12	− 5	—	—	—
Tukubasan	7·7	215	1 51	0	3 13	− 4	—	—	—
Maebasi	8·0	220	1 55	0	—	—	—	—	—
Kumagaya	8·1	218	1 59	+ 2	3 30	+ 3	—	—	—
Nagano	8·2	225	2 2	+ 4	3 33	+ 3	—	—	—
Matusiro	8·3	225	2 1a	+ 2	3 31	− 1	—	—	—
Tokyo	8·3	214	2 1	+ 2	3 31	− 1	—	—	—
Wazima	8·5	234	2 3a	+ 1	3 38	+ 1	—	—	—
Toyama	8·8	229	2 7	+ 1	—	—	—	—	—
Hunatu	8·9	218	2 10a	+ 3	3 47	0	—	—	—
Mera	8·9	211	2 25	+18	3 45	− 2	—	—	—
Osima	9·3	213	1 55	−18	3 34	−22	—	—	—
Shizuoka	9·6	218	2 20	+ 3	3 58	− 6	—	—	—
Gihu	10·0	226	2 24	+ 2	—	—	—	—	—
Nagoya	10·0	224	2 25	+ 3	4 15	+ 2	—	—	—
Kameyama	10·5	225	2 32	+ 3	4 45	+20	—	—	—
Toyooka	10·9	233	2 38	+ 4	—	—	—	—	—
Osaka	11·2	227	2 46	+ 8	—	—	—	—	—
Kobe	11·3	229	2 21	−19	—	—	—	—	—
Owase	11·3	223	2 48	+ 8	—	—	—	—	—
Miyazaki	15·5	231	3 44k	+10	6 43	+20	—	—	—
Irkutsk	29·1	304	5 52	− 2	10 35	− 2	6 9	pP	—
College	42·6	35	i 7 47	− 1	—	—	i 8 7	pP	—
Semipalatinsk	44·2	303	—	—	i 14 24	− 2	—	—	—
Almata	48·8	296	i 8 38	+ 1	i 15 31	− 1	—	—	—
Sitka	49·9	44	i 8 47	+ 1	i 15 54	+ 7	i 9 3	pP	—
Frunse	50·6	296	e 8 54	+ 3	e 16 1	+ 4	—	—	—
Andijan	53·0	294	9 9	0	—	—	—	—	—
Murgab	53·1	291	e 9 11	+ 1	—	—	—	—	—
Sverdlovsk	53·1	317	i 9 8	− 2	—	—	i 9 28	pP	—
Tchimkent	54·1	297	i 9 17	0	—	—	—	—	—
Tashkent	54·8	296	e 9 21	− 1	—	—	e 9 39	pP	—
Obi-garm	55·8	293	i 9 27?	− 2	—	—	—	—	—
Stalinabad	56·5	294	i 9 4?	−30	e 16 40?	−36	—	—	—
Samarkand	57·1	296	e 9 39	0	—	—	—	—	—
Batavia	60·0	226	i 9 59k	0	i 18 8	+ 6	—	—	—
Victoria	60·3	49	i 9 58a	− 3	18 8	+ 2	i 10 16	pP	—
Ashkabad	63·7	298	10 23	0	—	—	—	—	—
Moscow	64·6	323	e 10 29	0	—	—	—	—	—
Shasta Dam	65·3	56	i 10 33	− 1	e 19 45	sS	—	—	—
Hungry Horse	65·6	46	i 10 34	− 2	e 19 8	− 4	e 10 54	pP	—
Ukiah	65·7	58	—	—	e 19 17	+ 4	—	—	e 42·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mineral	Z.	66·0	56	i 10 37k	− 1	—	—	i 10 59	pP	—
Helsinki		66·6	332	e 10 9	−33	—	—	—	—	—
Scoresby Sund		66·8	356	i 10 42a	− 1	19 28	+ 2	—	—	—
Saskatoon		66·9	39	e 17 22	?	i 19 39	+11	—	—	—
Berkeley		67·0	59	i 10 45a	0	i 19 33	+ 4	i 11 5	pP	—
Santa Clara		67·5	59	e 19 39	S	(e 19 39)	+ 4	20 37?	sS	—
Baku		67·6	305	e 10 54	+ 6	—	—	—	—	—
Reno	N.	67·6	56	e 10 49	+ 1	e 19 41	+ 5	i 11 5	pP	—
Lick	Z.	67·7	59	i 10 48a	− 1	—	—	i 11 11	pP	—
Butte	N.	67·8	47	e 10 42	− 8	i 19 34	− 4	—	—	—
Bozeman		68·8	47	e 10 55	− 1	i 19 53	+ 3	—	—	—
Upsala		69·2	334	i 10 56a	− 2	—	—	—	—	—
Fresno		69·3	58	i 10 57a	− 2	e 20 0	+ 4	i 11 19	pP	—
Tinemaha		70·0	58	i 11 3a	0	e 20 11	+ 7	i 11 27	pP	—
Brisbane	Z.	70·2	173	i 11 7k	+ 3	—	—	—	—	—
Logan		70·9	50	e 11 4	− 4	e 20 14	− 1	e 11 23	pP	e 47·8
Salt Lake City		71·5	51	e 11 12	0	e 20 14	− 8	e 21 13	PS	e 34·1
Pasadena		71·9	59	i 11 14a	0	i 20 30	+ 4	i 11 34	pP	—
Bergen	Z.	72·2	341	11 14	− 2	—	—	—	—	—
Riverside		72·5	59	i 11 17a	− 1	i 11 50	sP	i 11 39	pP	—
Overton	Z.	72·7	56	e 11 20	+ 1	—	—	—	—	—
Boulder City		72·9	56	i 11 20	0	—	—	i 11 51	pP	—
Palomar		73·3	59	i 11 22a	− 1	i 20 15	−27	i 11 44	pP	—
Pierce Ferry		73·3	46	i 11 22	− 1	—	—	i 11 45	pP	—
Copenhagen		74·2	334	i 11 27	− 1	—	—	—	—	—
Ivigtut		75·9	7	i 11 38	0	—	—	11 58	pP	—
Riverview		76·0	173	i 11 43k	+ 5	e 21 22	+10	i 12 5	pP	—
Aberdeen	N.	76·8	342	i 11 37	− 6	—	—	—	—	—
Potsdam		76·8	333	e 11 47?	+ 4	—	—	—	—	—
Raciborzu		76·8	328	e 11 38?	− 5	—	—	e 12 14	pP	—
Collmberg		77·7	331	e 11 46	− 2	—	—	i 11 51	P	—
Bucharest	N.	77·8	320	e 11 52	+ 4	—	—	—	—	—
Tucson		77·8	57	i 11 49	+ 1	i 21 36	+ 5	i 12 9	pP	—
Prague		78·2	330	11 53	+ 3	—	—	e 12 16	pP	—
Budapest		78·5	326	e 11 39	−13	—	—	e 11 44	P	—
Jena		78·5	331	e 11 52	0	—	—	—	—	—
Ogyalla		78·5	327	e 11 54?	+ 2	—	—	—	—	—
Istanbul		78·8	316	e 11 57	+ 3	—	—	—	—	—
Kalossa		79·3	326	e 12 4	+ 8	—	—	e 12 24	pP	—
De Bilt		79·5	336	e 11 58	0	—	—	e 12 15	pP	—
Sofia		80·4	320	e 12 2	0	—	—	—	—	—
Zagreb		81·1	327	e 12 2	− 4	—	—	—	—	—
Rathfarnham Castle		81·3	343	e 12 2	− 5	—	—	e 12 23	pP	—
Stuttgart		81·3	332	i 12 5a	− 2	—	—	e 12 26	pP	—
Kew	Z.	81·6	339	i 12 9	0	—	—	i 12 21	PcP	—
Strasbourg		81·8	333	e 12 9a	− 1	—	—	i 12 30	pP	—
Triest		82·1	328	e 12 23	PcP	—	—	—	—	—
Zürich		82·6	332	e 12 13k	− 1	—	—	—	—	—
Basle		82·7	332	e 12 35	pP	—	—	—	—	—
Chur		82·7	330	e 12 14k	0	—	—	—	—	—
Paris		83·2	336	i 12 17	0	—	—	i 12 38	pP	—
Neuchâtel		83·4	332	e 12 17	− 1	—	—	—	—	—
Besançon		83·5	333	i 12 16	− 2	—	—	i 12 37	pP	—
Bologna		84·0	328	e 12 22	+ 1	—	—	—	—	—
Pavia		84·2	330	e 12 34?	+12	—	—	—	—	—
St. Louis		84·5	40	i 12 23	0	i 22 40	0	i 12 44	pP	—
Florence, Xim.		84·6	328	e 12 23	− 1	—	—	—	—	—
Prato		84·6	328	e 12 31	+ 7	—	—	—	—	—
Ottawa		84·9	28	12 23	− 2	22 37	[0]	—	—	—
Shawinigan Falls	N.	84·9	25	e 12 25	0	—	—	—	—	—
Seven Falls	E.	85·0	24	e 12 16	−10	—	—	—	—	—
Rome		85·7	326	e 12 28	− 1	—	—	e 12 46	pP	—
Clermont-Ferrand		85·8	334	i 12 32	+ 2	i 13 8	sP	i 12 52	pP	—
Cleveland		86·1	34	e 12 31	0	i 22 56	0	e 15 52	PP	—
Cincinnati		86·8	37	i 12 19	−16	i 22 52	[+ 3]	i 15 59	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Harvard		88·9	26	i 12 44	− 1	i 24 14	sS	i 13 5	pP	—
Weston		89·1	26	i 12 30	−16	—	—	i 14 29	?	—
City College, N.Y.		89·5	29	i 12 48	+ 1	—	—	i 13 10	pP	—
Tortosa	E.	91·0	333	13 1	+ 7	—	—	13 51	pP	—
Alicante		92·7	334	13 14	+12	—	—	—	—	—
Toledo		93·3	337	i 13 6	+ 1	—	—	—	—	—
Algiers Univ.	Z.	93·8	331	13 7	0	—	—	—	—	—
Tacubaya		94·3	59	i 13 53	sP	e 24 18	+ 8	e 20 56	?	—
San Juan		112·6	32	e 19 8	PP	e 26 32	S	—	—	—
Bogota		120·8	47	e 19 11	pPKP	—	—	—	—	—
Pretoria	Z.	126·7	267	i 18 55	[+ 3]	—	—	—	—	—
La Paz		141·2	57	e 19 23k	[+ 4]	i 32 55	PS	i 22 55	PP	66·5

Additional readings :—
College i =11m.23s.
Sitka e =10m.19s., ePPP? =11m.55s.
Victoria e =19m.42s.
Hungry Horse ePPP =14m.37s., eS_cS =20m.22s.
Mineral iZ =10m.45s.
Helsinki e =11m.0s. and 11m.18s.
Berkeley iZ =11m.33s., iEN =20m.37s., iN =21m.16s., and 27m.45s.
Fresno eSZ =20m.4s., eSSZ =24m.7s.
Tinemaha isPZ =11m.39s.
Logan esS =20m.44s., eSS =35m.3s.
Salt Lake City eSS =25m.7s.
Pasadena isPZ =11m.43s., ePPZ =13m.41s., eZ =13m.51s., iZ =14m.18s., iN =21m.11s.
Palomar isPZ =11m.54s.
Riverview eS_cSN =21m.49s., ePSN =22m.16s.
Raciborzu eEZ =13m.10s.
Tucson iP_cP =11m.59s., epS =22m.0s.
Prague ePPP? =12m.30s., e =12m.47s.
Stuttgart eZ =12m.9s., 12m.43s., and 13m.3s.
Strasbourg iP_cP =12m.14s., isP? =12m.39s., i =14m.41s., iPP =14m.58s.
Paris iP =12m.21s., iPP =15m.7s., e =15m.27s.
Besançon isP? =12m.55s., e =13m.10s., i =14m.24s.
Bologna e =13m.40s. and 19m.19s.?.
St. Louis eSS =28m.8s.
Cleveland iSKSN =22m.48s.
Cincinnati i =23m.23s., SS =34m.29s.
Harvard iPP =16m.11s., isPP? =17m.15s., i =22m.3s.
City College, N.Y. i =13m.25s.
San Juan e =23m.43s. and 24m.12s.
La Paz iSSN =40m.41s.

Aug. 17d. 18h. 44m. 13s. Epicentre 39°·5N. 40°·6E.

Destructive to the S.W. of Erzeroum, particularly at Agakeuy ; numerous houses destroyed at Cat, Bingol, Tercan, Karliova, and Kigi ; 320 dead (press report). Felt at Artvin, Varto, Mardin, Solhan, etc.

Suggested epicentres : 39°·5N. 40°·5E. (Strasbourg).
39°·5N. 40°·7E. (Istanbul).

A = +·5875, B = +·5035, C = +·6335 ; δ = −1 ; h = −1 ;
D = +·651, E = −·759 ; G = +·481, H = +·412, K = −·774.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m
Leninakan	2·8	63	0 52	P*	—	—	—	—	—
Erevan	3·1	76	0 53	+ 2	i 1 40	S_s	—	—	—
Tiflis	3·9	53	1 1	− 1	—	—	—	—	—
Sotchi	4·1	351	1 6?	+ 1	1 55?	0	—	—	—
Piatigorsk	4·9	21	i 0 56?	−21	e 2 10?	− 5	i 1 21	P	—
Grozny	5·4	45	1 27	+ 3	—	—	—	—	—
Theodosia	6·7	327	1 17	−25	i 2 11	−49	—	—	—
Ksara	6·8	215	i 1 39a	− 5	3 4	+ 1	—	—	—
Yalta	6·9	318	i 1 21	−24	i 2 59	− 6	1 1 43	P	—
Baku	7·2	80	i 3 56?	?	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Simferopol		7·2	321	1 21	−28	—	—	—	—	—
Istanbul		8·9	284	i 2 18	+ 6	i 5 9	S_e	—	—	—
Bucharest		11·9	299	2 58	+ 4	i 5 16	+ 7	—	—	—
Helwan		12·2	221	i 2 29	−29	5 20	+ 4	—	—	—
Sofia		13·4	289	i 3 16	+ 2	i 5 7	−38	—	—	i 6·7
Cernanti		13·7	315	—	—	e 5 15	−37	—	—	—
Ashkabad		14·0	91	3 19	− 3	—	—	—	—	—
Lwow		15·6	317	3 43	0	e 6 39?	+ 2	—	—	—
Belgrade		15·8	296	i 3 49k	+ 4	i 6 55	+13	—	—	—
Moscow		16·4	354	i 3 51	− 2	6 54	− 2	—	—	—
Kalossa		17·3	303	4 10	+ 6	7 56	+40	i 4 28	PPP	10·8
Skalnate Pleso		17·4	311	e 3 59	− 7	e 7 25	+ 6	—	—	—
Budapest	E.	17·5	305	i 4 6	− 1	i 7 41	+20	4 20	PP	10·8
	N.	17·5	305	i 4 7	0	7 35	+14	4 37	PPP	i 11·1
Taranto		17·9	281	4 11	− 1	—	—	—	—	—
Ogyalla		18·2	305	e 4 17	+ 1	e 7 53	+16	—	—	—
Raciborzu		19·0	312	i 4 26	0	e 8 13	SS	e 4 57	PPP	e 13·8
Zagreb		19·1	298	e 4 28	+ 1	i 7 59	+ 2	—	—	i 10·8
Messina		19·5	275	e 4 30a	− 1	e 8 17	+11	i 4 59	PPP	—
Catania		20·1	273	e 4 36	− 2	e 8 27	+ 8	—	—	e 11·8
Samarkand		20·3	82	i 4 44	+ 4	—	—	—	—	—
Triest		20·7	297	i 4 44a	0	i 8 40	+ 9	—	—	i 11·2
Prague		21·3	310	e 4 51	+ 1	i 8 49	+ 6	e 5 14	PP	e 10·8
Rome		21·4	286	i 4 49a	− 2	i 8 51	+ 6	i 5 13	PP	e 11·0
Sverdlovsk		21·8	30	i 4 53	− 3	i 8 52	0	—	—	—
Stalinabad		21·9	83	i 4 54	− 3	—	—	—	—	—
Tashkent		21·9	76	i 4 53?	− 4	—	—	—	—	—
Tchimkent		22·1	73	i 4 59?	0	8 58?	0	—	—	—
Bologna		22·3	294	e 5 1a	0	—	—	i 5 29	PP	e 12·3
Florence, Arc.		22·3	292	i 5 0a	− 1	i 9 9	+ 7	—	—	—
Florence, Xim.		22·3	292	e 4 53	− 8	i 9 7	+ 5	—	—	—
Prato		22·4	292	i 5 1	− 1	i 9 13	+ 9	—	—	—
Cheb		22·5	308	i 5 7?	+ 5	e 9 13?	+ 8	—	—	—
Collmberg		22·6	310	e 5 3	0	e 9 10	+ 3	i 5 28	PP	e 11·8
Obi-garm		22·6	83	i 5 1	− 2	—	—	—	—	—
Helsinki		22·9	340	i 5 5a	− 1	i 9 15	+ 2	—	—	e 10·8
Potsdam		22·9	314	i 5 6	0	i 9 22	+ 9	i 5 46	PPP	i 12·1
Jena		23·3	308	e 5 9	− 1	i 9 23	+ 3	i 5 40	PP	e 11·3
Chur		23·7	299	e 5 14	0	e 9 30	+ 3	—	—	—
Pavia		23·8	295	e 5 15a	0	—	—	—	—	—
Ravensburg		23·8	300	e 5 15	0	e 9 32	+ 4	—	—	—
Stuttgart		24·2	304	i 5 19	0	i 9 43	+ 8	e 6 8	PPP	e 11·3
Andijan		24·3	77	5 19	− 1	—	—	—	—	—
Lund		24·4	322	i 5 22	+ 1	i 9 42	+ 3	—	—	—
Zürich		24·4	300	e 5 19a	− 2	e 9 52	+13	—	—	—
Copenhagen		24·7	321	i 5 26	+ 2	i 9 49	+ 5	—	—	13·8
Upsala		25·0	332	e 5 27k	0	i 9 52	+ 3	i 6 6	PP	e 13·8
Basle		25·1	300	e 5 30	+ 2	—	—	—	—	—
Strasbourg		25·1	303	i 5 28	0	i 10 4	+13	i 6 7	PP	i 13·8
Neuchâtel		25·5	299	e 5 29	− 3	e 9 58	+ 1	—	—	—
Frunse		25·7	72	e 5 34	+ 1	—	—	—	—	—
Besançon		26·2	300	i 5 36	− 2	i 10 13	+ 4	—	—	—
Heerlen		26·7	309	e 5 49	+ 6	—	—	—	—	—
De Bilt		27·4	310	i 5 49k	0	i 10 36	+ 8	i 9 5	P_eP	e 12·3
Clermont-Ferrand		28·1	295	e 5 56	+ 1	i 11 31	SS	i 6 46	PP	—
Paris		28·6	302	e 5 59	− 1	i 10 45	− 3	i 6 47	PP	e 14·8
Barcelona		29·2	288	6 8	+ 3	11 4	+ 6	—	—	e 14·2
Algiers Univ.	z.	29·5	277	e 6 3	− 5	e 10 51	−11	e 6 58	PP	—
Semipalatinsk		29·8	55	—	—	e 11 13	+ 6	—	—	—
Bergen		30·3	327	i 6 13	− 2	i 11 19	+ 4	7 15	PP	i 14·9

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tortosa		30·5	286	i 6 16	− 1	11 18	0	7 13	PP	13·8
Kew		30·7	308	i 6 18	− 1	i 11 19	− 2	e 12 38	SS	e 18·8
Alicante		31·8	282	i 6 26	− 2	i 11 42	+ 4	6 40	pP	—
Dehra Dun	N.	31·9	95	e 6 1	−28	e 11 59	+19	e 15 34	Q	e 18·4
Durham		31·9	313	i 6 32	+ 3	i 11 42	+ 2	7 40	PP	—
New Delhi	N.	32·0	99	i 6 31	+ 1	i 11 39	− 3	i 13 31	SS	14·8
Aberdeen		32·8	318	i 6 34	− 3	i 11 52	− 2	i 7 46	PP	19·2
Edinburgh	E.	33·1	315	6 37	− 3	11 42	−17	7 54	PP	—
Almeria		33·7	281	i 6 45	0	i 12 5	− 3	8 15	PPP	17·8
Toledo		34·1	286	i 6 46	− 2	—	—	—	—	—
Granada		34·5	282	i 6 53k	+ 1	i 12 11	− 9	7 45	PP	i 16·1
Rathfarnham Castle		34·5	310	i 6 53	+ 1	i 12 15	− 5	—	—	—
Bombay		34·6	118	e 6 55	+ 2	i 12 21	− 1	8 8	PP	18·2
Malaga		35·3	282	i 7 9	+10	i 12 33	0	i 7 23	pP	15·2
Poona		35·5	117	6 58	− 2	12 36	0	i 8 29	PP	17·0
Lisbon		38·2	286	7 21a	− 2	13 18	+ 1	8 43	PP	—
Hyderabad	N.	39·5	113	e 7 27	− 7	i 13 36	− 1	9 4	PP	19·0
Reykjavik		43·4	326	e 8 8	+ 2	e 14 42	+ 7	e 9 53	PP	e 23·0
Calcutta	E.	43·7	99	i 8 12	+ 4	i 14 44	+ 5	i 17 53	SS	20·9
Kodaikanal	E.	43·9	122	i 8 7	− 3	i 14 34	− 8	17 38	SS	20·0
Scoresby Sund		44·2	335	i 8 14	+ 2	14 52	+ 6	9 57	PP	—
Irkutsk		44·7	52	—	—	14 49	− 5	—	—	—
Colombo	E.	47·9	23	8 39	− 3	19 4	SS	—	—	30·6
Ivigtut		55·8	324	e 9 39	− 2	17 28	0	—	—	—
Tananarive		58·5	173	10 2	+ 2	e 18 2	− 1	18 6	PS	26·5
Pretoria	Z.	65·9	192	i 10 47	− 3	—	—	—	—	e 37·0
Hamada		69·8	62	—	—	e 21 41	?	—	—	—
Hirosima		70·4	63	—	—	e 25 40	SS	—	—	—
Miyazaki		71·1	65	—	—	e 24 0	?	—	—	—
Koti		71·6	63	e 17 46	PP	—	—	—	—	36·0
Halifax		72·1	314	11 32	+ 4	20 52	+ 2	25 26	SS	32·8
Nagano		72·9	57	11 34	+ 1	—	—	—	—	34·5
Nagoya		73·0	58	e 11 16	−17	—	—	—	—	e 38·1
Grahamstown	Z.	73·6	192	i 11 26	−11	—	—	—	—	e 39·8
Hunatu		73·9	57	11 41	+ 2	—	—	—	—	39·8
Shizuoka		74·0	59	e 10 54	−45	20 33	−38	25 25	SS	e 38·2
Seven Falls	E.	74·3	319	11 41	0	21 15	0	26 53	SS	36·8
College		75·6	5	i 11 49	+ 1	—	—	i 14 36	PP	—
Shawinigan Falls	N.	75·7	319	e 11 48	− 1	—	—	—	—	—
Batavia		76·0	110	e 11 47	− 4	e 21 37	+ 3	—	—	—
Harvard		77·8	315	i 12 1	0	e 21 55	+ 2	e 33 32	Q	e 39·4
Weston		77·8	315	e 9 46	?	—	—	19 39	?	—
Ottawa		78·0	320	12 5	+ 3	21 57	+ 2	e 22 33	PS	34·8
Fordham		80·2	315	i 12 26	+12	i 22 32	+13	—	—	—
City College, N.Y.		80·3	315	i 12 16	+ 2	e 22 22	+ 2	i 15 19	PP	—
Bermuda		80·5	304	e 12 28	+13	e 22 36	+14	e 28 17	SS	e 33·4
Philadelphia		81·6	316	e 12 11	−10	e 22 31	− 2	e 15 32	PP	e 34·8
Pennsylvania		82·4	318	i 12 25	0	i 22 42	+ 1	—	—	—
Sitka		83·2	358	e 12 34	+ 5	i 22 57	+ 8	i 23 34	PS	e 34·2
Georgetown		83·3	316	i 12 34	+ 4	e 22 49	− 1	—	—	—
New Kensington	E.	83·5	319	e 13 9	+38	e 22 53	+ 1	e 24 11	PPS	e 43·2
Cleveland		83·7	320	i 12 34	+ 2	i 22 56	+ 2	e 15 48	PP	42·3
Saskatoon		84·4	341	—	—	23 7	+ 6	24 45	PPS	44·2
Chicago		86·4	324	e 12 30	−15	e 23 8	[− 2]	e 16 32	PP	e 35·8
Columbia		89·1	315	e 12 59	+ 1	e 23 27	[0]	e 29 30	SS	e 37·9
Fort de France		89·6	288	e 13 55	+54	e 24 47	PS	—	—	—
Hungry Horse		89·7	344	i 13 0	− 1	e 23 58	+ 6	e 29 12	SS	—
St. Louis		90·1	324	i 13 2	− 1	i 23 49	− 6	i 16 40	PP	—
Roosevelt Roads		90·5	294	e 12 36	−29	—	—	—	—	—
San Juan		90·7	295	e 13 11	+ 5	e 23 37	[0]	e 17 33	PP	e 40·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lincoln	E.	91·1	329	e 16 34	PP	e 23 34	[− 5]	—	—	e 36·9
Victoria		91·2	350	i 13 11a	+ 3	i 23 43	[+ 3]	25 18	PS	45·4
Bozeman		91·5	340	e 13 59	+49	e 23 57	{+ 4}	e 25 25	PS	e 43·6
Butte	N.	91·5	342	e 14 24	?	e 23 53	{ 0}	e 25 8	PS	e 46·2
Pensacola		95·1	318	i 13 25	− 1	e 27 37	?	e 22 45	?	—
Logan		95·3	340	e 13 21	− 6	—	—	e 11 1	?	—
Guantanamo Bay		95·8	301	e 13 41	+12	—	—	—	—	—
Shasta Dam		98·7	347	e 13 35	− 7	—	—	e 17 43	PP	—
Mineral	Z.	98·9	346	e 17 45	PP	e 26 35	PS	i 17 54	?	—
Reno		99·3	344	e 17 48	PP	e 25 26	+12	e 26 51	PS	e 54·7
Lubbock		99·4	329	12 20	−86	—	—	—	—	—
Overton	Z.	100·9	340	i 13 57	+ 5	—	—	—	—	—
Pierce Ferry		101·2	339	i 13 57	+ 3	e 21 56	PKS	i 18 4	PP	—
Berkeley		101·4	346	i 22 28	PKS	e 32 38	SS	—	—	e 52·5
Tinemaha		101·4	343	e 14 0	+ 5	—	—	—	—	—
Boulder City		101·6	340	i 14 0	+ 4	—	—	e 18 3	PP	—
Lick		101·8	346	e 18 10	PP	—	—	—	—	e 58·7
Santa Clara		101·9	346	e 18 9	PP	e 24 44	[+ 8]	e 27 15	PS	e 52·5
Fresno		102·0	344	i 17 59	PP	e 25 23	−14	—	—	e 57·2
Tucson		103·9	335	e 14 10	+ 4	e 24 56	[+10]	e 27 28	PS	e 47·6
Pasadena	Z.	104·1	341	e 14 34	+27	e 24 48	[+ 2]	i 18 26	PP	e 42·7
Palomar		104·6	340	e 14 2	− 7	—	—	i 18 30	PP	—
Bogota		105·7	290	—	—	e 24 55	[+ 1]	e 25 56	S	—
Tacubaya		110·4	319	i 17 52	?	e 29 21	PS	i 19 16	PP	68·6
La Paz		114·7	269	i 19 43	PP	i 25 33	[+ 2]	e 29 27	PS	53·8
Honolulu		117·1	19	—	—	e 37 2	SSP	42 25	Q	e 48·2
Huancayo		117·6	277	e 20 3	PP	e 25 47	[+ 5]	e 29 49	PS	e 47·5
Riverview		125·3	108	e 21 57	?	e 32 17	PPS	e 38 1	SS	e 58·1

Additional readings :—
Yalta iS = 2m.37s.
Bucharest iN = 4m.55s., iS*N = 6m.1s., iS_gN = 6m.34s.
Helwan PPPZ = 2m.49s., iEN = 2m.53s.
Belgrade i = 4m.24s. and 4m.44s.
Kalossa eE = +4m.45s., iN = 4m.53s., iE = 5m.5s., iN = 5m.16s., iE = 5m.22s.
Budapest PPPE = 4m.34s., eN = 7m.24s., SSN = 7m.57s., iSSE = 8m.0s., SSSN = 8m.7s., SSSE = 8m.20s., P_cPN = 8m.31s.
Raciborzu eEN = 5m.59s., eN = 6m.15s., eEN = 7m.9s., e = 11m.25s., eN = 11m.36s.?
Prague ePPP = 5m.29s., e = 5m.59s., eSS = 9m.19s.
Rome iSS = 9m.46s.
Bologna e = 5m.22s., i = 7m.45s.
Collmberg iEZ = 5m.9s., iZ = 5m.24s. and 6m.2s., iN = 9m.15s., iE = 10m.16s.
Potsdam iE = 5m.50s., iN = 6m.48s.
Jena iPNZ = 5m.14s., iN = 5m.34s., iPPZ = 5m.37s., iPPPN = 6m.1s., $iP_cP?N$ = 8m.42s., iSNZ = 9m.27s., iSN = 9m.30s., iN = 9m.56s., iSSN = 10m.27s.
Upsala iN = 6m.26s., 6m.46s., 7m.33s., and 10m.23s.
Strasbourg iPP = 5m.37s. and 6m.10s., iPPP = 6m.28s., iP_cP = 8m.28s., iS = 10m.7s., iSS = 11m.25s., iSSS = 11m.37s. and other unidentified i readings.
De Bilt iPP = 6m.43s.
Clermont-Ferrand iP = 6m.6s., iPPP = 7m.13s., i = 7m.56s., 8m.38s., and 11m.8s.
Paris i = 6m.4s. and 6m.28s., iPPP = 7m.6s., i = 7m.45s. and 9m.47s., e = 10m.27s., i = 11m.13s., iSS = 12m.15s., i = 12m.55s.
Algiers Univ. ePPPZ = 7m.12s., eZ = 7m.32s., eP_cPZ = 9m.6s.
Bergen eZ = 7m.52s.?, SN = 9m.52s.?, SSN = 12m.21s., P_cS = 13m.10s.
Tortosa PPPEN = 7m.25s., $P_cP?E$ = 9m.11s., $P_cS?E$ = 12m.51s., SS?N = 13m.5s., SSS?N = 13m.28s.
Kew e = 13m.45s. and 14m.54s.
Alicante PP = 7m.36s., PPP = 7m.54s., P_cS = 12m.36s., SS = 13m.32s., SSS = 14m.20s.
Durham iN = 8m.35s., EN = 9m.42s., iSEN = 11m.52s., iN = 13m.1s., iEN = 13m.11s., iSSE = 13m.58s.
New Delhi PPN = 6m.37s., PPPN = 7m.1s.
Aberdeen iE = 8m.54s., iSSSEN = 14m.4s., iEN = 16m.15s.
Almeria PP = 7m.55s., P_cP = 9m.27s., P_cS = 13m.9s., S_cS = 17m.11s.
Granada PPP = 8m.20s., P_cP = 9m.32s., iSS = 14m.26s.
Bombay eSSEN = 14m.44s.
Malaga PP = 8m.29s., P_cP = 9m.27s., S_cP = 12m.57s.
Poona PPPEN = 8m.52s., $P_cP?EN$ = 9m.25s., P_cSEN = 13m.17s., SSEN = 15m.20s., SSSEN = 15m.47s.
Lisbon PPEN = 8m.53s., N? = 15m.17s., eZ = 15m.51s.
Hyderabad iN = 7m.31s., SSN = 16m.31s.

Continued on next page.

Reykjavik eE =8m.12s., ePcP?E =9m.46s., eN =14m.13s., eE =16m.15s., eSSEN = 17m.58s.
Kodaikanal PPE =8m.53s.
Scoresby Sund 17m.53s. and 18m.23s.
Tananarive ScS =19m.48s., SS =21m.53s., SSS =24m.31s.
Halifax SSS =28m.52s.
City College, N.Y. ePPS? =23m.34s., e =35m.19s.
Philadelphia e =13m.30s., eSS =27m.54s., e =32m.6s.
Sitka e =16m.11s., i =24m.56s., eSS =28m.19s.
New Kensington eE =18m.31s.
Cleveland iPEN =12m.37s., iPPN =15m.51s., iSKKSE =23m.27s., eE =25m.20s., eSSN =29m.0s.
Chicago ePPS =24m.42s., e =27m.55s., 28m.49s., and 29m.51s.
Hungry Horse e =22m.59s. and 29m.29s., ePKP,PKP? =38m.30s.
St. Louis iPS =25m.7s., iPPS =25m.25s., iSS? =29m.34s.
Victoria SS =30m.30s.
Bozeman ePPS =25m.52s., e =31m.4s.
Butte eSS?N =30m.40s.
Logan i =11m.22s., e =17m.13s.
Shasta Dam e =13m.39s. and 14m.12s.
Reno eN =17m.51s.
Berkeley iN =26m.23s. and 32m.36s., iZ =43m.47s.
Boulder City i =18m.10s.
Santa Clara eN =26m.30s., 32m.35s., and 40m.17s.
Fresno eE =18m.10s., eN =18m.14s., eSKSE =25m.20s.
Tucson e =17m.1s., eS =25m.57s., eSSS =37m.11s.
Pasadena ePKPZ =18m.10s., eSKKSZ =25m.39s., ePSZ =27m.31s., ePPSZ =28m.47s., eSSZ =33m.5s.
Palomar iZ =14m.14s. and 14m.29s., eZ =17m.11s.
Tacubaya e =23m.34s.
La Paz iSSN =35m.39s., Q =45m.5s.
Huancayo e =20m.37s. and 23m.21s., eS? =27m.57s., eSS =35m.43s., eSSS =40m.27s., e =43m.49s.
Riverview eE =28m.39s. and 33m.51s., eN =40m.4s., eE =40m.59s., eN =41m.38s., eE =45m.48s., eQN =52m.11s.
Long waves were also recorded at Seattle, Santa Lucia, Auckland, Wellington, and at other Japanese stations.

Aug. 17d. 20h. 38m. 7s. Epicentre 39°·5N. 40°·6E. (as at 18h. 44m.).

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Leninakan		2·8	63	1 2	P_g	e 2 14	+52
Erevan		3·1	76	0 56	+ 5	—	—
Sotchi		4·1	351	e 1 3	− 2	—	—
Grozny		5·4	45	1 52	P_g	—	—
Ksara		6·8	215	e 2 9	P_g	e 3 36	S_g
Yalta		6·9	318	e 1 53	+ 8	—	—
Baku		7·2	80	e 2 36?	P_g	—	—
Istanbul		8·9	284	2 14	+ 2	4 57	S_g
Collmberg	z.	22·6	310	e 4 57	− 6	—	—
Stuttgart	z.	24·2	304	e 5 15	− 4	—	—

Aug. 17d. 20h. 45m. 25s. Epicentre 39°·5N. 40°·6E. (as at 20h. 38m.).

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Leninakan	2·8	63	0 48	+ 1	i 1 46	S_g	—	—	—
Erevan	3·1	76	0 54	+ 3	—	—	—	—	—
Tiflis	3·9	53	1 1	− 1	—	—	i 1 21	P_g	—
Sotchi	4·1	351	e 1 3	− 2	—	—	—	—	—
Piatigorsk	4·9	21	1 15	− 2	—	—	—	—	—
Grozny	5·4	45	1 32	P*	—	—	—	—	—
Theodosia	6·7	327	i 1 46	+ 4	i 3 6	+ 6	—	—	—
Ksara	6·8	215	i 1 47	+ 3	3 12	+ 9	—	—	—
Yalta	6·9	318	1 46	+ 1	3 7	+ 2	—	—	—
Baku	7·2	80	e 1 52	+ 3	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Simferopol		7·2	321	1 59?	+10	3 0?	−13	—	—	—
Istanbul		8·9	284	e 2 14	+ 2	e 4 54	S_g	—	—	—
Bucharest	N.	11·9	299	e 3 59	?	—	—	—	—	—
Helwan		12·2	221	e 2 55	− 3	e 5 53	SSS	3 15	PPP	—
Lwow		15·6	317	e 3 48	+ 5	e 6 42?	+ 5	—	—	—
Belgrade		15·8	296	e 3 40a	− 5	e 6 55	+13	e 4 22	?	e 8·2
Moscow		16·4	354	i 3 49	− 4	6 55	− 1	—	—	—
Kalossa		17·3	303	e 4 7	+ 3	e 7 50	SSS	e 4 10	PP	—
Skalnate Pleso		17·4	311	e 4 0	− 6	e 7 30	+11	—	—	—
Budapest	E.	17·5	305	4 8	+ 1	7 32	+11	e 4 51	PPP	e 11·6
	N.	17·5	305	4 12	+ 5	7 32	+11	e 4 55	PPP	—
Ogyalla		18·2	305	e 4 17	+ 1	e 7 49	+12	—	—	—
Raciborzu		19·0	312	e 4 24?	− 2	e 8 24?	SS	e 4 56	PPP	e 10·8
Zagreb		19·1	298	e 4 25	− 2	e 7 41	−16	—	—	e 11·7
Samarkand		20·3	82	e 4 43	+ 3	—	—	—	—	—
Triest		20·7	297	i 4 44	0	i 8 41	+10	—	—	—
Prague		21·3	310	e 4 49	− 1	8 50	+ 7	—	—	—
Rome		21·4	286	e 4 46	− 5	e 8 51	+ 6	—	—	e 10·6
Sverdlovsk		21·8	30	i 4 52	− 4	8 53	+ 1	—	—	—
Stalinabad		21·9	83	i 4 56	− 1	i 8 58	+ 4	—	—	—
Bologna		22·3	294	e 5 9	+ 8	—	—	—	—	e 12·1
Florence, Arc.		22·3	292	e 4 56	− 5	e 9 13	+11	e 5 18	PP	—
Florence, Xim		22·3	292	e 4 45	−16	e 8 59	− 3	—	—	—
Prato		22·4	292	e 5 1	− 1	e 9 1	− 3	—	—	—
Cheb		22·5	308	e 5 1	− 1	i 9 27	+22	—	—	—
Collmberg		22·6	310	e 5 0	− 3	e 9 19	+12	e 5 20	PP	—
Obi-garm		22·6	83	i 4 59	− 4	—	—	—	—	—
Potsdam	N.	22·9	314	e 5 12	+ 6	—	—	—	—	—
Jena		23·3	308	e 5 8	− 2	—	—	e 5 57	PPP	—
Chur		23·7	299	e 5 12	− 2	e 9 33	+ 6	—	—	—
Pavia		23·8	295	e 5 19?	+ 4	—	—	—	—	—
Stuttgart		24·2	304	e 5 17	− 2	e 9 40	+ 5	—	—	e 13·6
Zürich		24·4	300	e 5 18a	− 3	e 9 41	+ 2	—	—	—
Copenhagen		24·7	321	—	—	e 9 31	−13	—	—	12·6
Upsala		25·0	332	e 5 38?	+11	e 9 54	+ 5	6 19	PPP	e 14·6
Basle		25·1	300	e 5 24	− 4	e 9 35	−16	—	—	—
Strasbourg		25·1	303	e 5 24	− 4	i 10 5	+14	i 6 14	PPP	e 14·0
Neuchâtel		25·5	299	e 5 33	+ 1	—	—	—	—	—
Frunse		25·7	72	e 5 35	+ 2	—	—	—	—	—
Murgab		25·9	82	e 6 36	+61	—	—	—	—	—
Besançon		26·2	300	e 5 33	− 5	—	—	e 6 13	PP	—
De Bilt		27·4	310	e 6 7	+18	—	—	—	—	e 12·1
Clermont-Ferrand		28·1	295	e 5 41	−14	—	—	—	—	—
Tortosa	E.	30·5	286	8 5	?	12 0	+42	13 46	SSS	—
Alicante		31·8	282	5 26	−62	11 42	+ 4	—	—	—
Granada		34·5	282	i 7 22k	+30	—	—	—	—	—
Pretoria	Z.	65·9	192	i 10 46	− 4	—	—	—	—	—
College		75·6	5	i 11 46	− 2	—	—	—	—	—
Hungry Horse		89·7	344	e 12 57	− 4	—	—	—	—	—
Shasta Dam		98·7	347	e 13 42	0	—	—	—	—	—
Pierce Ferry		101·2	339	i 13 32	−22	—	—	—	—	—

Additional readings :—
Helwan eZ = 3m.5s.
Budapest eN = 6m.27s., eE = 7m.55s.
Raciborzu eEN = 8m.38s.
Upsala eSE = 10m.0s., eSS = 11m.22s.
Strasbourg e = 6m.38s., iSS = 11m.21s., iSSS = 11m.43s. and 11m.55s.
Besançon e = 6m.1s., 6m.45s., and 6m.57s.
Long waves were also recorded at Bergen.

Aug. 17d. Continuation of list of after-shocks from the epicentre of the Turkestan earthquake on July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	16	20	5	30	21	8	8	15	14	10	49
4	58	34	6	9	10	11	9	2	22	17	0

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	14	32	3	24	50	4	58	49	11	9	9
3	16	34	4	39	53						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	14	41	4	59	2	11	9	19

Murgab.

h.	m.	s.	h.	m.	s.
4	59	19	11	9	34

Tashkent.

h.	m.	s.	h.	m.	s.
4	59	2	11	9	23

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	14	56	4	59	12?	11	9	32

Frunse.

h.	m.	s.
11	11	18

Aug. 17d. Readings also at 0h. (near Berkeley (2), Lick (2), and Branner (2)), 1h. (Boulder City, Hungry Horse, Shasta Dam, Tucson (2), Bogota, and La Paz), 2h. (Rome and Shasta Dam), 3h. (College, Hungry Horse (2), Shasta Dam, Boulder City, Overton, Pierce Ferry, Tucson, Mount Wilson, Riverside, China Lake, Tinemaha, Lick, Mineral, near Seattle, and near Obi-garm), 4h. (Shasta Dam, Boulder City, Overton, Pierce Ferry, and Tucson), 5h. (Copiapo, Tucson, near Boulder City, and Pierce Ferry), 6h. (near Belgrade), 7h. (Copiapo, College, Overton, Tucson, Obi-garm (2), Stalinabad (2), Tashkent, Tchimkent, Samarkand, near Almata, Frunse, Murgab (2), and Andijan (2)), 8h. (Tucson and Santa Lucia), 11h. (near Yalta, Simferopol, and Theodosia), 12h. (near Erevan), 16h. (College and Pierce Ferry), 17h. (College and Hungry Horse), 19h. (Erevan, Sotchi, and near Leninakan), 20h. (Christchurch), 21h. (Tashkent and Pretoria), 23h. (Ksara).

Aug. 18d. 7h. 17m. 46s. Epicentre 41°·9N. 20°·9E.

Intensity IV at Gradac at the epicentre, Gorjane and Zirovnika.

M. D. Uzelac.
Annuaire microséismique et macroséismique de l'Institut séismologique de Belgrade, 1949, Nouvelle Série No. 9, Belgrade, 1950, p. 65. Epicentre as adopted. Macroseismic radius 18km.

$A = +\cdot6974$, $B = +\cdot2663$, $C = +\cdot6653$; $\delta = -9$; $h = -2$;
$D = +\cdot357$, $E = -\cdot934$; $G = +\cdot622$, $H = +\cdot237$, $K = -\cdot747$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		2·9	354	e 0 52a	+ 4	i 1 31	S*	1 0	P_g	—
Taranto		3·1	242	e 0 50	− 1	e 1 20	− 9	e 1 49	S_g	—
Zagreb		5·3	319	e 1 29	P*	—	—	—	—	e 2·8
Triest		6·4	308	e 2 11	P_g	i 2 41	−12	i 3 25	S_g	—
Bologna		7·4	294	—	—	e 3 3	−15	—	—	—
Stuttgart		10·7	314	e 2 29	− 9	—	—	e 2 52	PP	e 5·8
Collmberg	z.	10·8	333	—	—	e 4 35	− 7	—	—	—
Strasbourg		11·4	310	—	—	e 4 50	− 6	—	—	—
Besançon		11·9	302	—	—	e 5 2	− 7	—	—	—

Additional readings :—
Belgrade P_gS_g = 1m.38s.
Bologna e = 6m.59s.
Strasbourg e = 4m.56s. and 5m.10s., i = 6m.0s., e = 6m.20s. and 6m.34s.
Besançon e = 6m.8s., 6m.22s., and 6m.36s.
Long waves were also recorded at Rome.

Aug. 18d. 9h. 58m. 12s. Epicentre 29°·8N. 139°·0E. Depth of focus 0·060.
(as on 1948, Nov. 15d.).

A = −·6560, B = +·5702, C = +·4945; δ = −1; h = +2;
D = +·656, E = +·755; G = −·373, H = +·324, K = −·869.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Nagoya		5·6	343	e 1 30	0	i 2 36	− 4	—	—	—
Osaka		5·6	332	e 1 30	0	2 25	−15	—	—	—
Tokyo		5·9	6	e 1 31a	− 2	2 38	− 8	—	—	—
Hukuoka		8·3	299	2 8k	+ 8	3 28	− 6	—	—	—
Sendai		8·6	10	e 2 2	− 1	3 30	−10	—	—	—
Mizusawa	E.	9·5	10	2 13	0	3 49	−10	—	—	—
Irkutsk		34·0	322	e 6 4?	− 4	10 53?	−11	—	—	—
Almata		50·6	304	i 8 17	− 4	—	—	—	—	—
Andijan		54·3	301	8 45	− 3	15 46	− 6	—	—	—
College		56·3	29	i 9 2	0	—	—	—	—	—
Tashkent		56·5	303	i 9 2	− 1	i 16 15	− 6	—	—	—
Obi-garm		56·8	299	i 9 1	− 4	e 16 16	− 9	—	—	—
Stalinabad		57·5	300	i 9 8	− 2	16 26	− 8	—	—	—
Sverdlovsk		59·4	322	—	—	16 48	−10	—	—	—
Victoria	z.	73·0	44	i 10 50a	+ 2	—	—	—	—	—
Seattle	z.	74·0	44	e 10 57a	+ 4	—	—	e 12 13	pP	—
Shasta Dam		77·2	50	i 11 14?	+ 3	—	—	i 12 50?	pP	—
Mineral	z.	77·7	51	i 11 18a	+ 3	—	—	i 11 31	PcP	—
Hungry Horse		78·5	41	i 11 21	+ 3	—	—	—	—	—
Berkeley	z.	78·6	53	i 11 22a	+ 4	—	—	i 12 59	pP	—
Branner		78·9	53	i 11 24a	+ 4	—	—	—	—	—
Scoresby Sund		79·1	354	—	—	20 43	− 2	—	—	—
Lick	z.	79·3	53	i 11 26a	+ 4	—	—	11 30	PcP	—
Reno		79·5	51	i 11 28	+ 5	—	—	e 11 40	PcP	—
Fresno	z.	80·9	53	i 11 34a	+ 3	—	—	—	—	—
Tinemaha		81·7	53	i 11 39a	+ 4	—	—	e 13 17	pP	—
China Lake	z.	82·9	53	i 11 44a	+ 3	—	—	e 13 22	pP	—
Pasadena		83·3	55	i 11 46a	+ 3	—	—	e 13 22	pP	—
Logan		83·4	45	i 11 38	− 5	—	—	—	—	—
Riverside		84·0	55	i 11 49a	+ 3	—	—	—	—	—
Overton	z.	84·6	51	i 11 54	+ 5	—	—	e 15 16	PP	—
Boulder City		84·7	52	i 11 53	+ 3	—	—	i 12 15	PcP	—
Palomar		84·7	55	i 11 54a	+ 4	—	—	e 13 23	pP	—
Pierce Ferry		85·2	51	i 11 56	+ 4	—	—	i 15 20	PP	—
Collmberg	z.	86·3	329	e 11 52?	− 5	—	—	e 13 38	pP	—
Tucson		89·5	53	i 12 17	+ 5	—	—	e 15 54	PP	—
Stuttgart	z.	89·8	330	e 12 13	− 1	—	—	—	—	—

Additional readings:—
Irkutsk e = 4m.14s.?, and 13m.11s.
Shasta Dam i = 11m.19s.
Palomar iZ = 12m.1s., iNZ = 12m.8s., iZ = 12m.17s.
Pierce Ferry isP = 13m.32s.
Collmberg eZ = 11m.56s.

Aug. 18d. 13h. 33m. 24s. Epicentre 8°·4N. 82°·7W. (as on 1945, June 3d.).

A = +·1257, B = −·9814, C = +·1451; δ = 0; h = +7;
D = −·992, E = −·127; G = +·018, H = −·144, K = −·989;

		Δ	Az.	P.	O−C	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Balboa Heights		3·1	79	e 0 52	+ 1	e 1 43	S_g	—	—	—
Galerazamba		7·7	72	i 2 10	P*	i 3 40	+15	i 2 32	P_g	—
Bogota	z.	9·4	113	i 2 24	+ 6	e 4 13	+ 6	—	—	—
Guantanamo Bay		13·6	32	i 3 22	+ 5	—	—	—	—	—
Vera Cruz		16·9	311	e 4 4	+ 5	—	—	—	—	e 9·0
Miami		17·6	7	i 4 13	+ 5	—	—	—	—	—
San Juan		18·9	57	i 4 25	+ 1	i 8 0	+ 7	i 8 36	SSS	e 9·4
Roosevelt Roads		19·2	58	i 4 29	+ 1	—	—	e 4 33	P	e 9·0
Tacubaya		19·4	307	4 32	+ 2	i 8 20	SS	—	—	—
Huancayo		21·6	161	i 4 56	+ 2	e 8 52	+ 3	i 5 26	PP	i 9·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		22·0	73	i 4 59	+ 1	e 9 9	+13	—	—	—
Columbia		25·5	4	e 5 30	− 2	e 9 54	− 3	—	—	e 11·6
La Paz		28·6	150	e 6 0	0	i 10 31	−17	i 11 52	SS	13·8
Bermuda		29·1	33	e 6 11	+ 7	e 10 56	0	—	—	e 13·4
Cincinnati		30·6	358	i 6 15	− 3	i 11 33	+13	i 7 23	PP	—
Georgetown		30·8	10	i 6 18	− 2	i 11 23	0	—	—	—
St. Louis		30·9	349	e 6 16	− 4	i 11 22	− 2	i 7 26	PP	—
New Kensington	E.	32·1	5	e 7 16	+45	e 11 29	−14	—	—	e 14·4
Philadelphia		32·1	14	e 11 20	?	e 11 46	+ 3	(e 13 19)	PeS	e 13·3
Cleveland		33·0	2	i 6 37	− 2	i 11 56	− 1	e 7 52	PP	15·1
City College, N.Y.		33·2	13	e 6 41	+ 1	e 12 8	+ 8	e 7 57	PP	e 14·4
Fordham		33·3	13	e 6 42	+ 1	e 12 5	+ 3	—	—	—
Chicago		33·5	353	e 6 45	+ 2	e 12 5	0	e 7 57	PP	e 15·2
Tucson		35·3	316	i 6 57	− 2	e 12 29	− 4	i 9 29	PeP	e 15·4
Weston		35·3	15	e 4 35	−144	10 12	−141	i 6 2	?	—
Harvard		35·4	15	i 6 58	− 2	e 12 33	− 1	e 14 36?	SS	e 16·6
Ottawa		37·4	8	e 7 15	− 1	13 6	+ 1	—	—	—
Pierce Ferry		39·7	319	e 7 33	− 3	—	—	i 9 41	PeP	—
Seven Falls	E.	39·9	13	9 22	PP	e 13 43	0	16 46	SS	20·6
Boulder City		40·1	318	e 7 37	− 2	—	—	i 7 40	P	—
Palomar		40·1	314	i 7 38a	− 1	—	—	—	—	—
Overton	Z.	40·2	319	e 7 38	− 2	—	—	—	—	—
Riverside		40·8	314	i 7 44	− 1	—	—	i 9 45	PPP	—
Pasadena		41·5	314	i 7 49a	− 1	e 14 5	− 2	e 13 37	PeS	e 18·4
China Lake	Z.	41·9	317	i 7 51	− 3	—	—	i 9 48	PeP	—
Logan		42·0	328	e 7 49	− 5	e 14 3	−11	e 9 40	PP	e 17·5
Tinemaha		43·1	317	i 8 3	− 1	—	—	i 9 53	PeP	—
Fresno		43·9	316	i 8 7a	− 3	—	—	e 8 10	P	—
Bozeman		44·4	332	—	—	i 14 48	− 1	—	—	e 23·9
Reno		45·4	319	e 8 23	+ 1	—	—	i 9 27	?	—
Lick	Z.	45·5	316	i 8 21a	− 2	—	—	—	—	—
Santa Clara		45·7	316	e 8 26	+ 2	e 15 14	+ 6	e 15 33	PPS	e 26·1
Branner	Z.	45·9	316	e 8 24a	− 2	—	—	—	—	—
Berkeley		46·2	316	e 8 24	− 4	i 15 18	+ 3	i 10 3	PeP	e 24·9
Mineral	Z.	47·0	319	i 8 33a	− 2	—	—	i 10 6k	PeP	—
Ukiah		47·5	317	—	—	e 15 56	PPS	—	—	e 26·7
Shasta Dam		47·7	320	i 8 34	− 6	—	—	e 10 7	PeP	—
Hungry Horse		47·8	333	i 8 37	− 4	—	—	e 9 8	?	—
Saskatoon		47·8	340	—	—	e 15 35	− 3	e 18 49	SS	26·0
Seattle		51·5	327	e 9 7	− 2	—	—	—	—	—
Victoria		52·6	327	i 9 14a	− 4	—	—	—	—	25·6
Sitka		63·5	331	e 10 39	+ 5	e 19 14	+ 7	e 23 32	SS	e 28·9
College		72·0	336	e 11 24	− 4	—	—	e 14 2	PP	—
Scoresby Sund		72·6	18	11 27a	− 4	20 49	− 7	—	—	—
Toledo		76·0	52	—	—	e 21 38	+ 4	—	—	—
Granada		76·3	54	11 54	+ 2	22 41	PPS	—	—	—
Almeria		77·2	55	12 0	+ 3	21 48	+ 1	14 56	PP	39·0
Aberdeen	E.	77·9	33	—	—	e 20 36?	−78	—	—	—
Alicante		78·7	53	12 13	+ 7	e 22 2	− 1	—	—	e 36·0
Kew		78·7	39	e 12 2	− 4	e 21 57	− 6	e 27 7	SS	e 33·6
Tortosa		79·4	50	—	—	22 2	− 8	22 29	SeS	e 38·6
Paris		80·6	42	e 12 11	− 5	e 22 17	− 6	e 22 37	SeS	e 36·6
Clermont-Ferrand		81·1	45	e 12 18	0	e 22 28	0	e 27 57	SS	38·6
De Bilt		82·1	38	e 12 21	− 3	e 22 6	−32	—	—	e 38·6
Besançon		83·0	44	e 12 49	+21	—	—	e 13 15	?	—
Strasbourg		84·1	42	e 12 33	− 1	e 22 55	− 3	e 23 51	PS	38·6
Stuttgart		85·0	42	e 12 37a	− 1	e 23 0	− 7	e 12 46a	PeP	e 39·6
Tamanrasset	Z.	85·2	68	e 12 38	− 1	e 23 7	− 2	i 12 41a	PeP	44·6
Copenhagen		86·0	35	—	—	23 18	+ i	—	—	—
Jena	E.	86·2	40	e 12 42	− 2	—	—	—	—	—
Collmberg		87·1	39	e 12 48	− 1	e 23 12	−16	e 12 58	PeP	—
Upsala		87·9	30	e 15 54	PP	e 23 29	− 6	—	—	e 39·6
Prague		88·2	40	—	—	—	—	e 36 11	Q	e 43·1
Rome		88·3	48	—	—	e 23 38	− 1	e 24 38	PS	—
Istanbul		100·5	46	14 4	+13	—	—	17 34?	PP	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Christchurch	106·4	227	e 22 41	PKS	e 34 21	SSP	—	—	50·6
Ksara	108·3	50	e 14 33	P	e 28 31	PS	e 19 3	PP	—
Riverview	124·5	234	—	—	e 38 3	SSP	—	—	e 59·9
Poona	144·6	40	—	—	(30 36?){+48}		—	—	30·6

Additional readings:—
Galerazamba iP_g =2m.54s., iS* =4m.10s., iS_g =4m.35s.
San Juan i =7m.39s.
Huancayo i =5m.46s. and 5m.50s., iS =8m.57s.
St. Louis i =7m.37s.
Tucson i =7m.18s., iPP =7m.31s., ePPP =8m.16s.
Pierce Ferry i =8m.36s.
Riverside iZ =7m.52s. and 7m.56s.
Pasadena iZ =7m.59s., iE =14m.20s.
China Lake iZ =8m.3s.
Tinemaha iZ =8m.10s. and 8m.17s.
Lick eEN =8m.24s., iZ =8m.32s., 9m.2s., and 9m.11s.
Branner eN =8m.27s., eZ =8m.33s., eEN =8m.44s.
Berkeley ePZ =8m.27s., iZ =8m.49s., eZ =15m.26s., eE =15m.29s.
Mineral iZ =8m.43s. and 8m.53s.
Shasta Dam i =8m.36s. and 8m.48s.
College i =11m.44s.
Almeria PPP =16m.44s., SS =26m.48s., SSS =30m.16s.
Kew ePPZ =15m.37s., eE =18m.33s., eEN =28m.9s., eSSS =30m.35s.
Tortosa PS?E =22m.59s., SSS?E =31m.25s.
Paris i =12m.39s., ePS =23m.11s.
Clermont-Ferrand eP =12m.22s., eSSS =31m.39s.
Strasbourg e =13m.25s., ePP =15m.45s., e =16m.1s., ePPP =17m.45s., ePPS =24m.1s., eSS =28m.25s. and 28m.36s., eSSS =31m.46s., eQ =36m.21s.
Stuttgart ePS =23m.57s., eSS =28m.48s.
Tamanrasset iZ =12m.51s.a, ePPZ =16m.0s.
Upsala eE =22m.3s., eSS?N =28m.36s.?, eE =31m.12s.
Rome eSS =29m.28s., eSSS =33m.8s.
Long waves were also recorded at Pensacola, Salt Lake City, Ivigtut, Bergen, Auckland, Wellington, Tananarive, and Bombay.

Aug. 18d. 14h. 25m. 13s. Epicentre 38°·6N. 118°·5W. (as on 1942 Aug. 18d.).

A = −·3739, B = −·6886, C = +·6213 ; δ = −2 ; h = −1 ;
D = −·879, E = +·477; G = −·296, H = −·546, K = −·784.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Reno		1·4	313	e 0 25	− 2	i 0 41	− 5	—	—	—
Fresno		2·1	209	i 0 39a	+ 2	i 1 7	+ 3	—	—	—
Lick		2·8	243	i 0 46a	− 1	i 1 21	− 1	e 0 49	P*	—
Mineral		3·0	306	i 0 49a	− 1	1 30	+ 3	i 0 55	P*	—
Berkeley	z.	3·0	256	i 0 53k	+ 3	i 1 28	+ 1	—	—	—
Shasta Dam		3·7	126	i 0 57	− 3	—	—	i 1 8	P*	i 1·8
Overton	z.	3·8	121	i 1 18	P_g	—	—	—	—	—
Boulder City		3·9	131	e 1 18	P_g	—	—	—	—	—
Pierce Ferry		4·4	123	e 1 20	P_g	i 2 26	S_g	—	—	—

Additional readings:—
Fresno iPE =43s., iSN =1m.10s.
Lick iN =1m.25s.
Mineral eE =1m.20s.
Berkeley iZ =1m.19s.
Pierce Ferry e =1m.26s.

Aug. 18d. Continuation of the list of aftershocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	20	3	15	48	56	19	52	52	22	10	32
11	57	6	17	33	0	21	45	45	23	6	37
15	26	3	17	35	56						

Continued on next page.

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
15	49	9	19	53	7	22	10	47	23	6	53
17	33	13									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
15	49	20	19	53	7	22	10	52	23	7	3
17	33	16									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
15	49	24	17	33	24	19	53	18

Murgab.

h.	m.	s.
19	53	14?

Samarkand.

h.	m.	s.	h.	m.	s.
19	53	30	23	7	28

Tchimkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
15	49	37	17	33	39	19	53	29	22	11	56

Frunse.

h.	m.	s.
15	50	58

Almata.

h.	m.	s.	h.	m.	s.	h.	m.	s.
15	51	54	17	35	49	19	55	40?

Aug. 18d. Readings also at 0h. (Leninakan, Sotchi, Tiflis and Ksara), 1h. (Ksara, Erevan, Leninakan, Harvard, and Hungry Horse), 2h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Mineral, Lick, Seattle, Victoria, Pretoria, Taranto, near Catania and Messina), 3h. (Strasbourg, Istanbul, Ksara, Erevan, Sotchi, near Leninakan, and near Messina), 4h. (Tacubaya and Tucson), 5h. (Nanking and Shasta Dam), 6h. (Kew, Clermont-Ferrand, De Bilt, Paris, Strasbourg, Stuttgart, and Alicante), 7h. (near Leninakan), 8h. (College, Hungry Horse, near Victoria, and near Triest), 9h. (Collmberg, Stuttgart, Zürich, Ksara, Erevan, Grozny, Sotchi, near Leninakan and Tiflis), 10h. (Zürich and Zagreb), 11h. (College (2), Shasta Dam, Collmberg, Stuttgart, near Leninakan, near Tiflis, and near Apia), 12h. (China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, Lick, Shasta Dam, Hungry Horse, and College), 13h. (La Plata), 14h. (Piatigorsk, Sotchi, near Erevan, Grozny, Leninakan (2) and Tiflis), 15h. (Leninakan, Overton, Shasta Dam, and near Reno), 17h. (Istanbul, near Leninakan and near Copiapo), 18h. (near Belgrade), 19h. (Istanbul), 20h. (Tucson, Hungry Horse, Victoria, College, and near Branner), 21h. (near Branner), 22h. (near Apia), 23h. (Istanbul, Ksara, Collmberg, and Stuttgart).

Aug. 19d. 8h. South Pacific. Undetermined shock.

Apia eP =26m.55s., e =27m.47s., eS =27m.50s.
Kaimata eP?NE =31m.12s.
Berkeley iPZ =37m.10s.a, ipPZ =37m.15s.
Lick ePZ =37m.11s.a, ipPZ =37m.17s.
Pasadena iPNZ =37m.12s.a, iZ =37m.33s.
Riverside iPZ =37m.14s.a, eZ =37m.27s.
Fresno iPZ =37m.15s.a.
Palomar iP =37m.15s.a, iZ =37m.29s. and 37m.38s.
China Lake iPZ =37m.20s.a.
Shasta Dam iP =37m.20s., i =37m.24s.
Mineral iPZ =37m.21s.a, ipPZ =37m.25s.
Tinemaha iP =37m.22s., iZ =37m.34s., eZ =37m.54s.
Reno ePEN =37m.26s.
Boulder City iP =37m.30s., iPcP =37m.40s.
Pierce Ferry iP =37m.34s., i =37m.48s., ipP =37m.56s., esP =38m.8s.
Overton iPZ =37m.35s.
Tucson iP =37m.35s.
Victoria iZ =37m.44s.a.
Seattle iP =37m.46s., eS =48m.28s.
Logan eP =37m.51s., epP =38m.11s.
Hungry Horse iP =38m.8s.
College iP =38m.9s., ipP =38m.28s.
Paris e =45m.
Collmberg ePKPZ =45m.13s., eZ =45m.32s.
Stuttgart ePKPZ =45m.16s. and 45m.21s.
Clermont-Ferrand ePKP =45m.20s.
Strasbourg ePKP =45m.22s., e =45m.40s. and 45m.45s.
Besançon ePKP =45m.24s., e =45m.32s., $ePKP_2$ =45m.43s., e =46m.1s.

Aug. 19d. 14h. 36m. 0s. Epicentre 45°·6N. 15°·3E. (as on 1949 March 14d.).

Intensity V at Suhor (45° 30'N. 15° 11'E.); IV at Semic, Radovica, Gradac, Kast, and Jurovski Brod. Epicentre 45°·5N. 15°·2E. Macroseismic radius 26km.
M. D. Uzelac.
Annuaire microséismique et macroséismique de l'Institut Séismiologique de Belgrade, 1949. Nouvelle Série No. 9, Belgrade, 1950, p.66.

$A = +\cdot6772$, $B = +\cdot1852$, $C = +\cdot7121$; $\delta = -1$; $h = -4$;
$D = +\cdot264$, $E = -\cdot965$; $G = +\cdot687$, $H = +\cdot188$ $K = -\cdot702$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Zagreb	0·5	66	e 0 8	− 6	—	—	—	—
Triest	1·1	273	e 0 22	0	i 0 36	− 3	—	—
Prague	4·5	353	—	—	e 1 46	−19	e 2 16	S*
Stuttgart	5·2	309	1 25?	+ 4	e 2 48	S_g	e 1 50	P_g
Strasbourg	5·9	303	—	—	e 3 22	S_g	—	—
Collmberg	5·9	346	e 1 49?	P*	e 2 52	S*	e 3 8	S_g
Besançon	6·6	288	—	—	e 3 41	S_g	—	—

Additional readings :—
Zagreb e =41s., eE =45s.
Stuttgart eZ =1m.38s.

Aug 19d. Continuation of the list of aftershocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	58	44	12	53	0	21	33	32	23	8	46

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	58	57?	12	53	16	21	33	33	23	8	49
12	40	33									

Andijan.

h.	m.	s.	h.	m.	s.
2	58	56	23	10	24

Tashkent.

h.	m.	s.
2	59	11?

Murgab.

h.	m.	s.	h.	m.	s.
2	59	6	23	9	56

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	59	16	12	54	23	21	34	33	23	9	52

Tchimkent.

h.	m.	s.
23	10	31

Aug. 19d. Readings also at 0h. (Hungry Horse, near Berkeley, Branner, Lick, and near Apia), 1h. (Overton), 2h. (near Berkeley, Branner, and Lick), 4h. (near Zurich), 8h. (near Theodosia (2)), 9h. (Theodosia and Tucson), 10h. (Fresno, near Boulder City, and Pierce Ferry), 12h. (College and Durham), 13h. (College), 14h. (near Istanbul), 16h. (Paris, Istanbul, Erevan, Leninakan, and Hungry Horse), 18h. (near Andijan, Murgab, Obi-garm, and Stalinabad), 19h. (Shasta Dam, Hungry Horse, Victoria (3), and near Mizusawa), 20h. (near Victoria (2)), 22h. (Overton and Pierce Ferry), 23h. (near Victoria (2)).

Aug. 20d. Continuation of list of aftershocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	5	18	10	36	58	16	18	0	23	33	25
5	15	19	14	56	26						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	5	32	10	37	10	16	15	56	23	33	36
5	15	22	14	56	30	16	18	18			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	5	24	14	56	50	16	18	27	23	33	37
10	37	4?									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	5	30	10	37	26	16	19	8	23	33	47
8	11	9	14	56	30						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
5	15	49	14	57	53	23	34	3

Tchimkent.

h.	m.	s.	h.	m.	s.
5	17	14	10	37	48

Frunse.

h.	m.	s.
5	17	47

Aug. 20d. Readings also at 0h. (College and near Istanbul), 2h. (Palomar, Pasadena, Riverside, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Mineral, Shasta Dam, Hungry Horse, College, and Paris), 3h. (Santa Lucia), 4h. (Mount Wilson, Palomar, Riverside, Tucson, Boulder City, Overton, Pierce Ferry, Mineral, Shasta Dam, and Hungry Horse), 5h. (La Paz, Shasta Dam, and near Mizusawa), 6h. (Stuttgart), 7h. (Strasbourg), 8h. (Paris, Strasbourg (2), Upsala, Tortosa, and College), 9h. (Strasbourg, Hungry Horse, and near Balboa Heights), 11h. (Pierce Ferry, Mineral, Shasta Dam, Lick, Hungry Horse, and College), 13h. (Istanbul, Ksara, College, and near Tacubaya), 14h. (Overton), 15h. (College, Seattle, and near Tacubaya), 18h. (College), 20h. (Pierce Ferry), 21h. (College), 22h. (Tacubaya), 23h. (Copiapo).

Aug. 21d. 10h. 51m. 1s. I
11h. 45m. 18s. II
20h. 48m. 16s. III
} Epicentre 40°·3N. 121°·2W.

A = −·3962, B = −·6542, C = +·6443 ; δ = +7 ; h = −2 ;
D = −·855, E = +·518 ; G = −·334, H = −·551, K = −·765.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Mineral	0·3	280	i 0 8a	− 3	i 0 13	− 5	—	—	—
II		0·3	280	i 0 8a	− 3	i 0 13	− 5	—	—	—
III		0·3	280	i 0 6a	− 5	i 0 10	− 8	—	—	—
II	Shasta Dam	1·0	292	i 0 19	− 2	—	—	—	—	—
III		1·0	292	i 0 18	− 3	i 0 30	− 6	—	—	—
I	Reno	1·3	126	i 0 26	+ 1	i 0 43	− 1	—	—	—
II		1·3	126	i 0 26	+ 1	i 0 42	− 2	—	—	—
III		1·3	126	i 0 24	− 1	i 0 43	− 1	—	—	—
III	Ukiah	1·9	233	i 0 46	+12	e 1 6	S_g	—	—	—
I	Berkeley	2·6	199	i 0 42k	− 2	i 1 12	− 5	—	—	—
III		2·6	199	i 0 40k	− 4	i 1 11	− 6	—	—	—
I	Branner	Z. 3·0	195	i 0 48a	− 2	i 1 26	− 1	—	—	—
II		3·0	195	i 0 49k	− 1	e 1 23	− 4	—	—	—
III		N. 3·0	195	—	—	i 1 28	+ 1	—	—	—
I	Lick	3·0	187	e 0 49	− 1	e 1 27	0	i 0 57	P_g	—
II		3·0	187	i 0 49a	− 1	i 1 26	− 1	e 1 2	P_g	—
III		3·0	187	e 0 48	− 2	i 1 25	− 2	i 1 8	P_g	—

Continued on next page,

			△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
III	Santa Clara	N.	3·0	191	—	—	i 1 24	− 3	—	—	—
I	Fresno		3·7	162	e 1 5	+ 5	e 1 51	+ 6	—	—	—
II			3·7	162	i 1 5k	+ 5	i 1 52	+ 7	—	—	—
III			3·7	162	i 1 3a	+ 3	i 1 51	+ 6	—	—	—
III	Tinemaha		4·0	143	e 1 5	+ 1	e 2 3	+11	i 1 14	P*	—
III	Haiwee		4·9	147	i 1 28	P*	i 2 30	S*	—	—	—
III	China Lake	Z.	5·3	146	e 1 39	P_g	e 2 45	S*	—	—	—
III	Overton	Z.	6·5	123	i 1 40	+ 1	—	—	—	—	—
III	Boulder City		6·6	129	i 1 42	+ 1	i 3 40	S_g	i 2 14	P_g	—
III	Pasadena		6·6	158	e 1 41	0	i 3 13	S*	i 1 50	P*	—
III	Riverside	Z.	7·0	153	e 1 51	+ 5	i 3 35	S*	—	—	—
II	Pierce Ferry		7·0	124	e 1 55	+ 9	—	—	—	—	e 3·8
III			7·0	124	e 1 47	+ 1	i 3 44	S_g	i 2 15	P_g	—
III	Palomar	Z.	7·8	152	i 2 11	P*	—	—	—	—	—
III	Victoria	Z.	8·4	350	e 2 10	+ 4	—	—	—	—	—
II	Hungry Horse		9·5	30	e 2 24	+ 4	—	—	—	—	—
III			9·5	30	e 2 24	+ 4	e 4 54	S*	—	—	—

Additional readings :—
Reno I iN = 30s. and 45s., II iE = 30s., III iE = 29s. and 39s.
Ukiah III e = 52s. and 1m.15s.
Branner III iZ = 3m.25s.
Lick I iZ = 1m.6s., eE = 1m.9s., iN = 1m.29s., iZ = 1m.31s., II iZ = 55s., eN = 1m.7s., iN = 1m.29s., III iN = 53s.
Fresno II iN = 1m.55s., III iN = 1m.6s., iZ = 1m.42s.
Overton III iPZ = 20h. 47m. 38s.
Boulder City III e = 1m.49s.
Hungry Horse III i = 3m.0s., e = 3m.21s.
Long waves were recorded to shock I and II at Arcata and shock III at Arcata, San Francisco, and Seattle.

Aug. 21d. 20h. 33m. 32s. Epicentre 10°·5N. 62°·6W. Depth of focus 0·010.
(as on 1948 April 28d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		8·5	337	e 2 4	+ 2	e 3 44	+ 7	—	—	e 4·5
Bogota		12·8	244	e 3 2	+ 2	i 5 23	+ 3	—	—	—
Chinchina		14·0	248	e 3 18	+ 3	e 5 50	+ 2	e 5 38	?	—
La Paz		27·4	191	5 42	+ 4	i 12 42	P_eS	—	—	i 14·1
Harvard		32·8	348	i 6 26	0	—	—	e 7 13	PP	—
Ottawa	Z.	36·5	345	e 6 58	0	—	—	—	—	—
Tucson		49·4	304	e 8 41	− 1	e 13 47	P_eS	i 9 4	pP	—
Pierce Ferry		52·9	308	i 9 1	− 7	—	—	e 9 37	pP	—
Logan		53·1	315	e 9 7	− 3	e 17 0	PPS	—	—	—
Overton	Z.	53·4	308	i 9 14	+ 2	—	—	—	—	—
Boulder City		53·5	307	i 9 14	+ 1	—	—	—	—	—
Palomar	Z.	54·6	304	i 9 21	0	—	—	i 9 46	pP	—
Riverside	Z.	55·1	305	e 9 24	0	—	—	e 9 47	pP	—
Mount Wilson	Z.	55·7	305	e 9 44	+15	—	—	—	—	—
Tinemaha	Z.	56·5	308	i 9 34	0	—	—	—	—	—
Hungry Horse		57·0	322	i 9 37	− 1	—	—	i 10 4	pP	—
Lick	Z.	59·2	308	i 9 53a	0	—	—	i 10 20	pP	—
Mineral	Z.	59·7	311	i 10 16a	+19	—	—	i 10 24	pP	—
Victoria	Z.	63·0	320	e 10 17	− 2	—	—	—	—	—
Clermont-Ferrand		65·6	45	i 10 38	+ 2	—	—	e 11 3	pP	—
Paris		65·8	41	i 10 29	− 8	—	—	i 10 56	pP	—
Tamanrasset	Z.	65·9	70	i 10 41k	+ 3	—	—	—	—	—
Besançon		67·8	44	e 10 51	+ 1	—	—	—	—	—
Strasbourg		69·2	42	i 10 59k	+ 1	e 12 39	sP	e 11 34	pP	
Stuttgart	Z.	70·2	42	e 11 4	0	—	—	—	—	—
Collmberg	Z.	72·9	40	e 11 16	− 4	—	—	e 11 46	pP	—
College		78·6	335	i 11 51	− 2	—	—	—	—	—

Additional readings :—
La Paz iP?E = 11m.20s.
Lick ipPZ = 10m.1a., iZ = 10m.24s., iPPZ = 12m.14s.
Collmberg eZ = 11m.21s.

Aug. 21d. Continuation of the list of aftershocks of the large earthquake in Turkestan.

Obi-garm.
h. m. s.
10 46 11

Stalinabad.
h. m. s.
10 46 28?

h. m. s.
16 58 15

Andijan.
h. m. s.
0 25 14

h. m. s.
10 46 28

h. m. s.
12 20 43

h. m. s.
16 57 18

Murgab.
h. m. s.
0 26 4

h. m. s.
10 46 40

Samarkand.
h. m. s.
10 47 40

Taskhent.
h. m. s.
16 56 58?

Frunse.
h. m. s.
10 48 25

Almata.
h. m. s.
10 49 4

Aug. 21d. Readings also at 3h. (Pasadena, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Seattle, College, and Paris), 5h. (Berkeley, Branner, Lick, Tucson, near Reno, Fresno, and near Frunse), 6h. (Ksara), 8h. (Palomar (2), Pasadena (2), Riverside (2), Tinemaha (2), Tucson (2), Boulder City (2), Overton (2), Pierce Ferry (2), Lick (2), Mineral (3), Shasta Dam (2), Hungry Horse (2), Victoria (2), College (2), near Alicante (2), near Apia, and near Bogota), 9h. (Besançon, Paris, Strasbourg (2), Triest, and Ottawa), 11h. (Pierce Ferry, and near Alicante), 12h. (Reno, near Mineral, Bucharest, Istanbul, Ksara, Erevan, Tiflis, and near Leninakan), 13h. (Hungry Horse, Istanbul (2), Leninakan, and near Obi-garm), 14h. (Istanbul and near Mizusawa), 15h. (Mount Wilson, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Hungry Horse, and Victoria), 17h. (near Mineral and near Ottawa), 18h. (near La Paz and near Mineral), 19h. (Istanbul, Erevan, Tiflis, near Leninakan and near Tacubaya), 20h. (College, near Fort de France, and near Leninakan), 21h. (Erevan), 22h. (College, Istanbul, and Ksara), 23h. (near Mineral and near Grozny).

Aug. 22d. 4h. 1m. 12s. Epicentre 53°·8N. 133°·2W.
Felt extensively along the coast of British Columbia, damage at Prince Rupert and at Terrace, tidal wave at Ketchican (Alaska).
Macroseismic radius greater than 1,000km.
Epicentre : 53°·75N. 133°·25W. (Pasadena).
54°·2N. 133°·0W. (W. G. Milne).

L. M. Murphy and F. P. Ulrich,
United States Earthquakes, 1949, Serial No. 748 (Washington, 1951), p.28.

J. Coulomb,
"Love waves of the Queen Charlotte Islands earthquake of August 22nd, 1949." Bulletin of the Seismological Society of America, January, 1952, Vol. 42, No. 1, pp. 29-37.

$A = -\cdot4061$, $B = -\cdot4324$, $C = +\cdot8051$; $\delta = +7$; $h = -6$;
$D = -\cdot729$, $E = +\cdot685$; $G = -\cdot551$, $H = -\cdot587$, $K = -\cdot593$;

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		4·0	343	i −0 8	?	—	—	—	—	—
Victoria		8·1	127	i 1 57a	− 5	3 3	−32	i 2 0	P	—
Seattle		9·2	127	e 2 15a	− 1	—	—	i 2 18	P	—
Hungry Horse		13·2	107	i 3 9	− 2	—	—	i 4 41	?	—
College		13·3	332	e 3 10	− 3	—	—	—	—	—
Ferndale		14·5	152	e 3 30	+ 2	i 6 14?	+ 3	i 6 18?	S	—
Shasta Dam		15·0	147	i 3 34	− 1	i 6 0	−23	i 6 57	PPP	i 7·5
Butte	N.	15·4	112	i 3 28	−12	i 6 13	−19	—	—	i 7·0
Mineral		15·6	145	e 3 42k	− 1	e 6 36	− 1	e 6 48	SS	—
Saskatoon		16·1	85	i 3 45	− 4	—	—	i 4 3	PP	—
Ukiah		16·2	151	i 3 50	0	i 6 49	− 2	—	—	e 8·2
Bozeman		16·4	110	i 3 52	− 1	i 6 53	− 3	e 6 47	S	e 7·5
Reno		16·9	142	i 4 2	+ 3	—	—	—	—	e 9·3
Berkeley		17·6	149	i 4 8k	0	e 7 36	+13	i 7 45	SS	—
Branner		18·1	149	i 4 13k	− 1	i 7 23	−12	i 4 39	PPP	i 9·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Clara		18·2	149	i 4 16	0	e 7 53	SS	—	—	—
Logan		18·7	122	i 4 18	− 4	—	—	—	—	—
Fresno		19·4	145	i 4 29k	− 1	—	—	—	—	—
Salt Lake City		19·4	123	i 4 30	0	i 8 9	+ 5	—	—	—
Tinemaha		19·7	142	i 4 28k	− 6	i 8 32	SS	—	—	—
Haiwee		20·6	142	i 4 44k	+ 1	e 8 41	+12	—	—	—
China Lake	Z.	21·0	142	i 4 46k	− 1	—	—	—	—	—
Overton	Z.	21·6	135	i 4 53	− 1	—	—	—	—	—
Santa Barbara		21·6	147	i 4 53k	− 1	—	—	—	—	—
Rapid City	E.	21·8	104	i 4 56	0	—	—	—	—	—
Boulder City		22·0	136	e 4 56	− 2	i 9 8	+12	i 5 6	—	i 11·7
Pierce Ferry		22·2	134	i 5 0	0	i 8 30	−30	i 5 11	?	i 11·2
Pasadena		22·4	145	i 5 0k	− 2	(i 9 9)	+ 5	—	—	i 9·2
Riverside		22·8	145	i 5 4k	− 1	—	—	—	—	—
Palomar		23·5	143	i 5 11k	− 1	—	—	—	—	—
La Jolla		23·8	145	i 5 15k	0	—	—	—	—	—
Tucson		26·8	134	e 5 43	− 1	i 10 8	−11	—	—	i 11·1
Chihuahua		32·0	131	6 34	+ 4	—	—	—	—	15·7
Chicago		32·2	93	i 6 30	− 2	i 11 39	− 6	i 7 44	PP	e 13·0
Florissant		32·6	100	i 6 34	− 1	i 11 44	− 7	—	—	—
St. Louis		32·8	100	i 6 35	− 2	i 12 5	+11	—	—	—
Cleveland		36·1	89	e 7 7	+ 2	e 16 6	SSS	e 16 18	Q	—
Ottawa		37·3	79	i 7 14a	− 2	13 4	0	8 43	PP	—
Honolulu		37·5	219	e 7 16	− 1	e 13 12	+ 5	i 8 39	PP	i 15·8
New Kensington	E.	37·8	88	i 7 18	− 2	—	—	—	—	—
Shawinigan Falls	N.	38·3	75	7 23a	− 1	13 13	− 6	8 49	PP	16·3
Pennsylvania	E.	38·7	87	i 8 38	+71	e 13 48?	+23	—	—	—
Seven Falls	E.	39·1	74	7 30k	− 1	13 27	− 4	9 9	PP	20·8
Guadalajara		40·1	134	7 40	+ 1	i 13 56	+10	i 9 24	PP	—
Georgetown		40·4	88	i 7 40	− 1	—	—	—	—	—
Philadelphia		40·9	86	i 7 43	− 3	i 13 53	− 5	i 9 24	PP	e 17·0
Fordham		41·1	83	e 7 47	0	i 13 59	− 2	i 8 30	?	—
Manzanillo		41·2	136	e 7 46	− 2	14 2	0	e 17 22	SS	—
Harvard		41·4	80	i 7 51	+ 1	i 14 7	+ 2	i 9 35	PP	—
Columbia		41·4	97	e 7 47	− 3	i 14 2	− 3	i 9 32	PP	i 16·8
Tacubaya		43·1	129	i 8 7a	+ 3	i 14 33	+ 3	i 10 5	PP	i 20·7
Ivigtut		43·2	46	i 8 7	+ 3	i 14 36	+ 4	i 17 27	SS	19·8
Puebla		43·9	128	8 8	− 2	e 14 39	− 3	i 10 7	PP	—
Halifax		44·7	73	8 20	+ 4	14 58	+ 4	10 14	PP	19·6
Vera Cruz		44·7	125	8 17	+ 1	14 59	+ 5	—	—	—
Oaxaca		46·3	127	8 27	− 2	—	—	—	—	22·8
Merida		46·5	118	8 31	0	e 15 23	+ 4	—	—	—
Scoresby Sund		46·7	26	i 8 32k	0	—	—	—	—	—
Miami		47·8	104	e 8 42	+ 1	—	—	—	—	—
Reykjavik		51·0	32	e 9 6	0	e 16 34	+12	e 11 9	PP	e 24·8
Nemuro		51·9	294	9 11	− 1	16 36	+ 1	—	—	29·2
Bermuda		52·2	86	e 9 22	+ 7	i 16 47	+ 8	i 9 27	P	i 20·5
Sapporo		54·4	297	9 30	− 1	17 21	+12	—	—	—
Guantanamo Bay		55·4	104	e 9 37	− 1	—	—	—	—	—
Mori		55·5	296	9 38	− 1	17 43	+19	—	—	26·2
Hatinohe		56·0	294	e 9 42	− 1	17 47	+17	—	—	26·7
Miyako		56·4	293	i 9 44	− 1	17 38	+ 2	—	—	26·7
Morioka		56·8	294	e 9 48	0	17 58	+17	—	—	27·3
Mizusawa	E.	57·3	293	9 47	− 5	17 45	− 2	—	—	e 24·3
	N.	57·3	293	9 53	+ 1	17 51	+ 4	—	—	24·4
Akita		57·4	294	9 52	− 1	18 8	+19	—	—	30·1
Sendai		58·0	292	9 55	− 2	17 55	− 2	—	—	27·6
Port au Prince		58·1	102	e 9 57	− 1	e 18 31	PPS	12 22	PP	e 28·4
Hukusima		58·6	292	10 2	+ 1	18 22	PS	—	—	25·7
Onahama		59·0	291	e 10 3	− 1	18 25	PS	—	—	28·0
Aikawa		59·6	295	10 1	− 7	18 28	+11	—	—	—
Kakioka		59·9	292	10 10	0	18 39	PS	—	—	28·2
Tukubasan		59·9	292	e 10 16	+ 6	18 31	+10	12 46	PP	27·0
Kumagaya		60·4	292	10 11	− 2	18 44	PS	—	—	28·1
Maebasi		60·4	293	i 10 13	0	18 46	PS	—	—	28·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tokyo		60·5	291	e 10 16	+ 2	18 49	PS	—	—	27·0
Nagano		60·6	293	10 0	−15	18 46	PS	12 2	PP	29·3
Matusiro		60·7	293	10 10	− 5	18 15	−17	—	—	—
Hunatu		61·2	292	10 13	− 6	18 59	PPS	—	—	28·4
Toyama		61·2	294	10 19	0	18 40	+ 2	—	—	28·0
Bergen		61·4	22	10 21	+ 1	18 43	+ 3	19 13	PPS	24·3
Misima		61·4	291	10 9	−11	—	—	—	—	—
Shizuoka		61·8	291	e 10 22	− 1	(19 3)	PS	11 28	?	19·0
Balboa Heights		61·8	115	e 10 28	+ 5	e 18 48	+ 2	—	—	—
San Juan		61·8	97	e 10 21	− 2	i 18 48	+ 2	i 13 1	PP	e 27·7
Roosevelt Roads		62·3	97	e 10 28	+ 2	—	—	—	—	—
Aberdeen		62·4	28	i 10 26	− 1	i 18 56	+ 3	i 12 41	PP	29·9
Nagoya		62·4	292	e 10 19	− 8	19 11	PS	e 29 25	Q	e 34·9
Kameyama		62·9	292	10 42	+12	19 18	PS	26 37	Q	30·3
Edinburgh	E.	63·2	29	10 32	0	18 58	− 5	12 52	PP	—
Toyooka		63·3	295	e 10 32	− 1	19 6	+ 2	—	—	—
Osaka		63·6	293	e 10 34	− 1	—	—	11 20	?	—
Kobe		63·7	293	e 10 35	− 1	e 21 51	?	e 12 44	PP	30·4
Owase		63·7	292	10 36	0	—	—	—	—	—
Irkutsk		63·9	326	i 10 42	+ 5	19 18	+ 6	i 12 59	PP	—
Sumoto		64·2	293	i 10 39	0	19 34	PS	(25 44)	SSS	25·7
Upsala		64·3	17	i 10 39k	0	i 19 7	−10	i 13 7	PP	e 30·8
Rathfarnham Castle		64·5	33	e 10 43	+ 2	i 19 9	−10	—	—	—
Durham		64·7	29	i 10 49	+ 7	i 19 31	+ 9	i 13 17	PP	27·0
Helsinki		65·0	13	i 10 51k	+ 7	e 19 24	− 2	—	—	e 26·8
Hamada		65·3	296	e 10 42	− 4	19 25	− 4	23 0	SS	31·5
Muroto		65·4	293	10 38	− 9	19 42	+12	—	—	30·7
Hirosima		65·5	295	10 46	− 1	—	—	—	—	—
Simidu		66·4	293	9 9	−104	18 2	−101	13 46	PP	29·2
Hukuoka		67·2	296	i 10 58	0	19 54	+ 2	24 0	SS	32·3
Copenhagen		67·3	21	i 10 59	0	i 20 1	+ 7	20 46	PPS	32·4
Lund		67·4	20	11 1	+ 2	20 2	+ 7	—	—	—
Fort de France		67·6	95	i 11 3	+ 2	e 20 3	+ 6	—	—	e 32·8
Kumamoto		67·6	295	11 6	+ 5	19 59	+ 2	—	—	24·6
Kew		67·9	30	e 11 1	− 1	i 20 7	+ 6	e 13 37	PP	e 28·8
Miyazaki		67·9	294	e 10 48	−14	20 3	+ 2	—	—	e 28·8
Bogota	z.	68·4	113	i 11 5	− 1	e 20 19	+12	i 13 46	PP	—
Kagosima		68·6	295	11 10	+ 3	20 17	+ 8	24 42	SS	33·0
De Bilt		68·9	27	i 11 10k	+ 1	i 20 25	+12	e 28 18	Q	e 31·8
Sverdlovsk		69·2	352	i 11 11	+ 1	—	—	i 13 48	PP	—
Potsdam		70·5	22	e 11 22	+ 4	i 20 43?	+11	i 25 21	SS	—
Moscow		70·6	6	i 11 22	+ 3	i 20 49	+16	—	—	—
Paris		71·1	30	i 11 21	− 1	i 20 21	−17	i 13 57	PP	e 29·8
Collmberg		71·5	22	e 11 22	− 2	i 20 48	+ 5	e 14 2	PP	e 32·8
Jena		71·5	23	e 11 22	− 2	i 20 48	+ 5	e 14 0	PP	e 32·8
Semipalatinsk		72·4	338	e 11 28	− 2	e 21 2?	+ 9	e 11 46	PcP	—
Cheb		72·5	23	e 11 33	+ 3	i 21 7	+13	—	—	—
Strasbourg		72·8	26	e 11 31k	− 1	i 21 6	+ 8	i 11 51	PcP	i 34·7
Prague		73·0	22	e 11 36	+ 3	i 21 5	+ 5	e 21 48	PPS	e 31·8
Stuttgart		73·0	25	e 11 32	− 1	i 21 8	+ 8	e 14 14	PP	34·8
Besançon		73·5	28	i 11 36	0	—	—	—	—	—
Basle		73·7	27	e 11 35	− 3	e 21 19	+11	e 14 49	PP	—
Raciborzu		73·7	19	e 11 39	+ 1	e 21 28	+20	e 21 48?	PS	—
Zi-ka-wei		73·7	300	e 11 48	+10	e 21 23	+15	—	—	—
Neuchatel		74·0	28	e 11 39	0	e 21 7	− 4	—	—	—
Clermont-Ferrand		74·1	31	i 11 40	0	i 26 31	SS	i 11 58	PcP	34·8
Zürich		74·1	27	e 11 39a	− 1	e 21 12	0	e 14 24	PP	—
Nanking		74·4	303	e 11 45	+ 3	21 20	+ 4	i 12 6	PcP	—
Chur		74·8	26	e 11 43	− 1	e 21 33	+13	—	—	—
Lwow		75·0	15	11 49	+ 4	—	—	—	—	—
Skalnate Pleso		75·0	18	i 11 50	+ 5	21 23	0	—	—	—
Apia		75·5	218	e 11 59	+11	e 21 18	−10	—	—	e 30·8
Ogyalla		75·8	20	e 11 52	+ 2	21 45	+14	—	—	—
Lisbon		76·0	43	11 52	+ 1	21 38	+ 4	12 17	PcP	36·0
Pavia		76·3	27	e 12 48?	+56	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Budapest	E.	76·4	19	11 57	+ 4	21 39	+ 1	i 12 6		PcP	34·8
	N.	76·4	19	11 57	+ 4	21 50	[−11]	i 22 22		PS	35·8
Cernauti		76·8	15	11 52	− 3	i 22 39	PPS	i 16 58		PPP	—
Toledo		76·9	39	i 11 57	+ 1	—	—	—		—	—
Triest		77·0	24	e 11 58k	+ 2	i 21 47	+ 2	i 15 3		PP	—
Kalossa		77·3	20	e 12 2	+ 4	e 21 56	+ 8	e 12 8		PcP	e 35·8
Zagreb		77·3	22	e 11 58	0	e 22 0	+12	i 12 12		PcP	e 37·5
Bologna		77·5	26	e 12 6k	+ 7	e 22 8	+18	i 22 53		PPS	e 36·3
Barcelona		77·7	33	12 4	+ 4	i 21 56	+ 4	22 30		PS	33·0
Tortosa	N.	77·7	35	i 12 3	+ 3	i 22 5	+13	12 17		PcP	e 32·8
Prato		78·0	26	e 12 6	+ 4	i 22 4	+ 9	—		—	—
Florence Xim.		78·1	26	e 12 2	0	i 21 55	− 1	—		—	—
Belgrade		79·2	19	e 12 9k	+ 1	i 22 20	+12	e 15 26		PP	e 38·3
Granada		79·5	40	i 12 8k	− 2	i 22 16	+ 5	16 49		PPP	i 36·8
Alicante		79·6	37	12 18	+ 8	22 27	+15	12 43		pP	33·6
Malaga		79·6	40	i 12 8	− 2	i 22 10	− 2	i 15 20		PP	37·4
Almata		79·9	338	i 12 14	+ 2	—	—	—		—	—
Almeria		80·2	39	i 12 16	+ 2	i 22 17	− 2	15 17		PP	36·7
Rome		80·2	26	e 12 14	0	i 22 39	+20	e 15 27		PP	e 35·8
Bucharest		80·6	15	e 12 19	+ 3	i 22 32	+ 9	i 23 2		PS	—
Frunse		80.8	340	e 12 18	+ 1	—	—	—		—	—
Yalta		81·5	10	12 20	− 1	22 50	ScS	—		—	—
Huancayo		81·8	123	i 12 31	+ 9	i 22 5	−30	i 27 28		SS	i 33·5
Algiers Univ.	Z.	82·2	35	e 12 25	+ 1	i 22 48	+ 9	e 15 32		PP	—
Taranto		82·7	23	12 27	0	22 43	− 1	—		—	e 36·2
Andijan		83·3	341	e 12 31	+ 1	—	—	—		—	—
Grozny		83·3	1	12 31	+ 1	23 11	ScS	—		—	—
Tashkent		83·3	343	i 12 33	+ 3	i 22 57	+ 7	i 16 1		PP	—
Istanbul		84·3	13	13 26	+51	e 23 59	+59	—		—	—
Messina		84·5	25	12 48	+12	e 24 34	PPS	—		—	e 39·8
Tiflis		84·8	2	12 40	+ 3	i 23 10	+ 5	—		—	—
Catania		85·0	25	e 12 43	+ 5	e 23 8	+ 1	e 38 48?		Q	e 40·8
Murgab		85·3	339	e 12 42?	+ 2	—	—	—		—	—
Samarkand		85·3	345	e 12 42?	+ 2	e 23 15?	+ 5	—		—	—
Leninakan		85·8	333	12 41	− 1	23 25	+10	—		—	—
Obi-garm		85·8	342	i 12 47?	+ 5	i 23 23?	+ 8	—		—	—
Baku		86·1	358	e 13 6?	+22	e 23 29?	+11	—		—	—
Stalinabad		86·1	343	i 12 44	0	i 23 9	− 9	—		—	—
Erevan		86·4	2	12 51	+ 6	23 40?	+19	—		—	—
La Paz		89·3	119	i 12 58k	− 1	i 23 43	− 5	i 24 58		PS	42·6
Ksara		92·2	10	i 13 17a	+ 4	25 55	PPS	—		—	—
New Delhi	N.	93·8	333	i 13 26a	+ 6	i 24 6	{+ 4}	i 25 44		PS	43·6
Antofagasta	E.	94·2	125	22 39	?	e 24 30	− 1	e 26 1		PS	e 40·7
Helwan		95·6	13	i 13 30a	+ 2	e 24 12	[+ 8]	17 18		PP	—
Tamanrasset	Z.	95·8	38	e 13 31	+ 2	e 24 59	+14	i 17 34k		PP	40·8
Copiapo	N.	97·3	127	e 13 57	+21	24 19	[+ 6]	17 39		PP	43·8
Auckland	N.	100·8	220	—	—	e 24 43	[+12]	i 27 12		PS	46·4
Arapuni	E.	101·6	219	e 18 48?	PP	e 26 0	+26	e 32 48?		SS	e 42·8
Santa Lucia		102·3	130	e 14 16	+17	e 24 44	[+ 6]	27 16		PS	—
Brisbane	Z.	102·8	241	i 20 9a	PPP	—	—	—		—	—
Hyderabad	N.	104·0	328	i 14 6	0	i 27 40	PS	18 45		PP	—
Bombay		104·2	334	e 14 17	+10	i 26 6	+11	e 18 33		PP	43·1
Poona		104·3	333	14 3	− 5	25 51	− 5	18 34		PP	51·1
Wellington		104·7	218	e 18 50	PP	—	—	—		—	e 42·8
Kaimata	N.E.	107·0	220	e 14 20	+ 1	—	—	—		—	—
Christchurch		107·5	218	e 14 18	− 3	26 23	0	e 18 53		PP	49·0
Riverview		108·9	238	i 18 20a	[−11]	i 25 24	[+16]	i 19 6		PP	e 45·1
Buenos Aires		109·0	122	17 57	[−34]	—	—	—		—	51·0
La Plata	E.	109·6	122	18 40	[+ 8]	25 16	[+ 5]	28 0		PS	51·2
	N.	109·6	122	18 58	PP	26 27	{+25}	28 36		PS	53·3
	Z.	109·6	122	19 12	PP	—	—	—		—	60·0

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kodaikanal	E.	111·1	327	19 13	PP	29 3	PS	21 58	PPP	44·5
Batavia		112·4	291	i 18 50 a	[+12]	i 24 39	[−43]	(34 48)	SS	34·8
Colombo	E.	113·4	323	19 9	[+29]	27 34	{+65}	—	—	46·5
Melbourne	E.	115·2	240	e 20 40	?	e 27 48	{+67}	i 35 32	SS	—
Punta Arenas	N.	118·5	142	—	—	27 19	?{+16}	i 31 5	PPS	—
Tananarive		145·2	0	19 46	[+ 6]	26 42	[− 5]	23 5	PP	i 70·8
Pretoria	Z.	148·8	33	i 19 50	[+ 6]	—	—	e 52 42	Q	e 73·1
Grahamstown	Z.	155·0	43	i 19 59	[+ 4]	—	—	—	—	e 79·3

Additional readings :—
Saskatoon i = 5m.0s.
Berkeley iZ = 4m.12s., iE = 4m.29s.
Branner iEN = 7m.56s.
Tucson i = 9m.29s. and 10m.31s.
Ottawa P_cP = 9m.28s.
Honolulu e = 8m.21s. and 8m.55s., i = 11m.54s. and 14m.46s.
Shawinigan Falls P_cPN = 9m.24s., eN = 11m.48s., $S_cS?N$ = 17m.31s.
Seven Falls eE = 9m.55s., SSE = 16m.24s.
Guadalajara i = 17m.2s.
Columbia i = 8m.8s. and 14m.10s.
Tacubaya i = 14m.18s.
Ivigtut 9m.34s. and 9m.57s.
Halifax e = 10m.58s., PS = 15m.26s., SS = 18m.22s.
Reykjavik $eP_cP?N$ = 10m.6s., ePPP?N = 12m.5s., eP_cSN = 14m.21s., $eS_cS?N$ = 18m.37s., eN = 20m.51s. and 21m.48s.
Port-au-Prince PPP = 13m.47s.
Tukubasan PPP = 13m.49s.
Nagano SS = 24m.53s.
Bergen i = 10m.25s., eN = 11m.26s., eZ = 11m.58s., 12m.58s., and 14m.28s., P_cSN = 15m.0s.
San Juan iP = 10m.24s., i = 14m.23s., e = 24m.34s.
Aberdeen iEN = 14m.46s., iPPSEN = 19m.39s., iSSEN = 23m.7s., iSSSEN = 25m.26s.
Kobe e = 10m.45s., ePPP = 14m.40s., Q = 24m.6s.
Irkutsk PPP = 14m.39s.?
Sumoto Q = 21m.57s.
Upsala iP = 10m.43s., iP_cPE = 11m.15s., i = 11m.29s., iN = 12m.12s., 12m.23s., and 12m.36s., iPPP?N = 13m.13s., PPP?N = 14m.3s., P_cS = 15m.5s., iE = 16m.17s., eN = 18m.17s., iPS?E = 19m.29s., S_cS = 20m.33s., iN = 21m.4s. and 22m.22s., SSN = 23m.12s., eE = 24m.3s., SSSE = 25m.56s., eQ = 26m.51s.?
Durham iPPPE = 14m.54s., iE = 19m.36s., iPSEN = 19m.56s., iPPSEN = 20m.8s.
Simidu PP = 11m.50s.
Copenhagen 11m.35s., SS = 24m.38s.
Kew i = 11m.9s. and 11m.43s., ePPP = 15m.23s., iN = 20m.11s., iE = 20m.43s. and 21m.30s., eSS = 25m.5s., eSSSZ = 27m.43s.
Bogota iZ = 11m.10s., eS_cP,P_cSZ = 35m.46s.
Sverdlovsk iP_cP = 11m.26s., iPPP = 15m.33s.
Potsdam iE = 12m.14s., 19m.23s., and 20m.14s., iSE = 20m.47s., iSSE = 25m.26s., iE = 25m.49s., iN = 26m.5s., iSSSN = 28m.54s.
Paris i = 11m.28s. and 11m.35s.?, iP_cP = 11m.47s., i = 12m.13s., iPPP = 15m.37s., i = 15m.55s., iPS = 20m.48s., iSS = 24m.57s., iSSS = 27m.44s., PKP,PKP = 39m.16s.
Collmberg eEN = 11m.25s., ePZ = 11m.30s., iE = 11m.36s., iPE = 12m.14s., iE = 12m.55s., ePPE = 13m.58s. and 14m.11s., ePSZ = 21m.16s., iS_cSN = 21m.34s., iSSN = 25m.38s., eSSSE = 28m.13s., eN = 29m.54s., ePKP,PKP?Z = 39m.7s.
Jena iPZ = 11m.28s., ePPN = 14m.3s., eN = 15m.10s., iSN = 20m.51s., iPSE = 21m.12s., iPSN = 21m.18s., iSSN = 25m.38s., iSSZ = 25m.42s., eSSSEN = 29m.8s., eSSSZ = 29m.42s.
Strasbourg iPP? = 14m.7s., iPP = 14m.21s., iPPP = 16m.0s., iPS = 21m.30s. and 21m.33s. iS_cS = 21m.42s., iPPS = 21m.57s. and 22m.1s., iSS = 25m.47s., iSSS = 29m.43s., and many other unidentified i readings.
Prague eSS = 25m.48s., eSSS = 29m.48s.?
Stuttgart iP = 11m.37s.a, e = 12m.28s., ePPP = 16m.8s., iSS = 25m.58s., iSSS = 29m.7s., eQ = 30·8m.
Raciborzu eEN = 12m.2s., 12m.29s., 13m.51s., and 14m.23s., e = 16m.41s.?
Clermont-Ferrand i = 11m.43s., iPP = 14m.36s., iPPP = 16m.18s., iSSS = 30m.29s., Q = 31m.18s.
Zürich eSS = 25m.4s.
Lisbon iPEN = 11m.55s., iSE = 21m.41s., SS?N = 26m.41s., QEN = 31·0m.
Budapest E. ePPP = 16m.10s., SKS = 21m.59s., PS = 22m.26s., SS = 26m.48s.?, eSSS = 29m.25s.
Budapest N. PP = 14m.50s., e = 16m.48s.?, S_cSN = 22m.8s., SSS = 29m.48s.
Cernauti iSS = 27m.21s.
Triest iPS = 22m.27s., eSS = 26m.51s.
Kalossa iN = 12m.12s., eE = 12m.25s., iE = 12m.43s., eE = 15m.2s., eSE = 22m.8s., eN = 22m.19s.
Zagreb iP = 12m.25s., iPP = 12m.30s. and 15m.38s., ePPS = 23m.7s., eSS = 26m.49s., eSSS = 29m.58s., eE = 33m.35s., eZ = 36m.22s.

Continued on next page,

Bologna i =13m.20s., eSS =27m.35s., e =33m.18s.?
Tortosa PPN =14m.58s., PPP?N =17m.16s., iN =18m.9s. and 19m.59s., S_cSN =22m.19s. PSN =22m.45s., PPS?N =23m.40s., SSN =27m.11s., SSSN =30m.31s.
Belgrade i =18m.44s. and 27m.24s.
Granada P_cP =12m.43s., PPS =22m.58s., iSS =26m.34s., Q =33·0m.
Alicante PP =15m.29s., PPP =17m.3s., PS =23m.17s., PPS =23m.37s., SS =27m.31s., SSS =30m.51s.
Malaga PPP =17m.21s.
Almeria PPP =17m.5s., S_cS =22m.33s., PPS =23m.23s., SS =27m.29s., SSS =30m.53s., Q =33m.9s.
Rome iP =12m.17s., i =12m.36s. and 14m.17s., eSS =27m.44s., eSSS =31m.22s.
Bucharest iN =14m.52s., iE =14m.57s., i =15m.34s., eS?Z =22m.10s., iSE =22m.36s., iPSE =22m.59s., iSS?N =27m.14s., iSSE =27m.26s.
Algiers Univ. iZ =12m.51s. and 15m.39s., ePPPZ =17m.22s., iZ =17m.43s.
Tashkent iSS =29m.9s., iSSS =32m.36s.
Catania e =13m.48s.
La Paz iPPZ =16m.32s., PPP =18m.39s., iSKS =23m.33s., iPPS =25m.28s., iSS = 29m.48s., Q =38m.0s.
New Delhi N. i =13m.38s., iPP =17m.10s., i =17m.22s., iPPP =19m.17s., i =24m.44s. and 26m.5s., iSS =30m.59s., iSSS =34m.24s., i =39m.3s.
Antofagasta eE =24m.3s., 31m.24s.
Helwan iN =18m.48s., SEN =34m.52s.
Tamanrasset Z. eP =13m.37s., iPPP =19m.25s., ePS? =26m.40s., e =28m.16s., eSS = 31m.40s.
Copiapo eSN =24m.38s., N =26m.36s., 27m.5s., and 36m.48s.?
Auckland eN =26m.47s., ePPPN =27m.58s., iN =29m.52s., eN =32m.39s., eSSN = 32m.57s., iP_cP,PKPN =34m.59s., eSSSN =36m.15s., iSKKKSN =41m.43s., iN = 43m.7s.
Santa Lucia N =15m.34s. and 16m.35s., E =17m.58s., iPPN =18m.16s., E =18m.24s. eN =21m.54s., eE =26m.47s., E =32m.48s.?, eN =34m.7s.
Hyderabad SSN =32m.56s.
Bombay iPSE =26m.33s., iSSE =32m.53s.
Poona PPPEN =20m.38s., SKKSEN =25m.16s., PSEN =27m.40s., PPSEN =28m.37s., SSEN =33m.14s., SSSEN =37m.13s., QEN =45m.10s.
Christchurch ePPPNZ =21m.38s., eEN =23m.53s., SKS =25m.14s., eN =27m.18s., PSEN =28m.8s., SSEN =33m.18s., SSSEN =37m.18s., SSSSE =41m.13s., QEN = 43m.33s.
Riverview iPPPZ =20m.59s., iSN =26m.29s., ePSE =28m.9s., iPPSN =29m.20s., iSSE =34m.26s., iSSN =34m.29s., iPSPSN =34m.47s., eSSSN =38m.34s., eQEN = 44m.36s., and many other readings given without phase.
La Plata E. PP =18m.59s., 20m.18s., PPP =22m.0s., SKKS =26m.27s., PPS =29m.1s., 32m.44s., SS =35m.0s., SSS =38m.13s., Q =45m.17s.
La Plata N. PPP =21m.0s., 23m.6s., 24m.12s., SKS =25m.17s., SS =34m.28s., SSS = 38m.44s., Q? =44m.30s., Q =47m.54s.
Kodaikanal ePPE =19m.43s., SSE =34m.48s., QE =39m.32s.
Punta Arenas N =35m.12s.
Tananarive e =19m.51s., 20m.3s., 23m.37s., 24m.10s., 27m.49s., and 30m.38s., PPS? = 36m.4s., iSS =42m.45s., SSS =47m.40s., Q =62m.12s.
Long waves were also recorded at San Francisco and Lincoln.

Aug. 22d. 8h. 51m. 11s. Epicentre 38°·5S. 17°·0W. (as on 1946, Sept. 30d.).

A = +·7503, B = −·2294, C = −·6199; δ = −15; h = −1;
D = −·292, E = −·956; G = −·593, H = +·181, K = −·785.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grahamstown	Z.	35·4	95	i 7 44	+44	—	—	—	—	—
Pretoria	Z.	40·0	85	i 7 49	+11	—	—	—	—	—
La Paz		49·7	282	8 54	− 2	i 16 1	− 3	e 11 3	PP	25·4
Tananarive		58·7	90	—	—	e 18 29	+23	—	—	e 28·3
Tamanrasset	Z.	64·5	23	i 10 39a	− 2	e 19 17	− 2	e 13 0	PP	31·8
Fort de France		67·2	313	e 11 39	+41	—	—	—	—	—
Bogota	Z.	67·9	295	e 11 1	− 1	—	—	—	—	—
Malaga		75·8	11	i 11 47	− 3	e 21 39	+ 8	e 14 45	PP	—
Almeria		76·2	12	i 11 48	− 4	21 25	−11	14 41	PP	39·8
Granada		76·3	11	11 52	0	i 21 30	− 7	14 30	PP	38·5
Alicante		78·0	13	i 12 7	+ 5	22 7	+12	12 20	pP	36·2
Toledo		78·9	10	i 12 6	− 1	—	—	—	—	—
Helwan		81·6	41	i 12 24a	+ 3	e 22 37	+ 4	15 31	PP	—
Bermuda		83·3	321	e 12 51	+21	e 23 0	+10	e 28 0	SS	e 34·4
Rome		84·4	22	i 12 36	0	e 23 0	− 1	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Florence Arc.	z.	85·8	20	e 12 44	+ 2	—	—	—	—	—
Florence Xim.		85·8	20	e 13 5	+23	e 23 18	+ 3	—	—	—
Pavia		86·6	18	e 12 44	− 2	—	—	—	—	—
Ksara		87·1	42	i 12 54	+ 5	24 35	PS	—	—	—
Besançon		87·8	16	e 12 52	0	—	—	e 15 25	PP	—
Chur		88·2	18	e 12 51	− 3	—	—	—	—	—
Triest		88·2	21	e 12 55	+ 1	e 23 37	− 1	e 16 25	PP	—
Basle		88·4	17	e 12 55	0	e 24 1	+21	—	—	—
Zürich		88·5	17	e 12 56	0	e 23 29	−12	e 16 12	PP	—
Paris		88·6	13	e 12 57	+ 1	e 28 55?	SS	e 17 42	PPP	e 43·8
Zagreb		89·0	23	e 13 1	+ 3	—	—	—	—	—
Strasbourg		89·5	16	e 13 2	+ 2	e 23 41	− 9	e 16 35	PP	e 42·6
Istanbul		89·7	33	e 13 37	+36	e 24 18?	+26	—	—	—
Stuttgart		89·9	17	e 13 3	+ 1	e 23 51	− 3	e 29 37	SS	e 44·8
Cheb		91·9	18	e 13 21	+10	—	—	—	—	—
Rathfarnam Castle		91·9	7	e 13 3	− 8	e 23 52	[+ 8]	—	—	—
De Bilt		92·3	13	e 13 15	+ 2	e 24 19	+ 4	e 30 19	SS	e 43·8
Prague		92·4	20	e 13 13	− 1	e 22 40	?	—	—	—
Jena		92·5	18	e 13 16	+ 2	—	—	—	—	—
Collmberg		93·2	18	e 13 20	+ 3	—	—	e 16 59	PP	—
Potsdam		94·2	17	e 13 31	+ 9	—	—	—	—	—
Harvard		94·6	323	e 13 24	0	—	—	—	—	—
Tacubaya		96·0	290	e 13 53	+23	—	—	—	—	—
Tiflis		97·7	41	e 17 33	PP	—	—	—	—	—
Ottawa	z.	98·8	322	—	—	e 31 25	SS	—	—	—
Moscow		104·7	29	e 18 23	[0]	—	—	—	—	—
Samarkand		109·3	54	e 19 13	PP	—	—	—	—	—
Stalinabad		109·8	57	e 19 10	PP	—	—	—	—	—
Obi-garm		110·5	57	e 19 16	PP	—	—	—	—	—
Tashkent		111·7	54	i 19 23	PP	e 28 50?	PS	—	—	—
Tucson		111·9	294	e 18 12	[−25]	e 30 1	PPS	—	—	—
Andijan		113·4	57	e 19 35	PP	—	—	—	—	—
Sverdlovsk		115·2	36	19 45	PP	e 29 18	PS	—	—	—
Pierce Ferry		116·2	296	e 19 52	PP	e 29 19	PS	—	—	—
Boulder City		116·7	296	e 19 54	PP	—	—	—	—	—
Overton	z.	116·7	297	e 19 48	PP	—	—	e 29 13	PS	—
Palomar	z.	116·9	293	e 19 57	PP	—	—	—	—	—
Logan		117·4	303	e 29 40	PS	—	—	—	—	e 34·9
Riverside	z.	117·5	293	e 20 8	PP	e 22 32	PKS	e 39 5	P′P′	—
Mount Wilson	z.	118·1	293	e 20 0	PP	e 29 21	PKKP	e 39 0	P′P′	—
China Lake	z.	118·6	295	e 20 7	PP	—	—	e 29 14	PKKP	—
Tinemaha	z.	119·6	295	e 20 20	PP	i 22 1	PKS	—	—	—
Hungry Horse		121·7	309	e 19 1	[+ 5]	—	—	e 20 41	PP	—
Shasta Dam		124·1	298	e 19 8	[+ 7]	i 28 0	{+18}	—	—	—
Seattle		126·6	306	e 22 56	PKS	(e 26 42)	[+31]	—	—	e 29·7
Sitka		136·3	316	e 18 11	?	e 18 51	?	—	—	—
College		141·2	329	e 27 9	SKS	e 29 7	{−21}	—	—	e 30·0

Additional readings :—
La Paz iPPZ =11m.19s.
Tamanrasset eZ =10m.49s. and 10m.59s., iZ =11m.55s.
Malaga PPP =15m.49s.
Almeria PPP =16m.23s., S_eS =21m.53s.
Granada P_eS =12m.6s., pP =12m.28s., pPP =15m.18s., PS =22m.9s., SS =26m.12s.
Alicante PP =15m.13s., PPP =17m.8s., Q =32m.9s.
Helwan eZ =12m.37s., 13m.2s., and 13m.28s.
Besançon e =13m.16s. and 13m.54s.
Paris i =13m.6s., e =15m.7s. and 16m.58s.
Strasbourg e =15m.38s., ePPP =18m.37s., eS =23m.48s., ePS =24m.48s., e =25m.37s., eSS =29m.30s., eSSS =33m.13s., eQ =37·2m.
Collmberg eZ =13m.28s., eE =17m.6s., ePPP?E =20m.55s.
Tucson e =19m.21s.
Riverside ePKKP =29m.26s.
Hungry Horse e =24m.24s.
Long waves were also recorded at La Plata and Shawinigan Falls.

Aug. 22d. 20h. 26m. 0s. Epicentre 16°·0S. 13°·0W.

A = +·9371, B = −·2164, C = −·2739; δ = +1; h = +6;
D = −·225, E = −·974; G = −·267, H = +·062, K = −·962.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pretoria	Z.	39·5	111	i 7 54	+20	—	—	—	—	—
Grahamstown	Z.	39·6	123	i 8 0	+25	—	—	—	—	—
Tamanrasset	Z.	42·6	26	e 7 59	0	—	—	e 9 50	PP	22·0
La Paz	Z.	52·8	261	9 20	+ 1	—	—	—	—	—
Almeria		53·5	11	—	—	e 18 18	S_cS	—	—	e 27·3
Granada		53·6	9	9 12	−13	18 0	S_cS	21 48	SS	24·0
Alicante		55·3	12	—	—	e 18 20	S_cS	—	—	e 27·5
Tortosa	N.	57·9	13	9 59	+ 3	15 0	P_cS	10 53	P_cP	e 27·0
Rome		62·2	22	e 10 25	− 1	e 18 49	− 2	—	—	—
Helwan	Z.	62·5	44	e 10 32	+ 4	—	—	—	—	—
Taranto		62·8	26	e 14 0?	PPP	—	—	—	—	—
Clermont-Ferrand		63·2	13	i 10 31	− 1	—	—	29 0?	Q	30·5
Besançon		65·2	14	i 10 44	− 1	—	—	e 13 4	PP	—
Paris		66·0	11	i 10 49	− 1	—	—	e 13 15	PP	e 34·0
Triest		66·0	20	e 10 50	0	e 19 30	− 8	—	—	—
Strasbourg		66·9	15	i 10 55a	− 1	e 19 42	− 7	e 11 28	P_cP	—
Stuttgart		67·4	16	e 10 57	− 2	e 19 54	− 1	—	—	e 32·0
Ksara		68·0	43	e 11 8	+ 5	e 20 26	+24	—	—	—
Istanbul		68·9	33	e 12 3	+54	e 21 0?	+47	—	—	—
De Bilt		69·6	12	e 11 14	+ 1	e 20 30	+ 9	—	—	e 31·0
Prague		70·1	18	e 11 16	0	—	—	e 15 9	PPP	—
Collmberg	Z.	70·8	17	e 11 18	− 2	—	—	e 13 52	PP	—
Harvard		79·2	320	i 12 8	0	—	—	—	—	—
Fordham		79·8	318	e 12 11	− 1	—	—	—	—	—
Ottawa	Z.	83·3	321	i 12 30	0	—	—	—	—	—
St. Louis		90·2	310	e 13 5	+ 1	—	—	—	—	—

Additional readings :—
Tamanrasset iZ = 8m.5s.. eZ = 8m.49s.
Tortosa PP?N = 12m.14s., PPS?N = 18m.35s.
Helwan eZ = 10m.45s.
Paris e = 10m.54s., ePPP? = 14m.45s.
Strasbourg e = 11m.14s., iPP = 13m.19s.
Prague e = 12m.11s., 13m.14s., 14m.24s., 15m.18s., 16m.35s., and 18m.20s.
Long waves were also recorded at Bogota, Huancayo, Butte, Seattle, Kew, Victoria, and Bombay.

Aug. 22d. Continuation of the list of aftershocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.
0	18	6	21	12	50

Andijan.

h.	m.	s.	h.	m.	s.
0	21	13	15	51	25?

Murgab.

h.	m.	s.	h.	m.	s.
1	39	51	15	51	52

Samarkand.

h.	m.	s.	h.	m.	s.
0	21	35	15	53	1

Stalinabad.

h.	m.	s.	h.	m.	s.
0	21	15?	15	51	49

Tashkent.

h.	m.	s.
0	22	2?

Frunse.

h.	m.	s.
15	53	53

Aug. 22d. Readings also at 1h. (Hungry Horse, Tucson, near Boulder City, and Pierce Ferry), 2h. (Boulder City and Pierce Ferry), 3h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Mineral, Berkeley, Shasta Dam, Hungry Horse, Victoria, College, Ottawa, and Tamanrasset), 4h. (Istanbul, Stuttgart, Mount Wilson (2), and Tinemaha (2)), 5h. (Brisbane, Mount Wilson, Tinemaha, Pierce Ferry, Seattle, College, and near Sitka), 6h. (Mount Wilson, Pasadena (2), Palomar (3), Riverside (3), China Lake (3), Tinemaha (4), Tucson (2), Boulder City, Overton, Pierce Ferry (2), Branner, Berkeley (2), Fresno, Shasta Dam (2), Hungry Horse (4), Seattle, Sitka (4), College (2), Butte, Ottawa (3), SevenFalls, Shawinigan Falls, Cleveland, Harvard (2), Besançou, Paris, Strasbourg, Stuttgart, and near Fort de France), 7h. (Mount Wilson, Pasadena, Palomar, Riverside (2), China Lake (2), Tinemaha (2), Tucson, Boulder City (2), Overton, Pierce Ferry (3), Berkeley, Shasta Dam (2), Hungry Horse (2), Seattle (4), Sitka (3), College, Ottawa, Harvard, Tacubaya, Antofagasta, Tamanrasset, Besançon, and near La Paz), 8h. (Mount Wilson, China Lake, Tinemaha, Pierce Ferry, Hungry Horse, Seattle, Sitka, College (2), and Ottawa (2)), 9h. (Mount Wilson, Riverside, Tinemaha, Overton, Hungry Horse, and Seattle), 10h. (Overton (2)), 11h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Pierce Ferry, Berkeley, Shasta Dam, Hungry Horse, College, and Mizusawa), 12h. (Pasadena (2), Palomar (2), Riverside (2), China Lake (2), Tinemaha (2), Tucson, Overtou, Pierce Ferry, Shasta Dam, Fresno, Seattle (2), Hungry Horse, Victoria, Sitka, College, Bozeman, Butte, Logan, Rapid City, Saskatoon, Chicago, Ottawa, Shawinagan Falls, Cleveland, Philadelphia, Harvard, La Paz, and Paris), 13h. (Pasadena, Riverside, China Lake, Tinemaha, Tucson, Pierce Ferry, Shasta Dam, Fresno, Hungry Horse (2), Seattle (2), Victoria (2), Sitka, College, Bozeman, Butte, Logan, Rapid City, Saskatoon, Chicago, Ottawa, and Paris), 14h. (Pretoria, Grahamstown, Tamanrasset, Helwan, Harvard, Philadelphia, Seven Falls, Shawinigan Falls, Fort de France, and La Paz), 15h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Overton, Branner, Shasta Dam (2), Hungry Horse (2), Seattle (2), College, Ottawa, Kew, De Bilt, and Ksara), 17h. (Shasta Dam, Hungry Horse, Seattle, and Victoria), 18h. (Shasta Dam, Hungry Horse, Seattle (2), Philadelphia, and near Istanbul), 19h. (Riverside, Tinemaha, Tucson, Shasta Dam, Hungry Horse, Seattle (2), Victoria, Butte, Logan, Saskatoon, and near Mizusawa), 20h. (Hungry Horse, Chicago, Ottawa, Philadelphia, Shawinigan Falls, near Basle, Ebingen, Zürich, and Stuttgart), 21h. (Shasta Dam, and Hungry Horse), 22h. (Boulder City and Overton).

Aug. 23d. 2h. 59m. 19s. Epicentre 53°·8N. 133°·2W. (as on 22d.).

Approximate determination.

$A = -\cdot4061$, $B = -\cdot4324$, $C = +\cdot8051$; $\delta = +7$; $h = -6$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		4·0	343	i 0 24	−40	e 1 3	−49	—	—	i 2·0
Victoria		8·1	127	2 4	+ 2	3 51	SS	i 2 8	PP	i 4·4
College		13·3	332	3 41	+28	e 6 47	?	e 6 11	SSS	e 7·2
Shasta Dam		15·0	147	e 3 39	+ 4	—	—	e 3 44	PP	—
Mineral	z.	15·6	145	e 3 47 a	+ 4	—	—	i 3 55	PP	—
Reno		16·9	142	i 4 4	+ 5	—	—	—	—	—
Berkeley		17·6	149	e 4 13	+ 5	e 7 54	SS	e 7 57	SSS	e 10·2
Logan		18·7	122	e 4 18	− 4	—	—	e 4 23	P	e 8·3
Tinemaha	z.	19·7	142	e 4 32	− 2	—	—	—	—	—
Overton	z.	21·6	135	e 4 55	+ 1	—	—	e 4 59	P	—
Rapid City	E.	21·8	104	i 4 54	− 2	e 8 56	+ 4	—	—	e 11·4
Mount Wilson	z.	22·3	145	e 5 0	− 1	—	—	—	—	—
Riverside	z.	22·8	145	e 5 5	0	—	—	—	—	—
Palomar	z.	23·5	143	e 5 21	+ 9	—	—	—	—	—
Tucson		26·8	134	e 5 41	− 3	—	—	e 9 10	PcP	e 17·0
Ottawa		37·3	79	e 7 3	−13	—	—	—	—	19·3
Paris		71·1	30	e 11 14	− 8	—	—	—	—	38·7

Shasta Dam also gives e = 4m.7s.
Long waves were also recorded at Scoresby Sund, Kew, Granada, Bermuda, and at other North American stations.

Aug. 23d. 9h. 11m. 32s. I
9h. 22m. 13s. II
Epicentre 46°·7N. 9°·6E. (as on 1947, Oct. 7d.).

Intensity V at Chur and nearby; IV at Lenzerheide and Davos; III-IV at Domleschg.
Macroseismic radius 15km.
Epicentre 46°·8N. 9°·5E.

Dr. E. Wanner:
Jahresbericht des Erdbebendienstes der Schweiz im Jahre 1949, Zürich, 1950, p, 3, with macroseismic chart.

A = +·6786, B = +·1148, C = +·7255; δ = +3; h = −4;
D = +·167, E = −·986; G = +·715, H = +·121, K = −·688.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
I	Chur	0·2	—	i 0 3	P_g	i 0 4	S_g	—	—
II		0·2	—	i 0 2	P_g	i 0 3	S_g	—	—
I	Zürich	1·0	314	i 0 20	− 1	i 0 35	− 1	i 0 31	S_g
II		1·0	314	i 0 19	− 2	i 0 35	− 1	i 0 31	S_g
I	Ravensburg	1·1	1	e 0 21?	− 1	i 0 38	− 1	—	—
II		1·1	1	e 0 22?	0	i 0 38	− 1	—	—
I	Basle	1·6	301	i 0 32	+ 2	i 0 53	+ 2	—	—
II		1·6	301	i 0 32	+ 2	e 0 53	+ 2	—	—
I	Neuchatel	1·8	279	e 0 34	+ 2	i 0 52	− 4	i 0 37	P_g
II		1·8	279	i 0 37	P_g	i 1 0	S_g	—	—
I	Stuttgart	2·1	352	e 0 35	− 2	e 0 58	− 6	e 0 44	P_g
II		2·1	352	e 0 41?	P_g	i 1 5	S*	e 1 11	S_g
I	Strasbourg	2·3	327	—	—	e 1 4	− 5	i 1 17	S_g
II		2·3	327	—	—	i 1 12	S*	e 1 16	S_g
I	Besançon	2·5	283	e 0 52	P_g	e 1 22	S_g	—	—
II		2·5	283	e 0 52	P_g	e 1 22	S_g	—	—
I	Jena	4·4	16	e 1 29	P_g	e 2 20	S*	e 2 23	S_g
I	Clermont-Ferrand	4·6	261	—	—	e 2 5	− 2	e 2 19	S*
II		4·6	261	—	—	e 2 25	S*	—	—
I	Collmberg	5·1	25	e 1 38?	P_g	e 2 17	− 3	e 2 44	S_g
II	z.	5·1	25	e 1 39?	P_g	—	—	e 2 44	S_g

Additional readings:—
Stuttgart I iS = 1m.6s., iS_g = 1m.12s.
Strasbourg I i = 1m.21s. and 1m.28s.
Clermont-Ferrand I e = 2m.48s., II e = 2m.48s.
Collmberg II eE = 1m.54s.

Aug. 23d. 13h. 40m. 42s. Epicentre 39°·5N. 40°·6E. (as on 17d.).

A = +·5875, B = +·5035, C = +·6335; δ = −1; h = −1.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Leninakan		2·8	63	0 42	− 5	i 1 32	S_g	i 0 48	P_g	—
Erevan		3·1	76	0 50	− 1	e 1 32	+ 3	—	—	—
Tiflis		3·9	53	0 57	− 5	1 50	0	i 1 7	P*	—
Sotchi		4·1	351	e 1 7	+ 2	—	—	—	—	—
Piatigorsk		4·9	21	1 15	− 2	—	—	—	—	—
Grozny		5·4	45	e 1 40?	P*	3 2	S_g	—	—	—
Ksara		6·8	215	i 1 42	− 2	e 3 42?	S_g	—	—	—
Yalta		6·9	318	—	—	i 3 18	+13	—	—	—
Baku		7·2	80	e 2 17?	P_g	—	—	—	—	—
Istanbul		8·9	284	(e 2 15)	+ 3	(4 4)	+ 9	—	—	—
Helwan	z.	12·2	221	i 2 57k	− 1	i 12 18	P_eS	3 20	PPP	6·8
Ashkabad		14·0	91	e 3 13	− 9	—	—	—	—	—
Lwow		15·6	317	—	—	e 6 49	+12	—	—	—
Moscow		16·4	354	e 3 50	− 3	—	—	—	—	—
Raciborzu		19·0	312	e 4 26	0	—	—	e 4 33	PP	—
Zagreb		19·1	298	e 4 32	+ 5	—	—	—	—	—
Samarkand		20·3	82	e 4 38	− 2	—	—	—	—	—
Triest		20·7	297	e 4 47	+ 3	i 8 42	+11	—	—	e 12·8
Prague		21·3	310	e 4 50	0	e 8 54	+11	—	—	—
Rome		21·4	286	e 4 56	+ 5	e 9 1	+16	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sverdlovsk		21·8	30	4 50	− 6	8 53	+ 1	—	—	—
Stalinabad		21·9	83	e 4 53?	− 4	i 8 56?	+ 2	—	—	—
Tashkent		21·9	76	i 5 4?	+ 7	i 9 5?	+11	—	—	—
Collmberg		22·6	310	e 5 3	0	e 8 54?	−13	—	—	—
Obi-garm		22·6	83	i 4 57?	− 6	—	—	—	—	—
Jena		23·3	308	e 5 8	− 2	—	—	e 5 41	PP	—
Stuttgart		24·2	304	e 5 20	+ 1	e 9 50	+15	—	—	e 14·7
Andijan		24·3	77	e 5 15	− 5	—	—	—	—	—
Copenhagen		24·7	321	i 5 29	+ 5	—	—	—	—	12·3
Strasbourg		25·1	303	e 5 30	+ 2	e 10 4	+13	e 6 10	PP	e 14·6
Besançon		26·2	300	e 5 36	− 2	—	—	e 6 11	PP	—
Clermont-Ferrand		28·1	295	e 6 0	+ 5	e 11 9	+29	—	—	—
Paris		28·6	302	e 6 44	PP	—	—	—	—	—
Kew		30·7	308	e 9 18?	P_cP	—	—	—	—	—
Alicante		31·8	282	—	—	e 10 44	−54	—	—	e 14·7
Tamanrasset	z.	34·1	252	i 6 47a	− 1	—	—	e 6 36	P	—
Rathfarnham Castle		34·5	310	e 6 56	+ 4	e 12 14	− 6	—	—	—

Additional readings and note :—
Tiflis i = 1m.39s.
Istanbul readings have been reduced by 5m.
Jena eN = 5m.37s.
Strasbourg e = 5m.33s., iPPP = 6m.30s., e = 10m.48s., eSS? = 11m.8s. and 11m.14s., eSSS? = 11m.28s.
Besançon e = 5m.53s.
Tamanrasset eZ = 6m.50s.
Long waves were also recorded at Florence Arc.

Aug. 23d. 15h. 13m. 44s. Epicentre 15°·6S., 73°·2W. Depth of focus 0·015.
(as on July 21d.).

Intensity IV at Arequipa and Chala ; III-IV at Aplao.
Epicentre 16°S., 73°W. (U.S.C.G.S.). Depth about 150km.

E. Silgado.
Datos Sismologicos del Perú, 1949-50, Instituto Geologico del Perú, Lima, 1952, Bol. No. 4, p. 14.

A = +·2785, B = −·9225, C = −·2673 ; δ = +2 ; h = +6 ;
D = −·957, E = −·289 ; G = −·077, H = +·256, K = −·964.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·1	329	i 1 2	0	i 1 59	+ 9	i 1 32	?	—
La Paz		5·0	101	i 1 9	− 5	i 2 17	+ 5	i 1 22	pP	—
Antofagasta	E.	8·4	162	i 2 55	+55	3 59	sS	—	—	—
Copiapo	N.	12·0	168	2 16?	−32	—	—	—	—	—
Santa Lucia	N.	17·9	173	e 3 47	−15	i 8 10	SSS	i 9 32	?	—
Bogota		20·1	358	i 4 29	+ 3	i 8 31	sS	i 4 54	PP	10·3
La Plata	N.	23·6	147	4 47	−13	9 9	+ 7	—	—	11·5
San Juan		34·5	13	e 6 51	+13	e 12 5	+ 9	—	—	e 14·9
Tacubaya		43·2	323	i 6 27	?	—	—	e 7 24	?	—
Bermuda		48·4	9	e 7 41	−50	e 15 42	+22	e 18 36	SS	e 20·8
Columbia		49·9	351	—	—	e 20 27	SSS	—	—	e 26·0
Philadelphia		55·3	359	e 9 15	− 7	e 16 57	+ 3	e 11 26	PP	e 23·6
Pennsylvania		56·3	356	—	—	i 17 24	+16	—	—	—
Harvard		57·8	3	i 9 42	+ 2	—	—	—	—	e 29·3
Chicago		58·6	346	—	—	e 17 47	+ 9	e 24 6	SSS	e 28·8
Tucson		59·7	324	e 9 51	− 2	e 18 6	+14	e 10 21	pP	e 29·8
Ottawa		60·8	359	e 10 2	+ 1	e 18 23	+17	—	—	26·3
Seven Falls	E.	62·5	3	—	—	e 17 46	−42	—	—	29·3
Palomar	Z.	64·1	320	i 10 23	0	—	—	e 10 35	pP	—
Boulder City		64·7	324	e 10 26	− 1	—	—	e 11 4	pP	—
Overton	Z.	64·8	324	e 10 28	+ 1	—	—	—	—	—
Riverside	Z.	64·8	320	e 10 27	0	—	—	e 10 39	pP	—
Pasadena		65·4	320	e 10 30	− 1	e 19 21	+18	e 10 42	pP	e 31·0
Logan		67·3	330	e 10 41	− 2	—	—	—	—	—
Tinemaha		67·4	323	i 10 45	+ 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Clara		69·8	321	—	—	e 20 14	+18	—	—	—
Reno		70·0	324	e 11 0	0	—	—	e 11 10	P	—
Berkeley		70·4	321	—	—	e 20 20	+17	—	—	e 34·6
Shasta Dam		72·2	323	i 11 11	− 2	—	—	i 12 6	pP	—
Hungry Horse		73·3	334	i 11 49	pP	i 12 26	sP	—	—	—
Saskatoon		73·4	340	—	—	e 20 34	− 3	—	—	43·3
Victoria		77·9	329	11 47k	+ 2	21 47	SP	e 30 7	SSS	41·3
Malaga		83·1	49	i 12 16	+ 3	e 22 46	+26	—	—	—
Granada		83·8	49	i 12 20k	+ 4	i 22 40	+13	—	—	—
Almeria		84·5	50	12 22	+ 2	22 48	+14	15 40	PP	47·4
Toledo		84·7	47	i 12 22	+ 1	—	—	—	—	—
Tamanrasset	z.	85·9	65	i 12 29k	+ 2	—	—	e 12 56	pP	47·3
Alicante		86·6	49	—	—	e 23 11	+17	—	—	e 40·8
Tortosa		88·2	47	12 45	+ 7	23 28	+19	16 19	PP	e 39·3
Rathfarnham Castle		89·3	34	e 12 15	−28	i 23 49	+30	—	—	—
Clermont-Ferrand		91·8	43	e 12 58	+ 4	e 23 31	−11	e 25 59	PPS	45·3
Kew		91·8	37	e 12 57	+ 3	e 25 9	PS	e 16 37	PP	e 37·3
Paris		92·5	40	i 12 59	+ 1	e 25 35?	PS	e 16 40	PP	e 46·3
Scoresby Sund		92·8	13	—	—	24 10	+20	—	—	40·3
Besançon		94·2	43	e 13 6	+ 1	—	—	e 16 52	PP	—
De Bilt		95·2	37	e 13 12	+ 2	e 24 28	+17	—	—	e 41·3
Strasbourg		95·7	41	e 13 29	+17	e 24 6	− 9	e 17 2	PP	e 40·3
Stuttgart		96·7	41	e 13 17	0	e 26 46	PPS	—	—	e 49·3
Rome		97·1	49	e 13 20	+ 1	e 23 54	[+12]	e 24 14	S	—
College		97·6	335	e 13 20	− 1	—	—	—	—	—
Triest		98·9	44	e 17 30	PP	e 27 20	PPS	—	—	—
Collmberg	z.	99·7	39	e 13 32	+ 2	—	—	—	—	—
Copenhagen		100·3	35	—	—	24 32	−22	32 34	PSS	46·3
Prague		100·3	40	e 16 13	?	—	—	e 16 41	?	—
Upsala		102·8	31	—	—	e 34 16	?	—	—	e 55·3
Istanbul		109·3	51	e 19 16?	PP	e 29 16?	PPS	—	—	—
Helwan	z.	110·0	63	i 18 49a	PP	—	—	—	—	—
Ksara		114·2	59	i 19 22	PP	e 30 16	PPS	—	—	—

Additional readings :—
La Paz iS_g =2m.54s.
Bogota iPPP =5m.3s.
Philadelphia i =17m.29s., eS_cS? =19m.6s.
Chicago e =19m.32s.
Tucson eS_cS =19m.40s.
Boulder City eP_cP =10m.47s.
Shasta Dam iP_cP =11m.36s., i =11m.42s.
Hungry Horse ipP =11m.57s.
Saskatoon e =31m.40s. and 36m.10s.
Almeria PPP =17m.34s., SS =28m.32s.
Tamanrasset iZ =12m.39s.k, ePPZ =16m.2s.
Tortosa S_cSE =23m.50s., PS?E =24m.49s., SS?E =29m.23s.
Clermont-Ferrand eSSS? =35m.16s., Q =40m.46s.
Kew ePPS =25m.49s., ePKKP =28m.39s., eSS =30m.21s.
Paris e =13m.12s. and 28m.16s.
Strasbourg e =13m.47s., eSKKS =24m.10s., ePS =25m.56s., ePPS? =26m.16s., eSSP? =30m.46s., e =32m.23s.
Rome ePPS =26m.0s.
Copenhagen eS =25m.32s.
Helwan eZ =20m.58s. and 23m.19s., eN =26m.49s.
Long waves were also recorded at Wellington, Ukiah, Sitka, and Bombay.

Aug. 23d. 19h. 37m. 30s. Epicentre 52°·6N. 132°·1W. (as on 1940, July 3d.).

A = −·4089, B = −·4525, C = +·7924 ; δ = −15 ; h = −6 ;
D = −·742, E = +·670 ; G = −·531, H = −·588, K = −·610.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hungry Horse		12·3	103	i 2 59	0	—	—	—	—	—
Mineral	z.	14·2	145	e 3 23	− 1	i 5 24	−40	—	—	—
Reno		15·6	142	e 4 0	PP	—	—	—	—	—
Fresno	z.	18·1	146	i 4 15a	+ 1	—	—	—	—	—
Tinemaha	z.	18·3	142	i 4 19	+ 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Overton	Z.	20·3	134	i 4 40	0	—	—	—	—	—
Boulder City		20·7	135	e 4 44	0	—	—	—	—	—
Pasadena	Z.	21·0	145	e 4 46	− 1	—	—	—	—	—
Riverside	Z.	21·4	145	e 4 51	0	—	—	—	—	—
Tucson		25·5	134	e 5 34	+ 2	—	—	—	—	—
Malaga		80·1	40	(12 36)	PcP	—	—	—	—	12·6
Istanbul		85·3	14	e 18 30?	PPP	e 28 30?	SS	—	—	—

Long waves were recorded at numerous other North American stations.

Aug. 23d. 19h. 43m. 35s. Epicentre 52°·6N. 132°·1W. (as at 19h. 37m.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		4·8	339	(e 1 15)	0	—	—	—	—	e 1·2
Victoria		6·9	123	2 51?k	+66	i 4 27	L	i 3 49	SSS	(i 4·4)
Hungry Horse		12·3	103	i 3 29	+30	—	—	—	—	—
Ferndale		13·2	153	e 4 10	+59	e 6 37	+57	—	—	—
Shasta Dam		13·7	147	i 3 17	− 1	—	—	e 3 23	PP	—
Mineral	Z.	14·2	145	i 3 26a	+ 2	—	—	i 3 33	PP	—
Butte	N.	14·3	110	—	—	e 6 59	+53	—	—	e 7·6
College		14·7	333	(e 4 30)	+59	—	—	—	—	e 4·5
Reno	N.	15·6	142	e 3 45	+ 2	—	—	i 3 52	PP	—
Saskatoon		15·6	81	4 22	+39	8 10	L	4 55	?	(8·2)
Berkeley		16·3	151	e 3 49	− 3	e 7 3	+10	i 4 2	PP	—
Santa Clara		16·8	152	e 4 1	+ 3	e 7 29	SS	—	—	e 8·8
Fresno	Z.	18·1	146	i 5 15a	+61	—	—	—	—	—
Salt Lake City		18·2	121	e 4 16	0	e 7 17	−20	—	—	e 9·6
Tinemaha		18·3	142	i 4 19a	+ 2	—	—	i 4 48	PPP	—
Haiwee		19·3	142	i 4 29	0	—	—	—	—	—
Overton	Z.	20·3	134	e 4 39	− 1	—	—	—	—	—
Boulder City		20·7	135	e 4 43	− 1	—	—	e 5 19	PPP	—
Pasadena		21·0	145	i 4 46a	− 1	—	—	—	—	e 8·8
Riverside		21·4	145	i 4 50a	− 1	—	—	—	—	—
Palomar		22·2	143	i 4 59a	− 1	—	—	—	—	—
Tucson		25·5	134	e 5 32	0	—	—	e 6 1	PP	e 12·8
St. Louis		32·0	99	e 6 28	− 2	e 11 7	−35	—	—	e 15·2
Cleveland	E.	35·5	87	e 7 8	+ 8	e 12 45	+ 9	—	—	—
Ottawa		36·9	78	7 11	− 1	13 37	+39	—	—	19·4
New Kensington	E.	37·2	87	—	—	e 14 3	+61	—	—	e 19·2
Pennsylvania		38·1	86	—	—	e 14 46	?	—	—	i 20·1
Seven Falls	E.	38·8	73	(7 23)	− 5	(13 31)	+ 5	(13 9)	?	—
Philadelphia		40·3	85	e 9 7	PP	e 14 39	+50	e 15 39	?	e 20·8
Harvard		41·0	79	(e 8 0)	+14	(i 14 11)	+12	(e 9 4)	PP	(e 17·0)
Tacubaya		41·8	129	e 11 4	?	—	—	—	—	—
Halifax		44·4	71	—	—	e 17 15	?	e 17 41	ScS	23·3
Scoresby Sund		47·5	26	—	—	19 13	SS	—	—	22·4
Paris		71·9	30	i 11 27	0	—	—	—	—	e 36·4
Collmberg	Z.	72·4	22	e 11 31	+ 1	—	—	—	—	—
Strasbourg		73·6	27	e 11 36	− 1	—	—	—	—	e 34·4
Stuttgart		73·8	26	e 11 35	− 3	—	—	—	—	e 42·4
Besançon		74·3	28	e 11 40	− 1	—	—	—	—	—
Rome		81·0	26	e 12 17	− 1	e 22 27	0	—	—	—
La Paz	Z.	88·1	120	i 12 58k	+ 4	—	—	—	—	—

Additional readings and notes :—
Ferndale ePE = 4m.15s., eSN = 7m.8s., eE = 7m.30s., eN = 10m.26s.,
Mineral iZ = 4m.11s.
Reno iN = 5m.49s.
Berkeley iZ = 3m.54s. and 3m.57s., iN = 4m.5s.
Boulder City e = 4m.57s.
Tucson e = 6m.28s. and 9m.3s.
St. Louis e = 10m.52s., eSS = 13m.4s.
Cleveland eSN = 12m.48s., eN = 13m.8s. and 14m.1s.
Seven Falls readings reduced by 7m.
Harvard readings reduced by 7m.
Long waves were also recorded at Honolulu, Bermuda, and at other North American and European stations.

Aug. 23d. 20h. 24m. 31s. Epicentre 52°·6N. 132°·1W. (as at 19h. 43m.).

$A = -\cdot4089$, $B = -\cdot4525$, $C = +\cdot7924$; $\delta = -15$; $h = -6$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		4·8	339	e 1 11	− 4	i 1 54	−18	—	—	e 2·3
Victoria		6·9	123	i 1 47k	+ 2	i 3 18	+13	—	—	4·0
Seattle		8·0	124	e 2 4	+ 4	—	—	—	—	e 4·4
Hungry Horse		12·3	103	i 3 28	PPP	—	—	—	—	e 6·2
Shasta Dam		13·7	147	i 3 17	− 1	e 5 39	−13	i 3 25	PP	—
Mineral		14·2	145	i 3 27k	+ 3	—	—	i 3 30	P	e 7·9
Butte	N.	14·3	110	e 3 15	−11	e 5 54	−12	—	—	i 7·1
College		14·7	333	i 3 28	− 3	e 5 45	−31	—	—	e 7·9
Bozeman		15·4	109	e 3 40	0	e 6 42	+10	—	—	e 7·7
Reno		15·6	142	e 3 46	+ 3	—	—	i 3 57	PP	e 8·7
Saskatoon		15·6	81	3 45	+ 2	6 47	+10	3 57	PP	7·8
Berkeley		16·3	151	i 3 53k	+ 1	e 7 3	+10	e 3 59	PP	—
San Francisco		16·3	152	3 29?	−23	7 19?	+26	—	—	—
Branner		16·7	152	i 4 1	+ 4	e 7 28	SS	e 4 5	PP	—
Santa Clara		16·8	152	i 3 58	0	i 6 9	−56	—	—	e 7·2
Logan		17·5	119	i 4 6	− 1	e 7 42	SS	i 4 38	PPP	i 8·8
Fresno		18·1	146	i 4 17k	+ 3	—	—	i 4 22	PP	i 10·2
Salt Lake City		18·2	121	i 4 15	− 1	i 7 48	+11	i 8 14	SSS	i 9·3
Tinemaha		18·3	142	i 4 20k	+ 3	e 8 0	SS	—	—	—
Haiwee		19·3	142	e 4 30	+ 1	—	—	—	—	—
Overton	Z.	20·3	134	e 4 39	− 1	—	—	—	—	—
Boulder City		20·7	135	i 5 13	PPP	i 7 59	?	i 6 52	?	—
Pasadena		21·0	145	i 4 47a	0	e 8 21	−16	i 5 3	P	i 8·8
Riverside		21·4	145	i 4 51k	0	—	—	—	—	—
Palomar		22·2	143	i 5 1k	+ 1	—	—	—	—	—
Tucson		25·5	134	i 5 32	0	e 10 40	+43	i 6 12	PP	e 13·0
Chicago		31·6	92	e 6 28	+ 2	e 11 33	− 2	e 7 30	PP	e 14·4
St. Louis		32·0	99	e 6 27	− 3	e 11 45	+ 3	—	—	i 14·1
Cleveland		35·5	87	e 8 3	PP	e 12 42	+ 6	e 14 36	SS	—
Ottawa		36·9	78	7 10k	− 2	e 12 59	+ 1	e 8 33	PP	19·5
Honolulu		37·0	222	e 7 14	+ 1	e 13 3	+ 4	e 8 40	PP	e 15·7
New Kensington	E.	37·2	87	e 7 16	+ 1	—	—	—	—	—
Shawinigan Falls	N.	38·0	74	7 22	+ 1	i 13 19	+ 5	—	—	16·0
Pennsylvania		38·1	86	i 7 23	+ 1	i 13 22	+ 6	i 8 51	PP	—
Seven Falls	E.	38·8	73	7 28a	0	13 33	+ 7	8 55	PP	19·7
Manzanillo		39·9	136	e 6 21	−76	—	—	—	—	19·6
Philadelphia		40·3	85	e 7 41	+ 1	e 13 53	+ 4	e 9 11	PP	e 16·9
Columbia		40·6	96	e 7 42	− 1	e 13 52	− 2	e 9 16	PP	e 17·9
Harvard		41·0	79	i 7 46	0	e 14 8	+ 9	i 9 20	PP	i 21·0
Tacubaya		41·8	129	i 8 11	+18	e 14 26	+15	e 14 32	PS	—
Vera Cruz		43·5	125	e 11 1	PPP	—	—	—	—	e 25·8
Ivigtut		43·6	44	e 8 15	+ 7	i 14 47	+ 9	e 9 50	PP	20·5
Halifax		44·4	71	8 16	+ 2	14 56	+ 7	9 59	PP	22·5
Scoresby Sund		47·5	26	8 40	+ 2	15 37	+ 3	10 30	PP	23·5
Bermuda		51·6	85	e 9 30	+20	i 16 44	+13	e 11 40	PP	e 22·1
Reykjavik	N.	51·7	32	—	—	e 16 47	+15	e 19 59	SS	e 27·3
Sendai		59·1	293	10 3	− 1	17 52	−19	—	—	28·5
San Juan		61·0	67	e 10 19	+ 1	i 18 40	+ 5	e 12 29	PP	e 30·1
Galerazamba		61·6	110	e 10 45	+23	i 19 14	+31	i 23 39	?	—
Tokyo		61·6	292	e 10 7	−15	e 18 49	+ 6	—	—	—
Bergen		62·3	23	10 29	+ 3	18 59	+ 7	12 40	PP	27·5
Aberdeen		63·2	28	i 10 33	+ 1	i 19 10	+ 7	i 24 8	?	32·5
Nagoya		63·5	293	e 10 42	+ 8	—	—	—	—	—
Edinburgh	E.	63·9	30	10 37	0	e 19 3	− 9	—	—	—
Osaka		64·7	294	e 10 43	+ 1	—	—	—	—	—
Irkutsk		65·3	326	10 46	0	19 35	+ 6	13 8?	PP	—
Upsala		65·3	17	e 10 43a	− 3	19 32?	+ 3	13 5	PP	e 29·5
Durham		65·4	30	i 10 50	+ 3	i 19 43	+13	—	—	—
Helsinki		66·1	13	—	—	e 19 53	+14	e 20 50	PPS	e 33·5
Fort de France		66·9	96	e 10 42	−14	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		67·3	113	e 11 1	+ 2	i 20 0	+ 6	—	—	29·5
Copenhagen		68·2	21	i 11 3	− 1	i 20 11	+ 7	13 34	PP	33·0
Kew		68·7	31	e 11 4	− 3	e 20 12	+ 2	e 13 42	PP	e 30·5
De Bilt		69·7	27	i 11 11	− 3	e 20 29	+ 7	e 13 58	PP	e 32·5
Sverdlovsk		70·4	353	11 14	− 4	i 20 32	+ 2	e 11 30	P_cP	—
Potsdam		71·4	22	e 11 27	+ 3	e 20 52	+10	—	—	e 38·6
Moscow		71·7	7	e 11 23	− 3	20 48	+ 3	—	—	—
Paris		71·9	30	i 11 24	− 3	e 20 58	+10	i 11 40	P_cP	e 35·5
Collmberg		72·4	22	e 11 27	− 3	e 20 59	+ 6	e 14 6	PP	e 36·5
Jena	N.	72·4	24	e 11 27	− 3	e 20 58	+ 5	e 25 37	SS	e 37·8
Cheb		73·4	24	e 11 31?	− 5	i 21 11?	+ 6	—	—	—
Strasbourg		73·6	27	i 11 36	− 1	i 21 15	+ 8	i 14 20	PP	e 37·5
Stuttgart		73·8	26	e 11 36	− 2	e 21 17	+ 8	e 14 19	PP	38·5
Prague		73·9	22	i 11 40	+ 1	21 15	+ 5	e 11 52	pP	e 34·5
Besançon		74·3	28	i 11 38	− 3	—	—	e 14 26	PP	—
Basle		74·5	27	e 11 41	− 1	e 21 37	+20	—	—	—
Raciborzu		74·7	19	e 11 43	0	e 21 22?	+ 3	e 12 16	P_cP	—
Clermont-Ferrand		74·8	31	e 11 43	− 1	e 21 32	+12	i 11 55	P_cP	36·0
Neuchatel		74·8	27	e 11 42	− 2	e 21 29	+ 9	—	—	—
Zürich		74·9	27	e 11 43	− 1	e 21 24	+ 2	e 14 39	PP	—
Chur		75·6	27	e 11 47	− 1	e 21 39	+10	—	—	—
Skalnate Pleso		75·9	18	e 11 52	+ 2	21 21	−11	—	—	—
Lwow		76·0	15	e 12 3	P_cP	—	—	—	—	—
Lisbon		76·5	42	11 56	+ 2	21 36	− 3	—	—	36·3
Ogyalla		76·8	21	e 11 54	− 1	e 21 54	+12	—	—	—
Pavia		77·1	27	e 12 4?	+ 7	—	—	—	—	—
Toledo		77·5	31	i 11 58	− 1	—	—	—	—	—
Triest		77·8	24	e 12 0	− 1	e 21 59	+ 6	e 15 6	PP	—
Zagreb		78·2	22	e 12 5	+ 2	e 22 2	+ 5	—	—	e 42·5
Barcelona		78·3	33	e 12 5	+ 2	e 22 6	+ 7	—	—	e 40·0
Bologna		78·3	25	e 12 7	+ 4	e 22 15	+16	—	—	—
Tortosa		78·3	35	12 3	0	22 8	+ 9	12 11	P_cP	37·5
Prato		78·8	27	e 12 9	+ 3	e 22 12	+ 8	—	—	—
Florence Arc.		78·9	27	e 12 6	− 1	e 22 13	+ 8	e 14 56	PP	—
Florence Xim.		78·9	27	e 12 45	P_cP	i 22 12	+ 7	—	—	—
Granada		80·0	40	i 12 23a	+10	i 22 19	+ 2	15 18	PP	39·9
Alicante		80·1	37	12 17	+ 4	22 32	+14	12 21	pP	—
Belgrade		80·1	19	e 12 11k	− 2	i 22 24	+ 6	i 15 14	PP	e 44·8
Malaga		80·1	40	i 12 13	0	i 22 31	+13	15 23	PP	41·5
Huancayo		80·6	124	e 12 21	+ 5	i 22 31	+ 8	—	—	e 34·8
Almeria		80·7	40	i 12 16	0	i 22 30	+ 6	15 24	PP	40·5
Rome		81·0	26	e 12 15	− 3	i 22 39	+12	i 15 25	PP	—
Almata		81·3	338	e 12 17?	− 3	i 22 34	+ 4	—	—	—
Bucharest		81·6	16	e 12 18	− 3	i 22 38	+ 5	i 23 19	PS	38·5
Frunse		82·2	341	e 12 23	− 1	e 22 45	+ 6	—	—	—
Yalta		82·6	350	12 24	− 2	22 50	+ 7	i 23 40	PS	—
Algiers Univ.	Z.	82·8	35	e 12 26	− 1	—	—	i 12 34	P_cP	—
Taranto		83·6	23	12 26	− 5	22 56	+ 3	e 14 6	?	—
Piatigorsk		83·7	3	12 33	+ 1	—	—	—	—	—
Sotchi		83·9	6	e 12 49?	+16	—	—	—	—	—
Grozny		84·4	2	12 36	0	23 3	+ 2	—	—	—
Andijan		84·6	342	e 12 33	− 3	i 23 4	+ 1	e 12 39	P_cP	—
Tashkent		84·6	345	i 12 40?	+ 4	i 23 3?	0	e 24 5?	PS	—
Istanbul		85·3	14	e 14 12	?	e 24 24	PPS	—	—	—
Tiflis		86·0	3	e 12 46	+ 3	23 16	− 1	23 26	S_cS	—
Murgab		86·6	339	12 55?	+ 9	23 29?	+ 6	—	—	—
Samarkand		86·6	346	e 12 48	+ 2	—	—	—	—	—
Obi-garm		87·1	342	i 12 44	− 5	i 23 18	{− 3}	i 23 32	S_cS	—
Baku		87·4	358	e 12 56	+ 6	i 23 40	+10	—	—	—
Stalinabad		87·4	343	i 12 49	− 1	i 23 20	[+ 3]	i 23 38	S_cS	—
La Paz		88·1	120	i 12 55k	+ 1	i 23 46	+ 9	i 16 19	PP	42·1
Ashkabad		89·2	351	e 12 58	− 1	23 36	{+ 1}	—	—	—
Ksara		93·3	9	e 13 19	+ 1	e 24 3	{− 3}	—	—	—
New Delhi	N.	95·2	334	e 13 28	+ 1	i 24 5	[+ 3]	i 24 58	S	—
Tamanrasset	Z.	96·3	39	e 13 31	− 1	e 24 21	{− 6}	e 17 21	PP	44·5

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		96·6	13	i 13 35k	+ 2	24 11	[+ 1]	17 23	PP	—
Calcutta	E.	97·3	322	e 17 48	PP	e 25 0	+ 2	e 31 45	SS	—
Auckland	N.	100·4	220	—	—	i 24 32	[+ 3]	—	—	e 49·5
Brisbane		102·8	242	—	—	e 24 48	[+ 8]	i 25 59	S	—
Hyderabad	N.	105·4	329	18 20	[− 4]	24 47	[− 5]	—	—	—
Bombay	E.	105·6	335	e 18 35	PP	e 26 13	+ 6	—	—	—
Poona	N.	105·7	334	—	—	i 24 59	[+ 5]	i 35 29	SSS	—
Riverview		108·8	239	e 18 55	PP	i 25 17	[+10]	i 28 27	PS	49·4
Kodaikanal	E.	112·5	328	—	—	e 24 31	[−51]	—	—	—

Additional readings :—
Victoria i = 2m.12s., e = 2m.50s.
Shasta Dam e = 4m.47s. and 5m.10s.
Reno eSN = 4m.2s., eE = 4m.5s.
Berkeley iZ = 4m.11s. and 5m.0s.
Logan i = 5m.40s., iS = 7m.52s.
Tucson i = 5m.38s.
St. Louis i = 9m.59s., iS = 11m.48s.
Cleveland ePPE = 8m.10s., eE = 12m.52s.
Ottawa i = 7m.15s., P_cP? = 9m.32s., iS = 13m.6s., e = 17m.29s.
Shawinigan Falls eSN = 12m.44s.
Pennsylvania iEN = 16m.12s.
Seven Falls SSE = 16m.35s.
Columbia iS = 14m.0s., eSS = 16m.56s.
Harvard iPPP = 9m.51s., iSS = 17m.10s.
Ivigtut 18m.12s.
Halifax e = 16m.22s., SS = 18m.17s.
Scoresby Sund 18m.35s., SS = 19m.7s.
Bermuda eS_cS = 19m.7s., eSS = 20m.39s.
Reykjavik eN = 18m.41s.
Bergen S_cSN = 20m.26s., SSN = 22m.49s.
Irkutsk PPP = 14m.46s., PS = 19m.57s., S_cS = 20m.38s., eSSS = 26m.47s.
Upsala iPN = 10m.46s., P_cSN = 15m.4s., eS_cSN = 20m.40s., eS_cSE = 20m.46s., eN = 23m.8s., eSS?E = 23m.29s.?, eSSSN = 26m.47s., eE = 27m.14s.
Bogota ePP = 12m.31s., eSSEN = 25m.30s., eSSSEN = 27m.49s.
Copenhagen 21m.7s., SS = 24m.32s., SSS = 27m.35s.
Kew i = 11m.8s., iP_cP?Z = 11m.32s., ePPP = 15m.30s., ePPS?EN = 21m.14s., eSS = 24m.46s., eSSS = 28m.6s.
De Bilt iP = 11m.16s., ePPP = 15m.29s., eS_cS? = 21m.23s., eSS = 24m.59s.
Sverdlovsk PPP = 15m.36s., iPS = 21m.1s., SS = 25m.6s., eSSS = 28m.29s.
Potsdam eE = 11m.36s., and 12m.23s.?, eN = 16m.38s.
Paris i = 12m.29s., ePP = 13m.52s., iPPP = 15m.54s., i = 16m.44s., ePS? = 21m.29s., eSS? = 25m.51s., eSSS? = 29m.3s.
Collmberg eSSEN = 25m.41s., eSSSN = 29m.23s., eE = 29m.35s., ePKP,PKPZ = 39m.11s.
Jena ePNZ = 11m.31s., eSS?E = 25m.41s.
Strasbourg i = 11m.39s., iP_cP = 11m.46s., i = 12m.13s., 20m.9s., and 21m.45s., iPPS = 21m.53s., iSS = 25m.53s., and 26m.0s., iSSS = 29m.7s., i = 29m.12s., eQ = 35m.11s.
Stuttgart iP = 11m.40s., ePS = 21m.53s., eSS = 25m.59s., eSSS? = 29m.59s., eQ = 36·5m.
Prague esP = 12m.4s., e = 14m.14s., ePP = 14m.50s., ePPP = 16m.13s., ePS = 21m.44s., eSS = 25m.57s., eSSS = 29m.41s.
Besançon e = 11m.42s., eP_cP = 11m.56s., e = 12m.29s. and 14m.15s.
Raciborzu ePEN = 11m.46s.
Clermont-Ferrand iP = 11m.47s., iPP = 14m.41s., ePPP = 16m.23s., ePS = 22m.6s., eSS = 26m.37s., eSSP = 26m.48s., eSSS = 30m.2s.
Triest iPPP = 16m.44s.
Tortosa PPEN = 15m.10s., S_cSE = 22m.16s., PSEN = 22m.50s., PPSN = 23m.14s., SSE = 27m.23s., SSSN = 30m.49s.
Granada P_cP = 12m.25s., PS = 23m.1s., SS = 27m.43s., SSS = 31m.16s.,
Alicante PP = 15m.26s., S_cS = 22m.43s., sS = 22m.46s., PS = 23m.4s., PPS = 23m.21s., S = 27m.26s., SSS = 30m.28s.
Huancayo i = 12m.55s., eSS = 28m.29s.
Almeria PPP = 17m.20s., S_cS = 22m.44s., PS = 23m.46s., SS = 28m.0s., SSS = 31m.24s.
Rome iP = 12m.19s.
Bucharest iE = 13m.24s., iPPEN = 14m.55s., iPPP?N = 16m.53s., iPPPE = 17m.9s., iPSE = 23m.24s.
Algiers Univ. eZ = 12m.55s. and 15m.2s.
Tashkent eSS = 28m.54s.?.
La Paz iPS = 24m.42s., iPPS = 25m.10s., iSS = 29m.30s.
Tamanrasset ePPPZ = 19m.27s., eZ = 22m.57s., ePSZ = 26m.9s.
Helwan eZ = 14m.35s., 16m.8s., and 16m.51s., PPPZ = 19m.29s., SN = 24m.59s., PSN = 26m.9s., eN = 27m.9s.
Poona iN = 26m.15s., 27m.51s., and 34m.9s.
Riverview iS?N = 26m.7s., iS?E = 26m.10s., eN = 32m.18s., iN = 34m.16s., eE = 34m.23s., 34m.39s., and 36m.27s.
Long waves were also recorded at Guadalajara, Christchurch, Wellington, and Pretoria,

Aug. 23d. 21h. 42m. 28s. Epicentre 37°·5N. 140°·7E. Depth of focus 0·010.

Intensity IV at Mito and Tukubasan; II-III at Shirakawa, Hukusima, Onahama, and Sendai. Macroseismic radius 200-300km.
Epicentre as adopted. Depth 100km.
Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1949, Tokyo, 1950, p.27., with macroseismic chart.

$A = -·6154$, $B = +·5037$, $C = +·6062$; $\delta = -9$; $h = -1$;
$D = +·633$, $E = +·774$,; $G = -·469$, $H = +·384$, $K = -·795$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.
Hukusima		0·3	324	0 13a	− 2	0 23	− 3
Onahama		0·6	165	0 18k	+ 1	0 30	+ 1
Sendai		0·8	11	0 18	0	0 32	0
Mito		1·1	189	0 22k	0	0 38	0
Tukubasan		1·4	210	0 24k	− 1	0 41	− 3
Kumagaya		1·7	218	0 30k	+ 1	0 49	− 2
Maebasi		1·7	231	0 28a	− 1	0 50	− 1
Mizusawa	E.	1·7	12	0 28	− 1	0 50	− 1
Aikawa		2·0	285	0 30	− 3	0 54	− 3
Tokyo		2·0	202	0 33	0	0 56	− 1
Morioka		2·2	9	0 36	0	1 4	+ 2
Nagano		2·2	247	0 33	− 3	—	—
Akita		2·3	348	0 35	− 2	1 5	0
Miyako		2·4	25	0 39	+ 1	1 6	− 1
Hunatu		2·5	217	0 40	0	1 12	+ 2
Mera		2·7	195	0 41	− 2	—	—
Osima		2·9	201	0 44	− 1	1 20	+ 1
Toyama		2·9	253	0 43	− 2	1 25	+ 6
Omaesaki		3·5	216	1 6	+12	1 38	+ 4
Nagoya		3·8	234	1 3	+ 5	1 58	+16
Hikone		4·2	240	1 2	− 1	—	—
Kameyama		4·3	234	1 19	+14	2 7	+13
Mori		4·6	358	1 8	− 1	—	—
Osaka		5·1	237	1 55	+39	—	—

Aug. 23d. 22h. 3m. 55s. Epicentre 39°·2N. 70°·7E. (as on July 23d.).

$A = +·2568$, $B = +·7334$, $C = +·6295$; $\delta = +9$; $h = -1$;
$D = +·944$, $E = -·331$; $G = +·208$, $H = +·594$, $K = -·777$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Obi-garm		0·9	237	i 0 20	0	0 35	+ 1	—	—	—
Stalinabad		1·6	247	i 0 34	+ 4	i 1 2	S_g	—	—	—
Andijan		2·0	39	0 33	− 2	i 1 0	− 2	—	—	—
Tashkent		2·4	333	i 0 47	+ 6	i 1 28	S_g	—	—	—
Murgab		2·7	108	i 0 42?	− 3	—	—	—	—	—
Samarkand		2·9	279	i 0 56	P_g	—	—	—	—	—
Frunse		4·7	38	e 1 13	− 1	e 2 6	− 4	—	—	—
Almata		6·2	47	i 1 31	− 4	i 2 42	− 6	—	—	—
Ashkabad		9·8	267	e 2 26?	+ 2	—	—	—	—	—
New Delhi	N.	11·9	151	e 2 43	−11	—	—	i 5 5	SS	i 6·0
Semipalatinsk		13·1	28	e 3 5	− 5	—	—	—	—	—
Sverdlovsk		18·9	343	i 4 21	− 3	i 7 55	+ 2	—	—	—
Grozny		19·2	290	4 31	+ 3	8 15	+16	—	—	—
Tiflis		19·8	285	4 36	+ 1	—	—	—	—	—
Erevan		20·2	281	4 46	+ 7	—	—	—	—	—
Bombay	E.	20·3	175	—	—	e 8 26	+ 3	—	—	e 10·7
Leninakan		20·6	284	e 4 58?	+15	—	—	—	—	—
Poona	N.	20·8	172	i 4 40	− 5	i 8 39	+ 6	—	—	10·6
Piatigorsk		21·2	293	4 51	+ 2	—	—	—	—	—
Calcutta	E.	22·4	133	e 4 57	− 5	e 8 57	− 7	e 9 36	SS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hyderabad	N.	22·7	161	—	—	e 9 0	− 9	—	—	—
Sotchi		23·6	290	e 5 12	− 1	—	—	—	—	—
Irkutsk		26·6	49	e 5 36	− 6	—	—	—	—	—
Moscow		27·5	318	5 49	− 1	—	—	—	—	—
Yalta		27·6	293	e 5 10?	−41	—	—	—	—	—
Ksara		28·4	269	e 6 1	+ 3	e 11 19	+34	—	—	—
Kodaikanal	E.	29·5	167	e 11 48	S	(e 11 48)	+46	12 17	SS	e 15·1
Helwan	Z.	33·5	266	e 6 43	0	—	—	e 8 45	PPP	—
Lwow		34·4	304	e 7 6?	+15	e 12 6	−13	—	—	—
Skalnate Pleso		36·9	304	e 9 17	PPP	—	—	—	—	e 16·8
Raciborzu		38·2	305	e 7 58	+35	e 16 30	SSS	e 17 21	S_cS	e 18·2
Upsala	N.	38·8	320	—	—	e 15 39	SS	—	—	e 20·7
Prague		40·6	305	e 7 47	+ 4	e 16 45	SS	—	—	—
Potsdam	E.	41·2	309	—	—	e 16 41	SS	—	—	—
Collmberg		41·4	308	e 7 49	− 1	—	—	e 9 29	PP	—
Copenhagen		41·4	314	7 49	− 1	—	—	—	—	—
Triest		41·8	298	e 7 51	− 2	e 14 58	+47	i 9 37	PP	—
Jena		42·7	306	e 7 57	− 3	—	—	e 8 1	P	—
Rome		43·6	293	e 8 13	+ 5	e 14 37	− 1	—	—	—
Stuttgart		44·2	304	e 8 12	0	—	—	e 10 5	PP	—
Zürich		44·9	303	e 8 21	+ 3	—	—	—	—	—
Strasbourg		45·1	304	i 8 20	0	e 14 40	−19	i 10 15	PP	e 25·1
Basle		45·5	302	e 8 22	− 1	—	—	—	—	—
De Bilt		46·0	309	—	—	e 19 5?	SSS	—	—	—
Besançon		46·1	304	e 8 30	+ 2	—	—	e 10 20	PP	—
Paris		48·5	305	e 8 44	− 2	—	—	e 11 16	PPP	e 32·1
Clermont-Ferrand		49·0	301	e 8 50	0	—	—	—	—	25·6
Alicante		54·1	294	e 7 14	?	—	—	e 12 38	PPP	—
Tamanrasset	Z.	57·1	275	i 9 49k	− 1	—	—	e 12 4	PP	26·1
College		72·0	17	i 11 22	− 6	—	—	—	—	—
Pretoria	Z.	75·8	219	i 11 46	− 4	—	—	—	—	—
Ottawa	Z.	90·5	338	e 13 3	− 2	—	—	—	—	—

Additional readings :—
Upsala eN = 16m.26s. and 17m.8s.?.
Postdam eN = 16m.47s.
Collmberg eE = 9m.22s. and 17m.28s.?.
Triest iSS = 17m.24s.
Strasbourg i = 8m.46s., e = 16m.42s., eSS? = 17m.57s., eSSS? = 18m.59s., e = 19m.37s.
Besançon e = 9m.43s., 10m.43s., and 12m.39s.
Tamanrasset eZ = 10m.7s.
Long waves were also recorded at Tortosa and Victoria.

Aug. 23d. Continuation of the list of aftershocks from the epicentre of the Turkestan earthquake on July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	58	13	5	20	3	19	13	31	23	31	21
1	59	13	5	24	46	19	31	16	23	37	43
4	34	22	17	27	41						

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	18	28	5	20	21	13	5	56	19	31	31
1	59	23	9	18	35	17	28	8	23	37	56
4	34	34									

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	28	29	5	20	17	5	47	19	17	27	58
1	59	25	5	25	1	13	5	55	23	37	59
4	34	36									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	59	35	5	20	33	28	38	9

Continued on next page.

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	59	35	5	20	36	19	14	0	23	38	3?
4	34	45	13	6	5						

Samarkand.

h.	m.	s.	h.	m.	s.	m.	h.	s.	h.	m.	s.
1	59	58	5	25	25	13	6	22	23	38	15
5	20	48?									

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	0	59	5	21	58	23	38	34

Almata.

h.	m.	s.
23	39	1

Aug. 23d. Readings also at 0h. (Victoria, Seattle, Hungry Horse, and near Istanbul), 1h. (Victoria, Seattle (2), and Hungry Horse), 2h. (Butte, Boulder City, Shasta Dam, and near Catania), 3h. (Seattle, Saskatoon, and near Istanbul), 4h. (near Istanbul and near Copiapo), 5h. (near Mizusawa), 6h. (Hungry Horse), 10h. (Istanbul, Victoria, and near Chur), 12h. (Victoria), 13h. (Seattle. College, and Hungry Horse (2)), 14h. (Victoria, Seattle, Shasta Dam, Hungry Horse, and Overton), 15h. (Pretoria, and Grahamstown), 16h. (Strasbourg and Tacubaya), 17h. (College, Strasbourg, and Stuttgart), 18h. (Shasta Dam (2), Berkeley, Lick, Branner, Reno, Arcata, near Mineral, Ferndale, Besançon, near Neuchatel, and Zürich), 20h. (Mineral (2), Boulder City, Tucson, Pasadena (2), Riverside (2), Tinemaha, Malaga, Paris, Besançon, and Strasbourg), 21h. (Mineral, Seattle, Saskatoon (2), College, Hungry Horse, Overton, and near Chur), 22h. (near Leninakan (3), Tiflis, Erevan (2), Grozny, Piatigorsk, and Sotchi), 23h. (Victoria (2), College, Hungry Horse (2), Shasta Dam, Ashkabad, Sverdlovsk, and near Mizusawa).

Aug. 24d. 6h. 7m. 16s. Epicentre 43°·7N. 126°·7W. (as on 1948, October 28d.).

$A = -\cdot4335$, $B = -\cdot5815$, $C = +\cdot6884$; $\delta = -4$; $h = -3$;
$D = -\cdot802$, $E = +\cdot598$; $G = -\cdot411$, $H = -\cdot552$, $K = -\cdot725$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale	E.	3·6	149	(e 0 55)	− 3	(e 1 54)	S*	—	—	—
Shasta Dam		4·4	132	i 1 7	− 3	i 1 54	− 8	—	—	i 2·7
Seattle		5·0	36	i 1 22	+ 4	i 1 59	−19	—	—	e 2·6
Mineral		5·1	130	i 1 20a	0	—	—	—	—	e 3·2
Victoria		5·3	24	1 25k	+ 3	2 28	+ 3	—	—	i 2·7
Reno		6·6	126	i 1 46	+ 5	i 3 0	+ 2	—	—	—
Berkeley		6·7	148	i 1 39k	− 3	e 3 2	+ 2	—	—	—
Branner	Z.	7·2	150	i 1 44k	− 5	—	—	—	—	—
Santa Clara		7·3	149	e 1 47	− 3	e 3 9	− 6	—	—	e 3·8
Lick		7·4	147	i 1 49k	− 3	e 3 48	S*	—	—	e 4·5
Fresno		8·7	140	i 2 11a	+ 1	—	—	—	—	e 5·2
Tinemaha		9·2	133	i 2 21	+ 5	—	—	—	—	—
Hungry Horse		10·0	58	i 2 59	P*	e 3 46	?	—	—	e 6·7
Butte	N.	10·3	72	e 3 16	?	—	—	—	—	e 5·7
China Lake	Z.	10·6	135	i 2 38	+ 2	—	—	—	—	—
Logan		11·1	95	e 2 42	− 1	—	—	—	—	e 5·9
Bozeman		11·3	75	e 2 48	+ 2	—	—	—	—	e 5·9
Pasadena		11·6	142	i 2 48	− 2	—	—	—	—	e 4·9
Overton		11·8	123	i 2 55	+ 2	—	—	—	—	—
Boulder City		11·9	126	e 2 57	+ 3	—	—	—	—	—
Riverside		12·1	140	i 2 55	− 2	—	—	—	—	—
Palomar		12·8	140	i 3 7	+ 1	—	—	—	—	—
Sitka		14·9	342	e 3 24	−10	e 6 8	−12	—	—	e 7·0
Saskatoon		15·9	51	3 50	+ 3	e 6 57	+13	—	—	8·6
Tucson		16·9	127	i 4 2	+ 3	e 7 26	+19	—	—	e 8·5
College		24·3	338	i 5 16	− 4	—	—	—	—	—
St. Louis		27·8	88	e 5 55	+ 2	e 10 39	+ 4	e 6 35	PP	e 14·9
Chicago		28·6	79	—	—	e 10 48	0	—	—	e 15·0
Cleveland	N.	33·0	78	—	—	e 12 10	+13	—	—	—
Ottawa		35·9	69	e 7 3	− 1	—	—	—	—	18·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pennsylvania		35·9	77	—	—	i 12 51	+ 9	—	—	i 20·3
Seven Falls	E.	38·7	64	—	—	e 13 37	+12	—	—	20·7
Scoresby Sund		54·1	23	—	—	17 14	+ 9	—	—	28·7
Paris		77·7	32	i 11 59	− 1	—	—	—	—	—
Strasbourg		79·8	28	i 12 12	0	—	—	—	—	—
Besançon		80·3	30	12 30	+16	—	—	—	—	—
Rome		87·2	29	e 24 28	PS	—	—	—	—	e 35·7

Additional readings :—
Shasta Dam i =1m.12s.
Ferndale eSN =(2m.14s.) ; readings increased by 1m.
Mineral eEN =1m.24s.
Victoria i =1m.30s., 1m.38s., 1m.49s., 2m.8s., and 2m.32s.
Reno iE =2m.2s., eSN =3m.10s.
Berkeley iZ =1m.42s. and 1m.49s., eZ =3m.5s. and 3m.8s., eEZ =3m.42s.
Lick eEN =1m.52s., iZ =2m.17s.
Hungry Horse i =3m.4s.
Logan e =3m.12s.
Boulder City e =3m.37s. and 3m.50s.
Sitka e =6m.22s.
Saskatoon e =4m.27s.
Tucson i =4m.48s.
College e =8m.34s.
St. Louis ePPP =6m.52s., eS =10m.46s., e =11m.5s., i =11m.8s.
Strasbourg e =12m.32s.
Long waves were also recorded at De Bilt, Tortosa, Belgrade, Honolulu, and other American stations.

Aug. 24d. 6h. 25m. 45s. Epicentre 22°·3S. 174°·2W. Depth of focus 0·010.
(as on 1946, July 9d.).

A = −·9214, B = −·0936, C = −·3773 ; δ = +9 ; h = +4 ;
D = −·101, E = +·995 ; G = +·375, H = +·038, K = −·926.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		8·7	15	e 2 5	0	e 2 29	pP	—	—	—
Auckland	N.	17·3	211	i 3 54	− 3	i 6 56	− 8	—	—	—
Tuai	N.	18·0	202	e 4 7	+ 2	i 7 23	+ 4	—	—	—
Wellington		21·1	204	e 4 39	+ 1	i 8 17	− 5	i 5 9	pP	—
Cobb River	E.	21·8	209	e 4 48	+ 3	e 8 28	− 7	—	—	—
Kaimata	N.E.	23·5	207	e 5 5	+ 3	e 9 6	+ 1	—	—	—
Christchurch		23·8	204	e 5 18	+13	e 9 5	− 5	—	—	—
Brisbane	Z.	30·1	253	i 5 55k	− 7	—	—	—	—	—
Riverview		32·5	242	i 6 23k	0	—	—	i 16 46	S_cS	e 13·8
Branner		77·0	41	i 11 52a	+ 8	—	—	i 12 19	pP	—
Santa Clara	E.	77·1	41	e 11 49?	+ 5	e 15 53	PPP	—	—	e 18·0
Berkeley	Z.	77·2	41	i 11 53a	+ 8	—	—	i 12 21	pP	—
Pasadena		77·4	45	i 11 54a	+ 8	—	—	i 12 21	pP	—
Palomar		77·8	47	i 11 58a	+10	—	—	i 12 26	pP	—
Riverside		77·8	45	i 11 56a	+ 8	—	—	i 12 24	pP	—
Fresno		78·0	42	i 11 58a	+ 9	—	—	i 12 25	pP	—
China Lake	Z.	78·8	44	i 12 3a	+ 9	—	—	i 12 30	pP	—
Shasta Dam		79·0	38	i 12 2	+ 7	e 21 54	+10	i 12 28	pP	—
Tinemaha		79·2	44	i 12 4a	+ 8	—	—	i 12 32	pP	—
Mineral	Z.	79·3	39	i 12 4a	+ 8	—	—	i 12 29	pP	—
Reno		79·8	41	i 12 8	+ 9	e 22 10	+17	—	—	—
Boulder City		80·7	46	—	—	—	—	i 12 43	pP	—
Overton	Z.	81·3	45	i 12 16	+ 9	—	—	—	—	—
Tucson		81·3	50	i 12 17	+10	—	—	i 12 44	pP	—
Seattle		83·8	33	i 12 28	+ 8	—	—	i 12 55	pP	—
Victoria	Z.	83·8	32	e 12 27	+ 7	—	—	e 12 52	pP	—
Tacubaya		84·2	67	i 12 36	+14	e 19 5	?	—	—	—
Logan		85·9	42	e 12 38	+ 8	—	—	e 13 5	pP	—
Hungry Horse		88·5	36	—	—	e 22 49	[−12]	i 13 19	pP	—
College		89·2	11	i 12 48	+ 2	—	—	i 13 16	pP	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ottawa	z.	111·3	48	e 18 28	[+ 6]	—	—	—	—	—
Copenhagen		146·3	353	19 33	[+ 5]	—	—	—	—	—
Kew		150·5	7	e 19 15?	[−20]	—	—	—	—	—
Jena	N.	151·1	350	e 19 46	[+10]	—	—	e 20 15	pPKP	—
Ksara		151·2	299	e 19 46	[+10]	e 23 17	PP	—	—	—
Bucharest		152·3	328	e 22 33	?	e 23 22	PP	—	—	—
Istanbul		152·9	320	e 19 15	[−23]	—	—	—	—	—
Paris		153·4	5	e 19 52	[+13]	—	—	i 20 31	pPKP	—
Stuttgart		153·5	354	e 19 44	[+ 5]	(e 26 15?)[−20]		e 20 19	pPKP	e 26·2
Strasbourg		153·7	357	i 19 52	[+13]	—	—	i 20 23	pPKP	—
Besançon		155·1	359	e 19 58	[+17]	—	—	—	—	—
Triest		155·8	346	e 23 6	PKS	e 29 58	SKKS	e 23 51	PP	—
Granada		163·1	27	20 45	pPKP	31 21	SKKS	25 33	?	—

Additional readings :—
Auckland iN =7m.35s. and 7m.52s.
Tuai eN =7m.16s.
Wellington i =8m.30s., iSeS =15m.56s.
Berkeley iZ =12m.4s. and 12m.18s.
Pasadena isPZ =12m.34s.
Shasta Dam i =12m.8s., e =15m.1s.
Mineral iZ =12m.9s.
Boulder City e =13m.1s., i =13m.9s.
Hungry Horse i =13m.46s., ePP =16m.44s.
Bucharest eN =23m.30s. and 23m.35s., iE =23m.48s.
Paris i =20m.22s.
Stuttgart eZ =19m.58s.
Strasbourg i =19m.55s., isPKP? =20m.43s., ePP =23m.42s.
Besançon e =20m.12s., i =20m.38s.
Triest ePPP =27m.34s., i =28m.53s., ePSKS =33m.35s., ePPS =36m.53s., eSS = 43m.45s.?

Aug. 24d. 9h. 22m. 1s. Epicentre 9°·3S. 109°·0W.

A = −·3213, B = −·9332, C = −·1605 ; δ = −14 ; h = +7 ;
D = −·946, E = +·326 ; G = +·052, H = +·152, K = −·987.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manzanillo		28·6	9	—	—	i 11 5	+17	—	—	—
Tacubaya		30·1	19	e 6 28	+15	e 12 45	SS	—	—	—
Huancayo		33·2	98	e 6 39	− 1	i 11 59	− 1	i 7 47	PP	i 14·0
La Paz		40·4	104	i 7 42a	+ 1	i 13 52	+ 2	i 9 13	PP	i 20·7
Tucson		41·4	358	e 7 49	− 1	e 14 7	+ 2	e 9 2	PP	e 17·7
Palomar	z.	43·1	351	i 8 4	0	—	—	—	—	—
Riverside	z.	43·8	350	e 8 10	+ 1	—	—	e 9 51	PePe	—
Pasadena	z.	44·1	350	e 8 11	− 1	e 14 41	− 4	e 10 3	PePe	e 18·2
Boulder City		45·4	354	i 8 24	+ 2	—	—	—	—	e 28·7
China Lake	z.	45·6	350	e 8 26	+ 2	—	—	—	—	—
Overton	z.	45·9	354	e 8 27	+ 1	—	—	—	—	—
Fresno	z.	46·9	349	i 8 36	+ 2	—	—	e 13 40	PeS	—
Tinemaha	z.	47·0	350	e 8 38	+ 3	—	—	e 10 13	PeP	—
Lick	z.	47·9	346	e 8 43k	+ 1	—	—	—	—	—
Berkeley		48·5	346	i 8 52a	+ 6	—	—	e 10 52	PP	e 23·8
Reno		49·6	350	e 9 1	+ 6	—	—	—	—	—
Mineral	z.	50·8	347	e 9 4k	0	—	—	—	—	—
St. Louis		50·8	19	e 9 1	− 3	e 16 12	− 8	e 14 34	PeS	—
Logan		50·9	358	e 8 57	− 8	e 16 21	0	—	—	e 22·9
Shasta Dam		51·3	347	e 9 7	− 1	—	—	—	—	—
Chicago		54·5	19	—	—	e 17 8	− 2	e 15 32	PeS	e 27·0
Honolulu		56·8	303	e 16 29	?	e 17 45	+ 4	—	—	e 26·3
Hungry Horse		57·6	356	i 10 22	+28	—	—	e 10 52	PeP	—
Philadelphia		58·2	31	—	—	e 22 44	SS	—	—	e 29·7
Victoria		59·0	349	e 10 3	− 1	—	—	—	—	—
Bermuda		59·2	44	—	—	i 18 20	+ 8	—	—	e 27·2
Fordham		59·5	31	i 10 6	− 1	e 17 58	−18	—	—	—
Harvard		61·9	31	e 10 22	− 2	e 22 28	SS	—	—	e 31·7
Ottawa		62·1	26	e 10 21	− 4	e 17 24	?	—	—	35·0
Shawinigan Falls	N.	64·3	27	e 10 51	+12	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seven Falls	E.	65·6	28	e 18 4	?	e 18 46	?	—	—	34·0
College		79·4	344	e 12 10	+ 1	—	—	e 15 40	PP	—
Scoresby Sund		97·7	20	18 11	PP	31 47	SS	—	—	44·0
Kew		108·8	38	e 28 26	PS	e 34 4	SS	—	—	e 50·0
Paris		111·1	41	e 18 58	[+23]	—	—	e 20 54	PPP	e 53·0
De Bilt		112·0	37	—	—	e 32 59?	SS	—	—	e 53·0
Clermont-Ferrand		112·0	44	e 19 26	PP	—	—	e 28 52	PS	42·0
Besançon		113·7	43	19 32	PP	—	—	—	—	—
Strasbourg		114·5	41	e 19 47	PP	e 35 17	SS	e 39 47	SSS	e 48·4
Stuttgart	Z.	115·4	40	e 19 47?	PP	—	—	e 51 53	Q	e 56·0
Collmberg	Z.	117·0	37	e 20 25	PP	—	—	—	—	—
Triest		119·3	42	e 19 21	[+30]	e 26 5	[+17]	e 37 5?	SSP	e 56·0
Istanbul		131·3	42	e 21 59?	PP	—	—	e 32 59?	PPS	—
Helwan	Z.	137·7	56	e 22 14	PP	—	—	e 23 19	PKS	—
Ksara		139·6	48	e 19 35	[+ 5]	—	—	—	—	—
Frunse		146·4	355	e 19 51	[+ 9]	—	—	—	—	—
Tashkent		148·1	3	e 19 54	[+10]	e 29 48	[−19]	—	—	—
Andijan		148·6	358	e 19 54	[+ 9]	—	—	—	—	—
Ashkabad		149·3	20	e 19 1	[−45]	—	—	—	—	—
Obi-garm		150·7	2	i 19 52	[+ 4]	—	—	—	—	—
Stalinabad		150·8	4	e 19 58	[+10]	—	—	—	—	—

Additional readings :—
Huancayo e =9m.12s. and 10m.46s.
La Paz iSSN =16m.56s., iS_cS =17m.40s., Q =19·3m.
Tucson e =8m.5s.
Lick eZ =8m.47s.
Berkeley eE =9m.29s., eN =22m.23s.
Reno iE =9m.31s.
St. Louis e =15m.26s.
Shasta Dam e =9m.36s.
Strasbourg e =20m.7s., ePS =29m.17s., ePPS =30m.3s.
Stuttgart eZ =20m.45s.
Helwan eZ =27m.32s.
Ksara e =36m.22s.
Long waves were also recorded at Vera Cruz, Antofagasta, Copiapo, Christchurch, Tortosa, and at other American stations.

Aug. 24d. 22h. 37m. 13s. Epicentre 52°·6N. 132°·1W. (as on 23d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		4·8	339	e 1 12	− 3	—	—	—	—	e 2·0
Victoria		6·9	123	1 44	− 1	3 42	S_g	i 2 12	P_g	i 4·2
Hungry Horse		12·3	103	i 3 0	+ 1	e 5 32	+14	—	—	e 6·5
Shasta Dam		13·7	147	e 3 6	−12	—	—	—	—	—
Mineral	Z.	14·2	145	e 3 27k	+ 3	—	—	—	—	—
Reno	N.	15·6	142	e 3 45	+ 2	—	—	—	—	—
Saskatoon		15·6	81	—	—	8 25	P_cP	—	—	9·5
Berkeley		16·3	151	e 4 3k	+11	e 7 19	+26	—	—	—
Santa Clara		16·8	152	e 3 29	−29	e 12 13	P_cS	—	—	—
Lick	Z.	17·0	152	e 4 3	+ 2	—	—	—	—	—
Logan		17·5	119	e 4 17	+10	e 7 47	+26	—	—	e 9·2
Fresno	Z.	18·1	146	i 4 17a	+ 3	—	—	—	—	—
Tinemaha		18·3	142	e 4 28	+11	—	—	—	—	—
Overton	Z.	20·3	134	i 4 41	+ 1	—	—	—	—	—
Boulder City		20·7	135	e 4 44	0	—	—	—	—	—
Pasadena		21·0	145	i 4 48a	+ 1	—	—	—	—	—
Riverside	Z.	21·4	145	e 4 52	+ 1	—	—	—	—	—
Palomar	Z.	22·2	143	i 5 0	0	—	—	—	—	—
Tucson		25·5	134	e 5 34	+ 2	—	—	—	—	e 14·9
St. Louis		32·0	99	e 6 30	0	—	—	—	—	e 17·0
Ottawa	Z.	36·9	78	e 7 11	− 1	—	—	e 9 34	P_cP	19·8
Harvard		41·0	79	—	—	e 16 23	SS	—	—	e 24·8
Paris		71·9	30	i 11 26	− 1	—	—	—	—	—
Strasbourg		73·6	27	e 11 37	0	—	—	—	—	—
Besançon		74·3	28	e 11 41	0	—	—	—	—	—

For Notes see next page

NOTES TO AUGUST 24d. 22h. 37m. 13s.

Additional readings :—
Victoria i =1m.59s.
Shasta Dam e =3m.19s.
Mineral iZ =3m.35s. and 3m.40s.
Reno eE =4m.1s., eN =10m.53s.
Berkeley iZ =4m.7s., eZ =10m.59s.
Fresno eN =4m.20s.
Long waves were also recorded at Granada, Scoresby Sund, and other American stations.

Aug. 24d. Continuation of the list of after-shocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	9	37	2	17	37	12	3	31	18	8	47
1	44	46	5	31	25	15	19	2			

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	9	53	2	17	51	12	3	59	18	8	59
1	58	5	5	31	43	15	19	5			

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	10	9	2	28	9	13	22	30	15	19	27
1	58	14	5	31	51	13	41	58	18	8	55
2	17	48									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	10	17	2	18	6	5	31	55	18	9	12
1	59	0?									

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	10	19?	2	17	29	5	32	7	18	9	6
1	58	22	2	27	54	15	19	12	19	51	58

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
5	32	5	15	19	27	18	9	22

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	19	16	5	33	42	15	21	18	18	10	29

Almata.

h.	m.	s.
2	18	34

Ashkabad.

h.	m.	s.
2	19	44

Aug. 24d. Readings also at 0h. (De Bilt and Hungry Horse), 1h. (Paris), 2h. (Riverside, Pasadena, China Lake, Tinemaha, Tucson, Overton, Shasta Dam, Berkeley, Lick, Mineral, Hungry Horse, Logan, Bozeman, Saskatoon, Seattle, Victoria (2), College, Ottawa, Philadelphia, and Seven Falls), 3h. (Scoresby Sund, Hungry Horse, Seattle, Victoria, and Harvard), 6h. (Paris, Strasbourg, Hungry Horse, and near Istanbul), 7h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Overton, Antofagasta, Copiapo, La Paz, and near Algiers Univ.), 8h. (Rome and Tacubaya), 9h. (Santa Clara, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City (2), Overton (2), Shasta Dam, Reno, Bozeman, Butte, Logan, Saskatoon, Hungry Horse (2), Seattle, Victoria, College, Sitka, Ottawa, and near Irkutsk), 10h. (Tucson, Boulder City, Overton (2), Logan, Hungry Horse (2), Seattle, Victoria (3), College, Ottawa, and Tacubaya), 11h. (Boulder City, Overton, Shasta Dam, Logan, and near Tucson), 12h. (Mount Wilson, Tinemaha, Overton, Reno, Shasta Dam, Hungry Horse, Seattle, Victoria, College, Besançon, Strasbourg, Tortosa, Tamanrasset, and near Apia), 13h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Berkeley, Lick, Mineral, Reno, Shasta Dam, Hungry Horse, Victoria, near College (2), Besançon, Paris, Collmberg, Clermont-Ferrand (2), Strasbourg, and Stuttgart), 14h. (near College and near La Paz), 15h. (Overton), 16h. (Reykjavik), 17h. (Copiapo), 18h. (near Ottawa), 20h. (Bogota, Hungry Horse, and Shasta Dam), 21h. (Mount Wilson, Riverside, Tinemaha, Overton (2), Butte, Shasta Dam (2), Reno, Hungry Horse (2), Seattle, Ottawa, near College (2), and near Victoria), 22h. (Istanbul, Shawinigan Falls, Hungry Horse, and near Victoria).

Aug. 25d. 4h. 14m. 21s. Epicentre 52°·2N. 179°·3W.

A = −·6154, B = −·0075, C = +·7882; δ = +3; h = −6;
D = −·012, E = +1·000; G = −·788, H = −·010, K = −·615.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		20·5	39	i 4 43	+ 1	e 8 20	− 7	i 8 43	SS	—
Victoria		35·1	73	6 58a	+ 1	12 35	+ 5	e 8 9	PP	e 17·2
Seattle		36·2	74	i 7 9	+ 3	i 12 51	+ 4	—	—	e 15·2
Shasta Dam		39·9	83	i 7 39	+ 2	i 13 33	−10	i 7 55	pP	—
Hungry Horse		40·6	68	i 7 35	− 8	i 13 55	+ 1	e 10 14	PPP	e 18·2
Mineral	z.	40·6	83	i 7 44a	+ 1	—	—	—	—	—
Berkeley		41·7	87	i 7 53a	+ 1	i 14 9	− 1	i 8 16	pP	i 24·0
Branner	z.	42·0	87	i 7 56a	+ 2	—	—	—	—	—
Reno	E.	42·2	83	i 7 59	+ 3	i 14 17	0	i 9 6	PP	—
Santa Clara		42·2	87	—	—	i 14 8	− 9	e 17 46	SS	—
Lick	z.	42·4	87	i 7 59k	+ 1	e 13 33	−47	—	—	—
Fresno	z.	43·9	86	i 8 11	+ 1	i 14 42	0	—	—	—
Tinemaha		44·7	85	i 8 16a	0	e 14 55	+ 1	i 9 34	PcP	—
Logan		45·6	75	i 8 22	− 2	e 15 4	− 2	e 13 44	PcS	e 20·8
China Lake	z.	45·9	85	i 8 27a	+ 1	i 13 48	PcS	i 10 3	PcP	—
Pasadena		46·6	87	i 8 31a	− 1	i 15 18	− 3	e 18 20	SS	e 20·0
Riverside		47·2	87	i 8 36a	0	—	—	e 10 6	PcP	—
Overton	z.	47·3	83	i 8 38	+ 1	—	—	—	—	—
Boulder City		47·5	83	i 8 39	+ 1	e 9 20	pP	i 8 57	pP	—
Pierce Ferry		47·9	83	i 8 43	+ 1	—	—	i 9 3	pP	—
Palomar		48·0	87	i 8 42a	− 1	i 15 37	− 4	i 13 56	ScP	—
Tucson		52·4	84	i 9 17	+ 1	e 16 38	− 4	e 11 13	PP	e 23·6
Scoresby Sund		56·5	9	9 48a	+ 2	17 39	+ 2	—	—	24·6
St. Louis		60·1	64	i 10 9	− 2	e 18 29	+ 5	—	—	—
Sverdlovsk		60·7	327	—	—	e 18 29	− 3	—	—	—
Seven Falls	E.	60·8	46	e 10 34	+18	—	—	—	—	26·4
Rolphton		61·3	51	i 10 16a	− 4	—	—	—	—	—
Ottawa		62·8	50	i 10 27a	− 3	—	—	—	—	30·6
Almata		64·4	308	e 10 41	+ 1	i 19 19	+ 1	—	—	—
Harvard		66·9	50	i 10 55	− 1	—	—	—	—	e 36·5
Weston		67·1	50	i 11 0	+ 3	—	—	—	—	—
Upsala		67·5	351	—	—	e 19 47	− 9	e 24 15	SS	—
Moscow		68·2	339	e 11 2	− 2	e 19 58	− 6	—	—	—
Andijan		68·6	309	e 11 7	0	—	—	—	—	—
Tacubaya		68·9	85	e 9 13	?	—	—	—	—	—
Obi-garm		71·4	310	e 11 24	0	—	—	—	—	—
Samarkand		71·9	312	e 11 40	+13	—	—	—	—	—
Copenhagen		72·0	354	e 11 28	0	e 20 48	− 1	26 4	SS	35·6
De Bilt		76·0	357	i 11 51a	0	e 21 35	+ 1	—	—	e 35·6
Collmberg		76·3	352	e 11 52	0	—	—	—	—	—
Kew		76·7	1	e 11 54	− 1	e 20 41	−60	—	—	e 33·6
Baku		78·4	324	—	—	e 21 42	−18	—	—	—
Tiflis		79·0	328	e 12 6	− 1	e 22 2	− 4	—	—	—
Stuttgart		79·1	354	e 12 7	− 1	e 22 0	− 7	—	—	—
Paris		79·4	359	i 12 9	0	—	—	i 12 36	pP	—
Strasbourg		79·4	355	i 12 10	+ 1	e 22 6	− 4	e 12 33	pP	e 39·6
Yalta		79·5	336	—	—	e 21 39?	−32	—	—	—
Zürich		80·6	355	e 12 16a	0	—	—	—	—	—
Besançon		80·8	356	i 12 17	0	—	—	e 15 28	PP	—
Triest		81·9	351	e 12 38	+15	e 22 40	+ 4	e 23 28	PS	e 37·6
Clermont-Ferrand		82·4	358	e 12 26	+ 1	e 22 42	+ 1	e 23 51	PS	34·6
Rome		85·7	351	e 12 42	0	e 23 16	+ 2	e 24 39	PPS	—
Ksara		89·0	331	e 16 41	PP	—	—	—	—	—
Alicante		89·8	1	e 13 2	0	e 23 23	[− 9]	—	—	e 37·1
Granada		90·9	4	17 18	PP	24 1	− 2	—	—	34·2
Almeria		91·3	2	—	—	e 23 28	[−12]	—	—	36·3
Bogota		95·6	75	—	—	e 24 28	−15	e 26 43	PPS	—
Pretoria	z.	146·4	311	i 19 42	[0]	—	—	i 23 11	PP	—
Grahamstown	z.	153·4	306	i 19 59	[+ 7]	—	—	—	—	—

For Notes see next page.

NOTES TO AUGUST 25d. 1h. 14m. 21s

Additional readings :—
Victoria i = 9m.27s.
Shasta Dam eS_cP = 13m.19s.
Hungry Horse isP = 8m.25s., isS = 14m.29s.
Mineral iZ = 8m.53s.
Berkeley iZ = 8m.4s. and 8m.47s., iPPZ = 9m.27s., iS_cPZ = 13m.30s., eE = 14m.13s., iSSN = 17m.33s., iN = 18m.13s.
Lick iZ = 8m.10s. and 8m.28s.
Tinemaha iZ = 8m.31s., iS_cPZ = 13m.50s.
Logan eS_cS = 18m.10s.
China Lake i = 8m.31s.
Pasadena iEZ = 8m.35s., i = 8m.44s.
Riverside iZ = 8m.53s.
Boulder City eP_cP = 10m.7s., ePP? = 10m.45s.
Pierce Ferry i = 9m.1s., iPP = 10m.36s.
Palomar iEN = 8m.47s.
Tucson e = 9m.48s., eP_cS = 14m.18s., e = 19m.28s.
St. Louis e = 10m.53s.
Upsala eE = 20m.23s.
Tacubaya e = 10m.7s.
Paris i = 12m.28s.
Strasbourg ePP = 15m.5s., ePPP = 16m.51s., ePPS = 23m.27s., e = 35m.33s.
Besançon e = 12m.36s., i = 12m.43s., e = 13m.19s. and 15m.5s.
Clermont-Ferrand eS = 22m.50s.
Long waves were also recorded at Honolulu, Sitka, Chicago, Pennsylvania, and Bergen.

Aug. 25d. 5h. 50m. 12s. Epicentre 37°·4N. 19°·0W. (as on 1942, May 29d.).

A = +·7530, B = −·2593, C = +·6048 ; δ = +3 ; h = −1 ;
D = −·326, E = −·946 ; G = +·572, H = −·197, K = −·796.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lisbon		7·9	78	1 51a	− 8	3 0	−30	2 9	P*	—
Malaga		11·7	89	e 3 3	+12	i 4 47	−17	—	—	—
Granada		12·2	86	3 23a	+25	5 10	− 6	—	—	—
Almeria		13·2	88	e 2 39	−32	4 41	−59	—	—	7·6
Alicante		14·6	81	—	—	e 6 6	− 7	—	—	e 11·2
Tortosa		15·5	71	3 41	− 1	7 27	+52	7 30	SS	7·9
Clermont-Ferrand		18·5	57	e 4 16	− 3	e 7 18	−26	—	—	12·8
Paris		19·3	47	i 4 28	− 1	e 8 8	+ 6	i 4 42	PP	e 10·8
Besançon		20·9	55	i 4 46	0	—	—	e 5 9	PP	—
Basle		22·0	54	e 4 59	+ 1	—	—	—	—	—
De Bilt		22·4	41	e 5 0	− 2	—	—	—	—	e 11·8
Strasbourg		22·4	52	i 5 3k	+ 1	e 9 8	+ 4	i 5 36	PP	e 11·1
Zürich		22·6	55	e 5 4a	+ 1	—	—	—	—	—
Stuttgart		23·4	52	e 5 13	+ 2	—	—	—	—	e 13·5
Rome		24·6	69	—	—	e 9 37	− 5	—	—	—
Tamanrasset	z.	25·6	117	e 5 35	+ 3	—	—	e 6 2	PP	—
Collmberg	z.	26·5	49	e 5 43	+ 2	—	—	—	—	—
Hungry Horse		66·2	313	e 11 3	+11	—	—	—	—	—
Overton	z.	72·7	303	e 11 47	+15	—	—	—	—	—

Additional readings :—
Lisbon P = 1m.54s.a, iSEN = 3m.3s.
Tortosa P_gE = 4m.43s., P_gS_gE = 5m.25s., PSN = 6m.11s., and 6m.51s.
Clermont-Ferrand e = 4m.22s.
Paris i = 4m.31s. and 4m.37s.
Besançon e = 4m.57s. and 5m.56s.
Strasbourg i = 5m.7s. and 5m.17s., e = 6m.1s.
Stuttgart eZ = 5m.18s.
Tamanrasset eZ = 5m.45s.
Long waves were also recorded at Kew and New Kensington.

Aug. 25d. 18h. Undetermined shock. Bolivia. Deep focus.

La Paz iP =34m.6s.a, iP_g =34m.11s., iS =34m.35s., iS_g =34m.40s.
Antofagasta iE =35m.31s., E =36m.5s.
Huancayo e =36m.21s., iS =37m.12s., iL =37m.32s.
Copiapo iPN =36m.52s., N =37m.34s. and 37m.44s.
Santa Lucia eN =36m.59s. and 40m.4s.
Bogota iP =38m.29s., iS =43m.6s., eL? =48m.22s.
St. Louis eP =43m.19s., epP =43m.46s., eS =51m.17s.
Harvard iP =43m.24s., ipP =43m.48s.
Ottawa eZ =43m.44s.
Tucson iP =43m.48s., e =44m.38s.
Palomar iPZ =44m.18s., iZ =44m.35s., ipPZ =44m.46s.
Pierce Ferry eP =44m.19s., epP =44m.46s.
Riverside iPZ =44m.21s.k, ipPZ =44m.48s.
Boulder City eP =44m.21s., epP =44m.49s.
Overton iP =44m.22s.
Pasadena iPNZ =44m.25s., ipPZ =44m.51s.
Tinemaha iP =44m.38s.k, ipPZ =45m.6s.
Lick iPZ =44m.51s.k, iZ =45m.24s.
Shasta Dam iP =45m.3s., ipP =45m.32s., i =46m.5s.
Hungry Horse iP =45m.10s., epP =45m.34s.
Victoria eZ =45m.35s.
Toledo iP =45m.47s.
Long waves were also recorded at Galerazamba.

Aug. 25d. 23h. 25m. 56s. Epicentre 7°·2S. 129°·3E. Depth of focus 0·015.

A = −·6285, B = +·7678, C = −·1245 ; δ = +3 ; h = +7 ;
D = +·774, E = +·633 ; G = +·079, H = −·096, K = −·992.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		22·3	272	i 4 48a	+ 1	i 9 4	+25	—	—	—
Brisbane		30·2	136	i 6 1	+ 1	i 10 45	− 4	—	—	e 13·4
Riverview		33·3	147	e 7 32	PP	i 11 40	+ 3	i 13 27	SS	—
Kagosima		38·6	2	7 10	− 2	12 52	− 6	—	—	—
Miyazaki		38·9	4	e 7 16	+ 1	12 55	− 8	—	—	—
Sumoto		41·7	8	e 7 37	− 1	13 38	− 6	—	—	—
Kobe		42·0	8	e 7 47	+ 7	13 44	− 5	—	—	—
Osaka		42·0	8	e 7 41	+ 1	13 44	− 5	—	—	—
Kameyama		42·4	9	7 41	− 2	13 49	− 6	—	—	—
Nagoya		42·8	10	e 7 38	− 9	13 56	− 4	—	—	—
Shizuoka		42·8	12	e 7 53	+ 6	13 54	− 6	—	—	—
Tokyo		43·8	13	e 7 46	− 9	e 13 37	−38	—	—	—
Kumagaya		44·1	12	8 22	pP	e 14 8	−11	—	—	—
Macbasi		44·3	12	8 5	+ 6	14 18	− 4	—	—	—
Toyama		44·3	9	8 7	+ 8	14 18	− 4	—	—	—
Kakioka		44·4	12	7 55	− 4	14 14	−10	—	—	—
Nagano		44·4	10	7 56	− 3	14 16	− 8	—	—	—
Onahama		45·2	12	e 8 18	+12	14 31	− 4	—	—	—
Hukusima		45·9	11	e 8 10	− 1	14 39	− 6	—	—	—
Sendai		46·5	11	e 8 11	− 5	14 47	− 7	—	—	—
Mizusawa		47·4	11	8 20	− 3	14 56	−10	e 8 24	P	—
Akita		47·7	11	e 8 13	−12	14 26	−44	—	—	—
Aomori		48·9	11	8 32	− 3	—	—	—	—	—
Calcutta	E.	49·8	308	e 8 41	− 1	i 15 41	+ 1	i 16 27	SS	—
Auckland	N.	50·8	133	—	—	i 15 55	+ 1	i 16 24	SS	e 27·1
Colombo	E.	51·3	285	8 56	+ 3	18 42	S_cS	—	—	33·1
Christchurch		52·4	142	e 9 44	pP	16 12	− 3	e 24 29	Q	e 29·1
Wellington		52·9	138	—	—	e 16 7	−15	i 18 34	ScS	e 29·1
Hyderabad	N.	55·9	297	9 21	− 6	16 56	− 6	19 0	S_cS	27·0
Apia		58·2	103	9 43	0	—	—	—	—	—
Poona	E.	60·4	296	i 9 50	− 8	i 17 53	− 8	i 10 26	pP	—
Bombay	E.	61·4	296	e 10 3	− 2	e 18 15	+ 1	e 10 35	pP	31·0
New Delhi	N.	61·5	308	i 10 10	+ 5	i 18 10	− 5	i 19 44	S_cS	—
Murgab		68·5	317	i 10 49	− 1	19 39	− 2	—	—	—
Almata		69·0	323	i 10 52	− 2	i 19 44	− 2	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Frunse		70·3	321	e 11 1	0	e 20 1	− 1	—	—	—
Andijan		70·7	318	11 4	0	20 6	0	—	—	—
Obi-garm		71·6	315	i 11 8	− 1	i 20 15	− 1	—	—	—
Stalinabad		72·2	315	i 11 11	− 2	i 20 21	− 2	—	—	—
Tashkent		73·0	318	i 11 20	+ 3	i 20 34	+ 2	e 21 17	S_cS	—
Samarkand		73·9	315	i 11 23?	0	e 20 44?	+ 2	—	—	—
Honolulu		76·9	67	—	—	i 21 12	− 3	—	—	e 36·0
Sverdlovsk		84·6	330	i 12 19	− 1	i 22 27	− 8	—	—	—
Baku		86·6	312	i 12 31	+ 1	i 22 48	− 6	i 15 36	PP	—
Grozny		90·2	314	e 12 51	+ 4	23 5	[+ 1]	—	—	—
Tiflis		90·7	312	12 50	+ 1	23 10	[+ 3]	e 16 26	PP	—
Leninakan		91·2	311	12 55	+ 3	—	—	—	—	—
College		93·4	24	e 17 31	pPP	i 23 17	[− 5]	i 23 47	S	—
Grahamstown	z.	96·6	235	i 13 20	+ 4	—	—	—	—	—
Moscow		96·8	325	13 15	− 2	23 42	[+ 1]	24 20	S	—
Ksara		96·8	303	i 13 19a	+ 2	27 25	pPPS	—	—	—
Pretoria	z.	96·8	243	i 13 19	+ 2	—	—	i 17 17	PP	—
Theodosia		97·8	314	—	—	23 48	[+ 2]	—	—	—
Yalta		98·7	314	13 24	− 2	i 23 50	[− 1]	i 24 16	sSKS	—
Sitka		98·9	33	—	—	i 23 51	[− 1]	e 31 30	SS	e 34·8
Helwan		100·4	299	13 34	0	24 4	[+ 5]	17 31	PP	—
Istanbul		102·4	310	e 18 40	pPP	25 52	+41	—	—	—
Bucharest		104·4	314	18 16	PP	i 24 23	[+ 5]	i 25 34	S	—
Victoria		106·8	41	18 10	PKP	24 29	[+ 1]	—	—	—
Upsala		107·0	331	—	—	i 24 28	[− 1]	i 25 49	S	e 43·4
Seattle		107·7	42	—	—	i 24 37	[+ 5]	e 33 44	SS	—
Shasta Dam		108·5	49	e 14 6	P	—	—	i 18 16	PKP	—
Berkeley		108·9	53	i 21 37k	?	i 24 40	[+ 3]	e 29 9	PPS	—
Raciborzu		109·0	321	e 18 50	PP	e 27 51	PS	—	—	—
Santa Clara		109·2	53	—	—	24 43	[+ 4]	e 27 53	PS	—
Mineral		109·2	50	e 18 16a	[+ 2]	—	—	e 18 42	PP	—
Lick	z.	109·5	53	e 14 3	P	—	—	e 18 17	PKP	—
Reno		110·7	51	e 18 32	pPKP	e 24 48	[+ 3]	e 18 50	PP	—
Copenhagen		110·9	327	e 18 54	PP	29 11	PPS	34 28	SS	54·1
Fresno	z.	111·0	53	i 18 55k	PP	i 24 50	[+ 4]	i 20 17	pPP	—
Zagreb		111·3	316	e 18 57	PP	—	—	—	—	—
Prague		111·4	321	i 18 53	PP	e 28 34	PS	e 29 7	pPS	—
Potsdam		111·5	324	e 19 4?	PP	—	—	—	—	—
Collmberg		111·9	322	e 18 20	[0]	e 29 23	PPS	e 35 22	PSS	62·1
Tinemaha		112·2	53	e 18 22	[+ 2]	e 24 54	[+ 3]	i 19 5	PP	—
Pasadena		112·6	56	i 18 21	[0]	i 24 55	[+ 3]	i 19 5	PP	—
Cheb		112·6	322	e 19 2	PP	e 28 39	PS	—	—	—
Bergen	N.	112·6	334	e 17 4?	?	—	—	—	—	—
Triest		112·9	317	i 19 15	PP	e 28 45	PS	e 29 27	PPS	—
Hungry Horse		112·9	40	i 18 22	[0]	i 24 51	[− 3]	e 14 44	P	—
Jena		112·9	322	e 18 22	[0]	—	—	e 19 6	PP	—
Riverside		113·3	56	e 18 23	[0]	e 24 57	[+ 2]	e 19 11	PP	—
Scoresby Sund		114·2	350	i 19 22	PP	25 0	[+ 1]	28 42	PS	—
Butte	N.	114·5	42	—	—	i 24 46	[−14]	e 38 30	SSS	—
Rome		114·6	313	19 3	pPKP	e 28 49	PS	e 39 4?	SSS	—
Bologna		114·8	316	e 19 31	PP	—	—	—	—	—
Stuttgart		115·0	321	e 18 26	[0]	e 24 57	[− 5]	e 19 32	PP	—
Boulder City		115·1	54	e 18 27	[+ 1]	—	—	e 19 13	PP	—
Overton		115·3	53	e 18 27	[+ 1]	—	—	i 19 26	PP	—
Pierce Ferry		115·7	54	e 18 29	[+ 2]	—	—	—	—	—
Bozeman		115·7	42	—	—	i 25 6	[+ 2]	—	—	e 55·5
Zürich		115·8	319	i 18 24	[− 3]	—	—	e 19 34	PP	—
Strasbourg		116·0	321	i 18 28k	[0]	e 27 8	S	i 19 40	PP	e 59·1
Saskatoon		116·1	35	e 18 39	[+11]	e 25 4	[− 2]	e 26 19	sSKS	—
Logan		116·2	47	e 18 26	[− 2]	e 25 7	[+ 1]	e 29 5	PS	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
De Bilt		116·2	325	e 19 28	PP	i 25 10	[+ 4]	i 29 0	PS	e 54·1
Salt Lake City		116·4	48	—	—	i 25 9	[+ 2]	e 26 22	sSKS	—
Basle		116·4	320	e 19 32	PP	—	—	—	—	—
Besançon		117·5	320	e 18 31	[0]	e 29 14	PS	e 19 42	PP	—
Tucson		119·0	57	18 35	[+ 1]	e 35 55	SS	i 19 52	PP	e 44·8
Paris		119·1	323	i 18 34	[0]	e 25 17	[+ 1]	e 22 3	PPP	e 62·1
Kew		119·5	326	e 18 34	[0]	e 25 19	[+ 1]	e 19 57	PP	e 56·1
Clermont-Ferrand		119·9	319	i 18 37	[+ 2]	e 25 25	[+ 6]	e 19 58	PP	47·6
Rapid City	E.	121·4	42	i 20 26	PP	e 29 26	SKSP	i 21 54	?	—
Rathfarnham Castle		121·7	330	e 18 52	pPKP	—	—	i 20 15	PP	—
Algiers Univ.	Z.	123·0	309	i 18 43k	[+ 2]	—	—	—	—	—
Tortosa	E.	123·6	314	20 13	PP	25 33	[+ 2]	30 36	PS	e 60·1
Tamanrasset	Z.	123·9	293	i 18 46	[+ 3]	e 22 11	SKP	i 20 34k	PP	—
Alicante		125·2	312	i 20 35	PP	e 27 21	SKKS	—	—	e 42·5
Almeria		127·2	311	i 18 48	[− 1]	25 53	[+11]	19 13	pPKP	61·1
Granada		127·9	312	i 18 50a	[− 1]	i 27 28	SKKS	20 53	PP	63·2
Tacubaya		131·4	71	—	—	e 22 13	SKP	—	—	—
Chicago		132·5	38	i 22 13	SKP	e 28 12	SKKS	e 38 41	SS	—
St. Louis		132·6	43	e 18 58	[− 1]	i 25 58	[+ 2]	e 19 46	pPKP	—
Rolphton		134·7	26	e 19 1	[− 2]	i 22 19	SKP	—	—	—
Cincinnati		136·0	38	i 21 58	PP	i 28 1	SKKS	—	—	—
Cleveland		136·2	34	e 19 7	[+ 1]	i 28 25	SKKS	i 22 26	PKS	—
Ottawa	Z.	136·2	25	e 19 6	[0]	e 22 25	PKS	—	—	—
Shawinigan Falls	N.	136·4	21	e 22 27	PKS	—	—	—	—	—
Pennsylvania	N.	138·7	32	i 22 37	PKS	i 28 44	SKKS	—	—	—
Harvard		140·3	24	e 19 7	[− 7]	i 32 9	PS	i 22 37	PKS	e 63·1
Philadelphia		140·7	30	—	—	e 40 24	SS	—	—	62·4
Huancayo		148·9	128	e 19 32	[+ 3]	e 33 49	PS	i 20 27	pPKP	e 70·6
La Paz		150·8	144	i 19 35a	[+ 4]	i 42 33	SS	i 19 56	pPKP	72·1
Galerazamba		155·5	79	e 19 58?	pPKP	e 30 20	SKKS	—	—	e 45·1
Bogota		156·0	95	e 19 44	[+ 5]	e 30 18	SKKS	e 38 43	pPPS	—
San Juan		161·3	52	e 20 18	pPKP	e 30 46	SKKS	e 20 45	PKP_2	—
Fort de France		167·3	54	—	—	e 31 19	SKKS	e 35 29	PS	—

Additional readings :—
Tokyo e =10m.40s. and 16m.59s.
Christchurch e =18m.24s., eSS =21m.14s.
Wellington eSS =17m.4s., eQ =25·1m.
Hyderabad PPN =11m.6s., iN =17m.48s.
Poona iPPE =12m.14s., iSSE =18m.43s., iS_cSE =19m.32s., iSSE =22m.4s., eSSSN = 24m.46s.
Bombay iPPE =12m.28s., esSE =19m.1s., iSSE =22m.22s.
New Delhi iN =18m.57s., eN =19m.32s., iN =22m.59s.
Moscow PP =17m.15s., SKKS =24m.6s.
Sitka iS =24m.22s., ePS =26m.4s.
Helwan eZ =16m.15s. and 16m.46s., eSN =24m.58s.
Bucharest iN =25m.6s., iSSN =27m.7s., iS_cSN =28m.14s.
Upsala iSKKSE =25m.15s., eE =32m.46s., eSSN =33m.18s., eN =33m.51s., eSSSN = 37m.34s.
Seattle iS =25m.4s., e =37m.59s.
Shasta Dam iPP =18m.38s.
Berkeley iE =25m.33s., eN =26m.55s. and 28m.23s., iE =33m.53s., eE =52m.34s.
Santa Clara eEN =25m.33s. and 33m.16s.
Lick iPPZ =18m.44s.
Reno eN =25m.4s.
Copenhagen 19m.27s., 26m.26s., and 31m.15s.
Fresno eZ =25m.42s., eN =25m.47s.
Prague ePPP =21m.48s., eSS =33m.40s., eSSS =36m.22s.
Collmberg ePKPZ =17m.54s.?, ePS?E =29m.10s.
Tinemaha iSKPZ =21m.46s., iPKKPZ =29m.15s.
Pasadena iSKPZ =21m.46s., iE =25m.51s., eE =28m.9s., iSPEZ =28m.25s., ePKKPZ =29m.21s.
Hungry Horse esPP =20m.11s., e =20m.31s.
Jena ePKP?E =18m.30s.
Riverside iSKPZ =21m.46s., iPKKPZ =29m.15s.
Scoresby Sund 26m.7s., 26m.53s., 29m.41s., and 34m.40s.
Rome ePSKS? =32m.45s.
Stuttgart e =20m.13s., ePPP? =21m.54s., e =26m.59s. and 28m.39s., ePS? =29m.46s., e =30m.52s. and 36m.22s.

Continued on next page.

Strasbourg i=19m.8s., ePPP?=22m.4s., iSKP?=22m.48s., i=23m.22s., ePS?=29m.2s., ePPS?=29m.31s., e=29m.52s. and 34m.19s., eSS?=35m.18s., eSSS?=38m.37s.
De Bilt iSKKS=26m.24s., ePPS=31m.4s.?
Besançon e=18m.54s., 19m.14s., 21m.4s., 23m.21s., and 24m.12s.
Tucson e=21m.59s. and 26m.39s., eSP=29m.16s., e=29m.25s., ePS=29m.32s.
Paris iPP?=19m.33s., eSKKS=26m.40s., ePKKP=28m.48s., iPS=29m.29s., eSS?=37m.4s., eSSS?=40m.16s.
Kew eEN=26m.43s., e=29m.25s., eZ=32m.7s., eNZ=35m.56s., e=39m.19s. and 43m.57s.
Clermont-Ferrand iPP=20m.7s., eSKKS=26m.50s., ePS=29m.37s., eSS=36m.17s., eSSS=40m.32s.
Tortosa SKKSE=27m.8s., SSEN=37m.2s., SSSE=41m.27s.
Tamanrasset ePPZ=20m.28s., ePPP?Z=22m.55s.
Almeria iPP=20m.48s., PKS=22m.28s., PPP=23m.40s., SKKS=27m.31s., PS=30m.33s., SS=37m.57s., SSS=42m.46s.
Granada SKP=22m.20s., PPP=23m.44s., S=29m.14s., PS=31m.8s., PPS=32m.33s., SS=38m.29s., SSS=43m.44s.
St. Louis ePP=21m.21s., e=21m.35s., i=21m.55s., iPKS=22m.14s., iSKP=22m.57s., ipPKS=23m.5s., i=28m.5s., e=29m.34s., eSP=31m.8s., e=32m.0s.
Huancayo e=39m.20s.
La Paz iZ=20m.34s., ePPZ=23m.24s., iZ=24m.4s., iN=25m.10s., iSSP=43m.14s.
Bogota ePKP$_2$Z=20m.15s.

Aug. 25d. Continuation of the list of aftershocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	40	37	7	35	6	9	33	12	17	56	17
5	43	44	7	52	16	11	12	48	22	10	29
7	0	26									

Stalinabad.

h.	m.	s.	h.	m.	s.
7	52	33	22	10	45

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	40	49	10	11	23	17	56	26	22	10	47
7	52	44									

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	40	59	5	44	31?	7	53	18?	22	10	59?

Murgab.

h.	m.	s.
22	10	55

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	41	9	7	53	31	17	56	51	22	11	8

Frunse.

h.	m.	s.
22	12	20

Almata.

h.	m.	s.
22	11	48

Ashkabad.

h.	m.	s.
22	13	9

Aug. 25d. Readings also at 2h. (Huancayo, La Paz, Tacubaya, Ottawa, Riverside, Tinemaha, Tucson, and Hungry Horse), 3h. (Scoresby Sund), 5h. (La Paz, Tacubaya, and near Bogota), 6h. (near Branner and near Granada (2)), 8h. (Bucharest), 9h. (Palomar, Overton, Lick, Hungry Horse, Cobb River. Kaimata, Christchurch, Wellington, and near Tuai), 10h. (near College), 11h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City (2), Overton, Pierce Ferry (2), Shasta Dam, Hungry Horse, Victoria, College, Collmberg, Stuttgart, near La Paz, near Apia, and near Mizusawa), 12h. (Besançon and Strasbourg), 13h. (New Delhi), 16h. (Ottawa, Copiapo, and near Balboa Heights), 17h. (near Istanbul), 18h. (Pennsylvania and Santa Lucia), 21h. (Hungry Horse, Bogota, Istanbul, and Leninakan), 23h. (Leninakan, Tucson, Boulder City, Shasta Dam, Hungry Horse, College, and near Chinchina).

Aug. 26d. 5h. Alaska.

Sitka iP = 26m.18s., iS = 26m.44s., eL = 27m.2s.
Victoria P = 28m.30s., e = 28m.39s., S = 30m.57s., e = 31m.27s. and 31m.33s.
Hungry Horse eP = 29m.34s., i = 29m.41s., iL = 33m.54s.
College eP = 29m.35s., e = 31m.36s., eS? = 32m.6s., iL = 32m.45s.
Shasta Dam eP = 30m.4s.
Mineral iPZ = 30m.13s.k.
Reno ePEN = 30m.32s.
Logan eP = 30m.43s., eL = 34m.57s.
Berkeley iPZ = 30m.44s.k, iN = 36m.26s., eE = 36m.30s.
Lick eZ = 30m.45s., iZ = 30m.53s.
Fresno iPZ = 30m.55s.k, eN = 31m.5s.
Tinemaha iPNZ = 31m.0s., iZ = 31m.8s.
China Lake ePZ = 31m.12s., iZ = 31m.20s.
Overton ePZ = 31m.15s.
Boulder City eP = 31m.19s.
Pasadena ePZ = 31m.24s., iZ = 31m.32s., eLE = 40·5m.
Riverside ePZ = 31m.26s., eZ = 31m.34s.
Palomar iPZ = 31m.36s.
Tucson eP = 32m.5s., eL = 42m.37s.
Ottawa e = 33m.20s., L = 46m.
Saskatoon e = 33m.37s., S = 35m.20s., L = 36m.57s.
Paris eP = 37m.18s., L = 66m.
Copenhagen P = 38m.31s., 39m.1s.
Scoresby Sund 41m.12s., 44m.36s., L = 50m.
Long waves were also recorded at Honolulu, Kew, and other American stations.

Aug. 26d. 16h. 52m. 30s. Epicentre 34°·7N. 120°·5W. (as on 1944, June 13d.).

Intensity VI at Arlight and Surf; IV at Guadalupe and Los Alamos. Epicentre 34°·5N. 120°·5W., Macroseismic area 250 sq. miles.

L. M. Murphy aud F. P. Ulrich.
United States Earthquakes, 1949, Serial No. 748, Washington, 1951, p.16.

A = −·4182, B = −·7099, C = +·5667; δ = 0; h = 0;
D = −·862, E = +·508; G = −·288, H = −·488, K = −·824.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Barbara		0·7	112	i 0 16a	− 1	i 0 27	− 1	—	—	—
Pasadena		2·0	106	i 0 35a	0	i 1 2	0	—	—	—
Fresno		2·1	16	i 0 38a	+ 1	i 1 0	− 4	—	—	i 1·2
Haiwee		2·5	55	i 0 46	+ 3	i 1 34	S_g	—	—	—
Lick		2·8	341	i 0 45a	− 2	i 1 33	S_g	i 0 55	P_g	—
Santa Clara		2·9	336	e 1 3	P_g	i 1 40	S_g	—	—	—
Branner		3·0	336	i 0 48k	− 2	i 1 27	0	i 0 55	P*	—
Tinemaha		3·0	37	i 0 53	+ 3	i 1 29	+ 2	—	—	—
Berkeley		3·5	337	e 0 51	− 6	i 1 41	+ 1	i 1 9	P_g	—
Boulder City		4·8	72	e 1 24	P*	—	—	i 1 37	P_g	i 2·9
Reno		4·9	7	e 1 23	P*	i 2 19	+ 4	i 1 46	P_g	—
Overton	z.	5·3	68	e 1 30	P*	—	—	i 1 49	P_g	—
Pierce Ferry		5·5	73	i 1 25	0	(i 2 39)	+ 9	i 1 48	P_g	i 2·6
Mineral	z.	5·7	352	i 1 28k	0	i 2 56	S*	i 1 34	P*	—
Tucson		8·4	104	e 2 7	+ 1	—	—	e 3 0	P_g	e 4·2
Logan		9·8	42	e 2 26	+ 2	—	—	—	—	e 5·8
Hungry Horse		14·5	18	e 3 30	+ 2	—	—	—	—	—

Additional readings :—
Fresno iEN = 50s.
Lick eN = 58s., eE = 1m.1s., iN = 1m.47s.
Branner iE = 1m.50s.
Berkeley eE = 1m.1s., eZ = 1m.4s., eE = 1m.56s., iZ = 2m.1s., eE = 2m.4s.
Boulder City i = 1m.41s.
Reno iN = 1m.49s., iE = 2m.5s., 2m.27s., and 2m.45s.
Pierce Ferry i = 1m.43s. and 2m.4s.
Mineral eE = 1m.31s., iZ = 2m.14s. and 2m.25s.
Shasta Dam gives long waves only.

Aug. 26d. 22h. 39m. 29s. Epicentre 54°·5N. 136°·0W.

$A = -·4196$, $B = -·4052$, $C = +·8123$; $\delta = +8$; $h = -7$;
$D = -·695$, $E = +·719$; $G = -·584$, $H = -·564$, $K = -·583$.

		Δ	Az.	P.	O−C.	S.	O−C.	Suup.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		3·1	7	e 0 50	− 1	e 1 34	+ 5	—	—	e 1·9
Victoria		9·9	122	2 21k	− 4	4 7	−13	e 4 45	SSS	—
College		11·9	335	e 3 10	PPP	—	—	—	—	e 6·8
Hungry Horse		15·0	105	e 3 26	− 9	—	—	i 3 37	P	i 7·2
Shasta Dam		16·5	141	e 3 55	+ 1	—	—	—	—	—
Mineral	z.	17·1	140	e 4 2	0	—	—	—	—	—
Saskatoon		17·7	86	e 8 59	P_cP	(16 31)	S_cS	—	—	16·5
Reno		18·5	137	e 4 22	+ 3	—	—	e 4 26	P	—
Berkeley		19·0	145	i 4 29k	+ 3	i 7 17	−38	i 8 15	SS	e 11·1
Lick	z.	19·8	145	e 4 35k	0	—	—	i 4 56	PP	—
Logan		20·4	118	e 4 38	− 3	—	—	—	—	e 10·3
Fresno	z.	21·0	140	(i 4 48)	+ 1	—	—	—	—	—
Tinemaha		21·3	138	i 4 51	+ 1	—	—	—	—	—
Overton	z.	23·3	132	e 5 11	+ 1	—	—	—	—	—
Boulder City		23·6	133	e 5 16	+ 3	—	—	—	—	—
Rapid City	E.	23·6	103	e 5 14	+ 1	e 9 25	0	—	—	i 12·1
Pierce Ferry		23·8	131	e 5 17	+ 2	—	—	e 5 37	PP	—
Pasadena	z.	23·9	141	i 5 18	+ 2	—	—	—	—	—
Riverside	z.	24·3	141	e 5 21	+ 1	—	—	—	—	—
Palomar	z.	25·1	139	i 5 28	0	—	—	—	—	—
Tucson		28·5	130	e 6 0	+ 1	—	—	—	—	e 16·9
St. Louis		34·5	98	e 6 49	− 3	—	—	—	—	e 18·1
Rolphton		37·1	78	e 7 11	− 3	—	—	—	—	18·8
Ottawa		38·7	78	e 7 25	− 2	—	—	—	—	19·5
Scoresby Sund		46·8	26	—	—	18 55	SS	—	—	23·5
Paris		71·3	28	e 11 27	+ 4	—	—	—	—	—
Strasbourg		72·8	25	e 11 37	+ 5	—	—	e 13 31?	PP	—
Besançon		73·7	26	e 11 40	+ 2	—	—	—	—	—

Additional readings :—
Mineral iZ = 4m.6s. and 5m.22s.
Berkeley eZ = 10m.19s.
Fresno reading has been decreased by 3m.
Pierce Ferry e = 6m.30s.
Long waves were also recorded at Granada and at other American stations.

Aug. 26d. Continuation of the list of aftershocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	26	33	6	43	45	16	47	47	18	48	15
2	20	53	7	54	42	17	6	53	18	50	28
2	59	24	11	16	40						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	21	3	6	43	59	16	48	39

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
2	21	7	2	59	31	6	44	8	16	48	25

Tashkent.

h.	m.	s.	h.	m.	s.
2	21	19?	6	44	58

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	21	13	2	59	38	6	44	16

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
2	21	27	2	59	55	6	44	26

Frunse.

h.	m.	s.
2	21	45

Almata.

h.	m.	s.
2	22	4

Aug. 26d. Readings also at 0h. (Collmberg, Tacubaya, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Victoria, and near Apia), 1h. (Overton, Kew, and near Istanbul), 2h. (Istanbul, Ksara, Leninakan, Overton, and Hungry Horse), 5h. (New Delhi, Pretoria, Santa Clara, and near Tananarive), 6h. (Istanbul, Ksara, and near Leninakan), 7h. (Overton and Santa Lucia), 8h. (Collmberg and near Zagreb), 9h. (Pierce Ferry), 10h. (Istanbul), 11h. (Durham and Istanbul), 14h. (Overton, Shasta Dam, and Collmberg), 16h. (Strasbourg), 17h. (Ksara, Rome, Paris, Strasbourg, Besançon, and near Taranto), 18h. (Istanbul (2)), 20h. (Victoria), 21h. (Shasta Dam, Victoria, and near Mizusawa), 22h. (Victoria, near Tacubaya (2), and near Taranto).

Aug. 27d. 14h. 51m. 46s. Epicentre 34°·7N. 120°·5W. (as on 26d.).

Intensity VI at Arlight, Lompoc, and Sudden ; V at Los Alamos, and Surf. Epicentre 34°·5N. 120°·5W. Macroseismic area 350 sq. miles.

L. M. Murphy and F. P. Ulrich :
United States Earthquakes, 1949, Serial No. 748, Washington, 1951, p. 16.

A = −·4182, B = −·7099, C = +·5667 ; δ = 0 ; h = 0.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Barbara		0·7	112	i 0 15a	− 2	i 0 27	− 1	—	—	—
Pasadena		2·0	106	i 0 34a	− 1	i 0 57	− 5	—	—	—
Fresno		2·1	16	i 0 37a	0	i 1 0	− 4	i 0 41	P_g	—
Haiwee		2·5	55	i 0 44a	+ 1	i 1 23	S_g	—	—	—
Riverside		2·7	105	i 0 42a	− 3	i 1 16	− 3	—	—	—
Lick		2·8	341	i 0 44a	− 3	i 1 30	S_g	i 0 58	P_g	i 1·7
Santa Clara		2·9	336	e 0 50	+ 2	i 1 35	S_g	—	—	—
Branner		3·0	336	i 0 46a	− 4	e 1 39	S_g	e 1 0	P_g	—
Tinemaha		3·0	37	i 0 52	+ 2	i 1 33	S*	—	—	—
Boulder City		4·8	72	i 1 51	0	—	—	i 1 38	P_g	i 3·0
Reno		4·9	7	e 1 17	0	i 2 13	− 2	i 1 37	P_g	i 3·0
Ukiah		4·9	335	—	—	e 2 20	+ 5	e 2 40	S_g	e 3·2
Pierce Ferry		5·5	73	i 1 23	− 2	—	—	i 1 35	P*	i 3·3
Mineral		5·7	325	i 1 27k	− 1	i 2 50	S*	i 1 52	P_g	i 3·3
Shasta Dam		6·2	347	i 1 31	− 4	—	—	—	—	e 3·0
Tucson		8·4	104	e 2 5	− 1	e 3 51	+ 8	i 2 58	P_g	i 4·2
Salt Lake City		9·1	46	e 0 19	−115	—	—	—	—	e 4·8
Logan		9·8	42	i 2 29	+ 5	—	—	e 2 45	PPP	e 4·6
Hungry Horse		14·5	18	i 3 29	+ 1	—	—	—	—	e 6·4
Rapid City	E.	16·3	50	i 3 56	+ 4	—	—	—	—	e 8·0
Cleveland		31·2	66	—	—	e 16 19	S_cS	—	—	e 18·6

Additional readings and notes :—
Lick iEZ = 1m.2s.
Branner eEN = 1m.3s.
Reno eEN = 1m.20s., iE = 1m.59s., iZ = 2m.26s., iN = 2m.50s.
Mineral iZ = 1m.47s. and 2m.2s., iE = 2m.15s., iZ = 2m.58s., iN = 3m.4s.
Tucson i = 2m.35s., e = 3m.0s.
Long waves were also recorded at Seattle, Bozeman, Butte, Chicago, Pennsylvania, and Harvard.

Aug. 27d. 21h. 30m. 41s. Epicentre 52°·6N. 132°·1W. (as on 24d.).

A = −·4089, B = −·4525, C = +·7924 ; δ = −15 ; h = −6.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		4·8	339	e 1 4	−11	e 1 49	−23	—	—	e 2·2
Victoria		6·9	123	1 49	+ 4	3 1	− 4	i 2 15	P_g	e 3·7
Hungry Horse		12·3	103	e 2 59	0	—	—	—	—	e 6·6
Shasta Dam		13·7	147	e 3 20	+ 2	—	—	—	—	—
Mineral	z.	14·2	145	e 3 29k	+ 5	—	—	i 3 35	PP	—
College		14·7	333	e 4 1	+30	—	—	—	—	e 7·9
Reno		15·6	142	e 3 42	− 1	—	—	e 4 0	PPP	—
Berkeley		16·3	151	e 3 57a	+ 5	e 7 12	SS	—	—	e 10·8
Lick	z.	17·0	152	e 3 57	− 4	—	—	—	—	—
Logan		17·5	119	e 4 11	+ 4	—	—	—	—	e 9·4

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Fresno	Z.	18·1	146	e 4 19	+ 5	—	—	—	—	—
Tinemaha	Z.	18·3	142	e 4 23	+ 6	—	—	—	—	—
Overton	Z.	20·3	134	e 4 41	+ 1	—	—	—	—	—
Boulder City		20·7	135	e 4 44	0	—	—	e 5 2	PP	—
Pierce Ferry		20·9	134	i 4 42	− 4	—	—	—	—	—
Rapid City	E.	20·9	102	i 4 47	+ 1	—	—	—	—	e 10·8
Pasadena	Z.	21·0	145	e 4 47	0	—	—	—	—	—
Riverside	Z.	21·4	145	e 4 50	− 1	—	—	—	—	—
Tucson		25·5	134	e 5 33	+ 1	—	—	—	—	e 15·7
Paris		71·9	30	e 11 20	− 7	—	—	—	—	e 43·3

Additional Readings :—
Victoria i = 3m.16s. and 3m.22s.
Reno eZ = 3m.48s.
Berkeley eN = 7m.26s.
Long waves were also recorded at Scoresby Sund, Kew, Granada, Triest, and at numerous other North American stations.

Aug. 27d. Continuation of list of aftershocks from the epicentre of the Turkestan earthquake on July 10d.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	13	13	4	11	22	22	25	29	23	3	0
2	22	52	19	25	40						

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	11	30	8	33	39	15	30	4	20	14	19
8	22	28	12	47	32	19	25	54	22	25	33

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
0	0	26	8	33	40	15	30	14	20	14	17
4	11	19	11	8	2	19	26	1	22	26	1
8	23	22	12	47	40						

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	34	26	15	30	24	19	26	8	20	15	6

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.
19	26	14	20	14	30	22	26	24

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	33	56	15	30	31	20	14	50	22	26	43
12	47	56	19	26	19?						

Frunse.

h.	m.	s.	h.	m.	s.	h.	m.	s.
8	35	16	15	30	51	19	27	36

Almata

h.	m.	s.	h.	m.	s.
15	32	23	19	28	17?

Aug. 27d. Readings also at 2h. (Boulder City, Overton, and near Apia), 3h. (Overton, Antofagasta and near Copiapo), 5h. (Hungry Horse and Overton), 6h. (Hungry Horse (2)), 8h. (near Istanbul), 9h. (Overton, Tucson, Hungry Horse, near College, and near Leninakan), 10h. (near Reno), 12h. (Calcutta), 13h. (Shasta Dam), 14h. (Lick and near Mizusawa), 15h. (Santa Clara, Berkeley (2), Lick (3), Branner (2), Fresno (2), Mineral (2), Reno (2), Boulder City (2), Pierce Ferry (2), Tucson (2), and College), 16h. (Lick and Bogota), 19h. (Mizusawa), 20h. (Hungry Horse (2), Overton, Pierce Ferry, Lick, Reno, and near Mineral), 22h. (Boulder City, Overton, and Pierce Ferry), 23h. (Victoria, Seattle, Shasta Dam, Pierce Ferry, and near Istanbul).

Aug. 28d. 19h. 28m. 50s. Epicentre 52°·1N. 34°·9W.

A = +·5059, B = −·3529, C = +·7871 ; δ = 0 ; h = −6 ;
D = −·572, E = −·820 ; G = +·646, H = −·450, K = −·617.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rathfarnham Castle		17·4	75	i 4 3	− 3	e 7 16	− 3	—	—	—
Scoresby Sund		19·4	13	4 30k	0	8 7	+ 3	—	—	—
Aberdeen		19·5	63	i 4 38	+ 7	i 8 8	+ 2	—	—	9·3
Kew		21·3	79	i 4 50	0	e 8 55	+12	e 5 13	PP	e 10·2
Paris		23·9	84	e 5 18	+ 2	e 9 37	+ 7	—	—	e 12·2
De Bilt		24·4	74	e 5 20	− 1	e 9 40	+ 1	—	—	e 11·7
Clermont-Ferrand		25·5	90	e 5 43	+11	e 10 3	+ 6	e 11 7	SS	12·5
Besançon		26·7	84	e 5 47	+ 4	—	—	e 6 40	PPP	—
Strasbourg		27·2	81	e 5 43	− 4	e 10 23	− 2	e 6 34	PP	e 13·5
Copenhagen		27·7	64	—	—	e 10 32	− 1	—	—	13·4
Stuttgart		28·0	80	e 5 53	− 2	e 10 39	+ 1	—	—	e 14·2
Collmberg	z.	29·3	74	e 6 6	0	—	—	—	—	—
Algiers Univ.	z.	30·7	106	5 29	−50	—	—	—	—	—
Rome		33·3	89	—	—	e 11 58	− 4	—	—	—
Hungry Horse		48·4	300	i 8 44	− 2	—	—	—	—	—
Logan		51·2	292	e 9 4	− 3	—	—	—	—	—
College		52·5	331	e 10 13	PcP	—	—	—	—	—
Ksara		52·8	82	e 8 43	−36	—	—	e 16 57	PS	—
Pierce Ferry		56·2	287	i 9 42	− 2	—	—	—	—	—
Overton	z.	56·2	288	i 9 45	+ 1	—	—	—	—	—
Boulder City		56·8	288	i 9 49	+ 1	—	—	—	—	—
Tucson		57·0	282	e 9 51	+ 1	—	—	—	—	e 32·2
Mineral	z.	57·7	297	e 9 54k	− 1	—	—	—	—	—
Shasta Dam		57·9	297	e 9 52	− 4	—	—	—	—	—
Tinemaha	z.	58·0	291	e 9 56	− 1	—	—	—	—	—
Riverside	z.	59·7	288	e 10 10	+ 1	—	—	—	—	—
Palomar	z.	59·8	287	i 10 11	+ 2	—	—	—	—	—
Lick	z.	59·8	294	e 10 9k	0	—	—	—	—	—
Mount Wilson	z.	59·9	288	e 10 8	− 2	—	—	—	—	—

Additional readings :—
Paris i = 5m.26s.
Clermont-Ferrand e = 6m.20s. and 6m.37s.
Besançon i = 5m.54s. and 6m.56s.
Strasbourg e = 5m.49s. and 5m.56s.
Palomar iZ = 10m.17s.
Riverside iZ = 10m.18s.
Mount Wilson eZ = 10m.18s.
Long waves were also recorded at Harvard, Seattle, and Triest.

Aug. 28d. Continuation of the list of after-shocks from the epicentre of the large earthquake of Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.
4	51	38	10	32	20	13	21	50

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	51	45	13	22	3	17	48	31	20	28	0
10	32	13	14	19	5	18	6	27	20	56	44
11	31	31?	15	37	9	19	52	26	22	9	57

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	52	37	13	22	19	15	37	15	22	9	59
11	30	27	14	19	19	20	28	47			

Tashkent.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
11	30	57	13	22	23?	15	37	24?	20	29	48

Continued on next page,

Murgab.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
4	51	40	13	22	28	20	28	36	20	57	1
11	31	10	15	37	29						

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
10	32	16	13	22	30	15	37	33	22	10	27
11	32	19	14	20	11	20	28	40			

Frunse.

h.	m.	s.	h.	m.	s.
11	31	7	20	31	6

Aug. 28d. Readings also at 2h. (Pierce Ferry, Shasta Dam, and Hungry Horse), 3h. (Tucson, Shasta Dam, Reno, near Boulder City, Pierce Ferry, Lick, and Fresno), 4h. (Boulder City, Overton, and Pierce Ferry), 5h. (College), 6h. (Hungry Horse), 7h. (Tacubaya), 9h. (Boulder City, Overton, Pierce Ferry, Shasta Dam, Mineral, Victoria, Hungry Horse, College, and near Alicante (2)), 10h. (Hungry Horse, Bucharest, Sofia, and near Istanbul), 11h. (near Istanbul), 14h. (Shasta Dam, Hungry Horse, and near College), 15h. (Hungry Horse), 17h. (near Apia), 18h. (Pierce Ferry, Shasta Dam, and near Mizusawa), 19h. (Triest, Alicante, Hungry Horse, Victoria, and near Mineral), 20h. (Shasta Dam), 21h. (Santa Lucia and College), 22h. (Boulder City and Overton), 23h. (College).

Aug. 29d. 0h. 19m. 15s. Epicentre 39°·5N. 40°·6E. (as on 23d.).

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Erevan		3·1	76	0 50	− 1	—	—
Tiflis		3·9	53	e 0 57	− 5	—	—
Sotchi		4·1	351	e 1 17	P_g	—	—
Piatigorsk		4·9	21	e 1 21	+ 4	—	—
Grozny		5·4	45	e 1 42	P_g	—	—
Ksara		6·8	215	e 1 46	+ 2	e 3 42	S_g
Yalta		6·9	318	e 3 3	S	(e 3 3)	− 2
Moscow		16·4	354	e 3 47	− 6	—	—
Rome		21·4	286	—	—	e 8 55	+10
Sverdlovsk		21·8	30	4 49	− 7	8 52	0
Collmberg	z.	22·6	310	e 5 2	− 1	—	—
Stuttgart		24·2	304	e 5 16	− 3	e 9 47	+12
Strasbourg		25·1	303	e 5 27	− 1	e 9 56	+ 5
Tamanrasset	z.	34·1	252	i 6 42a	− 6	—	—
College		75·6	5	e 11 39	− 9	—	—
Hungry Horse		89·7	344	e 12 56	− 5	—	—

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

Aug. 29d. 14h. 32m. 26s. Epicentre 39°·2N. 70°·7E. (as on 23d.).

$A = +·2568$, $B = +·7334$, $C = +·6295$; $\delta = +9$; $h = -1$;
$D = +·944$, $E = -·331$; $G = +·208$, $H = +·594$, $K = -·777$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stalinabad		1·6	247	i 0 32	+ 2	i 0 56	+ 5	—	—	—
Andijan		2·0	39	i 0 36	+ 1	i 1 3	+ 1	—	—	—
Tashkent		2·4	333	e 0 45	+ 4	i 1 20	+ 8	—	—	—
Samarkand		2·9	279	i 0 55	+ 7	i 1 36	+12	—	—	—
Frunse		4·7	38	e 1 16	+ 2	e 2 14	+ 4	—	—	—
Almata		6·2	47	1 34	− 1	2 48	0	—	—	—
Ashkabad		9·8	267	2 25	+ 1	—	—	—	—	—
Baku		16·0	281	—	—	e 6 56	+10	—	—	—
Sverdlovsk		18·9	343	4 21	− 3	7 53	0	—	—	—
Bombay	E.	20·3	175	—	—	e 8 27	+ 4	—	—	—
Leninakan		20·6	284	e 4 51	+ 8	—	—	—	—	—
Poona	F.	20·8	172	—	—	e 9 14	+41	—	—	i 11·0
Irkutsk		26·6	49	e 5 40?	− 2	—	—	—	—	—
Moscow		27·5	318	e 5 38	−12	—	—	—	—	—
Ksara		28·4	269	e 8 41	?	—	—	—	—	e 13·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Upsala		38·8	320	e 8 56	PP	e 13 34?	+ 8	—	—	e 20·6
Collmberg	Z.	41·4	308	e 7 48	− 2	—	—	e 9 22	PP	—
Jena	E.	42·7	306	e 7 57	− 3	—	—	—	—	—
Stuttgart		44·2	304	e 8 10	− 2	—	—	—	—	e 25·6
Strasbourg		45·1	304	i 8 19	− 1	—	—	—	—	e 22·9
Paris		48·5	305	e 8 45	− 1	—	—	—	—	e 29·6
Clermont-Ferrand		49·0	301	e 8 49	− 1	—	—	—	—	28·6
College		72·0	17	e 11 24	− 4	—	—	—	—	—

Long waves were also recorded at New Delhi, Bergen, Copenhagen, De Bilt, and Kew.

Aug. 29d. Continuation of the list of after-shocks from the epicentre of the large earthquake in Turkestan. The shock at 14h. has been listed separately.

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	43	57	7	45	32	16	26	36	17	25	36
1	51	31									

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
1	44	10	5	8	3	7	45	45	16	26	39
1	52	0									

Tashkent.

h.	m.	s.	h.	m.	s.
1	44	15	1	52	18

Murgab.

h.	m.	s.	h.	m.	s.
1	44	22	1	51	45

Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.
1	44	23	7	46	33	16	27	51

Frunse.

h.	m.	s.
1	45	46

Ashkabad.

h.	m.	s.
1	47	37

Aug. 29d. Readings also at 0h. (Seattle and Granada), 1h. (Overton, Mineral, Reno, Shasta Dam, San Francisco, near Berkeley, Branner, Lick, Fresno, and Santa Clara), 2h. (Hungry Horse), 3h. (Tacubaya, Ksara, Collmberg, Stuttgart, Copenhagen, Moscow, Sverdlovsk, Sotchi, near Erevan, Grozny, Tiflis, and Piatigorsk), 4h. (Tucson, Overton, Shasta Dam, Hungry Horse, and College), 5h. (Seattle and College (2)), 7h. (Strasbourg), 8h. (Paris), 9h. (Apia, Auckland, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Logan, College, Besançon, Paris, and Strasbourg), 11h. (Palomar, Pasadena, China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, and Shasta Dam), 12h. (College (2), Shasta Dam, Tucson, Overton, Pierce Ferry, near Boulder City, near Mineral, Reno, Berkeley, Branner, Fresno, Lick, and Santa Clara), 13h. and 16h. (College), 18h. (Nanking, Boulder City, Overton, Pierce Ferry, and Shasta Dam), 20h. (Copiapo, Victoria, near Branner, and near Tacubaya), 21h. (Pierce Ferry and Shasta Dam), 23h. (College, Collmberg, and near Istanbul).

Aug. 30d. 16h. 50m. 19s. Epicentre 44°·0N. 34°·3E.

$A = +\cdot5922$, $B = +\cdot4039$, $C = +\cdot6972$; $\delta = -8$; $h = -3$;
$D = +\cdot564$, $E = -\cdot826$; $G = +\cdot576$, $H = +\cdot393$, $K = -\cdot717$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yalta	0·1	—	0 10	+ 2	—	—	—	—	—
Simferopol	0·6	347	0 17	+ 2	0 27	+ 1	—	—	—
Theodosia	1·0	51	i 0 23	+ 2	i 0 37	+ 1	—	—	—
Sotchi	4·0	100	1 2	− 2	i 1 47	− 5	—	—	—
Istanbul	5·1	231	i 1 17	− 3	i 2 12	− 8	—	—	—
Bucharest	5·9	273	e 1 35	+ 4	i 2 38	− 2	e 2 7	P_g	—
Piatigorsk	6·3	90	e 1 45	P*	—	—	—	—	—
Leninakan	7·9	114	2 6	+ 7	3 41	+11	—	—	—
Sofia	8·1	262	e 2 28	P*	e 3 28	− 7	—	—	—
Tiflis	8·1	106	i 2 2	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grozny		8·4	93	e 2 18?	+12	—	—	—	--	--
Lwow		8·9	311	2 11	− 1	3 48	− 7	—	--	—
Belgrade		9·9	277	e 3 36	+71	i 6 22	?	—	--	—
Ksara		10·6	173	i 2 40	+ 4	e 5 28	S*	—	--	—
Skalnate Pleso		10·8	301	e 3 49	+70	e 6 14	S_g	—	—	—
Budapest		11·1	292	3 11	+28	6 15	S_g	—	—	—
Moscow		11·6	9	2 47	− 3	4 50	−11	—	—	—
Ogyalla		11·7	293	e 3 34	+43	—	—	—	—	e 6·1
Baku		12·2	104	e 3 4?	+ 6	—	—	—	—	—
Raciborzu		12·3	303	e 3 0	+ 1	e 5 36?	+18	—	—	e 7·0
Triest		14·6	282	i 3 36	+ 6	e 6 34	+21	i 4 18	PP	—
Helwan		14·7	190	i 3 29	− 2	e 6 20	+ 4	—	—	—
Collmberg		15·9	303	e 3 44	− 3	e 6 49?	+ 5	—	—	e 8·7
Rome		16·1	269	e 4 5	+16	e 7 0	+11	—	—	—
Potsdam		16·2	307	e 3 52	+ 2	e 6 59	+ 8	e 4 7	PP	i 8·6
Jena	E.	16·6	301	e 3 53	− 3	e 7 26	+26	—	—	—
Helsinki		16·8	344	—	—	e 6 44	−21	—	—	e 8·2
Pavia	Z.	17·8	282	e 4 11?	0	—	—	—	—	—
Stuttgart		17·8	294	e 4 9	− 2	e 7 36	+ 8	—	—	e 10·5
Copenhagen		17·9	318	4 10	− 2	i 7 14	−16	—	—	9·3
Zürich		18·1	289	e 4 11	− 3	e 8 43	+68	—	—	e 10·3
Upsala		18·5	333	i 4 19a	0	e 7 23	−21	i 7 38	SS	e 8·8
Strasbourg		18·7	294	i 4 22	0	e 7 48	0	e 4 49	PP	e 10·4
Basle		18·8	290	e 4 26	+ 3	—	—	—	—	e 9·7
Ashkabad		19·2	101	e 4 37?	+ 9	—	—	—	—	—
Besançon		19·9	290	e 4 34	− 2	—	—	e 4 55	PP	—
Sverdlovsk		20·7	44	i 4 42	− 2	e 8 20	−11	—	—	—
De Bilt		20·8	303	i 4 47	+ 2	e 8 37	+ 4	—	—	e 10·2
Clermont-Ferrand		22·0	285	e 4 58	0	i 9 0	+ 4	i 5 35	PP	—
Paris		22·2	294	e 5 0	0	e 9 1	+ 1	i 5 31	PP	e 12·2
Bergen	E.	23·6	324	—	—	e 10 6	+41	—	—	—
Kew		24·1	300	—	—	e 9 54	+20	e 10 55	SSS	e 14·7
Algiers Univ.	Z.	24·8	263	4 36	?	—	—	—	—	—
Tortosa		25·0	274	5 29	+ 2	—	—	5 55	PP	e 15·7
Tashkent		25·7	85	e 5 29?	− 4	e 10 0?	− 1	—	—	—
Stalinabad		26·4	90	e 5 49	+ 9	—	—	—	—	—
Andijan		28·1	85	e 6 4?	+ 9	—	—	—	—	—
Tamanrasset	Z.	32·0	237	e 6 31	+ 1	—	—	—	—	—
College		71·1	2	e 12 22	+60	—	—	e 15 48	PPP	—
Hungry Horse		83·5	339	e 12 1	−30	—	—	—	—	—

Additional readings :—
Bucharest iSE = 2m.42s., iS* = 3m.2s., iS_gE = 3m.18s.
Belgrade e = 4m.13s. and 5m.12s., i = 5m.53s.
Budapest eN = 3m.25s., eE = 4m.1s., eN = 4m.7s. and 5m.35s., eE = 5m.38s., SN = 6m.18s., SSN = 6m.33s., SSSN = 7m.2s., P_cPE = 7m.45s., P_cPN = 8m.2s.
Collmberg eEZ = 3m.54s.
Potsdam eN = 6m.41s.
Jena eE = 5m.24s., eN = 5m.28s., eSN = 7m.30s.
Upsala eN = 4m.57s., eE = 5m.1s., iN = 5m.8s., iSE = 7m.27s., iN = 7m.31s., SSSN = 7m.50s., eE = 7m.59s., iE = 8m.19s. and 8m.32s., iP_cPN = 9m.15s.
Strasbourg i = 4m.28s., e = 5m.14s.
Besançon e = 4m.41s. and 5m.30s.
Clermont-Ferrand iP = 5m.6s., iPPP = 5m.50s., eSSS? = 9m.56s.
Paris i = 5m.9s.
Kew eN = 13m.41s.
Tamanrasset eZ = 6m.39s. and 6m.45s.

Aug. 30d. Continuation of the list of aftershocks from the epicentre of the large earthquake in Turkestan.

Obi-garm.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
3	5	22	10	59	8	16	36	15	19	30	12
7	1	36	14	48	1	18	30	41	19	46	14
10	57	11									

Continued on next page,

Stalinabad.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
7	1	30	10	59	20	14	47	38	16	36	16

Andijan.

h.	m.	s.	h.	m.	s.	h.	m.	s.
7	1	50	10	59	25	16	36	42

Tashkent. Murgab. Samarkand.

h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
16	37	38	10	59	41	16	36	31	16	36	38

Aug. 30d. Readings also at 0h. (Seattle), 2h. (Riverside, China Lake, Tinemaha, Tucson, Boulder City, Pierce Ferry, Guadalajara, Vera Cruz, and near Tacubaya), 4h. (Boulder City, Shasta Dam, and near Mizusawa), 5h. (Santa Lucia), 6h. (Copiapo), 7h. (Christchurch, Wellington, Auckland, Brisbane, Riverview, Overton, Pierce Ferry, Shasta Dam, Ksara, Collmberg, Basle, Zürich, Besançon, Paris, Strasbourg, Stuttgart, Clermont-Ferrand, and Algiers Univ.), 8h. (Palomar, Pasadena, China Lake, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Berkeley, Seattle, De Bilt, Kew, and near Belgrade), 9h. (Christchurch and Wellington), 10h. (Hungry Horse and near College (2)), 12h. (Rome and Tucson), 13h. (near College), 14h. (Bucharest, Triest, and near Huancayo), 15h. (Mount Wilson, Palomar, Tinemaha, Ksara, Istanbul, Baku, Leninakan, Tiflis, Yalta, near Erevan, and near Rome), 16h. (Jena and Stuttgart), 17h. (Kaimata, Harvard, Besançon, Clermont-Ferrand, Paris, Strasbourg, near Rome (2), and near Istanbul), 18h. (Auckland, Christchurch, Cobb River, Wellington, and near Rome (2)), 19h. (Palomar, Riverside, Tinemaha, Tucson, Overton, Shasta Dam, Lick, College, Collmberg, and Zürich), 20h. (Reno and near Fresno), 21h. (Rome), 22h. (Shasta Dam), 23h. (Shasta Dam, College, Riverview, and near Belgrade.).

Aug. 31d. 0h. 29m. 49s. Epicentre 35°·0N. 140°·2E. Depth of focus 0·010.
(as on 1941, Oct. 9d.).

Intensity IV at Tokyo and Hunatu ; II-III at Osima, Kohu, Ito, Kakioka, and Yokohama.
Epicentre as adopted. Depth 75km. Macroseismic radius 200-300km.
Seismo. Bull. Cent. Met. Obs., Japan for 1949, Tokyo, 1950, p.28 with macroseismic chart.

$A = -\cdot6308$, $B = +\cdot5255$, $C = +\cdot5710$; $\delta = +10$; $h = 0$;
$D = +\cdot641$, $E = +\cdot768$; $G = -\cdot439$, $H = +\cdot366$, $K = -\cdot821$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Mera		0·3	254	0 18	+ 3	0 28	+ 2
Yokohama		0·6	314	0 21	+ 4	0 31	+ 2
Osima		0·7	259	0 19	+ 1	0 30	− 1
Tokyo		0·8	333	0 20	+ 2	0 31	− 1
Misima		1·0	277	0 19a	− 1	—	—
Kakioka		1·2	0	0 25k	+ 2	0 41	+ 1
Tukubasan		1·2	356	0 23	0	0 38	− 2
Hunatu		1·3	293	0 21a	− 3	0 37	− 5
Kumagaya		1·3	330	0 24a	0	0 41	− 1
Mito		1·4	9	0 29	+ 4	0 45	+ 1
Shizuoka		1·5	269	0 25	− 2	0 44	− 3
Maebasi		1·7	326	0 27k	− 2	0 47	− 4
Omaesaki		1·7	256	0 25	− 4	0 45	− 6
Onahama		2·0	16	0 30	− 3	1 3	+ 6
Matusiro		2·2	314	0 20	−16	0 48	−14
Nagoya		2·7	274	0 43	0	1 9	− 5
Hukusima		2·8	4	0 45	+ 1	1 15	− 2
Kameyama		3·1	268	0 37	−11	1 19	− 5
Hikone		3·3	276	0 49	− 2	1 23	− 6
Sendai		3·3	10	0 51	0	1 28	− 1
Aikawa		3·4	333	0 49	− 3	1 27	− 5
Osaka		3·9	265	0 57	− 2	1 44	0
Mizusawa	E.	4·2	9	1 4	+ 1	1 48	− 3
Sumoto		4·4	262	1 10	+ 4	1 51	− 5
Akita		4·7	359	1 20	+10	—	—
Morioka		4·8	9	1 11	0	2 2	− 4

Aug. 31d. 13h. 47m. 18s. Epicentre 62°·0N. 146°·2W.

$A = -·3921$, $B = -·2625$, $C = +·8816$; $\delta = -13$; $h = -10$;
$D = -·556$, $E = +·831$; $G = -·733$, $H = -·490$, $K = -·472$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		2·9	346	i 0 48	0	i 1 20	− 4	—	—	e 1·7
Sitka		7·1	124	i 2 8	+20	e 3 52	+42	i 3 55	SSS	e 5·6
Victoria	z.	18·6	127	e 4 33	+12	—	—	e 4 50	PPP	—
Seattle		19·8	126	i 4 54	+19	—	—	i 5 8	PPP	e 8·4
Hungry Horse		22·6	112	i 5 8	+ 5	—	—	i 12 2	P_cS	—
Shasta Dam		25·7	97	i 5 33	0	—	—	—	—	—
Mineral	z.	26·3	135	i 6 38k	PPP	i 12 13	S_cP	—	—	—
Reno	z.	27·7	133	e 5 54	+ 2	—	—	—	—	—
Berkeley		28·3	138	e 5 53	− 4	i 12 21	SSS	—	—	e 13·4
Logan		28·8	119	e 6 11	+ 9	e 12 22	SS	e 7 8	PPP	—
Lick	z.	29·0	138	i 6 0a	− 4	i 12 23	SS	i 12 27	SS	—
Fresno	z.	30·2	135	e 6 38a	+24	—	—	—	—	—
Tinemaha		30·4	133	e 6 11	− 5	i 12 28	SS	i 8 56	P_cP	—
China Lake	z.	31·8	133	e 6 28	0	i 12 35	SS	i 9 1	P_cP	—
Overton	z.	32·3	128	i 6 31	− 2	—	—	i 7 0	pP	—
Boulder City		32·6	129	e 6 34	− 1	e 12 16	+25	e 7 1	pP	—
Pierce Ferry		32·8	128	e 6 36	− 1	—	—	i 7 3	?	—
Pasadena	z.	33·1	135	e 6 38	− 2	i 12 37	SS	—	—	—
Riverside	z.	33·5	135	e 6 40	− 3	i 12 38	SS	i 9 6	P_cP	—
Palomar	z.	34·2	133	i 6 47	− 2	i 12 42	SS	—	—	—
Tucson		37·4	126	i 7 16	0	—	—	e 7 39	?	—
St. Louis		41·0	99	e 7 46	0	—	—	e 8 13	?	—
Ottawa	z.	42·6	79	e 7 59	0	—	—	e 8 27	?	—
Paris		66·7	23	e 10 43	−12	—	—	i 10 56	P	—

Additional readings :—
Seattle i = 5m.22s., 5m.48s., and 6m.59s.
Mineral iZ = 6m.42s., 7m.5s., 7m.21s., and 7m.32s.
Reno eZ = 6m.18s.
Berkeley iZ = 6m.7s. and 6m.22s.
Lick eZ = 6m.22s.
Tinemaha iZ = 6m.42s. and 7m.9s.
China Lake eZ = 6m.56s.
Pasadena iZ = 6m.52s. and 7m.4s.
Riverside eZ = 6m.54s., iZ = 7m.4s.
Palomar i = 7m.15s., iZ = 7m.30s.
Pennsylvania also records long waves.

Aug. 31d. Continuation of the list of aftershocks from the epicentre in Turkestan.

Obi-garm.			Andijan.		
h.	m.	s.	h.	m.	s.
7	26	24	1	25	0

Aug. 31d. Readings also at 0h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Shasta Dam (2), Berkeley, Lick, Mineral, Reno, Hungry Horse (2), College, Logan, Paris, and Ksara), 1h. (Pennsylvania, Philadelphia, Tacubaya, De Bilt, and Kew), 2h. (Tucson, Boulder City, Overton, Pierce Ferry, and Shasta Dam), 4h. (near Ottawa), 10h. (Pierce Ferry and Shasta Dam). 13h. (Victoria, Overton, Shasta Dam, and near Tacubaya), 14h. (Tucson), 15h. (Fresno, College, and near Reno), 18h. (Hungry Horse), 22h. (Vera Cruz and near Tacubaya), 23h. (Vera Cruz, Tacubaya, Helwan, and Ksara).

Sept. 1d. 13h. 58m. 17s. Epicentre 35°·8S. 98°·7W (as on 1942, Sept. 22d.).

$A = -·1230$, $B = -·8036$, $C = -·5823$; $\delta = -2$; $h = 0$;
$D = -·988$, $E = +·151$; $G = +·088$, $H = +·576$, $K = -·813$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		31·7	47	i 6 18	− 9	e 12 0	+23	e 9 44	PcP	e 13·5
La Paz		33·3	63	6 43	+ 2	11 56	− 6	i 13 59	SS	15·7
Tucson		68·6	349	i 11 8	+ 1	—	—	e 13 56	PP	e 28·9
Palomar		70·9	344	i 11 23	+ 2	—	—	—	—	—
Riverside	z.	71·6	343	i 11 26	+ 1	—	—	—	—	—
Pasadena		71·9	343	i 11 28	+ 1	—	—	—	—	e 30·8
Boulder City		73·0	346	e 11 34	+ 1	—	—	—	—	—
Pierce Ferry		73·0	347	e 11 30	− 3	—	—	—	—	—
China Lake	z.	73·4	344	i 11 39a	+ 3	—	—	—	—	—
St. Louis		74·5	6	i 11 41	− 1	e 21 14	− 3	e 29 15	SSS	—
Fresno	z.	74·8	343	e 11 44	0	—	—	e 14 1	PP	—
Tinemaha		74·8	344	i 11 45a	+ 1	—	—	—	—	—
Lick	z.	75·8	341	i 11 52k	+ 2	—	—	—	—	—
Berkeley		76·5	341	i 11 56k	+ 2	e 21 36	− 3	i 12 1	pP	e 36·2
Reno	z.	77·4	344	e 12 1a	+ 3	—	—	—	—	—
Logan		78·1	350	e 12 6	+ 4	—	—	—	—	e 35·7
Mineral	z.	78·6	342	e 12 5a	0	—	—	—	—	—
Pennsylvania	E.	78·6	16	—	—	e 21 57	− 5	—	—	—
Shasta Dam		79·2	342	e 12 2	− 6	(e 22 8)	0	—	—	—
Harvard		81·8	20	i 12 18	− 4	—	—	—	—	e 33·8
Ottawa	z.	83·4	16	e 12 26	− 4	—	—	—	—	—
Riverview		84·9	231	—	—	e 23 12	+ 6	e 24 9	PS	e 39·4
Hungry Horse		84·9	350	i 12 34	− 4	—	—	—	—	—
Seattle		85·7	345	e 12 58	+16	e 23 24	+10	e 29 6	SS	e 37·7
Victoria		86·8	344	12 47	0	e 23 33	+ 8	—	—	42·7
Tamanrasset	z.	114·1	78	18 56	[+15]	—	—	—	—	—
Almeria		114·7	60	(e 17 51)	?	—	—	—	—	e 17·8
Alicante		116·8	59	19 10	[+23]	29 45	PS	20 25	PP	e 54·8
Paris		122·8	49	i 18 54	[− 4]	—	—	—	—	—
Stuttgart	z.	127·0	51	e 15 2	P	—	—	—	—	—
Collmberg		129·9	48	e 19 8	[− 4]	—	—	—	—	—
Ksara		142·9	79	e 12 37	?	—	—	e 22 40	PKS	—

Additional readings and note :—
Boulder City e = 11m.41s.
Pierce Ferry iP = 11m.35s., e = 11m.55s.
Lick iZ = 11m.55s., 12m.14s., and 12m.25s.
Berkeley iZ = 12m.24s., eSZ = 21m.42s., eN = 21m.52s. and 34m.7s.
Reno eE = 12m.7s.
Shasta Dam iP = 12m.8s., S is given as P of another shock.
Riverview ePPSE = 24m.31s., eSSEZ = 28m.55s.
Hungry Horse i = 12m.38s.
Alicante SS = 34m.0s.
Long waves were also recorded at Copiapo, Santa Lucia, Honolulu, Auckland, Wellington, and other American and European stations.

Sept. 1d. 16h. 59m. 13s. Epicentre 15°·0N. 146°·4E. (as on 1947, Aug. 13d.).

$A = -·8049$, $B = +·5348$, $C = +·2572$; $\delta = +3$; $h = +6$;
$D = +·554$, $E = +·883$; $G = -·214$, $H = +·142$, $K = -·966$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m.	s.
College		66·3	25	e 10 51	− 1	—	—	—	—
Andijan		68·3	308	e 11 9	+ 4	e 20 12	+ 6	—	—
Tashkent		70·6	309	e 11 24	+ 5	i 20 37	+ 4	i 21 23	PPS
Stalinabad		71·2	306	i 11 25	+ 2	—	—	—	—
Sverdlovsk		75·3	326	11 47	0	e 21 23	− 3	—	—
Shasta Dam		81·3	50	i 12 18	− 2	—	—	—	—
Lick	z.	82·6	53	i 12 25a	− 1	—	—	—	—
Fresno	z.	84·2	53	e 12 33a	− 1	—	—	e 15 55	PP
Hungry Horse		85·2	41	i 12 39	0	—	—	—	—
Tinemaha	z.	85·3	54	e 12 41	+ 1	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
China Lake	z.	86·1	53	e 12 45	+ 1	—	—	—	—
Pasadena	z.	86·1	56	e 12 43	− 1	—	—	—	—
Riverside	z.	86·8	56	e 12 45	− 2	—	—	—	—
Palomar	z.	87·4	56	i 12 50	0	—	—	—	—
Boulder City		88·2	54	i 12 51	− 3	—	—	—	—
Pierce Ferry		88·8	53	i 12 53	− 4	—	—	—	—
Tucson		92·5	56	e 13 14	0	—	—	—	—
Alicante		118·5	331	18 37	[−13]	22 1	PKS	—	—

Additional readings :—
Shasta Dam e =12m.33s.
Hungry Horse e =14m.4s.
Pierce Ferry e =12m.57s.
Long waves were also recorded at Ukiah.

Sept. 1d. 18h. 26m. 47s. Epicentre 1°·5N. 90°·3W. (as on 1948, Aug. 19d.).
A = −·0052, B = −·9997, C = +·0260 ; δ = +10 ; h = +7 ;
D = −1·000, E = +·005 ; G =000, H = −·026, K = −1·000.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		17·3	78	e 3 55	− 9	e 7 5	−11	—	—	e 8·2
Tacubaya		19·8	336	e 4 48	+13	e 8 19	+ 6	—	—	—
Huancayo		20·1	134	e 4 46	+ 8	e 8 34	+15	—	—	i 9·5
La Paz		28·3	130	e 4 49	−68	i 10 53	+10	12 33	SSS	14·0
San Juan		29·0	53	e 6 56	PP	e 11 1	+ 7	—	—	e 13·6
Copiapo	N.	34·5	147	e 5 50	−62	—	—	i 6 1	?	14·2
Tucson		36·2	330	e 7 3	− 3	e 12 33	−14	e 8 19	PP	e 14·8
St. Louis		37·0	0	e 7 12	− 1	i 12 58	− 1	e 15 9	SS	—
Bermuda		38·9	36	e 9 15	PP	e 13 44	+16	—	—	e 16·7
Palomar		40·3	325	i 7 37	− 3	—	—	—	—	—
Pennsylvania	E.	40·7	15	—	—	e 13 56	+ 1	e 16 41	SS	e 21·5
Philadelphia		40·7	19	—	—	e 13 35	−20	(e 16 42)	SS	e 16·7
Pierce Ferry		40·8	331	e 7 55	+10	—	—	—	—	—
Riverside	z.	41·1	325	e 7 46	− 1	—	—	—	—	—
Boulder City		41·2	330	e 7 43	− 5	—	—	—	—	—
Overton	z.	41·4	331	i 7 47	− 3	—	—	—	—	—
Pasadena		41·6	325	e 7 47	− 4	i 14 7	− 1	—	—	e 20·4
China Lake	z.	42·5	327	e 7 57	− 2	—	—	—	—	—
Tinemaha	z.	43·8	327	e 8 14	+ 5	—	—	—	—	—
Rapid City	E.	43·9	348	e 12 37	?	—	—	—	—	e 18·1
Weston		44·1	21	—	—	14 47	+ 2	18 3	SS	—
Logan		44·5	338	e 8 30	+15	e 14 10	−41	—	—	e 20·4
Lick	z.	45·9	325	i 8 5a	−21	—	—	—	—	—
Berkeley		46·6	325	—	—	i 15 23	+ 2	—	—	e 22·8
Bozeman		47·6	341	—	—	e 15 37	+ 2	—	—	24·6
Hungry Horse		51·0	341	i 8 58	− 8	—	—	—	—	—
Sitka		66·2	335	—	—	e 19 41	+ 1	—	—	e 31·0
College		75·4	338	e 11 52	+ 5	—	—	—	—	—
Malaga	z.	85·8	54	i 12 46a	+ 4	e 23 30	+15	e 16 26	PP	40·4
Almeria		87·2	54	i 12 49	0	23 29	+ 1	16 13	PP	46·2
Kew		88·8	39	—	—	—	—	e 38 7	Q	e 42·2
Alicante		88·9	52	12 45	−13	24 51	PS	—	—	e 42·4
Clermont-Ferrand		91·3	45	—	—	e 25 23	PS	e 30 28	SS	42·2
Stuttgart		95·1	41	—	—	—	—	e 36 13?	SSS	e 45·2

Additional readings :—
Bogota e =6m.26s., eS_ePEN =10m.28s.
Tacubaya e =7m.26s.
Huancayo e =6m.24s.
La Paz iPZ =6m.13s.
St. Louis iP =7m.21s., e =15m.44s.
Pennsylvania eE =19m.6s.
Lick iZ =8m.23s. and 8m.30s.
Berkeley iE =15m.28s., iZ =16m.1s., iE =18m.1s.
Almeria PPP =18m.15s., SKS =23m.5s., PPS =25m.13s., SS =29m.33s.
Clermont-Ferrand e =30m.46s.
Long waves were also recorded at Butte, Salt Lake City, Seattle, Harvard, Ottawa, Granada, De Bilt, Paris, Strasbourg, and Rome.

Sept. 1d. Readings also at 1h. (Ksara (2), Strasbourg, and Pierce Ferry), 2h. (Bucharest, Triest, Rome, Besançon, Collmberg, Strasbourg, Stuttgart, Paris, Zürich, Tamanrasset, Samarkand, Tchimkent, near Andijan, Obi-garm, Tashkent, Stalinabad, Hungry Horse, near Tacubaya, and near Santa Lucia), 3h. (near Mizusawa and near Obi-garm), 4h. (Messina and Paris), 6h. (Strasbourg), 10h. (near Andijan), 12h. (Collmberg and Shasta Dam), 13h. (Apia, Overton, and near College), 16h. (La Paz, Bogota, Pierce Ferry, Strasbourg, and Tamanrasset), 18h. (Paris and Strasbourg (2)), 21h. (Stalinabad, near Andijan (2), and Obi-garm), 22h. (College, Jena, and near Collmberg), 23h. (Hungry Horse).

Sept. 2d. 1h. 47m. 33s. Epicentre 35°·3N. 44°·6E. (as on 1948, April 26d.).

Rough.

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Erevan		4·9	356	1 27	P*	—	—	—	—	—
Leninakan		5·5	355	1 26	+ 1	—	—	—	—	—
Tiflis		6·4	1	1 38	0	—	—	—	—	—
Ksara		7·4	260	e 2 9?	P*	4 50	?	—	—	—
Yalta		12·2	322	e 3 3	+ 5	—	—	—	—	—
Helwan	z.	12·4	248	3 17	+16	6 0	SSS	3 35	PPP	—
Istanbul		13·5	300	e 2 13	−62	5 7	−40	—	—	—
Samarkand		18·3	70	4 3	−14	—	—	—	—	—
Stalinabad		19·6	72	i 4 23	− 9	e 8 1	− 7	—	—	—
Tashkent		20·3	65	i 4 26	−14	e 8 6	−17	—	—	—
Moscow		21·0	350	e 4 43	− 4	e 8 33	− 4	—	—	—
Andijan		22·5	68	4 55	− 7	e 8 58?	− 7	—	—	—
Sverdlovsk		24·1	22	5 15	− 3	—	—	—	—	—
Frunse		24·4	63	e 5 19	− 2	—	—	—	—	—
Triest		25·5	304	e 5 36	+ 4	e 10 23	+26	—	—	—
Rome	e.	25·9	295	—	—	e 16 15	S_eS	—	—	—
Collmberg	z.	27·7	315	e 5 55	+ 3	—	—	—	—	—
Stuttgart	z.	29·3	309	(e 6 9)	+ 3	—	—	—	—	—
Alicante		36·0	289	e 8 36	PP	—	—	—	—	e 12·9
Tamanrasset	z.	36·2	261	e 7 17	+11	—	—	—	—	—
Pretoria	z.	62·7	196	i 10 35	+ 6	—	—	—	—	—
College		79·7	5	e 12 7	− 4	—	—	—	—	—

Additional readings and note :—
Helwan eZ = 6m.27s., iP_ePZ = 7m.33s.
Stuttgart reading increased by 4m.
Tamanrasset ePZ = 7m.22s., eZ = 7m.35s.

Sept. 2d. Readings also at 0h. (Mount Wilson, Riverside, China Lake, Andijan, Tashkent, Almata, Tchimkent, near Frunse, and near Istanbul (3)), 1h. (Victoria, Pasadena, Riverside, Palomar, Tinemaha, Seattle, College, Bozeman, Butte, Hungry Horse (2), Overton, Pierce Ferry, Tucson, Pennsylvania, and near Sitka), 2h. (Mineral and near Vera Cruz), 3h. (Seattle), 5h. (Alicante, Seattle, Shasta Dam, Hungry Horse, near Sitka, near Harvard, and near Obi-garm), 6h. (Pennsylvania), 7h. (Sitka, Tucson, Pasadena, Riverside, Tinemaha, near Istanbul, near Obi-garm, Stalinabad, and Tchimkent), 8h. (Hungry Horse (2)), 9h. (Collmberg, Samarkand, near Obi-garm and Andijan), 12h. (Andijan, Tchimkent, and near Obi-garm), 14h. (Reno), 15h. (Strasbourg and Rome), 16h. (Stalinabad and near Obi-garm), 17h. (Reno and near Andijan), 19h. (Victoria), 20h. (Victoria and Santa Lucia), 21h. (Victoria (2), near Obi-garm, Stalinabad, Andijan, Samarkand, Tashkent, and Tchimkent), 22h. (near Obi-garm and near Tacubaya), 23h. (near Andijan).

Sept. 3d. 3h. 6m. 42s. Epicentre 62°·6N. 150°·9W. Depth of focus 0·010.
(as on 1948, August 19d.).

$A = -·4042$, $B = -·2250$, $C = +·8865$; $\delta = -12$; $h = -10$;
$D = -·486$, $E = +·874$; $G = -·775$, $H = -·431$, $K = -·463$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		2·7	30	i 0 39	− 4	i 1 14	0	i 0 55	PP	i 3·3
Sitka		9·3	116	e 2 8	− 5	e 4 4	+ 8	e 3 26	?	e 4·4
Victoria	z.	20·7	119	i 4 33a	− 1	—	—	—	—	—
Seattle		21·9	119	i 4 48k	+ 2	e 9 23	SS	—	—	—
Hungry Horse		24·9	107	i 5 14	− 1	i 12 24	P_cS	i 5 51	PP	—
Shasta Dam		27·8	128	i 5 42	0	—	—	i 5 50	pP	—
Mineral		28·4	127	i 5 48k	+ 1	—	—	i 6 12	pP	—
Reno	z.	29·7	126	e 6 0k	+ 1	—	—	—	—	—
Berkeley	z.	30·3	130	i 6 6k	+ 2	—	—	i 6 31a	pP	—
Lick	z.	31·0	130	i 6 12k	+ 2	—	—	i 6 27k	pP	—
Tinemaha		32·5	126	i 6 24k	+ 1	—	—	i 6 49	pP	—
China Lake	z.	33·8	126	i 6 37k	+ 2	—	—	i 7 2	pP	—
Overton	z.	34·4	122	i 6 41	+ 1	—	—	—	—	—
Boulder City		34·7	122	i 6 44	+ 2	e 7 17	sP	e 7 10	pP	—
Pierce Ferry		34·9	121	i 6 46	+ 2	—	—	i 7 11	pP	—
Pasadena		35·1	127	i 6 56k	+10	—	—	i 7 12	pP	—
Riverside		35·5	127	i 6 50k	+ 1	—	—	i 7 12	pP	—
Palomar		36·3	126	i 6 58k	+ 2	—	—	i 7 22	pP	—
Tucson		39·6	120	i 7 25	+ 2	—	—	i 7 51	pP	—
St. Louis		43·2	94	e 7 51	− 2	—	—	e 8 18	pP	e 22·7
Ottawa	z.	44·6	76	8 1k	− 3	—	—	—	—	—
Shawinigan Falls	N.	45·0	72	i 8 6k	− 1	—	—	—	—	—
Harvard		48·7	75	i 8 34	− 2	i 9 12	sP	i 8 57	pP	—
Weston		48·9	75	i 8 37	− 1	—	—	—	—	—
Collmberg	z.	65·7	12	e 10 42	+ 6	—	—	e 10 56	pP	—
Bogota	z.	79·9	100	e 10 44	?	—	—	—	—	—
Copiapo	N.	109·7	112	i 10 20	?	—	—	—	—	—
Pretoria	z.	143·2	1	i 19 25	[+ 2]	—	—	—	—	—
Grahamstown	z.	150·6	4	i 19 47	[+12]	—	—	—	—	—

Additional readings :—
Seattle i = 4m.54s., 5m.44s., and 5m.52s.
Hungry Horse i = 8m.15s., ePS = 8m.51s.
Shasta Dami = 7m.28s.
Mineral iPPZ = 6m.26s., iZ = 7m.13s., iP_ePZ = 9m.0s.
Berkeley iZ = 6m.38s.
Lick eEN = 6m.17s., iZ = 9m.8s.
China Lake eZ = 9m.16s.
Boulder City i = 6m.50s.
Pierce Ferry i = 6m.53s. and 7m.30s.
Pasadena iZ = 8m.48s.
Riverside eZ = 9m.19s.
Palomar iZ = 8m.45s.
Tucson iPP = 8m.51s.
Long waves were also recorded at Philadelphia and City College, N.Y.

Sept. 3d. Readings also at 0h. (near Tacubaya), 1h. (Andijan, Frunse, Almata, and near Tchimkent), 2h. (Mineral, Andijan, near Stalinabad, and near Obi-garm (2)), 3h. (near Obi-garm), 4h. (Andijan, near Obi-garm (2), and near Reno), 6h. (Victoria and near Tacubaya), 7h. (Reykjavik, Victoria, Seattle, Pasadena, Riverside, Tinemaha, Hungry Horse, Shasta Dam, Boulder City, Overton, Pierce Ferry, Tucson, Rapid City, Salt Lake City, Bozeman, near Butte, and Logan), 8h. (near Obi-garm), 11h. (Copiapo and Hungry Horse), 12h. (Copiapo, College, Hungry Horse, Tucson, near Logan, Andijan, and near Obi-garm (2)), 13h. (near Andijan), 16h. (near Lick and Branner), 17h. (College, near La Paz and near Klyuchi), 18h. (near Berkeley, Lick, and Branner), 20h. and 22h. (near Istanbul), 23h. (near San Juan).

Sept. 4d. Readings also at 0h. (Hungry Horse, Harvard, Ksara, and near Leninakan). 3h. (Shasta Dam and Hungry Horse), 5h. (Palomar, Pasadena, China Lake, Tinemaha, near Barcelona, and Tortosa), 6h. (near Mineral), 8h. (San Juan), 9h. (near Tacubaya and near Balboa Heights), 10h. (Tucson), 11h. (Boulder City, Pierce Ferry, Ksara, Copenhagen, Sotchi, near Erevan, Leninakan, and Tiflis), 12h. (near Mineral), 13h. (Strasbourg), 14h. (near Istanbul and near Apia), 15h. (Auckland, Christchurch, Wellington, Riverview, Tucson, Overton, Shasta Dam, Berkeley, Lick, Hungry Horse, Seattle, Victoria, Harvard, Weston, Besançon, Paris, Strasbourg, Helwan, Istanbul, and Ksara), 16h. (Malaga, Tchimkent, near Obigarm, and near Tacubaya), 17h. (Butte, Almata, Frunse, near Andijan, Obi-garm, Samarkand, and Tchimkent), 18h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, and Lick), 21h. (Basle, Zürich, Collmberg, Ksara, and near Raciborzu), 22h. (near Messina), 23h. (near Zürich).

Sept. 5d. 2h. 54m. 1s. (I)
3h. 18m. 9s. (II)
Epicentre 17°·0N. 121°·5E.
(as on 1946, May 29d.).

Intensity respectively V and IV at Tuguegarao; IV and III at Manila; and III at Aparri.
Letter from the French Legation at Manila suggesting epicentre 17°·5N. 121°·25E.

$A = -·5000$, $B = +·8159$, $C = +·2906$; $\delta = +14$; $h = +5$;
$D = +·853$, $E = +·522$; $G = -·152$, $H = +·248$, $K = -·957$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Nanking	15·2	351	e 3 25	−13	—	—	—	—	—
II		15·2	351	e 3 31	− 7	—	—	—	—	—
I	Hukuoka	18·3	25	e 4 19	+ 2	e 8 9	SS	—	—	9·1
II		18·3	25	e 4 28	+11	7 18	−21	—	—	11·0
I	Osaka	21·6	33	e 4 54	0	—	—	5 57	PPP	—
II		21·6	33	e 4 53	− 1	—	—	e 5 48	PPP	—
I	Nagoya	22·7	35	5 2	− 2	—	—	e 6 2	PPP	—
II		22·7	35	e 5 8	+ 4	—	—	e 6 18	PPP	—
I	Tokyo	24·7	37	e 5 45	+21	e 10 29	SS	—	—	—
II		24·7	37	e 5 41	+17	—	—	—	—	e 11·2
I	Calcutta	E. 31·6	286	e 6 20	− 6	i 11 26	− 9	7 8	PP	—
II		E. 31·6	286	e 6 26	0	e 11 30	− 5	—	—	—
I	Irkutsk	37·7	343	e 7 17	− 2	13 20	+10	16 40	SSS	—
II		37·7	343	e 7 25?	+ 6	13 30?	+20	—	—	—
I	Colombo	E. 41·9	262	8 19	+25	15 14	+61	—	—	23·2
I	New Delhi	N. 42·2	295	—	—	e 17 41	S_eS	—	—	e 23·8
II		N. 42·2	295	7 36	−20	—	—	—	—	e 22·4
I	Kodaikanal	E. 43·2	268	e 8 16	+12	e 14 28	− 4	—	—	19·8
II		E. 43·2	268	e 8 6	+ 2	e 14 18	−14	—	—	19·6
I	Bombay	E. 46·2	280	e 8 34	+ 6	e 15 15	0	15 32	PPS	—
I	Semipalatinsk	46·9	326	i 8 32	− 2	—	—	—	—	—
II		46·9	326	i 8 32	− 2	—	—	—	—	—
I	Andijan	48·3	310	e 8 45	0	—	—	—	—	—
II	Stalinabad	50·6	307	e 8 49	−13	—	—	—	—	—
I	Tchimkent	50·7	312	i 9 2	− 1	—	—	—	—	—
I	Tashkent	50·7	310	e 9 1	− 2	—	—	i 10 59	PP	—
I	Samarkand	52·2	307	e 9 12	− 3	—	—	—	—	—
II		52·2	307	e 9 13	− 2	—	—	—	—	—
I	Brisbane	Z. 53·8	145	i 9 39	+13	—	—	—	—	—
II		Z. 53·8	145	i 9 27	+ 1	—	—	—	—	—
I	Ashkabad	58·7	305	e 10 2	0	—	—	—	—	—
I	Sverdlovsk	60·1	327	i 10 9	− 2	18 31	+ 7	e 13 51	PPP	—
II		60·1	327	i 10 9	− 2	—	—	—	—	—
II	Grozny	68·2	311	e 10 53	−11	—	—	—	—	—
II	Tiflis	69·1	309	e 11 10?	0	—	—	—	—	—
II	Sotchi	72·6	312	e 11 48?	+17	—	—	—	—	—
I	Moscow	72·7	324	11 29	− 3	21 5	+ 8	—	—	—
II		72·7	324	11 29	− 3	20 53	− 4	—	—	—
I	College	75·1	26	e 12 20	+34	—	—	e 14 19	PP	—
II		75·1	26	e 11 44	− 2	i 29 50	SSS	—	—	i 30·1
I	Ksara	77·2	301	i 11 59	+ 2	—	—	e 20 22	?	—
II		77·2	301	i 11 58k	+ 1	22 4?	+17	—	—	—
I	Istanbul	80·8	311	i 12 19	+ 2	—	—	e 23 25	PPS	—
II		80·8	311	e 12 19	+ 2	e 22 48	+23	—	—	—

Continued on next page.

			△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Helwan		81·9	299	12 36	+13	e 22 49	+13	—	—	—
II		z.	81·9	299	i 12 22a	− 1	—	—	e 15 29	PP	—
I	Bucharest		82·1	314	e 12 17	− 7	i 22 51	+13	e 23 21	PS	44·0
I	Upsala		82·2	331	12 21	− 3	22 49	+10	e 31 43	SSS	e 43·0
II			82·2	331	e 12 26	+ 2	e 22 39	0	e 24 51?	?	—
I	Copenhagen		86·4	328	e 12 44	− 1	e 23 23	+ 2	e 24 27	PS	40·0
II			86·4	328	e 12 45	0	—	—	—	—	—
I	Bergen		87·6	334	e 11 31	?	—	—	e 17 24	PPP	46·0
I	Prague		87·6	323	e 12 10	−41	—	—	—	—	—
II			87·6	323	e 12 46	− 5	e 23 32	0	e 24 39	PS	e 51·9
I	Collmberg		88·0	324	e 12 51	− 2	e 23 35	− 1	e 24 29	PS	e 47·0
II			88·0	324	e 12 55	+ 2	e 23 33	− 3	e 27 57	SS	e 46·9
I	Scoresby Sund		89·1	349	12 59	+ 1	23 42	− 4	—	—	—
II			89·1	349	13 1k	+ 3	23 27	ScS	—	—	—
I	Taranto		89·5	313	e 18 9	PPP	—	—	e 27 59	?	—
I	Triest		89·9	318	e 13 1	− 1	e 24 3	+ 9	e 18 32	PPP	e 44·0
II			89·9	318	i 16 41	PP	e 23 51	− 3	i 23 29	SKS	—
I	Stuttgart		91·3	322	e 13 8	− 1	e 24 14	+ 8	e 25 19	PS	e 47·0
II			91·3	322	e 13 9	0	e 24 17?	+11	—	—	e 47·9
I	Padova		91·5	318	e 13 14	+ 4	e 24 10	+ 2	—	—	—
I	De Bilt		91·9	327	e 13 17	+ 6	e 23 59	−12	—	—	e 46·0
II			91·9	327	e 13 13	+ 2	—	—	—	—	—
I	Strasbourg		92·2	323	e 13 11	− 2	e 24 19	+ 5	e 26 6	PPS	e 47·8
II			92·2	323	i 13 12a	− 1	i 24 24	+10	e 17 1	PP	e 46·9
I	Zürich		92·3	321	e 13 12k	− 1	—	—	—	—	e 37·3
I	Rome		92·3	316	e 13 14	+ 1	e 23 36	[−10]	e 25 30	PS	—
II		z.	92·3	316	e 13 13	0	e 23 32	[−14]	e 16 56	PP	—
I	Florence Xim		92·3	317	i 17 23	PP	i 23 47	[+ 1]	—	—	—
II			92·3	317	e 12 46	−27	e 23 32	[−14]	—	—	—
I	Aberdeen		92·6	333	—	—	e 23 48	[0]	i 30 54	SSP	e 46·9
I	Victoria	z.	93·0	37	e 13 18k	+ 1	—	—	—	—	—
II		z.	93·0	37	i 13 19	+ 2	—	—	—	—	—
I	Durham	E.	93·8	330	i 15 36	?	—	—	i 25 12	PS	—
I	Besançon		93·9	322	e 13 19	− 2	—	—	—	—	—
II			93·9	322	e 13 20	− 1	—	—	—	—	—
I	Kew	E.	95·1	328	e 16 59	PP	—	—	—	—	e 59·0
I	Paris		95·1	325	e 13 24	− 2	—	—	e 13 55	PcP	—
II			95·1	325	e 21 51?	PKP	e 30 51?	SS	e 26 52	PPS	—
I	Clermont-Ferrand		96·4	322	e 17 38	PP	—	—	—	—	—
II			96·4	322	e 17 33	PP	—	—	e 32 51	?	e 36·8
II	Shasta Dam		97·6	44	e 13 37	− 1	—	—	e 13 54	PcP	—
I	Hungry Horse		98·3	34	i 13 41	0	—	—	e 17 1	PP	—
II			98·3	34	e 13 42	+ 1	—	—	—	—	—
I	Berkeley		99·0	46	—	—	e 24 35	{−12}	e 26 23	PS	e 50·7
II			99·0	46	i 13 45k	+ 1	e 24 39	{− 8}	17 45	PP	—
I	Lick	z.	99·7	46	e 13 47a	0	—	—	e 16 14	PcS	—
II		z.	99·7	46	i 13 48k	+ 1	—	—	—	—	—
I	Pretoria	z.	100·1	246	i 20 6	PPP	—	—	—	—	—
II	Tinemaha	z.	102·2	45	e 14 31	+33	—	—	—	—	—
I	Alicante		102·7	317	14 13	+13	25 26	−17	28 3	PPS	e 50·1
I	China Lake	z.	103·3	45	e 18 13	PP	—	—	e 30 37	PKKP	—
II		z.	103·3	45	e 18 23	PP	—	—	—	—	—
I	Pasadena	z.	103·8	47	e 30 49	PKKP	—	—	—	—	—
II	Mount Wilson	z.	103·8	47	e 14 48	+43	—	—	e 18 31	PP	—
I	Almeria		104·8	316	14 10	0	25 48	−12	18 24	PP	56·0
I	Overton	z.	105·0	44	e 18 16	PP	—	—	—	—	—
II		z.	105·0	44	i 18 27	PP	—	—	—	—	—
I	Boulder City		105·1	45	e 18 34	PP	—	—	—	—	—
I	Palomar	z.	105·1	48	i 18 21	PP	—	—	—	—	—
II		z.	105·1	48	e 18 23	PP	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Granada		105·3	318	18 39a	PP	37 56	SSS	28 47	PPS	53·2
I Pierce Ferry		105·6	44	e 18 33	PP	—	—	—	—	—
II		105·6	44	e 18 26	PP	—	—	—	—	—
I Tamanrasset	z.	106·0	301	18 24	PP	—	—	—	—	—
II	z.	106·0	301	17 50	?	e 27 56	PS	e 18 41	PP	—
I Malaga	z.	106·1	317	e 18 52	PP	i 25 30	{− 8}	28 52	PPS	58·8
I Tucson		109·9	46	e 18 29	[− 4]	—	—	e 17 17	?	—
II		109·9	46	e 18 54	[+21]	e 39 11	SSS	—	—	—
I St. Louis		117·2	27	e 19 39	PP	e 35 58	SS	e 27 35	?	—
II		117·2	27	e 20 29	PP	e 35 40	SS	—	—	—
I Harvard		119·6	10	—	—	i 27 52	{+41}	i 28 1	?	e 63·5
I Weston		119·7	10	—	—	27 53	{+42}	54 19	Q	e 61·6
I Fort de France		148·4	4	e 19 49	[+ 4]	—	—	—	—	—
I Bogota		153·6	37	e 20 33	[+40]	—	—	—	—	—
II		153·6	37	e 20 6	[+13]	—	—	—	—	—

Additional readings :—
Nagoya I eE =6m.29s.
Calcutta I PPPE =7m.32s., P_cPE =9m.15s.
Irkutsk I PP =8m.57s.?, eSS =16m.8s.
Bombay I PPE =10m.33s., SSSE =19m.10s.
Helwan I eZ =12m.50s., 12m.59s., 13m.50s., and 20m.32s.
Helwan II eZ =12m.54s. and 13m.30s.
Upsala I ePPP?E =16m.59s.?, eN =22m.59s.?, eE =23m.13s. and 32m.15s.
Prague II e =14m.1s., 14m.31s., 14m.42s., and 15m.6s., ePP? =16m.40s., ePPP? =18m.35s., e =19m.55s., and 25m.19s., eSS? =28m.51s., e =32m.3s. and 37m.33s.
Collmberg I ePPZ =16m.18s., eN =22m.47s.
Triest I ePP =16m.48s., eSKS =23m.30s., iPPS =25m.34s., eSS =28m.57s., eSSS =34m.41s.
Triest II ePPP =18m.34s., iSKKS =23m.42s., iPS =24m.53s., iPPS =25m.48s.
Stuttgart I ePP =17m.2s.
Strasbourg I e =13m.18s. and 13m.42s., ePP =17m.4s., e =18m.19s., ePPP =19m.4s., e =20m.35s., ePS =25m.32s., e =26m.21s., eSS =30m.47s.
Strasbourg II e =13m.36s., ePPP =19m.3s.
Rome I ePP?Z =16m.56s.
Rome II eSSE =29m.42s.
Aberdeen I iSEN =24m.29s., iN =46m.39s.
Paris I e =15m.59s.?
Shasta Dam II i =14m.19s.
Berkeley I eN =27m.53s.
Berkeley II iZ =14m.28s.
Alicante I PP =18m.24s., PPP =19m.40s., eS =26m.20s., SS =33m.16s., SSS =37m.34s.
Almeria I PPP =20m.40s., SS =33m.8s.
Granada I S =30m.29s., ePPS =33m.35s.
Tamanrasset II eZ =27m.51s.
Malaga I iPKSZ =22m.20s.
Tucson I ePP =19m.4s.
Long waves were also recorded to shock I at Aberdeen, Potsdam, Seattle, Pennsylvania, Seven Falls, Wellington, and Christchurch.

Sept. 5d. 6h. 54m. 6s. Epicentre 53°·8N. 133°·2W. (as on Aug. 23d.).

		Δ	Az.	P.	O−C.	S.	O−C	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		4·0	343	e 1 3	− 1	e 1 46	− 6	i 1 20	P*	e 2·0
Victoria		8·1	127	2 0	− 2	3 40	+ 5	—	—	i 4·1
Seattle		9·2	127	e 2 35	P*	e 4 2	− 1	—	—	e 4·7
Hungry Horse		13·2	107	i 3 11	0	—	—	i 3 23	PP	e 6·4
Shasta Dam		15·0	147	i 3 41	+ 6	—	—	e 4 1	PP	—
Mineral	z.	15·6	145	e 3 42	− 1	—	—	—	—	—
Reno	n.	16·9	142	e 4 0	+ 1	—	—	—	—	—
Lick	z.	18·3	149	i 4 17a	0	—	—	—	—	—
Logan		18·7	122	e 4 21	− 1	e 8 22	+34	—	—	e 9·9
Fresno		19·4	145	e 4 32	+ 2	—	—	—	—	—
Tinemaha		19·7	142	i 4 34	0	—	—	i 4 54	PP	—
China Lake	z.	21·0	142	e 4 47	0	—	—	—	—	—
Overton	z.	21·6	135	i 4 54	0	—	—	—	—	—
Rapid City	e.	21·8	104	e 4 59	+ 3	—	—	—	—	—
Boulder City		22·0	136	e 4 58	0	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pierce Ferry		22·2	134	e 5 0	0	—	—	—	—	—
Pasadena	z.	22·4	145	i 5 1	− 1	—	—	e 5 14	pP	—
Riverside	z.	22·8	145	e 5 5	0	—	—	—	—	—
Palomar	z.	23·5	143	e 5 13	+ 1	—	—	—	—	—
Tucson		26·8	134	e 5 44	0	e 10 21	+ 2	e 11 3	SS	e 16·2
Ottawa		37·3	79	e 7 17	+ 1	—	—	—	—	18·9
Weston		41·6	80	7 55	+ 4	—	—	—	—	e 21·5
Alicante		79·6	37	12 11	+ 1	e 21 48	−24	15 16	PP	e 35·2

Additional readings :—
Victoria e = 2m.9s., i = 3m.58s.
Shasta Dam i = 4m.20s.
Mineral iZ = 3m.47s.
Reno eE = 4m.5s., iE = 4m.29s., iN = 4m.35s.
Overton iZ = 4m.58s.
Pierce Ferry e = 5m.19s. and 5m.34s.
Long waves were also recorded at Scoresby Sund and several other American stations.

Sept. 5d. Readings also at 0h. (near Tananarive), 2h. (Durham and near College), 3h. (Brisbane, Tucson, Pierce Ferry, Hungry Horse, Logan, Almata, Frunse, Moscow, Semipalatinsk, Samarkand, Tchimkent, Sverdlovsk, Andijan, Tashkent (2), near Obi-garm, Stalinabad (2), near Batavia and near Istanbul (2)), 4h. (near Istanbul, near Andijan, Stalinabad, Samarkand, Obi-garm, Tashkent, and Tchimkent), 5h. (Andijan), 6h. (La Paz), 7h. (College, Pennsylvania, near Andijan, Obi-garm, Stalinabad, Tchimkent, and near Tacubaya), 9h. (Andijan, Samarkand, near Obi-garm, Stalinabad, and near Leninakan), 10h. (near College), 12h. (Auckland and Wellington), 13h. (Victoria), 15h. (Rome, Strasbourg, and Wellington), 18h. (Apia), 19h. (Almata, Frunse, Samarkand, Tashkent, near Andijan, Obi-garm, Stalinabad, and near Ashkabad), 21h. (Tucson, Hungry Horse, College, and Scoresby Sund).

Sept. 6d. 11h. 20m. 28s. Epicentre 40°·6N. 124°·6W. (as on 1948, Aug. 18d.).

$A = -\cdot4324$, $B = -\cdot6268$, $C = +\cdot6482$; $\delta = +1$; $h = -2$;
$D = -\cdot823$, $E = +\cdot568$; $G = -\cdot368$, $H = -\cdot534$, $K = -\cdot762$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale		0·2	98	i 0 11	+ 1	i 0 17	+ 1	—	—	—
Shasta Dam		1·7	87	i 0 31	0	e 0 44	−10	—	—	—
Ukiah		1·8	144	e 0 43	+11	e 0 51	− 5	—	—	e 1·1
Berkeley	z.	3·3	145	i 0 52k	− 1	i 1 29	− 6	i 1 1	P_g	—
San Francisco	N.	3·3	147	e 0 53	0	—	—	e 0 58	P*	—
Branner		3·7	148	i 0 57a	− 3	e 1 39	− 6	—	—	—
Reno		3·8	104	e 1 2a	+ 1	i 1 40	− 7	i 1 20	P_g	—
Santa Clara		3·8	147	e 1 32	S	(e 1 32)	−15	—	—	—
Lick		4·0	143	i 1 2k	− 2	e 1 52	0	—	—	—
Fresno	z.	5·4	134	i 1 24k	0	e 3 3	S_g	—	—	—
Tinemaha		6·0	125	i 1 39	+ 7	e 2 24	−19	—	—	—
Haiwee	z.	6·9	128	i 1 47	+ 2	—	—	—	—	—
Seattle		7·3	12	e 2 1	P*	—	—	—	—	e 4·6
Victoria	z.	8·0	5	e 1 58	− 2	—	—	—	—	—
Pasadena		8·2	138	i 2 4	+ 1	e 3 42	+ 4	—	—	—
Overton	z.	8·9	114	e 2 17	+ 5	—	—	—	—	—
Boulder City		9·0	118	e 2 10	− 3	—	—	—	—	—
Pierce Ferry		9·4	115	e 2 20	+ 2	—	—	—	—	e 5·6
Palomar		9·5	137	i 2 20	0	—	—	—	—	—
Logan		9·7	79	e 2 31	+ 9	—	—	—	—	e 5·6
Hungry Horse		10·8	41	e 2 52	+13	—	—	—	—	—
Tucson		13·9	123	e 3 29	+ 8	—	—	—	—	—

Additional readings :—
Ukiah e = 1m.0s.
Berkeley iZ = 56s., 1m.15s. and 1m.23s., iE = 1m.38s., iZ = 1m.41s., iN = 1m.47s., iZ = 1m.54s.
Reno iZ = 1m.6s., iN = 1m.35s.
Lick iZ = 1m.8s and 1m.49s.
Fresno iZ = 3m.36s., iN = 3m.39s.
Boulder City e = 2m.21s. and 2m.44s.
Pierce Ferry i = 2m.24s., 2m.28s., 2m,42s., and 2m,48s,

Sept. 6d. Readings also at 0h. (Shasta Dam and near Leninakan), 2h. (Hungry Horse and La Paz), 3h. (Shasta Dam and near Tortosa), 4h. (College, Grozny, Almata, Frunse, Obi-garm, Samarkand, near Andijan and Stalinabad), 7h. (Hungry Horse, Shasta Dam, and Victoria), 8h. (Jena, Strasbourg, Stuttgart, and near Raciborzu), 9h. (near Andijan, Obi-garm, and Stalinabad), 10h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Victoria, and College), 12h. (Apia and Tucson), 13h. (near Andijan), 14h. (Santa Lucia), 15h. (Oaxaca, Puebla, Tacubaya, Vera Cruz, Mount Wilson, Palomar, Riverside, China Lake, Boulder City, Pierce Ferry, Hungry Horse, College, and Ottawa), 16h. (Ksara, Tiflis, near Andijan, and Stalinabad), 19h. (Chinchina, Santa Lucia, Potsdam, near Andijan, Obi-garm, and Stalinabad (2)), 21h. (Upsala), 22h. (Apia, Auckland, Christchurch, Calcutta, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College (2), and Tacubaya), 23h. (College (2), Ottawa (5), Almata, Ashkabad, Frunse, Tchimkent, near Andijan, Obi-garm, Samarkand, Stalinabad, and Tashkent).

Sept. 7d. 7h. Region of Galapagos Islands.

Huancayo eP =31m.29s., iP =31m.33s., iPP =31m.59s., i =32m.19s. and 32m.31s., eS =35m.21s., eL =36m.29s.
Bogota ePEN =31m.31s., eSN =34m.44s., eSSN =35m.41s.
La Paz PE =33m.0s., iS =37m.38s., iSS =39m.13s., L =40m.30s.
Tucson eP =34m.17s., eL =48m.32s.
Palomar iPZ =34m.53s.
Boulder City eP =34m.57s.
Pierce Ferry eP =34m.57s.
Overton ePZ =35m.2s.
Mount Wilson ePZ =35m.3s.
Hungry Horse eP =36m.18s.
Shasta Dam ePcP =37m.15s.
San Juan eS =39m.15s., eL =41m.28s.
Copiapo eN =44m.
Berkeley iZ =47m.19s.a, and 50m.21s., eN =51m.30s., eE =51m.54s.
Long waves were also recorded at Philadelphia, Harvard, Seattle, and La Plata.

Sept. 7d. 13h. South-West Pacific.

Riverview ePPZ =37m.38s., iSN =41m.22s., iSSEN =42m.36s., eLE =43·8m.
Brisbane iPZ =37m.45s., iN =41m.5s.
Wellington eP?Z =37m.50s., iS =42m.30s., L =44m.40s.
Auckland eN =42m.?
Christchurch S =42m.38s., Q =43m.45s., R =45m.20s.
Berkeley ePZ =46m.44s.
Mount Wilson iPZ =46m.47s.
Shasta Dam iP =46m.48s., e =46m.53s. and 47m.12s.
Riverside iPZ =46m.50s.
Palomar iPZ =46m.51s.
China Lake iPZ =46m.54s.
Reno eE =46m.54s.
Tinemaha ePZ =46m.54s.
Boulder City eP =47m.4s.
College eP =47m.4s.
Overton iPZ =47m.7s.
Pierce Ferry eP =47m.7s.
Stuttgart ePKPZ =53m.43s.
Strasbourg i =53m.46s., e =54m.11s.
Besançon ePKP =53m.48s., e =54m.16s.
Paris ePKP =53m.50s.
Copiapo iN =55m.13s.

Sept. 7d. Readings also at 1h. (near Istanbul (2)), 2h. (Obi-garm, Tchimkent, Frunse, Almata, near Stalinabad, Andijan, Tashkent, and near Istanbul (2)), 3h. (Collmberg), 4h. (Hungry Horse, Stuttgart, La Paz, and near Misuzawa (2)), 5h. (Reno, near San Francisco, Branner, Berkeley, and Lick), 6h. (Copiapo and near Branner), 7h. (Boulder City, Overton, Fresno, Reno, Samarkand, Frunse, near Obi-garm, Stalinabad, Andijan, Tashkent, and Tchimkent), 8h. (Santa Lucia, Obi-garm, near Stalinabad and Andijan (2)), 9h. (Ksara, near Erevan and Tiflis), 10h. (Wellington and near Stalinabad), 11h. (Christchurch, Brisbane, Riverview, Berkeley, Lick, Branner, Fresno, Mineral, Reno, Shasta Dam (2), Overton, Strasbourg, and Besançon), 12h. (Berkeley, Reno, Boulder City, Pierce Ferry, Overton, Shasta Dam, Tucson, Pasadena, Riverside, Palomar, China Lake, Tinemaha, and Strasbourg), 13h. (Seattle and Apia), 14h. (Hungry Horse, Shasta Dam, Reno, Berkeley, Lick (2), near Branner (2), Fresno, and San Francisco), 15h. (Hungry Horse, Ashkabad, Almata, Tchimkent, Frunse, near Obi-garm, Stalinabad, Samarkand, and Tashkent), 17h. (near Copiapo, near Berkeley, Lick, and Branner), 20h. (College), 22h. (Lick), 23h. (Lick, Palomar, Hungry Horse, Boulder City, Overton, Tucson, near Seattle, Ottawa, and near Victoria).

Sept. 8d. 2h. 46m. 49s. Epicentre 47°·7N. 153°·0E. (as on 1947, September 3d.).

$A = -·6019$, $B = +·3067$, $C = +·7374$; $\delta = +11$; $h = -5$;
$D = +·454$, $E = +·819$; $G = -·657$, $H = +·335$, $K = -·675$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
College		35·5	39	e 7 16	+16	—	—	—	—
Victoria	z.	53·1	56	i 9 18a	− 3	—	—	—	—
Shasta Dam		58·2	63	i 9 56	− 2	—	—	—	—
Hungry Horse		58·3	52	e 9 57	− 2	—	—	i 10 49	P_cP
Mineral	z.	58·9	63	i 10 1k	− 2	—	—	—	—
Lick	z.	60·7	66	i 10 14k	− 1	—	—	—	—
Tinemaha	z.	63·0	50	i 10 30	− 1	—	—	—	—
Logan		63·7	57	i 10 34	− 2	—	—	e 10 53	pP
China Lake	z.	64·2	65	i 10 40	+ 1	—	—	—	—
Pasadena	z.	64·9	66	i 10 42	− 1	—	—	i 10 59	pP
Riverside	z.	65·5	66	i 10 45	− 2	—	—	i 11 4	pP
Overton	z.	65·6	63	e 10 47	− 1	—	—	—	—
Boulder City		65·8	63	i 10 47	− 2	—	—	e 11 6	pP
Palomar	z.	66·3	66	i 10 51	− 1	—	—	i 11 8	pP
Tucson		70·7	63	i 11 19	− 1	—	—	—	—
Collmberg		75·6	336	e 11 49	+ 1	—	—	—	—
St. Louis		77·3	46	i 11 57	− 1	e 21 41	− 7	e 22 11	sS
Ottawa	z.	77·9	34	i 12 0a	− 1	—	—	—	—
Stuttgart	z.	78·9	337	e 12 9	+ 2	—	—	—	—
Strasbourg		79·5	337	i 12 12	+ 2	—	—	—	—
Paris		80·5	341	i 12 19	+ 4	—	—	—	—
Besançon		81·2	338	e 12 11	− 8	—	—	—	—
Weston		82·1	32	12 25	+ 1	—	—	—	—
Clermont-Ferrand		83·3	339	e 12 32	+ 2	—	—	—	—

Additional readings :—
Shasta Dam i = 10m.2s., e = 10m.16s.
Palomar iZ = 11m.11s.
St. Louis e = 16m.17s.
Strasbourg e = 12m.34s. and 12m.45s.
Paris i = 12m.39s. and 12m51s.
Besançon eP? = 12m.30s., e = 12m.44s.
Long waves were also recorded at Alicante.

Sept. 8d. 3h. 28m. 6s. Epicentre 36°·8N. 121°·4W. (as on 1948, April 27d.).

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick	z.	0·6	339	i 0 14k	− 1	i 0 22	− 4	—	—	—
Branner		0·9	314	i 0 18a	− 2	i 0 30	− 4	—	—	—
Berkeley	z.	1·3	327	i 0 27k	+ 2	i 0 44	0	—	—	—
Fresno		1·3	93	i 0 28a	+ 3	i 0 48	+ 4	—	—	—
San Francisco		1·3	319	i 0 25	0	i 0 41	− 3	—	—	—
Reno		3·0	25	e 0 58	P_g	e 1 42	S_g	—	—	—
Mineral	z.	3·5	357	i 1 4	P*	—	—	i 1 10	P_g	—

Additional readings :—
Berkeley iZ = 0m.41s.
Reno eZ = 1m.3s.

Sept. 8d. 16h. 1m. 46s. Epicentre 16°·0S. 76°·0W. (as on 1949, August 8d.).

$A = +·2327$, $B = -·9332$, $C = -·2739$; $\delta = +3$; $h = +6$;
$D = -·970$, $E = -·242$; $G = -·066$, $H = +·266$, $K = -·962$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo	4·0	9	i 1 0	− 4	i 1 41	−11	—	—	i 2·7
La Paz	7·6	95	i 1 55k	0	i 3 27	+ 4	—	—	4·0
Bogota	20·6	5	i 4 46	+ 3	e 8 29	0	e 12 38	P_eS	—
Galerazamba	26·6	2	e 10 54	SS	i 14 59	?	—	—	18·2
St. Louis	56·0	347	e 9 40	− 3	e 17 20	−10	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Weston		58·2	4	—	—	17 56	− 3	—	—	—
Tucson		58·4	326	e 10 1	+ 1	—	—	—	—	—
Ottawa	z.	61·1	0	e 10 16	− 2	—	—	—	—	—
Palomar	z.	61·6	322	i 10 32	+10	—	—	—	—	—
Pierce Ferry		63·1	326	e 10 33	+ 1	—	—	—	—	—
Overton	z.	63·6	326	i 10 37	+ 2	—	—	—	—	—
Mount Wilson	z.	64·0	322	e 10 38	0	—	—	—	—	—
Pasadena	z.	64·0	322	e 10 39	+ 1	—	—	—	—	—
China Lake	z.	64·9	324	e 10 44	+ 1	—	—	—	—	—
Tinemaha	z.	66·1	324	e 10 53	+ 2	—	—	—	—	—
Lick	z.	68·3	322	i 11 9k	+ 4	—	—	—	—	—
Reno	z.	68·7	325	e 11 18	+11	—	—	—	—	—
Hungry Horse		72·5	335	e 11 29	− 1	—	—	—	—	e 32·3
Victoria	z.	76·8	330	e 11 55	0	—	—	—	—	—

Additional readings and note :—
Bogota iEN =4m.52s., eSN =8m.32s.
Galerazamba ePP =11m.25s., ePPP =11m.55s. ; record wrongly interpreted.
Reno eN =11m.22s.
Hungry Horse e =12m.15s. and 13m.18s.
Long waves were also recorded at Alicante, Kew, and De Bilt.

Sept. 8d. Readings also at 1h. (Stuttgart and Rome), 3h. (College, Hungry Horse, and near Mizusawa), 4h. (College and near Hungry Horse), 5h. (near Obi-garm (2) and Stalinabad (2)), 7h. (Bombay, Tashkent, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Reno, Shasta Dam, Hungry Horse, and Logan), 10h. (near Santa Lucia), 11h. (near Obi-garm), 12h. (Hungry Horse), 13h. (Christchurch, Kaimata, and Wellington), 14h. (Hungry Horse, Sitka, and near Victoria), 15h. (Bozeman, Butte, Pennsylvania, and near Stalinabad), 16h. (Andijan, Samarkand, and Tchimkent), 17h. (Samarkand, near Andijan, Stalinabad (2), Tchimkent, near Branner, and Lick), 19h. (La Paz, near Huancayo, near Andijan, Obi-garm, and Stalinabad (2)), 20h. (near Obi-garm), 21h. (near Tucson).

Sept. 9d. 20h. 26m. 19s. Epicentre 16°·3S. 172°·8W. (as on 1948, August 28d.).

$A = -·9528$, $B = -·1204$, $C = -·2789$; $\delta = +11$; $h = +5$;
$D = -·125$, $E = +·992$; $G = +·277$, $H = +·035$, $K = -·960$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		2·7	21	0 44	− 1	1 14	− 5	—	—	—
Brisbane	z.	33·5	245	i 6 43	0	—	—	—	—	—
Berkeley	z.	71·8	41	i 11 29a	+ 3	—	—	—	—	—
Lick	z.	71·8	41	i 11 28a	+ 2	—	—	—	—	—
Pasadena	z.	72·2	46	i 11 30	+ 1	—	—	—	—	—
Riverside	z.	72·7	46	i 11 32	0	—	—	—	—	—
Fresno		72·7	43	i 10 33	−59	—	—	—	—	—
Shasta Dam		73·5	37	i 11 37	+ 1	—	—	—	—	—
China Lake	z.	73·6	44	i 11 37	0	—	—	—	—	—
Tinemaha		73·9	43	i 11 41	+ 2	—	—	—	—	—
Reno	E.	74·3	41	e 11 43	+ 2	—	—	—	—	—
Boulder City		75·5	45	i 11 39	− 9	—	—	—	—	—
Overton	z.	76·1	45	e 11 53	+ 2	—	—	—	—	—
Tucson		76·4	50	e 11 54	+ 1	—	—	—	—	e 37·8
Victoria	z.	78·0	32	e 12 4	+ 2	—	—	—	—	—
Logan		80·6	42	e 12 14	− 2	—	—	—	—	—
Hungry Horse		82·9	35	i 12 28	0	—	—	—	—	—
College		83·1	10	e 12 28	− 1	—	—	—	—	—
De Bilt		144·2	2	e 20 11	[+33]	—	—	—	—	e 85·7
Collmberg	z.	144·8	353	e 19 39	[0]	—	—	—	—	—
Prague		145·8	351	i 20 7	[+26]	—	—	e 22 17	PP	—
Paris		147·4	6	i 19 49	[+ 6]	—	—	i 20 0	PKP,	—
Stuttgart	z.	147·6	358	e 19 49	[+ 5]	—	—	—	—	—
Strasbourg		147·8	359	i 19 51	[+ 7]	—	—	—	—	—
Ksara		148·9	309	e 20 13	[+27]	—	—	23 59	PP	—
Besançon		149·1	0	e 19 53	[+ 7]	—	—	—	—	—
Zagreb		149·7	347	e 19 55	[+ 8]	—	—	—	—	—
Clermont-Ferrand		150·4	5	e 20 1	[+13]	—	—	—	—	—

For Notes see next page,

NOTES TO SEPTEMBER 9d. 20h. 26m. 19s.

Additional readings :—
Apia e =1m.2s.
Berkeley iZ =11m.36s. and 11m.47s.
Lick iZ =11m.39s.
Pasadena iZ =11m.40s.
Shasta Dam e =11m.47s. and 12m.6s.
Tinemaha iZ =11m.50s.
Reno eN =11m.46s., iN =12m.1s.
Boulder City i =11m.50s., e =12m.45s.
Hungry Horse e =13m.5s.
Paris e =20m.14s. and 20m.20s.
Stuttgart eZ =20m.17s.
Strasbourg i =20m.6s. and 20m.15s.
Besançon e =20m.17s. and 21m.12s.
Long waves were also recorded at Wellington, La Paz, Harvard, Weston, and Alicante.

Sept. 9d. Readings also at 1h. (Grozny, Sotchi, near Erevan, Leninakan, and Tiflis), 2h. (near Andijan and near Copiapo), 3h. (near Andijan), 4h. (Tucson, Samarkand, near Andijan, Stalinabad, and Tchimkent), 5h. (near Bogota), 6h. (Reno), 7h. (La Plata, near Copiapo and near Apia), 8h. (Auckland (2), Christchurch, Kaimata, Wellington, Brisbane, Riverview, Tucson, Overton (2), Pierce Ferry, Reno, Lick, Seattle, College, Ottawa, and near Mizusawa), 9h. (Hungry Horse and near Batavia), 10h. (College, Frunse, Samarkand, Tchimkent, near Andijan, Stalinabad, and Tashkent), 11h. (Boulder City, Pierce Ferry, Rome, Triest, and Toledo), 12h. (College, Samarkand, near Andijan (2), Stalinabad (2), and Tchimkent), 17h. (Tchimkent), 18h. (Auckland, Wellington, Tucson, Overton, Samarkand, Tchimkent, near Almata, Andijan (2), Obi-garm (2), Frunse, Stalinabad (2), and Tashkent), 19h. (near Messina and near Antofagasta), 20h. (Kaimata, and near Messina), 21h. (near Mizusawa).

Sept. 10d. Readings at 0h. (Collmberg), 1h. (near Bogota), 2h. (Upsala and near Mizusawa), 4h. (Mizusawa), 5h. (near Copiapo), 6h. (New Delhi, Andijan, near Obi-garm, and near Stalinabad), 7h. (Andijan and near Stalinabad), 11h. (Pierce Ferry), 13h. (Frunse, Samarkand, Semipalatinsk, near Andijan, Obi-garm, Stalinabad, and Tashkent), 14h. (near Berkeley, Branner, Lick, and San Francisco), 15h. (Ksara), 17h. (Hungry Horse, Tucson, and near Reykjavik (3)), 18h. (Andijan and near Obi-garm), 19h. (Reykjavik), 20h. (Christchurch, near Auckland, Havelock North, Kaimata, New Plymouth, Tuai, Wellington, Shasta Dam, near Reno, and near Istanbul), 21h. (Baku, Erevan, Sotchi, near Grozny, Leninakan, and Tiflis), 22h. (Ksara, Hungry Horse, Samarkand, Tashkent, Tchimkent, near Andijan, Obi-garm, and Stalinabad), 23h. (La Plata, near Istanbul, Tashkent, near Andijan, Obi-garm, Stalinabad, and Tchimkent).

Sept. 11d. 21h. 44m. 46s. Epicentre 37°·7N. 141°·8E. Depth of focus 0·005.
(as on 1949, May 6d.).

Intensity IV at Kinkazan (Miyagi Prefecture); II-III at Hukusima, Miyako, and Shirakawa. Epicentre 37°·5N. 141°·9E.
Depth 30-100km. Macroseismic radius 200-300km.
Seismo. Bull. Central Met. Obs., Japan, 1949, Tokyo, 1950, p. 29, with macroseismic chart.

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

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Sendai		0·9	309	0 16k	− 2	0 28	− 3
Hukusima		1·1	273	0 22a	+ 2	0 37	+ 1
Onahama		1·1	223	0 10	−10	0 23	−13
Mizusawa	E.	1·5	343	0 25	− 1	0 59	+14
Mito		1·7	219	0 28	0	0 46	− 4
Kakioka		1·9	221	0 28	− 3	0 53	− 1
Miyako		1·9	4	0 32	+ 1	0 53?	− 1
Morioka		2·0	347	0 36	+ 4	1 3	+ 6
Tukubasan		2·0	322	0 30	− 2	0 54	− 3
Akita		2·4	326	0 42	+ 4	1 19	+12
Kumagaya		2·5	231	0 38	− 1	1 10	+ 1
Maebasi		2·6	239	0 41	0	1 9	− 3
Tokyo		2·6	219	0 40	− 1	1 9	− 3
Aikawa		2·8	276	0 45	+ 1	—	—
Hatinohe		2·8	356	0 41	− 3	1 18	+ 1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Yokohama		2·8	217	0 47	+ 3	1 15	− 2
Nagano		3·0	247	0 47	0	1 37	+15
Matusiro		3·1	248	0 56	+ 8	1 52	+28
Aomori		3·2	346	0 53	+ 4	1 42	+15
Hunatu		3·3	228	0 59	+ 8	1 37	+ 8
Misima		3·5	223	0 52	− 2	—	—
Osima		3·5	214	0 52	− 2	1 33	− 1
Toyama		3·8	256	1 13	+15	2 5	+23
Shizuoka		3·9	226	0 59	0	1 46	+ 2
Omaesaki		4·2	224	1 51	S	(1 51)	− 1
Gihu		4·6	242	1 15	+ 6	—	—
Hikone		5·1	243	1 16	0	—	—
Sapporo		5·3	356	1 24	+ 5	—	—
Owase		5·8	233	1 37	+12	—	—
Osaka		5·9	241	1 52	+25	2 11	−23
College		48·4	33	e 8 38	+ 1	—	—
Shasta Dam		70·5	53	e 11 10	0	—	—
Hungry Horse		71·1	43	i 11 15	+ 2	—	—
Overton	z.	77·9	53	i 12 10	+18	—	—
Collmberg		80·7	330	e 12 9	+ 1	—	—
Tucson		82·9	54	e 12 35	+16	—	—
Stuttgart	z.	84·2	331	e 12 27	+ 1	—	—

Additional readings :—
Mizusawa SN = 1m.2s.
Shasta Dam e = 11m.18s., 11m.25s., and 11m.38s.
Hungry Horse i = 11m.27s., e = 12m.7s.

Sept. 11d. Readings also at 0h. (near Istanbul (2)), 1h. (Ksara and near Andijan), 3h. (near Istanbul (2)), 4h. (near Seattle), 5h. (Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Collmberg, Stuttgart, Mizusawa, Frunse, near Andijan, Obi-garm, Samarkand, Stalinabad, Tashkent, Tchimkent, and near Victoria ; several shocks), 6h. (Santa Lucia, Frunse, Tashkent, near Andijan, Obi-garm, and Stalinabad), 7h. (near Alicante), 8h. (Logan, near Alicante, near Istanbul, near Obi-garm (4), and Stalinabad), 10h. (near Poona), 11h. (Collmberg, Logan, Tucson, Seattle, and near College), 12h. (near Alicante (2), near Andijan, near College, and near Tucson), 13h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Hungry Horse, Seattle, Victoria, College (2), Ottawa, Collmberg, Stuttgart, and Ksara), 14h. (Bombay, Palomar, Riverside, China Lake, Tinemaha, Tucson, Shasta Dam, Hungry Horse, Ottawa, Copiapo, La Paz, near Antofagasta, and near Barcelona), 15h. (Shasta Dam, Reno, and near College), 16h. (Stuttgart, Triest, and near Mineral), 17h. (Obi-garm, Tchimkent, near Andijan, and Stalinabad), 18h. (Ottawa), 20h. (Salt Lake City, Auckland, Christchurch, Kaimata, near Tuai, and Wellington), 21h. (near Belgrade), 22h. (Samarkand, near Andijan, and Obi-garm, Overton, Seattle, Hungry Horse, near Tucson, near Victoria, and near Istanbul), 23h. (Hungry Horse, Seattle, Victoria, and College).

Sept. 12d. 8h. Undetermined shock. The readings do not suggest a repetition from the epicentre of Aug. 22d. 4h.

Sitka iP = 36m.38s., eL = 37m.17s.
Seattle iP = 38m.32s., e = 40m.9s., eL = 41·2m.
College eP = 39m.4s., eL = 43m.15s.
Victoria P = 39m.15s., S = 40m.58s., e = 41m.39s.
Hungry Horse iP = 39m.30s., i = 40m.0s., eL = 43m.20s.
Shasta Dam i = 39m.17s. and 39m.23s., iP = 39m.56s., e = 40m.54s. and 41m.2s.
Mineral ePZ = 39m.59s.k.
Reno ePZ = 40m.14s., eE = 40m.44s.
Lick eZ = 40m.36s.
Fresno ePZ = 40m.42s.
Tinemaha iPZ = 40m.43s.
China Lake ePZ = 41m.0s.
Overton iPZ = 41m.10s.
Pasadena eZ = 41m.11s.
Pierce Ferry i = 41m.12s., e = 41m.34s. and 42m.20s.
Riverside ePZ = 41m.13s.
Tucson e = 42m.16s.
Ottawa eZ = 43m.19s.
Saskatoon i = 45m.2s.
Ksara e = 45m.36s. and 60m.30s.
Alicante P = 47m.54s., eL = 76m.1s.
Granada P = 48m.54s., PP = 52m.4s.
Long waves were also recorded at Butte, Rapid City, Chicago, and Seven Falls,

Sept. 12d. 9h. 17m. 3s. Epicentre 22°·0S. 170°·3E. (as on 1944, February 5d.).

$A = -·9148$, $B = +·1564$, $C = -·3724$; $\delta = 0$; $h = +4$;
$D = +·168$, $E = +·986$; $G = +·367$, $H = -·063$, $K = -·928$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	15·3	166	i 3 45	+ 6	i 6 47	+17	—	—	e 7·6
Brisbane		16·6	247	i 3 57k	+ 1	i 7 5	+ 5	i 4 7	pP	—
Arapuni	E.	16·7	165	—	—	e 7 45	SSS	—	—	—
New Plymouth	E.	17·3	171	e 4 25?	+21	—	—	—	—	—
Tuai	N.	17·7	165	i 4 12	+ 2	e 7 36	+10	—	—	—
Apia		18·9	70	4 24	0	e 7 55	+ 2	—	—	e 9·4
Wellington		19·6	172	i 4 33	+ 1	i 8 19	+11	i 5 7	pP	9·7
Kaimata	N.E.	20·5	178	e 4 42	0	e 8 35	+ 8	—	—	—
Riverview		20·7	230	i 4 44k	0	i 8 35	+ 4	i 4 53	pP	e 10·0
Christchurch		21·6	177	i 4 49	− 5	8 50	+ 1	—	—	e 10·0
Melbourne	E.	26·9	228	i 5 17	−28	i 10 7	−13	—	—	—
Batavia		63·1	275	e 10 29	− 3	i 19 1	− 1	—	—	—
Berkeley		86·9	48	e 12 48a	0	i 23 45	+19	—	—	e 40·2
Lick	Z.	87·1	48	i 12 49a	0	—	—	i 12 57a	pP	—
Fresno	Z.	88·0	49	i 12 54a	+ 1	e 23 45	+ 9	—	—	e 43·4
Pasadena		88·0	52	i 12 53	0	i 23 17	[− 4]	—	—	e 40·8
Shasta Dam		88·3	45	e 12 53	− 2	—	—	e 16 22	PP	—
Riverside	Z.	88·5	52	i 12 55a	− 1	—	—	—	—	—
Mineral	Z.	88·6	45	e 12 56a	0	—	—	—	—	—
Palomar		88·6	54	i 12 55a	− 1	e 23 28	[+ 4]	—	—	—
China Lake	Z.	89·2	51	i 12 59a	0	—	—	—	—	—
Tinemaha		89·3	49	i 13 0	+ 1	—	—	—	—	—
Reno		89·4	47	e 13 1	+ 1	—	—	—	—	—
Boulder City		91·2	52	i 13 9	+ 1	—	—	—	—	—
Sitka		91·3	27	—	—	e 23 39	[− 1]	—	—	e 41·7
Overton	Z.	91·7	51	e 13 11	+ 1	—	—	—	—	—
Victoria		91·7	38	e 13 10	0	—	—	—	—	—
Pierce Ferry		91·9	52	i 13 14	+ 3	—	—	i 16 18	PP	—
Seattle		91·9	39	e 13 13	+ 2	—	—	e 14 33	?	e 42·0
College		92·4	17	i 13 21	+ 7	—	—	i 16 27	PP	e 46·1
Tucson		92·7	56	e 13 15	0	e 24 29	+11	e 25 41	PS	e 42·9
Colombo	E.	92·9	276	23 57	SKS	(23 57)	[+ 7]	—	—	—
Hungry Horse		97·1	40	e 13 33	− 2	—	—	—	—	—
Hyderabad	N.	98·0	286	e 25 8	S	(e 25 8)	+ 4	—	—	49·4
New Delhi	N.	102·8	296	—	—	e 24 42	[+ 2]	i 25 46	S	e 70·1
Bombay		103·6	285	e 18 35	PP	e 24 43	[− 1]	—	—	—
Huancayo		107·3	111	e 23 37	?	e 26 41	+19	e 33 47	SS	e 45·0
St. Louis		110·6	55	e 21 49	PPP	e 25 9	[− 6]	e 28 40	PS	—
La Paz		111·2	119	e 18 47	[+11]	i 29 15	PS	i 19 25	PP	54·4
New Kensington	E.	118·9	55	—	—	e 30 0	PS	—	—	—
Ottawa		122·0	48	i 18 56k	[− 1]	—	—	e 22 30	PKS	55·0
Harvard		125·1	53	i 19 3	[0]	—	—	—	—	e 58·3
San Juan		127·2	83	e 19 10	[+ 3]	e 26 11	[− 1]	e 21 18	PP	e 51·2
Upsala		137·5	341	e 18 22	[−64]	e 29 19	{+13}	e 22 57?	PKS	e 62·0
Ksara		138·3	296	i 19 35a	[+ 8]	—	—	23 27?	PP	—
Copenhagen		142·5	340	i 19 33	[− 2]	29 29	(− 7)	22 47	PP	61·0
Bucharest	N.	143·0	316	e 19 27	[− 9]	e 35 34	PPS	i 22 38	PP	—
Potsdam		145·0	337	e 19 42	[+ 3]	—	—	—	—	—
Collmberg		145·8	335	e 19 37	[− 4]	—	—	e 39 32	P'P'	e 77·0
Ogyalla		145·9	326	i 19 47	[+ 6]	—	—	e 22 8	PP	—
Belgrade		146·2	320	e 19 41a	[0]	—	—	—	—	e 84·6
Prague		146·2	332	i 19 43	[+ 2]	e 27 27	[+38]	i 19 50	PKP_2	e 71·0
Jena	N.	146·7	335	e 19 45	[+ 3]	—	—	—	—	—
De Bilt		147·8	343	i 19 46	[+ 2]	e 34 5	PS	e 23 33	PP	e 69·0
Zagreb		148·3	325	e 19 45	[0]	—	—	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stuttgart		149·3	336	e 19 47	[+ 1]	e 30 57	{+42}	e 23 25	PP	e 76·0
Triest		149·6	327	e 19 52	[+ 5]	i 30 33	{+17}	i 20 43	PKP_2	—
Kew		149·7	349	—	—	e 26 57	[+ 4]	e 31 1	SKKS	e 70·0
Strasbourg		150·0	337	i 19 50k	[+ 3]	e 30 17	{− 1}	i 23 33	PP	e 66·4
Taranto		150·7	315	19 35	[−13]	—	—	23 17	PP	—
Zürich		150·7	335	i 19 54a	[+ 6]	—	—	e 23 32	PP	—
Basle		151·0	336	e 19 55	[+ 6]	—	—	—	—	—
Padova		151·4	327	20 0	[+10]	—	—	—	—	—
Paris		151·5	344	e 19 50	[0]	36 58	PPS	i 23 39	PP	e 74·0
Bologna		151·6	328	e 20 10?	[+20]	—	—	—	—	—
Besançon		151·8	337	i 19 58	[+ 8]	—	—	i 20 7	PKP_2	—
Pavia		152·2	331	e 20 0	[+ 9]	—	—	—	—	—
Prato		152·2	327	e 20 4	[+13]	e 30 35	{+ 5}	—	—	—
Rome		152·8	322	e 19 50	[− 2]	e 42 53	SS	e 23 55	PP	—
Clermont-Ferraud		154·1	340	e 19 55	[+ 2]	e 23 23	PKS	i 20 17	PKP_2	76·0
Toledo	z.	161·5	347	e 20 49	PKP_2	—	—	e 24 31	PP	—
Alicante		161·9	337	20 24	[+21]	27 30	[+24]	24 0	PKS	e 73·9
Almeria		163·9	338	20 4	[− 1]	27 3	[− 5]	20 57	PKP_2	78·0
Granada		164·0	342	24 7	PP	—	—	i 28 25	PPP	87·8
Malaga	N.W.	164·6	344	i 24 51	PP	i 31 37	{+ 1}	i 26 35	SKS	—

Additional readings :—
Brisbane iZ =4m.37s. and 7m.24s.
Apia eE =4m.46s.
Wellington iPPZ =5m.18s.
Riverview i =4m.47s. and 4m.56s., iPPNZ =5m.11s., iPPPE =5m.18s., iZ =5m.23s., iP_cPZ =8m.46s., isSE =8m.50s., iE =8m.56s.
Christchurch iNZ =5m.2s., iE =5m.49s., eN =6m.32s. and 8m.23s.
Berkeley iZ =12m.54s., iE =24m.37s.
Fresno eN =15m.48s.
Shasta Dam e =16m.50s. and 17m.4s.
Boulder City i =13m.15s., e =13m.32s. and 13m.37s.
Pierce Ferry e =13m.24s., i =13m.36s., e =13m.49s.
College e =13m.55s.
Tucson e =14m.52s.
St. Louis ePPS =29m.23s., iPPS =29m.33s., eSS =34m.34s.
La Paz iSS =34m.57s.
San Juan e =22m.27s., eSS? =38m.18s.
Upsala iN =23m.11s., eN =23m.31s., eP_cP,PKPE =27m.34s., eE =28m.15s., eN =37m.33s., eQ =50·0m.
Copenhagen 26m.6s.
Bucharest eN =21m.27s., iN =23m.14s.
Collmberg eE =19m.42s., eZ =19m.46s., eE =19m.58s., 20m.18s., and 39m.44s.
Belgrade i =20m.51s., e =22m.20s. and 24m.55s.
Prague e =20m.9s. and 23m.57s.
De Bilt eSS =42m.27s.
Stuttgart iPKPZ =19m.51s.a, ePSKS =33m.48s., eSS =42m.39s.
Triest iPKP =20m.2s., ePKS =23m.42s., ePP =24m.18s., i =29m.24s., ePPS =37m.26s.
Kew e =27m.59s., ePPP? =33m.51s., e =61m.39s.
Strasbourg iPKP =19m.54s., $iPKP_2$ =20m.2s. and 20m.13s., i =20m.28s. and 20m.54s., e =21m.36s., i =22m.41s., ePPP =26m.47s., e =28m.37s., eSKKS (△ >180°) =35m.8s., ePPS =36m.10s., eSS =42m.39s., eSSS =48m.15s., e =51m.45s. and 59m.57s.
Zürich e =24m.28s.
Paris i =19m.57s., $ePKP_2$ =20m.7s., ePP =23m.46s.
Besançon i =20m.26s. and 21m.4s.
Clermont-Ferrand i =20m.4s., ePP =23m.43s.
Alicante PP =25m.18s., PPP =28m.51s., SKKS =32m.10s.
Almeria PP =24m.38s., PPP =28m.29s., SKKS =31m.29s., PPS =38m.5s., SS =44m.55s., SSS =51m.17s.
Long waves were also recorded at Perth, Honolulu, Tananarive, Scoresby Sund, Rathfarnham Castle, Tortosa, and other North American stations.

Sept. 12d. 10h. South of Fiji. Very deep.

Apia eP = 56m.55s., eS? = 59m.2s., S = 59m.6s., e = 59m.14s.
Wellington iP = 57m.47s., iS = 60m.42s.
Kaimata eP?NE = 58m.8s., eS?NE = 60m.13s.
Tuai eN = 59m.52s.
Christchurch eS? = 61m.23s.
La Paz ePKP = 62m.44s.
Lick iPZ = 65m.38s. a, iZ = 65m.42s.
Pasadena iPNZ = 65m.39s. a.
Palomar iPNZ = 65m.41s. a.
Riverside iPZ = 65m.41s.
Shasta Dam iP = 65m.45s., e = 66m.4s. and 66m.22s.
China Lake iPZ = 65m.46s. a.
Mineral ePZ = 65m.46s. a.
Tinemaha iPEZ = 65m.48s.
Boulder City eP = 65m.55s.
Overton ePZ = 65m.56s.
Pierce Ferry iP = 65m.58s., i = 66m.2s. and 66m.17s., epP = 67m.54s.
Tucson iP = 66m.0s., e = 66m.18s., eL = 101m.37s.
Victoria eZ = 66m.7s. a.
College eP = 66m.22s.
Hungry Horse iP? = 66m.27s.
Ksara i = 78m.22s.

Sept. 12d. 14h. 37m. 46s. Epicentre 55°·8N. 132°·0W.

$A = -\cdot3778$, $B = -\cdot4196$, $C = +\cdot8253$; $\delta = -8$; $h = -7$;
$D = -\cdot743$, $E = +\cdot669$; $G = -\cdot552$, $H = -\cdot613$, $K = -\cdot565$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		2·5	314	i 0 43	0	e 1 12	− 2	—	—	e 1·3
Victoria		9·0	140	2 10	− 3	2 57	P_g	—	—	—
Seattle		10·1	140	e 2 33	+ 5	e 4 6	−19	—	—	e 5·1
College		12·0	326	e 3 3	+ 8	e 5 20	+ 9	—	—	e 6·7
Hungry Horse		13·3	116	i 3 18	+ 5	—	—	—	—	e 6·6
Shasta Dam		16·4	153	i 3 50	− 3	—	—	—	—	—
Mineral	z.	16·9	152	e 3 53	− 6	—	—	—	—	—
Reno	z.	18·2	147	e 4 12k	− 4	—	—	—	—	—
Logan		19·3	126	e 4 29	0	—	—	—	—	e 9·2
Lick		19·8	154	i 4 35k	0	—	—	—	—	—
Fresno		20·8	151	i 4 41k	− 4	—	—	—	—	—
Tinemaha		21·0	147	i 4 44	− 3	—	—	—	—	—
Rapid City	E.	21·8	109	e 4 56	0	e 9 18	+26	—	—	e 10·6
China Lake	z.	22·3	147	e 5 0	− 1	—	—	—	—	—
Overton	z.	22·7	140	e 5 5	+ 1	—	—	—	—	—
Boulder City		23·0	141	e 5 25	+18	—	—	—	—	—
Pierce Ferry		23·2	139	i 5 8	− 1	—	—	i 5 38	PP	—
Pasadena	z.	23·7	149	e 5 15	+ 1	—	—	—	—	—
Riverside	z.	24·0	149	e 5 19	+ 2	—	—	—	—	—
Palomar	z.	24·8	148	e 5 25	0	—	—	—	—	—
Tucson		27·8	139	e 5 55	+ 2	—	—	—	—	—

Additional readings :—
Victoria e = 3m.29s.
College e = 6m.12s. and 6m.34s.
Shasta Dam i = 3m.56s., 3m.59s., and 4m.22s., e = 5m.7s.
Mineral iPZ = 3m.58s.
Long waves were also recorded at several other American stations.

Sept. 12d. Readings also at 0h. (Pierce Ferry, near Istanbul and near Klyuchi (2)), 2h. (Samarkand, near Andijan, Obi-garm, and Stalinabad), 4h. (Seattle), 8h. (Seattle, near Andijan, Stalinabad, and near Istanbul), 9h. (near Andijan, Obi-garm, and Stalinabad), 10h. (Apia, Brisbane, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, near College (3), near Andijan, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 11h. (Istanbul), 12h. (Hungry Horse, Seattle, and Victoria), 13h. (Istanbul, and near Triest), 14h. (Almata, Frunse, Samarkand, near Andijan (2), Obi-garm (2), Stalinabad and Tashkent), 16h. (Ksara, Harvard (2), Weston, Bermuda, Bogota, Port au Prince, and near San Juan), 17h. (near Andijan, Obi-garm, Samarkand, Stalinabad, and Tashkent), 19h. (Santa Lucia and near Alicante), 21h. (Pretoria), 22h. (La Paz, Riverside, Tinemaha, Tucson, Hungry Horse, Victoria (2), College, Logan, near Berkeley, near Ottawa, Frunse, near Andijan, Obi-garm, Stalinabad, Tashkent, and Tchimkent).

Sept. 13d. 6h. 50m. 42s. I
11h. 55m. 13s. II
Epicentre 0°·5S. 128°·0E. (as on 1949 July 11d.).

Doubtful.

A = −·6157, B = +·7880, C = −·0087; δ = +11; h = +7;
D = +·788, E = +·616; G = +·005, H = −·007, K = −1·000.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Batavia	21·9	255	i 4 48k	− 9	i 9 0	+ 6	—	—	—
II		21·9	255	e 4 47	−10	i 8 35	−19	—	—	—
I	Brisbane Z.	36·0	140	e 8 10	PP	—	—	—	—	—
I	Riverview	39·6	149	e 7 38	+ 3	e 9 54	PPP	e 9 12	PP	e 20·7
II		39·6	149	e 7 38	+ 3	e 13 40	+ 2	e 9 9	PP	e 20·9
I	Irkutsk	56·2	343	—	—	e 18 25	PPS	—	—	—
I	Auckland N.	56·3	135	—	—	e 16 35	−59	—	—	—
I	Bombay E.	57·5	293	e 9 51	− 2	—	—	—	—	—
II	E.	57·5	293	e 8 7	?	e 17 42	− 8	—	—	—
I	Christchurch	58·4	144	e 10 43	+43	15 40	?	e 17 3	Q	e 19·6
I	Wellington	58·6	140	—	—	e 18 18?	+14	—	—	36·3
I	Almata	63·1	321	i 10 35	+ 3	i 19 9	+ 7	—	—	—
II		63·1	321	10 33	+ 1	19 5	+ 3	—	—	—
I	Frunse	64·4	319	e 11 3	+23	—	—	—	—	—
I	Semipalatinsk	64·9	329	e 10 43?	0	—	—	—	—	—
II		64·9	329	e 10 43?	0	—	—	—	—	—
I	Andijan	65·0	316	e 10 46	+ 2	19 26	0	e 11 22	PcP	—
II		65·0	316	e 10 46	+ 2	e 19 27	+ 1	—	—	—
I	Obi-garm	66·1	314	i 10 52	+ 1	i 19 35	− 4	—	—	—
II		66·1	314	e 10 52	+ 1	e 19 38	− 1	—	—	—
I	Stalinabad	66·7	314	i 10 55	0	i 19 39	− 7	—	—	—
II		66·7	314	i 10 54	− 1	i 19 44	− 2	—	—	—
I	Tashkent	67·3	316	e 11 0?	+ 1	i 19 54	0	i 11 22	PcP	—
II		67·3	316	i 11 0?	+ 1	i 19 51?	− 3	—	—	—
II	Tchimkent	67·5	317	e 10 59	− 1	—	—	—	—	—
I	Samarkand	68·4	314	e 11 8?	+ 2	—	—	—	—	—
II		68·4	314	e 11 9	+ 3	—	—	—	—	—
I	Ashkabad	74·4	310	e 11 48	+ 6	—	—	—	—	—
I	Sverdlovsk	78·2	329	—	—	e 21 49?	− 8	—	—	—
II		78·2	329	—	—	e 22 1	+ 4	—	—	—
I	Tiflis	85·2	312	12 43	+ 4	e 23 2	[0]	e 16 3	PP	—
I	Leninakan	85·9	311	e 12 55?	+12	—	—	—	—	—
II		85·9	311	11 47?	−56	—	—	—	—	—
I	College	88·0	25	e 15 46	PP	—	—	—	—	—
II		88·0	25	e 13 3	+10	—	—	—	—	—
I	Ksara	92·0	303	e 13 15	+ 3	24 29?	+17	—	—	—
II		92·0	303	e 13 18	+ 6	e 24 36	+24	—	—	—
II	Istanbul	97·1	311	e 15 5	?	e 26 35	PS	—	—	—
I	Victoria Z.	102·6	40	e 15 29	+89	—	—	—	—	—
I	Shasta Dam	105·1	48	i 15 5	+53	—	—	e 18 55	PP	—
I	Lick Z.	106·4	51	i 14 54a	P	—	—	—	—	—
I	Reno Z.	107·3	48	e 15 10	P	—	—	—	—	—
I	Hungry Horse	108·6	38	e 15 55	P	—	—	e 19 15	PP	—
I	Stuttgart	109·0	322	e 19 6	PP	e 23 7	?	—	—	e 63·3
II		109·0	322	e 19 9	PP	e 29 23	PPS	e 41 53	Q	e 57·8
I	Tinemaha Z.	109·1	51	e 15 4	PP	—	—	—	—	—
I	Mount Wilson Z.	109·9	54	e 14 59	P	—	—	—	—	—
II	De Bilt	109·9	326	e 19 23	PP	—	—	—	—	e 64·8
I	Strasbourg	109·9	323	e 19 17	PP	—	—	—	—	—
II		109·9	323	e 19 9	PP	e 22 8	PKS	e 34 59	SS	e 58·8
I	Besançon	111·6	321	e 19 24	PP	—	—	—	—	—
I	Boulder City	112·1	51	e 15 13	P	—	—	—	—	—
I	Overton Z.	112·2	50	e 15 19	P	—	—	—	—	—
I	Pierce Ferry	112·7	51	e 15 17	P	—	—	e 19 39	PP	—
II		112·7	51	e 19 40	PP	—	—	—	—	—
I	Paris	113·0	324	e 19 15	PP	e 23 18	?	—	—	e 74·3
II		113·0	324	i 19 47	PP	e 29 22	PS	—	—	e 72·9
I	Kew	113·2	327	e 17 18?	?	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Clermont-Ferrand	114·0	321	19 43	PP	—	—	—	—	—
II		114·0	321	i 19 43	PP	—	—	—	—	65·8
I	Tucson	116·3	54	e 15 22	P	—	—	e 20 11	PP	—
I	Ottawa z.	130·6	22	e 22 43	PKS	—	—	—	—	—

Additional readings :—
Tiflis I S_cS =23m.17s., ePS =23m.55s.
Shasta Dam I e =15m.19s.
Reno I eE =15m.20s., eN =15m.44s.
Hungry Horse I e =18m.50s.
Strasbourg I e =19m.8s., II ePPS =29m.55s.
Boulder City I e =15m.30s.
Pierce Ferry I e =15m.26s.
Paris II e =22m.58s.
Long waves were also recorded for Shock II at Auckland, Christchurch, Wellington, Kew, and Seattle.
The American readings to Shock I may be associated with the local shock recorded at Apia.

Sept. 13d. Readings also at 0h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Shasta Dam, Hungry Horse, Victoria, College, Ottawa, and near Obi-garm), 1h. (Collmberg, Triest, Istanbul, Granada, and near Victoria), 5h. (Copiapo, Santa Lucia, and Granada), 6h. (near Apia), 8h. (College), 9h. (Copiapo), 11h. (Shasta Dam and Hungry Horse), 12h. (Istanbul, Erevan, and near Leninakan), 13h. (Batavia, Bombay, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Victoria, and College), 14h. (Wellington, Shasta Dam, Seattle, Hungry Horse, and Victoria), 16h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Hungry Horse, College, Chinchina, Bogota, Galerazamba, near Balboa Heights, Ksara, and near Obi-garm), 20h. (near Istanbul, near Andijan, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 22h. (College), 23h. (Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, and Pierce Ferry).

Sept. 14d. 1h. 30m. 28s. Epicentre 19°·2N. 121°·2E. (as on 1947, Dec. 19d.).

$A = -·4896$, $B = +·8084$, $C = +·3269$; $\delta = +8$; $h = +5$
$D = +·855$, $E = +·518$; $G = -·169$, $H = +·280$, $K = -·945$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Irkutsk		35·6	343	e 7 2	+ 1	e 12 32	− 6	e 15 37	SSS	—
Almata		44·1	314	e 8 12	0	—	—	—	—	—
Semipalatinsk		44·9	324	e 8 10	− 8	—	—	—	—	—
Bombay	E.	45·6	278	—	—	e 14 57	− 9	—	—	—
Frunse		45·7	313	e 8 33	+ 9	—	—	—	—	—
Obi-garm		48·4	306	e 8 51	+ 5	—	—	—	—	—
Tashkent		49·1	309	e 8 49	− 2	e 15 52	− 4	e 10 46	PP	—
Tchimkent		49·1	311	e 8 46	− 5	—	—	—	—	—
Samarkand		50·6	306	e 9 12	+10	—	—	—	—	—
Sverdlovsk		58·1	327	9 51	− 7	17 43	−15	—	—	—
Tiflis		67·5	309	e 11 9?	+ 9	e 19 52?	− 4	—	—	—
Moscow		70·8	324	e 11 24	+ 4	—	—	—	—	—
College		73·2	27	e 11 29	− 6	—	—	—	—	—
Ksara		75·8	300	e 19 49	?	e 29 31	SSS	—	—	—
Collmberg	z.	86·0	324	e 12 38	− 5	—	—	—	—	—
Triest		88·0	319	e 13 4	+11	e 23 25	[+ 4]	—	—	—
Stuttgart		89·4	323	e 11 32	?	—	—	—	—	e 50·5
Strasbourg		90·3	323	—	—	e 23 48	− 9	—	—	e 47·5
Rome	E.	90·5	315	—	—	e 23 26	[−10]	e 33 39	SSS	—
Seattle		92·5	38	e 13 17	+ 3	—	—	—	—	—
Kew		93·1	328	—	—	—	—	e 43 0	Q	e 56·5
Paris		93·1	325	—	—	e 27 32	?	—	—	e 53·5
Shasta Dam		96·2	43	e 13 25	− 6	—	—	e 16 48	PP	—
Hungry Horse		96·7	33	e 13 24	− 9	—	—	—	—	—

Additional readings :—
Tashkent iSS =19m.16s.
Collmberg eZ =12m.52s.
Shasta Dam e =13m.29s., i =13m.33s.
Hungry Horse i =13m.27s.
Long waves were also recorded at Aberdeen, Copenhagen, and De Bilt.

Sept. 14d. 5h. 27m. 44s. Epicentre 40°·4N. 126°·0W. (as on 1949, Feb. 24d.).

$A = -\cdot4489$, $B = -\cdot6178$, $C = +\cdot6456$; $\delta = -1$; $h = -2$;
$D = -\cdot809$, $E = +\cdot588$; $G = -\cdot379$, $H = -\cdot522$, $K = -\cdot764$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Ferndale		1·3	83	i 0 24	− 1	i 0 42	− 2	—	—
Mineral		3·4	90	i 0 53	− 2	i 1 33	− 4	—	—
Berkeley	z.	3·8	130	i 0 59	− 2	i 1 52	+ 5	i 1 17	P_g
San Francisco		3·8	132	i 0 59	− 2	i 1 43	− 4	—	—
Branner		4·2	133	i 1 3k	− 4	e 1 54	− 3	—	—
Lick		4·6	130	i 1 10a	− 2	e 2 8	+ 1	—	—
Reno		4·8	98	e 1 18	+ 3	i 2 12	0	i 1 41	P_g
Tinemaha		6·9	114	i 1 47	+ 2	i 3 21	+16	—	—
Haiwee		7·6	121	i 1 59	+ 4	e 3 34	+11	—	—
Santa Barbara		7·8	139	—	—	e 3 26	− 2	—	—
Mount Wilson	z.	8·8	132	i 2 8	− 3	i 3 49	− 1	—	—
Pasadena		8·8	132	i 2 12	+ 1	i 3 46	− 7	—	—
Boulder City		9·8	113	e 2 28	+ 4	—	—	—	—
Overton	z.	9·8	109	i 2 28	+ 4	—	—	—	—
Pierce Ferry		10·4	111	e 2 36	+ 2	—	—	—	—
Hungry Horse		11·7	43	e 2 42	− 9	—	—	—	—
Tucson		14·7	119	e 3 30	− 1	—	—	—	—

Additional readings :—
Ferndale iE = 39s., eE = 1m.12s., eN = 1m.16s.
Mineral iEN = 1m.36s.
Berkeley iZ = 1m.2s., 1m.5s., 1m.8s., and 1m.42s.
Lick iZ = 2m.4s.
Reno iN = 2m.15s., iE = 2m.18s., iN = 2m.34s.
Tinemaha iZ = 1m.59s.
Mount Wilson iZ = 2m.19s.
Pasadena iZ = 2m.22s.
Hungry Horse iP = 2m.47s.
Long waves were also recorded at Arcata, Seattle, and Ukiah.

Sept. 14d. 16h. 38m. 45s. Epicentre 0°·5S. 128°·0E. (as on 13d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		21·9	255	i 4 45a	−12	e 8 56	+ 2	—	—	—
Brisbane		36·0	140	i 7 4	− 1	i 12 39	− 5	—	—	—
Riverview		39·6	149	e 9 10	PP	e 13 34	− 4	(e 16 26)	SS	e 21·2
Calcutta	E.	44·9	304	—	—	e 14 34	−22	e 19 4	SSS	—
Colombo	E.	48·6	280	8 47	0	11 15	PPP	—	—	12·7
Kodaikanal	E.	51·4	284	e 8 30	−39	e 11 18	PP	—	—	—
Hyderabad	E.	51·9	293	e 9 5	− 7	e 13 57	?	—	—	—
Irkutsk		56·2	343	e 9 51	+ 7	e 21 20	PS	e 11 51	PP	—
Poona		56·4	293	e 9 45	0	e 13 40	?	—	—	16·2
New Delhi	N.	56·5	306	e 16 39	?	i 17 28	− 9	—	—	—
Bombay		57·5	293	e 9 55	+ 2	e 14 0	P_cS	—	—	—
Tuai	N.	58·9	136	e 10 5	+ 2	—	—	—	—	—
Apia		61·0	105	e 10 22	+ 4	—	—	—	—	—
Klyuchi		62·5	20	e 10 33	+ 5	—	—	—	—	—
Almata		63·1	321	e 10 28	− 1	i 19 4	+ 2	—	—	—
Frunse		64·4	319	e 10 48	+ 8	—	—	—	—	—
Semipalatinsk		64·9	329	e 10 40	− 3	—	—	e 13 6	PP	—
Andijan		65·0	316	e 10 41	− 3	i 19 24	− 2	—	—	—
Obi-garm		66·1	314	i 10 50	− 1	—	—	—	—	—
Stalinabad		66·7	314	e 10 52	− 3	i 19 42	− 4	—	—	—
Tashkent		67·3	316	e 11 0	+ 1	e 20 22	PS	e 13 15	PP	—
Tchimkent		67·5	317	i 10 56	− 4	—	—	—	—	—
Samarkand		68·4	314	e 11 3	− 3	—	—	—	—	—
Sverdlovsk		78·2	329	12 3	0	21 55	− 2	—	—	—
Tananarive		80·8	251	e 13 25	?	—	—	e 15 48	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grozny		84·7	314	e 12 51	PcP	—	—	—	—	—
Tiflis		85·2	312	12 43	+ 4	e 22 58	[− 4]	e 24 24	PS	—
College		88·0	25	e 12 51	− 2	—	—	i 16 51	PP	—
Moscow		90·6	326	e 13 9	+ 4	e 24 3	+ 3	—	—	—
Ksara		92·0	303	e 13 14	+ 2	25 31	PS	—	—	—
Pretoria	z.	98·6	244	i 12 26	?	—	—	—	—	—
Grahamstown	z.	99·3	236	i 14 2	+17	—	—	—	—	—
Shasta Dam		105·1	48	e 14 16	+ 4	—	—	e 18 36	PP	—
Collmberg	z.	105·8	323	e 16 8	?	—	—	e 18 40	PP	—
Reno	z.	107·3	48	e 18 56	PP	—	—	—	—	—
Hungry Horse		108·6	38	e 14 31	P	—	—	e 18 34	PKP	-
Stuttgart		109·0	322	e 16 10	?	—	—	e 19 4	PP	e 66·2
Tinemaha	z.	109·1	51	e 18 52	[+21]	—	—	—	—	—
Mount Wilson	z.	109·9	54	e 18 41	[+ 8]	—	—	—	—	—
Strasbourg		109·9	323	e 16 15	?	—	—	i 19 16	PP	62·2
Overton	z.	112·2	50	e 18 50	[+12]	—	—	e 19 31	PP	—
Pierce Ferry		112·7	51	e 14 59	P	—	—	e 19 35	PP	—
Paris		113·0	324	i 16 41	?	—	—	e 19 40	PP	—
Kew		113·2	327	—	—	e 27 31	S	e 28 59	PS	e 57·2
Clermont-Ferrand		114·0	321	e 19 44	PP	e 26 4	{−29}	—	—	70·2
Tucson		116·3	54	e 18 51	[+ 5]	—	—	e 20 0	PP	—
Ottawa	z.	130·6	22	e 19 19	[+ 6]	—	—	e 22 35	PKS	—

Additional readings :—
Riverview iSN =16m.29s., iN =16m.50s., eSSN? =19m.52s. ; the times recorded for P and S are those of PP and SS, true P not appearing.
Hyderabad PN =9m.57s.
New Delhi eN =18m.58s. and 23m.20s.
Tashkent i =19m.29s., e =22m.30s., eSS =23m.59s.
Tananarive e =17m.39s., 20m.15s., and 25m.18s.
College e =13m.43s. and 16m.1s.
Shasta Dam e =18m.1s., iPP =18m.41s.
Reno eN =20m.15s., eE =20m.21s.
Mount Wilson eZ =19m.12s.
Overton eZ =19m.1s.
Kew eZ =30m.11s.
Long waves were also recorded at Auckland, Wellington, Christchurch, Seattle, Harvard, Philadelphia, Scoresby Sund, Rome, Tortosa, and Malaga.

Sept. 14d. 19h. 50m. 24s. Epicentre 1°·1N. 126°·4E. Depth of focus 0·005.
(as on 1949, July 23d.).

Felt at Ternate. Bulletin Séismique Trimestriel de Batavia, July-September, 1949, p. 4.

A = −·5933, B = +·8047, C = +·0190 ; δ = −9 ; h = +7 ;
D = +·805, E = +·593; G = −·011, H = +·015, K = −1·000.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia	20·8	250	i 4 31	− 7	i 8 17	− 4	—	—	—
Yakusima	29·5	7	e 5 58	− 2	11 18	+29	—	—	—
Miyazaki	31·0	8	e 6 16	+ 2	i 11 22	+10	—	—	13·5
Nanking	31·6	347	6 18	− 1	11 19	− 3	—	—	—
Kumamoto	31·8	6	6 21	0	11 38	+13	—	—	15·7
Simidu	32·1	10	6 24	+ 1	11 32	+ 2	—	—	15·8
Hukuoka	32·5	6	e 6 29	+ 2	11 39	+ 3	—	—	14·4
Muroto	32·8	12	6 32	+ 3	11 56	+15	—	—	23·4
Kôti	33·0	10	6 30	− 1	11 38	− 6	7 15	PP	14·0
Matuyama	33·1	10	e 6 32	0	11 49	+ 4	7 51	PP	16·3
Siomisaki	33·4	15	e 6 40	+ 6	11 41	− 9	—	—	i 15·8
Hirosima	33·6	9	6 37	+ 1	i 11 57	+ 4	—	—	14·4
Hamada	34·0	8	6 42	+ 2	12 8	+ 9	14 35	SSS	17·1
Sumoto	34·0	13	i 6 40	0	12 4	+ 5	—	—	15·4
Owase	34·1	14	6 41	+ 1	12 7	+ 6	7 40	pP	—
Kobe	34·4	13	e 6 42	− 1	12 12	+ 7	e 8 10	PP	13·6
Perth	34·4	195	6 48	+ 5	12 12	+ 7	7 56	PP	—
Osaka	34·5	13	e 6 46	+ 2	12 30	+23	8 29	PP	14·9
Kameyama	34·9	15	6 47	0	12 16	+ 3	—	—	13·7
Toyooka	35·1	11	6 52	+ 3	12 21	+ 5	—	—	14·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hikone		35·2	13	6 51	+ 1	12 24	+ 6	7 51	PP	23·2
Nagoya		35·3	16	e 6 41	−10	12 26	+ 7	16 49	Q	22·7
Shizuoka		35·5	17	6 52	0	12 29	+ 7	e 7 57	PP	15·1
Tokyo		36·6	18	e 7 3	+ 1	12 38	− 1	8 10	PP	16·2
Toyama		36·8	14	7 6	+ 3	i 12 50	+ 8	—	—	15·6
Matusiro		36·9	17	7 4	0	12 34	−10	8 27	PPP	16·9
Nagano		37·0	15	7 5	0	12 36	− 9	8 4	PP	—
Kakioka		37·2	18	7 4	− 3	12 47	− 1	—	—	—
Mito		37·5	18	e 7 15	+ 6	12 55	+ 2	—	—	—
Onahama		38·1	19	e 7 12	− 2	13 8	+ 6	—	—	—
Brisbane		38·3	140	i 7 16k	0	i 13 3	− 2	i 8 45	PP	i 21·7
Hukusima		38·7	18	7 19	0	13 16	+ 5	—	—	—
Sendai		39·3	18	7 22	− 2	13 24	+ 4	7 46	pP	e 24·4
Mizusawa	E.	40·2	18	7 35	+ 3	13 36	+ 2	—	—	—
Morioka		40·7	17	7 36	0	13 40	− 1	—	—	—
Miyako		40·9	19	7 37	0	13 47	+ 3	—	—	—
Aomori		41·6	17	7 48	+ 5	13 50	− 4	—	—	26·7
Hatinohe		41·6	18	i 7 44	+ 1	14 11	+17	—	—	—
Riverview		41·8	148	i 7 46a	+ 1	i 14 2	+ 5	i 9 32	PP	e 19·1
Melbourne		42·4	158	i 7 29	−21	i 13 46	−20	i 9 26	PP	—
Calcutta	E.	42·7	303	i 7 50a	− 2	i 14 8	− 3	i 9 53	PPP	20·2
Mori		42·8	15	7 49	− 4	14 12	0	—	—	19·2
Sapporo		43·9	15	8 5	+ 3	14 36	+ 8	e 9 1	PP	20·2
Nemuro		45·4	20	8 15	+ 1	14 55	+ 5	17 57	Q	20·9
Colombo	E.	46·8	278	i 8 31	+ 6	15 16	+ 7	—	—	27·2
Kodaikanal	E.	49·5	283	i 8 41	− 5	i 15 38	− 9	10 33	PP	22·4
Hyderabad		49·8	292	i 8 44	− 4	i 15 44	− 8	10 40	PP	23·8
Dehra Dun	N.	54·3	307	e 8 12	−70	e 15 47	−66	—	—	e 27·0
New Delhi	N.	54·3	305	i 9 19	− 3	i 16 39	−14	11 22	PP	24·5
Irkutsk		54·3	343	9 20	− 2	i 16 54	+ 1	—	—	—
Poona		54·4	292	i 9 17	− 6	i 16 45	− 9	10 21	PcP	—
Bombay		55·4	292	—	—	i 17 2	− 6	i 21 43	SS	26·3
Auckland		58·4	135	e 9 46	− 5	i 17 54	+ 7	i 19 50	S_eS	26·6
Cobb River	E.	59·4	141	e 9 57	− 1	e 18 4	+ 4	e 19 50	S_eS	—
Kaimata	N.E.	59·4	143	e 13 8	?	—	—	—	—	—
Arapuni	E.	59·8	136	e 9 36?	−25	—	—	—	—	—
Christchurch		60·7	143	i 10 6	− 1	18 14	− 3	i 10 32	pP	30·2
Almata		60·8	321	i 10 14	+ 6	i 18 26	+ 8	—	—	—
Wellington		60·8	140	i 10 3	− 5	i 18 17	− 1	i 10 37	P_eP	25·6
Tuai	N.	61·2	136	10 12	+ 2	18 27	+ 4	—	—	—
Klyuchi		61·6	21	e 10 15	+ 2	18 37	+ 9	—	—	—
Frunse		62·1	318	e 10 16	0	e 18 40	+ 5	—	—	—
Andijan		62·7	315	i 10 20	0	e 18 42	0	—	—	—
Semipalatinsk		62·8	328	i 10 17	− 4	e 18 38	− 6	—	—	—
Apia		63·0	105	e 10 24	+ 2	e 18 43	− 3	—	—	e 26·1
Obi-garm		63·8	313	i 10 23	− 5	i 18 53	− 3	—	—	—
Stalinabad		64·4	313	i 10 29	− 3	i 19 1	− 2	—	—	—
Tashkent		65·1	315	i 10 35	− 1	i 19 12	0	—	—	—
Tchimkent		65·2	316	i 10 32	− 5	—	—	—	—	—
Samarkand		66·1	313	i 10 43	+ 1	e 19 27	+ 3	—	—	—
Ashkabad		72·1	310	11 20	+ 1	—	—	15 36	PPP	—
Sverdlovsk		76·0	329	i 11 40	− 2	i 21 14	− 5	—	—	—
Honolulu		76·4	68	e 11 44	0	e 21 16	− 7	e 15 33	PPP	e 35·0
Baku		79·0	311	i 12 2	+ 3	e 22 36	PS	—	—	—
Tananarive		79·8	250	i 12 0	− 3	e 22 0	+ 1	15 7	PP	36·6
Grozny		82·4	313	12 19	+ 3	22 34	+ 8	—	—	—
Tiflis		83·0	312	12 20	0	22 33	+ 1	—	—	—
Erevan		83·1	310	e 12 23	+ 3	—	—	22 45	S_eS	—
Leninakan		83·7	310	12 23	0	—	—	22 44	S_eS	—
Sotchi		86·8	313	12 38	0	23 3	− 6	—	—	—
College		87·2	25	e 12 39	− 1	i 23 7	− 6	e 15 51	PP	e 37·1
Moscow		88·4	326	i 12 46	0	e 23 14	−10	—	—	—
Ksara		89·8	303	i 12 52k	− 1	23 51	S_eS	—	—	—
Theodosia		90·0	315	13 0	+ 6	23 51	S_eS	—	—	—
Yalta		90·8	314	13 58	+61	24 26	[+64]	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		93·5	32	e 13 11	+ 1	e 23 45	[+ 8]	e 16 55	PP	e 44·9
Helwan		93·9	300	i 13 12a	0	24 13	0	16 51	PP	—
Helsinki		94·7	331	e 17 5	PP	e 23 39	[− 4]	e 31 15	SS	e 43·6
Istanbul		94·8	311	e 13 16	0	e 23 50	[+ 6]	—	—	—
Bucharest		96·6	315	e 13 30	+ 6	e 23 37	[−17]	i 16 17	PP	42·6
Pretoria	z.	97·9	245	i 13 0	−30	e 29 42	PKKP	i 16 57	PP	—
Upsala		98·4	331	e 13 36?	+ 4	24 6	[+ 3]	e 17 37?	PP	e 42·6
Grahamstown	z.	98·8	237	i 13 37	+ 3	i 30 6	PKKP	e 17 36?	PP	—
Sofia		98·8	313	13 36	+ 2	—	—	17 39	PP	—
Skalnate Pleso		99·7	321	e 13 43?	+ 5	—	—	e 17 57	PP	—
Belgrade		100·5	316	e 13 40a	− 2	i 24 21	[+ 8]	e 19 22	PPP	e 33·0
Budapest		100·8	319	13 54	+11	25 8	− 3	17 51	PP	e 44·6
Raciborzu		100·8	322	e 13 36?	− 7	e 25 24	+13	e 17 20	PP	—
Kalossa		101·1	318	e 13 49	+ 5	e 24 59	−15	e 18 0	PP	e 37·6
Ogyalla		101·3	320	e 18 14	PP	e 25 27	+11	—	—	—
Copenhagen		102·4	328	e 13 42	− 8	e 24 24	[+ 2]	20 6	PPP	—
Victoria		102·4	40	13 52a	+ 2	24 35	[+13]	18 22	PP	46·6
Prague		103·1	322	e 13 58	+ 5	e 26 45	PS	e 18 9	PP	e 47·6
Potsdam		103·2	325	e 18 11	PKP	i 25 45	+14	i 27 29	PS	e 32·6
Zagreb		103·3	318	e 13 56	+ 2	e 24 34	[+ 7]	e 18 12	PKP	—
Seattle		103·4	40	e 13 58	+ 4	e 25 51	+18	e 18 8	PP	e 47·6
Collmberg		103·6	324	e 13 57	+ 2	e 24 36	[+ 8]	e 18 9	PP	e 49·1
Taranto		103·8	312	17 23	PP	e 29 5	PPS	—	—	51·1
Bergen		103·9	334	18 24?	PP	24 46	[+17]	28 17	PPS	44·8
Ferndale	E.	103·9	48	e 15 46	?	e 24 44	[+15]	—	—	e 48·2
Cheb		104·3	323	e 14 8	P	—	—	i 18 19	PP	—
Jena		104·5	323	e 14 4	P	e 25 46	+ 4	e 18 18	PP	e 50·3
Triest		104·9	318	e 14 3	P	i 25 53	+ 7	i 18 5	PKP	—
Ukiah		105·0	49	e 18 29	PP	e 24 47	[+13]	e 27 11	PS	e 43·4
Shasta Dam		105·2	47	e 14 2	P	e 24 43	[+ 8]	e 18 23	PP	—
Scoresby Sund		105·6	350	14 10	P	24 46	[+ 9]	18 30	PP	—
Mineral	z.	105·9	48	e 14 12	P	e 27 43	PS	e 18 8	PP	e 49·1
Berkeley		106·0	50	e 14 9	P	i 24 48	[+ 9]	i 18 26	PP	e 50·3
Catania		106·1	310	e 15 8	?	e 24 46	[+ 7]	18 0	PP	—
Santa Clara		106·4	50	e 18 32	PP	e 25 56	− 2	e 33 36	SS	e 53·8
Padova		106·5	318	e 14 40	P	24 46	[+ 5]	18 31	PP	—
Lick	z.	106·6	50	i 14 11a	P	e 33 55	SS	i 18 36	PP	—
Stuttgart		106·7	322	e 14 11a	P	e 26 7	+ 6	e 18 15	PKP	e 50·6
Bologna		106·9	318	e 14 40	P	e 24 59	[+16]	e 34 21	SSP	—
Rome		106·9	315	e 14 8a	P	i 24 46	[+ 3]	e 18 18	PKP	e 49·6
Florence Xim.		107·1	316	e 14 9	P	—	—	i 18 48	PP	—
Prato		107·2	316	e 14 13	P	—	—	i 18 48	PP	—
Reno		107·5	48	e 14 16	P	e 27 39	PS	i 18 42	PP	e 50·5
De Bilt		107·7	327	e 14 31	P	e 24 53	[+ 7]	e 18 57	PP	e 48·6
Zürich		107·7	321	e 14 21	P	e 24 56	[+10]	e 17 33	PKP	—
Strasbourg		107·7	323	e 14 13	P	i 24 55	[+ 9]	i 18 27	PP	e 50·6
Pavia		108·1	319	e 18 49?	PP	—	—	—	—	—
Basle		108·2	322	e 15 38	?	e 24 56	[+ 8]	e 18 47	PP	—
Fresno		108·2	50	e 14 19a	P	e 28 13	PS	i 18 40	PP	e 53·1
Hungry Horse		108·4	37	i 14 21	P	e 26 24	S	i 18 44	PP	—
Neuchatel		108·8	321	e 17 36	PKP	e 26 28	S	—	—	—
Aberdeen		108·9	334	i 18 52	PP	25 2	[+11]	i 28 12	PS	e 48·3
Besançon		109·3	321	e 14 35	P	e 28 11	PS	e 18 31	PKP	—
Tinemaha		109·3	50	e 18 4	[−19]	i 29 44	PKKP	i 19 0	PP	—
Durham		109·9	331	i 19 6	PP	i 25 11	[+15]	i 28 21	PS	—
Edinburgh	E.	110·1	332	e 18 21	[− 3]	24 58	[+ 2]	19 4	PP	—
Butte	N.	110·2	39	19 0	PP	e 26 50	S	e 28 32	PS	e 46·3
Pasadena		110·2	53	i 14 27	P	i 25 6	[+ 9]	e 18 28	PKP	i 45·1
China Lake	z.	110·2	51	e 14 27	P	i 29 40	PKKP	i 19 1	PP	—
Paris		110·8	324	e 14 21?	P	e 24 56	[− 3]	e 18 25	PKP	e 57·6
Saskatoon		110·8	32	19 7	PP	25 7	[+ 8]	21 25	PPP	49·6
Reykjavik	N.	110·9	346	—	—	e 26 36	S	e 29 5	PPS	e 53·7
Kew		111·0	328	i 14 33	P	e 24 52	[− 8]	i 19 20	PP	e 41·6
Bozeman		111·3	39	e 19 5	PP	e 26 59	S	e 35 48	SS	e 52·0
Palomar		111·5	53	i 14 33	P	e 24 51	[−11]	i 18 23	PKP	—

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Clermont-Ferrand		111·8	321	e 14 34	P	e 25 17	[+14]	e 18 28	PKP	51·6
Boulder City		112·3	50	i 14 37	P	—	—	e 18 33	PKP	—
Logan		112·4	43	e 14 37	P	i 25 15	[+ 9]	i 19 13	PP	e 46·9
Overton	z.	112·4	50	e 14 37	P	—	—	—	—	—
Salt Lake City		112·8	44	e 19 16	PP	e 26 32	S	e 28 48	PS	e 46·5
Pierce Ferry		112·9	50	i 14 40	P	i 19 21	PP	—	—	—
Rathfarnham Castle		113·1	332	i 14 37	P	i 25 14	[+ 6]	i 19 33	PP	54·6
Barcelona		114·3	318	e 19 32	PP	28 55	PS	40 58	SSS	—
Algiers Univ.	z.	115·5	312	e 18 34	[− 1]	e 25 27	[+ 9]	i 19 46	PP	—
Tortosa		115·6	317	19 37	PP	25 34	[+16]	22 10	PPP	e 46·6
Tucson		116·6	53	e 14 54	P	e 26 45	SKKS	e 18 40	PKP	e 48·1
Rapid City	E.	117·0	37	e 18 42	[+ 4]	e 27 46	S	e 19 51	PP	e 49·3
Alicante		117·4	315	18 37	[− 1]	29 49	PS	19 57	PP	e 55·1
Ivigtut		117·7	357	i 19 55	PP	e 29 34	PS	36 6	SS	51·6
Tamanrasset	z.	117·8	297	e 18 42	[+ 3]	e 29 51	PS	19 56	PP	e 57·6
Toledo		119·1	318	e 18 48	[+ 7]	25 47	[+16]	i 20 10	PP	54·1
Almeria		119·5	314	i 18 39	[− 3]	25 31	[− 1]	20 1	PP	50·2
Granada		120·1	315	17 44a	[−60]	24 24	[−70]	18 18	pPKP	i 61·2
Malaga	z.	120·9	315	i 18 47	[+ 2]	i 26 4	[+27]	i 20 18	PP	56·1
Lisbon		123·1	319	20 44	PP	30 8	PS	36 24	SS	—
Chicago		127·4	32	e 21 0	PP	e 26 9	[+12]	e 31 18	PS	e 51·6
St. Louis		128·1	36	i 19 1	[+ 2]	e 27 51	SKKS	i 21 4	PP	—
Shawinigan Falls	N.	129·6	17	e 19 3	[+ 1]	e 22 26	PKS	e 21 15	PP	—
Seven Falls	E.	129·7	15	e 19 15	[+13]	e 38 33	SS	i 21 32	PP	59·6
Ottawa		129·7	20	e 18 53	[− 9]	28 28	SKKS	21 3	PP	—
Cleveland		130·6	27	e 19 12	[+ 8]	i 22 30	PKS	e 21 14	PP	61·1
Tacubaya		130·9	63	i 19 14	[+10]	e 28 27	SKKS	e 22 38	PKS	—
Puebla		131·9	63	e 22 38	PKS	e 28 27	SKKS	—	—	—
New Kensington		132·2	27	e 19 22	[+15]	e 26 24	[+15]	e 21 34	PP	—
Pennsylvania		132·8	25	e 19 12	[+ 4]	i 28 24	SKKS	i 21 35	PP	—
Halifax		133·6	10	19 18	[+ 9]	26 12	[0]	21 56	PP	—
Vera Cruz		133·6	61	e 19 20	[+11]	e 28 6	SKKS	e 22 52	PKS	e 54·4
Harvard		133·7	18	i 19 12	[+ 2]	e 32 23	PSKS	i 21 37	PP	e 64·9
Weston		133·9	18	19 12?	[+ 2]	28 19	SKKS	21 39	PP	—
City College, N.Y.		134·3	21	i 19 15	[+ 4]	e 22 45	PKS	e 21 41	PP	e 71·0
Fordham		134·3	21	i 19 15	[+ 4]	i 29 1	SKKS	e 21 44	PP	70·6
Philadelphia		134·6	23	e 21 43	PP	e 26 45	[+31]	28 37	SKKS	e 57·5
Columbia		136·6	33	e 21 52	PP	—	—	—	—	e 61·0
Santa Lucia	N.	144·0	156	19 35	[+ 7]	29 34	SKKS	22 45	PP	—
Bermuda		145·1	17	e 19 45	[+15]	e 26 54	[+23]	i 23 17	PP	e 57·9
La Plata	E.	146·1	174	19 35	[+ 3]	28 54	SKKS	22 6	PP	69·2
	N.	146·1	174	e 19 34	[+ 2]	33 0	PS	22 6	PP	68·3
Buenos Aires		146·4	173	19 39	[+ 7]	—	—	—	—	—
Galerazamba		155·4	60	i 20 3	[+17]	e 25 50	[−54]	i 30 43	SKKS	73·6
Huancayo		155·8	117	i 19 50	[+ 4]	e 26 43	[− 1]	e 24 6	PP	—
San Juan		157·0	31	i 19 56	[+ 8]	e 43 44	SS	e 23 40	PP	e 62·0
Bogota		158·8	73	i 19 56	[+ 6]	26 40	[− 7]	e 30 51	SKKS	e 74·6
La Paz		159·0	138	i 19 52a	[+ 2]	i 26 56	[+ 9]	i 20 12	pPKP	73·6
Fort de France		162·6	25	—	—	e 50 7	SSS	e 64 58	Q	—

Additional readings and notes :—
Owase PP =7m.57s.
Kobe eP_cP =9m.27s.
Perth SS =13m.36s.
Hikone SS =14m.20s.
Nagoya i =6m.53s.
Shizuoka SS =14m.15s.
Tokyo PPP =8m.45s., P_cP =9m.53s., SS =14m.43s.
Matusiro i =15m.12s.
Nagano PPP =8m.54s.
Brisbane iSZ =13m.7s., iSS?N =15m.45s., iZ =15m.59s.
Sendai eE =8m.15s., P_cP =9m.22s., sS =14m.7s., SS =16m.6s., e =17m.31s., eQ =18m.54s.
Mizusawa eSN =13m.43s.
Riverview iP_cPZ =9m.42s., iPPPN =9m.52s., iSE =14m.5s., iZ =14m.9s., iE =14m.16s., e =14m.42s., iSSNZ =17m.4s., iEZ =17m.9s., iEN =17m.23s.
Calcutta iSSE =16m.45s.
Kodaikanal PPPE =11m.17s.
New Delhi iN =9m.36s., 12m.48s., and 13m.24s., S_cSN =19m.0s., iN =19m.11s., SSN = 21m,37s., iN =22m.10s.

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Poona iPPEN =11m.19s., iPPPE =12m.26s., P_cSN =14m.22s., iS_cSEN =19m.9s., iSSEN =20m.30s., SSSEN =21m.56s.
Auckland eN =17m.34s.
Christchurch iPEN =10m.11s., PPNZ =12m.51s., PPPNZ =14m.2s., eE =14m.50s.
Wellington iZ =11m.26s., iPPZ =12m.31s., iZ =18m.41s.
Apia eS?N =18m.58s.
Honolulu eSS =26m.30s.
Tananarive e =22m.8s., PS =23m.10s., Q =33·6m.
College iP =12m.43s., eS_eS =23m.36s.
Sitka ePPP =18m.48s., eSS? =30m.43s.
Helwan eEZ =13m.45s., SKSE =23m.41s.
Helsinki iSKKS =24m.26s., e =28m.12s., e =34m.6s. and 36m.32s.
Bucharest iPPPE =18m.22s., iPSE =24m.2s., iSSE =28m.40s., iSS?N =28m.59s.
Upsala PPN =16m.59s., PPP =19m.11s., ePPPPE =21m.7s., eSKSE =23m.47s., SN = 24m.29s., SE =24m.33s., $S_eSP?E$ =26m.21s., eSSN =31m.0s., eSSE =31m.36s.?, eSSSN =35m.5s., eS_eS,S_eS? =36m.36s.?, eQN =38·6m. and other eE, eN readings.
Belgrade i =18m.6s. and 26m.41s.
Budapest PPPN =20m.11s., PPPE =20m.14s., SKSE =23m.50s., SKSN =24m.34s., iE =25m.51s., PSE =26m.21s., PSN =26m.36s., PPSE =27m.21s., PPSN = 27m.26s., SSEN =31m.24s., eSSSEN =32m.45s.
Raciborzu eZ =13m.54s., iZ =13m.58s., eEZ =14m.18s., eN =19m.6s.?, eSKSN = 23m.48s.
Kalossa eE =15m.9s., eN =15m.12s., and 15m.42s., eE =24m.25s.
Copenhagen e =14m.11s., i =18m.6s., iPS =26m.58s., 28m.11s.
Victoria PS =27m.9s., SS =33m.18s., Q =42·6m.
Prague ePKP =17m.36s., ePPP =20m.54s., ePPS =27m.48s., eSS =32m.38s., eSSS = 37m.1s., eSSSS =40m.48s.
Potsdam ePP?N =19m.6s., eN =21m.51s., iE =24m.34s., 28m.3s. and 31m.14s.
Zagreb ePPE =18m.43s., ePPPE =20m.21s., eSKKS =25m.44s., and 25m.50s., ePS = 25m.59s., eSS =33m.36s.?, eSSS =37m.0s.
Seattle e =19m.1s. and 19m.12s.
Collmberg eE =14m.0s., eZ =17m.12s., ePPEZ =18m.12s., eZ =18m.44s., eSN = 25m.36s., eSE =25m.42s., ePSN =27m.6s., ePPS?E =28m.0s., eSSE =32m.30s., eSSSSE =37m.18s.
Taranto e =21m.25s. and 24m.5s.
Bergen eN =29m.0s., SSE =43m.0s.
Ferndale ePN =16m.20s., eN =24m.58s.
Jena eSKS?E =24m.36s., eE =29m.0s., eN =37m.36s., eE =37m.58s.
Triest iSKS =24m.40s., iPS =27m.28s., iSS =33m.25s., iSSS =37m.25s.
Ukiah eSS? =34m.21s.
Shasta Dam i =14m.5s., 17m.15s., and 17m.45s., e =18m.7s.
Scoresby Sund 17m.54s., 25m.35s., and 25m.57s., PS =27m.36s., PPS =28m.36s., SS = 33m.30s.
Mineral eZ =42m.38s.
Berkeley iPPZ =18m.29s., iSKSNZ =25m.4s., ePSZ =27m.46s., iPKKPZ =29m.59s., iSSN =33m.30s., and other unidentified readings.
Santa Clara eSSSE =41m.40s.
Padova S =26m.11s.
Lick iZ =14m.33s., 18m.54s., and 29m.58s.
Stuttgart eZ =17m.19s., iPPZ =18m.39s., ePPP =21m.12s., eSKS =24m.47s., ePS = 27m.41s., ePPS =28m.42s., eSS =33m.58s., eSSS =38m.36s., e =42m.36s.
Bologna e =19m.53s.
Rome eZ =17m.29s., iE =18m.43s., eN =19m.23s., PSN =27m.27s.?, iPPS =28m.33s., iSSN =33m.53s., eSSSE =37m.58s.
Reno eN =14m.24s., iN =18m.45s., eN =26m.23s.
De Bilt eS =26m.22s., eSS =34m.6s.
Zürich ePP =18m.40s., eS =26m.16s.
Strasbourg i =14m.25s., iPP =18m.42s., i =20m.7s., iPPP =20m.57s., iSKP =21m.40s., and 21m.44s., iS =26m.19s., i =26m.45s., iPS =27m.53s., iPPS =29m.2s., i = 30m.48s., iPKKS =32m.59s., iSS =33m.40s. and 33m.47s., iSSS =38m.2s., and 38m.19s., i =42m.15s. and 44m.9s.
Basle ePS =27m.52s.
Fresno eZ =17m.42s., eE =21m.47s.
Hungry Horse i =14m.26s., e =14m.58s., iPPP =20m.56s., ePS =28m.9s.
Aberdeen SKPE =21m.54s., iS =26m.24s., iPSSEN =29m.9s., eEN =34m.19s., eSSSEN =38m.4s., eE =41m.48s.
Besançon ePP =18m.52s., e =20m.9s., ePPP =21m.7s.,
Tinemaha iNZ =18m.29s.
Durham iE =19m.16s., iEN =28m.26s., iE =29m.31s., iEN =30m.4s.
Edinburgh PKSE =21m.57s.
Butte eSS?N =34m.3s., eSSS?N =38m.14s.
Pasadena iPPE =19m.11s., iPPPEN =21m.45s., eSN =26m.36s., ePSEN =28m.19s., iPKKPZ =29m.39s., iSKKPZ =33m.38s., eSSZ =35m.24s.
China Lake eZ =18m.32s.
Paris e =14m.27s.?, i =14m.34s., iPP =19m.2s. and 19m.7s., i =19m.35s. and 20m.16s., e =21m.4s., iPPP =21m.36s., e =22m.14s., i =23m.26s., eSKS =25m.5s., iS = 26m.40s., e =28m.14s., iPS =28m.23s., ePS =28m.30s., iPKKP =29m.44s., eSS = 35m.2s., eSSS =39m.35s., eQ =51·6m.

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Saskatoon e =25m.37s., PS =28m.37s., PPS =28m.47s., SS =34m.52s., Q =45·6m.
Reykjavik eN =34m.48s.
Kew iPKP =17m.58s., e =20m.8s., and 21m.4s., eSKKSZ =25m.33s., eN =26m.40s., ePS =28m.34s., e =29m.33s., ePPS =30m.4s., e =31m.8s. and 32m.58s., eSS =34m.40s., eEN =37m.39s.
Bozeman ePS? =28m.30s., eSSS =38m.31s.
Palomar iZ =14m.40s., eZ =17m.58s., iPP =19m.13s., eZ =28m.45s., iPKKPZ =29m.35s.
Clermont-Ferrand iPP =19m.16s., i =19m.30s., and 19m.48s., eSKP =22m.16s., eSKKS =26m.17s., eSP =28m.34s., iSP =28m.41s., i =29m.13s., iPPS =29m.48s., i =30m.14s., iSS =34m.52s., eSSS =38m.40s., Q =45·6m.
Boulder City e =14m.56s. and 15m.31s.
Logan e =18m.7s., ePPP =21m.42s., eSKKS =26m.15s., eS =27m.5s., iPS =28m.47s., eSS =34m.38s.
Pierce Ferry i =14m.50s.
Rathfarnham Castle e =14m.58s. and 22m.12s., i =23m.53s., 26m.17s., and 29m.24s.
Algiers Univ. eZ =20m.4s., 23m.1s., and 29m.15s., iPSZ =29m.23s., ePKKSZ =32m.58s.
Tortosa eN =19m.12s., SKSEN =26m.2s., SKKSE =26m.43s., PSEN =29m.9s., PPSEN =30m.27s., SSPEN =35m.33s., SSSE =38m.31s.
Tucson iPP =19m.46s., e =20m.2s., i =20m.40s., eS =27m.39s., iPS =29m.32s., eSS =36m.8s., eSSS? =40m.11s.
Rapid City eE =24m.52s., ePSE =29m.28s., eSSE =35m.31s., eSSS?E =41m.6s.
Alicante PKS =21m.56s., PPP =22m.25s., PKS =25m.37s., PPS =31m.25s., SS =36m.21s., SSS =40m.15s., Q =49m.7s.
Ivigtut i =26m.51s., SSS =39m.54s.
Tamanrasset ePKSZ =21m.56s., ePPPZ =22m.26s., eSSZ =35m.56s.
Toledo eZ =19m.29s., iZ =19m.54s., PPPN =22m.47s., PS?E =29m.48s., SSE =36m.28s., SSS?E =41m.8s., eE =45m.44s.
Almeria PKS =22m.15s., PPP =22m.31s., SKKS =26m.51s., PS =29m.47s., PPS =30m.55s., SS =36m.3s., SSS =40m.27s.
Granada iPP =18m.54s., pPP =19m.42s., SKP =20m.25s., PPP =21m.30s., SKKS =25m.25s., iS =26m.42s., PS =29m.9s., PPS =30m.0s., SS =34m.54s., sSS =35m.54s., SSS =39m.9s., sSSS =40m.57s., Q =56m.18s.
Malaga PPPZ =22m.50s., iPKP,PKPZ =37m.12s., QZ =50m.52s.
Lisbon PP =20m.47s., SKSEN =26m.19s., PSEZ =30m.13s., SSS? =41m.54s.
Chicago eSKSP =31m.5s., eSS? =38m.10s., eSSS =42m.52s.
St. Louis i =20m.13s., ePPP =23m.57s., eS? =28m.47s., ePS =31m.6s.
Seven Falls eE =19m.46s., 22m.27s., and 52m.36s.?
Ottawa i =19m.3s., e =19m.24s., PP =21m.11s., PKS =22m.32s., PPP? =24m.14s., Q =52·6m.
Cleveland eSSN =38m.28s.
Tacubaya e =29m.58s. and 38m.35s.
Puebla e =28m.15s.
New Kensington iE =22m.38s., eE =36m.37s., eSSSE =43m.40s.
Pennsylvania iE =19m.33s., eEN =21m.21s., iE =21m.44s., iEN =22m.43s., iE =24m.24s., eE =30m.51s.
Halifax PKS =22m.42s., SKKS =28m.52s., PS =32m.26s., Q =39·5m.
Harvard iPKS =22m.45s., iPPP =24m.26s., i =33m.25s., ePPS =34m.3s., ePPPS =35m.25s., e =36m.41s. and 38m.19s., eSS =39m.18s., eQ =57m.26s.
City College e =27m.7s. and 29m.2s., eSS =39m.32s.
Fordham i =22m.2s. and 22m.42s., iSKP =22m.53s.
Philadelphia e =22m.45s., eSKSP =31m.50s., ePS? =32m.6s., e =35m.43s., eSS =39m.19s.
Santa Lucia N =20m.4s., 21m.53s., and 23m.53s.
Bermuda eSS =41m.46s., eSSS? =47m.26s.
La Plata Z =19m.59s., E =21m.7s., PKSN =23m.6s., SKSP?E =31m.33s., SKKS (△ >180°) N. =35m.42s., SKKS(△ >180°)E. =37m.4s., PSSN =40m.30s., PSSE =42m.5s., SSSN =47m.42s., QE =63m.54s.
Galerazamba eEN =21m.13s.
Huancayo iSKKS? =30m.49s., eSKSP =34m.28s., eSS =44m.4s., i =45m.11s., e =54m.11s. and 55m.6s.
San Juan e =24m.46s., ePPP? =27m.25s., eSSS =49m.41s.
Bogota e =21m.1s.
La Paz iPPZ =24m.16s., ipPPZ =24m.40s., iPPPZ =28m.1s., iSKKS =31m.2s., iPPS =31m.36s., iSS =44m.29s., SSP =45m.28s., iSSS =49m.44s., Q =66·6m.
Fort de France e =54m.40s.

Sept. 14d. Readings also at 0h. (Victoria and near Istanbul), 1h. (near Istanbul (2)), 5h. (Hungry Horse and near Batavia), 6h. (Mizusawa and near Malaga), 7h. (Boulder City, Overton, Pierce Ferry, Hungry Horse, and near Logan), 8h. (Overton, Pierce Ferry, and near Fort de France), 9h. (Yalta), 12h. (near Frunse), 13h. (near Mizusawa and near Istanbul), 14h. (Tucson and near Obi-garm), 15h. (Hungry Horse and near Ottawa), 16h. (Tucson and China Lake), 17h. (Mount Wilson, Pasadena, Palomar, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, and Hungry Horse), 19h. (Ashkabad, Frunse, near Andijan, Obi-garm, Samarkand, Stalinabad, and Tchimkent), 20h. (Stuttgart, near Tucson (2), Boulder City (2), Overton, Pierce Ferry (2), Shasta Dam, Hungry Horse, near Berkeley, Branner, and Lick, probably three shocks), 23h. (Stuttgart, Erevan, Leninakan, Tiflis, and Ksara),

Sept. 15d. 0h. 26m. 2s. (I) } Epicentre 48°·2N. 9°·0E.
6h. 15m. 35s. (II) } (as on July 8d.).

Intensity IV-V near Onstmettingen in the upper valley of the Schmiecha. Epicentre 48°17′N. 9°0′E.
Seismischer Bericht des Württembergischen Erdbebendienstes, Stuttgart 3, Vierteljahr, 1949, p. 33.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
I Ebingen	0·0	—	i 0 5k	− 2	i 0 7	− 4	—	—
II	0·0	—	i 0 5k	− 2	i 0 7	− 4	—	—
I Ravensburg	0·6	135	e 0 15	0	e 0 24	− 2	—	—
II	0·6	135	e 0 15	0	e 0 24	− 2	—	—
I Stuttgart	0·6	13	e 0 12	− 3	i 0 19	− 7	i 0 22	S_g
II	0·6	13	e 0 12	− 3	i 0 19	− 7	i 0 23	S_g
I Strasbourg	0·9	295	—	—	i 0 33	− 1	—	—
II	0·9	295	—	—	i 0 34	0	—	—
I Zürich	0·9	198	e 0 21	+ 1	e 0 34	0	—	—
II	0·9	198	e 0 21	+ 1	e 0 34	0	—	—
I Basle	1·2	235	e 0 26	+ 2	e 0 43?	+ 2	—	—
II	1·2	235	e 0 26	+ 2	e 0 42	+ 1	—	—
I Collmberg	4·0	38	—	—	e 2 7	S*	e 2 13	S_g
II	4·0	38	—	—	e 2 7	S*	e 2 10	S_g

Sept. 15d. Readings also at 3h. (Taranto), 5h. (Bombay, Calcutta, Dehra Dun, New Delhi, Poona, Obi-garm, Stalinabad, Tashkent, Tchimkent, and near Andijan (2)), 6h. (Copiapo and near Mizusawa), 10h. (Durham, Grahamstown, Pretoria, and Tacubaya), 11h. (Tucson and Overton), 12h. (Samarkand, near Obi-garm, and Stalinabad), 13h. (Copiapo, Collmberg, near Andijan, Obi-garm, Samarkand, and Stalinabad (2), 14h. (Mount Wilson, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Seattle, Victoria, and College), 15h. (Pretoria, Tchimkent, near Andijan, Obi-garm, Stalinabad, and Tashkent), 16h. (Irkutsk, Almata, Frunse, Samarkand, Tashkent, Ashkabad, Copenhagen, Collmberg, Stuttgart, Rome, Mount Wilson, Palomar, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Hungry Horse, Victoria, and College), 17h. (Ksara), 18h. (Palomar, Pasadena, China Lake, Tinemaha, Tucson, Boulder City, Overton, Shasta Dam, Lick, and Hungry Horse), 20h. (Algiers Univ., Tacubaya, La Paz, and near Huancayo), 21h. (Hungry Horse and Pierce Ferry), 22h. (Shasta Dam).

Sept. 16d. 14h. 50m. 35s. Epicentre 39°·9N. 142°·4E. Focus at Base of Superficial layers. (as on 1944, January 11d.).

Intensity VI at Kuji (Iwate Pref.); V at Miyako; IV at Morioka and Hatinohe; II-III at Mizusawa. Macroseismic radius 200-300km.
Epicentre 39°·9N., 142°·2E. Depth 40km.
The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1949, Tokyo, 1950, p. 30, with macroseismic chart.

$A = -·6095$, $B = +·4694$, $C = +·6389$; $\delta = +2$; $h = -2$;
$D = +·610$, $E = +·792$; $G = -·506$, $H = +·390$, $K = -·769$.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Miyako	0·4	230	0 11	+ 2	0 17	+ 1
Hatinohe	0·9	314	0 18	+ 2	0 31	+ 3
Morioka	1·0	258	0 18a	0	0 28	− 3
Mizusawa	1·2	232	0 20	0	0 33	− 3
Akita	1·8	264	0 29	0	0 47	− 4
Sendai	2·0	215	0 31	− 1	0 50	− 6
Hukusima	2·6	215	0 39	− 2	1 8	− 3
Onahama	3·2	202	0 56	+ 7	1 33	+ 6
Sapporo	3·2	346	1 1	+12	2 11	+44
Aikawa	3·7	241	0 55	− 1	—	—
Mito	3·8	204	0 57	− 1	1 36	− 6
Tukubasan	4·1	207	1 1	− 1	—	—
Nemuro	4·2	34	1 25	+22	—	—
Kumagaya	4·4	213	1 8	+ 2	1 56	− 1
Maebasi	4·4	218	1 3	− 3	2 5	+ 8

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tokyo		4·7	207	1 10	0	2 5	0
Hunatu		5·3	214	1 20	+ 1	2 22	+ 2
Misima		5·5	211	1 23	+ 1	2 31	+ 6
Gihu		6·3	227	1 29	− 4	—	—
Nagoya		6·4	224	1 28	− 6	—	—
Hikone		6·7	228	1 39	0	—	—
Shasta Dam		68·8	54	i 11 3	0	—	—
Hungry Horse		69·2	44	i 11 5	0	—	—
Overton	z.	76·3	53	i 11 48	+ 1	—	—
Boulder City		76·4	54	i 11 48	0	—	—

Shasta Dam also gives e =11m.14s. and 11m.24s.

Sept. 16d. 19h. 11m. 16s. Epicentre 1°·1N. 126°·4E. Depth of focus 0·005. (as on 14d.).

A = −·5933, B = +·8047, C = +·0190; $\delta = -9$; $h = +7$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		20·8	250	i 4 43a	+ 5	i 7 49	−32	—	—	—
Miyazaki		31·0	8	e 6 15	+ 1	11 21	+ 9	—	—	—
Hukuoka		32·5	6	e 6 28	+ 1	11 41	+ 5	—	—	—
Matuyama		33·1	10	6 34	+ 2	11 54	+ 9	—	—	—
Sumoto		34·0	13	i 6 42	+ 2	12 14	+15	—	—	—
Osaka		34·5	13	e 6 46	+ 2	7 57	?	—	—	—
Nagoya		35·3	16	e 6 51	0	e 12 35	sS	—	—	—
Tokyo		36·6	18	e 7 48	+46	e 14 20	SS	—	—	—
Brisbane		38·3	140	i 7 16	0	i 13 10	+ 5	i 8 45	PP	—
Riverview	E.	41·8	148	—	—	e 13 59	+ 2	e 16 59	SS	e 22·5
Colombo	E.	46·8	278	8 29	+ 4	17 34	?	—	—	26·7
Irkutsk		54·3	343	9 21	− 1	17 0	+ 7	—	—	—
Poona	E.	54·4	292	9 15	− 8	17 34	sS	11 30	PP	—
Bombay	E.	55·4	292	e 9 6	−24	—	—	—	—	—
Christchurch		60·7	143	—	—	e 18 24	+ 7	—	—	25·4
Almata		60·8	321	i 10 10	+ 2	—	—	—	—	—
Frunse		62·1	318	e 10 15	− 1	—	—	—	—	—
Andijan		62·7	315	e 10 19	− 1	e 18 57	SP	e 11 8	PcP	—
Semipalatinsk		62·8	328	e 10 17	− 4	—	—	—	—	—
Apia		63·0	105	—	—	e 37 33	?	e 37 43	?	e 38·2
Stalinabad		64·4	313	i 10 29	− 3	i 20 13	ScS	—	—	—
Tashkent		65·1	315	i 10 35	− 1	e 19 5	− 7	i 12 59	PP	—
Tchimkent		65·2	316	e 10 34	− 3	—	—	—	—	—
Samarkand		66·1	313	i 10 40	− 2	—	—	—	—	—
Ashkabad		72·1	310	e 11 28	+ 9	—	—	—	—	—
Sverdlovsk		76·0	329	i 11 42	0	21 18	− 1	—	—	—
Grozny		82·4	313	e 12 22	+ 6	—	—	—	—	—
Tiflis		83·0	312	i 12 21?	+ 1	e 22 40?	+ 8	—	—	—
Leninakan		83·7	310	12 25	+ 2	—	—	—	—	—
Sotchi		86·8	313	e 12 36	− 2	—	—	—	—	—
College		87·2	25	e 12 39	− 1	—	—	e 15 42	PP	—
Moscow		88·4	326	i 12 45	− 1	23 23	− 1	—	—	—
Ksara		89·8	303	i 12 54k	+ 1	—	—	16 26	PP	—
Yalta		90·8	314	13 3	+ 6	—	—	—	—	—
Helwan	z.	93·9	300	13 9	− 3	—	—	e 16 58	PP	39·5
Istanbul		94·8	311	e 13 23	+ 7	e 23 55?	[+11]	—	—	—
Bucharest		96·6	315	e 13 26	+ 2	e 23 45	[− 9]	e 24 6	SKKS	—
Upsala	N.	98·4	331	—	—	—	—	e 40 44	Q	e 48·7
Copenhagen		102·4	328	—	—	24 42	SKKS	—	—	46·7
Prague		103·1	322	e 15 8	?	e 25 38	+ 7	e 18 14	PP	—
Triest		104·9	318	e 13 58	P	e 24 34	[0]	e 18 16	PP	—
Shasta Dam		105·2	47	i 18 25	PP	—	—	—	—	—
Scoresby Sund		105·6	350	—	—	24 50	[+13]	28 14	PS	—
Stuttgart		106·7	322	e 17 32	PKP	e 26 11	+10	e 18 21	PP	e 55·7
Rome		106·9	315	e 14 13?	P	e 24 54	[+11]	34 3	SS	—

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		107·7	327	e 18 44	PP	e 25 20	SKKS	—	—	e 53·7
Strasbourg		107·7	323	e 18 44	PP	e 26 17	S	e 29 8	PPS	e 53·7
Hungry Horse		108·4	37	e 18 40	PP	—	—	—	—	—
Kew		110·0	328	—	—	e 28 36	PS	e 38 50	SSS	e 50·7
Paris		110·8	324	e 19 15	PP	—	—	e 21 0?	PPP	e 63·7
Clermont-Ferrand		111·8	321	19 15	PP	e 29 8	PS	39 44?	Q	—
Logan		112·4	43	—	—	e 33 44	SS	—	—	—
Overton	z.	112·4	50	i 18 34	[+ 5]	—	—	e 19 28	PP	—
Pierce Ferry		112·9	50	e 18 34	[+ 4]	—	—	—	—	—
Rathfarnam Castle		113·1	332	—	—	e 32 44	?	—	—	50·7
Algiers Univ.	z.	115·5	312	18 37	[+ 2]	—	—	—	—	—
Tucson		116·6	53	e 18 42	[+ 5]	—	—	e 20 3	PP	e 53·6
Almeria		119·5	314	18 47	[+ 5]	29 55	PS	20 15	PP	64·7
Granada		120·1	315	19 0	[+17]	—	—	20 21	PP	61·7
Malaga	z.	120·9	315	(i 18 50k)	[+ 5]	(e 30 6)	PS	(i 22 24)	PPP	(48·8)
St. Louis		128·1	36	e 19 1	[+ 2]	e 22 30	PKS	e 21 7	PP	—
Ottawa	z.	129·7	20	e 19 5	[+ 3]	—	—	—	—	—
Cleveland		130·6	27	—	—	e 22 32	PKS	—	—	—
Harvard		133·7	18	e 19 14	[+ 4]	i 22 41	PKS	i 21 42	PP	e 64·6
Weston		133·9	18	18 58	[−12]	22 46	PKS	21 38	PP	—
Bogota		158·8	73	e 19 54	[+ 4]	—	—	—	—	73·7
La Paz		159·0	138	i 19 56a	[+ 6]	i 30 44	SKKS	24 36	PP	—

Additional readings and note :—
Riversview eE =15m.11s., iN =17m.50s.
Poona P_cP?E =9m.58s., PPPE =12m.59s., PSE =17m.48s.
Andijan eS_cS =20m.15s.?
Tashkent eSS =23m.6s.
Helwan eZ =13m.44s. and 21m.22s.
Prague e =28m.44s.?
Triest ePKP =17m.57s., eS =25m.44s., ePS =27m.31s., eSS =33m.16s.
Stuttgart ePPPZ =21m.8s.
Rome eSKKS? =25m.51s.
Strasbourg e =19m.51s. and 30m.8s., eSS? =34m.38s., eSSS =38m.14s.
Kew eEN =33m.20s., eN =37m.49s.
Almeria SS =36m.31s., SSS =41m.51s.
Malaga ePPPZ =(24m.30s.) ; readings reduced by 14 minutes.
St. Louis esSKKS? =28m.3s., e =28m.56s. and 37m.4s.
Harvard e =35m.36s.
Weston PS =32m.32s., SS =39m.38s.
Long waves were also recorded at Auckland, Wellington, Helwan, Collmberg, Aberdeen, Alicante, Pasadena, Philadelphia, Galerazamba, and Huancayo.

Sept. 16d. 20h. 44m. 44s. Epicentre 32°·0N. 116°·0W.

Epicentre as suggested by the U.S.C.G.S.

$A = -·3725$, $B = -·7636$, $C = +·5273$; $\delta = -11$; $h = +1$;
$D = -·899$, $E = +·438$; $G = -·231$, $H = -·474$, $K = -·850$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Jolla		1·4	310	i 0 20	− 7	i 0 57	+11	—	—	—
Palomar		1·5	332	i 0 26	− 2	—	—	—	—	—
Riverside	N.	2·3	330	e 0 37	− 3	—	—	—	—	—
Pasadena		2·8	320	i 0 47	0	i 1 36	S_g	—	—	—
Boulder City		4·1	13	e 1 9	+ 4	—	—	—	—	—
Pierce Ferry		4·4	19	i 1 13	+ 3	—	—	—	—	i 3·2
Tucson		4·4	85	i 1 3	− 7	e 1 50	−12	i 1 29	P_g	i 2·5
Fresno		5·7	327	e 1 28	0	i 2 38	+ 3	e 1 46	P*	—
Lick	z.	7·1	320	e 1 46	− 2	e 3 36	S*	—	—	—
Berkeley		7·8	320	—	—	e 2 58	−30	e 3 52	S*	—
Reno		8·1	339	e 2 7	+ 5	e 3 21	−14	e 4 12	S*	—
Shasta Dam		10·1	331	e 3 49	?	—	—	—	—	—
Logan		10·3	18	e 2 35	+ 3	—	—	—	—	e 5·6
Rapid City	E.	15·7	36	e 3 41	− 3	e 7 15	SSS	—	—	e 8·6
Hungry Horse		16·4	5	e 4 1	+ 8	—	—	—	—	e 9·1
Aberdeen	N.	75·2	31	e 19 51	?	—	—	—	—	—

For Notes see next page.

NOTES TO SEPTEMBER 16d. 20h. 44m. 44s.

Additional readings :—
Tucson i = 1m.14s.
Fresno iE = 2m.48s., iN = 2m.51s., eSEZ = 3m.23s., eN = 4m.15s., eEN = 5m.15s., eZ = 5m.20s.
Lick iZ = 4m.14s., eZ = 4m.53s.
Berkeley eZ = 4m.22s. and 5m.34s.
Reno eN = 2m.14s. and 3m.6s., eZ = 4m.24s., iN = 4m.40s.
Long waves were also recorded at De Bilt, Paris, Strasbourg, Bermuda, and at other North American stations.

Sept. 16d. Readings also at 0h. (Pretoria, Hungry Horse, Overton, Pierce Ferry, and Shasta Dam), 3h. (near Stalinabad and Andijan), 4h. (near Stalinabad), 5h. (Hungry Horse, Shasta Dam, Takaka, Cobb River, Tuai, Auckland, Christchurch, Kaimata, and near Wellington), 6h. (Alicante, Mizusawa, Frunse, Tchimkent, Samarkand, near Obi-garm, Andijan, and Stalinabad), 7h. (near Mizusawa, near Berkeley, Lick, Branner, and San Francisco), 8h. (Victoria, Hungry Horse, Shasta Dam, Overton, Pierce Ferry, and Tucson), 10h. (Istanbul, College, and near Stalinabad), 11h. (Tucson, San Juan, and near Andijan), 13h. (near Stuttgart), 14h. (Frunse, Samarkand, near Stalinabad, Andijan, and Tashkent), 15h. (Santa Clara, Lick, Fresno, Reno, Hungry Horse, Chicago, Logan, Salt Lake City, Boulder City (2), Overton (2), Pierce Ferry (2), near Tucson (2), Pasadena, Palomar, and La Jolla), 16h. (Fresno, Reno, Boulder City, Overton, Pierce Ferry, Tucson, Philadelphia, Harvard, Weston, and Almata), 17h. (near Boulder City (3), Overton (2), Pierce Ferry (3), and near Andijan), 18h. (Collmberg, Shasta Dam, and near Mineral), 19h. (Harvard, Hungry Horse, Overton, and Pierce Ferry), 20h. (Ksara and Stuttgart).

Sept. 17d. 2h. Indian Ocean.

Bombay eE = 8m.33s. and 12m.31s.
Andijan eP = 10m.39s.?, S = 16m.13s.?
Stalinabad iP = 10m.39s., S = 16m.12s.
Almata eP = 10m.42s., eS = 16m.16s.
Tchimkent eP = 10m.51s.
Tashkent eP = 10m.56s., iS = 16m.44s.
Samarkand eP = 10m.57s.
Ksara eP? = 12m.29s., eS? = 21m.43s.?
Sverdlovsk P = 12m.56s., S = 20m.21s.
Moscow eP = 14m.2s., S = 22m.27s.
Collmberg eZ = 15m.24s.
Stuttgart ePZ = 15m.39s.
Strasbourg eP? = 15m.46s., e = 16m.16s.
Besançon eP = 15m.52s., e = 16m.8s.
Paris iP = 16m.3s., e = 16m.26s.
Weston L = 22m.25s.
Tucson iP = 26m.18s.
Pierce Ferry eP = 26m.28s.
Long waves were also recorded at Colombo, Hyderabad, Kew, Copenhagen, Granada, and Scoresby Sund.

Sept. 17d. 10h. 29m. 11s. Epicentre 6°·5S. 116°·5E. Depth of focus 0·080.
(as on 1937, Aug. 11d.).

Doubtful determination. Pasadena records an abnormal earthquake and the very early readings at large distances can only be accounted for by unusual depth of focus.

$A = -\cdot4434$, $B = +\cdot8893$, $C = -\cdot1125$; $\delta = +11$; $h = +7$;
$D = +\cdot895$, $E = +\cdot446$; $G = +\cdot050$, $H = -\cdot101$, $K = -\cdot994$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.
	°	°	m. s.	s.	m. s.	s.	m. s.
Batavia	9·6	268	e 2 19	+ 4	i 3 58	− 4	— —
Almata	61·1	328	e 9 27	+ 4	—	—	— —
Andijan	62·1	323	9 29	− 1	i 17 8	− 5	— —
Frunse	62·1	326	e 9 30	0	—	—	— —
Stalinabad	63·0	320	i 9 32	− 4	e 17 12?	−12	— —
Tashkent	64·3	322	i 9 43	− 1	i 17 35	− 5	— —
Tchimkent	64·6	323	i 9 44	− 2	—	—	— —
Samarkand	64·8	319	9 45	− 2	—	—	— —
Ashkabad	69·8	315	e 10 17	− 1	—	—	— —
Sverdlovsk	77·7	333	i 11 0	− 2	i 20 3	− 7	— —

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Leninakan		81·3	313	e 11 27	+ 6	—	—	—	—	
Ksara		85·8	304	i 11 44	+ 1	e 22 30	+60	—	—	
Moscow		89·1	327	e 11 56?	− 3	e 21 57	− 3	—	—	
Shasta Dam		117·6	47	e 17 44	[0]	—	—	—	—	
Hungry Horse		120·3	36	i 17 50	[0]	—	—	e 19 24	pPKP	
Tinemaha	z.	121·7	49	i 17 54	[+ 2]	—	—	i 20 37	PP	
China Lake	z.	122·6	50	e 17 55	[+ 1]	—	—	—	—	
Pasadena		122·6	53	i 17 55	[+ 1]	—	—	i 20 38	PP	
Mount Wilson		122·7	53	i 17 56	[+ 1]	—	—	i 20 38	PP	
Palomar	z.	123·9	54	i 17 59	[+ 2]	—	—	i 19 51	?	
Boulder City		124·7	50	i 18 2	[+ 4]	—	—	—	—	
Logan		124·7	42	e 17 57	[− 1]	—	—	—	—	
Overton	z.	124·8	49	i 18 1	[+ 3]	—	—	e 19 47	?	
Pierce Ferry		125·3	49	e 18 1	[+ 2]	—	—	e 19 59	?	
Tucson		129·1	53	e 18 9	[+ 2]	—	—	i 20 47	PP	
Ottawa		139·8	12	e 21 9	PP	—	—	—	—	
Harvard		143·5	8	i 18 33	[− 1]	—	—	—	—	
Weston		143·6	8	i 18 32a	[− 2]	—	—	i 18 41	?	

Sept. 17d. 11h. 30m. 8s. Epicentre 36°·9N. 22°·0E. (as on 1948, July 22d.).

A = +·7432, B = +·3003, C = +·5978 ; δ = −11 ; h = −1 ;
D = +·375, E = −·927 ; G = +·554, H = +·224, K = −·802.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		5·2	315	1 22	+ 1	2 23	+ 1	—	—	—
Messima		5·4	286	e 1 26	+ 2	e 2 32	+ 4	—	—	—
Sofia		5·9	9	1 29	− 2	3 2	S*	—	—	4·0
Istanbul		6·9	50	e 1 34	−11	e 3 9	+ 4	—	—	—
Belgrade		8·0	353	e 2 18k	P_g	e 3 27	− 6	e 2 51	?	i 4·6
Bucharest	E.	8·1	21	e 2 8	+ 6	3 52?	+17	e 2 34	PPP	—
Rome		8·9	306	e 2 52	P_g	e 4 39	S*	—	—	e 5·2
Zagreb		10·0	335	2 26	− 1	e 4 17	− 5	e 5 25	S_g	e 6·2
Florence Xim.		10·7	313	e 2 13	−25	i 4 40	+ 1	—	—	—
Triest		10·7	328	e 2 40	+ 2	i 4 41	+ 2	e 3 31	?	6·3
Padova		10·8	318	e 3 31	?	—	—	—	—	e 7·2
Prato		10·9	313	e 2 18	−22	—	—	—	—	e 6·3
Ksara		11·7	101	e 2 46	− 5	e 7 3	+119	—	—	—
Yalta		11·9	47	2 47	− 7	5 7	− 2	—	—	—
Prague		14·3	340	e 3 35	+ 9	i 6 24	+18	—	—	e 7·9
Zürich		14·4	321	e 3 31	+ 4	e 6 23	+14	—	—	—
Cheb		14·9	335	e 4 24	?	i 6 39	+19	—	—	e 8·8
Basle		15·1	319	e 3 36	0	e 6 42	+17	—	—	—
Stuttgart		15·1	326	e 3 36	0	e 6 18	− 7	—	—	e 8·9
Algiers Univ.	z.	15·2	275	e 3 42	+ 4	—	—	i 3 53	PP	—
Strasbourg		15·6	323	i 3 45	+ 2	e 6 47	+10	i 3 58	PP	e 7·4
Besançon		15·7	316	e 3 48	+ 4	—	—	e 4 3	PP	—
Karlsruhe		15·7	325	e 3 51	+ 7	e 7 1	SS	—	—	—
Collmberg		15·8	339	e 3 49	+ 4	—	—	—	—	e 9·0
Jena		15·9	335	e 3 51	+ 4	e 6 56	+12	e 8 58	Q	e 9·3
Clermont-Ferrand		16·7	308	e 3 59	+ 2	—	—	i 4 13	PP	9·9
Potsdam		16·7	341	—	—	e 7 11	+ 8	e 7 15	SS	e 10·2
Tortosa		17·2	290	4 8	+ 5	7 30	SS	—	—	e 8·9
Leninakan		17·3	70	4 18	+14	—	—	—	—	—
Alicante		17·9	283	e 4 9	− 3	e 7 23	− 7	4 21	PP	e 8·7
Tiflis		18·3	68	4 12	− 5	e 7 34	− 5	—	—	—
Paris		18·6	316	i 4 20	− 1	e 7 59	+13	4 36	PP	e 10·9
De Bilt		19·3	329	i 4 34	+ 5	e 8 18	+16	—	—	e 10·4
Almeria		19·6	278	i 4 36	+ 4	i 8 30	SS	8 42	P_cP	13·5
Copenhagen		19·9	344	i 4 33	− 3	i 8 18	+ 3	—	—	10·4

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tamanrasset	z.	20·0	230	i 4 39a	+ 2	—	—	—	—	—
Granada		20·4	279	i 4 52k	+11	i 8 49	+24	5 31	PP	13·0
Toledo		20·6	287	i 4 47	+ 4	e 8 42	+13	—	—	—
Kew		21·5	321	e 4 57	+ 5	e 8 56	+ 9	e 9 16	SS	e 11·9
Moscow		21·6	24	e 4 49	− 5	e 8 42	− 7	—	—	—
Baku		22·0	72	—	—	e 8 51	− 5	—	—	—
Upsala		23·2	354	i 4 40	−29	i 9 12	− 6	—	—	e 12·9
Rathfarnham Castle		25·6	320	—	—	e 10 45	SS	—	—	e 14·4
Sverdlovsk		32·5	39	—	—	e 11 30	−19	—	—	—
Weston		68·5	307	e 11 6	0	—	—	i 11 9	P	—
Ottawa		69·6	312	e 11 13	0	—	—	—	—	—
St. Louis		82·3	313	e 12 24	− 1	—	—	e 12 49	?	—
Hungry Horse		86·5	332	i 12 43	− 3	—	—	—	—	—
Pierce Ferry		96·7	325	e 13 34	+ 1	—	—	—	—	—
Tucson		98·3	321	e 13 39	− 2	—	—	—	—	—

Additional readings :—
Prague i = 6m.51s. and 7m.7s.
Stuttgart eP = 3m.42s., eS = 6m.33s.
Algiers Univ. iZ = 3m.45s., eZ = 4m.9s., and 4m.29s.
Strasbourg i = 3m.51s., iPPP = 4m.3s., i = 4m.15s. and 4m.37s.
Besançon e = 3m.52s. and 4m.21s.
Jena eE = 5m.36s.
Clermont-Ferrand i = 4m.28s. and 4m.50s.
Alicante PPP = 4m.31s., SS = 7m.48s., SSS = 7m.57s.
Paris ePPP = 4m.51s., e = 4m.59s. and 6m.47s.
Almeria PP = 5m.6s.
Tamanrasset eZ = 4m.50s.
Granada P_cP = 8m.37s.
Toledo iZ = 4m.51s.
Upsala iSN = 9m.15s., eE = 9m.34s.
Long waves were also recorded at Ogyalla and Skalnate Pleso.

Sept. 17d. 13h. 48m. 37s. Epicentre 34°·8N. 26°·2E. (as on 1938, May 12d.).

A = +·7384, B = +·3633, C = +·5681 ; δ = −4 ; h = 0 ;
D = +·442, E = −·897 ; G = +·510, H = +·251, K = −·823.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		6·7	20	—	—	e 4 1	S_g	—	—	e 5·4
Ksara		8·1	98	e 1 58	− 4	—	—	—	—	e 5·0
Zürich		18·2	319	e 4 17	+ 1	e 7 42	+ 5	—	—	—
Stuttgart		18·8	323	e 4 25	+ 2	e 7 57	+ 7	—	—	e 10·4
Algiers Univ.	z.	18·9	281	4 22	− 2	—	—	—	—	—
Basle		18·9	319	e 4 26	+ 2	e 8 11	SS	—	—	—
Collmberg	z.	19·1	332	e 4 28	+ 1	—	—	—	—	—
Strasbourg		19·4	320	i 4 33a	+ 3	e 8 7	+ 3	—	—	—
Besançon		19·6	316	e 4 31	− 1	—	—	—	—	—
Clermont-Ferrand		20·7	308	e 4 45	+ 1	e 8 40	+ 9	—	—	13·9
Tamanrasset	z.	21·7	242	e 4 48	− 7	—	—	e 5 11	PP	—
Paris		22·4	315	i 4 58	− 4	—	—	i 5 24	PP	—
Almeria		23·3	283	5 20	+10	9 31	+11	9 0	P_cP	12·4
Granada		24·2	284	i 5 19a	0	i 9 28	− 7	—	—	14·2
Malaga	z.	24·9	284	i 5 23a	− 3	i 8 49	−58	e 16 45	S_cS	10·9
Kew		25·3	319	e 1 23?	?	—	—	—	—	—
Weston		72·4	309	i 11 31	+ 1	—	—	—	—	—
Ottawa		73·5	313	e 11 38	+ 2	—	—	—	—	—
College		80·6	357	e 12 20	+ 4	—	—	—	—	—

Additional readings :—
Collmberg eE = 4m.33s.
Besançon e = 4m.40s.
Tamanrasset eZ = 5m.5s.
Paris iPPP = 5m.38s.
Almeria PP = 6m.3s.
Malaga iP_cPZ = 9m.49s.
Long waves were also recorded at Rome.

Sept. 17d. 15h. Region of Solomon Islands.
Riverview iZ =25m.57s., iN =32m.42s. and 32m.57s., iNZ =33m.5s., eLE =35·6m.
Brisbane iPNZ =26m.59s., iZ =27m.33s., iSEN =30m.53s., iLZ =33m.41s.
Wellington eP =29m.49s., eS? =35m.28s., eL =43m.?
College eP =34m.37s.
Tashkent iP =35m.18s., iS =46m.11s.
Boulder City eP? =35m.21s.
Pasadena iP =35m.21s., iZ =35m.45s.
Tinemaha iP?Z =35m.23s.
China Lake ePZ =35m.24s.
Palomar iPZ =35m.27s., iZ =36m.7s.
Overton ePZ =35m.39s.
Tucson eP =35m.43s., e =52m.48s., eL =74m.53s.
Pierce Ferry eP? =36m.10s.
Auckland eN =40m.?
Stuttgart ePKPZ =41m.31s., eZ =41m.52s., ePP =43m.29s.
Tamanrasset ePKP?Z =41m.55s., eZ =41m.57s. and 42m.40s.
Ksara ePKP? =42m.13s., e =58m.49s.
Andijan iS =45m.45s.
Long waves were also recorded at other European and North American stations.

Sept. 17d. 22h. Pacific Ocean.
Christchurch P =51m.47s., PPNZ =52m.40s., eSE =55m.58s., i =56m.23s.?, eLZ =58m.20s.
Wellington eP =51m.55s., iS =56m.30s., eSS? =58m.17s., eL =59m.?
Brisbane iPZ =54m.48s.k.
Riverview iZ =56m.29s., eZ =57m.15s., iS?EN =60m.37s., eLEN =63·6m.
Auckland eS?N =57m.34s., LN =60·0m.
La Paz P =58m.22s., L =82m.
Helwan PZ =66m.6s., iZ =66m.15s., pP?Z =66m.44s., eZ =66m.51s., sP?Z =67m.2s., eZ =67m.14s., 67m.30s., 68m.0s., and 69m.10s., ePKP? =69m.45s.
Tamanrasset ePKPZ =66m.6s., ePP?Z =68m.36s., ePPP?Z =71m.20s., LZ =128m.
Malaga iPKPZ =66m.10s.a, PKSZ =69m.28s., iPPZ =71m.26s., SKSZ =73m.16s., PPPZ =75m.54s., LZ =118m.50s.
Ksara ePKP =66m.19s., PPS? =80m.33s.
Almeria PKP =66m.25s., PKP_2 =67m.55s., PP =71m.43s., SKS =73m.27s., PPP =75m.51s., L =122m.
Granada PKP =66m.30s.a, PKP_2 =67m.24s., pPKP =68m.57s., PP =70m.57s., eSKS =73m.30s., eSKKS =76m.36s., SS =89m.30s., SSS =96m.49s., L =121m.5s.
Paris ePKP =66m.32s., $ePKP_2$ =67m.21s., ePP? =70m.45s.?, ePPS =85m., eL =127m.
Algiers Univ. PKP_2Z =66m.38s., Z =67m.52s.
Strasbourg ePKP =66m.39s.?, $ePKP_2$ =67m.29s., e =68m.9s., ePP =71m.10s.?, ePPP? =75m.1s., ePPP =75m.19s., eSKKS =77m.56s., $eSKKS_2$? =81m.46s., ePPS =84m.43s., e =86m.10s. and 89m.9s.?, eSS =91m.36s., eSSS =97m.54s., L =126m.
Clermont-Ferrand ePKP? =66m.44s., $ePKP_2$ =67m.21s., ePP =70m.55s., iPPP =74m.41s., SS =91m., SSS =97m.44s., L =123m.
Istanbul e =66m.48s.
Rome e =67m.0s.?, eN =70m.2s., eE =71m.35s., e =82m.14s.
Alicante ePKP? =67m.3s., SKS =74m.7s., eL =124m.9s.
Besançon e =67m.16s., $ePKP_2$ =67m.32s.
Stuttgart ePKPZ =67m.28s., ePP =71m.27s., eSKKS =78m.12s., e =88m.30s., eSSS =98m.36s., eQ =130m., R =133m.
Kew ePKPZ =68m.19s., ePPZ =70m.24s., eZ =76m.2s., eL =115m.
Triest $iPKP_2$? =68m.48s., ePKS =70m.55s., ePP =72m.10s., ePPP =76m.9s., eSKKS =78m.27s., $ePPP_2$ =79m.12s., ePSKS =82m.11s., eSS =91m.33s., eSSS =98m.55s., eL =117m.?
Copenhagen eP =71m.53s., 73m.47s., 77m.42s., iSKS =81m.21s.
Berkeley iZ =74m.22s.a, eE =80m.9s., eN =93m.48s., eZ =94m.18s., eE =94m.30s.
Bombay eE =83m.
De Bilt e =98m., eL =128m.
Long waves were also recorded at Arapuni, Honolulu, Scoresby Sund, Punta Arenas, San Juan, Huancayo, and at other North American and European stations.

Sept. 17d. Readings also at 0h. (near Andijan), 1h. (Boulder City, Overton, Pierce Ferry, Tucson, and Reno), 2h. (Pasadena, Palomar, China Lake, Tinemaha, Boulder City, Pierce Ferry, Tucson (2), Lick, Fresno, Mineral, Reno, Hungry Horse, Shasta Dam, Logan, Bozeman, Butte, Chicago, Philadelphia, Seattle, and near Victoria), 3h. (Tucson and near Huancayo), 4h. (Tucson and Palomar), 5h. (Pasadena, China Lake, Tinemaha, Pierce Ferry, and Bogota), 8h. (near Mineral (2)), 9h. (Hungry Horse, Tucson (2), Collmberg, Stuttgart, Zagreb, Paris, Triest, Istanbul, Rome (2), and near Messina (2)), 10h. (Collmberg, Overton, Tucson, Stalinabad, and near Tashkent), 11h. (Overton and Granada), 13h. (Istanbul (3), Ashkabad, Frunse, near Obi-garm, Stalinabad (2), Samarkand (2), Andijan (2), Tchimkent, and Granada), 15h. (Granada and near Yalta), 16h. (Reno, near Lick and Fresno), 17h. (near Victoria and near Copiapo), 20h. (Ashkabad, Almata, Frunse, Tchimkent, near Obi-garm, Stalinabad (2), Andijan (2), and Samarkand), 21h. (Overton), 22h. (near Victoria), 23h. (Huancayo, Andijan, near Stalinabad, near San Juan and Fort de France).

Sept. 18d. 12h. 45m. 54s. Epicentre 18°·3S. 69°·2W. Depth of focus 0·020.

Intensity IV between latitudes 18° and 19° South.

F. Greve.
Bol. del Año, 1949, Segundo Semestre, Instituto Sismológico, Santiago, p. 13.

$A = +\cdot3374$, $B = -\cdot8882$, $C = -\cdot3121$; $\delta = +14$; $h = +5$;
$D = -\cdot935$, $E = -\cdot355$; $G = -111$, $H = +\cdot292$, $K = -950$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		2·1	29	i 0 38k	+ 1	i 1 8	+ 2	—	—	—
Huancayo		8·6	316	e 2 2	0	e 3 28	−10	—	—	e 4·0
Copiapo	N.	9·1	186	—	—	e 3 33	−17	—	—	—
St. Louis		60·0	341	e 9 49	− 3	e 17 52	+ 2	e 10 18	pP	—
Weston		60·4	358	i 9 54	− 1	—	—	i 10 23	pP	—
Harvard		60·5	358	i 9 54	− 1	—	—	—	—	—
Tucson		64·1	321	i 10 19	0	—	—	—	—	—
Palomar		68·6	318	i 10 48k	0	—	—	—	—	—
Pierce Ferry		68·7	322	i 10 49	+ 1	—	—	—	—	—
Boulder City		69·1	321	i 10 51	0	—	—	—	—	—
Overton	z.	69·3	322	i 10 53	+ 1	—	—	i 11 48	pP	—
Pasadena		69·9	318	i 10 56k	+ 1	—	—	i 11 25	pP	—
China Lake	z.	70·7	320	i 11 0	0	—	—	e 11 29	pP	—
Logan		71·6	328	e 11 4	− 2	—	—	—	—	—
Tinemaha		71·9	320	i 11 8k	+ 1	—	—	—	—	—
Lick	z.	74·2	319	i 11 21k	0	—	—	i 11 41k	pP	—
Reno	z.	74·4	321	i 11 34a	+12	—	—	i 11 53	pP	—
Berkeley	z.	74·9	319	i 11 26k	+ 1	—	—	i 11 56k	pP	—
Shasta Dam		76·7	321	i 11 32	− 3	—	—	e 12 4	pP	—
Hungry Horse		77·5	331	i 11 39	0	—	—	e 12 9	pP	—
Malaga	z.	82·0	47	i 12 3k	0	e 22 1	− 1	—	—	—
Victoria	z.	82·2	327	i 12 5k	+ 1	—	—	—	—	—
Tamanrasset	z.	83·6	63	i 12 12k	+ 1	—	—	i 12 45	pP	—
Alicante		85·5	47	—	—	e 23 37	+60	—	—	e 42·1
Algiers Univ.	z.	87·3	50	e 12 34	+ 4	—	—	e 13 6	pP	—
Stuttgart	z.	96·2	40	e 13 10	− 1	—	—	—	—	—

Additional readings :
La Paz $iZ = 50s.$, $iS_g = 1m.16s.$
Huancayo $e = 2m.17s.$ and $3m.18s.$
Copiapo $eN = 4m.6s.$
St. Louis $esP = 10m.32s.$, $esS = 18m.41s.$, $eS_cS? = 19m.35s.$
Overton $iP_cPZ = 11m.21s.$
Lick $iZ = 11m.30s.$ and $12m.10s.$
Reno $eE = 11m.38s.$
Tamanrasset $eP_cPZ = 12m.17s.$, $eZ = 12m.27s.$

Sept. 18d. Readings also at 0h. (Overton and near Andijan), 3h. (near College), 6h. (Berkeley Bogota, Basle, near Ebingen, Stuttgart, and Zürich), 7h. (Hungry Horse, Tucson, and near Sitka), 8h. (near Andijan), 10h. (Overton), 11h. (Overton and near Sitka), 12h. (Mount Wilson, China Lake, Tinemaha, Hungry Horse, College, near La Paz, and near Mizusawa), 13h. (Samarkand, near Andijan, Stalinabad, near Berkeley, Branner, Lick, and near College), 14h. (near Berkeley, Branner, Lick, and San Francisco), 17h. (College), 18h. (Stuttgart), 20h. (Clermont-Ferrand and near Mizusawa), 21h. (near Andijan), 22h. (Antofagasta, Copiapo, College, Tchimkent, and near Andijan), 23h. (Moscow, Sverdlovsk, Tchimkent, and Andijan (2)).

Sept. 19d. 7h. 51m. 11s. Epicentre 0°·5S. 128°·0E. (as on 14d.).

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia	21·9	255	e 4 46	−11	e 8 23	−31	—	—	—
Irkutsk	56·2	343	e 9 49	+ 5	e 17 49	PS	—	—	—
Semipalatinsk	64·9	329	e 10 43	0	—	—	—	—	—
Andijan	65·0	316	e 10 42	− 2	e 19 17	− 9	e 20 16	S_cS	—
Stalinabad	66·7	314	i 10 54	− 1	e 20 46	S_cS	i 11 30	P_cP	—
Tashkent	67·3	316	e 10 57	− 2	e 19 27	−27	—	—	—
Tchimkent	67·5	317	e 10 57	− 3	—	—	—	—	—
Samarkand	68·4	314	e 11 6	0	—	—	—	—	—
Sverdlovsk	78·2	329	12 7	+ 4	21 41	−16	—	—	—
Leninakan	85·9	311	12 59?	P_cP	—	—	—	—	—
College	88·0	25	e 13 0	+ 7	—	—	—	—	—
Moscow	90·6	326	e 13 11	+ 6	e 23 36	[0]	23 50	S_cS	—
Ksara	92·0	303	e 13 18	+ 6	e 25 48	PS	—	—	—
Tucson	116·3	54	e 19 4	[+18]	e 29 32	PS	—	—	—

College gives also e =13m.7s.

Sept. 19d. 13h. Local Shock.

San Juan eP =9m.31s., e =9m.40s., iS =9m.55s., iL =10m.11s.
Fort de France eP =10m.51s., eS =12m.6s.
Weston eP =14m.21s., iP =14m.32s., eS =18m.34s., iS =18m.43s.
Harvard eP =14m.27s., eS =18m.38s.
Overton eP =16m.57s., i =17m.5s. and 17m.28s.
Palomar iPZ =17m.7s.
Mount Wilson iPZ =17m.17s.
China Lake ePZ =17m.17s.
Tinemaha iPZ =17m.22s.
Hungry Horse eP =17m.22s., i =17m.28s.
Lick iPZ =17m.41s.k.
Shasta Dam eP =17m.48s., i =17m.54s.
College eP =19m.51s.

Sept. 19d. 21h. - 22h. Atlantic. Region of Bouvet Island.

Pretoria eZ =45m.36s., iZ =49m.12s.
La Paz PZ =52m.39s., iS =61m.12s., L =72m.30s.
Huancayo eP? =54m.0s., eS =62m.45s., e =63m.22s., eSS =67m.5s., eL =70m.35s.
Tamanrasset ePZ =54m.3s., eP_cPZ =54m.17s., eZ =54m.25s., ePPZ =56m.42s., eZ = 60m., eLZ =80m.
Bogota eP =54m.43s., ePPNZ =57m.56s., eS?EN =65m.7s., ePSEN =65m.47s., eSSEN =69m.14s., LEN =82m.0s.
Helwan ePZ =55m.9s., eZ =55m.24s., 56m.24s., and 57m.13s., eSE =66m.12s., ePSN = 67m.18s.
Riverview ePZ =55m.12s., iSE =66m.7s., eSSN =72m.18s., eSSSS?E =75m.27s., eQE = 78·8m. eRE =82·2m.
Granada P =55m.21s.a, iS =66m.21s., PPS =68m.3s., SS =72m.51s., L =84·1m.
Algiers Univ. Z =55m.30s. and 56m.6s.
San Juan eP =55m.33s., eSKS =65m.42s., eL =81m.10s.
Ksara eP =55m.40s.?, eS? =66m.1s.
Alicante eP? =55m.46s., eS =66m.32s., PS =67m.38s., PPS =68m.16s., SS =72m.50s., SSS =76m.12s., eL =86m.42s.
Rome e =58m.6s.?, 67m.8s., and 73m.48s.
Istanbul P? =60m.5s.
Strasbourg iPP =60m.22s., e =60m.37s., and 63m.24s., ePPS =70m.8s., e =70m.36s., eSS =75m.4s., eSSS =78m.42s., eL? =85·8m.
Stuttgart ePPZ =60m.31s., e =63m.30s., eS =68m.1s., eSS =75m.12s., eR =96m.
Tucson e =61m.15s.
Victoria eZ =61m.40s.
Hungry Horse ePKP =61m.52s.
Pierce Ferry ePKP? =61m.56s.
College ePKP =62m.29s., iPKP =62m.47s.
Bucharest eEN =66m.48s., eN =69m.2s., L?EN =96m.
Tortosa SEN =67m.1s., PS?EN =68m.45s., PPSN =69m.24s., SSN =73m.23s., eLN = 89m.
Kew e =70m.6s., eZ =75m.0s., e =75m.40s., eZ =75m.56s., eEN =79m.30s., eEZ = 82m.22s., e =85m.22s., eL =91m.
Copenhagen 70m.41s., 72m.34s., SS =76m.49s., SSS =80m.36s., L =93m.
Paris ePPS =71m., eL =92m.
De Bilt eSS =76m., eL =90m.
Scoresby Sund 79m.48s., L =102m.
Long waves were also recorded at Tananarive, Almeria, Collmberg, Malaga, Aberdeen, Harvard, Weston, and Seattle.

Sept. 19d. Readings also at 0h. (Overton and near Bucharest), 1h. (near Reno), 2h. (Shasta Dam, Logan, near La Paz), 4h. (near Leninakan), 5h. (Overton, Frunse, Samarkand, near Andijan, Obi-garm, Stalinabad, Tashkent, and Tchimkent), 8h. (near College), 9h. and 11h. (Copiapo), 12h. (Tchimkent and near Andijan), 13h. (Istanbul), 14h. (near Tacubaya), 16h. (College, Overton, and Pretoria), 17h. (Hungry Horse and Tucson), 18h. (Ksara, Rome, La Paz, and near Tacubaya), 19h. (Kew, Granada, Ashkabad, Almata, Stalinabad, near Andijan, Frunse, Obi-garm, Samarkand, Tashkent, and Tchimkent), 20h. (Copiapo and Victoria), 21h. (Tacubaya and near Andijan), 22h. (near Andijan).

Sept. 20d. 2h. 26m. 47s. Epicentre 38°·2N. 137°·9E. Depth of focus 0·005.

Intensity V at Niigata; IV at Toyama, Aikawa, and Wazima; II-III at Takada, Inawashiro, Nagano, Kanazawa, and Sakata. Epicentre as above, depth 40km. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1949, Tokyo, 1950, pp. 30, 31, with macroseismic chart.

$A = -\cdot5846$, $B = +\cdot5282$, $C = +\cdot6159$; $\delta = +9$; $h = -1$;
$D = +\cdot670$, $E = +\cdot742$; $G = -\cdot457$, $H = +\cdot413$, $K = -\cdot788$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Aikawa		0·3	124	0 4k	− 8	0 10	−10	—	—	—
Wazima		1·1	224	0 19	− 1	0 32	− 4	—	—	—
Nagano		1·6	171	0 22	− 5	0 43	− 4	—	—	—
Toyama		1·6	200	0 21a	− 6	0 49	+ 2	—	—	—
Matusiro		1·7	171	0 25	− 3	0 48	− 2	—	—	—
Maebasi		2·0	154	0 31	− 1	0 57	0	—	—	—
Kumagaya		2·4	150	0 39	+ 1	1 19	+12	—	—	—
Sendai		2·4	88	0 34	− 4	1 3	− 4	—	—	—
Mito		2·7	132	0 45	+ 3	1 28	+14	—	—	—
Mizusawa		2·7	70	i 0 38	− 4	1 25	+11	—	—	—
Hunatu		2·8	166	0 46	+ 2	1 29	+12	—	—	—
Gihu		2·9	198	0 53	+ 8	1 30	+11	—	—	—
Tokyo		2·9	150	0 51	+ 6	1 25	+ 6	—	—	—
Nagoya		3·1	194	0 56	+ 8	1 37	+13	—	—	—
Misima		3·2	165	0 48	− 1	1 36	+ 9	—	—	—
Shizuoka		3·3	173	0 54	+ 3	1 44	+15	—	—	—
Aomori		3·4	39	0 48	− 4	1 44	+12	—	—	—
Miyako		3·5	64	0 48a	− 6	1 29	− 5	—	—	—
Hatinohe		3·6	49	0 49	− 6	1 32	− 5	—	—	—
Toyooka		3·6	224	1 8	+13	1 59	+22	—	—	—
Osaka		4·0	209	1 29	+28	2 15	+28	—	—	—
Kobe		4·1	213	1 3	+ 1	2 4	+15	—	—	—
Mori		4·4	27	1 1	− 5	2 15	+18	—	—	—
Owase		4·4	199	1 19	+13	2 14	+17	—	—	—
Sumoto		4·6	213	1 22	+13	2 17	+15	—	—	—
Siomisaki		5·1	201	2 0	?	2 59	+45	—	—	—
Sapporo		5·5	27	1 18	− 3	2 34	+10	—	—	—
Koti		5·8	219	1 35	+10	—	—	—	—	—
Muroto		5·8	213	1 50	+25	2 59	+27	—	—	—
Hirosima		5·9	231	1 27	0	2 43	+ 9	—	—	3·8
Matuyama		6·0	225	1 36	+ 8	3 16	+39	—	—	—
Miyazaki		8·2	222	2 26	+27	4 16	+45	—	—	—
Irkutsk		27·2	313	e 5 45	+ 5	—	—	—	—	—
Sverdlovsk		52·4	318	9 5	− 3	16 29	+ 2	—	—	—
Moscow		64·6	322	e 10 37	+ 4	e 19 9	+ 3	—	—	—
Victoria	z.	67·6	46	e 10 52	0	—	—	—	—	—
Scoresby Sund		70·6	354	—	—	20 31	+13	—	—	39·2
Shasta Dam		72·6	52	i 11 20	− 2	—	—	—	—	—
Hungry Horse		72·8	42	e 11 21	− 2	—	—	—	—	—
Berkeley	z.	74·3	54	e 11 31	− 1	—	—	i 11 44	pP	—
Tinemaha	z.	77·3	53	e 11 49	0	—	—	—	—	—
China Lake	z.	78·6	53	e 11 56	0	—	—	—	—	—
Pasadena	z.	79·2	55	i 11 59	− 1	—	—	—	—	—
Boulder City		80·2	52	e 12 4	− 1	—	—	—	—	—
Pierce Ferry		80·6	51	e 11 46	−21	—	—	—	—	—

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Palomar	z.	80·6	55	i 12 6	− 1	—	—	—	—	—
De Bilt		81·1	333	—	—	e 22 13	0	—	—	e 42·2
Stuttgart		82·2	328	e 12 14	− 1	e 22 28	+ 4	—	—	—
Triest		82·6	324	e 12 25	+ 8	e 21 54	−34	—	—	—
Tucson		85·1	53	e 12 30	0	—	—	—	—	—
Rome		86·1	322	—	—	e 23 6	+ 3	—	—	e 40·9

Additional reading :—
Mizusawa PN =41s.
Long waves were also recorded at other European stations.

Sept. 20d. 4h. 14m. 11s. Epicentre 34°·9N. 116°·7W.

A = −·3693, B = −·7343, C = +·5696 ; δ = +2 ; h = 0 ;
D = −·893, E = +·449 ; G = −·256, H = −·509, K = −·822.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Riverside		1·1	211	i 0 21	− 1	i 0 36	− 3	—	—	—
Pasadena		1·4	238	i 0 27	0	i 0 46	0	—	—	—
Haiwee		1·6	320	i 0 31	+ 1	i 0 53	+ 2	—	—	—
Palomar		1·6	185	i 0 28	− 2	i 0 47	− 4	—	—	—
Boulder City		1·8	55	i 0 33	+ 1	i 0 55	− 1	—	—	i 1·2
Pierce Ferry		2·5	61	(i 0 42)	− 1	(i 1 16)	+ 2	(i 0 49)	P_g	—
Fresno		3·1	306	i 0 59k	P_g	i 1 33	+ 4	—	—	—
Lick	z.	4·7	303	i 1 12k	− 2	i 2 29	S_g	i 1 29	P_g	—
Reno	z.	5·2	333	e 1 42	P_g	e 2 50	S_g	—	—	—
Tucson		5·6	117	i 1 22	− 5	e 2 31	− 2	—	—	i 2·8

Additional readings and notes :
Boulder City i =36s. and 1m.1s.
Pierce Ferry i =(1m.3s.); readings have been recorded 1min. late.
Fresno iSN =1m.38s.
Lick iZ =1m.15s., eE =2m.38s.
Reno eE =2m.53s.
Tucson i =1m.29s., e =1m.38s., i =1m.47s., e =1m.56s.

Sept. 20d. 7h. 43m. 55s. Epicentre 39°·2N. 70°·7E. (as on August 29d.).

A = +·2568, B = +·7334, C = +·6295 ; δ = +9 ; h = −1 ;
D = +·944, E = −·331 ; G = +·208, H = +·594, K = −·777.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.
Obi-garm		0·9	237	0 20	0	0 35	+ 1
Stalinabad		1·6	247	i 0 30	0	i 0 55	+ 4
Andijan		2·0	39	i 0 33	− 2	e 0 59	− 3
Tashkent		2·4	333	i 0 41	0	i 1 21	+ 9
Samarkand		2·9	279	e 0 51	+ 3	i 1 43	S_g
Tchimkent		3·1	345	i 0 51	0	i 1 43	S_g
Frunse		4·7	38	e 1 12	− 2	i 2 7	− 3
Almata		6·2	47	e 1 15?	−20	i 2 45?	− 3
Ashkabad		9·8	267	e 2 26	+ 2	—	—
Baku		16·0	281	e 7 20?	S	(e 7 20?)	+34
Sverdlovsk		18·9	343	e 4 19	− 5	e 7 59	+ 6
Grozny		19·2	290	4 7	−21	—	—
Tiflis		19·8	285	4 36	+ 1	8 27	+14
Leninakan		20·6	284	4 51?	+ 8	—	—
Moscow		27·5	318	5 51	+ 1	—	—
Ksara		28·4	269	e 7 8	PPP	e 13 1	SSS
Collmberg		41·4	308	e 9 31	PP	—	—
Stuttgart	z.	44·2	304	e 9 59	PP	—	—
College		72·0	17	e 11 22	− 6	—	—

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

Sept. 20d. 11h. 55m. 21s. Epicentre 29°·3S. 178°·2W. (as on 1946, June 27d.).

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	9·6	216	i 2 20	− 1	i 4 4	− 8	—	—	—
Arapuni	E.	10·1	208	—	—	i 5 9	L	—	—	(i 5·1)
Tuai	N.	10·2	200	e 2 33	+ 2	4 2	−25	—	—	—
Wellington		13·3	203	2 59	−14	i 5 9	−33	—	—	e 6·4
Cobb River	E.	13·9	210	e 3 24	+ 3	e 5 28	−29	—	—	—
Kaimata	N.E.	15·6	210	e 3 36	− 7	e 6 6	−31	—	—	—
Christchurch		16·0	207	e 3 49	+ 1	6 14	−32	—	—	—
Apia		16·5	23	e 3 56	+ 2	e 6 47	−11	—	—	e 9·2
Brisbane		25·4	267	i 5 32a	+ 1	i 10 2	+ 6	i 6 6	PP	i 12·3
Riverview		26·4	251	i 5 41a	+ 1	i 10 8	− 4	i 5 50	pP	e 12·0
Melbourne	E.	31·7	244	i 5 51	−36	—	—	—	—	—
Honolulu		54·0	24	e 9 30	+ 2	e 17 2	− 1	—	—	e 25·9
Batavia		73·9	272	i 11 36	− 3	i 21 10	0	—	—	—
Branner	Z.	84·6	42	i 12 36a	0	—	—	—	—	—
Santa Clara		84·7	42	e 12 39	+ 2	e 23 11	+ 7	—	—	e 43·6
Pasadena		84·8	47	i 12 36a	− 1	i 22 57	− 8	i 12 50	pP	e 35·0
Berkeley		84·9	42	i 12 38a	0	e 23 3	− 3	i 12 54a	pP	e 38·6
Lick	Z.	84·9	42	i 12 37a	− 1	—	—	e 16 11	PP	—
Ukiah		85·2	40	e 12 50	+11	e 23 31	+22	e 29 5	SS	e 39·1
Palomar		85·2	48	i 12 39a	0	e 23 3	[+ 1]	i 12 51	pP	—
Riverside		85·3	47	e 12 38	− 2	—	—	—	—	—
Fresno	Z.	85·6	43	i 12 41a	0	—	—	—	—	—
China Lake	Z.	86·3	45	i 12 42a	− 3	—	—	i 12 56	pP	—
Tinemaha		86·7	44	i 12 46a	− 1	e 23 29	+ 5	e 30 39	PKKP	—
Shasta Dam		86·7	39	i 12 45	− 2	e 23 21	− 3	e 16 24	PP	—
Reno		87·4	42	i 12 50a	0	e 23 37	+ 7	—	—	—
Boulder City		88·1	46	i 12 53	− 1	—	—	—	—	—
Tucson		88·5	51	e 12 55	− 1	e 23 37	− 4	i 13 13	pP	e 40·3
Pierce Ferry		88·7	47	e 12 55	− 2	—	—	—	—	—
Tacubaya		90·2	68	13 12	+ 8	e 24 3	+ 7	i 23 35	SKS	—
Seattle		91·6	35	e 13 10	0	e 23 43	[+ 1]	e 13 26	pP	e 41·6
Victoria		91·7	34	i 13 10a	0	e 24 16	+ 6	e 23 40	SKS	—
Salt Lake City		92·9	43	—	—	e 23 50	[0]	—	—	—
Logan		93·5	42	e 13 15	− 4	e 24 21	− 4	e 17 5	PP	e 38·7
Sitka		93·7	22	—	—	e 25 45	PS	—	—	e 42·6
Huancayo		95·1	107	e 13 39	+13	e 23 57	[− 5]	e 13 55	sP	e 42·7
Bozeman		96·3	40	e 17 25	PP	e 24 9	[+ 1]	—	—	e 45·0
Hungry Horse		96·3	37	e 13 27	− 5	—	—	e 13 53	pP	—
College		96·8	13	e 13 31	− 3	i 24 49	− 5	e 17 41	PP	e 42·8
La Paz		98·6	115	i 13 48	+ 6	i 24 14	[− 6]	i 17 47	PP	—
Rapid City	E.	100·1	45	e 13 49	0	e 24 26	[− 1]	e 17 22	PP	e 47·4
Calcutta	E.	103·6	288	—	—	e 24 47	[+ 3]	e 27 59	PS	—
Colombo	E.	103·7	270	18 29	PP	28 54	PPS	—	—	54·2
Florissant		106·2	55	e 18 49	pPP	e 26 21	+ 9	i 25 39	SKKS	—
St. Louis		106·2	55	i 18 51	pPP	i 24 53	[− 3]	i 25 41	SKKS	—
Kodaikanal	E.	107·4	272	e 16 56	?	—	—	—	—	—
Chicago		109·3	52	—	—	e 26 44	S	—	—	e 56·6
Cleveland		113·4	54	—	—	e 25 20	[− 6]	e 29 12	PS	52·8
Grahamstown	Z.	113·5	203	i 18 38	[− 2]	—	—	i 19 22	PP	—
Bombay	E.	115·2	278	e 19 39	PP	e 22 46	PKS	e 29 32	PS	—
New Delhi	N.	115·2	290	—	—	e 29 49	PS	—	—	e 65·9
Pennsylvania	E.	115·8	56	e 20 4	PP	i 26 43	{− 3}	e 29 27	PS	e 47·4
Philadelphia		117·6	57	e 20 10	PP	e 25 35	[− 7]	e 26 53	SKKS	e 56·2
San Juan		117·7	84	—	—	i 25 34	[− 8]	e 29 43	PS	e 55·4
Ottawa		118·6	51	i 18 47k	[− 3]	—	—	e 42 33	SSS	60·6
City College, N.Y.		118·7	57	—	—	e 26 54	{−11}	e 30 1	PS	e 65·9
Fordham		118·8	57	e 20 17	pPP	e 25 41	[− 5]	e 27 3	SKKS	60·6
Semipalatinsk		119·1	314	i 18 47	[− 4]	—	—	—	—	—
Pretoria	Z.	119·7	208	i 18 49	[− 3]	—	—	i 22 29	PPP	—
Weston		121·0	55	—	—	e 30 15	PS	—	—	44·4

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		122·5	302	18 56	[− 2]	e 30 29	PS	e 20 36	PP	—
Bermuda		123·5	68	e 20 45	PP	e 25 59	[− 2]	e 30 45	PS	e 51·8
Stalinabad		124·8	299	i 19 1	[− 1]	i 26 1	[− 4]	—	—	—
Tchimkent		124·8	303	i 18 59	[− 3]	—	—	—	—	—
Tashkent		124·9	301	e 18 55	[− 7]	e 25 56	[−10]	i 22 16	PKS	—
Samarkand		126·3	299	e 19 6	[+ 1]	—	—	—	—	—
Sverdlovsk		130·9	322	i 19 12	[− 2]	i 22 35	PKS	21 25	PP	—
Scoresby Sund		136·7	12	19 23	[− 1]	22 59	PKS	22 3	PP	64·6
Baku		139·4	299	e 19 13	[−16]	—	—	e 23 8	PKS	—
Grozny		142·3	304	19 24	[−11]	—	—	—	—	—
Tiflis		143·2	302	i 19 32	[− 4]	—	—	—	—	—
Moscow		143·3	326	i 19 34	[− 2]	—	—	i 22 47	PP	—
Erevan		143·6	298	19 36	[− 1]	—	—	—	—	—
Leninakan		144·0	300	19 41	[+ 4]	—	—	—	—	—
Sotchi		146·6	306	e 19 43	[+ 1]	—	—	—	—	—
Upsala		147·6	344	19 42?	[− 2]	e 33 27	SKSP	i 23 13	PKS	e 70·6
Theodosia		149·2	310	e 19 46	[0]	—	—	—	—	—
Yalta		150·2	309	19 45	[− 3]	—	—	—	—	—
Ksara		150·7	287	i 19 46	[− 2]	36 52	PPS	—	—	—
Copenhagen		152·6	347	19 48	[− 3]	43 27	SS	23 34	PKS	62·6
Helwan	z.	154·3	278	i 19 52a	[− 2]	30 7	{−35}	23 4	PP	—
Istanbul		154·9	306	e 19 51	[− 3]	—	—	e 23 47	PP	—
Rathfarnham Castle		155·3	12	e 20 14	[+19]	i 39 39	P'P'	i 24 25	PP	76·6
Bucharest		155·5	315	e 18 52	[−63]	e 22 49	PKS	e 20 22	PKP_2	52·6
Collmberg		156·5	342	e 19 53	[− 3]	e 43 15	SS	e 24 1	PP	e 76·6
De Bilt		157·1	354	i 19 55	[− 2]	e 43 57	SS	i 20 19	PKP_2	e 74·6
Jena		157·2	342	e 19 58	[+ 1]	—	—	e 20 30	PKP_2	—
Prague		157·2	338	i 20 31	PKP_2	e 31 39	{+41}	i 20 41	$pPKP_2$	e 52·4
Kew		157·8	3	i 19 55a	[− 3]	e 30 39	{−22}	i 20 32	PKP_2	e 72·6
Stuttgart		159·7	346	i 19 58a	[− 2]	e 44 39	SS	i 20 41	PKP_2	79·6
Strasbourg		160·2	348	i 19 59a	[− 2]	i 27 3	[− 2]	i 20 43	PKP_2	e 74·6
Paris		160·5	359	i 20 0	[− 1]	e 37 39?	PPS	i 20 45	PKP_2	e 79·6
Basle		161·2	348	e 19 59	[− 3]	e 23 30	PKS	e 20 40	PKP_2	—
Zürich		161·2	346	e 19 59a	[− 3]	—	—	e 20 46	PKP_2	—
Triest		161·2	334	e 20 41	PKP_2	32 0	{+41}	i 24 28	PP	—
Besançon		161·8	351	i 19 48?	[−15]	—	—	i 20 37?	PKP_2	—
Clermont-Ferrand		163·5	354	i 20 3	[− 1]	e 32 5	SKKP	i 20 57	PKP_2	80·6
Prato		163·7	335	e 20 3	[− 1]	—	—	—	—	—
Florence, Arc.		163·7	335	e 20 2	[− 2]	43 54?	SS	e 20 57	PKP_2	—
Florence Xim		163·7	335	i 20 5	[+ 1]	—	—	i 24 55	PP	—
Rome		164·7	328	i 20 2	[− 3]	26 57	[−11]	i 21 1	PKP_2	—
Catania		166·2	310	20 5	[− 2]	—	—	21 3	PKP_2	—
Toledo		168·4	22	e 19 56	[−12]	26 51	[−20]	i 21 17	PKP_2	—
Tortosa		168·5	5	e 20 15	[+ 7]	32 6	{+10}	21 20	PKP_2	e 90·6
Alicante		170·8	11	19 56	[−14]	27 6	[− 6]	20 34	PKP_2	e 79·8
Granada		170·9	29	20 18a	[+ 8]	27 15	[+ 3]	21 24	PKP_2	—
Malaga	z.	170·9	34	i 20 8k	[− 2]	46 22	SS	i 21 28	PKP_2	81·8
Almeria		171·7	24	i 20 7	[− 3]	27 3	[− 9]	i 21 36	PKP_2	97·5
Algiers, Univ.	z.	172·4	352	i 20 9	[− 2]	—	—	i 21 37	PKP_2	—
Tamanrasset	z.	172·7	208	i 20 9k	[− 2]	—	—	e 21 33	PKP_2	e 98·6

Additional readings :—
Auckland iN =2m.59s. and 3m.48s.
Apia eEZ =4m.0s., e =4m.11s., eSN =6m.51s., e =7m.14s.
Brisbane iSSN =11m.0s.
Riverview iEZ =6m.4s., iPPPE =6m.37s., isS?E =10m.28s., iZ =10m.37s., iN =10m.50s. and 11m.42s., iEN =11m.59s.
Pasadena ePPZ =15m.53s., iZ =16m.9s., iPKKPZ =30m.44s., ePKP,PKPZ =39m.8s.
Berkeley eN =12m.49s., iE =13m.9s., iZ =14m.2s. and 14m.5s., eZ =15m.40s. and 15m.47s., iNZ =23m.16s., iZ =24m.24s. and 24m.40s., iN =24m.53s., eE =28m.33s., iN =36m.43s.
Lick iZ =12m.45s. and 12m.55s.
Palomar ePKP,PKPZ =38m.51s.
Fresno eN =14m.20s., eE =14m.42s., eZ =15m.23s., eN =15m.31s., eE =15m.45s.
China Lake ePKKPZ =30m.39s., ePKP,PKPZ =38m.46s.
Tinemaha ePKP,PKPZ =38m.47s.

Continued on next page.

Reno iZ =13m.7s., iE =13m.10s.
Tucson ePP =16m.30s., ePPP? =17m.15s., ePS =24m.49s.
Pierce Ferry i =14m.13s.
Tacubaya ePPS =25m.38s.
Seattle e =24m.17s.
Salt Lake City e =28m.10s.
Logan eSKS? =23m.49s., ipS =24m.43s., e =26m.49s., eSS =30m.40s., e =32m.8s.
Sitka i =26m.1s., e =28m.35s.
Huancayo ePP? =17m.29s., i =26m.2s., eSS? =31m.2s., eSSS? =38m.52s.
Hungry Horse i =14m.54s., ePP =17m.27s.
College e =16m.36s., eSKS =24m.5s., e =31m.12s., eSSS =35m.40s.
La Paz iPSZ =26m.26s.
Florissant esSP? =27m.56s., esPPS? =29m.2s., eSS =33m.40s.
St. Louis e =19m.10s., esSP? =27m.59s., esPPS? =29m.5s., eSS? =33m.21s., eSSS? = 37m.54s.
Cleveland eE =25m.36s. and 29m.23s., eSSN =35m.20s., eN =42m.42s. and 43m.16s.
Grahamstown ePPPZ =22m.45s.
Pennsylvania iE =25m.26s., iPSEN =29m.44s., eE =30m.9s., ePPSE =30m.49s., iSKP,PKPEN =43m.20s., iE =46m.31s.
Philadelphia ePS? =30m.6s., eSS =36m.18s.
City College, N.Y. e =44m.2s.
Fordham eSP =29m.59s., e =44m.25s.
Pretoria eZ =32m.21s.
Bermuda eSS? =37m.54s.
Tashkent iPPP =23m.35s., eSKSP =30m.11s.
Sverdlovsk i =22m.59s.
Scoresby Sund 23m.26s., 33m.33s., 34m.27s., and 39m.21s.
Upsala eE =20m.13s., eN =29m.58s. and 33m.39s.?, eSS?N =43m.39s.?, eSSSN = 48m.39s.?
Copenhagen 19m.55s., 33m.56s., SSS =48m.51s.
Helwan eZ =20m.31s., 21m.29s., and 23m.45s., PPZ =24m.56s., SKKSZ =31m.53s., eZ =32m.48s., 33m.24s., 34m.7s., and 36m.32s.
Rathfarnham Castle e =20m.40s., ePP =24m.50s., ePPP? =29m.9s., i =32m.47s. and 52m.47s.
Collmberg ePKPZ =20m.6s., iPKP$_2$ =20m.26s.
De Bilt iPP =24m.8s., eSSS =50m.9s.
Jena eE =20m.8s. and 20m.58s., ePP?EN =24m.4s.
Prague i =20m.51s., ePP =24m.5s., epPP =24m.21s.
Kew e =20m.53s., iZ =24m.9s., ePPNZ =24m.36s., ePPPE =28m.37s., e =30m.14s., iSKKS =33m.3s., ePPSN =39m.57s., eSSSEN =52m.19s.
Stuttgart iPP =24m.21s., e =29m.48s., ePSKS =34m.39s., ePPS =37m.45s., e =48m.33s., eQ =76·6m.
Strasbourg i =20m.15s. and 21m.21s., eSKP =23m.34s., iPP =24m.19s., i =24m.49s., 24m.53s., and 24m.59s., iPPP =28m.5s., ePPP =28m.21s., i =29m.49s., eSKKS = 31m.8s., eSKKS($\Delta > 180°$) =34m.12s., ePPS =37m.50s., eSS =44m.39s., eSSS = 50m.45s.
Paris i =20m.7s., iPP =24m.24s., ePPP =28m.30s., e =32m.18s., eSKKS =34m.21s., eSS? =44m.39s.?
Zürich ePP =24m.27s.
Triest i =25m.32s.
Besançon ePP =24m.28s.?
Clermont-Ferrand e =21m.28s. and 21m.58s., iPP =24m.44s., e =33m.55s., ePPS = 38m.23s., eSS =44m.43s., eSSS =51m.13s.
Florence, Arc. PP =24m.55s.
Rome PP =24m.46s., e =29m.1s.
Catania PP =24m.57s.
Toledo iZ =20m.6s., eE =23m.27s.?, iPPE =25m.6s., iZ =29m.37s., eZ =30m.6s., eN = 35m.36s.
Tortosa SKPN =23m.44s., PPN =25m.5s., PPPE =28m.48s.
Alicante PP =25m.22s., SKKS =33m.23s.
Granada iPP =25m.21s., PPP =29m.45s., SKKS =32m.15s., SKSP =36m.19s., iSS = 46m.45s.
Malaga iPPZ =25m.20s., PPPZ =29m.22s.
Almeria PKS =23m.34s., iPP =25m.20s., PPP =29m.28s., SKKS =42m.18s., SKSP = 35m.56s., PPS =39m.26s., SS =46m.28s., SSS =53m.12s.
Algiers Univ. eZ =21m.59s., ePPZ =25m.30s., ePPZ($\Delta > 180°$) =26m.37s., ePPPZ = 29m.33s.
Tamanrasset iZ =20m.18s., eZ =21m.42s. and 21m.55s., iPPZ =25m.21s., ePPPZ = 29m.20s.
Long waves were also recorded at Saskatoon, Harvard, Halifax, Shawinigan Falls, and New Kensington.

Sept. 20d. 12h. Undetermined shock :—

Victoria ? =19m.40s., P =19m.46s., e =19m.51s., 19m.54s., 20m.6s., 20m.19s., S = 20m.36s., i =20m.40s., e =20m.53s. and 21m.21s.
Seattle e =19m.47s., 20m.3s., and 20m.28s., iS =22m.4s., i =22m.11s. and 22m.23s.
Hungry Horse iP =21m.3s., eL =23m.58s.
Shasta Dam eP =21m.20s., i =21m.43s.
Reno ePZ =21m.47s., eE =21m.59s., eN =22m.2s.
Lick iPZ =21m.59s.k, iZ =22m.8s., 22m.14s., 22m.21s., and 22m.40s.
Branner ePZ =22m.1s.
Berkeley iPZ =22m.2s.k, iZ =22m.12s.
College eP? =22m.9s., e =24m.5s. and 25m.48s., eL =26m.12s.
Fresno iPZ =22m.21s.k, iZ =22m.28s.
Tinemaha iP =22m.24s.
China Lake ePZ =22m.37s.
Rapid City ePE =22m.45s., eLE =28m.29s.
Boulder City eP =22m.48s.
Pierce Ferry eP =22m.50s.
Pasadena ePZ =22m.52s.
Riverside eN =22m.57s.
Palomar iP =23m.5s.
Tucson eP =23m.39s., ePP? =24m.24s.
Saskatoon e =26m.38s.
Long waves were also recorded at Bozeman, Salt Lake City, and Chicago.

Sept. 20d. 13h. 32m. 13s. Epicentre 34°·2N. 140°·6E. Depth of focus 0·010.
(as on August 4d.).

Intensity V at Hatidyozima ; IV at Mera ; II-III at Tokyo, Yokohama, Hunatu, and Osaka.
Epicentre 34°·1N. 140°·5E. Depth 60km. Macroseismic radius 200-300km.
Seismo. Bull. Cent. Met. Obs. Japan for 1949. Tokyo 1950, p.p. 31, 32, with macroseismic chart.

$A = -\cdot6405$, $B = +\cdot5261$, $C = +\cdot5595$; $\delta = +6$; $h = 0$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Mera	1·0	319	0 14	− 6	0 27	− 9
Yokohama	1·4	328	0 25	0	0 42	− 2
Tokyo	1·6	335	0 27a	− 1	0 46	− 3
Hunatu	2·0	311	0 32	− 1	0 54	− 3
Omaesaki	2·0	282	0 28	− 5	0 49	− 8
Shizuoka	2·0	293	0 27	− 6	0 48	− 9
Tukubasan	2·0	349	0 35	+ 2	0 59	+ 2
Kakioka	2·1	350	0 34	0	0 59	− 1
Kumagaya	2·2	333	0 36	0	1 1	− 1
Mito	2·2	357	0 39	+ 3	1 4	+ 2
Maebasi	2·5	330	0 39	− 1	1 7	− 3
Matusiro	3·1	320	0 46	− 2	1 22	− 2
Nagoya	3·2	288	0 45	− 5	1 26	− 1
Gihu	3·4	292	0 52	0	1 27	− 5
Takayama	3·4	306	1 13	+21	1 47	+15
Hukusima	3·5	358	1 2	+ 8	1 41	+ 7
Kameyama	3·5	282	0 55	+ 1	1 47	+13
Hikone	3·8	288	0 58	0	1 35	− 7
Sendai	4·0	3	1 12	+12	1 43	− 3
Aikawa	4·3	334	1 7	+ 2	—	—
College	51·8	31	e 9 3	+ 3	—	—
Hungry Horse	74·3	42	e 11 40	+12	—	—

Sept. 20d. Readings also at 0h. (Istanbul, Triest, and near Sofia), 1h. (Sofia), 2h. (Algiers Univ., Ksara, and near Grozny), 3h. (Clermont-Ferrand), 5h. (Tashkent, near Andijan (2), Samarkand, Stalinabad, Tchimkent, and near College), 6h. (Boulder City and near Tucson), 7h. (College), 8h. (near Port au Prince), 9h. (Hungry Horse), 10h. (La Paz, Hungry Horse, near College, near Bogota, and near Istanbul), 11h (near Zürich and near Almata), 12h. (College and Ksara), 14h. (Rome, Samarkand, near Andijan, and Stalinabad), 15h. (near Andijan), 16h. (Bombay, Calcutta, Poona, Stalinabad, Tashkent, and near Victoria), 17h. (De Bilt, Paris, Clermont-Ferrand, Stuttgart, Rome, and Ksara), 18h. (Helwan and Victoria (2)), 22h. (College), 23h. (Leninakan, Tiflis, and near Grozny).

Sept. 21d. 12h. 55m. 10s. Epicentre 16°·9N. 94°·2W. Focus at base of superficial layers.
(as on 1946, December 13d.).

Felt strongly at Ixtepec and less so in several states of southern Mexico.
Epicentre 17°N, 94°·5W. Depth 100km. ca. (U.S.C.G.S.).
Monthly Seismic Bulletin, Tacubaya, September, 1949.

$A = -·0701$, $B = -·9548$, $C = +·2889$; $\delta = +2$; $h = +6$;
$D = -·997$, $E = +·073$; $G = -·021$, $H = -·288$, $K = -·957$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		2·5	273	0 34	− 5	—	—	—	—	—
Vera Cruz		2·9	321	0 54	+ 9	i 1 26	+ 7	—	—	—
Guatemala		4·2	123	0 53	−10	1 33	−19	—	—	—
Puebla		4·4	299	i 1 10	+ 4	i 1 54	− 3	—	—	—
Tacubaya		5·3	298	1 22	+ 4	2 13	− 7	—	—	—
Merida		5·9	46	i 1 49	+22	i 3 7	+32	—	—	—
Guadalajara		9·4	296	2 22	+ 6	4 5	+ 3	—	—	—
Manzanillo		9·9	285	2 24	+ 1	4 10	− 4	—	—	—
Chihuahua		16·0	319	i 3 55k	+11	i 6 51	+11	—	—	—
Balboa Heights		16·3	117	e 3 57	+ 9	—	—	—	—	—
Galerazamba		19·4	104	i 4 47	+21	i 8 47	+50	i 5 6	PPP	—
Columbia		20·7	32	e 4 41	+ 1	e 8 26	+ 2	—	—	e 9·9
Port au Prince		20·9	82	e 5 19	PP	—	—	—	—	—
Tucson		21·5	320	e 4 46	− 2	e 8 51	+12	i 5 14	pP	e 9·7
St. Louis		21·9	8	i 4 52	0	i 8 50	+ 3	i 5 16	pP	—
Florissant		22·1	8	i 4 54	0	i 8 50	0	i 5 19	pP	—
Bogota	z.	23·2	118	i 5 7	+ 2	i 8 38	−32	i 5 27	PP	—
Chicago		25·5	11	e 5 22	− 5	i 9 45	− 5	e 10 26	sS	e 11·4
Pierce Ferry		26·0	323	e 5 30	− 2	—	—	i 6 29	PPP	—
Palomar		26·2	315	i 5 31	− 2	—	—	i 6 3	sP	—
Boulder City		26·4	321	i 5 33	− 2	i 6 4	sP	i 5 43	pP	—
Overton	z.	26·5	322	i 5 34	− 2	i 6 4	sP	i 5 50	pP	—
New Kensington	E.	26·7	25	e 6 11	PP	i 10 54	sS	—	—	i 11·2
Cleveland		26·8	21	e 5 38	− 1	i 10 5	− 5	e 5 45	pP	—
San Juan		26·8	82	e 5 52	pP	e 10 15	+ 5	i 6 34	PPP	e 11·2
Riverside		26·9	314	e 5 36	− 4	i 6 9	sP	—	—	—
Pasadena		27·5	314	e 5 41	− 4	i 6 11	sP	—	—	e 10·4
Pennsylvania		27·7	27	e 5 47	0	e 10 19	− 7	e 11 8	sS	—
China Lake	z.	28·1	319	e 5 47	− 4	i 6 18	sP	—	—	—
Philadelphia		28·3	33	e 5 51	− 2	e 10 37	+ 2	i 6 19	pP	i 11·8
Rapid City	E.	28·3	347	i 5 59	+ 6	e 10 35	0	e 11 17	sS	—
Salt Lake City		28·3	332	e 6 0	+ 7	e 10 27	− 8	—	—	e 12·2
Logan		29·0	333	e 5 56	− 3	i 10 57	+11	e 6 19	pP	i 13·1
Tinemaha		29·3	319	e 5 58	− 4	i 6 30	sP	i 6 9	pP	—
City College, N.Y.		29·6	32	e 6 6	+ 2	e 10 43	−13	e 6 28	pP	e 12·1
Fordham		29·6	32	e 6 4	0	e 10 57	+ 1	i 6 52	PP	—
Fresno		30·0	318	i 6 5a	− 3	e 11 19	sS	i 6 58	PP	e 15·6
Bermuda		30·8	55	e 6 22	pP	e 6 33	sP	e 10 19	?	e 12·2
Lick	z.	31·6	316	i 6 19a	− 3	e 13 36	SS	i 7 45	PPP	e 15·2
Reno	z.	31·7	322	e 6 22	− 1	—	—	—	—	—
Fort de France		31·8	89	i 6 24	0	i 13 54	SSS	7 16	PP	e 23·0
Santa Clara		31·8	316	e 6 28	+ 4	e 11 33	+ 3	i 6 51	pP	e 16·0
Bozeman		32·0	338	e 6 50	pP	e 11 42	+ 8	i 7 43	PPP	e 13·4
Branner		32·0	316	e 6 22	− 3	—	—	e 6 25	P	e 16·9
Harvard		32·0	33	i 6 50	pP	e 13 14	SS	—	—	e 20·5
Weston		32·0	33	i 6 27	+ 2	i 11 30	− 4	—	—	—
Berkeley		32·3	316	i 6 28k	0	j 11 40	+ 2	i 7 27	PP	—
Ottawa		32·4	25	i 6 26a	− 3	11 39	− 1	—	—	14·7
San Francisco		32·4	316	e 6 26	− 3	e 11 46	+ 6	e 6 37	pP	e 16·6
Butte	N.	32·8	337	e 6 30	− 2	e 12 0	sS	i 6 55	pP	e 16·8
Mineral	z.	33·3	321	e 6 34	− 3	—	—	i 6 44	pP	e 16·4
Ukiah		33·6	318	e 7 11	pP	e 12 19	sS	e 7 34	PP	e 15·2
Shasta Dam		34·0	321	e 6 46	+ 3	e 12 17	+12	i 7 6	pP	—
Huancayo		34·3	146	i 6 47	+ 2	i 12 13	+ 4	i 8 8	PP	i 14·4
Shawinigan Falls	N.	34·5	27	6 46	− 1	12 9	− 3	8 15	PPP	15·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale	E.	35·1	319	e 7 21	pP	e 12 28	+ 6	—	—	—
Hungry Horse		35·3	338	i 6 51	− 3	e 12 33	+ 8	—	—	—
Seven Falls	E.	35·8	28	6 56	− 2	e 12 30	− 2	8 20	PP	15·8
Saskatoon		36·5	348	7 29	pP	i 12 43	0	—	—	17·2
Halifax		37·8	37	e 7 20	+ 5	(12 50)	−13	e 8 51	PP	12·8
Seattle		38·4	330	e 7 21	+ 1	e 13 18	+ 6	—	—	e 15·8
Victoria		39·5	330	i 7 27 a	− 2	13 33	+ 4	8 54	PP	19·9
La Paz		42·0	140	i 7 50 k	0	i 14 4	− 2	i 9 34	PP	20·4
Sitka		50·8	333	—	—	e 16 8	− 3	—	—	e 24·9
Santa Lucia	N.	54·8	156	9 28	− 1	e 15 6	?	11 2	PP	25·8
Ivigtut		54·9	26	i 9 29	− 1	e 17 2	− 5	22 32	SSS	26·8
College		59·7	337	i 10 0	− 4	e 18 0	−10	i 10 23	pP	e 27·8
Honolulu		59·9	286	e 10 1	− 4	e 18 1	−12	e 12 32	PP	e 25·0
Buenos Aires		61·4	146	e 10 15	0	18 27	− 5	—	—	—
La Plata	E.	62·0	147	10 20	+ 1	18 32	− 8	13 8	PP	34·2
	N.	62·0	147	10 14	− 5	18 44	+ 4	12 44	PP	34·6
Scoresby Sund		68·3	20	i 10 58 a	− 2	19 54	− 3	11 26	PcP	—
Rathfarnham Castle		75·4	38	i 11 39	− 3	i 21 22	+ 4	—	—	35·8
Lisbon		75·8	53	11 42 a	− 2	21 20	− 3	26 4	SS	34·2
Edinburgh	E.	76·7	36	e 11 46	− 4	i 21 31	− 2	—	—	—
Aberdeen		77·1	34	e 11 50	− 2	i 21 31	− 6	e 26 15	SS	32·1
Durham		77·9	37	i 12 3	+ 7	i 21 45	− 1	i 22 29	PS	—
Kew		79·4	39	i 12 4 a	0	i 21 58	− 4	e 15 4	PP	e 36·8
Toledo		79·5	52	i 12 6	+ 1	i 22 3	0	e 15 4	PP	37·3
Malaga	N.W.	79·9	54	i 12 9	+ 2	i 22 10	+ 3	15 21	PP	37·6
Bergen		80·1	30	e 12 6	− 2	e 22 10	+ 1	e 15 24	PP	33·9
Granada		80·5	54	i 12 8	− 2	i 22 14	+ 1	12 32	pP	i 38·7
Almeria		81·4	54	i 12 14	− 1	i 22 20	− 2	15 20	PP	39·5
Paris		81·4	42	i 12 17?	+ 2	i 22 22	0	i 12 42?	pP	e 37·8
Apia		82·4	253	—	—	(e 21 50?)	−43	—	—	e 21·8
Alicante		82·5	53	i 12 23	+ 2	i 22 37	+ 3	12 31	PcP	e 40·1
De Bilt		82·5	37	i 12 20 a	− 1	i 22 34	0	e 12 49	pP	e 38·8
Tortosa		82·6	50	12 22	+ 1	22 33	− 2	12 28	PcP	34·4
Clermont-Ferrand		83·0	45	i 12 23	0	i 22 39	0	i 12 49	pP	38·8
Besançon		84·5	43	i 12 30	− 1	—	—	—	—	—
Strasbourg		85·2	40	i 12 34 a	0	i 23 0	0	i 12 55	pP	e 40·3
Copenhagen		85·3	33	i 12 36	+ 1	23 3	+ 2	23 54	PS	—
Basle		85·4	42	e 12 33	− 2	e 22 57	[+ 3]	—	—	—
Algiers Univ.	Z.	85·7	53	e 12 36	− 1	e 23 10	+ 5	e 15 46	PP	—
Stuttgart		86·0	40	i 12 38 a	0	e 22 59	[0]	e 12 59	pP	e 39·8
Upsala		86·0	28	i 13 5	pP	i 23 3	[+ 4]	24 15	PS	e 35·8
Zürich		86·1	42	e 12 39 a	0	e 22 58	[− 1]	e 23 34	SP	—
Jena		86·6	38	e 12 41	0	e 23 3	[− 1]	i 13 5	pP	—
Potsdam		86·9	36	—	—	e 22 46	[−18]	e 23 17	S	—
Collmberg		87·3	37	e 12 46	+ 1	e 23 20	− 1	e 13 14	pP	e 35·8
Pavia		87·3	43	e 12 45	0	—	—	—	—	—
Cheb		87·6	38	i 12 53	+ 7	i 23 18	− 6	—	—	—
Prague		88·6	37	e 12 50?	− 1	i 23 15	[0]	e 16 18	PP	e 38·8
Helsinki		89·0	26	—	—	e 23 17	[− 1]	e 24 41	PS	e 34·8
Prato		89·0	44	e 12 50	− 3	i 23 36	0	—	—	—
Florence, Arc.		89·2	44	e 13 3	+ 9	e 23 18	[− 1]	i 23 36	S	—
Florence Xim		89·2	44	i 12 50	− 4	i 24 10	SP	—	—	—
Padova		89·3	43	e 13 0	+ 6	e 23 20	[+ 1]	e 23 43	S	—
Triest		90·1	42	e 12 58	0	i 23 46	− 1	e 13 17	pP	—
Rome		90·7	46	i 12 59 a	− 2	i 23 52	0	23 23	SKS	42·7
Raciborzu	Z.	90·8	36	e 12 53?	− 8	—	—	—	—	—
Zagreb		91·4	41	e 13 10	+ 6	e 24 1	+ 3	e 23 25	SKS	e 37·8
Tamanrasset	Z.	92·2	65	i 13 9 k	+ 1	e 24 2	− 3	e 13 36	pP	—
Budapest		92·5	39	e 13 20	+11	i 23 39	[+ 1]	e 24 15	S	e 36·3
Belgrade		95·2	40	e 13 20 k	− 1	e 24 29	− 2	e 19 4	PPP	e 40·2
Moscow		97·1	25	e 13 32	+ 2	e 24 4	[+ 1]	e 35 2	SSS	—
Wellington		101·7	230	e 21 50?	?	e 28 50?	PPS	—	—	—
Istanbul		102·0	40	e 18 17	PP	e 24 25	[− 3]	—	—	—
Christchurch		102·7	228	—	—	e 39 30	?	e 43 0	Q	e 48·2
Sverdlovsk		103·6	14	e 18 17	PP	e 27 18	PS	e 32 49	SS	—
Irkutsk		109·3	348	e 18 46	PP	e 24 50	[−10]	34 0	SS	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		109·9	49	e 17 52	PKP	28 23	PS	e 19 5	PP	—
Tiflis		110·4	31	e 19 5	PP	e 25 5	[+ 1]	e 28 25	PS	—
Leninakan		110·6	33	e 19 9	PP	—	—	—	—	—
Ksara		110·7	43	e 14 38	P	28 30	PS	19 4	PP	—
Baku		114·0	29	—	—	e 29 25	PS	—	—	—
Brisbane		117·5	247	e 20 28	pPP	e 30 10	SPP	—	—	—
Riverview		119·5	240	e 20 32	pPP	e 25 46	[+ 6]	e 29 46	PS	e 54·8
Ashkabad		119·7	24	e 19 4	[+17]	—	—	—	—	—
Tashkent		120·1	14	e 20 26	PP	25 32	[− 9]	29 48	PS	—
Samarkand		121·0	17	e 19 15	pPKP	—	—	—	—	—
Andijan		121·3	11	e 20 24	PP	—	—	—	—	—
Stalinabad		121·6	15	e 18 52	[+ 2]	—	—	—	—	—
Grahamstown	Z.	124·6	118	i 18 57	[+ 1]	—	—	—	—	—
Pretoria	Z.	126·0	109	i 19 0	[+ 1]	—	—	—	—	—
New Delhi	N.	134·0	10	i 23 8	PKS	i 42 5	?	—	—	e 66·2
Calcutta	E.	140·7	355	e 21 20	?	e 27 0	sSKS	—	—	—
Bombay		142·2	20	e 21 25	?	—	—	e 22 50	PP	—
Hyderabad	N.	145·1	12	e 19 34	[0]	e 29 34	SKKS	—	—	—

Additional readings :—
Chihuahua i =6m.40s. and 8m.26s.
Tucson iP =4m.49s., esP =5m.21s., isS =9m.20s.
St. Louis isP =5m.25s., iSS =9m.32s.
Florissant isP =5m.31s., iSS =9m.34s.
Chicago esP =5m.54s.
Pierce Ferry i =5m.47s.
Palomar iEZ =5m.38s.
Overton iZ =6m.19s., isPPZ =6m.51s., eZ =8m.21s., ePcP?Z =9m.6s.
Cleveland eN =6m.5s., iN =6m.8s., iS?E =10m.53s.
Riverside iZ =7m.5s. and 7m.29s.
Pasadena iNZ =6m.18s., iPPZ =7m.8s., iZ =7m.58s.
Pennsylvania isPEN =6m.17s., eE =7m.55s., ePcPN =8m.52s.
China Lake iZ =8m.8s.
Philadelphia esS =11m.15s.
Logan isP =6m.33s., iPP =6m.56s., iPcP =8m.59s., i =10m.21s., isS =11m.31s.
Tinemaha iZ =6m.51s., 7m.43s., and 9m.41s.
City College, N.Y., iPP =6m.50s.
Fordham iSS =12m.50s.
Fresno ePE =6m.11s., iZ =6m.29s., iN =6m.34s., iE =6m.37s., eSE =11m.30s.
Lick iZ =6m.26s., 6m.40s., and 6m.48s., iE =6m.52s., iZ =6m.56s., iN =7m.5s.
Reno iE =7m.8s., iN =8m.22s.
Bozeman esS =12m.12s.
Harvard i =7m.9s. and 7m.24s., e =8m.24s. and 10m.50s.
Berkeley ePE =6m.34s., iPcPZ =9m.14s., and many other unidentified readings.
Ottawa i =6m.47s., PP =7m.6s., e =11m.19s.
San Francisco eSE =12m.3s., eN =16m.20s.
Butte isPN =7m.12s., eN =7m.34s.
Mineral ePE =6m.38s., iZ =7m.12s.
Huancayo isPP =8m.42s.
Shawinigan Falls eN =7m.11s., 12m.52s., and 13m.47s.
Ferndale eE =15m.22s. and 18m.20s., eN =18m.36s.
Saskatoon i =9m.2s., PPP =9m.34s., e =13m.24s., i =14m.3s.
Seattle e =7m.49s., i =8m.5s. and 9m.35s.
Victoria i =7m.33s., 7m.47s., and 7m.58s.
La Paz iSS =17m.22s.
Ivigtut 19m.56s.
College e =12m.4s., 13m.17s., and 21m.48s.
La Plata PcPE =11m.32s., N =12m.8s., PcSE =15m.26s., SKKSE =20m.38s., SS?E = 21m.2s., SSN =22m.44s., SSSE =24m.15s., N =26m.32s., QN =28m.14s.
Scoresby Sund 20m.54s. and 25m.2s.
Rathfarnham Castle i =17m.54s., e =23m.58s.
Lisbon PEZ =11m.49s., QN =30m.35s.
Aberdeen iN =22m.18s., iE =22m.31s.
Durham iEN =21m.50s., iE =21m.59s. and 22m.12s.
Kew iZ =12m.11s., iPS =22m.42s., ePPSNZ =23m.6s., eNZ =26m.38s., eSS =31m.8s., eSSSEN =33m.44s.
Toledo PcPZ =12m.11s., iZ =12m.57s., eE =14m.56s., PSN =22m.49s., PPSN =23m.7s., iE =25m.25s., SSE =27m.7s.
Malaga ePPPNW =17m.15s., PSNW =23m.25s., SSNW =27m.33s.
Bergen PSN =21m.24s., eE =23m.15s., eN =31m.25s.?
Granada iPP =15m.20s., pPP =15m.35s., PS =23m.4s., SS =28m.41s.
Almeria PPP =17m.16s., ScS =22m.40s., PPS =23m.32s., SS =27m.32s., SSS =30m.52s., Q =34m.26s.

Continued on next page.

Paris isP =12m.56s.?, e =14m.27s., iPP =15m.11s.?, iPS =23m.4s., e =26m.1s., eSS = 27m.50s.?, eQ =32·8m.
Alicante PP =15m.43s., PPP =17m.34s., PS =23m.23s., PPS =23m.51s., SS =28m.27s., SSS =31m.53s.
De Bilt ePP =15m.33s., eSS =23m.17s.
Tortosa PP?E =15m.16s., S_cSEN =22m.49s., PSEN =23m.26s., PPSN =23m.53s., SSE =27m.52s., SSSN =31m.22s.
Clermont-Ferrand iS? =22m.55s., ePS =23m.41s., eSS =28m.9s., eSSS =31m.59s.
Strasbourg iPP =15m.44s., eSKS =22m.50s., iPS =23m.46s., eSS =28m.38s., iSSS? = 32m.39s., Q =34·4m., and many other unidentified readings.
Copenhagen PPS =24m.18s., SS =28m.42s., SSS =32m.20s.
Algiers Univ. iZ =12m.46s., eZ =14m.6s. and 14m.44s.
Stuttgart iZ =12m.48s., eZ =13m.32s. and 14m.5s., ePP =16m.25s., e =19m.22s., ePS = 23m.54s., ePPS? =25m.20s., eSS =29m.2s., eSSS =33m.50s.
Upsala iSE =23m.17s., e =23m.53s.?, eN =24m.26s., eSS =28m.50s., eSSSE =32m.50s.?
Jena iEN =13m.25s., eSKS?E =22m.58s., eS?E =23m.15s., eS?N =23m.19s., ePS?E = 23m.58s.
Potsdam eN =23m.7s., iN =23m.29s.
Collmberg eZ =12m.53s. and 18m.7s., eEN =23m.25s., eE =23m.33s., esSN =24m.4s., eE =24m.8s.
Prague e =14m.6s., i =14m.15s. and 14m.54s., iS =23m.34s., esS =24m.24s., eSS? = 29m.14s., eSSS? =33m.14s.
Florence Arc. eZ =14m.59s., ePS =24m.25s.
Padova e =13m.53s.
Triest iPP =16m.24s., ePPP =18m.27s., iSKS =23m.20s., iSKKS =23m.34s., isS? = 24m.28s., iSP =24m.36s., iPS =24m.42s., iPPS =25m.35s., eSS =30m.8s.?, eSSS = 33m.38s.?
Rome iPS? =24m.43s., i =38m.6s.
Raciborzu eEZ =13m.11s., eZ =13m.30s.
Tamanrasset iP_cPZ =13m.10s., iZ =13m.17s., ePP?Z =17m.20s., ePPP? =19m.23s.
Budapest ePN =13m.36s.
Belgrade iP_cP =13m.28s., e =15m.14s. and 25m.21s.
Moscow eS =25m.1s.
Helwan eZ =19m.48s., 20m.22s., 23m.23s., and 24m.5s.
Riverview iZ =20m.51s., eE =26m.22s. and 26m.37s., iSE =27m.51s., eE =29m.57s., iZ =30m.43s., iE =30m.48s., eE =32m.12s., eSSN =36m.11s., ePSPSE =37m.1s., eSSSN =40m.47s., eQN =48m.32s.
Long waves were also recorded at Reykjavik.

Sept. 21d. 18h. 19m. 39s. Epicentre 15°·8S. 172°·8W. (as on May 27d.).

A = −·9551, B = −·1207, C = −·2706 ; δ = +1 ; h = +6 ;
D = −·125, E = +·992 ; G = +·268, H = +·034, K = −·963.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		2·2	26	e 0 36	− 2	e 1 4	− 2	e 0 44	P_g	—
Auckland	N.	23·7	205	—	—	e 10 21?	SS	—	—	e 13·3
Brisbane		33·7	244	e 6 41	− 4	e 12 9	+ 1	e 7 59	PP	e 15·9
Riverview		37·1	234	e 7 15	+ 1	e 13 10	+ 9	i 8 56	PP	e 17·6
Honolulu		39·7	23	e 7 27	− 9	—	—	—	—	e 16·4
Berkeley		71·4	41	i 11 26a	+ 2	e 20 47	+ 5	e 14 29	PP	e 35·6
Lick	Z.	71·5	41	i 11 26a	+ 2	—	—	i 11 29	P	—
Pasadena		71·9	46	i 11 28	+ 1	—	—	—	—	e 30·2
Fresno		72·3	43	i 11 33a	+ 4	—	—	—	—	—
Palomar	Z.	72·3	47	i 11 33	+ 4	—	—	—	—	—
Riverside	Z.	72·3	46	i 11 33	+ 4	—	—	—	—	—
China Lake	Z.	73·2	44	i 11 38	+ 3	—	—	—	—	—
Tinemaha		73·5	43	i 11 37	+ 1	—	—	—	—	—
Reno	Z.	73·9	41	e 11 43	+ 4	—	—	—	—	—
Boulder City		75·2	46	e 11 50	+ 4	—	—	—	—	—
Overton	Z.	75·7	45	i 11 52	+ 3	—	—	—	—	—
Pierce Ferry		75·8	46	e 11 50	0	—	—	i 11 54	P	—
Tucson		76·1	51	e 11 52	+ 1	e 21 40	+ 5	i 11 56	P	e 34·6
Victoria	Z.	77·6	31	e 12 2	+ 2	—	—	—	—	—
Logan		80·2	42	e 12 12	− 2	e 22 15	− 4	—	—	e 37·2
Hungry Horse		82·5	35	i 12 25	− 1	—	—	—	—	—
College		82·6	11	e 12 27	+ 1	—	—	—	—	e 34·6
Bozeman		82·7	39	—	—	e 22 49	+ 5	e 23 46	PS	e 36·6
Huancayo		93·8	104	—	—	e 23 58	[+ 4]	e 31 1	SS	e 44·5
Florissant		94·0	51	—	—	e 24 2	[+ 6]	e 24 35	S	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
St. Louis		94·1	51	e 26 21	PPS	e 24 0	[+ 4]	e 24 30	S	—
La Paz		99·1	110	i 13 49	+ 5	24 41	{− 7}	—	—	47·3
Bogota		99·6	88	—	—	e 24 27	[+ 2]	—	—	e 70·4
Galerazamba		100·0	82	—	—	i 24 46	{− 8}	e 28 56	?	51·4
Pennsylvania		103·8	52	—	—	i 24 44	[− 1]	—	—	i 47·4
Scoresby Sund		122·5	11	—	—	40 27	?	—	—	58·4
De Bilt		143·7	2	e 19 35?	[− 2]	e 41 51	SS	—	—	e 78·4
Kew		143·9	7	e 20 17	[+40	—	—	—	—	e 76·4
Collmberg	z.	144·3	352	e 19 39?	[+ 1]	—	—	—	—	—
Raciborzu		144·7	348	e 19 40	[+ 1]	—	—	e 19 43	PKP_2	—
Paris		146·9	5	e 19 46	[+ 4]	e 35 15	PPS	—	—	e 80·4
Stuttgart		147·1	357	e 19 47	[+ 4]	—	—	e 20 12	?	e 83·4
Strasbourg		147·3	358	e 19 49	[+ 6]	—	—	—	—	—
Istanbul		148·5	327	e 20 1	[+16]	—	—	e 23 18	PP	—
Ksara		148·5	309	e 19 49	[+ 4]	36 41	PPS	—	—	—
Clermont-Ferrand		149·9	5	e 20 0	[+13]	—	—	—	—	83·4
Rome	z.	153·6	350	e 20 27	[+34]	—	—	—	—	—
Helwan	z.	153·8	306	e 20 16	[+23]	—	—	e 23 51	PP	—
Alicante		156·5	15	20 12	[+16]	23 48	PKS	37 40	PPS	e 73·3
Malaga	z.	156·7	23	e 19 59	[+ 2]	25 58	[−63]	i 20 32	PKP_2	80·5

Additional readings :—
Apia e = 51s., S = 1m.11s.
Riverview isSE = 13m.27s., eQN = 15m.45s., iS_cS?N = 17m.40s.
Berkeley iZ = 14m.51s., eE = 20m.51s., iN = 21m.4s., eN = 29m.39s., eE = 29m.57s.
Fresno ePN = 11m.36s., eZ = 15m.29s.
Kew eZ = 22m.19s. and 22m.57s., eE = 43m.37s., eEN = 51m.25s.
Paris i = 20m.15s. and 20m.36s.
Strasbourg i = 20m.6s. and 20m.38s.
Helwan eZ = 20m.33s., 20m.48s., 22m.15s., and 24m.33s.
Alicante PKP_2 = 20m.36s., SS = 44m.16s.
Malaga SKKSZ = 29m.48s.
Long waves were also recorded at Arapuni, Christchurch, Wellington, Almeria, Granada, Tortosa, Bermuda, Sitka, and at other North American stations.

Sept. 21d. Readings also at 1h. (Victoria, Rome (2), Granada, Samarkand, near Stalinabad (2), and Andijan), 2h. (Granada, Stuttgart, Bermuda, College, Overton, Tucson, Frunse, near Obi-garm (2), Stalinabad (2), Samarkand (2), Tashkent, and Andijan (2)), 3h. (College), 6h. (La Paz, Bogota, College, near Reno, and Mineral (2)), 7h. (Overton, Samarkand, near Obi-garm, Stalinabad, Andijan, Tashkent, near Mineral, and Reno), 8h. (near Istanbul), 10h. (near Obi-garm), 11h. (Grozny and Ksara), 12h. (Overton, Mount Wilson, Palomar, and Tinemaha), 13h. (Hungry Horse and Cleveland (5)), 14h. (near Mineral), 16h. (near Zürich), 18h. (Malaga), 19h. (Stuttgart), 21h. (College, Stuttgart, and Collmberg), 22h. (College, Overton, and near Apia), 23h. (Ksara and near Obi-garm).

Sept. 22d. 15h. 38m. 24s. Epicentre 41°·1N. 142°·2E. Depth of focus 0·015.
(as on 1945, February 11d.).

Intensity V at Hatinohe and Miyako ; IV at Urakawa, Hakodate, Morioka, and Aomori ; II-III at Mori and Mizusawa. Epicentre 41°·3N. 142°·1E. Macroseismic radius >300km.
Seismo. Bull. Cent. Met. Obs., Japan, for 1949, Tokyo, 1950, pp. 32, 33, with macrosesmic chart.

A = −·5972, B = +·4632, C = +·6548 ; $\delta = -3$; $h = -2$;
D = +·613, E = +·790 ; G = −·517, H = +·401, K = −·756.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hatinohe		0·8	222	0 15	− 7	0 28	−10	—	—	—
Aomori		1·1	255	0 14	−10	0 32	−11	—	—	—
Miyako		1·5	186	0 25	− 4	0 45	− 5	—	—	—
Mori		1·6	309	0 18k	−12	0 34	−18	—	—	—
Morioka		1·6	209	0 29	− 1	0 50	− 2	—	—	—
Sapporo		1·8	342	0 24	− 8	0 45	−11	—	—	—
Akita		2·1	229	0 33	− 3	1 2	− 1	—	—	—
Mizusawa	E.	2·1	203	0 37	+ 1	1 4	+ 1	—	—	—
Sendai		3·0	199	0 48a	0	1 24	0	—	—	—
Nemuro		3·3	48	0 42	−10	1 18	−13	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hukusima		3·6	203	0 56	0	1 51	+13	—	—	—
Onahama		4·3	194	1 7	+ 2	2 3	+ 8	—	—	—
Mito		4·9	207	1 16	+ 3	2 20	+11	—	—	—
Kakioka		5·1	198	1 15	− 1	2 26	+12	—	—	—
Tukubasan		5·2	200	1 16	− 1	2 19	+ 3	—	—	—
Kumagaya		5·4	205	1 26	+ 6	2 33	+12	—	—	—
Nagano		5·4	217	1 21	+ 1	2 38	+17	—	—	—
Matusiro		5·5	216	1 22	+ 1	—	—	—	—	—
Wazima		5·6	230	1 27	+ 5	3 11	?	—	—	—
Tokyo		5·7	200	1 35	+11	2 45	+17	—	—	—
Toyama		5·9	223	1 32	+ 6	2 42	+ 9	—	—	—
Hunatu		6·2	207	1 20	−10	2 51	+10	—	—	—
Osima		6·7	200	1 42	+ 5	3 9	+16	—	—	—
Nagoya		7·2	217	1 46	+ 2	3 7	+ 2	—	—	—
Kameyama		7·7	219	2 8	+17	3 19	+ 2	—	—	—
Kyoto		7·9	222	1 53	0	3 29	+ 7	—	—	—
Osaka		8·2	219	e 2 9	+12	5 18	?	—	—	—
Irkutsk		28·0	307	e 5 39	− 2	e 13 6	SSS	—	—	—
Semipalatinsk		43·1	306	e 7 46	− 3	—	—	—	—	—
College		45·4	35	i 8 6	− 1	—	—	—	—	—
Frunse		49·0	297	e 8 37	+ 1	—	—	—	—	—
Andijan		51·4	295	i 8 51	− 3	e 16 9	+ 7	—	—	—
Sverdlovsk		52·6	317	i 9 1	− 2	e 16 31	+13	—	—	—
Tashkent		53·3	296	i 9 9?	+ 1	e 16 36?	+ 8	—	—	—
Obi-garm		54·2	294	i 9 14	0	—	—	—	—	—
Stalinabad		54·9	295	e 9 20	0	e 16 55	+ 6	—	—	—
Samarkand		55·6	296	e 9 17	− 8	—	—	—	—	—
Victoria		63·2	48	e 10 17	0	—	—	e 10 32	pP	—
Seattle		64·3	49	e 10 45	+21	—	—	e 11 2	pP	—
Moscow		64·4	323	e 10 24	− 1	—	—	—	—	—
Hungry Horse		68·4	45	i 10 50	0	—	—	i 11 8	pP	—
Tiflis		68·8	309	10 53	+ 1	—	—	—	—	—
Mineral	z.	68·9	55	e 10 54	+ 1	—	—	i 11 9a	pP	—
Leninakan		70·0	308	e 11 15?	+15	—	—	—	—	—
Berkeley	z.	70·0	58	e 11 2k	+ 2	—	—	i 11 19k	pP	—
Reno	z.	70·5	55	e 11 4	+ 1	—	—	i 11 23	pP	—
Lick	z.	70·7	58	e 11 5a	+ 1	—	—	i 11 24k	pP	—
Fresno	z.	72·2	57	i 11 14	+ 1	—	—	i 11 33	pP	—
Tinemaha		73·0	55	e 11 20	+ 3	—	—	i 11 38	pP	—
China Lake		74·2	57	e 11 25	+ 1	—	—	e 11 43	pP	—
Pasadena		74·9	58	e 11 31	+ 3	—	—	i 11 48	pP	—
Riverside	z.	75·5	58	e 11 35	+ 3	—	—	i 11 51	pP	—
Boulder City		75·8	55	e 11 39	+ 6	—	—	—	—	—
Pierce Ferry		76·2	54	e 11 38	+ 2	—	—	e 11 56	pP	—
Palomar		76·2	57	e 11 38	+ 2	—	—	i 11 56	pP	—
Collmberg		77·9	330	e 11 45	0	—	—	e 11 56	pP	—
Istanbul		78·2	316	e 11 47	0	—	—	e 14 42	PP	—
Ksara		79·3	305	i 11 55a	+ 2	22 10	+29	15 0	PP	—
De Bilt		80·0	336	e 11 57	0	e 22 4	+16	—	—	e 41·6
Tucson		80·7	55	e 12 4	+ 4	—	—	e 12 21	pP	—
Stuttgart		81·4	331	e 12 5	+ 1	—	—	—	—	e 44·6
Strasbourg		82·1	332	e 12 29	+21	—	—	—	—	e 42·6
Kew		82·2	338	e 12 10	+ 2	e 23 8	+57	—	—	e 41·6
Paris		83·7	335	e 12 18	+ 2	—	—	e 12 55	pP	—
Helwan	z.	84·8	305	i 12 21a	0	—	—	i 12 47	pP	—
Rome		85·7	325	e 12 25a	− 1	e 23 21	+36	—	—	e 44·1
Clermont-Ferrand		86·1	333	i 12 28	0	—	—	—	—	45·6
St. Louis		87·3	39	e 12 35	+ 2	e 23 9	+ 8	e 16 7	PP	—
Alicante		93·9	333	13 7	+ 3	e 24 9	+ 9	17 7	PP	e 44·7
La Paz		144·2	55	e 19 24	[+ 3]	—	—	—	—	—

Additional readings :—
Reno eN =11m.18s.
Fresno eN =12m.55s.
Collmberg eZ =14m.38s.
Helwan eZ =15m.38s.
St. Louis e =23m.46s.
Alicante SS =30m.17s., SSS =33m.53s.
Long waves were also recorded at Copenhagen.

Sept. 22d. Readings also at 0h. (Pasadena, Riverside, Tinemaha, China Lake, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Hungry Horse (2), College, Obi-garm, Semipalatinsk, near Almata, Andijan, Frunse, and Tashkent), 7h. (Bogota, La Paz, and near Copiapo), 8h. (near Almata), 9h. (Cobb River, Kaimata, Wellington, Copiapo, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, and Lick), 12h. (Istanbul, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Tucson (2), Pierce Ferry, Shasta Dam, Hungry Horse, near Antofagasta, Copiapo, and near Apia), 13h. (Calcutta), 14h. (near Apia), 15h. (La Plata and Tucson), 18h. (Shasta Dam and near Balboa Heights), 19h. (La Plata, College, Hungry Horse, Ashkabad, Semipalatinsk, near Almata, Andijan, Frunse, Obi-garm, Samarkand, Stalinabad, and Tashkent), 21h. (near Obi-garm), 22h. (Tacubaya, Samarkand, near Obi-garm, and Stalinabad), 23h. (Santa Lucia).

Sept. 23d. 8h. 12m. 7s. Epicentre 43°·3N. 134°·5E. Depth of focus 0·060.

Intensity V at Onuma (Hokkaido); IV at Hakodate II-III at Mito and Yokohama.
Epicentre 44°·0N. 134°·5E. Depth 300km., macroseismic radius 300km.
Seismo. Bull. Cent. Met. Obs., Japan, for 1949. Tokyo, 1950, pp. 33, 34.

$A = -\cdot5117$, $B = +\cdot5207$, $C = +\cdot6834$; $\delta = 0$; $h = -3$;
$D = +\cdot713$, $E = +\cdot701$; $G = -\cdot479$, $H = +\cdot487$, $K = -\cdot730$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mori		4·6	103	1 18	− 1	2 22	0	—	—
Sapporo		5·0	90	1 26k	+ 3	2 27	− 2	—	—
Aomori		5·3	116	1 28	+ 2	2 34	0	—	—
Akita		5·5	129	1 29	+ 1	2 40	+ 2	—	—
Aikawa		6·0	150	1 38	+ 4	2 54	+ 7	—	—
Morioka		6·2	123	1 37	+ 1	2 51	0	—	—
Wazima		6·2	162	1 35k	− 1	2 54	+ 3	—	—
Mizusawa	E.	6·5	128	1 40	+ 1	2 55	− 2	—	—
Miyako		6·7	121	1 41	0	2 57	− 4	—	—
Sendai		7·0	134	1 43	− 2	3 6	− 2	—	—
Hukusima		7·2	139	1 45	− 2	3 10	− 2	—	—
Nagano		7·2	156	1 50	+ 3	3 18	+ 6	—	—
Matusiro		7·3	156	1 51	+ 3	3 13	− 1	—	—
Maebasi		7·7	151	1 54	+ 1	3 25	+ 3	—	—
Toyooka		7·8	178	1 54a	0	3 26	+ 2	—	—
Gihu		8·1	167	1 57	0	3 30	0	—	—
Hikone		8·1	170	1 57	0	3 30	0	—	—
Kakioka		8·3	146	1 57	− 3	3 29	− 5	—	—
Mito		8·3	144	2 2	+ 2	3 31	− 3	—	—
Nagoya		8·3	166	2 16	+16	3 54	+20	—	—
Tukubasan		8·3	147	1 59	− 1	3 30	− 4	—	—
Hunatu		8·5	156	2 3	+ 1	3 35	− 3	—	—
Hamada		8·6	194	2 5	+ 2	3 46	+ 6	—	—
Kameyama		8·6	169	2 2	− 1	3 43	+ 3	—	—
Kobe		8·6	176	2 4a	+ 1	3 44	+ 4	—	—
Tokyo		8·6	150	1 55	− 8	3 38	− 2	—	—
Osaka		8·7	174	2 7	+ 3	3 47	+ 5	—	—
Shizuoka		8·8	159	2 5	0	3 47	+ 3	—	—
Sumoto		9·0	178	2 8	0	3 51	+ 3	—	—
Hirosima		9·1	191	2 9	0	—	—	—	—
Mera		9·3	152	2 12	+ 1	3 53	− 1	—	—
Owase		9·3	171	2 11	0	3 56	+ 2	—	—
Osima		9·3	154	2 8	− 3	3 48	− 6	—	—
Matuyama		9·5	189	2 16	+ 3	4 3	+ 4	—	—
Kôti		9·7	185	2 16	0	4 5	+ 2	—	—
Muroto		10·0	182	2 21a	+ 2	4 13	+ 4	—	—
Hukuoka		10·2	200	2 22a	+ 1	4 18	+ 5	—	—
Kumamoto		10·9	197	2 31	+ 2	4 31	+ 3	—	—
Miyzaki		11·6	193	2 36	− 1	4 43	+ 1	—	—
Irkutsk		22·0	306	4 20	− 3	—	—	—	—
Frunse		42·9	291	e 7 14	− 7	e 13 7	− 8	—	—
College		46·8	35	i 7 50	− 2	—	—	—	—
Sverdlovsk		47·0	314	i 7 51	− 3	14 6	− 7	—	—
Tashkent		47·2	292	i 7 49?	− 6	14 8?	− 8	—	—
Obi-garm		48·0	288	e 8 1	0	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Stalinabad		48·7	289	i 8 5	− 1	i 14 34	− 2	—	—
Samarkand		49·5	291	e 8 12	0	—	—	—	—
Moscow		59·1	320	—	—	e 13 51	?	—	—
Baku		60·4	300	—	—	e 17 12	+ 1	—	—
Tiflis		62·9	303	i 9 44?	− 2	—	—	—	—
Victoria		65·9	46	e 10 3	− 2	—	—	—	—
Hungry Horse		70·7	41	i 10 32	− 2	—	—	—	—
Shasta Dam		71·5	52	i 10 30	− 9	—	—	—	—
Mineral	z.	72·1	52	i 10 41	− 1	—	—	—	—
Ksara		73·3	301	e 17 27	pPP	e 20 17	+34	—	—
Lick	z.	74·1	54	i 10 53	− 1	—	—	—	—
Tinemaha	z.	76·3	52	i 11 6	0	—	—	—	—
China Lake	z.	77·5	52	i 11 12a	− 1	—	—	e 12 50	pP
Pasadena		78·4	54	i 11 16	− 1	—	—	—	—
Riverside		79·0	54	i 11 18a	− 3	—	—	—	—
Boulder City		79·0	51	i 11 20	− 1	—	—	—	—
Pierce Ferry		79·4	50	i 11 23	0	—	—	—	—
Palomar	z.	79·7	54	i 11 23a	− 1	—	—	—	—
Tucson		84·0	51	i 11 46	0	—	—	—	—
St. Louis		88·9	34	e 12 9	− 1	e 22 23	+ 3	e 25 1	sS

Additional readings :—
Hungry Horse e =10m.39s.
Shasta Dam i =10m.38s. and 10m.44s.

Sept. 23d. Readings also at 0h. (Reno, Berkeley, near Fresno, and Lick), 1h. (near Obi-garm), 3h. (near Rome), 5h. (Seattle, and near Victoria, and near Istanbul), 6h. (Mount Wilson, Palomar, China Lake, Tinemaha, Tucson, Pierce Ferry, Copiapo, near Santa Lucia, and Antofagasta), 7h. (Frunse, Samarkand, near Obi-garm, Stalinabad, and Tashkent), 8h. (near Stalinabad), 10h. (Santa Lucia, Reno, Arcata, Shasta Dam and near Mineral), 11h. (Samarkand, near Obi-garm, and Stalinabad), 12h. (near Messina and near Leninakan), 13h. (Tamanrasset), 16h. (near Klyuchi and near Tacubaya), 18h. (Puebla, near Tacubaya, and near Apia), 21h. (Reno, Tucson, and near Pierce Ferry), 22h. (near Obi-garm, Stalinabad, and near Tunis), 23h. (Rome, Samarkand, and near Stalinabad).

Sept. 24d. 4h. 17m. 39s. Epicentre 6°·2S. 154°·8E. (as on 1947, January 2d.).

$A = -·8996$, $B = +·4233$, $C = -·1073$; $\delta = -2$; $h = +7$;
$D = +·426$, $E = +·905$; $G = +·097$, $H = -·046$, $K = -·994$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	N.	21·2	184	i 4 47k	− 2	i 8 42	+ 1	i 5 8	PP	—
Riverview		27·7	187	e 5 49	− 3	i 10 30	− 3	i 6 37	PP	e 12·8
Melbourne	E.	32·7	194	e 6 43	+ 7	i 11 30	−22	—	—	—
Auckland	N.	35·6	151	—	—	i 12 55	+17	—	—	e 17·4
Arapuni	E.	36·9	153	—	—	e 16 21	Q	—	—	—
Wellington		39·2	156	—	—	e 13 39	+ 7	—	—	e 21·4
Christchurch		40·3	160	—	—	17 21?	SS	—	—	—
Batavia		47·7	268	e 8 33	− 7	e 15 28	− 8	—	—	—
Honolulu		53·9	58	e 9 31	+ 4	e 17 9	+ 7	—	—	e 25·0
Irkutsk		72·3	330	e 15 38	PPP	i 20 47	− 5	25 33	SS	—
Colombo	E.	75·5	279	e 11 36	−12	—	—	—	—	—
Hyderabad	N.	78·9	290	—	—	22 1	− 4	—	—	—
New Delhi	N.	82·1	300	—	—	i 22 31	− 7	i 26 11	SS	—
College		82·4	21	e 12 24	− 1	e 22 32	− 9	e 15 53	PP	e 36·1
Poona	N.	83·4	290	e 12 21	− 9	i 22 45	− 6	e 15 39	PP	—
Bombay		84·4	290	e 12 41	+ 5	i 23 1	0	—	—	—
Sitka		84·6	31	e 12 44	+ 8	e 22 55	− 8	e 28 25	SS	e 38·7
Semipalatinsk		85·0	322	i 12 37?	− 1	—	—	—	—	—
Almata		85·4	316	i 12 43	+ 3	i 23 11	0	—	—	—
Frunse		87·1	314	e 12 47	− 2	e 23 26?	− 2	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ukiah		87·7	51	e 12 57	+ 5	e 23 33	0	—	—	e 39·6
Berkeley		88·2	53	i 12 57k	+ 3	i 23 21	[− 1]	e 23 44	ScS	e 40·2
Santa Clara		88·4	52	e 13 3	+ 8	e 23 23	[0]	e 23 55	S	e 44·7
Lick	z.	88·6	52	i 13 0k	+ 4	—	—	e 16 33	PP	—
Shasta Dam		88·6	49	i 12 58	+ 2	—	—	—	—	—
Mineral	z.	89·1	50	e 13 0a	+ 2	—	—	e 16 36	PP	—
Victoria		89·2	42	e 13 2	+ 3	—	—	—	—	40·3
Seattle		89·8	42	e 13 7	+ 5	e 24 3	+10	e 24 49	PS	e 37·4
Fresno	z.	90·0	53	i 13 7k	+ 4	—	—	—	—	—
Obi-garm		90·0	309	i 13 2	− 1	—	—	—	—	—
Reno	z.	90·4	51	e 13 9k	+ 5	—	—	—	—	e 56·2
Stalinabad		90·7	309	i 13 6	0	i 24 1?	0	—	—	—
Tashkent		90·7	312	i 13 4	− 2	i 24 1	0	i 24 53?	PS	—
Pasadena		91·0	56	e 13 10	+ 3	i 24 11	+ 8	e 23 40	SKS	e 41·4
Tinemaha		91·3	53	e 13 11	+ 2	—	—	—	—	—
China Lake	z.	91·6	54	i 13 15	+ 5	—	—	—	—	—
Riverside		91·6	56	e 13 14	+ 4	—	—	—	—	—
Palomar		92·0	57	i 13 16	+ 4	—	—	—	—	—
Samarkand		92·2	309	e 13 14	+ 1	—	—	—	—	—
Boulder City		93·9	55	e 13 23	+ 2	—	—	—	—	—
Pierce Ferry		94·6	55	i 13 29	+ 5	—	—	—	—	—
Hungry Horse		95·4	42	e 13 27	− 1	—	—	e 17 25	PP	—
Salt Lake City		96·5	50	e 17 51	PP	e 26 21	PS	e 27 22	PPS	e 43·9
Logan		96·6	49	e 13 33	0	e 26 14	PS	e 17 2	PP	e 41·8
Tucson		97·0	58	e 13 38	+ 3	e 25 9	+14	e 17 31	PP	e 43·9
Bozeman		97·3	45	—	—	e 24 16	[+ 3]	—	—	e 45·5
Sverdlovsk		97·4	327	e 13 34	− 3	e 24 53	− 6	e 17 24	PP	—
Saskatoon		100·1	39	e 18 0	PP	e 24 34	[+ 7]	—	—	36·4
Baku		105·3	310	—	—	e 24 59	[+ 7]	—	—	—
Tiflis		109·0	312	e 18 30	[− 1]	26 36	S	e 29 31	PPS	—
St. Louis		113·7	50	e 19 31	PP	e 25 27	[0]	i 29 10	PS	i 55·2
Chicago		114·5	46	—	—	e 29 12	PS	—	—	e 52·3
Scoresby Sund		115·5	359	19 57	PP	29 27	PS	34 45	SS	54·4
Ksara		117·4	304	20 2	PS	31 2	PPS	—	—	—
Cleveland	E.	119·0	46	e 20 14	PP	i 25 48	[+ 1]	e 29 56	PS	—
Pretoria	z.	119·2	237	i 18 56	[+ 5]	e 29 9	PS	—	—	—
Istanbul		120·6	315	e 19 53	[+59]	—	—	e 23 38	PKS	—
Bucharest		121·4	319	e 20 51	PP	e 29 32	PS	—	—	50·4
Ottawa		121·4	39	e 18 58	[+ 3]	—	—	—	—	—
Pennsylvania		121·8	45	—	—	i 26 2	[+ 6]	i 30 31	PS	e 58·7
Helwan		122·0	301	i 20 35	PP	e 37 15	SS	—	—	—
Copenhagen		122·3	336	30 59	PS	36 33	SS	39 33	P'P'	57·4
Seven Falls	E.	123·6	34	e 21 3	PP	—	—	—	—	54·4
Philadelphia		124·1	45	e 21 2	PP	e 30 50	PS	e 37 59	SS	e 58·3
Fordham		124·6	43	e 20 25	PP	e 26 15	[+10]	e 33 5	PPS	e 61·4
Collmberg		125·0	332	e 19 5	[+ 3]	—	—	—	—	e 63·4
Aberdeen		126·0	343	—	—	e 43 38	SSS	—	—	e 72·7
Cheb		126·1	331	e 21 25	PP	e 31 21	PS	—	—	—
Huancayo		127·0	110	e 18 43	[−23]	e 33 53	PPS	e 39 6	PSS	e 55·4
De Bilt		127·9	337	e 19 13	[+ 5]	e 28 21	{+15}	e 21 18	PP	e 57·4
Triest		128·2	327	i 23 28	PKS	e 26 53	[+38]	e 38 38	SS	—
Stuttgart		128·6	332	e 19 11	[+ 2]	e 25 51	[−25]	e 21 30	PP	e 62·4
Strasbourg		129·4	332	e 19 9	[− 2]	e 25 50	[−28]	e 21 12	PP	e 61·4
Chinchina	E.	129·8	88	e 18 58	[−14]	i 22 56	PKS	—	—	—
Zürich		129·8	331	e 18 52	[−20]	—	—	—	—	—
Basle		130·2	331	e 18 52	[−20]	—	—	—	—	—
Galerazamba		130·3	81	i 21 23?	PP	—	—	—	—	—
Kew		130·4	340	e 21 53	PP	e 28 2	{−20}	e 24 43	PPP	e 63·3
Florence Xim.		130·8	325	i 22 7	PP	i 32 37	PPS	—	—	—
Pavia		131·0	329	e 22 45?	PKS	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Besançon		131·1	332	e 19 17	[+ 3]	e 22 40	PKS	e 21 27		PP	—
Rome		131·2	321	e 19 9	[− 5]	e 22 51	PKS	e 21 14		PP	e 58·8
Bogota		131·3	89	i 19 18	[+ 3]	i 22 42	PKS	e 30 25		PS	e 65·4
Paris		131·5	336	e 19 20	[+ 5]	e 22 40	PKS	e 21 56		PP	e 62·4
La Paz		131·9	118	19 28	[+12]	—	—	i 22 45		PKP	65·4
Clermont-Ferrand		133·7	333	e 19 19	[0]	e 26 28	[− 1]	e 24 38		PPP	65·4
Bermuda		134·9	49	e 21 54	PP	e 27 27	[+56]	e 42 2		SSP	e 57·6
San Juan		138·3	68	e 19 33	[+ 6]	e 26 43	[+ 7]	e 22 43		PP	e 56·5
Algiers Univ.	z.	140·1	323	19 36	[+ 5]	—	—	—		—	—
Alicante		140·9	329	19 36	[+ 4]	26 52	[+11]	22 40		PP	e 69·5
Toledo	z.	141·5	334	e 19 33	[0]	—	—	e 22 35		PP	—
Almeria		143·1	329	e 19 59	[+23]	27 7	[+23]	23 23		PP	—
Granada		143·4	331	i 20 3	[+27]	i 23 21	PKS	i 20 33		PKP_2	—
Fort de France		143·7	73	e 19 9	[−28]	—	—	—		—	—
Malaga	z.	144·2	331	i 19 35 a	[− 3]	i 26 37	[− 9]	i 45 43		SSS	73·2
Tamanrasset	z.	146·1	303	e 19 44	[+ 3]	—	—	e 23 8		PP	65·4

Additional readings :
Brisbane iPE = 4m.52s., iSZ = 8m.46s.
Riverview iPNZ = 5m.53s. a, ePPPZ = 6m.51s., iSN = 10m.34s., isSE = 10m.46s., iZ = 10m.50s., iE = 11m.16s., iEN = 11m.38s., iSSE = 11m.53s.
Wellington e = 18m.1s.
Poona PSN = 23m.38s., PPS?N = 24m.3s.
Berkeley iZ = 13m.5s. and 13m.9s., eZ = 14m.4s., iSE = 23m.31s., iS_cSN = 23m.47s., iPPSE = 24m.23s., iE = 35m.6s., eN = 38m.45s.
Lick iZ = 13m.11s.
Shasta Dam e = 15m.9s. and 15m.21s., i = 15m.30s.
Seattle e = 26m.1s., eSS = 29m.1s., e = 33m.31s.
Fresno ePN = 13m.10s.
Reno iN = 13m.23s., iZ = 13m.37s.
Tashkent eSS = 29m.13s.?, eSSS = 33m.17s.?
Pasadena iZ = 13m.22s. and 13m.27s., eQ?E = 37·4m.
Tinemaha iZ = 13m.15s.
Boulder City i = 13m.27s. and 13m.35s.
Hungry Horse iP = 13m.32s., e = 13m.45s.
Logan e = 19m.46s.
Tucson ePPP = 19m.48s., ePS = 26m.14s., eSS = 31m.31s., e = 33m.26s.
Sverdlovsk eSKS = 24m.17s., ePS = 26m.19s., eSS = 31m.35s
St. Louis epPP? = 19m.51s., e = 26m.17s., iSKKS = 26m.41s., e = 27m.8s. and 27m.54s., i = 29m.28s. and 30m.37s.
Cleveland ePSN = 30m.2s.
Pennsylvania iE = 27m.26s.
Helwan eZ = 21m.12s., 21m.36s., 22m.9s., and 23m.21s., eN = 28m.21s.
Copenhagen 34m.3s.
Huancayo e = 25m.43s. and 36m.43s.
De Bilt ePKS = 22m.57s., iSS = 38m.39s.
Stuttgart eZ = 20m.5s., ePPS = 33m.12s., e = 34m.15s., eSS = 38m.21s., e = 41m.21s. and 47m.57s.
Strasbourg e = 19m.12s. and 19m.48s., eSKP? = 22m.24s., eSKKS = 27m.55s., ePKKP = 29m.9s., ePPS = 33m.3s. and 33m.13s., eSS = 38m.25s. and 39m.1s., e = 40m.41s., eSSS = 43m.11s. and 43m.27s., e = 48m.33s.
Chinchina eE = 19m.14s. and 19m.19s., iS?E = 22m.23s.
Kew e = 22m.38s., ePPPEN = 27m.15s., eSKKS = 32m.17s., e = 33m.28s., ePPS = 39m.25s., eNZ = 43m.19s., eSSS = 49m.43s., eEN = 54m.41s., eQEN = 56·3m.
Besançon e = 19m.57s. and 23m.50s.
Paris ePPP? = 24m.44s., e = 35m.48s. and 42m.22s.
Clermont-Ferrand e = 22m.23s., eSS = 39m.16s., e = 47m.28s.
San Juan eSS? = 41m.31s.
Alicante PKS = 23m.36s., PPP = 25m.32s., SS = 40m.56s., SSP = 41m.32s.
Toledo eZ = 22m.55s. and 23m.45s.
Almeria PPP = 26m.37s., PPS = 35m.47s.
Tamanrasset iZ = 19m.49s.k. and 20m.29s., eZ = 20m.33s. and 21m.34s.
Long waves were also recorded at Apia, Tananarive, Columbia, Harvard, Weston, New Kensington, Halifax, Ivigtut, Upsala, and Tortosa.

Sept. 24d. 7h. 22m. 57s. Epicentre 2°·3S. 102°·2E. Depth of focus 0·015.

Felt at Painan in Sumatra.

Bulletin séismique trimestriel de Batavia, July-Sept., 1949, p. 4. Approximate epicentre 1°S. 102°·5E.

$A = -·2112$, $B = +·9767$, $C = -·0398$; $\delta = +13$; $h = +7$;
$D = +·977$, $E = +·211$; $G = +·008$, $H = -·039$, $K = -·999$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		6·0	130	i 1 28 a	0	i 2 35	− 1	—	—	—
Colombo	E.	24·1	291	5 18	+13	6 58	?	—	—	9·4
Bombay	E.	35·8	307	e 8 12	PP	e 12 18	+ 2	—	—	—
Obi-garm		50·6	327	e 8 46	− 2	i 15 45	− 6	—	—	—
Almata		50·7	337	i 8 51	+ 3	i 15 54	+ 2	—	—	—
Stalinabad		51·0	327	i 8 50	− 1	i 15 52	− 4	—	—	—
Frunse		51·4	334	e 8 53	− 1	e 16 4	+ 2	—	—	—
Tashkent		52·7	329	i 9 3	0	i 16 20	0	—	—	—
Samarkand		52·8	325	e 9 5?	+ 1	e 16 17?	− 4	—	—	—
Brisbane	Z.	54·6	123	i 9 20 a	+ 3	—	—	i 9 46	pP	—
Ashkabad		57·0	319	9 33	− 1	—	—	—	—	—
Sverdlovsk		67·8	337	i 10 45	− 1	i 19 31	− 1	—	—	—
Grozny		67·9	319	e 10 49	+ 2	19 42	PS	—	—	—
Tiflis		67·9	317	i 10 48	+ 1	i 19 34	+ 1	—	—	—
Leninakan		68·1	316	e 10 48	0	e 19 39	+ 3	—	—	—
Ksara		71·8	306	e 5 3	?	e 15 48	?	—	—	—
Pretoria	Z.	74·6	244	i 11 26	− 1	—	—	—	—	—
Grahamstown	Z.	76·7	237	i 11 39	0	—	—	—	—	—
Rome		91·3	311	—	—	e 23 9	[− 2]	—	—	e 53·6
Stuttgart	Z.	93·7	318	e 13 3	0	—	—	e 16 48	PP	—
College		100·5	24	e 17 35	PP	—	—	—	—	—
Hungry Horse		124·6	28	e 18 46	[+ 2]	—	—	e 20 31	PP	—
Logan		130·3	33	e 22 8	PKS	—	—	—	—	—
Tucson		137·0	42	e 19 15	[+ 7]	—	—	i 22 33	PP	—
Fort de France		159·4	306	—	—	e 26 17	[−17]	—	—	—

Additional readings :—
Brisbane iZ = 11m.45s.
Hungry Horse i = 19m.15s. and 19m.59s.

Sept. 24d. Readings also at 0h. (Clermont-Ferrand, Ksara, Baku, Sotchi, Leninakan, near Erevan, Grozny, and Tiflis), 2h. (Brisbane), 3h. (Obi-garm, Stalinabad, Sverdlovsk and College), 5h. (Frunse, Obi-garm, near Samarkand, Stalinabad, and Tashkent), 6h. (Istanbul), 9h. (Brisbane, Copiapo, Santa Lucia, College, near Fresno (2), Lick (2), Mineral (2), and Reno (2)), 10h. (La Paz and near Balboa Heights), 11h. (Copiapo, La Paz, and Santa Lucia), 12h. (College and near Apia), 13h. (Tucson), 14h. (near Stalinabad), 15h. (near Almata and near Batavia), 17h. (near Istanbul, and near Tacubaya), 18h. (Santa Lucia), 20h. (Almata, Frunse, Samarkand, near Obi-garm, Stalinabad, Tashkent, Tchimkent, and near Lick), 23h. (Hungry Horse).

Sept. 25d. 15h. 15m. 1s. Epicentre 6°·2S. 154°·8E. (as on 24d.).

$A = -·8996$, $B = +·4233$, $C = -·1073$; $\delta = -2$; $h = +7$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s	m. s.		m.
Brisbane		21·2	184	i 4 47k	− 2	i 8 42	+ 1	i 5 17	PP	—
Riverview		27·7	187	i 5 49k	− 3	i 10 32	− 1	i 5 57	pP	e 13·6
Auckland	N.	35·6	151	—	—	i 12 45	+ 7	—	—	e 20·0
Wellington		39·2	156	e 7 26	− 5	i 13 30	− 2	e 9 19	PP	e 16·4
Christchurch		40·3	160	i 9 20	PP	i 13 46	− 3	e 16 44	SS	e 20·2
Perth		44·5	230	—	—	i 14 44	− 7	i 17 3	?	i 24·7
Batavia		47·7	268	e 8 34	− 6	i 15 27	− 9	—	—	—
Irkutsk		72·3	330	e 11 30	+ 1	—	—	—	—	—
Hyderabad	N.	78·9	290	—	—	21 58	− 7	—	—	—
New Delhi	N.	82·1	300	—	—	i 22 32	− 6	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		82·4	21	e 12 24	− 1	e 22 41	0	—	—	e 35·4
Poona	E.	83·4	290	e 12 27	− 3	i 22 50	− 1	23 21	PS	—
Bombay		84·4	290	e 14 24	?	i 22 59	− 2	—	—	—
Sitka		84·6	31	e 12 56	+20	e 23 3	0	—	—	e 38·8
Almata		85·4	316	e 12 45	+ 5	i 23 11	0	—	—	—
Frunse		87·1	314	e 12 50?	+ 1	e 23 28?	0	—	—	—
Ukiah		87·7	51	—	—	e 23 33	0	—	—	e 41·5
Berkeley		88·2	53	i 12 57k	+ 3	i 23 29	− 9	i 24 38	PS	e 40·9
Andijan		88·3	311	12 55?	0	23 39?	0	—	—	—
Santa Clara		88·4	52	e 12 23	−32	e 23 29	[+ 6]	—	—	e 45·0
Lick	Z.	88·6	52	i 12 57k	+ 1	—	—	i 13 15	?	—
Shasta Dam		88·6	49	e 12 58	+ 2	—	—	e 16 41	PP	—
Victoria		89·2	42	e 13 3	+ 4	e 24 34	PS	—	—	43·0
Fresno	Z.	90·0	53	e 13 5	+ 2	—	—	—	—	—
Obi-garm		90·0	309	13 3	0	i 23 53	− 1	e 19 8	PPP	—
Reno		90·4	51	e 13 7	+ 3	e 24 4	+ 6	e 16 59	PP	—
Tchimkent		90·6	313	e 13 5	0	e 23 59	− 1	—	—	—
Stalinabad		90·7	309	i 13 5	− 1	i 23 59	− 2	—	—	—
Tashkent		90·7	312	13 6	0	i 23 35	[− 2]	i 24 5	SeS	—
Pasadena		91·0	56	i 13 10k	+ 3	e 23 40	[+ 1]	i 24 12	S	e 41·7
Tinemaha		91·3	53	i 13 13	+ 4	—	—	—	—	—
China Lake	Z.	91·6	54	e 13 13	+ 3	—	—	—	—	—
Riverside		91·6	56	i 13 12	+ 2	—	—	—	—	—
Palomar		92·0	57	i 13 14	+ 2	—	—	—	—	—
Samarkand		92·2	309	e 13 12	− 1	—	—	—	—	—
Boulder City		93·9	55	i 13 25	+ 4	—	—	—	—	—
Pierce Ferry		94·6	55	e 12 57	−27	—	—	i 13 6	P	—
Hungry Horse		95·4	42	i 13 31	+ 3	—	—	—	—	—
Tucson		97·0	58	e 13 35	0	e 24 26	{− 7}	e 17 32	PP	e 44·9
Sverdlovsk		97·4	327	e 17 33	PP	e 24 55	− 4	e 26 27	PS	—
Baku		105·3	310	e 19 18	PP	—	—	—	—	—
Tiflis		109·0	312	e 19 5	PP	e 28 33	PS	e 21 16	PPP	—
Moscow		110·2	327	e 19 8	PP	e 28 32	PS	—	—	—
St. Louis		113·7	50	—	—	i 26 30	{− 1}	i 29 5	PS	—
Scoresby Sund		115·5	359	—	—	29 35	PS	—	—	57·0
Yalta		115·9	317	19 48	PP	—	—	—	—	—
Ksara		117·4	304	e 20 0	PP	30 22	PS	—	—	—
Istanbul		120·6	315	e 19 26	PP	e 31 47	PPS	—	—	—
Helwan	Z.	122·0	301	e 20 44	PP	—	—	—	—	—
Copenhagen		122·3	336	23 9	PPP	27 35	{+ 6}	36 59	SS	57·0
Collmberg		125·0	332	e 19 7	[+ 5]	—	—	—	—	e 70·0
De Bilt		127·9	337	e 21 11	PP	e 22 26	PKS	—	—	e 58·0
Triest		128·2	327	e 23 30	PPP	—	—	—	—	—
Stuttgart		128·6	332	e 19 9	[0]	e 22 27	SKP	e 21 32	PP	e 66·0
Strasbourg		129·4	332	e 21 47	PP	e 33 5	PPS	e 38 27	SS	63·5
Kew		130·4	340	i 23 35	PPP	e 33 23	PPS	e 43 39	SSS	e 60·0
Rome		131·2	321	e 17 17	?	i 22 38	PKS	e 21 31	PP	e 75·4
Bogota		131·3	89	—	—	e 22 43	PKS	—	—	66·0
Paris		131·5	336	—	—	i 22 43	SKP	—	—	e 71·0
La Paz		131·9	118	e 19 47	[+31]	i 22 35	PKS	—	—	—
Clermont-Ferrand		133·7	333	e 20 34	?	e 22 48	SKP	24 15	PPP	73·5
San Juan		138·3	68	e 19 11	[−16]	e 26 59	[+23]	e 23 6	PKS	e 66·3
Almeria		143·1	329	19 55	[+19]	27 3	[+19]	23 11	PP	79·9
Granada		143·4	331	i 20 4k	[+28]	e 27 10	[+26]	20 37	pPKP	82·2
Fort de France		143·7	73	—	—	e 44 51	?	—	—	—
Malaga	Z.	144·2	331	i 19 36s	[− 2]	i 26 31	[−15]	29 42	SKKS	84·4
Tamanrasset	Z.	146·1	303	e 19 42	[+ 1]	—	—	e 23 7	PP	—

Additional readings :—
Brisbane iZ =5m.9s., iSN =8m.45s., iSSE =9m.12s., iSSN =9m.15s.
Riverview ipPZ =6m.1s., iN =6m.27s., iPPPZ =6m.50s., iN =10m.22s., iSN =10m.35s., isSN =10m.48s., iNZ =10m.53s., iSSN =11m.55s., iN =12m.28s.
Christchurch QEN =17m.19s.
Poona iE =12m.44s., 13m.54s., and 16m.6s., iSE =22m.43s.
Berkeley iZ =13m.1s.k, iPPZ =17m.25s., iEN =23m.45s., iZ =23m.48s., iN =27m.1s., eN =39m.23s.

Continued on next page.

Shasta Dam i =13m.15s.
Obi-garm ePS =28m.32s.
Reno eN =13m.11s., eE =13m.14s. and 17m.14s.
Tashkent ePS =25m.8s.
Pasadena iZ =13m.20s.
Riverside iZ =13m.24s. and 13m.34s.
Palomar iZ =13m.24s. and 13m.35s.
Boulder City e =13m.35s. and 13m.42s.
Tucson e =19m.47s.
Sverdlovsk eSKS =23m.10s., eSS =31m.39s.
Helwan eZ =20m.50s. and 24m.11s., eN =28m.23s.
Stuttgart eZ =19m.28s., eSS =38m.35s., e =41m.41s.
Strasbourg e =45m.29s.
Kew eZ =24m.3s., e =35m.41s.
Clermont-Ferrand PPS? =34m.52s., SS? =40m.36s.
Almeria PPP =26m.20s., SKKS =30m.3s., PPS =35m.41s.
Granada iPP =23m.9s., eSKSP =36m.46s.
Tamanrasset iZ =19m.47s. and 19m.55s., eZ =21m.22s.
Long waves were also recorded at Apia, Upsala, Alicante, Rathfarnham Castle, Honolulu, Bermuda, Huancayo, and at other North American stations.

Sept. 25d. 15h. 57m. 34s. Epicentre 6°·2S. 154°·8E. (as at 15h. 15m.).

		△	Az.	P.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.
Brisbane	z.	21·2	184	i 4 46	− 3	—	—
College		82·4	21	e 12 22	− 3	—	—
Shasta Dam		88·6	49	e 12 52	− 4	—	—
Reno	z.	90·4	51	i 13 5k	+ 1	—	—
Pasadena		91·0	56	i 13 8	+ 1	i 13 19	pP
Tinemaha		91·3	53	i 13 8	− 1	i 13 20	pP
China Lake	z.	91·6	54	e 13 11	+ 1	—	—
Riverside	z.	91·6	56	i 13 10	0	i 13 21	pP
Palomar		92·0	57	i 13 13	+ 1	i 13 23	pP
Boulder City		93·9	55	i 13 23	+ 2	e 14 32	?
Pierce Ferry		94·6	55	e 13 25	+ 1	e 13 36	pP
Hungry Horse		95·4	42	i 13 26	− 2	—	—
Tucson		97·0	58	e 13 37	+ 2	—	—
Ksara		117·4	304	e 11 16	?	e 19 40	PP
Tamanrasset	z.	146·1	303	e 19 41	[0]	i 19 47	PKP_2

Tamanrasset also gives eZ =19m.53s.

Sept. 25d. Readings also at 1h. (Copiapo, Santa Lucia, and near Zürich), 2h. (Riverview, Brisbane, Melbourne, Christchurch, Wellington, and Ksara), 3h. (Rome, De Bilt, Tiflis, Ashkabad, Almata, near Obi-garm, Andijan (2), Frunse, Tashkent, Tchimkent, Samarkand, Stalinabad, and near Messina), 4h. (Kew, Paris, Samarkand, near Obi-garm, Andijan, and Stalinabad), 5h. (Bucharest), 6h. (Messina), 7h. (Hungry Horse, Pierce Ferry, and Tucson), 8h. (near Bogota), 18h. (Hungry Horse, Pierce Ferry, and near Rome), 19h. (La Paz), 22h. (Arapuni and Boulder City), 23h. (near Taranto).

Sept. 26d. 3h. 5m. 12s. I } Epicentre 6°·2S. 154°·8E.
8h. 4m. 14s. II } (as on 25d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
I	Brisbane	21·2	184	i 4 48a	− 1	i 8 54	+13	—	—	—
II		21·2	184	e 4 48a	− 1	i 8 39	− 2	—	—	—
I	Riverview	27·7	187	i 5 53k	+ 1	i 10 33	0	—	—	e 13·7
II		27·7	187	e 5 51	− 1	e 10 33	0	—	—	e 13·0
I	Christchurch	40·3	160	—	—	e 16 36	SS	e 18 48	Q	e 22·2
II		40·3	160	—	—	e 17 14	SSS	e 18 51	Q	e 22·9
I	College	82·4	21	e 12 20	− 5	—	—	—	—	—
II		82·4	21	i 12 24	− 1	—	—	—	—	e 42·6
II	Bombay	84·4	290	—	—	e 22 56	− 5	—	—	—
I	Andijan	88·3	311	12 53	− 2	i 23 37	− 2	—	—	—
II		88·3	311	—	—	e 23 39	0	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Lick	z.	88·6	52	i 12 58k	+ 2	—	—	—	—	—
II	z.	88·6	52	i 13 10k	+14	—	—	—	—	—
I Shasta Dam		88·6	49	e 12 57	+ 1	—	—	—	—	—
II		88·6	49	i 12 57	+ 1	—	—	—	—	—
I Victoria	z.	89·2	42	e 13 5	+ 6	—	—	—	—	—
I Tchimkent		90·6	313	e 13 2	− 3	—	—	—	—	—
I Stalinabad		90·7	309	e 13 4	− 2	e 23 59	− 2	—	—	—
II		90·7	309	—	—	e 24 2	+ 1	—	—	—
I Tashkent		90·7	312	e 13 6?	0	i 23 57?	− 4	—	—	—
II		90·7	312	e 13 3	− 3	i 23 57	− 4	—	—	—
I Pasadena		91·0	56	i 13 8	+ 1	—	—	—	—	e 45·0
II		91·0	56	i 13 9	+ 2	—	—	i 13 21	pP	e 41·8
I Tinemaha	z	91·3	53	i 13 11	+ 2	—	—	—	—	—
II	z.	91·3	53	i 13 11	+ 2	—	—	—	—	—
I China Lake	z.	91·6	54	e 13 11	+ 1	—	—	—	—	—
II	z.	91·6	54	i 13 12	+ 2	—	—	—	—	—
I Palomar	z.	92·0	57	i 13 15	+ 3	—	—	—	—	—
II	z.	92·0	57	i 13 15	+ 3	—	—	i 13 26	pP	—
I Boulder City		93·9	55	e 13 23	+ 2	—	—	—	—	—
II		93·9	55	i 13 23	+ 2	—	—	—	—	—
II Pierce Ferry		94·6	55	e 13 26	+ 2	—	—	—	—	—
I Hungry Horse		95·4	42	e 13 27	− 1	—	—	—	—	—
II		95·4	42	e 13 26	− 2	—	—	—	—	—
II Tucson		97·0	58	e 13 37	+ 2	—	—	—	—	e 46·8
I Bozeman		97·3	45	e 18 2	PP	—	—	—	—	e 40·9
I St. Louis		113·7	50	e 29 13	PS	e 39 48	SSS	—	—	—
II		113·7	50	e 29 22	PS	—	—	—	—	—
I Ksara		117·4	304	e 20 42	PP	34 41	SS	—	—	—
II		117·4	304	e 20 6	PP	e 33 20	SS	—	—	—
I Stuttgart		128·6	332	e 19 9	[0]	—	—	—	—	e 82·8
I Rome	E.	131·2	321	e 20 10	[+56]	—	—	—	—	—
I La Paz		131·9	118	e 19 24	[+ 8]	—	—	—	—	—
I Tamanrasset	z.	146·1	303	e 19 42	[+ 1]	e 26 19	[−29]	e 23 17	PP	—
II	z.	146·1	303	e 19 42	[+ 1]	—	—	—	—	—

Additional readings :—
Brisbane II iZ = 5m.51s.
Riverview I iN = 10m.54s., II iN = 10m.54s., iE = 11m.16s.
Shasta Dam I i = 13m.5s., e = 13m.9s.
Boulder City II e = 13m.34s.
Pierce Ferry II i = 13m.35s.
Hungry Horse I i = 13m.45s., II e = 13m.38s.
Tamanrasset I iZ = 19m.46s., eZ = 19m.55s., ePPPZ = 26m.10s., II eZ = 19m.47s. and 19m.54s.
Long waves to Shock I were recorded at De Bilt, Clermont-Ferrand, Algiers Univ., Kew, and American stations. To Shock II at Auckland, De Bilt, and American stations.

Sept. 26d. 22h. 32s. 0s. Epicentre 6°·7S. 153°·0E. (as on 1948, Oct. 3d.).

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

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	20·7	179	i 4 46a	+ 2	i 8 39	+ 8	—	—	—
Riverview	27·1	183	e 5 46	0	i 10 27	+ 3	i 6 33	PP	e 12·9
Irkutsk	71·9	330	e 11 26	− 1	e 20 44?	− 4	—	—	—
College	83·5	21	i 12 28	− 3	—	—	—	—	—
Frunse	86·1	314	e 12 45	+ 1	—	—	—	—	—
Andijan	87·3	311	12 51	+ 1	23 34?	+ 5	e 13 28	pP	—
Obi-garm	88·9	309	e 12 57	− 1	e 22 51	−53	—	—	—
Stalinabad	89·6	308	i 13 0	− 1	e 23 59	+ 8	e 23 20	SKS	—
Tchimkent	89·6	313	e 13 4?	+ 3	—	—	—	—	—
Tashkent	89·7	311	i 13 0	− 1	i 23 56	+ 4	i 25 2	sS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shasta Dam		90·2	309	e 13 3	− 1	—	—	—	—	—
Victoria		90·8	41	i 12 10	−56	—	—	—	—	—
Pasadena		92·7	56	e 13 13	− 2	—	—	—	—	—
Tinemaha	z.	93·0	54	i 13 18	+ 1	—	—	—	—	—
Riverside	z.	93·4	56	e 13 16	− 2	—	—	—	—	—
Pierce Ferry		96·3	54	e 13 33	+ 1	—	—	—	—	—
Hungry Horse		96·9	42	e 13 31	− 3	—	—	—	—	—
Sverdlovsk		96·9	327	e 17 30	PP	e 26 22	PS	—	—	—
Tucson		98·7	58	e 13 47	+ 5	—	—	—	—	—
Ksara		116·2	304	e 19 30	PP	e 34 42	SS	—	—	—
Helwan	z.	120·7	300	e 20 27	PP	e 28 42	?	—	—	—
Ottawa		123·0	39	e 18 58	[0]	—	—	—	—	—
Collmberg	z.	124·6	331	e 19 4	[+ 2]	—	—	—	—	—
Stuttgart	z.	128·1	331	e 19 9	[+ 1]	—	—	e 21 12	PP	—
Rome		130·5	322	e 19 17	[+ 4]	e 22 39	SKP	e 39 19	SS	e 60·8
Bogota		133·1	90	i 19 16	[− 2]	e 22 57	SKP	—	—	—
La Paz		133·2	120	19 20	[+ 2]	—	—	e 22 24	PKS	—
Tamanrasset	z.	144·9	301	i 19 41a	[+ 2]	—	—	e 22 59	PP	—
Fort de France		145·5	75	e 19 15	[−25]	—	—	—	—	—

Additional readings :—
Brisbane iSE =8m.42s.
Riverview iEN =10m.46s., eQE =11m.48s.
Stalinabad esS =24m.59s.
Victoria i =12m.28s.
Pasadena iZ =13m.18s.
Riverside iZ =13m.21s.
Rome e =24m.19s., eE =31m.27s.
Long waves were also recorded at Auckland, Berkeley, Seattle, and De Bilt.

Sept. 26d. Readings also at 0h. (La Paz), 2h. near (Obi-garm), 4h. (near Mizusawa), 5h. (Clermont-Ferrand and Pierce Ferry), 7h. (Andijan, Wellington, and near Tortosa), 8h. (Samarkand, near Obi-garm and Stalinabad), 10h. (Copiapo, La Paz, La Plata, Mount Wilson, Tinemaha, Pierce Ferry, Hungry Horse, and College (2)), 11h. (Durham), 12h. (Weston and Wellington), 13h. (Brisbane and near Obi-garm), 14h. (near Istanbul), 15h. (Belgrade, Bucharest, Istanbul, Sofia, Prague, Stuttgart, Zagreb, Triest, Rome, near Messina and near Florence Xim.), 17h. (Victoria, near Andijan and Obi-garm), 18h. (Victoria (2)), 19h. (near Istanbul (2)), 20h. (Rome), 21h. (Victoria (4), Frunse, near Andijan, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 22h. (Grahamstown (2), Pretoria (2), Victoria, and Hungry Horse), 23h. (near Tacubaya).

Sept. 27d. 11h. 54m. 14s. Epicentre 8°·7S. 124°·1E. (as on 1947, May 27d.).

$A = -\cdot5543$, $B = +\cdot8186$, $C = -\cdot1503$; $\delta = -6$; $h = +7$;
$D = +\cdot828$, $E = +\cdot561$; $G = +\cdot084$, $H = -\cdot124$, $K = -\cdot989$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		17·3	278	i 4 2k	− 2	i 7 47	+31	—	—	—
Brisbane		33·1	128	i 6 43	+ 3	e 14 2	SS	i 7 49	PP	e 17·6
Riverview		35·7	139	e 7 1	− 1	i 13 4	+25	—	—	e 19·2
Bombay	E.	57·5	298	e 10 5	+12	—	—	—	—	—
Andijan		68·4	320	e 11 6	0	e 20 6	− 1	—	—	—
Obi-garm		69·1	317	i 11 11	+ 1	—	—	—	—	—
Stalinabad		69·7	317	i 11 12	− 2	e 20 20	− 2	—	—	—
Semipalatinsk		70·1	332	i 10 46	−30	—	—	—	—	—
Tashkent		70·7	319	e 11 19	− 1	e 20 36	+ 2	—	—	—
Tchimkent		71·0	320	i 11 20	− 2	—	—	—	—	—
Samarkand		71·4	317	e 11 25	+ 1	—	—	—	—	—
Sverdlovsk		83·3	330	i 12 31	+ 1	e 22 59	+ 9	—	—	—
Tiflis		87·8	313	i 12 54	+ 2	e 23 35?	+ 1	—	—	—
Leninakan		88·3	312	e 13 0?	+ 5	—	—	—	—	—
Grahamstown	z.	91·5	237	i 13 43	+33	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pretoria	z.	91·5	244	i 13 11	+ 1	—	—	—	—	—
Ksara		93·3	303	e 13 20	+ 2	—	—	17 11	PP	—
Moscow		95·1	326	i 13 24	− 2	—	—	—	—	—
Helwan	z.	96·7	299	e 16 55	PP	—	—	—	—	—
Stuttgart		112·8	319	e 19 31	PP	e 30 24	PPS	—	—	e 62·8
Tinemaha	z.	117·2	53	i 18 50	[+ 3]	—	—	—	—	—
Hungry Horse		117·4	40	i 18 49	[+ 1]	—	—	—	—	—
Pasadena	z.	117·7	56	i 18 52	[+ 4]	—	—	i 39 53	P′P′	—
Pierce Ferry		120·7	53	e 18 58	[+ 4]	—	—	e 20 7	PP	—
Tucson		124·1	57	e 19 5	[+ 4]	—	—	e 32 23	PPS	—
La Paz		152·2	155	e 19 56	[+ 5]	—	—	—	—	—

Additional readings :—
Brisbane iZ = 13m.31s. and 17m.12s.
Helwan eZ = 17m.24s.
Tinemaha eZ = 19m.5s.
Pierce Ferry e = 19m.7s.
Tucson i = 19m.13s.
Long waves were also recorded at Auckland, Wellington, and Kew.

Sept. 27d. 15h. 30m. 42s. Epicentre 60°·2N. 148°·9W. (as on 1945, Aug. 17d.).

Intensity III-IV at Anchorage. Epicentre 59°·75N. 149°W. Depth 50 km.

L. M. Murphy and F. P. Ulrich.
United States Earthquakes, 1949, Serial No. 748, Washington, 1951, p. 29.

A = −·4277, B = −·2580, C = +·8663 ; δ = −3 ; h = −9 ;
D = −·517, E = +·856 ; G = −·742, H = −·447, K = −·500.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		4·7	6	i 1 14	0	i 2 12	+ 2	—	—	e 3·2
Sitka		7·7	107	e 1 54	− 2	i 3 16	− 9	—	—	e 3·9
Victoria		18·9	118	i 4 22k	− 2	8 3	+10	5 16	PP	9·9
Seattle		19·9	117	i 4 37k	+ 1	i 8 46	SS	i 8 55	PcP	e 10·3
Hungry Horse		23·3	105	i 5 10	0	e 9 19	− 1	i 6 2	PP	—
Saskatoon		24·5	91	i 5 22	0	9 44	+ 4	6 5	PP	13·2
Arcata		24·7	129	i 5 25k	+ 1	i 10 0	+16	—	—	e 12·2
Ferndale	E.	24·9	131	e 5 30	+ 4	e 10 2	+15	e 10 22	SS	e 12·0
	N.	24·9	131	e 5 34	+ 8	e 10 10	+23	—	—	e 12·0
Shasta Dam		25·5	129	i 5 30	− 2	e 9 54	− 3	i 6 20	PPP	—
Butte	N.	25·6	106	e 5 32	0	i 10 27	+28	—	—	e 11·6
Mineral		26·1	127	i 5 36k	− 1	e 10 16	+ 9	—	—	e 10·6
Klyuchi		26·2	283	5 37	− 1	—	—	—	—	—
Ukiah		26·5	130	e 5 47	+ 6	e 10 26	+12	—	—	e 11·8
Bozeman		26·6	106	e 5 42	0	i 10 21	+ 5	e 6 44	PPP	e 11·6
Reno		27·5	125	i 5 50k	0	e 10 38	+ 8	—	—	e 13·8
Berkeley	Z.	28·0	131	i 5 53k	− 2	e 10 47	+ 9	—	—	e 13·5
San Francisco	E.	28·0	131	e 5 58	+ 3	e 10 48	+10	e 6 48	PP	e 13·5
	N.	28·0	131	i 5 54	− 1	e 10 56	+18	e 6 51	PP	e 13·5
Branner		28·4	131	i 5 57	− 1	e 10 40	− 5	—	—	e 13·7
Santa Clara		28·6	131	e 5 58	− 2	i 10 54	+ 6	—	—	e 13·7
Lick		28·7	131	i 5 59k	− 2	e 10 58	+ 8	i 6 48	PP	e 13·6
Logan		29·2	112	i 6 2	− 3	i 11 0	+ 2	i 6 48	PP	i 12·0
Fresno		29·9	128	i 6 11k	− 1	i 11 18	+ 9	i 7 27	PPP	e 14·4
Salt Lake City		30·0	113	e 6 12	0	i 11 12	+ 2	—	—	e 12·7
Tinemaha		30·3	127	i 6 14k	− 1	e 11 27	+12	i 6 28	pP	—
Rapid City	E.	31·6	99	e 6 27	+ 1	e 11 31	− 4	e 7 59	PPP	e 14·2
Boulder City		32·6	123	i 6 40	+ 5	i 11 58	+ 7	i 6 49	pP	e 15·9
Pierce Ferry		32·8	122	i 6 37	0	i 12 10	+16	i 7 48	PP	e 15·5
Pasadena		32·9	128	i 6 36k	− 2	i 11 55	− 1	i 6 48	pP	i 14·5
Riverside		33·3	128	i 6 39k	− 2	e 12 2	0	i 6 52	pP	—
Palomar		34·1	127	i 6 48	0	i 12 16	+ 2	i 6 59	pP	—
Tucson		37·5	121	i 7 17	0	e 13 15	+ 8	i 8 46	PP	e 15·9
Honolulu		39·4	194	e 7 30	− 3	e 13 34	− 1	e 8 58	PP	e 16·5
Lubbock		40·4	108	7 40	− 1	13 40	−10	—	—	—

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chicago		40·9	89	e 7 52	+ 6	i 13 57	− 1	e 9 30	PP	e 17·0
Florissant		41·9	94	e 7 53	− 1	i 14 13	0	i 9 45	PP	—
Nemuro		42·0	277	e 7 45	− 9	14 4	−10	—	—	e 20·1
St. Louis		42·1	94	i 7 55	0	i 14 12	− 4	i 9 50	PP	—
Ottawa		44·2	76	e 8 10k	− 2	14 44	− 2	—	—	17·5
Cleveland		44·3	83	e 8 12	− 1	i 14 47	− 1	e 10 15	PPP	—
Sapporo		44·3	280	8 17	+ 4	14 52	+ 4	—	—	21·3
Scoresby Sund		44·4	23	8 15	+ 1	14 48	− 1	14 8	P_cS	21·3
Ivigtut		44·5	43	i 8 16	+ 1	i 14 52	+ 1	e 10 6	PP	21·3
Shawinigan Falls	N.	44·8	72	e 8 18	+ 1	14 51	− 4	10 4	PP	20·4
Seven Falls	E.	45·3	71	i 8 19k	− 2	14 59	− 3	10 15	PP	23·7
New Kensington		45·9	83	e 8 13	−13	e 15 10	− 1	—	—	e 18·2
Miyako		46·5	276	e 8 28	− 3	15 11	− 8	—	—	—
Pennsylvania		46·6	81	i 8 35	+ 3	(e 15 18)	− 3	—	—	e 15·3
Mizusawa	E.	47·3	276	e 8 37	0	e 15 25	− 6	—	—	—
	N.	47·3	276	8 50	+13	e 15 28	− 3	—	—	—
Sendai		48·1	275	8 42	− 1	15 37	− 5	e 10 24	PP	e 21·6
Woodstock		48·2	80	—	—	e 15 48	+ 5	e 19 42	SSS	e 23·7
Georgetown		48·4	81	i 8 47	+ 1	i 15 52	+ 6	—	—	—
Harvard		48·4	75	i 8 44	− 2	i 15 43	− 3	i 9 56	P_cP	e 19·4
Fordham		48·5	77	i 8 48	+ 2	i 15 48	0	i 18 40	SS	i 24·5
Philadelphia		48·6	80	e 8 48	+ 1	i 15 47	− 2	e 10 48	PP	e 21·8
Weston		48·6	75	e 8 45	− 2	e 15 50	+ 1	—	—	—
Hukusima		48·7	275	e 8 52	+ 4	15 49	− 1	—	—	—
Reykjavik		49·7	28	—	—	e 16 4	0	e 19 23	SS	e 25·1
Kakioka		50·1	274	e 8 57	− 2	16 6	− 4	—	—	e 28·0
Columbia		50·3	89	e 9 7	+ 7	e 16 12	− 1	e 19 33	SS	—
Halifax		50·5	67	9 4	+ 2	16 15	− 1	e 11 46	PPP	22·0
Maebasi		50·5	276	i 9 0	− 2	16 12	− 4	—	—	—
Tokyo		50·7	275	e 9 8	+ 5	16 13	− 5	—	—	37·7
Mera		51·3	273	e 9 22	+14	16 25	− 1	—	—	e 31·6
Hunatu		51·4	275	i 9 12	+ 3	16 26	− 2	—	—	—
Gihu		52·4	276	e 9 14?	− 2	—	—	—	—	23·3
Nagoya		52·5	276	e 9 13	− 4	—	—	—	—	—
Irkutsk		53·5	313	9 21	− 3	16 54?	− 3	—	—	—
Osaka		53·6	278	e 9 32	+ 7	17 2	+ 4	—	—	25·7
Kobe		53·8	278	e 9 22	− 4	e 16 56	− 5	e 10 2	P_cP	e 30·7
Tacubaya		53·8	116	e 9 33	+ 7	e 17 7	+ 6	—	—	—
Sumoto		54·2	278	9 46	+17	16 47	−19	—	—	22·3
Puebla		54·5	115	9 39	+ 7	e 19 43	S_cS	—	—	—
Koti		55·5	278	9 35	− 4	17 21	− 3	e 11 22	PP	34·7
Matuyama		55·7	279	9 4	−36	17 24	− 2	—	—	30·1
Hukuoka		57·0	280	e 9 46	− 4	17 43	0	(19 34)	S_cS	19·6
Bergen		58·1	14	9 58	0	18 26	+28	12 13	PP	27·3
Kagosima		58·6	279	10 14	+13	18 4	0	—	—	—
Bermuda		59·7	77	e 10 25	+16	i 18 23	+ 4	i 20 4	S_cS	e 23·5
Upsala	E.	59·8	8	10 16	+ 7	18 22?	+ 2	e 19 55	ScS	e 25·3
	N.	59·8	8	10 9	0	18 13	− 7	i 11 2	P_cP	—
Helsinki		59·9	4	e 10 7a	− 3	e 18 18	− 3	e 13 53	PPP	e 25·3
Aberdeen		60·1	20	i 10 33	+22	e 19 3	+39	e 12 58	PP	28·8
Sverdlovsk		61·0	343	i 10 17	− 1	i 18 33	− 2	—	—	—
Edinburgh	E.	61·1	21	e 10 14	− 4	e 18 28	− 9	19 58	ScS	—
Durham		62·5	21	i 10 31	+ 3	i 18 58	+ 4	i 10 42	pP	—
Rathfarnham Castle		63·0	24	i 10 33	+ 2	i 18 57	− 4	i 11 21	P_cP	27·3
Copenhagen		63·5	11	e 10 32	− 2	i 19 8	+ 1	23 18	SS	30·3
Nanking		63·9	289	e 10 11	−26	e 18 23	−49	18 43	sS	—
Moscow		64·3	357	i 10 37	− 2	i 19 17	0	—	—	—
Kew		65·8	21	i 10 48a	− 1	i 19 39	+ 4	e 13 19	PP	e 30·3
De Bilt		66·1	17	i 10 49	− 2	i 19 42	+ 3	e 13 23	PP	e 31·3
Potsdam		66·8	12	e 10 54	− 2	i 19 50	+ 2	i 14 24	PPP	e 28·1
Collmberg		67·9	12	e 11 1	− 1	e 19 58	− 3	e 13 39	PP	e 32·8
Jena		68·1	13	e 11 1	− 3	e 20 1	− 2	e 11 17	P_cP	e 32·3
Paris		68·9	20	i 11 7	− 2	i 20 9	− 4	i 11 37	P_cP	e 32·3
Cheb		69·0	13	e 10 59	−10	e 20 8	− 6	—	—	—
Prague		69·3	11	i 11 11	0	i 20 13	− 4	i 13 47	PP	e 32·3
Raciborzu		69·6	8	e 11 9a	− 4	e 20 25	+ 4	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Strasbourg		69·9	16	e 11 12a	− 3	i 20 25	+ 1	i 11 28	PcP	e 33·8
Stuttgart		69·9	15	i 11 14a	− 1	i 20 28	+ 4	e 11 55	PcP	e 34·3
Almata		70·3	326	e 11 17	0	i 20 19	−10	—	—	—
Skalnate Pleso		70·6	7	i 11 18?	− 1	e 20 33	0	—	—	—
San Juan		70·7	86	e 11 15	− 5	i 20 27	− 7	e 13 48	PP	e 30·4
Basle		70·9	16	e 11 19	− 2	e 20 40	+ 4	—	—	—
Besançon		71·0	17	i 11 20	− 2	e 20 47	+10	i 11 35	PcP	—
Zürich		71·2	16	e 11 20a	− 3	e 20 35	− 5	e 13 46	PP	—
Frunse		71·3	328	e 11 22	− 1	e 20 32	− 9	—	—	—
Neuchatel		71·4	17	e 11 21	− 3	e 20 44	+ 2	—	—	—
Ogyalla		71·8	8	e 11 27	+ 1	e 20 51	+ 5	—	—	—
Clermont-Ferrand		72·0	20	i 11 26	− 2	i 20 56	+ 7	i 11 40	PcP	34·3
Budapest		72·2	8	11 30	+ 1	20 55	+ 4	11 41	PcP	e 33·3
Tchimkent		73·1	331	i 11 31?	− 3	21 0?	− 1	—	—	—
Kalossa		73·2	8	e 11 34	− 1	e 21 2	0	11 55	PcP	e 40·8
Pavia		73·5	15	e 11 41	+ 5	—	—	—	—	—
Triest		73·6	12	i 11 34	− 3	i 21 6	− 1	i 11 50	PcP	e 35·3
Zagreb		73·6	11	e 11 36?	− 1	e 21 8	+ 1	e 11 40	PcP	e 35·2
Andijan		73·9	329	i 11 36	− 3	e 21 4	− 6	—	—	—
Tashkent		74·1	332	e 11 38	− 2	i 21 6	− 6	—	—	—
Padova		74·5	14	i 11 41	− 1	21 9	− 8	—	—	—
Belgrade		75·0	7	e 11 42a	− 3	e 21 30	+ 7	e 13 46	PP	e 38·0
Prato		75·0	15	i 11 47	+ 2	i 21 28	+ 5	—	—	—
Florence Xim.		75·1	15	i 11 46	0	i 21 25	+ 1	—	—	—
Florence Arc.		75·1	15	e 11 44a	− 2	i 21 24	0	e 22 0	PS	e 37·3
Theodosia		75·1	356	e 11 43	− 3	e 21 23?	− 1	—	—	—
Bucharest		75·7	3	e 11 46	− 3	i 21 28	− 2	e 14 22	PP	37·3
Yalta		75·7	358	e 11 46?	− 3	21 42?	+12	—	—	—
Apia		76·0	202	e 11 45	− 6	e 21 33	− 1	e 14 23	PP	e 34·3
Barcelona		76·0	22	e 11 52	+ 1	i 22 27	+53	26 41	SS	e 34·5
Lisbon		76·0	31	11 50a	− 1	21 36	+ 2	14 40	PP	35·1
Fort de France		76·2	84	i 11 53	+ 1	e 22 5	PS	—	—	—
Samarkand		76·2	333	e 11 53	+ 1	i 21 35	− 1	—	—	—
Toledo		76·2	28	i 11 51	− 1	i 21 37	+ 1	12 0	PcP	37·2
Tortosa		76·2	23	11 55	+ 3	21 38	+ 2	14 51	PP	e 34·3
Grozny		76·3	350	e 11 52	0	21 36	− 1	e 13 20	PP	—
Sotchi		76·3	353	e 11 53	+ 1	e 21 48?	+11	—	—	—
Obi-garm		76·5	330	i 11 51?	− 3	i 21 36?	− 3	—	—	—
Stalinabad		76·8	330	i 11 53	− 2	i 21 39	− 3	—	—	—
Rome		77·1	14	i 11 55a	− 2	i 21 47	+ 1	12 9	pP	e 37·3
Sofia		77·3	6	e 11 52	− 6	e 21 52	+ 4	—	—	—
Tiflis		77·8	350	i 12 0	− 1	i 21 54	+ 1	i 22 30	PS	—
Alicante		78·4	25	11 50	−14	i 22 2	+ 2	12 12	PcP	e 38·3
Bogota		78·5	100	e 12 7	+ 3	e 22 0	− 1	i 12 18	PcP	35·3
Granada		78·8	28	i 12 6k	0	i 22 9	+ 5	12 14	PcP	i 39·2
Leninakan		78·8	350	e 12 2	− 4	22 2	− 2	12 22	PcP	—
Taranto		79·0	10	11 23	−44	—	—	e 17 43	PPP	33·6
Istanbul		79·1	2	i 12 8	0	e 22 9	+ 2	—	—	—
Malaga	z.	79·1	28	i 12 9k	+ 1	i 22 17	+10	i 15 29	PP	38·8
Almeria		79·4	27	i 12 21	+12	i 22 25	+15	15 25	PP	38·4
Erevan		79·4	351	12 14	+ 5	—	—	—	—	—
Ashkabad		79·7	338	e 12 11	0	—	—	—	—	—
Algiers Univ.	z.	80·7	23	i 12 15	− 1	—	—	i 15 23	PP	—
Messina		81·1	12	e 12 15	− 3	e 22 34	+ 6	e 16 24	PP	—
Dehra Dun	N.	81·9	320	e 12 56	+33	e 23 8	+32	—	—	e 52·3
New Delhi	N.	83·8	320	e 12 32	0	i 22 49	− 6	15 31	PP	—
Calcutta	E.	85·4	308	e 12 44	+ 4	e 23 5	− 6	i 23 52	PS	—
Ksara		86·2	356	i 12 45a	+ 1	23 28?	+ 9	—	—	—
Helwan		90·3	0	i 13 3a	− 1	23 51	− 6	16 34	PP	—
Huancayo		92·4	109	e 13 13	− 1	e 23 42	[− 5]	e 17 12	PP	e 40·1
Hyderabad	N.	93·7	314	e 13 20	0	25 53	PS	17 4	PP	45·6
Bombay		94·3	320	e 13 24	+ 1	23 52	[− 5]	e 17 8	PP	—
Poona	N.	94·3	319	e 13 25	+ 2	24 30	− 2	e 17 9	PP	39·3
Tamanrasset	z.	94·7	23	e 13 22	− 2	e 24 18?	{+ 2}	e 17 17	PP	30·3
Brisbane		99·4	229	e 13 43	− 3	i 25 18	+ 3	e 18 9	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		99·6	105	e 13 46	0	i 24 19	[− 6]	i 17 49	PP	48·0
Kodaikanal	E.	100·7	313	e 15 59	?	—	—	—	—	—
Auckland		101·2	209	—	—	e 26 18?	PS	—	—	e 48·3
Batavia		102·4	279	18 45	PP	—	—	—	—	—
Colombo	E.	102·9	310	17 33	PKP	—	—	—	—	53·3
Wellington		105·4	207	—	—	(e 24 18?)	[−34]	—	—	e 48·3
Riverview		105·8	228	—	—	i 24 53	[− 1]	i 26 12	S	e 44·7
Christchurch		108·1	208	—	—	25 9	[+ 5]	e 28 10	PS	50·9
Santa Lucia	N.	112·9	116	—	—	31 18?	?	36 18?	SS	54·3
La Plata		120·0	107	25 42	SKS	(25 42)	[− 8]	36 42	SS	69·1
Tananarive		137·1	336	e 22 20	PP	27 0	[+35]	23 8	PKS	68·3
Pretoria	Z.	145·5	3	i 19 39	[− 1]	—	—	—	—	—
Grahamstown	Z.	152·9	7	i 19 52	[0]	—	—	—	—	—

Additional readings :—
Victoria i =6m.13s., e =9m.19s.
Seattle e =8m.36s., i =9m.10s. and 9m.44s.
Hungry Horse i =6m.27s.
Saskatoon e =10m.48s.
Arcata iE =5m.29s. and 5m.42s.
Butte eN =5m.57s.
Mineral eE =5m.43s.
Reno iN =6m.10s.
Berkeley iPNZ =5m.58s., iZ =6m.3s. and 6m.8s., eSN =11m.2s., eZ =11m.27s.
Branner iZ =6m.1s.
Lick eE =6m.3s., iZ =6m.28s., 7m.4s., and 7m.40s., eZ =9m.23s.
Logan i =6m.26s., 7m.20s., and 7m.51s.
Tinemaha iPPZ =7m.39s.
Boulder City i =7m.12s. and 10m.3s., e =12m.51s.
Pierce Ferry i =6m.50s.
Pasadena iPPNZ =8m.2s.
Riverside iPPZ =8m.0s.
Palomar iPPE =8m.6s., iS_cSE =16m.53s.
Tucson iPPP =9m.16s., iS =13m.19s.
Honolulu ePPP =9m.40s.
Chicago ePPP? =10m.13s., eSS =16m.47s.
Florissant i =8m.2s., iS =14m.2s., iSS =17m.0s.
St. Louis i =8m.0s., 8m.8s., and 14m.31s.
Cleveland ePZ =8m.16s., i =8m.25s., iSN =14m.52s., eSSN =17m.43s., eE =17m.54s., iEN =18m.4s., iN =18m.16s.
Scoresby Sund 10m.7s., 12m.15s., and 17m.25s., iSS =18m.12s.
Ivigtut i =18m.13s.
Shawinigan Falls eN =8m.32s., PSN =15m.8s., eN =15m.57s., SSN =17m.54s.
Seven Falls iE =9m.1s., eE =18m.10s. and 21m.3s.
Sendai S_cS =25m.13s.
Harvard i =9m.32s., iPP =10m.33s., iPPP =11m.37s., eQ =18m.8s.
Philadelphia eS_cS =18m.37s., eSS =19m.19s.
Weston iP =8m.48s.
Halifax S_cS =18m.49s., SS =19m.52s.
Kobe ePP =11m.25s., ePPP =12m.2s.
Kôti e =10m.9s., eSS =21m.15s.
Bergen P_cSZ =13m.45s., SSE =22m.46s. ; phases wrongly identified.
Bermuda iSS? =22m.23s.
Upsala ePPPN =13m.36s., SS?E =21m.44s., eSS?N =22m.18s.?
Helsinki epS =18m.31s., eS_cS =19m.59s.
Aberdeen iSSSEN =25m.31s.
Edinburgh SSE =22m.29s.
Durham iN =18m.53s., isSE =19m.14s., iS_cSE =20m.34s., iSSEN =23m.14s.
Rathfarnham Castle e =14m.22s., i =22m.57s., e =25m.7s., i =26m.15s.
Copenhagen i =10m.46s., 13m.3s., 14m.38s., and 20m.28s.
Kew iZ =11m.2s., ePPPZ =15m.7s., eEN =15m.35s., e =16m.33s., eSKS =19m.54s., ePSNZ =20m.31s., ePPS =20m.57s., e =22m.3s., eSSEN =23m.31s., eZ =25m.33s., eSSS =27m.19s.
De Bilt eSS =24m.9s.
Potsdam eN =10m.23s., iPN =10m.58s., iN =11m.10s., iN =15m.42s., iE =20m.53s., iN =21m.42s.
Collmberg eZ =11m.7s. and 11m.17s., eE =11m.48s., eZ =13m.44s., eS_cSE =21m.0s., eSSEN =24m.24s., eSSSE =28m.0s.
Jena ePP?N =13m.45s., ePS?N =20m.26s., eSS?N =24m.34s.
Paris i =11m.14s., 11m.24s., and 12m.6s., e =13m.42s., iPP =14m.4s., PPP =15m.24s., iPPS =21m.3s., SS =24m.30s., ePKP,PKP? =39m.20s.
Prague i =11m.19s., 11m.28s., 11m.51s., 12m.2s., and 13m.19s., e =14m.9s., ePPP = 15m.26s., e =15m.50s. and 17m.12s., ePS =20m.51s., ePPS? =21m.4s., eSS = 24m.59s., e =26m.11s., eSSS =28m.12s.
Raciborzu eN =21m.12s.

Continued on next page.

Strasbourg iPP =14m.0s., iPPP? =15m.13s., iS_cS =21m.14s. and 21m.18s., iSS = 25m.0s., eQ? =29m.12s.
Stuttgart i =11m.19s., iZ =11m.28s., ePP =13m.53s., e =15m.10s., 16m.38s., 18m.30s., and 19m.34s., iS =20m.42s., ePS =21m.18s., eSS =25m.8s., eSSS? =29m.31s.
San Juan ePPP? =15m.50s., eSS =25m.0s., eSSS? =28m.49s.
Besançon i =12m.28s., iPP =14m.8s., e =15m.13s., ePPP =15m.43s.
Clermont-Ferrand i =14m.3s., iPP =14m.12s., i =14m.18s. and 14m.34s., iPPP = 15m.56s., e =20m.47s., iPS =21m.31s., eSS =25m.38s., eSSS =29m.20s.
Budapest SE =21m.0s., ePSE =21m.10s., ePSN =21m.13s., PPSE =21m.38s., SSN = 25m.18s.?, SSSN =29m.0s., SSSE =29m.18s.?
Kalossa eN =21m.21s.
Triest iPPN =14m.37s., iPS =21m.44s., iSS =25m.50s., eSSS =29m.23s.
Belgrade i =11m.56s.
Florence Arcetri e =13m.32s.
Bucharest ePEN =11m.53s., ePPPN =16m.22s., iPSN =22m.2s.
Apia e =12m.5s., eS?E =21m.11s., eSEN =21m.25s.
Lisbon E =12m.27s., Z =12m.35s., S?E =21m.32s., SSEN =26m.1s. and 28m.30s.
Toledo iZ =12m.6s., ePPZ =14m.42s., ePPPZ =16m.27s., SKSE =21m.52s., PSN = 22m.18s., SSE =26m.33s., eN =30m.39s., QN =32m.39s.
Tortosa PPPE =16m.45s., S_cSN =21m.58s., PSN =22m.24s., SSE =26m.46s., SSSEN = 29m.53s.
Rome iPP =14m.53s., PPP? =16m.33s., i =18m.15s., PS? =22m.23s., SS =26m.55s.
Alicante PP =14m.49s., PPP =16m.28s., S =21m.46s., PS =22m.22s., PPS =22m.55s., SS =26m.44s., SSS =29m.54s., Q =32m.26s.
Bogota eS_cSEN =21m.57s.
Granada iPP =15m.6s., PPP =16m.48s., sS =22m.27s., PPS =23m.30s., iSS =27m.15s., SSS =31m.27s.
Malaga PPPZ =17m.15s., PSZ =23m.17s., SSZ =27m.29s.
Almeria PPP =17m.17s., S_cS =22m.45s., PPS =23m.33s., SS =27m.37s., SSS =30m.57s.
Algiers Univ. eZ =12m.30s. and 12m.47s., iZ =15m.3s.
New Delhi ePSN =23m.37s., iPPSN =23m.54s., iN =24m.32s., 28m.37s., and 33m.9s.
Helwan eZ =13m.17s., 14m.8s., 15m.39s., and 18m.3s., SKSN =23m.30s., eE =24m.48s., PPSN =25m.24s.
Huancayo i =14m.20s., e =17m.25s., iPS? =25m.46s., e =29m.3s., eSS =30m.18s., e =33m.50s., eSSS =34m.18s.
Hyderabad SSN =30m.52s.
Bombay eSSEN =30m.51s.
Poona SKSN =23m.50s., PSN =25m.48s., SSN =30m.43s.
Tamanrasset ePPP?Z =19m.10s., ePS? =26m.18s.?
Brisbane iSKKSE =25m.28s., eE =32m.18s.
La Paz PSNZ =26m.48s., iPPS =27m.50s., iSS =32m.18s.
Riverview eE =24m.57s., iN =25m.8s., iSN =26m.15s., iE =26m.24s., ePSN =27m.50s., iN =27m.59s., eSSZ =33m.28s., iSSEN =33m.34s., eN =37m.12s., eSSS?E = 38m.5s., eQE =43m.30s.
Christchurch SKS?E =24m.26s., iPS?EN =26m.38s., SSEN =33m.50s., SSSE = 38m.13s., QE =44m.18s.
La Plata PPPN =29m.36s., SKSN =31m.42s., PPSN =36m.30s., PPPN($\Delta > 180°$) = 40m.54s., SSSE =44m.24s., E =50m.0s., N =50m.12s. and 53m.30s., E =55m.18s. and 57m.6s., QN =61m.30s., QE =61·7m.
Tananarive e =32m.2s., PS =32m.20s., PPS =34m.40s., SS =40m.19s., e =42m.5s.
Long waves were recorded at Punta Arenas.

Sept. 27d. 17h. 13m. 27s. Epicentre 42°·5S. 172°·9E. (as on 1948, May 22d.).

Intensity V-VI in North portion of South Island, N.Z. Suggested origin 42°·5S. 172°·6E.

R. C. Hayes.
Earthquake Origins in New Zealand during year 1949, New Zealand Journal of Science and Technology, Sect. B., Vol. 31, No. 4, January, 1950, p. 444, with isoseismic chart in appendix.

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Christchurch		1·0	191	e 0 20	− 1	i 0 44	+ 8	—	—	—
Kaimata	N.E.	1·1	269	i 0 20	− 2	—	—	—	—	—
Cobb River	E.	1·4	355	i 0 20	− 7	i 0 36	−10	—	—	—
Wellington		1·8	49	i 0 28	− 4	i 1 2	+ 6	—	—	—
Tuai	N.	4·9	43	e 1 23	+ 6	2 6	− 9	—	—	i 2·6
Auckland	N.	5·8	15	—	—	e 3 23	S_g	—	—	—
Riverview		19·1	290	i 4 28k	+ 1	i 8 6	+ 9	i 4 36	pP	e 9·2
Brisbane	Z.	22·1	307	i 4 57a	− 2	—	—	—	—	—

Additional readings :—
Christchurch iS? =50s.
Tuai iN =2m.21s,

Sept. 27d. Readings also at 2h. (Tacubaya and Tucson), 3h. (near Lick), 5h. (Christchurch, Boulder City and Pierce Ferry), 7h. (Algiers Univ.), 8h. (Copiapo and Pierce Ferry), 9h. (Pasadena, Riverside, Tinemaha, Pierce Ferry (2), Samarkand (2), near Andijan (2), Obi-garm (3), Stalinabad (2), and Tchimkent), 11h. (College, Mount Wilson, Pasadena, Tucson, Pierce Ferry, and near Balboa Heights), 12h. (Pierce Ferry, Santa Lucia, and Stuttgart), 13h. (Pierce Ferry and Santa Lucia), 14h. (Kew and near Leninakan), 16h. (Besançon, Collmberg, Strasbourg, Stuttgart, Ksara, Erevan, near Leninakan, and Tiflis), 17h. (Apia, Brisbane (2), Aberdeen, Belgrade, Strasbourg, Toledo, Tortosa, Pasadena, Riverside, Tinemaha, Boulder City, Pierce Ferry, and College), 18h. (Wellington, Pasadena (2), Riverside (2), Tinemaha, Tucson (2), Boulder City (2), Pierce Ferry (2), Shasta Dam, Hungry Horse, near College (3), Weston, Almeria, Copenhagen, and Upsala), 19h. (Apia, Pasadena, Riverside, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Victoria, College, Jena, Collmberg, Paris, Besançon, Strasbourg, Stuttgart, and near Istanbul), 21h. (Brisbane (2), Tucson, Shasta Dam (2), Hungry Horse (2), Victoria College, and near Pierce Ferry), 22h. (Ksara, Collmberg, Paris, Strasbourg, Besançon, Rome, Tucson, Pierce Ferry, Shasta Dam, Hungry Horse (2), Victoria, College, and near Klyuchi), 23h. (Shasta Dam, Hungry Horse, Victoria, College, Nanking, Ksara, and near Obi-garm).

Sept. 28d. 15h. 7m. 22s. Epicentre 30°·1S. 177°·8W. (as on 1948, February 1d.).

$A = -\cdot8660$, $B = -\cdot0333$, $C = -\cdot4990$; $\delta = +7$; $h = +2$;
$D = -\cdot038$, $E = +\cdot999$; $G = +\cdot499$, $H = +\cdot019$, $K = -\cdot867$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	9·2	221	—	—	e 3 38?	−25	—	—	—
Tuai	N.	9·6	204	—	—	e 4 5	− 7	—	—	—
Wellington		12·7	207	e 3 3	− 2	e 5 13	−15	—	—	e 7·1
Cobb River	E.	13·4	212	—	—	e 5 30	−15	—	—	—
Kaimata	N.E.	15·1	212	e 3 39	+ 3	e 5 11	−74	—	—	—
Christchurch		15·4	207	—	—	e 6 15	−17	e 6 18	S	—
Apia		17·1	22	e 3 57	− 5	e 6 51	−21	e 4 13	PP	—
Brisbane	Z.	25·7	268	i 5 35k	+ 2	—	—	i 5 44	?	—
Branner	Z.	85·0	41	e 12 38	0	—	—	e 12 53	P_cP	—
Pasadena		85·1	46	i 12 38a	− 1	—	—	i 12 48	pP	—
Berkeley		85·2	41	i 12 39a	0	i 24 32	PPS	i 12 43	P_cP	e 43·5
Lick	Z.	85·2	41	i 12 40a	+ 1	—	—	i 12 49	P_cP	—
Palomar		85·4	47	i 12 41	+ 1	—	—	i 12 57	P_cP	—
Riverside	Z.	85·5	46	i 12 41a	0	—	—	i 12 51	pP	—
Fresno	Z.	85·9	43	e 12 41a	− 2	—	—	—	—	—
Tinemaha		87·0	44	i 12 48	0	—	—	i 13 3	P_cP	—
Shasta Dam		87·1	39	i 12 47	− 2	—	—	—	—	—
Boulder City		88·4	47	i 12 56	+ 1	—	—	—	—	—
Tucson		88·7	51	i 12 57	0	—	—	—	—	e 51·1
Pierce Ferry		89·0	47	i 13 13	+15	—	—	—	—	—
Logan		93·8	43	e 13 17	− 3	—	—	—	—	—
Hungry Horse		96·7	37	e 13 32	− 1	—	—	—	—	—
Ksara		151·3	285	i 19 54	[+ 5]	—	—	23 40	PP	—
Collmberg		157·3	342	e 20 9?	[+11]	—	—	e 20 29	PKP_2	—
Jena	N.	158·0	343	e 20 30	PKP_2	—	—	—	—	—
Stuttgart	Z.	160·6	345	e 20 1	[0]	—	—	e 20 43	PKP_2	—
Strasbourg		161·0	348	i 20 45	PKP_2	—	—	—	—	e 83·6
Paris		161·3	359	e 20 3	[+ 1]	(e 31 38)	{+19}	i 20 47	PKP_2	e 31·6
Besançon		162·6	352	i 20 4	[+ 1]	—	—	i 20 51	PKP_2	—
Clermont-Ferrand		164·4	357	e 21 0	PKP_2	—	—	—	—	99·6

Additional readings :—
Apia e =4m.30s.
Pasadena iZ =12m.54s.
Berkeley iZ =12m.47s. and 12m.55s.
Lick iZ =12m.54s.
Riverside iZ =12m.55s.
Shasta Dam i =13m.12s. and 13m.17s.
Boulder City i =13m.5s., e =13m.11s.
Tucson i =13m.7s., 13m.13s., and 13m.30s.
Pierce Ferry i =13m.22s. and 13m.28s., e =14m.50s.
Long waves were also recorded at Weston.

Sept. 28d. Readings also at 0h. (College, Rome, De Bilt, near Istanbul, and near Leninakan), 3h. (near Lick and near Alicante), 4h. (near Andijan and near Istanbul), 5h. (Andijan, Tchimkent, near Stalinabad, Samarkand, and Obi-garm), 6h. (Ksara, Sotchi, Erevan, and Leninakan), 7h. (near Istanbul (2)), 8h. (Tucson, Samarkand, near Obi-garm, Stalinabad (2), and Andijan), 9h. (Pierce Ferry, Istanbul (2), and near Granada), 11h. (near Frunse), 12h. (Stuttgart), 13h. (Pierce Ferry, near Berkeley, Branner, and Lick), 14h. (Algiers Univ. and near Copiapo), 15h. (near Granada), 16h. (Pierce Ferry, Tucson, Grahamstown, and near Pretoria), 17h. (near Istanbul (2), near Leninakan, and Tiflis), 18h. (Nanking), 19h. (Copiapo), 22h. (Tashkent, Tchimkent, near Obi-garm, Stalinabad, Samarkand, and Andijan), 23h. (College, Tucson, Obi-garm, Tchimkent, Frunse, Almata, near Andijan, Tashkent, Samarkand, and near Apia).

Sept. 29d. 4h. 47m. 4s. Epicentre 40°·5N. 84°·5E. (as on May 9d.).

$A = +·0731$, $B = +·7591$, $C = +·6469$; $\delta = +6$; $h = -2$;
$D = +·995$, $E = -·096$; $G = +·062$, $H = +·644$, $K = -·763$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata		6·3	299	i 1 34	− 2	—	—	—	—	—
Frunse		7·8	291	e 2 19	P*	—	—	—	—	—
Andijan		9·2	276	e 2 19	+ 3	—	—	—	—	—
Tchimkent		11·3	282	e 2 44	− 2	—	—	—	—	—
Tashkent		11·5	279	2 47	− 1	—	—	—	—	—
Obi-garm		11·6	266	i 2 51	+ 1	i 6 27	L	—	—	(i 6·4)
Stalinabad		12·3	266	i 3 1	+ 2	—	—	—	—	—
Samarkand		13·4	272	e 3 15	+ 1	—	—	—	—	—
Irkutsk		18·0	41	4 14	+ 1	7 35	+ 3	—	—	—
Calcutta	E.	18·2	167	—	—	e 8 24	SSS	e 12 16	P_eS	—
Ashkabad		20·4	270	4 45	+ 4	e 8 8	−17	—	—	—
Sverdlovsk		22·5	324	i 4 54	− 8	8 53	−12	—	—	—
Poona		23·7	204	—	—	e 16 41	S_eS	—	—	—
Grozny		28·8	288	e 6 14	+12	—	—	—	—	—
Tiflis		29·8	285	6 20	+ 9	e 12 56	SSS	—	—	—
Moscow		34·1	312	e 6 43	− 5	e 12 7	− 7	—	—	—
Ksara		38·9	276	e 7 35	+ 6	e 13 59	+31	—	—	—
Copenhagen		48·2	314	8 41	− 3	—	—	8 46	P	24·9
Collmberg		49·1	306	e 8 48	− 3	—	—	—	—	—
Jena		50·0	307	e 8 56	− 2	—	—	—	—	—
Stuttgart		52·2	305	e 9 12	− 3	—	—	e 11 45	PP	e 24·9
De Bilt		53·4	311	—	—	—	—	e 24 26	Q	e 27·9
Paris		56·3	308	i 9 43	− 2	—	—	—	—	e 28·9
College		67·3	21	i 10 56	− 3	—	—	—	—	—
Victoria		88·0	18	i 12 54a	+ 1	—	—	—	—	—
Hungry Horse		90·0	12	i 13 2	− 1	—	—	—	—	—
Shasta Dam		95·0	20	i 13 29	+ 3	—	—	—	—	—

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

Sept. 29d. Readings also at 0h. (Poona and near San Francisco), 1h. (Frunse, near Obi-garm (3), Andijan (3), Tashkent, Samarkand (3), and Tchimkent), 3h. (Victoria, near Stalinabad and near Obi-garm), 4h. (Istanbul, College, and Hungry Horse), 6h. (Lick, Boulder City, Pierce Ferry, and Shasta Dam), 8h. (Ksara), 9h. (Messina, Obi-garm, Tchimkent, near Stalinabad, Andijan, Samarkand, and near Istanbul), 11h. (Obi-garm, Samarkand, Frunse, near Andijan, Stalinabad, Tashkent, and Tchimkent), 12h. (Pierce Ferry, Tucson, Tchimkent, near Obi-garm, and Stalinabad), 13h. (Hungry Horse, Pierce Ferry, Samarkand, near Obi-garm, Stalinabad, Andijan, near Tchimkent, and near Ottawa), 15h. (near Obi-garm), 16h. (Stuttgart), 17h. (Tacubaya and Toledo), 18h. (Pierce Ferry, Victoria, Ottawa, and near Obi-garm), 19h. (near Obi-garm (2), Stalinabad, and Andijan), 20h. (near Tacubaya), 22h. (Andijan, Samarkand, near Obi-garm, and Stalinabad), 23h. (Nanking, Calcutta, Kew, Victoria, Hungry Horse, Shasta Dam (2), near Tacubaya (3), and near Obi-garm).

Sept. 30d. 3h. 58m. 48s. Epicentre 23°·2S. 177°·4W. (as on 1940, Feb. 12d.).

A = −·9191, B = −·0417, C = −·3917 ; δ = −9 ; h = +4 ;
D = −·045, E = +·999 ; G = +·391, H = +·018, K = −·920.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		10·8	31	e 2 37	− 2	e 4 28	−14	e 4 56	SS	e 5·1
Arapuni	E.	15·9	200	—	—	7 36?	L	—	—	7·6
Wellington		19·2	199	e 5 41	?	e 8 10	+11	e 8 12?	Q	e 9·7
Christchurch		21·9	200	e 4 52	− 5	8 55	+ 1	9 32	Q	10·8
Brisbane		27·0	256	e 5 56	+11	e 10 18	− 4	i 11 57	SSS	—
Riverview		29·5	242	e 6 19	+11	e 11 24	+22	i 7 19	PPP	e 14·6
Honolulu		48·2	26	—	—	e 15 44	+ 1	e 18 24	S_cS	e 22·5
Batavia		74·5	270	e 11 41	− 1	e 20 56	−21	—	—	—
Berkeley		79·8	42	i 12 14k	+ 2	i 22 18	+ 4	e 17 36	PPP	e 33·1
Lick	Z.	79·9	42	i 12 11a	− 1	—	—	i 12 22a	P_cP	—
Pasadena		80·1	47	e 12 10	− 3	e 22 19	+ 1	e 27 32	SS	e 33·2
Ukiah		80·1	41	—	—	e 22 19	+ 1	—	—	e 34·1
Fresno	Z.	80·6	44	i 12 16	0	i 23 6	PS	i 15 18	PP	e 41·2
China Lake	Z.	81·5	45	i 12 20	− 1	—	—	—	—	—
Shasta Dam		81·6	39	i 12 19	− 2	—	—	e 15 26	PP	—
Mineral	Z.	81·8	40	e 12 20	− 2	—	—	i 12 23	P	—
Tinemaha		81·8	45	e 12 20	− 2	—	—	—	—	—
Boulder City		83·4	47	e 12 44	P_cP	—	—	—	—	—
Pierce Ferry		84·0	47	i 12 33	0	—	—	—	—	—
Tucson		84·1	52	e 12 32	− 2	e 22 55	− 3	e 28 42	SS	e 36·4
Seattle		86·1	35	e 12 48	+ 4	e 23 28	+10	e 13 5	pP	—
Victoria		86·2	34	e 12 46	+ 2	e 23 28	+ 9	—	—	43·2
Sitka		87·8	22	e 12 44	− 8	e 23 32	− 2	e 29 26	SS	e 38·9
Salt Lake City		88·0	44	—	—	e 23 26	−10	—	—	e 38·9
Logan		88·6	43	e 12 53	− 3	e 23 26	−16	e 29 30	SS	e 39·4
College		90·7	12	—	—	e 24 1	0	—	—	e 45·2
Hungry Horse		91·0	37	e 13 6	− 1	—	—	e 16 22	PP	—
Bozeman		91·2	40	—	—	e 23 44	[+ 4]	e 24 9	S	e 41·4
Rapid City	E.	95·2	44	—	—	e 24 41	+ 1	—	—	e 45·4
Huancayo		96·1	106	—	—	e 24 1	[− 6]	e 26 58	PPS	e 43·8
Saskatoon		97·0	36	—	—	e 25 0	+ 5	—	—	46·6
Lincoln	E.	98·2	48	—	—	e 24 22	[+ 4]	—	—	e 44·8
La Paz		100·4	113	—	—	i 24 32	[+ 3]	i 25 0	SKKS	48·5
Irkutsk		101·2	323	e 14 30	+36	—	—	e 18 54	PP	—
St. Louis		102·0	53	—	—	e 24 24	[−13]	i 27 2	PS	—
Calcutta	E.	102·3	289	—	—	e 24 53	[+15]	—	—	—
Bogota		104·1	91	—	—	e 24 43	[− 3]	e 33 14	SS	e 74·4
Chicago		104·9	50	—	—	e 26 9	+ 8	e 26 39	?	e 47·3
Galerazamba		105·2	85	—	—	e 25 2	[+11]	—	—	e 53·2
New Kensington	E.	110·4	54	—	—	e 28 31	PS	e 37 57	SSS	e 55·3
Pennsylvania	E.	111·8	54	—	—	i 25 16	[− 4]	i 26 23	SKKS	—
Philadelphia		113·6	55	—	—	e 27 16	S	e 29 1	PS	e 50·3
Fordham		114·7	55	e 19 46	PP	e 29 8	PS	—	—	—
Ottawa		114·8	49	e 29 18	PS	e 27 26	S	e 36 18	SSP	57·2
Bombay	E.	114·9	281	e 20 42	?	—	—	—	—	—
San Juan		116·1	80	e 19 40	PP	e 25 28	[− 8]	e 29 18	PS	e 52·6
Weston		116·9	53	e 29 26	PS	e 36 12	SS	e 51 12	Q	e 60·1
Seven Falls	E.	117·7	47	—	—	e 29 42	PS	—	—	61·2
Fort de France		119·5	86	e 19 45	PP	—	—	—	—	—
Bermuda		120·5	65	—	—	e 30 29	PS	—	—	—
Sverdlovsk		126·5	325	e 22 30	PKS	e 29 38	?	—	—	—
Scoresby Sund		130·6	11	—	—	39 0	SS	—	—	67·2
Ksara		149·0	297	e 19 52	[+ 6]	—	—	23 32	PP	—
Rathfarnham Castle		149·2	10	—	—	e 35 42	PPS	e 42 42	SS	e 55·2
Collmberg	Z.	150·8	346	e 20 0	[+11]	—	—	—	—	—
De Bilt		151·1	357	e 20 3	[+14]	e 43 6	SS	i 23 41	PP	e 79·2
Istanbul		151·5	316	e 19 58	[+ 8]	—	—	e 23 58	PP	—
Prague		151·6	344	e 23 29	PP	e 33 43	PSKS	e 43 22	SS	e 87·2
Kew		151·7	3	e 20 8	[+18]	e 30 11	{−17}	e 23 17	PP	e 74·2
Helwan	Z.	153·5	291	i 19 57k	[+ 5]	—	—	23 26	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stuttgart		154·0	350	e 19 57	[+ 4]	e 43 47	SS	e 20 21	PKP_2	e 86·2
Strasbourg		154·3	353	e 20 0	[+ 6]	e 43 36	SS	e 27 34	PPP	e 84·2
Paris		154·4	1	e 19 59	[+ 5]	e 43 49	SS	e 27 51	PPP	e 84·2
Basle		155·4	351	e 19 42	[−13]	—	—	e 21 35	?	—
Triest		155·8	341	—	—	i 44 7	SS	—	—	e 76·2
Besançon		155·9	354	e 20 32	PKP_2	—	—	e 21 6	?	—
Clermont-Ferrand		157·5	0	e 20 3	[+ 5]	e 44 12?	SS	—	—	—
Rome		159·6	338	i 20 2	[+ 2]	27 2	[− 2]	44 39	SS	e 77·0
Lisbon	z.	161·6	29	20 7k	[+ 5]	—	—	24 30	PP	—
Toledo		162·4	17	e 20 4	[+ 1]	—	—	e 24 37	PP	86·5
Alicante		164·7	9	20 31	[+26]	27 41	[+33]	21 29	PKP_2	e 75·8
Malaga	z.	165·2	23	i 20 10k	[+ 4]	27 0	[− 9]	i 21 22	PKP_2	87·3
Almeria		165·7	17	20 3	[− 3]	27 1	[− 8]	21 57	PKP_2	87·4

Additional readings :—
Apia e =4m.18s.
Christchurch eZ =6m.28s.
Riverview iPPPEZ =7m.36s., iZ =11m.44s., eE =12m.6s., eSSN =13m.6s., eSSSN =13m.29s.
Berkeley iP_cPZ =12m.44s., cE =22m.4s., iN =23m.14s., iE =23m.33s. and 32m.10s.
Lick iZ =12m.16s. and 12m.36s.
Pierce Ferry i =12m.57s., e =14m.15s. and 20m.24s.
Seattle ePPS =24m.35s., e =27m.4s., eSS =29m.4s.
College e =24m.10s.
Hungry Horse i =13m.52s.
Huancayo ePS? =31m.49s., e =32m.28s.
La Paz iSS =32m.12s.
St. Louis iSKKS? =25m.4s., eSKKS? =25m.25s., iS =25m.47s., i =26m.16s.
Bogota eSSSEN =52m.12s.
Pennsylvania iPSE =28m.48s., eSSE =35m.5s.
Philadelphia ePPS =30m.11s., eSS =35m.17s., eSSS? =39m.11s.
Fordham eS =27m.34s., ePPS =30m.16s.
San Juan eS =27m.24s., eSS =35m.26s.
Kew $ePKP_2$ =20m.30s., eSPZ =34m.39s., eNZ =36m.15s., eSSZ =41m.18s., ePSSEN =43m.17s., e =53m.17s., eZ =60m.13s.
Helwan eZ =20m.24s., 20m.44s., 21m.0s., 21m.12s., 28m.24s., and 31m.15s., PPSZ =35m.21s.
Strasbourg e =21m.3s., 48m.12s., and 55m.30s.
Paris i =20m.22s., $ePKP_2$ =20m.37s., ePP? =24m.30s., e =42m.12s.? and 50m.12s.?
Rome PSKS? =34m.37s.
Toledo eZ =25m.1s.
Alicante PP =25m.25s., PPP =29m.27s., SS =45m.43s., SSS =52m.8s.
Malaga iPPZ =24m.56s., PPPZ =29m.4s.
Almeria PP =24m.40s., PPP =28m.32s., SS =45m.4s., SSS =51m.24s.
Long waves were also recorded at Auckland, Tananarive, La Plata, Columbia, City College, N.Y., Halifax, Harvard, Ivigtut, Aberdeen, and Upsala.

Sept. 30d. 4h. 9m. 39s. Epicentre 23°·2S. 177°·4W. (as at 3h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		10·8	31	e 2 35	− 4	e 4 28	−14	—	—	—
Tuai	N.	16·2	195	—	—	e 6 33	−18	—	—	—
Wellington		19·2	199	—	—	e 7 37	−22	—	—	—
Kaimata	N.E.	21·4	204	—	—	e 7 34	−71	—	—	—
Christchurch		21·9	200	—	—	e 8 40	−14	—	—	—
Santa Clara		79·7	42	i 11 29	−42	e 17 57	PPP	—	—	e 26·6
Lick	z.	79·9	42	i 12 12a	0	—	—	—	—	—
Pasadena	z.	80·1	47	i 12 11	− 2	—	—	—	—	—
China Lake	z.	81·5	45	e 12 20	− 1	—	—	—	—	—
Shasta Dam		81·6	39	i 12 21	0	—	—	i 12 33	P_cP	—
Mineral	z.	81·8	40	i 12 22a	0	e 27 21	SS	—	—	—
Tinemaha		81·8	45	i 12 22	0	—	—	i 12 36	P_cP	—
Boulder City		83·4	47	i 12 41	P_cP	—	—	—	—	—
Pierce Ferry		84·0	47	i 12 34	+ 1	—	—	—	—	—
Tucson		84·1	52	i 12 33	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hungry Horse		91·0	37	e 13 5	− 2	—	—	—	—	—
Huancayo		96·1	106	e 12 37	−54	—	—	—	—	—
Cleveland	E.	109·2	53	e 14 16	P	—	—	e 18 57	PP	—
Bombay	E.	114·9	281	—	—	i 28 28	PS	—	—	—
Collmberg	Z.	150·8	346	e 19 52	[+ 3]	—	—	—	—	—
Stuttgart	Z.	154·0	350	e 19 57	[+ 4]	—	—	—	—	—
Strasbourg		154·3	353	i 20 25	PKP_2	—	—	i 20 47	?	—
Paris		154·4	1	i 20 7	[+13]	—	—	—	—	—
Besançon		155·9	354	i 20 31	PKP_2	—	—	—	—	—

Additional readings :—
Lick iZ = 12m.16s., 13m.23s., and 13m.55s.
Pierce Ferry i = 13m.4s., e = 14m.2s.
Cleveland eN = 15m.53s., eE = 17m.26s.

Sept. 30d. 8h. South-west Pacific, but apparently neither an after-shock of 3h. nor a fore-shock of 15h.

Brisbane iPZ = 54m.30s.a, iN = 55m.19s., iSN = 58m.27s.
Riverview iPNZ = 55m.33s.k, iPPZ = 56m.35s., iSN = 60m.20s., iNZ = 60m.38s., eLZ 63·5m.
Perth i = 61m.24s. and 67m.8s.
Pasadena iPNZ = 62m.53s., i = 63m.6s., iZ = 63m.14s. and 63m.31s., eLZ = 100m.
China Lake ePZ = 62m.59s., eZ = 63m.9s.
Boulder City iP = 63m.10s., i = 63m.21s.
Hungry Horse eP = 63m.12s., iP = 63m.23s.
Pierce Ferry iP = 63m.14s., e = 63m.50s., i = 64m.10s.
Christchurch ePNZ = 63m.35s., eSEN = 66m.44s., eLNZ = 69m.0s.
Tucson eP? = 63m.38s., eL = 98m.9s.
Ksara eP = 65m.3s., PP = 69m.41s.
Bombay eE = 72m.39s.
Long waves were also recorded at Auckland, Wellington, Kew, and at other North American stations.

Sept. 30d. 14h. 44m. 39s. Epicentre 39°·2N. 70°·7E. (as on 20d.).

$A = +·2568$, $B = +·7334$, $C = +·6295$; $\delta = +9$; $h = -1$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		0·9	237	i 0 14	P_g	i 0 26	S_g	—	—	—
Stalinabad		1·6	247	i 0 29	− 1	i 0 55	S_g	—	—	—
Andijan		2·0	39	i 0 34	− 1	1 1	S*	—	—	—
Tashkent		2·4	333	—	—	i 1 25?	S_g	—	—	—
Tchimkent		3·1	345	i 0 53	+ 2	i 1 37	S*	—	—	—
Frunse		4·7	38	e 1 13	− 1	e 2 10	0	—	—	—
Almata		6·2	47	i 1 39	+ 4	—	—	—	—	—
Ashkabad		9·8	267	e 2 23	− 1	5 5	+48	—	—	—
Grozny		19·2	290	e 4 28	0	—	—	—	—	—
Tiflis		19·8	285	e 4 33	− 2	e 8 45?	+32	—	—	—
Calcutta	E.	22·4	133	—	—	e 9 23	SS	e 12 23	P_cS	—
Ksara		28·4	269	e 8 12	?	—	—	—	—	e 13·8

Sept. 30d. 15h. 15m. 58s. Epicentre 22°·0S. 170°·3E. (as on 12d.).

$A = -·9148$, $B = +·1564$, $C = -·3724$; $\delta = 0$; $h = +4$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	15·3	166	e 4 2	PPP	—	—	—	—	e 8·0
Brisbane		16·6	247	i 3 55a	− 1	i 7 14	+14	i 4 3	PP	—
Tuai	N.	17·7	165	e 4 13	+ 3	—	—	—	—	—
Apia		18·9	70	e 4 21	− 3	—	—	e 4 43	PP	—
Cobb River	E.	19·1	176	e 4 21	− 6	—	—	—	—	—
Wellington		19·6	172	i 4 36	+ 4	i 8 14	+ 6	i 8 26	SS	e 10·0
Kaimata	N.E.	20·5	178	e 4 53	+11	—	—	—	—	—
Riverview		20·7	230	i 4 42k	− 2	i 8 36	+ 5	i 5 2	PP	e 9·8
Christchurch		21·6	177	4 56	+ 2	8 39	−10	5 17	PP	11·3
Lick	Z.	87·1	48	e 12 44	− 5	—	—	—	—	—

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.	88·1	52	i 12 54	0	—	—	—	—	—
Riverside	z.	88·5	52	e 12 56	0	—	—	—	—	—
Tinemaha	z.	89·3	49	e 12 59	0	—	—	—	—	—
Boulder City		91·2	52	e 13 10	+ 2	—	—	—	—	—
Calcutta	E.	91·3	294	—	—	e 23 36	[− 4]	e 25 26	PS	—
Pierce Ferry		91·9	52	i 13 12	+ 1	—	—	e 13 58	?	—
College		92·4	17	e 13 12	− 2	—	—	—	—	e 44·3
Tucson		92·7	56	e 13 16	+ 1	—	—	e 20 38	PPPP	e 43·9
St. Louis		110·6	55	e 17 15	?	e 25 21	[+ 6]	—	—	e 55·7
Ottawa		122·0	48	e 18 54k	[− 3]	—	—	—	—	70·0
Ksara		138·3	296	e 19 1	[−26]	—	—	22 27	PP	—
Istanbul		142·3	310	e 19 36	[+ 1]	—	—	e 22 48	PP	—
Helwan	z.	142·4	291	e 21 2	?	e 24 8	?	i 22 46	PP	—
Collmberg		145·8	335	e 19 41	[0]	—	—	e 19 44	PKP_2	—
Prague		146·2	332	e 23 45	PP	e 24 50	?	e 23 57	?	—
Jena		146·7	335	e 19 44	[+ 2]	—	—	e 20 24	?	—
De Bilt		147·8	343	e 19 49	[+ 5]	—	—	e 23 22	PP	e 80·0
Stuttgart		149·3	336	e 19 50	[+ 4]	—	—	e 20 3	PKP_2	—
Strasbourg		150·0	337	i 19 54k	[+ 7]	—	—	i 20 8	PKP_2	—
Zürich		150·7	335	e 19 53a	[+ 5]	—	—	—	—	—
Basle		151·0	336	e 19 36	[−13]	—	—	—	—	—
Paris		151·5	344	e 19 57	[+ 7]	—	—	—	—	e 94·0
Besançon		151·8	337	e 19 58	[+ 8]	—	—	e 20 7	PKP_2	—
Rome		152·8	322	e 19 48	[− 4]	—	—	e 23 47	PP	e 75·5
Tamanrasset	z.	165·9	276	20 8	[+ 1]	—	—	—	—	—

Additional readings :—
Brisbane eSE = 7m.17s.
Riverview iE = 5m.13s., iP_cPZ = 8m.39s., iE = 8m.44s., iSSZ = 9m.11s.
Long waves were also recorded at Arapuni, Bombay, Tananarive, Kew, Clermont-Ferrand, and at other North American stations.

Sept. 30d. 18h. 19m. 32s. Epicentre 23°·2S. 177°·4W. (as at 4h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		10·8	31	e 2 38	− 1	4 31	−11	4 43	SS	e 5·2
Wellington	z.	19·2	199	(e 5 28?)	+60	—	—	—	—	e 5·5
Christchurch		21·9	200	e 4 34	−23	8 51	− 3	e 5 38	PPP	10·2
Brisbane		27·0	256	e 3 7	?	i 6 49	?	—	—	—
Riverview		29·5	242	e 6 17	+ 9	e 11 24	+22	i 7 18	PPP	—
Santa Clara	E.	79·7	42	—	—	—	—	e 36 12	Q	e 53·0
Berkeley		79·8	42	i 12 12k	0	i 22 10	− 4	e 35 22	Q	e 38·5
Lick	z.	79·9	42	i 12 10k	− 2	—	—	i 12 15	P	—
Pasadena		80·1	47	e 12 9	− 4	—	—	—	—	e 34·1
Mount Wilson	z.	80·2	47	i 15 2	PP	—	—	i 15 13	?	—
Fresno	z.	80·6	44	e 12 15	− 1	—	—	—	—	—
Riverside	z.	80·6	47	e 12 12	− 4	—	—	e 15 12	PP	—
Shasta Dam		81·6	39	i 12 20	− 1	—	—	e 15 37	PP	—
Mineral	z.	81·8	40	e 12 21	− 1	—	—	—	—	—
Tinemaha		81·8	45	i 12 21	− 1	—	—	—	—	—
Reno		82·4	42	e 12 25	0	—	—	e 12 31	P_cP	—
Boulder City		83·4	47	i 12 29	− 1	—	—	—	—	—
Overton	z.	84·0	47	i 12 33	0	—	—	i 12 47	P_cP	—
Pierce Ferry		84·0	47	i 12 33	0	—	—	e 14 27	?	—
Tucson		84·1	52	e 12 33	− 1	e 23 0	+ 2	—	—	e 40·2
Logan		88·6	43	e 12 50	− 6	e 23 45	+ 3	e 29 28	SS	e 42·0
Hungry Horse		91·0	37	i 13 6	− 1	—	—	—	—	—
La Paz		100·4	113	e 13 56	+ 6	—	—	—	—	e 46·5
St. Louis		102·0	53	e 28 47	PPS	e 24 36	[− 1]	e 25 39	S	—
Calcutta	E.	102·3	289	e 22 26	PKS	e 24 53	[+15]	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pennsylvania	E.	111·8	54	—	—	e 28 43	PS	e 29 50	PPS	—
Bombay	E.	114·9	281	e 21 28?	PPP	—	—	—	—	—
Tashkent		122·9	306	e 20 40	PP	i 30 49?	PS	—	—	—
Ksara		149·0	297	19 54	[+ 8]	—	—	23 37	PP	—
De Bilt		151·1	357	e 20 46	[+57]	—	—	—	—	e 80·5
Istanbul		151·5	316	e 19 54	[+ 4]	—	—	e 23 25	PP	—
Kew		151·7	3	—	—	e 34 28	PS	—	—	e 79·5
Helwan	Z.	153·5	291	e 19 58	[+ 6]	e 30 33	{− 5}	e 20 25	PKP_2	—
Stuttgart		154·0	350	e 19 56	[+ 3]	e 43 52	SS	—	—	e 86·5
Strasbourg		154·3	353	e 20 23	PKP_2	—	—	e 27 40	PPP	e 84·5
Paris		154·4	1	e 20 23	PKP_2	—	—	e 21 22	?	e 83·5
Besançon		155·9	354	e 20 30	PKP_2	—	—	e 20 40	?	—
Rome		159·6	338	e 24 53	PP	e 45 4	SSP	—	—	—
Malaga	Z.	165·2	23	i 19 58a	[− 8]	—	—	21 22	PKP_2	71·0
Tamanrasset	Z.	177·3	—	e 20 15	[+ 3]	—	—	e 22 4	PKP_2	—

Additional readings :—
Riverview iPPPEZ = 7m.38s., iE = 12m.24s.
Berkeley eZ = 12m.16s., iN = 22m.22s., eE = 22m.30s.
Riverside ePZ = 15m.1s.
Shasta Dam i = 12m.51s.
Reno eE = 12m.28s.
Helwan eZ = 21m.7s., PPZ = 23m 58s , eZ = 24m.34s.
Malaga iPPZ = 25m.4s.
Tamanrasset ePPZ = 25m.57s., ePPP?Z = 29m.0s.
Long waves were also recorded at Auckland, Arapuni, Kaimata, Bogota, Huancayo, Clermont-Ferrand, Triest, and at other North American stations.

Sept. 30d. 22h. 6m. 48s. Epicentre 23°·2S. 177°·4W. (as at 18h.).

		△	Az.	P.	O−C.	S.	O−C.		Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Apia		10·8	31	e 2 38	− 1	e 4 28	−14	e 2 59	PPP		e 5·3
Christchurch		21·9	200	—	—	8 32	−22	—	—		10·7
Brisbane	Z.	27·0	256	i 5 26	−19	—	—	i 9 9	P_cP		—
Riverview		29·5	242	e 6 26	+18	i 12 27	SS	i 7 24	PPP		e 13·3
Berkeley		79·8	42	i 12 12a	0	—	—	—	—		e 38·3
Lick	Z.	79·9	42	i 12 13k	+ 1	—	—	i 15 23k	PP		—
Pasadena		80·1	47	i 12 13	0	—	—	e 15 20	PP		e 38·8
Fresno	Z.	80·6	44	i 12 18	+ 2	—	—	i 15 28	PP		—
China Lake	Z.	81·5	45	e 12 19	− 2	—	—	e 15 30	PP		—
Shasta Dam		81·6	39	i 12 20	− 1	—	—	e 15 32	PP		—
Tinemaha	Z.	81·8	45	i 12 22	0	—	—	i 15 33	PP		—
Reno		82·4	42	e 12 28	+ 3	—	—	e 12 40	P_cP		—
Boulder City		83·4	47	i 12 30	0	—	—	i 15 40	PP		—
Overton	Z.	84·0	47	i 12 34	+ 1	—	—	i 12 47	P_cP		—
Pierce Ferry		84·0	47	i 12 34	+ 1	—	—	i 15 45	PP		—
Tucson		84·1	52	e 12 34	0	—	—	i 15 48	PP		e 41·5
Seattle		86·1	35	—	—	(e 23 12?)	− 6	—	—		e 23·2
Logan		88·6	43	e 12 54	− 2	—	—	—	—		e 41·9
College		90·7	12	i 13 10	+ 4	—	—	e 16 18	PP		—
Hungry Horse		91·0	37	i 13 7	0	—	—	e 16 17	PP		—
La Paz		100·4	113	—	—	e 24 32	[+ 3]	—	—		—
St. Louis		102·0	53	—	—	i 25 46	+ 9	e 31 20	?		—
Cleveland	E.	109·2	53	e 28 31	PS	e 34 33	SSP	—	—		58·1
Bombay	E.	114·9	281	—	—	e 40 12?	SSS	—	—		—
Tashkent		122·9	306	e 20 45	PP	e 30 46?	PS	—	—		—
Ksara		149·0	297	e 19 55	[+ 9]	36 56	PPS	—	—		—
Collmberg		150·8	346	e 20 1	[+12]	e 23 10	PKS	—	—		—
De Bilt		151·1	357	e 19 42	[− 7]	—	—	—	—		e 82·2
Istanbul		151·5	316	e 19 58	[+ 8]	—	—	e 23 55	PP		—
Kew		151·7	3	e 23 42	PP	—	—	—	—		e 81·2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Helwan	z.	153·5	291	e 20 0	[+ 8]	—	—	20 24 PKP$_2$	—
Stuttgart		154·0	350	e 19 58	[+ 5]	e 23 6	PKS	— —	e 91·2
Strasbourg		154·3	353	e 20 22	PKP$_2$	e 23 46	SKP	— —	e 90·2
Paris		154·4	1	e 20 0	[+ 6]	—	—	e 20 28 PKP$_2$	e 83·2
Malaga	z.	165·2	23	e 20 9	[+ 3]	—	—	i 21 7k PKP$_2$	70·7
Tamanrasset	z.	177·3	—	e 20 16	[+ 4]	—	—	e 22 6 PKP$_2$	—

Additional readings :—
Apia eS? =4m.25s.
Lick iZ =12m.25s. and 15m.37s.
Shasta Dam i =12m.29s. and 12m.33s.
Tinemaha iZ =12m.34s.
Reno eN =12m.44s.
Boulder City i =13m.16s.
Pierce Ferry i =13m.20s., e =16m.44s.
Hungry Horse i =13m.21s.
Helwan eZ =23m.30s., PPZ =23m.57s., eZ =24m.21s.
Malaga iPPZ =24m.55s., PPPZ =28m.57s.
Tamanrasset eZ =25m.16s., ePPZ =26m.3s., ePPP?Z =29m.6s.
Long waves were also recorded at Arapuni, Auckland, Wellington, Huancayo, Bogota, Galerazamba, Alicante, Clermont-Ferrand, and at other North American stations.

Sept. 30d. Readings also at 0h. (Rome), 1h. (Rome and near Obi-garm), 2h. (Kew), 3h. (Istanbul, Pierce Ferry, Tucson, near Obi-garm, Andijan, and Stalinabad), 4h. (near Lick, near Klyuchi, and near Stalinabad), 5h. (Pierce Ferry, Istanbul, near Bucharest, and near Stalinabad), 7h. (College, Hungry Horse, Tucson, Mount Wilson, and China Lake), 9h. (Pierce Ferry, near Obi-garm, Stalinabad, and Andijan), 11h. (near Stalinabad and near College), 12h. (near Frunse), 13h. (Copiapo), 14h. (Pasadena, Tinemaha, and near Mizusawa), 15h. (Reno and near Obi-garm), 16h. (Brisbane, College, Shasta Dam, Boulder City, Overton, Pierce Ferry, Tucson, Pasadena, and Tinemaha), 17h. (College), 18h. (Ksara, Obi-garm, Frunse, near Andijan, Samarkand, Tashkent, Tchimkent, and Stalinabad), 20h. (Pierce Ferry and near Tucson), 21h. (Boulder City and Pierce Ferry), 22h. (Overton and near Branner), 23h. (Pierce Ferry, Ksara, Istanbul, Erevan, Sotchi, Grozny, and near Leninakan).

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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