The International Seismological Summary.

1951 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 1951 contains 245 epicentres, 189 of which are repetitions from previously adopted epicentres.

Cases of deep focus are noted below :—

			°	°	
July	1d.	17h.	18.6S.	179·1W.	0·090
	2d.	5h.	5.5N.	126·0E.	Suggested Deep.
	2d.	18h.	Undetermined shock		Suggested Deep.
	3d.	11h.	16·0S.	74·5W.	0·010
	4d.	7h.	19·0S.	174·2W.	0·015
	7d.	3h.	36·7N.	70·5E.	0·030
	7d.	5h.	36·7N.	70·5E.	0·030
	9d.	1h.	33·1N.	139·3E.	0·025
	11d.	12h.	52·0N.	178·2E.	0·010
	11d.	18h.	28·1N.	139·9E.	0·070
	12d.	9h.	36·7N.	70·5E.	0·020
	13d.	19h.	6·1S.	150·5E.	0·010
	14d.	13h.	37·8N.	141·4E.	0·010
	14d.	22h.	28·0S.	70·0W.	0·010
	16d.	1h.	35·6N.	140·0E.	0·005
	16d.	10h.	6·0S.	146·5E.	0·010
	17d.	14h.	14·0S.	167·0E.	0·010
	19d.	20h.	51·6N.	177·8W.	0·005

July	19d.	21h.	51·6N.	177·8W.	0·005
	19d.	23h.	51·6N.	177·8W.	0·005
	21d.	4h.	36·7N.	70·5E.	0·020
	22d.	9h.	51·7N.	178·5W.	Suggested Deep
	23d.	19h.	12·9S.	172·7W.	0·010
	24d.	14h.	36·4N.	141·1E.	0·005
	25d.	17h.	42·5N.	143·7E.	0·030
	25d.	18h.	14·5N.	90·5W.	0·005
	25d.	20h.	29·8N.	131·2E.	Suggested Deep.
	26d.	10h.	40·9N.	142·7E.	0·005
	27d.	0h.	7·6S.	120·7E.	0·020
	30d.	4h.	6·8S.	127·5E.	0·040
	30d.	16h.	10·4N.	85·7W.	0·010
	31d.	13h.	8·0S.	112·0E.	0·010
Aug.	2d.	3h.	4·1S.	154·8E.	0·070
	2d.	20h.	13·0N.	87·8W.	Base of Superficial Layers.
	3d.	0h.	13·0N.	87·8W.	Base of Superficial Layers.
	3d.	5h.	13·0N.	87·8W.	Base of Superficial Layers.
	4d.	1h.	36·9N.	70·8E.	0·025
	4d.	7h.	36·9N.	70·8E.	0·025
	5d.	15h.	Undetermined shock		Deep.
	6d.	7h.	42·4N.	137·6E.	0·040
	6d.	8h.	13·0N.	87·8W.	Base of Superficial Layers.
	10d.	23h.	46·0N.	143·8E.	0·040
	13d.	6h.	42·3N.	142·4E.	0·005
	14d.	12h.	39·1N.	144·7E.	0·010
	14d.	20h.	5·2N.	74·5W.	0·030
	18d.	12h.	43·9N.	146·2E.	0·005
	19d.	15h.	36·9N.	70·8E.	0·030
	23d.	1h.	53·4N.	170·0W.	0·015
	23d.	13h.	35·5S.	179·6E.	0·010
	24d.	14h.	46·5N.	150·7E.	0·025
	24d.	23h.	37·8N.	141·4E.	Suggested Deep.
	26d.	18h.	36·9N.	70·8E.	0·030
	28d.	16h.	26·5S.	178·5E.	0·090
	29d.	12h.	36·7N.	70·5E.	0·030
	30d.	7h.	22·5N.	143·5E.	0·040
	30d.	20h.	35·8N.	140·8E.	0·010
	31d.	10h.	19·9S.	179·0W.	0·080

Sept.	3d.	2h.	40·6N.	142·3E.	0·005
	3d.	6h.	36·8N.	140·4E.	0·010
	8d.	16h.	24·9S.	179·8W.	0·070
	11d.	21h.	37·8N.	142·2E.	Base of Superficial Layers.
	15d.	8h.	18·5N.	66·0W.	0·010
	15d.	12h.	37·1N.	71·2E.	0·025
	15d.	22h.	36·4N.	140·6E.	0·010
	16d.	1h. (32m.)	15·0S.	167·4E.	0·010
	16d.	1h. (43m.)	16·8N.	146·4E.	0·020
	16d.	16h.	22·3S.	176·8W.	0·025
	17d.	11h.	17·5S.	172·2W.	Base of Superficial Layers.
	17d.	20h.	3·8S.	102·2E.	0·005
	19d.	4h.	20·5S.	69·8W.	0·010
	20d.	1h.	30·1S.	177·8W.	Base of Superficial Layers.
	20d.	17h. (0m.)	52·8N.	168·2W.	0·010
	20d.	17h. (48m.)	52·8N.	168·2W.	0·010
	21d.	3h.	18·8S.	175·0E.	0·060
	21d.	8h.	52·8N.	168·2W.	0·010
	21d.	16h.	52·8N.	168·2W.	0·010
	21d.	20h.	34·2N.	136·8W.	0·050
	23d.	10h.	34·3N.	136·2E.	Base of Superficial Layers.
	24d.	13h.	49·5N.	156·2E.	0·010
	25d.	3h.	36·7N.	141·2E.	Base of Superficial Layers.
	27d.	9h.	19·0S.	69·0W.	0·015
	28d.	12h.	11·5N.	86·3W.	Suggested Deep.
	28d.	14h.	11·5N.	86·3W.	0·020
	28d.	19h.	38·2N.	142·0E.	Base of Superficial Layers.
	30d.	0h.	39·5S.	175·1E.	0·020
	30d.	17h.	36·2N.	139·9E.	0·005

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

KEW OBSERVATORY,
Richmond,
SURREY.

July, 1959.

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1951 JULY, AUGUST, SEPTEMBER.

July 1d. 17h. 53m. 59s. Epicentre 18°·68, 179°·1W. Depth of focus 0·090.
(as on 1951, March 31d.).

A = −·9483, B = −·0149, C = −·3170; δ = −2; h = +5;
D = −·016, E = +1·000; G = +·317, H = +·005, K = −·948.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		8·5	57	e 2 1	− 3	3 39	− 5	—	—	—
Tuai	N.	20·4	189	—	—	e 7 1?	− 9	—	—	—
Wellington		23·2	193	4 25	+ 1	7 59	+ 4	—	—	—
Cobb River	E.	23·5	197	—	—	e 8 1?	+ 1	—	—	—
Kaimata	N.E.	25·2	197	i 4 41	0	e 8 27	+ 1	—	—	—
Christchurch		25·8	194	e 4 51	+ 4	e 8 44	+ 8	—	—	—
Berkeley	Z.	77·5	43	e 12 58a	pP	—	—	—	—	—
Lick	Z.	77·6	43	i 12 59a	pP	—	—	—	—	—
Pasadena		78·2	48	i 10 57	− 2	—	—	e 13 1	pP	—
Fresno	Z.	78·5	45	e 13 3a	pP	—	—	—	—	—
Riverside	Z.	78·6	48	i 11 0	− 2	—	—	e 13 6	pP	—
Palomar	Z.	78·7	49	i 11 0	− 2	—	—	e 13 8	pP	—
Mineral	Z.	79·3	41	e 13 7k	pP	—	—	—	—	—
China Lake	Z.	79·5	47	i 11 4	− 2	—	—	e 13 9	pP	—
Tinemaha	Z.	79·7	46	i 11 5	− 2	—	—	e 13 11	pP	—
Rathfarnham C.	Z.	144·9	7	i 18 27	[− 3]	—	—	e 18 37	PKP_2	—
Potsdam		145·0	348	e 18 26	[− 4]	—	—	—	—	e 82·0
Ksara		145·3	304	i 18 29	[− 1]	34 57	PPS	—	—	—
Witteveen	Z.	145·6	353	i 18 28k	[− 3]	—	—	—	—	—
Collmberg	Z.	146·0	346	e 18 28	[− 3]	—	—	e 21 13	pPKP	—
De Bilt		146·4	355	i 18 32	[0]	—	—	—	—	—
Jena	N.	146·6	347	e 18 30	[− 2]	—	—	—	—	—
Prague		146·8	343	e 18 32	[− 1]	—	—	—	—	—
Stuttgart	Z.	149·2	350	e 18 34	[− 2]	e 34 7	PS	e 18 37	PKP	—
Strasbourg		149·6	352	i 18 39	[+ 2]	—	—	—	—	—
Paris		149·8	358	i 18 40	[+ 3]	e 22 50	PP	e 22 2	sPKP	e 83·0
Basle		150·6	351	e 18 43	[+ 5]	—	—	—	—	—
Zürich		150·6	350	e 18 41a	[+ 3]	—	—	—	—	—
Besançon		151·1	354	e 18 43	[+ 4]	—	—	—	—	—
Tamanrasset	Z.	174·0	—	e 18 59	[− 2]	e 24 9	PP	e 20 29	pPKP	—

Additional readings :—
Collmberg eZ = 18m.45s.
Prague e = 18m.57s., 19m.7s., and 20m.8s.
Strasbourg i = 18m.43s.
Paris i = 18m.45s., e = 38m.10s. and 44m.2s.
Besançon e = 18m.51s.
Long waves were also recorded at Riverview, Bombay, Chatra, Granada, Palisades, and Harvard.

July 1d. Readings also at 0h. (Apia), 1h. (Apia, Fergana, near Dzhergetal, Khorog, and Stalinabad), 2h. (Dzhergetal, near Samarkand, near Kurmenty, and near Almata II), 4h. (Tamanrasset), 6h. (Manila (3) and Nanking), 7h. (Potsdam, near Alicante, near Manila, near Kurmenty, and near Dzhergetal), 9h. (Chatra and near Alicante), 10h. (Dzhergetal, Manila, and near Alicante (2)), 11h. (near Alicante, near Almeria, Granada, Malaga, and Toledo), 12h. (Pietermaritzburg), 13h. (near Mary), 14h. (Manila, Almata, Frunse, near Almata II, Chilisk, Krasnogorka, Kurmenty, Rybach'e, and near Istanbul), 16h. (near Manila), 17h. (Christchurch, Manila (4), and near Messina), 18h. (Auckland, Wellington, Collmberg, Berkeley, Shawinigan Falls, and near Seven Falls), 19h. (Ksara), 20h. (Apia and near Messina), 21h. (near Athens and near Dzhergetal (2)), 23h. (La Paz).

July 2d. 5h. 6m. 10s. Epicentre 5°·5N. 126°·0E. (as on 1950, Aug. 31d.).

Intensity II at Cotabato and Davao. Epicentre 6°·0N. 124°·5E. (U.S.C.G.S.). Depth 100km. c.a.

Monthly Seismo. Bull., Manila.

$A = -\cdot5851$, $B = +\cdot8054$, $C = +\cdot0952$; $\delta = +7$; $h = +7$;
$D = +\cdot809$, $E = +\cdot588$; $G = -\cdot056$, $H = +\cdot077$, $K = -\cdot996$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		10·3	332	e 2 45	+13	—	—	—	—	—
Guam		20·1	64	4 55	+17	—	—	—	—	—
Bandong		22·1	238	i 4 53	− 6	i 8 53	− 5	—	—	—
Djakarta		22·4	240	i 5 1	− 1	i 9 2	− 2	—	—	—
Zi-ka-wei	z.	25·9	352	5 52	+17	10 13	+ 9	—	—	—
Nanking		27·2	346	5 54	+ 7	i 10 24	− 1	—	—	—
Vladivostok		37·8	7	e 7 23	+ 3	i 13 13	+ 2	—	—	—
Brisbane	z.	41·9	142	e 8 4	+10	—	—	i 9 57	PP	—
Chatra	z.	42·6	304	i 7 57	− 2	—	—	—	—	—
Riverview		45·8	150	i 9 15a	PP	e 15 23	+14	—	—	—
Kabansk		49·1	344	8 51	0	e 15 48	− 8	—	—	—
Irkutsk		49·9	342	—	—	e 16 0	− 7	—	—	—
Petropavlovsk		54·5	23	e 9 36	+ 4	—	—	—	—	—
Przhevalsk		55·9	319	i 9 40	− 2	—	—	—	—	—
Kurmenty		56·2	320	i 9 40	− 4	—	—	—	—	—
Naryn		57·0	318	i 9 48	− 2	—	—	—	—	—
Almata		57·2	320	i 9 49	− 2	e 17 40	− 6	—	—	—
Ili		57·4	320	i 9 49	− 4	—	—	—	—	—
Rybach'e		57·4	318	e 9 50	− 3	e 17 41	− 8	—	—	—
Frunse		58·6	318	i 9 58	− 3	e 17 54	−10	—	—	—
Andijan		59·3	315	10 5	− 1	i 18 4	−10	—	—	—
Fergana		59·6	314	e 10 5	− 3	—	—	—	—	—
Obi-garm		60·6	312	10 14	− 1	i 18 22	− 8	—	—	—
Stalinabad		61·2	312	10 16	− 3	i 18 28	−10	—	—	—
Tashkent		61·7	315	i 10 20	− 2	i 18 36	− 8	—	—	—
Tchimkent		61·8	316	i 10 20	− 3	i 18 36	−10	—	—	—
Samarkand		62·9	312	10 31	+ 1	—	—	—	—	—
Mary		66·2	309	i 10 50	− 2	19 33	− 7	—	—	—
Ashkabad		69·1	308	i 11 10	0	i 20 9	− 6	—	—	—
Sverdlovsk		72·1	329	i 11 25	− 3	i 20 38	−12	—	—	—
Baku		75·9	311	e 11 50	0	—	—	—	—	—
Lenkoran		76·6	308	11 53	− 1	21 31	− 9	—	—	—
Shemakla		76·9	311	i 11 53	− 3	i 21 35	− 8	—	—	—
Kirovobad		78·6	310	i 12 4	− 1	i 21 52	−10	—	—	—
Grozny		79·2	313	e 12 5	− 3	e 21 59	− 9	—	—	—
Gori		80·3	312	12 15	• + 1	—	—	—	—	—
Moscow		84·6	325	e 12 34	− 2	—	—	—	—	—
Pulkovo		88·2	330	—	—	23 25	[+3]	—	—	—
Lwow		93·5	320	—	—	e 24 8	{ 0}	—	—	—
Resolute Bay	z.	96·2	10	e 13 32	+ 1	—	—	e 17 0	PP	—
Ogyalla		97·7	320	e 14 28	+50	e 24 16	[+ 1]	—	—	—
Prague		99·3	323	e 13 42	− 3	e 24 56	{+ 7}	e 14 26	sP	—
Potsdam		99·4	325	e 17 51	PP	e 24 50?	{ 0}	—	—	e 50·8
Collmberg	z.	99·8	323	e 13 59	+12	—	—	e 18 12	PP	—
Cheb		100·6	323	e 13 50	− 1	e 27 7	PS	e 17 56	PP	—
Scoresby Sund		101·2	349	—	—	24 44	[+11]	31 56	SS	53·8
Witteveen	z.	102·7	328	18 28	PP	—	—	—	—	—
Stuttgart		103·0	322	e 17 40?	PKP	25 38	− 8	e 18 15	PP	e 55·8
Mineral	z.	103·2	47	e 17 55k	PKP	—	—	e 18 43	PP	—
Rome		103·5	315	e 18 11	PKP	e 28 39	PPS	e 22 17	PKS	—
De Bilt		103·9	328	e 18 35	PP	e 27 50	PS	e 28 40	PPS	e 51·8
Strasbourg		104·0	323	e 18 23	[+ 2]	e 25 50	− 4	e 20 20?	PPP	e 52·8
Pavia		104·5	319	e 19 15	PP	—	—	—	—	e 67·0
Besançon		105·6	322	—	—	e 21 26	PKS	—	—	—
Paris		107·0	325	e 14 18	− 1	28 7	PS	e 18 28	PKP	e 53·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Kew		107·1	328	i 23 23	?	e 27 48	PS	e 34 1	SS		e 51·8
Pasadena		107·8	51	e 19 6	PP	—	—	e 20 43	PPP		e 50·8
Mount Wilson	z.	107·9	51	e 18 42	[+13]	—	—	—	—		—
Rathfarnham Castle		109·0	332	—	—	e 35 11	SS	—	—		e 51·8
Tamanrasset	z.	115·4	298	e 18 50	[+ 6]	e 29 27	PS	e 19 38	PP		—
Granada		116·7	317	i 19 43k	PP	26 1	[+23]	i 29 37	PKKP		64·3
Ottawa	z.	125·7	18	i 19 7	[+ 3]	—	—	i 21 12	PP		—
Morgantown		129·1	26	e 19 15	[+ 5]	e 23 2	PPP	—	—		—
Harvard		129·6	15	i 19 16	[+ 5]	—	—	i 22 32	PKS		e 66·3
Weston		129·8	15	e 19 15	[+ 3]	—	—	—	—		—
Palisades		130·3	20	i 19 17	[+ 4]	—	—	e 22 35	PKS		—
Huancayo		157·9	110	e 20 1	[+ 3]	—	—	—	—		—
La Paz		162·4	129	e 20 10	[+ 7]	23 19	PKS	20 54	PKP_2		—

Additional readings :—
Riverview iE = 18m.27s. and 18m.47s., iEN = 19m.11s.
Ogyalla eN = 23m.16s.
Prague e = 16m.43s., ePP = 17m.25s., e = 19m.4s.
Collmberg eZ = 17m.44s.
Cheb eE = 29m.58s.
Stuttgart e = 26m.50s., ePPS = 28m.4s., e = 28m.39s., ePKKP = 30m.8s.
Rome eSSE = 37m.34s.
Strasbourg ePS = 27m.44s.
Paris ePP = 18m.37s., ePPP? = 21m.18s., ePPS = 29m.4s., e = 29m.18s., eSSS = 38m.4s.
Tamanrasset iZ = 19m.31s.
Granada iSS = 35m.43s.
Palisades e = 19m.32s.
La Paz PPS = 37m.10s., SS = 45m.10s.
Long waves were also recorded at other European stations.

July 2d. 6h. 57m. 2s. I)
7h. 36m. 13s. II) Epicentre 4°·0N. 82°·5W.

Given by Pasadena.

$A = +·1302$, $B = -·9891$, $C = +·0693$; $\delta = +7$; $h = +7$;
$D = -·991$, $E = -·131$; $G = +·009$, $H = -·069$, $K = -·998$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
I	Balboa Heights	5·7	30	i 1 31	+ 3	—	—	—	—		—
II		5·7	30	i 1 34	+ 6	e 2 38	+ 3	—	—		—
I	Chinchina	6·9	82	i 1 46	+ 1	i 3 5	0	—	—		—
II		6·9	82	e 1 46	+ 1	i 3 1	− 4	—	—		—
I	Bogota	8·4	86	e 2 10	+ 4	i 3 44	+ 1	—	—		e 4·1
II		8·4	86	e 2 10	+ 4	i 3 51	+ 8	—	—		—
I	Guantanamo Bay	17·4	23	e 3 38	−28	e 6 56	−23	—	—		—
I	Huancayo	17·4	155	e 4 10	+ 4	e 7 24	+ 5	—	—		e 8·1
II		17·4	155	e 4 4	− 2	e 7 32	+13	e 5 7	?		e 8·6
II	Port au Prince	17·6	33	i 7 13	S	i 7 23	0	—	—		—
I	San Juan	21·5	46	i 4 53	+ 1	—	—	—	—		—
II		21·5	46	e 4 52	0	—	—	—	—		—
I	Roosevelt Roads	21·7	47	e 4 5	−50	e 6 35	?	—	—		—
II		21·7	47	i 4 7	−48	—	—	—	—		—
I	Tacubaya	22·3	315	e 5 0	− 1	—	—	—	—		—
II		22·3	315	e 5 33	PP	—	—	—	—		—
I	La Paz	24·8	143	i 5 25	0	i 10 12	+26	6 22	PP		14·5
II		24·8	143	i 5 24	− 1	i 10 6	+20	i 6 23	PP		13·5
I	St. Louis	35·2	349	e 6 55	− 3	—	—	—	—		—
II		35·2	349	e 6 56	− 2	e 11 30	−61	—	—		—
I	Tucson	38·7	320	e 7 26	− 1	—	—	—	—		—
II		38·7	320	e 7 32	+ 5	—	—	—	—		—
I	Ottawa	z. 41·7	7	i 7 49	− 3	—	—	—	—		—
II		z. 41·7	7	i 7 51	− 1	—	—	—	—		—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Palomar	Z.	43·3	317	e 8 5	0	—	—	e 8 23	?	—
II	Z.	13·3	317	e 8 10	+ 5	—	—	—	—	
II Boulder City		43·6	322	e 8 8	0	—	—	—	—	—
I Riverside	Z.	44·1	317	e 8 10	− 2	—	—	—	—	—
II	Z.	44·1	317	e 8 13	+ 1	—	—	—	—	—
I Pasadena	Z.	44·7	317	e 8 15	− 1	—	—	e 8 33	?	—
II	Z.	44·7	317	e 8 19	+ 3	—	—	—	—	—
I China Lake	Z.	45·3	319	i 8 19	− 2	—	—	—	—	—
II	Z.	45·3	319	e 8 17	− 4	—	—	—	—	—
II Mineral	Z.	50·5	321	e 8 54k	− 8	—	—	—	—	—
I Hungry Horse		51·8	331	i 9 9	− 3	—	—	—	—	—
II		51·8	334	i 9 8	− 4	i 13 24	?	—	—	—
II College		76·1	336	e 11 49	− 2	—	—	—	—	—

La Paz gives also for shock II, SS = 11m.23s.
Long waves were also recorded to shocks I and II at Harvard and Paris; to shock II at Granada.

July 2d. 18h. Intensity IV at Oventeni and Satipo.

Epicentre suggested 10°·25S. 74°·5W. Depth 150km., but readings do not suit.

E. Silgado.
Datos sismológicos del Perú, 1951, Bol. No. 8, Lima, 1953. p.15.

Huancayo iP = 13m.45s., iS = 14m.3s.
La Paz eP = 15m.30s., iP = 15m.36s., iS = 17m.24s., L = 18m.8s.
Bogota iP = 16m.52s., iS = 19m.46s., iSS = 20m.8s.
Palomar iPZ = 23m.9s.
Riverside iPZ = 23m.13s., eZ = 23m.44s.
Pasadena iPZ = 23m.17s., eZ = 23m.48s.
China Lake iPZ = 23m.22s.
Tinemaha iPZ = 23m.32s.
Lick iPZ = 23m.47s.a, iZ = 23m.59s.
Tamanrasset iPZ = 25m.43s.a, ipPZ = 26m.12s., ePPZ = 29m.3s.

July 2d. 21h. 46m. 31s. Epicentre 21°·2S. 174°·8W.

A = −·9293, B = −·0846, C = −·3595; δ = 0; h = +4;
D = −·091, E = +·996; G = +·358, H = +·033, K = −·933.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		7·9	22	2 2	+ 3	i 3 24	− 6	—	—	—
Tuai	N.	18·9	200	e 4 23	− 1	e 7 19	−34	—	—	—
Wellington		21·9	202	e 4 50	− 7	e 8 23	−31	—	—	e 10·2
Cobb River	E.	22·5	206	e 5 8	+ 6	e 8 10	−55	—	—	—
Kaimata	N.E.	24·2	206	e 5 23	+ 4	e 9 27?	− 8	—	—	—
Christchurch		24·6	202	e 5 47	+24	e 9 39	− 3	—	—	e 11·0
Riverview		32·6	240	i 7 47	PP	i 13 15	SS	—	—	e 14·3
Honolulu		45·3	22	e 8 24	+ 3	e 15 4	+ 2	—	—	—
Guam		52·6	307	—	—	16 10	−34	—	—	—
Terre Adelie		53·4	200	e 9 21	− 3	—	—	—	—	—
Berkeley		76·7	41	e 11 56k	+ 1	e 21 46	+ 5	e 31 17	Q	e 35·6
Lick	Z.	76·8	41	i 11 56a	+ 1	—	—	—	—	—
Pasadena		77·0	45	i 11 59	+ 3	e 21 51	+ 6	—	—	e 35·5
Palomar	Z.	77·4	47	i 11 58	0	—	—	i 12 8	PcP	—
Riverside	Z.	77·4	45	e 11 57	− 1	—	—	e 12 7	PcP	—
Fresno		77·5	42	e 11 59a	0	—	—	e 12 10	PcP	—
Petropavlovsk		77·5	344	e 11 58	− 1	—	—	—	—	—
China Lake	Z.	78·4	44	e 12 4	0	—	—	e 12 13	PcP	—
Shasta Dam		78·5	38	i 12 4	0	—	—	—	—	—
Tinemaha	Z.	78·7	43	e 22 7	S	(e 22 7)	+ 4	e 22 14	ScS	—
Boulder City		80·3	45	e 12 15	+ 1	e 22 26	+ 6	—	—	—
Zi-ka-wei	Z.	80·3	309	e 12 11	− 3	e 22 20	0	—	—	—
Vladivostok		80·6	323	e 12 15	− 1	e 22 9	−14	—	—	—
Tucson		81·0	50	e 12 19	+ 1	e 22 37	+10	—	—	—
Nanking		82·7	308	12 26a	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seattle		83·1	33	e 12 38 a?	+ 9	e 22 57	+ 9	—	—	e 53·5
Hungry Horse		87·9	36	e 12 51	− 2	—	—	i 12 55	PcP	—
College		88·3	11	e 12 53	− 2	e 23 40	+ 1	—	—	—
Huancayo		94·3	105	e 13 23	0	e 24 44	+12	e 24 2	SKS	e 43·9
La Paz		98·9	111	e 13 41	− 2	i 25 21	+10	i 24 20	SKS	47·5
St. Louis		98·9	52	—	—	e 25 22	+11	e 24 18	SKS	—
Bogota		101·6	89	—	—	e 24 31	[− 4]	e 31 46	SS	40·4
Cleveland	E.	106·1	51	—	—	e 24 57	[+ 2]	e 27 58	PS	—
Pennsylvania	N.	108·6	52	—	—	e 26 40	S	—	—	—
Ottawa		111·0	48	—	—	e 27 9	S	—	—	50·5
Palisades		111·6	53	—	—	e 29 39	PPS	—	—	e 55·0
Seven Falls	E.	114·6	47	—	—	25 27	[− 3]	29 3	PS	55·4
Frunse		119·0	308	19 3	[+12]	e 25 49	[+ 2]	20 10	PP	—
Andijan		120·6	306	e 18 59	[+ 5]	e 25 53	[+ 1]	e 20 19	PP	—
Tashkent		122·9	307	e 19 8	[+10]	e 26 2	[+ 3]	e 20 34	PP	—
Stalinabad		123·3	303	e 18 58?	[− 1]	—	—	20 38	PP	—
Sverdlovsk		126·3	326	e 19 12	[+ 7]	e 26 12	[+ 2]	e 31 4?	PS	—
Kimberley	Z.	126·9	202	i 19 3	[− 3]	—	—	—	—	—
Scoresby Sund		128·1	11	e 22 28	PKS	31 11	PS	38 35	SS	64·5
Ashkabad		131·5	303	e 19 16	[+ 1]	—	—	i 22 44	PKS	—
Pulkovo		137·5	341	e 22 56	PKS	—	—	—	—	—
Moscow		137·9	333	e 22 12	PP	—	—	—	—	—
Helsinki	N.	138·6	346	e 22 52	PP	—	—	—	—	—
Zugdidi		142·7	313	e 19 33	[− 2]	—	—	—	—	—
Copenhagen		145·1	353	e 19 39	[0]	—	—	—	—	67·5
Yalta		146·7	321	19 43	[+ 1]	—	—	—	—	—
Rathfarnham Castle		146·8	12	e 19 43	[+ 1]	e 30 31	{+30}	e 19 54	PKP_2	e 63·4
Lwow		147·8	337	e 19 42	[− 2]	—	—	—	—	—
Kishinev		147·9	330	e 19 47	[+ 3]	—	—	—	—	—
Potsdam		148·3	352	e 19 48	[+ 3]	—	—	e 19 54	PKP_2	e 77·5
Witteveen	Z.	148·4	358	i 19 46	[+ 1]	—	—	i 19 50	PKP_2	—
De Bilt		149·1	0	e 19 44	[− 2]	e 33 39	PS	e 23 23	PP	e 78·5
Collmberg	Z.	149·3	349	e 19 50	[+ 4]	e 23 29	PP	e 20 15	PKP_2	—
Raciborzu		149·4	344	i 19 52	[+ 6]	e 23 13	PKS	—	—	—
Uzhgorod		149·4	337	i 19 53	[+ 7]	—	—	—	—	—
Kew		149·5	6	e 19 50 a	[+ 3]	e 30 48	{+32}	e 23 28	PP	e 63·5
Skalnate Pleso		149·6	341	e 19 51	[+ 4]	e 27 59	[+66]	e 20 7	PKP_2	—
Jena		149·9	352	e 19 46	[− 1]	—	—	e 20 7	PKP_2	—
Ksara		150·1	302	i 19 51	[+ 3]	—	—	23 33	PP	—
Prague		150·3	348	e 19 56	[+ 8]	e 26 52	[− 2]	e 20 12	PKP_2	—
Cheb	E.	150·6	352	e 45 59	?	—	—	e 48 13	SSS	—
Ogyalla		151·4	342	e 20 8	[+18]	e 23 29	PP	e 21 1	PKP_2	—
Istanbul		151·7	321	e 20 3	[+13]	e 26 56	[0]	e 23 25	PP	e 85·5
Karlsruhe	Z.	152·1	356	e 19 54	[+ 3]	—	—	e 20 6	PKP_2	—
Stuttgart		152·3	354	e 19 50	[− 1]	e 27 9	[+12]	e 20 5	PKP_2	e 81·5
Paris		152·4	4	e 19 51	[0]	e 27 3	[+ 6]	e 20 9	PKP_2	e 73·5
Strasbourg		152·8	355	e 19 50	[− 2]	e 30 11	{−23}	e 20 10	PKP_2	e 82·5
Belgrade	Z.	153·3	335	e 19 59 k	[+ 7]	—	—	e 20 20	PKP_2	—
Basle		153·6	357	e 20 15	PKP_2	—	—	e 23 45	PP	—
Zürich		153·7	356	e 19 55	[+ 2]	e 23 52	PP	e 20 17	PKP_2	—
Triest	Z.	154·6	347	e 20 8	[+14]	e 23 49	PKS	—	—	—
Helwan	Z.	154·9	296	e 19 54	[0]	—	—	i 20 17	PKP_2	—
Pavia		155·9	353	e 19 58 k	[+ 2]	e 44 59	PPS	e 23 59	PP	—
Taranto		158·2	335	e 23 29?	PP	—	—	—	—	—
Rome		158·5	345	e 19 56	[− 3]	e 34 28	PSKS	e 20 29	PKP_2	—
Tortosa		160·0	9	—	—	e 53 40	?	—	—	e 79·5
Alicante		162·2	15	19 56	[− 7]	26 55	[−12]	20 52	PKP_2	e 75·5
Granada		162·3	23	e 20 41 a	PKP_2	—	—	—	—	82·7
Malaga		162·4	25	i 20 7	[+ 4]	—	—	i 25 53	PP	102·2
Almeria		163·0	21	19 58	[− 6]	38 2	PPS	20 50	PKP_2	82·6
Algiers Univ.	Z.	164·4	6	e 19 15	[−50]	—	—	i 23 47	PP	—
Tamanrasset	Z.	178·4	—	e 20 11	[− 1]	e 32 45	{+ 2}	e 25 54	PP	—

For Notes see next page.

NOTES TO JULY 2d. 21h. 46m. 31s.

Additional readings :—
Berkeley iZ = 12m.5s.
Lick iZ = 12m.6s. and 12m.20s.
Seattle i = 12m.59s. and 13m.26s., eS = 23m.9s.
Huancayo e = 26m.12s., eSS = 31m.15s., eSSS = 34m.39s.
Seven Falls SSE = 35m.53s.
Frunse SKKS = 27m.12s.?, PS = 30m.1s.?.
Tashkent eSKKS = 27m.37s.?, ePS = 30m.28s.?.
Scoresby Sund 41m.17s.
Rathfarnham Castle ePP?Z = 24m.35s., eZ = 30m.5s., e = 39m.38s., eSS = 43m.21s., eZ = 44m.41s., eSSS = 51m.59s.
De Bilt eSS = 42m.29s.
Raciborzu eN = 20m.5s., eZ = 20m.34s., eN = 21m.38s.
Kew ePPP = 33m.36s.. eSS = 4qm.47s.
Skalnate Pleso eN = 32m.56s. and 33m.59s., eSS = 42m.35s., eSSS = 48m.29s.
Jena iPKPZ = 19m.52s., eE = 19m.55s., ePKP$_2$?Z = 20m.7s., ePKP$_2$?N = 20m.11s.
Prague e = 20m.46s., 20m.59s., 21m.22s., and 22m.36s., ePP = 23m.14s., e = 33m.18s. and 36m.29s., eSS = 42m.53s.
Istanbul eSKKSN = 30m.26s., eN = 33m.11s., ePPSN = 36m.42s., eN = 38m.44s., eSSN = 42m.40s.
Stuttgart eZ = 19m.57s. and 20m.19s., ePP = SKP = 23m.31s., e = 29m.5s., ePSKS = 33m.54s., eSS? = 44m.29s., eSSS? = 48m.47s.
Paris eSKP? = 23m.7s., iPP = 23m.41s., ePPP = 28m.30s., eSKKS = 30m.33s., ePPP ($\Delta > 180°$) = 33m.43s., ePPS = 36m.45s., eSSP = 44m.1s. and other unidentified phases.
Strasbourg e = 19m.58s., 20m.44s., and 22m.48s., ePP = 23m.40s., e = 23m.49s. and 24m.54s., ePSKS = 33m.50s., eSS = 43m.9s., eSSP = 43m.53s., eSSS = 49m.5s., e = 53m.5s.
Helwan eZ = 20m.4s., 20m.44s., and 22m.59s.
Pavia ePPP? = 27m.16s.
Rome ePPZ = 24m.11s., eSSN = 45m.8s.
Alicante PP = 24m.36s., PPP = 28m.13s., PPS = 37m.43s., SSP = 45m.41s., SSS = 50m.55s., Q = 66m.37s.
Almeria PP = 24m.34s., PPP = 28m.22s.
Tamanrasset eZ = 20m.25s., ePKP$_2$Z = 22m.2s., ePcP,PKPZ = 28m.57s., eZ = 29m.27s., ePPPZ = 30m.2s.
Long waves were also recorded at Auckland, Bombay, Kodaikanal, Harvard, La Plata, Chinchina, Galerazamba, Ivigtut, Upsala, and Aberdeen.

July 2d. Readings also at 0h. (La Paz, Copiapo, Santa Lucia, Collmberg, and Tortosa), 1h. (Scoresby Sund (2), De Bilt, Paris, Alicante, Granada, Tamanrasset, near La Paz, and near Tacubaya), 2h. (Manila and near Dzhergetal), 4h. (Manila (2), Tortosa, near Malaga, and near Mizusawa), 5h. (Apia and near Manila (2)), 6h. (Manila and Yalta (4)), 7h. (Manila, Mount Wilson, China Lake, Mineral, Harvard, Weston, and near Dzhergetal), 8h. (Riverview, Huancayo, Palisades, near Ashkabad, and near Dzhergetal), 9h. (Apia), 12h. (near Alicante and near Dzhergetal), 13h. (Grahamstown, Kimberley, Pretoria, and near Dzhergetal), 4h. (Mineral, Lick, Resolute Bay, Granada, Ksara, and Obi-garm), 15h. (Manila), 18h. (near Alicante, near Dzhergetal, and near Manila), 19h. (near Istanbul), 20h. (La Paz, Copiapo, Ksara, and near Istanbul (3)), 22h. (near Almata II and Dzhergetal).

July 3d. 4h. 11m. 0s. Epicentre 12°·2N. 45°·8E. (as given by Strasbourg).

$A = +·6816$, $B = +·7008$, $C = +·2105$; $\delta = +1$; $h = +6$;
$D = +·717$, $E = -·697$; $G = +·147$, $H = +·151$, $K = -·978$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Helwan		22·1	324	e 5 0	+ 1	e 9 15	+17	—	—	—
Ksara		23·3	238	i 5 15a	+ 5	e 9 49	+29	—	—	—
Lenkoran		26·6	7	e 5 53	+11	10 45	+29	—	—	—
Ashkabad		28·0	21	e 5 49	− 6	—	—	—	—	—
Mary		29·1	26	e 6 5	+ 1	e 11 7	+11	—	—	—
Istanbul	N.	32·3	336	e 6 35	+ 2	e 17 44	L	—	—	(e 17·7)
Tashkent		35·5	31	e 7 0	0	e 12 42?	+ 6	—	—	—
Andijan		36·8	34	e 7 11	0	e 13 1	+ 5	—	—	—
Frunse		39·4	33	e 7 33	0	—	—	—	—	—
Tamanrasset	Z.	39·7	291	e 7 35	− 1	—	—	—	—	—
Rybach'e		40·0	35	e 7 36	− 2	—	—	—	—	—
Sverdlovsk		45·9	12	e 8 25	− 1	e 15 22	+11	—	—	—

Long waves were recorded at Collmberg.

July 3d. 5h. 23m. 46s. Epicentre 12°·2N. 45°·8E. (as at 4h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		22·1	324	i 4 59a	0	9 20	+22	5 35	PP	—
Ksara		23·3	238	i 5 11	+ 1	12 21?	L	—	—	(12·4)
Lenkoran		26·6	7	5 41	− 1	10 21	+ 5	—	—	—
Bombay		26·8	71	i 5 44	0	i 10 22	+ 3	i 6 14	PP	12·7
Poona	E.	27·7	72	i 6 34	+42	i 10 42	+ 9	i 7 6	PPP	12·4
Ashkabad		28·0	21	5 55	0	i 10 48	+10	—	—	—
Kizyl-Arvat		28·3	16	5 54	− 3	10 48	+ 5	—	—	—
Kirovobad		28·4	1	e 5 58	0	—	—	—	—	—
Mary		29·1	26	i 6 6	+ 2	11 7	+11	—	—	—
Tiflis		29·4	358	e 6 14	+ 7	—	—	—	—	—
Gori		29·7	357	e 6 13	+ 3	—	—	—	—	—
Grozny		31·0	0	e 6 26	+ 5	—	—	—	—	—
Tananarive		31·0	177	e 8 28	?	e 11 25	− 1	—	—	e 14·5
Hyderabad	N.	32·0	76	—	—	e 11 43	+ 1	—	—	—
Istanbul		32·3	336	e 6 31	− 2	e 11 53	+ 7	e 7 35	PP	e 19·2
Samarkand		33·1	30	e 6 47	+ 7	—	—	—	—	—
Stalinabad		33·3	34	i 6 41	0	—	—	—	—	—
Yalta		33·7	345	6 42	− 3	12 11	+ 3	—	—	—
Obi-garm		33·9	34	i 6 46	− 1	—	—	—	—	—
Tashkent		35·5	31	i 6 58	− 2	e 12 42	+ 6	—	—	—
Fergana		36·2	34	e 7 5	− 1	—	—	—	—	—
Tchimkent		36·4	30	i 7 6	− 2	i 12 56	+ 6	—	—	—
Andijan		36·8	34	e 7 7	− 4	i 13 1	+ 5	—	—	—
Messina	Z.	37·3	320	e 7 19	+ 3	—	—	e 8 18	PP	—
Kishinev		37·5	341	e 7 19	+ 2	—	—	—	—	—
Taranto		37·7	323	7 47	+28	14 9	+57	—	—	—
Belgrade		39·0	331	e 7 32a	+ 2	e 13 55	+26	e 10 29	?	e 22·2
Timisoara	E.N.	39·4	332	7 38	+ 5	—	—	—	—	—
Frunse		39·4	33	i 7 34	+ 1	i 13 44	+ 9	—	—	—
Tamanrasset	Z.	39·7	291	e 7 32	− 4	e 13 57	+17	i 9 8	PP	—
Rybach'e		40·0	35	e 7 38	0	e 13 52	+ 8	—	—	—
Almata		41·0	34	e 7 44	− 2	—	—	—	—	—
Uzhgorod		41·2	338	i 7 52	+ 4	i 14 9	+ 7	—	—	—
Chatra		41·4	63	e 7 40	−10	—	—	—	—	e 20·2
Rome		41·4	322	e 7 49	− 1	e 14 5	0	e 16 26?	SS	—
Lvov		41·6	338	i 7 50	− 1	e 14 8	0	—	—	—
Ogyalla		42·4	333	e 8 7?	+ 9	e 15 5	+45	e 9 33	PP	—
Skalnate Pleso		42·5	336	e 7 54	− 5	e 14 19	− 3	e 9 37	PP	e 20·5
Triest		43·0	327	e 8 3	0	e 14 29	0	e 9 52	PP	—
Prato		43·4	323	e 8 14	+ 8	—	—	—	—	—
Moscow		43·9	354	8 5	− 5	e 14 40	− 2	—	—	—
Pavia		45·3	324	i 8 22a	+ 1	e 15 11	+ 9	e 10 53	PPP	e 21·6
Algiers Univ.	Z.	45·4	310	i 8 22a	0	e 10 13	PP	e 9 28	?	—
Prague		45·7	332	e 8 17	− 7	e 15 8	0	e 10 15	PP	e 25·2
Sverdlovsk		45·9	12	e 8 25	− 1	14 37	−34	—	—	—
Cheb		46·6	330	e 8 31	− 1	e 15 26	+ 5	—	—	—
Collmberg	Z.	47·2	332	e 8 34	− 2	—	—	e 10 30	PP	—
Stuttgart		47·4	328	e 8 34	− 4	e 15 34	+ 2	e 10 30	PP	e 25·2
Jena	Z.	47·6	331	e 8 38	− 1	e 8 44	?	e 10 38	PP	—
Karlsruhe		47·9	328	e 8 41	− 1	e 15 37	− 2	—	—	e 26·2
Potsdam		47·9	333	i 8 42	0	e 15 47	+ 8	e 10 38	PP	e 21·2
Strasbourg		48·0	327	e 8 42a	− 1	e 15 41	0	e 10 32	PP	e 23·2
Alicante		48·6	311	e 8 40	− 7	e 16 20	PPS	10 47	PP	e 25·3
Tortosa		48·8	314	e 8 46	− 3	e 16 0	+ 8	—	—	—
Pulkovo		48·8	350	—	—	e 15 43	− 9	—	—	—
Clermont-Ferrand		49·2	321	e 11 0	PP	e 16 5	+ 7	e 19 20	SS	e 28·6
Almeria		49·6	308	i 9 14?	+19	e 16 24	PPS	11 14	PP	29·9
Copenhagen		50·5	336	9 2	0	16 19	+ 3	—	—	24·2
Granada		50·6	308	i 9 9k	+ 7	16 33	PPS	11 6	PP	28·3
Paris		51·1	324	i 9 4	− 2	e 16 39	PPS	e 11 4	PP	e 24·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Witteveen	z.	51·1	331	i 9 6	0	—	—	—	—	—
Malaga		51·1	308	i 8 57	− 9	i 16 17	− 7	—	—	29·7
De Bilt		51·4	329	e 9 10	+ 1	e 16 34	+ 6	e 20 20	SS	e 26·2
Toledo		51·7	311	e 9 9	− 2	16 0	−32	e 11 6	PP	—
Upsala		51·9	342	e 9 12?	0	e 16 31	− 4	e 10 27	PcP	e 25·2
Kew		54·0	326	e 9 25	− 3	e 17 9	+ 6	—	—	e 26·2
Durham		56·3	329	—	—	e 17 39	+ 5	—	—	—
Aberdeen		57·8	332	—	—	i 17 34	−20	i 19 35	SS	e 30·9
Rathfarnham Castle		58·1	326	e 9 52?	− 6	e 20 35	?	e 11 51	PP	e 27·2
Irkutsk		61·4	36	e 10 16	− 4	e 18 41	+ 1	—	—	—
Kabansk		62·6	37	10 26	− 2	19 0	+ 4	—	—	—
Scoresby Sund		71·2	341	e 11 20	− 3	e 20 45	+ 5	i 15 49	PPP	35·2
Vladivostok		78·9	48	e 12 5	− 2	e 22 8	+ 3	—	—	—
Mineral	z.	126·4	347	e 19 4k	[− 1]	—	—	—	—	—
China Lake	z.	129·7	342	e 19 11	[0]	—	—	—	—	—
Mount Wilson	z.	131·3	341	e 19 15	[+ 1]	—	—	—	—	—
Palomar	z.	131·8	340	e 19 17	[+ 2]	—	—	—	—	—

Additional readings :—
Helwan eZ = 5m.56s.
Bombay iSE = 10m.26s., QN = 11·5m.
Poona PPPE = 7m.17s., QE = 11·3m., SSE = 11m.36s., SSSE = 11m.53s.
Belgrade eNE = 11m.25s., eNW = 16m.46s.
Tamanrasset eZ = 9m.20s., ePPPZ = 9m.33s., ePKP,PKP?Z = 39m.35s.
Rome eZ = 9m.42s., eSSS = 17m.12s.?.
Ogyalla e = 9m.49s., 10m.39s., and 16m.11s.
Skalnate Pleso ePPP = 10m.22s., e = 13m.38s. and 15m.22s., eSS = 17m.42s.
Triest epP? = 8m.40s., ePPP = 10m.59s., e = 14m.40s., eS? = 15m.9s., eSS? = 17m.47s.
Pavia eSS = 18m.37s.
Prague ePS = 15m.15s., e = 15m.31s., eSS? = 18m.2s., e = 21m.44s.
Cheb eN = 8m.37s. and 13m.31s., eSSE = 19m.4s.
Stuttgart eSS = 19m.8s.
Potsdam ePE = 8m.47s., iPSN = 15m.54s.
Strasbourg e = 9m.1s., 10m.23s., 10m.39s., and 10m.49s., eSS = 19m.22s., eSSS = 20m.19s.
Alicante PcP = 9m.44s., PPP = 11m.50s., PS = 16m.39s., SS = 19m.54s., SSS = 21m.53s.
Almeria PcP = 10m.40s., ScS = 19m.4s.
Granada PcP = 10m.33s., PPP = 12m.32s., SS = 19m.55s.
Paris i = 9m.35s. and 9m.53s., e = 13m.16s., i = 16m.53s., e = 18m.45s., eScS = 18m.55s., eSS = 20m.12s., e = 20m.42s., i = 22m.40s.
Upsala ePPP? = 12m.31s., eS?N = 16m.47s., eN = 17m.47s., eSS?N = 20m.29s.
Aberdeen iSSSN = 20m.34s.
Scoresby Sund e = 21m.32s. ; 28m.50s.
Long waves were also recorded at Bergen and Huancayo.

July 3d. 8h. 47m. 28s. Epicentre 5°·5S. 126°·0E. (as on 1939, March 29d.).

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.
Djakarta		19·1	268	e 4 25	− 2	i 6 43	−74	—	—	—
Manila		20·6	347	i 4 38	− 5	—	—	i 5 2	PP	—
Brisbane	z.	33·7	133	e 6 57	+12	—	—	—	—	—
Riverview		36·6	144	i 8 0k	PP	i 13 14	?	e 15 17	SS	e 18·3
Zi-ka-wei	z.	36·7	354	e 7 7	− 3	e 12 33	−21	—	—	—
Nanking		38·0	350	7 24	+ 3	13 8	− 6	—	—	e 17·7
Vladivostok		48·7	5	e 8 44	− 4	i 15 45	− 5	—	—	—
Chatra	E.	49·4	313	e 8 48	− 5	e 20 32	SSS	—	—	—
Bombay	E.	57·7	297	—	—	i 17 53	0	—	—	—
Kabansk		59·7	346	e 10 4	− 5	i 18 13	− 6	—	—	—
Terre Adélie		62·1	173	e 10 39	+14	—	—	—	—	—
Rybach'e		65·8	321	e 10 50	+ 1	e 19 32	− 3	—	—	—
Frunse		66·9	322	e 10 54	− 2	i 19 46	− 3	—	—	—
Andijan		67·3	319	i 11 0	+ 1	19 52	− 2	—	—	—
Dzhergetal		67·3	317	e 10 57	− 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fergana		67·5	318	e 10 56	− 4	—	—	—	—	—
Obi-garin		68·1	316	e 11 4	0	20 1	− 2	—	—	—
Stalinabad		68·7	316	i 11 7	0	i 20 5	− 5	—	—	—
Tashkent		69·6	318	i 11 12	− 1	i 20 17	− 4	—	—	—
Tchimkent		69·8	320	i 11 12	− 2	i 20 19	− 4	—	—	—
Mary		73·3	312	e 11 36	+ 1	—	—	—	—	—
Ashkabad		76·1	311	11 55	+ 4	21 33	− 2	—	—	—
Sverdlovsk		81·5	330	e 12 21	0	22 25	− 7	—	—	—
Ksara		93·1	303	e 13 21	+ 4	e 22 49	?	—	—	—
Potsdam		108·2	324	—	—	e 34 12	SS	e 28 38	PS	e 44·5
Collmberg	z.	108·6	323	e 19 15	PP	—	—	—	—	—
Stuttgart		111·6	321	e 19 2	[+26]	e 29 12	PS	—	—	e 45·5
Strasbourg		112·6	321	e 19 13	[+35]	e 34 50	SS	e 29 19	PS	—
Paris		115·8	323	e 19 53	PP	e 27 13	{+27}	e 29 8	PS	e 57·5
Rathfarnham Castle		118·6	330	—	—	e 39 2	?	—	—	e 63·5
Tamanrasset	z.	120·2	294	e 19 2	[+ 9]	—	—	e 20 5	PP	—

Additional readings :—
Riverview iZ =9m.0s., eE =13m.37s., eSSS?E =15m.37s., iN =15m.45s.
Strasbourg e =25m.38s., ePKKP =29m.47s., e =42m.37s. and 44m.32s.?.
Paris e =20m.5s., 21m.4s., and 24m.46s., ePPS =30m.34s., eSSS =40m.38s.
Long waves were also recorded at Kew, Perth, Harvard, Pasadena, and Huancayo.

July 3d. 11h. 24m. 42s. Epicentre 16°·0S. 74°·5W. Depth of focus 0·010.
(as on 1951, March 4d.).

Intensity III at Vitor.

E. Silgado.
Datos Sismológicos del Perú, 1951, Boletin No. 8, Lima, Peru, 1953, p.15.

A = +·2570, B = −·9268, C = −·2739 ; δ = +3 ; h = +6 ;
D = −·964, E = −·267 ; G = −·073, H = +·264, K = −·962.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		4·0	348	i 1 0	0	i 1 48	+ 2	i 1 21	pP	i 2·2
Bogota		20·5	2	i 4 32	0	i 8 19	+ 8	i 4 59	pP	—
Chinchina		20·8	358	i 4 35	0	i 11 24	L	i 4 59	pP	(i 11·4)
Tacubaya		42·7	325	e 7 55	+ 6	—	—	—	—	—
Morgantown		55·6	356	i 9 24	− 4	—	—	e 9 52	pP	—
Weston		58·2	4	e 9 44	− 2	—	—	—	—	—
Harvard		58·3	4	i 9 44	− 3	—	—	—	—	—
Palomar	z.	63·6	322	i 10 24k	+ 1	e 10 51	sP	e 10 43	pP	—
Riverside	z.	64·3	321	i 10 29k	+ 2	i 10 56	sP	—	—	—
Pasadena		64·9	321	i 10 32k	+ 1	i 11 0	sP	—	—	—
China Lake	z.	65·7	323	i 10 37k	+ 1	i 11 4	sP	i 10 57	pP	—
Tinemaha	z.	66·9	323	i 10 46k	+ 2	i 11 14	sP	i 11 6	pP	—
Lick	z.	69·1	321	i 11 0k	+ 2	i 11 28	sP	i 11 21	pP	—
Mineral	z.	71·1	324	e 11 9k	− 1	i 11 37	sP	i 11 30	pP	—
Malaga		84·3	50	i 12 23	+ 1	e 22 37	− 1	—	—	—
Tamanrasset	z.	87·2	66	e 12 34	− 2	—	—	e 12 56	pP	—

Bogota gives also isS =9m,2s.

July 3d. 14h. 27m. 41s. Epicentre 12°·2N. 45°·8E. (as at 5h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan	z.	22·1	324	5 1	+ 2	—	—	e 5 32	PPP	e 13·8
Ksara		23·3	238	e 5 13	+ 3	12 39	L	—	—	(12·6)
Ashkabad		28·0	21	5 54	− 1	10 43	+ 5	—	—	—
Kizyl-Arvat		28·3	16	e 6 6	+ 9	—	—	—	—	—
Mary		29·1	26	—	—	e 11 1	+ 5	—	—	—
Tiflis		29·4	358	e 6 7	0	—	—	—	—	—
Gori		29·7	357	e 6 30	+20	—	—	—	—	—
Tashkent		35·5	31	i 6 59	− 1	e 12 30?	− 6	—	—	—
Andijan		36·8	34	e 7 8	− 3	e 12 52	− 4	—	—	—
Naryn		39·3	37	e 7 28	− 4	i 13 26	− 8	—	—	—
Frunse		39·4	33	e 7 31	− 2	e 13 33	− 2	—	—	—
Tamanrasset	z.	39·7	291	i 7 34k	− 2	—	—	e 9 48	PPP	—
Pretoria	z.	41·5	203	i 7 47	− 3	—	—	—	—	—
Triest		43·0	327	e 8 3	0	—	—	—	—	—
Sverdlovsk		45·9	12	e 8 26	0	—	—	—	—	—
Collmberg	z.	47·2	332	e 8 34	− 2	—	—	—	—	—
Stuttgart	z.	47·4	328	e 8 34	− 4	—	—	—	—	—
Strasbourg		48·0	327	e 8 46	+ 3	—	—	—	—	—
Paris		51·1	324	e 9 7	+ 1	—	—	—	—	—

July 3d. 18h. 16m. 1s. Epicentre 12°·2N. 45°·8E. (as at 14h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		22·1	324	i 5 1a	+ 2	9 17	+19	—	?	—
Ksara		23·3	238	i 5 14	+ 4	12 32	L	—	—	(12·5)
Lenkoran		26·6	7	5 42	0	10 25	+ 9	—	—	—
Bombay		26·8	71	e 5 44	0	i 10 31	+12	i 6 14	PP	12·7
Ashkabad		28·0	21	5 57	+ 2	10 48	+10	—	—	—
Kizyl-Arvat		28·3	16	5 55	− 2	10 48	+ 5	—	—	—
Baku		28·3	6	e 6 1	+ 4	—	—	—	—	—
Shemakha		28·4	4	5 59	+ 1	i 10 41	− 4	i 16 3	?	—
Mary		29·1	26	i 6 5	+ 1	i 11 7	+11	—	—	—
Tiflis		29·4	358	e 6 3?	− 4	11 9?	+ 8	—	—	—
Gori		29·7	357	e 6 14	+ 4	—	—	—	—	—
Zugdidi		30·4	355	e 6 22	+ 6	—	—	—	—	—
Istanbul		32·3	336	e 6 32	− 1	e 11 39	− 7	e 7 40	PP	e 18·0
Stalinabad		33·3	34	i 6 43	+ 2	e 12 14	+12	—	—	—
Yalta		33·7	345	6 45	0	12 17	+ 9	—	—	—
Obi-garm		33·9	34	e 6 45	− 2	e 12 19	+ 8	—	—	—
Tashkent		35·5	31	i 6 59	− 1	e 12 45	+ 9	—	—	—
Fergana		36·2	34	e 7 5	− 1	e 12 57	+10	—	—	—
Bucharest		36·3	336	e 7 11	+ 4	e 13 3	+15	e 8 39	PP	e22·0
Tchimkent		36·4	30	i 7 6	− 2	i 12 58	+ 8	—	—	—
Andijan		36·8	34	7 10	− 1	13 2	+ 6	—	—	—
Messina	z.	37·3	320	e 7 16	0	—	—	e 8 48	PP	—
Kishinev		37·5	341	7 18	+ 1	e 13 16	+ 9	—	—	—
Belgrade		39·0	331	e 7 33a	+ 3	e 13 32	+ 3	e 9 12	PPP	e 12·6
Naryn		39·3	37	i 7 30	− 2	i 13 38	+ 4	—	—	—
Frunse		39·4	33	i 7 31	− 2	i 13 43	+ 8	—	—	—
Tamanrasset	z.	39·7	291	i 7 35a	− 1	e 13 10	−30	e 9 8	PP	e 20·8
Rybach'e		40·0	35	e 7 39	+ 1	e 13 54	+10	—	—	—
Almata		41·0	34	i 7 45	− 1	—	—	—	—	—
Uzhgorod		41·2	338	i 7 49	+ 1	e 14 11	+ 9	—	—	—
Chatra		41·4	63	e 7 44	− 6	—	—	—	—	e 19·5
Rome		41·4	322	e 7 52?	+ 2	e 14 11?	+ 6	e 9 18	PP	e 22·2
Pretoria	z.	41·5	203	i 7 48	− 2	—	—	—	—	—
Triest		43·0	327	e 8 7	+ 4	e 14 44	+15	—	—	—
Moscow		43·9	354	e 8 9	− 1	e 14 50	+ 8	—	—	—
Pavia		45·3	324	e 8 33a	+12	e 15 15	+13	e 10 37	PPP	—
Algiers Univ.	z.	45·4	310	e 8 22	0	—	—	—	—	—
Kimberley	z.	45·5	206	i 8 21	− 2	—	—	—	—	—
Prague		45·7	332	e 8 29	+ 5	e 15 13	+ 5	e 10 20	PP	e 22·3
Sverdlovsk		45·9	12	e 8 26	0	15 20	+ 9	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Cheb		46·6	330	e 8 31	− 1	e 15 30	+ 9	—	—	—
Zürich		46·9	325	e 8 33	− 1	e 15 32	+ 7	e 10 25	PP	—
Collmberg	z.	47·2	332	e 8 34	− 2	—	—	—	—	—
Stuttgart		47·4	328	e 8 35	− 3	e 15 38	+ 6	e 10 26	PP	e 25·0
Basle		47·5	325	e 8 41	+ 3	e 15 29	− 5	—	—	—
Jena		47·6	331	e 8 38	− 1	e 10 30	PP	e 10 44	PP	—
Potsdam		47·9	333	e 8 44	+ 2	e 15 44	+ 5	e 10 39	PP	e 24·0
Karlsruhe		47·9	328	e 8 40	− 2	—	—	—	—	—
Strasbourg		48·0	327	e 8 42a	− 1	e 15 46	+ 5	e 10 30	PP	e 24·0
Besançon		48·3	324	e 8 44	− 1	—	—	e 10 50	PP	—
Alicante		48·6	311	9 20	+33	17 0	+71	11 38	PPP	e 26·0
Tortosa		48·8	314	e 8 45	− 4	e 16 5	+13	—	—	—
Pulkovo		48·8	350	e 8 49	0	e 16 1	+ 9	—	—	—
Almeria		49·6	308	e 9 53	+58	17 13	+70	11 17	PP	28·8
Copenhagen		50·5	336	—	—	16 22	+ 6	20 5	SS	24·0
Granada		50·6	308	i 9 17a	+15	16 21	+ 4	11 51	PPP	26·0
Paris		51·1	324	e 9 5	− 1	e 16 30	+ 6	e 11 8	PP	e 24·0
Malaga		51·1	308	i 9 6	0	i 16 48	+24	i 11 36	PP	31·0
Witteveen	z.	51·1	331	i 9 7	+ 1	—	—	—	—	—
De Bilt		51·4	329	e 9 9	0	e 16 41	+13	—	—	e 26·0
Toledo		51·7	311	i 9 11	0	e 16 45	+13	e 11 9	PP	—
Upsala		51·9	342	e 9 13	+ 1	e 16 41	+ 6	e 19 59?	SS	—
Kew		54·0	326	i 9 27a	− 1	i 17 12	+ 9	e 11 39	PP	e 26·0
Rathfarnham Castle		58·1	326	e 10 2	+ 4	e 17 31	−27	—	—	e 27·0
Kabansk		62·6	37	e 10 25	− 3	e 19 0	+ 4	—	—	—
Scoresby Sund		71·2	341	e 11 26	+ 3	e 20 46	+ 6	15 52	PPP	34·0
Manila		72·9	78	i 11 20	−13	—	—	—	—	—
Vladivostok		78·9	48	e 12 6	− 1	—	—	—	—	—
China Lake	z.	129·7	342	e 19 11	[0]	—	—	—	—	—
Mount Wilson	z.	131·3	341	i 19 15	[+ 1]	—	—	—	—	—
Riverside	z.	131·8	341	e 19 13	[− 2]	—	—	—	—	—

Additional readings :—
Helwan eN =5m.56s., e =7m.59s.
Bombay Q =11·6m.
Bucharest eN =6m.41s., eE =8m.9s.
Belgrade eS?NE =13m.26s., eNE =17m.53s.
Tamanrasset ePcPZ =9m.21s.
Rome eSSE =16m.57s.?.
Pavia eSS =18m.39s.
Prague e =9m.15s. and 13m.15s., ePS? =15m.35s., e =16m.42s. and 17m.37s., eSS = 18m.29s., e =20m.11s.
Cheb eN =8m.53s. and 12m.26s., eSSE =19m.1s.
Stuttgart e =10m.43s. and 16m.7s., eSS =18m.59s.
Potsdam eSE =15m.48s.
Strasbourg e =9m.0s. and 9m.30s., ePPP =11m.23s., eSS =19m.26s., e =19m.34s.
Besançon e =9m.5s. and 9m.26s.
Alicante PcP =10m.29s., PPP =12m.30s., PcS =14m.34s., PPS =17m.21s., ScS = 19m.10s., SS =20m.42s., SSS =22m.30s.
Granada PcS =14m.42s., SS =20m.44s.
Paris i =9m.9s. and 9m.34s., eSS =20m.15s., e =20m.27s. and 22m.25s.
Malaga iPPP =13m.10s.
Upsala eS =16m.22s., eN =17m.24s.
Long waves were also recorded at Clermont-Ferrand and Aberdeen.

July 3d. Readings also at 0h. (Ksara, Messina, Weston, Fergana, Stalinabad, near Obi-garm, Dzhergetal, Khorog, and near Kurmenty), 1h. (near Chur, Zürich, and Basle), 2h. (Ksara), 3h. (near Almata II), 4h. (Pavia, Ksara (2), and near Dzhergetal), 6h. (Apia, Ksara, Huancayo, near Tacubaya, and near Copiapo), 7h. (Ksara (2) and near Djakarta), 8h. (Paris (2), Istanbul, Helwan, Ksara, and near Tacubaya), 9h. (near Santa Lucia), 10h. (Paris), 12h. (Antofagasta and near Obi-garm), 13h. (near Huancayo), 14h. (near Dzhergetal (2)), 16h. (Manila, Chatra, near Huancayo, and near Almata II), 17h. (near Dzhergetal and near Alicante), 18h. (Chatra and near Athens), 19h. (Athens, Apia, Manila, Tamanrasset, Vera Cruz, near Puebla, and Tacubaya), 20h. (near Dxhergetal, Obi-garm, Stalinabad, and Khorog), 21h. (near Dzhergetal), 22h. (Tashkent, Andijan, Naryn, near Dzhergetal, Obi-garm, Stalinabad, Khorog, Fergana, near Ashkabad, and near Istanbul), 23h. (Algiers Univ. and Tamanrasset).

July 4d. 7h. 6m. 43s. Epicentre 19°·0S. 174°·2W. Depth of focus 0·015.
(as on 1950, June 14d.).

A = −·9414, B = −·0956, C = −·3236; δ = +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 19?	− 5	i 2 12	−16	i 6 55	?	—
Karapiro	N.	20·9	203	4 17?	−17	—	—	—	—	—
Tuai	N.	21·1	200	e 4 35	− 1	8 16	− 2	—	—	—
New Plymouth	E.	22·4	205	—	—	8 27	−14	—	—	—
Wellington		24·1	202	e 5 0	− 5	e 9 16	+ 6	—	—	—
Cobb River	E.	24·7	205	e 4 43	−27	e 8 59	−21	—	—	—
Kaimata	N.E.	26·4	205	e 5 23	− 3	—	—	e 5 28	P	—
Brisbane	Z.	31·2	248	i 6 4	− 5	—	—	—	—	—
Manila		72·0	293	e 11 7	− 5	—	—	—	—	—
Berkeley	Z.	74·7	41	i 11 28a	+ 1	—	—	e 12 3	pP	—
Lick	Z.	74·8	41	i 11 29a	+ 1	—	—	i 12 5	pP	—
Pasadena	Z.	75·1	46	i 11 29a	− 1	—	—	i 12 5	pP	—
Palomar	Z.	75·5	47	i 11 34a	+ 2	—	—	—	—	—
Riverside	Z.	75·5	46	i 11 32a	0	—	—	i 12 8	pP	—
Fresno	Z.	75·6	43	e 11 32a	0	—	—	e 12 3	pP	—
China Lake	Z.	76·4	44	i 11 38a	+ 1	—	—	e 12 13	pP	—
Mineral	Z.	76·7	39	e 11 37a	− 2	—	—	e 12 13	pP	—
Tinemaha	Z.	76·7	43	i 11 41a	+ 2	—	—	—	—	—
Huancayo		94·3	105	—	—	e 23 35	[+ 8]	e 27 8	?	e 31·1
La Paz		99·2	111	e 13 59	pP	—	—	17 35	PP	—
Scoresby Sund		125·9	12	i 18 47	[0]	—	—	—	—	—
Potsdam	Z.	146·2	352	i 19 25k	[+ 1]	—	—	—	—	—
Witteveen	Z.	146·2	0	i 19 15a	[− 9]	—	—	—	—	—
De Bilt		147·0	1	i 19 27	[+ 1]	—	—	—	—	—
Kew		147·2	7	i 19 29	[+ 3]	e 26 25	[+ 6]	e 20 9	pPKP	e 48·3
Collmberg	Z.	147·3	351	e 19 26	[0]	—	—	e 20 14	pPKP	—
Raciborzu		147·4	346	e 19 26	[0]	—	—	e 18 47	?	—
Jena		147·8	353	e 19 29?	[+ 2]	—	—	—	—	—
Prague		148·3	349	i 19 31a	[+ 3]	i 20 32	sPKP	e 19 47	PKP_2	—
Cheb		148·6	352	e 19 34	[+ 6]	e 20 40	sPKP	e 20 6	pPKP	—
Ksara		149·4	305	i 19 34	[+ 5]	36 54	sPPS	e 20 36	sPKP	—
Ogyalla		149·5	344	e 19 37	[+ 8]	—	—	e 19 50	PKP_2	—
Karlsruhe	Z.	150·0	356	e 19 31	[+ 1]	—	—	i 19 37	PKP_2	—
Stuttgart		150·2	356	e 19 31	[+ 1]	e 20 26	sPKP	i 19 36	PKP_2	—
Strasbourg		150·4	358	e 19 31	[0]	e 20 27	sPKP	i 19 37	PKP_2	—
Timisoara	N.	150·4	338	e 19 40	PKP_2	—	—	—	—	—
Belgrade		151·5	338	e 19 40	[+ 8]	e 33 47	PS	e 19 49	PKP_2	—
Zürich		151·6	357	e 19 32	[0]	—	—	e 19 38	PKP_2	—
Besançon		151·8	359	e 19 34	[+ 1]	20 37	sPKP	e 23 16	PP	—
Triest		152·6	348	i 19 33	[− 1]	—	—	e 19 50	PKP_2	—
Clermont-Ferrand		153·2	5	i 19 36	[+ 1]	—	—	i 19 55	PKP_2	—
Alicante		160·0	16	19 53	[+ 9]	26 28	[− 6]	37 32	PPS	e 75·1
Malaga		160·2	25	i 19 42	[− 2]	—	—	i 20 26	PKP_2	—
Tamanrasset	Z.	176·2	—	i 19 55k	[0]	e 25 26	PP	e 20 36	pPKP	—

Additional readings :—
Berkeley eZ = 11m.35s. and 12m.58s., ePP?Z = 14m.12s.
Lick iZ = 11m.35s.
Kew ePS? = 29m.54s., eEN = 32m.14s.
Raciborzu iPKP$_2$Z = 19m.29s., eE = 19m.38s., eZ = 21m.37s., eE = 21m.40s., eN = 22m.37s., eZ = 22m.54s.
Jena eEN = 19m.32s., eE = 19m.41s. and 20m.28s.
Prague e = 19m.53s., esPKP$_2$?Z = 20m.42s., e = 20m.54s., 21m.13s., 21m.25s., and 22m.1s.
Cheb eE = 20m.17s.
Ogyalla e = 20m.45s., ePP? = 23m.6s.
Stuttgart eZ = 19m.41s. and 20m.36s.
Besançon e = 19m.41s., i = 19m.50s.
Clermont-Ferrand i = 19m.43s.
Alicante PKP$_2$ = 20m.28s., PPP = 27m.48s., SSP = 45m.30s.
Tamanrasset iPKP$_2$Z = 21m.36s., epPKP$_2$Z = 22m.10s., eZ = 28m.43s.
Long waves were also recorded at Almeria.

July 4d. 14h. 43m. 50s. Epicentre 2°·2N. 126°·9E. (as on 1951, May 16d.).

$A = -\cdot6000$, $B = +\cdot7991$, $C = +\cdot0382$; $\delta = +2$; $h = +7$;
$D = +\cdot800$, $E = +\cdot600$; $G = -\cdot023$, $H = +\cdot031$, $K = -\cdot999$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Manila		13·6	335	e 3 23	+ 6	—	—
Brisbane	z.	38·8	141	i 7 28 k	0	—	—
Vladivostok		41·0	6	e 7 48	+ 2	e 13 59	0
Kabansk		52·5	345	9 19	+ 2	e 16 43	0
Irkutsk		53·3	343	e 9 26?	+ 3	e 16 54?	0
Petropavlovsk		57·1	22	e 9 56	+ 6	—	—
Przhevalsk		59·0	321	i 10 3	− 1	—	—
Krasnogorka		61·4	320	e 10 18	− 2	—	—
Andijan		62·3	316	10 25	− 1	18 49	− 3
Tashkent		64·4	315	e 10 41	+ 1	—	—
Tchimkent		64·8	317	e 10 20?	−23	—	—
Terre Adelie		69·6	173	i 11 11	− 2	—	—
Sverdlovsk		75·3	329	11 46	− 1	21 21	− 5
Grozny		82·0	313	e 12 23?	0	—	—
Tiflis		82·6	311	e 12 0	−26	—	—
Gori		83·2	311	e 12 31	+ 2	—	—
Harvard		132·5	17	i 19 19	[+ 2]	e 22 41	PKS

July 4d. Readings also at 0h. (Apia and near Stalinabad), 1h. (Manila and Stuttgart), 2h. (Weston, Branner, Mineral, Mount Wilson, Riverside, Palomar, China Lake, Collmberg, Obi-garm, Kimberley, and Pretoria), 4h. (Scoresby Sund and near Santa Lucia), 5h. (Collmberg), 7h. (Apia, La Paz, La Plata, Antofagasta, Harvard, Mount Wilson, Riverside, Palomar, China Lake, Obi-garm, Almata II, Kurmenty, Rybach'e, near Khorog, Dzhergetal, Fergana, Andijan, Stalinabad, Tashkent, Naryn, Samarkand, Tchimkent, Almata, Frunse, and near Ashkabad), 8h. (near Mizusawa, near Apia, and near Kurmenty), 9h. (near Tacubaya and near Dzhergetal), 10h. (Ksara, Pavia, Andijan, Tashkent, near Dzhergetal, Khorog, Obi-garm, and Stalinabad), 12h. (Guam, Manila, Brisbane (2), Terre Adelie, Pasadena, Riverside, Palomar, China Lake, Berkeley, Lick, Fresno, Mineral, Seattle, La Paz, and Stuttgart), 13h. (Stuttgart), 15h. (Chatra and Kimberley), 16h. (Jena and near Collmberg), 18h. (Apia, near Kurmenty, and near Dzhergetal), 21h. (near Dzhergetal and near Almata II), 22h. (near Apia and near Manila), 23h. (La Paz, near Dzhergetal, Fergana, Khorog, Obi-garm, and Stalinabad).

July 5d. 9h. 3m. 57s. Epicentre 35°·0N. 82°·0E. (as on 1943, October 10d.).

$A = +\cdot1143$, $B = +\cdot8130$, $C = +\cdot5710$; $\delta = +7$; $h = 0$;
$D = +\cdot990$, $E = -\cdot139$; $G = +\cdot079$, $H = +\cdot565$, $K = -\cdot821$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
New Delhi	7·6	214	i 2 2	+ 7	i 3 32	+ 9	2 10	P*	—
Naryn	8·0	326	e 1 57	− 3	i 3 41	+ 8	—	—	—
Przhevalsk	8·0	341	i 1 57	− 3	—	—	—	—	—
Khorog	8·8	290	e 2 14?	+ 3	i 4 45	S_g	—	—	—
Rybach'e	8·8	330	e 2 7	− 4	—	—	—	—	—
Almata II	9·0	338	e 2 11	− 2	—	—	—	—	—
Chilisk	9·0	343	e 2 9	− 4	—	—	—	—	—
Almata	9·1	336	i 2 13	− 1	—	—	—	—	—
Chatra	9·3	150	e 2 22	+ 5	i 4 13	+ 8	5 13	S_g	4·5
Andijan	9·5	310	e 2 20	0	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Dzhergetal		9·6	299	e 2 19	− 2	—	—	—	—	—
Fergana		9·7	307	e 2 21	+ 2	—	—	—	—	—
Frunse		9·8	326	i 2 22	− 2	—	—	—	—	—
Obi-garm		10·5	294	2 37	+ 2	—	—	—	—	—
Stalinabad		11·2	292	i 2 45	+ 1	—	—	—	—	—
Tashkent		11·8	306	i 2 52	− 1	—	—	—	—	—
Samarkand		12·8	296	3 3	− 3	—	—	—	—	—
Calcutta	E.	13·6	155	e 4 10?	+53	—	—	—	—	i 7·8
Mary		16·4	285	i 3 56	+ 3	—	—	—	—	—
Hyderabad	N.	17·8	191	i 4 16	+ 5	i 8 2	SSS	—	—	10·0
Poona	E.	17·9	206	i 4 16	+ 4	e 7 44	+14	8 10	SSS	8·8
Bombay	E.	18·0	210	—	—	i 7 47	+15	—	—	—
Ashkabad		19·2	286	i 4 26	− 2	7 59	6	—	—	—
Irkutsk		23·5	35	5 10	− 2	9 28	+ 5	—	—	—
Kabansk		24·5	36	5 20	− 2	e 9 39	− 1	—	—	—
Sverdlovsk		26·2	334	i 5 35	− 3	10 11	+ 2	—	—	—
Lenkoran		26·7	289	5 45	+ 2	e 10 30	+13	—	—	—
Kirovobad		28·6	293	6 5	+ 5	—	—	—	—	—
Grozny		29·1	298	e 6 6	+ 2	—	—	—	—	—
Tiflis		29·7	295	e 6 18	+ 8	—	—	—	—	—
Gori		30·3	295	e 6 22	+ 7	—	—	—	—	—
Nanking		30·7	83	—	—	e 11 25	+ 4	—	—	e 17·0
Moscow		36·6	319	e 7 9	− 1	e 12 53	0	—	—	—
Yalta		37·5	300	7 17	0	13 7	0	—	—	—
Ksara		37·8	282	i 7 22	+ 2	e 13 0?	−11	—	—	—
Pulkovo		41·4	323	e 7 50	0	e 14 8	+ 3	—	—	—
Helwan		42·7	278	e 8 6	+ 6	e 14 43	+19	—	—	—
Lwow		44·2	308	i 8 14	+ 2	e 14 50	+ 4	—	—	—
Uzhgorod		45·4	306	e 8 23	+ 1	e 15 5	+ 1	—	—	—
Skalnate Pleso		46·7	308	e 8 33	+ 1	e 15 33	+11	e 20 9	SSS	e 23·6
Belgrade		47·2	301	e 8 31	− 5	e 19 3	SS	e 12 21	?	—
Kiruna	Z.	47·4	333	i 8 32	− 6	—	—	—	—	—
Upsala		47·8	322	e 10 32	PP	e 15 38	0	e 19 13	SS	e 25·4
Ogyalla		48·2	306	e 11 49	PPP	e 15 59	+16	e 19 33	SS	—
Prague		50·3	310	e 8 55	− 5	e 16 15	+ 2	e 11 1	PP	e 24·0
Copenhagen		50·7	317	—	—	16 24	+ 6	20 9	SS	24·0
Potsdam		50·8	313	e 9 2	− 2	e 16 21	+ 1	e 11 2	PP	e 25·0
Collmberg	Z.	51·0	311	e 9 5	− 1	—	—	e 11 8	PP	—
Cheb	E.	51·6	310	11 15	PP	e 20 15	SS	—	—	—
Jena		52·0	310	e 9 12	− 1	—	—	e 11 15	PP	—
Stuttgart		53·9	309	e 9 26k	− 1	e 17 3	+ 1	e 9 30	P	e 30·0
Strasbourg		54·9	309	e 9 34	− 1	e 21 30	SS	e 12 47	PPP	e 27·0
De Bilt		55·6	313	e 9 39	− 1	e 17 33	+ 8	—	—	e 26·0
Besançon		56·4	307	e 9 44	− 1	—	—	—	—	—
Paris		58·2	310	e 9 57	− 1	e 17 59	0	e 13 31	PPP	e 29·0
Kew		59·1	314	i 10 3	− 1	e 24 35	SSS	e 13 37	PPP	e 31·0
Rathfarnham Castle		61·9	318	e 13 9	PP	e 25 33	SSS	—	—	e 32·0
Tamanrasset	Z.	66·6	282	i 10 54k	0	—	—	e 13 17	PP	—
Huancayo		149·3	312	e 19 50	[+ 4]	—	—	—	—	—

Additional readings :—
New Delhi SSEN = 3m.50s., SSSE = 3m.55s.
Chatra PPZ = 2m.30s., P*Z = 2m.52s., QZ = 4m.3s., SSZ = 4m.25s., SSSZ = 4m.37s., S$_e$EN = 5m.23s.
Calcutta iE = 8m.13s. and 8m.28s.
Poona QE = 7m.50s.
Skalnate Pleso ePS?N = 15m.49s., e = 16m.21s., eN = 16m.28s. and 17m.14s., e = 21m.45s.
Upsala eQN = 21·0m.
Prague e = 9m.49s. and 11m.34s., eSE = 16m.21s., eSS = 20m.14s.
Potsdam eSS?Z = 20m.17s.
Paris ePS? = 18m.9s., eSS? = 21m.53s., e = 24m.47s.
Long waves were also recorded at Helsinki.

July 5d. Readings also at 1h. (Tacubaya, Huancayo, and near Almata II), 2h. (Chatra), 3h. (Apia), 6h. (Huancayo), 10h. (near Alicante and near Manila), 11h. (Naryn, Przhevalsk, Kurmenty, Stalinabad, Samarkand, near Rybach'e, Frunse, Krasnogorka, Andijan, Almata II, Fergana, Chilisk, Dzhergetal (2), and Obi-garm), 13h. (Kurmenty, Przhevalsk, near Chilisk, Almata II, Almata, Rybach'e, Krasnogorka, Naryn, and Frunse), 14h. (Collmberg and near Dzhergetal (2)), 15h. (near Dzhergetal), 16h. (Tortosa), 17h. (Collmberg, near Alicante, and Kurmenty), 18h. (Ksara and near Dzhergetal), 19h. (Apia, Riverside, and China Lake), 20h. (Collmberg, Jena, Stuttgart, Strasbourg, Paris, Besançon, Kiruna, and near Almata II), 21h. (Obi-garm, near Khorog, Dzhergetal, and Andijan), 22h. (Apia), 23h. (near Granada and Malaga).

July 6d. 5h. 15m. 46s. Epicentre 41°·5N. 73°·3E. (given by U.S.S.R.).

$A = +\cdot2159$, $B = +\cdot7195$, $C = +\cdot6601$; $\delta = +3$; $h = -2$;
$D = +\cdot958$, $E = -\cdot287$; $G = +\cdot190$, $H = +\cdot632$, $K = -\cdot751$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan	1·0	224	i 0 20	− 1	0 34	− 2	—	—	—
Fergana	1·6	226	i 0 29	− 1	e 0 51	0	—	—	—
Frunse	1·7	35	i 0 30	− 1	i 0 53	− 1	—	—	—
Naryn	2·0	92	e 0 36	+ 1	e 1 6	+ 4	—	—	—
Krasnogorka	2·2	38	0 37	− 1	—	—	—	—	—
Rybach'e	2·3	65	i 0 41	+ 1	i 1 16	S_E	—	—	—
Dzhergetal	2·8	215	i 0 48	+ 1	—	—	—	—	—
Tchimkent	2·9	286	i 0 50	+ 2	i 1 23?	− 1	0 54	P*	—
Tashkent	3·0	267	i 0 53	+ 3	i 1 32	+ 5	—	—	—
Almata	3·2	57	i 0 53	+ 1	—	—	—	—	—
Almata II	3·5	58	0 57	0	i 1 55	S_E	—	—	—
Ili	3·7	47	i 0 58?	− 2	i 1 57	S*	i 1 6?	P*	—
Obi-garm	3·9	226	1 2	0	—	—	—	—	—
Przhevalsk	3·9	74	i 1 9?	P*	—	—	i 1 12?	P*	—
Kurmenty	4·0	65	i 1 4	0	—	—	1 12	P*	—
Khorog	4·2	199	e 1 8	+ 1	—	—	e 1 24	P_E	—
Chilisk	4·3	60	1 8	0	—	—	—	—	—
Stalinabad	4·6	231	e 1 10	− 2	—	—	—	—	—
Samarkand	5·2	251	i 1 17	− 4	—	—	1 29	P*	—
Ashkabad	12·0	258	e 2 53	− 2	—	—	—	—	—
Sverdlovsk	17·4	336	e 3 59	− 7	e 7 18	− 1	—	—	—
Baku	17·7	274	e 7 35?	S	(e 7 35?)	+ 9	—	—	e 9·9
Grozny	20·4	284	—	—	e 8 22	− 3	—	—	—

Andijan gives also i −28s.

July 6d. Readings also at 2h. (Manila and near Yalta), 3h. (near Apia), 4h. (Apia, Kimberley, Pretoria, and Tamanrasset), 5h. (Mount Wilson, Palomar, Pasadena, Riverside (2), China Lake (2), Lick, Fresno, Collmberg, Potsdam, Paris, Besançon, Strasbourg, Stuttgart, and Algiers Univ.), 6h. (near Dzhergetal), 7h. (near Copiapo), 8h. (Santa Lucia), 9h. (Santa Lucia, Almata II, Dzhergetal, Frunse, Ili, Kurmenty, Obi-garm, near Almata, Andijan, Fergana, Khorog, Krasnogorka, Naryn, Rybach'e, Samarkand, Stalinabad, Tashkent, and Tchimkent), 10h. (near Alicante), 11h. (Chilisk, Fergana, Przhevalsk, Tashkent, near Almata, Almata II, Dzhergetal, Frunse, Ili, Krasnogorka, Kurmenty (2), Naryn, Rybach'e, and Obi-garm), 12h. (Andijan, near Dzhergetal, Fergana, Khorog, Obi-garm, and Stalinabad), 13h. (La Paz, Mount Wilson, Palomar, Riverside, and China Lake), 15h. (Mount Wilson, Palomar, Riverside, China Lake, Andijan, Tchimkent, near Dzhergetal (2), Fergana, Khorog, Obi-garm, and Stalinabad), 16h. (near Alicante), 17h. (near Alicante, Tortosa, and near Ottawa), 19h. (China Lake and near Athens), 20h. (Apia, Kimberley, and Tortosa), 22h. (Kodaikanal and near Dzhergetal), 23h. (Bombay, Poona, Kimberley (2), Pretoria, Tamanrasset, Ksara, Collmberg, Jena, Stuttgart, Alicante, Granada, and China Lake),

July 7d. 3h. 57m. 13s. (I) } Epicentre 36°·7N. 70°·5E. Depth of focus 0·030.
5h. 49m. 39s. (II) } (as on 1951, May 1d.).

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.
		°	°	m. s.	s.	m. s.	s.
I	Khorog	1·2	48	0 33	− 1	0 58	− 2
II		1·2	48	0 35	+ 1	i 1 1	+ 1
I	Obi-garm	2·1	342	e 0 46?	+ 4	i 1 18?	+ 4
II		2·1	342	i 0 42	0	i 1 12	− 2
I	Stalinabad	2·3	323	e 0 46	+ 2	i 1 21	+ 4
II		2·3	323	i 0 43	− 1	i 1 14	− 3
I	Dzhergetal	2·6	12	i 0 45	− 2	i 1 20	− 3
II		2·6	12	0 47	0	i 1 23	0
I	Fergana	3·8	15	—	—	e 1 44	− 4
II		3·8	15	i 1 2	+ 1	i 1 49	+ 1
I	Andijan	4·3	20	e 1 3	− 4	i 1 53	− 6
II		4·3	20	e 1 7	0	i 1 59	0
I	Tashkent	4·7	349	—	—	i 2 7	− 1
II		4·7	349	e 1 12	0	i 2 6	− 2
II	Tchimkent	5·6	354	i 1 25	+ 2	i 2 28	0
I	Naryn	6·4	41	i 2 17	?	i 3 1	?
II		6·4	41	i 1 32	− 1	i 2 45	− 1
I	Frunse	6·9	26	—	—	e 2 52	− 6
II		6·9	26	i 1 40	0	i 2 58	0
II	Rybach'e	7·2	35	1 46	+ 2	3 8	+ 3
II	Krasnogorka	7·5	27	e 1 46	− 1	—	—
II	Almata	8·2	35	i 1 58	+ 1	—	—
II	Almata II	8·4	37	e 2 0	+ 1	—	—
II	Przhevalsk	8·4	44	i 2 0	+ 1	—	—
II	Kurmenty	8·7	41	2 2	− 1	—	—
II	Ashkabad	9·8	281	—	—	e 3 40	−25

July 7d. 10h. 15m. 16s. Epicentre 45°·0S. 167°·0E. (as on 1950, October 10d.).

Intensity IV-V at Otago Southland.

R. C. Hayes.
Earthquake origins in New Zealand during 1951. New Zealand Journal of Science and Technology. Sec. B. Vol. 34, No. 4, January, 1953, p. 255.

A = −·6913, B = +·1596, C = −·7047 ; δ = −3 ; h = −4 ;
D = +·225, E = +·974 ; G = +·687, H = −·159, K = −·710.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kaimata	N.E.	4·1	54	e 1 3	− 2	e 1 45	−10	—	—	—
Christchurch		4·3	71	e 1 7	− 1	e 1 44	−16	—	—	—
Cobb River	E.	5·7	49	e 1 27	− 1	e 2 27	− 8	—	—	—
Wellington		6·8	59	e 1 42	− 2	2 48	−15	—	—	—
New Plymouth	E.	7·9	44	e 2 4	+ 5	3 22	− 8	—	—	—
Tuai	N.	9·8	54	(e 2 38)	+14	e 2 38	P	—	—	—
Auckland	N.	10·0	39	e 2 10	−17	i 2 59	?	—	—	—
Riverview		16·5	307	i 3 58k	+ 4	i 7 19	+21	i 4 6	pP	i 7·8
China Lake	Z.	105·4	55	—	—	i 30 4	?	—	—	—
Scoresby Sund		154·1	7	i 20 9a	[+16]	—	—	—	—	—
Stuttgart	Z.	164·4	293	e 19 56	[− 9]	—	—	e 24 35	PP	—
Strasbourg		165·3	292	e 19 59	[− 7]	—	—	e 21 17	PKP_2	—
Besançon		166·6	286	e 21 5	PKP_2	—	—	—	—	—

Additional readings :—
Riverview eSSE = 7m.43s.
Stuttgart eZ = 20m.55s. and 21m.16s.
Strasbourg e = 20m.58s. and 21m.51s.
Long waves were also recorded at Tortosa.

July 7d. 19h. 56m. 35s. Epicentre 12°·4N. 144°·1E. (as on 1948, July 8d.).

$A = -·7914$, $B = +·5729$, $C = +·2134$; $\delta = +7$; $h = +6$;
$D = +·586$, $E = +·810$; $G = -·173$, $H = +·125$, $K = -·977$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		1·2	31	0 23	− 1	—	—	—	—	—
Vladivostok		32·4	343	—	—	e 11 33	−15	—	—	—
Kabansk		49·7	330	e 8 58	+ 2	e 15 58	− 6	—	—	—
Przhevalsk		63·8	312	e 10 36	0	—	—	—	—	—
Ili		65·1	313	i 10 43	− 2	—	—	—	—	—
Rybach'e		65·5	310	e 10 46	− 1	—	—	—	—	—
Frunse		66·7	310	e 10 53	− 2	e 19 44	− 2	—	—	—
Andijan		67·5	309	11 4	+ 4	20 3	+ 7	—	—	—
Fergana		68·6	308	e 11 6	− 1	—	—	—	—	—
Dzhergetal		69·0	307	e 11 11	+ 2	—	—	—	—	—
College		69·6	25	e 11 8	− 5	—	—	i 11 54	?	—
Obi-garm		70·2	307	e 11 21	+ 4	—	—	—	—	—
Tchimkent		70·3	311	i 11 15	− 2	—	—	—	—	—
Tashkent		70·5	310	e 11 19	+ 1	e 20 31	− 1	—	—	—
Stalinabad		70·9	307	i 11 21	0	e 20 35	− 1	—	—	—
Samarkand		72·3	308	i 11 28	− 1	20 49	− 3	—	—	—
Sverdlovsk		76·1	326	—	—	21 29	− 6	—	—	—
Terre Adélie		79·0	182	e 12 7?	0	—	—	—	—	—
Ashkabad		79·2	306	e 12 11	+ 3	e 22 8	0	—	—	—
Shasta Dam		84·7	49	i 12 35	− 2	—	—	—	—	—
Berkeley	Z.	85·3	53	i 12 40a	0	—	—	—	—	—
Lick	Z.	85·9	53	i 12 42k	− 1	—	—	—	—	—
Resolute Bay	Z.	85·9	13	e 12 41	− 2	—	—	—	—	—
Fresno	Z.	87·5	53	e 12 50a	− 1	—	—	—	—	—
Hungry Horse		88·6	40	12 55	− 1	—	—	i 16 21	PP	—
Tiflis		88·7	312	—	—	e 23 20	[− 5]	—	—	—
Gori		89·1	312	—	—	e 23 31	[+ 4]	—	—	—
China Lake	Z.	89·4	53	i 12 59k	− 1	—	—	—	—	—
Pasadena	Z.	89·4	55	i 12 59k	− 1	—	—	—	—	—
Riverside	Z.	90·1	55	i 13 2k	− 1	—	—	—	—	—
Palomar	Z.	90·7	55	i 13 5k	− 1	—	—	—	—	—
Boulder City		91·6	53	i 13 10	0	—	—	—	—	—
Tucson		95·8	55	i 13 29	0	—	—	—	—	—
Potsdam	N.	103·0	332	—	—	e 24 40	[− 1]	—	—	e 55·4
Kimberley	Z.	121·5	244	i 18 57	[+ 1]	—	—	—	—	—
Tamanrasset	Z.	126·4	311	i 19 8k	[+ 3]	—	—	—	—	—
La Paz	Z.	148·5	101	i 19 49	[+ 4]	—	—	23 45	PP	—

Additional readings :—
Lick iZ = 12m.48s. and 12m.54s.
Tamanrasset iZ = 19m.14s.
Long waves were also recorded at several European stations.

July 7d. Readings also at 0h. (Clermont-Ferrand), 1h. (Almata II, Dzhergetal, Fergana, Kurmenty, Obi-garm, Przhevalsk, Stalinabad, near Almata, Chilisk, Ili, Frunse, Krasnogorka, Naryn, Rybach'e, and Tchimkent), 3h. (Manila, Terre Adélie, Collmberg, Prague, Jena, Paris, Besançon, Strasbourg, Stuttgart, Palomar, Pasadena, Riverside, China Lake, Berkeley, Lick, Fresno, Tamanrasset, Kimberley, Almata II, Chilisk, Ili, Frunse, Krasnogorka, Kurmenty, Naryn, Przhevalsk, Rybach'e, Tashkent, near Almata, and near Fort de France, many shocks), 4h. (Granada), 5h. (Apia), 7h. and 8h. (near Almata II), 10h. (near Alicante), 11h. (near Kurmenty (2)), 12h. (near Ashkabad), 13h. (Apia, near Almata II, Frunse, Ili, Krasnogorka, and Naryn), 14h. (near Santa Lucia), 15h. (Nanking, Collmberg, Jena, Prague, Paris, Potsdam, Stuttgart, Scoresby Sund, Resolute Bay, Mount Wilson, Palomar, Riverside, China Lake, Lick, near Almata II (4), Chilisk, Ili, Krasnogorka, Kurmenty, and near La Paz, several shocks), 16h. (near Alicante), 17h. (near Alicante (2) and near Yalta (2)), 18h. (2) and 22h. (near Dzhergetal), 23h. (Almata, Almata II, Ili, Khorog Krasnogorka, Naryn, Rybach'e, near Andijan, Dzhergetal, Fergana, Frunse, Obi-garm (2), Samarkand, Stalinabad, Tashkent, and Tchimkent).

July 8d. 5h. 44m. 20s. Epicentre 10°·5N. 122°·3E. (as on 1950, March 7d.).

Intensity VI at Ilo-Ilo; V at Dumaguete; III at Mambajo, Rocsas City, Cuyo, and Dipolog. Epicentre 10°·4N. 122°·5E.
Monthly seismic bulletin, Manila, July, 1951.

$A = -\cdot5255$, $B = +\cdot8313$, $C = +\cdot1811$; $\delta = +1$; $h = +6$;
$D = +\cdot845$, $E = +\cdot534$; $G = -\cdot097$, $H = +\cdot153$, $K = -\cdot984$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		4·2	343	i 1 35	P_g	i 2 21	S_g	—	—	—
Zi-ka-wei		20·6	358	4 53	+10	8 42	+13	—	—	—
Yakusima		21·3	20	4 52	+ 2	8 56	+13	—	—	—
Nanking		21·7	351	e 5 1	+ 6	i 9 1	+10	i 5 4	P	10·0
Guam		22·2	80	4 57	− 3	—	—	—	—	—
Kagosima		22·3	18	5 0	− 1	8 58	− 4	—	—	11·7
Djakarta		22·6	224	e 4 59	− 4	i 9 1	− 6	—	—	—
Miyazaki		22·9	21	5 22	+16	9 31	+18	—	—	—
Nagasaki		23·2	16	5 23	+14	9 39	+21	—	—	—
Kumamoto		23·5	18	5 18	+ 6	9 46	+23	—	—	—
Hukuoka		24·1	17	5 21	+ 3	9 43	+ 9	—	—	11·8
Simidu		24·3	21	5 31	+11	—	—	—	—	—
Matuyama		25·1	20	5 30	+ 2	10 25	SS	—	—	—
Koti		25·2	22	5 32	+ 3	9 55	+ 3	—	—	—
Sumoto		26·4	23	5 48	+ 8	—	—	—	—	—
Owase		26·7	27	5 38	− 5	—	—	—	—	13·1
Kobe		26·8	23	5 47	+ 3	—	—	—	—	—
Tu		27·4	26	6 1	+12	10 29	+ 1	—	—	—
Kameyama		27·5	26	5 55	+ 5	11 2	+32	—	—	13·1
Hikone		27·7	25	5 55	+ 3	—	—	—	—	—
Nagoya		28·0	27	5 57	+ 2	—	—	—	—	—
Omaesaki		28·0	29	5 58	+ 3	—	—	—	—	—
Tsuruga		28·0	24	5 54	− 1	—	—	—	—	—
Gihu		28·1	27	5 58	+ 3	—	—	—	—	—
Shizuoka		28·4	29	6 8	+10	—	—	—	—	—
Hunatu		29·0	28	6 11	+ 7	11 56	+62	—	—	—
Kanazawa		29·0	24	6 33	+29	—	—	—	—	—
Mera		29·1	30	6 41	PP	12 41	SSS	—	—	—
Toyama		29·3	25	6 20	+14	—	—	—	—	13·3
Oiwake		29·6	26	6 12	+ 3	—	—	—	—	—
Titibu		29·6	28	6 22	+13	—	—	—	—	—
Matusiro		29·7	26	6 6	− 4	10 55	−11	—	—	12·6
Tokyo		29·7	30	6 8	− 2	10 57	− 9	(12 51)	SS	12·8
Maebasi		29·9	26	6 10	− 2	(12 41)	SS	—	—	12·7
Kumagaya		30·0	27	6 38	+26	12 52	SS	—	—	—
Hukusima		31·7	28	6 33	+ 6	(13 52)	SSS	—	—	13·9
Sakata		32·3	26	6 26	− 7	12 1	+15	—	—	—
Sendai		32·3	29	6 34	+ 1	11 53	+ 7	—	—	14·1
Akita		33·1	26	6 49	+ 9	—	—	—	—	—
Mizusawa		33·1	28	6 46	+ 6	e 13 59	SS	e 6 50	P	—
Morioka		33·6	27	6 43	− 1	—	—	—	—	—
Vladivostok		33·6	13	i 6 46	+ 2	—	—	—	—	—
Miyako		33·9	28	6 45	− 2	—	—	—	—	—
Calcutta	E.	34·6	295	i 6 58	+ 5	i 12 26	+ 4	i 8 10	PP	16·3
Urakawa		36·3	25	6 58	− 9	—	—	—	—	—
Chatra		36·9	301	e 7 13	+ 1	i 12 59	+ 1	8 40	PP	17·0
Obihiro		37·1	25	6 46	−28	—	—	—	—	—
Nemuro		38·5	27	6 55	−31	—	—	—	—	—
Colombo	E.	42·1	269	7 54	− 1	14 11	− 5	—	—	22·7
Perth		42·7	188	i 7 55	− 5	i 14 30	+ 6	10 0	PPP	20·8
Hyderabad	E.	43·0	284	i 8 10	+ 7	14 28	− 1	17 58	ScS	19·9
Kabansk		43·4	346	e 8 8	+ 2	14 34	− 1	—	—	—
Irkutsk		44·1	344	e 8 14	+ 2	14 45	0	—	—	—
Kodaikanal	E.	44·1	275	i 8 12	0	i 14 42	− 3	9 55	PP	20·4
New Delhi		45·8	300	8 27	+ 2	i 15 7	− 2	10 18	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Poona	E.	47·2	286	i 8 37	+ 1	i 15 30	+ 1	18 42	SS	—
Bombay		48·5	286	e 8 47	+ 1	i 15 46	− 2	i 10 53	PP	22·8
Przhevalsk		49·8	319	i 8 57	+ 1	—	—	—	—	—
Almata II		50·8	319	e 9 7	+ 3	—	—	—	—	—
Naryn		50·9	316	e 9 6	+ 1	16 25	+ 4	—	—	—
Almata		51·1	319	i 9 9	+ 3	i 16 31	+ 7	—	—	—
Ili		51·3	320	i 9 8?	0	i 16 25?	− 1	—	—	—
Rybach'e		51·3	317	e 9 9	+ 1	i 16 31	+ 5	—	—	—
Petropavlovsk		51·5	27	i 9 9	0	i 16 30	+ 1	—	—	—
Riverview		51·9	150	i 9 5a	− 7	i 16 31	− 4	i 9 15	pP	e 27·2
Frunse		52·5	317	e 9 6	−11	i 16 46	+ 3	—	—	—
Khorog		52·7	310	9 22	+ 4	16 52	+ 6	—	—	—
Andijan		53·2	313	e 9 23	+ 1	i 16 56	+ 4	—	—	—
Fergana		53·5	313	e 9 24	0	e 16 58	+ 1	—	—	—
Dzhergetal		53·6	312	i 9 25	0	—	—	—	—	—
Obi-garm		54·5	311	9 33	+ 1	17 19	+ 9	—	—	—
Stalinabad		55·2	311	i 9 37	0	i 17 19	− 1	—	—	—
Tashkent		55·6	314	i 9 41	+ 1	i 17 28	+ 3	—	—	—
Tchimkent		55·7	315	9 40	0	i 17 28	+ 2	—	—	—
Samarkand		56·8	311	9 47	− 1	—	—	—	—	—
Mary		60·3	307	10 12	− 1	—	—	—	—	—
Ashkabad		63·1	307	i 10 33	+ 1	—	—	—	—	—
Sverdlovsk		65·9	329	i 10 50	0	e 19 28	− 9	—	—	—
Auckland	N.	68·2	137	e 19 5	?	i 19 48	−16	e 24 47	SS	28·7
Baku		69·9	310	e 11 21?	+ 6	e 20 33?	+ 9	—	—	—
Christchurch		70·6	143	—	—	e 20 12	−21	e 21 40	PPS	e 25·7
Lenkoran		70·6	308	11 22	+ 3	20 39	+ 6	—	—	—
Wellington		70·6	140	e 21 10	PS	e 25 55	SS	—	—	i 29·5
Kirovobad		72·6	310	i 11 31	0	i 20 57	+ 1	—	—	—
Grozny		73·1	313	e 11 36	+ 2	—	—	—	—	—
Tiflis		73·8	311	e 11 38	0	e 21 10	+ 1	—	—	—
Gori		74·3	311	e 11 42	+ 1	21 16	+ 1	—	—	—
Zugdidi		75·9	312	e 11 53	+ 3	e 21 36	+ 4	—	—	—
Honolulu		76·9	70	e 11 56	0	e 21 46	+ 3	—	—	—
Moscow		78·4	325	e 12 2	− 2	e 21 56	− 4	—	—	—
Terre Adelie		78·4	172	i 11 56	− 8	—	—	i 14 53	PP	35·2
Tananarive		79·2	248	22 44	PS	e 22 5	− 3	26 59	SS	42·2
College		80·5	26	e 12 13	− 2	22 15	− 7	—	—	—
Ksara		81·3	302	i 12 20a	0	i 22 31	+ 1	—	—	—
Yalta		81·4	313	12 18	− 2	22 28	− 3	15 30	PP	—
Pulkovo		82·0	329	i 12 23	0	i 22 35	− 2	—	—	—
Helsinki		84·6	331	e 12 41	+ 5	e 22 54	− 9	—	—	e 39·7
Kiruna		84·8	339	i 12 33a	− 4	e 23 4?	− 1	e 28 32	SS	e 39·7
Kishinev		84·8	318	e 12 32	− 5	22 56	− 9	e 15 59	PP	—
Istanbul		85·6	311	e 12 40	− 1	e 23 5	[0]	e 23 16	S	e 34·7
Helwan		85·7	299	12 42	0	23 4	[− 1]	16 4	PP	—
Bucharest		87·1	315	e 12 52	+ 3	e 23 16	[+ 1]	i 23 30	S	50·7
Lwow		87·3	320	i 12 49	− 1	23 29	0	23 14	SKS	—
Sitka		87·8	32	e 12 55	+ 3	e 23 18	[− 1]	—	—	—
Upsala		88·2	331	e 12 53	− 1	i 23 35	− 3	i 23 17	SKS	e 41·7
Uzhgorod		88·7	319	12 56	− 1	i 23 40	− 3	—	—	—
Skalnate Pleso		89·9	320	e 12 59	− 3	e 29 52	SS	e 16 40	PP	—
Timisoara	E.	90·2	317	—	—	e 23 36	[+ 2]	e 30 11	SSP	e 58·7
Belgrade		90·9	316	e 13 5k	− 2	e 23 34	[− 4]	e 16 56	PP	e 34·5
Raciborzu		90·9	322	e 13 8	+ 1	e 23 56	− 7	e 18 46	PPP	—
Budapest		91·1	318	e 13 11	+ 3	e 23 59	− 5	e 16 59	PP	50·7
Resolute Bay		91·4	9	i 13 9	0	e 23 39	[− 2]	e 16 53	PP	—
Ogyalla		91·6	319	e 13 52	?	e 23 37	[− 5]	e 24 15	S	—
Copenhagen		92·3	328	e 13 12	− 1	i 23 45	[− 1]	i 24 19	S	45·7
Potsdam		93·2	324	e 13 18k	+ 1	i 24 24	+ 1	i 23 48	SKS	e 44·7
Collmberg	Z.	93·6	323	e 13 17	− 2	—	—	e 17 12	PP	—
Cheb		94·4	322	e 13 24	+ 1	e 24 35	+ 2	e 23 54	SKS	e 43·7
Taranto		94·4	312	12 59	−24	e 26 4	PS	e 29 44	PKKP	—
Jena		94·6	322	e 13 23	− 1	e 23 51?	[− 8]	e 17 17	PP	e 50·7
Triest		95·2	318	i 13 26	− 1	i 24 38	− 2	i 23 58	SKS	e 50·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		95·6	349	i 13 26	− 2	i 24 0	[− 4]	i 24 48	S	43·7
Witteveen	Z.	96·6	326	i 13 33	0	—	—	—	—	—
Stuttgart		96·9	322	e 13 33a	− 1	e 24 57	+ 3	e 24 6	SKS	e 45·7
Bologna		97·2	318	e 17 48	PP	e 24 10	[− 3]	—	—	—
Karlsruhe		97·2	323	e 13 36	0	e 24 8	[− 5]	e 17 44	PP	e 45·7
Rocca di Papa		97·3	314	—	—	e 25 43	?	—	—	—
Salo		97·3	319	e 17 50	PP	e 24 7	[− 6]	—	—	—
Rome		97·4	315	i 13 35	− 2	i 24 11	[− 3]	e 25 4	S	—
Prato		97·6	316	e 14 0	+22	e 26 21	PS	—	—	—
De Bilt		97·7	326	e 13 40	+ 2	e 24 14	[− 1]	e 25 8	S	e 44·7
Victoria		97·7	37	—	—	e 24 14	[− 1]	—	—	—
Strasbourg		97·8	322	e 13 36	− 2	i 24 10	[− 6]	e 25 17	S	e 44·7
Zürich		97·8	321	e 13 39	+ 1	e 24 4	[−12]	e 17 39	PP	—
Pretoria	Z.	98·2	246	i 13 7	−33	—	—	—	—	—
Pavia		98·3	319	e 17 26	PP	i 24 16	[− 3]	e 26 21	PS	e 47·8
Aberdeen	E.	98·7	333	i 17 15	?	i 24 19	[− 2]	i 17 59	PP	e 46·2
Seattle		98·7	38	e 17 39?	PP	e 24 19	[− 2]	e 19 56	PPP	e 48·7
Neuchatel		99·0	321	e 13 35	− 9	—	—	—	—	—
Besançon		99·5	321	e 13 43	− 3	—	—	e 17 57	PP	—
Durham		99·8	330	—	—	i 24 22	[− 4]	—	—	—
Edinburgh	E.	99·9	332	—	—	24 20	[− 7]	—	—	—
Paris		100·8	324	i 13 52	0	i 24 28	[− 3]	i 14 0	pP	e 47·7
Kew		101·0	327	e 13 56	+ 3	e 24 26	[− 6]	e 18 6	PP	e 47·7
Shasta Dam		101·7	44	e 13 56	0	—	—	—	—	—
Clermont-Ferraud		101·9	321	i 18 22	PP	e 24 36	[0]	e 33 16	SSP	—
Berkeley		102·9	47	e 14 2	+ 1	e 24 39	[− 2]	e 27 18	PS	e 50·3
Rathfarnham Castle		102·9	331	e 14 2	+ 1	e 24 37	[− 4]	e 18 30	PP	e 49·7
Jersey	E.	103·2	326	e 20 10	PPP	e 25 8	{− 9}	—	—	41·7
Santa Clara	E.	103·4	47	—	—	e 24 22	[−21]	—	—	e 50·1
Fresno	Z.	105·2	47	e 18 10k	PKP	—	—	e 18 46	PP	e 50·5
Tortosa		106·0	317	18 39	PP	—	—	—	—	e 50·7
Algiers Univ.	Z.	106·1	313	e 18 40	PP	—	—	—	—	—
China Lake		107·2	46	e 18 30	[+ 3]	e 29 56	PKKP	e 14 23	P	—
Pasadena		107·5	49	e 15 0	PP	i 24 59	[− 3]	e 18 48	PP	e 49·9
Alicante		107·9	316	14 19	P	24 51	[−12]	18 44	PP	e 51·1
Ivigtut		108·1	350	e 18 54	PP	i 25 1	[− 3]	33 59	SS	46·7
Riverside	Z.	108·2	49	e 18 33	[+ 4]	e 29 53	PKKP	e 17 59	?	—
Toledo		109·4	318	e 18 35	[+ 3]	e 25 11	[+ 1]	e 21 35	PPP	50·3
Tamanrasset	Z.	109·8	299	e 17 52	?	e 28 37	PS	i 19 5	PP	—
Almeria		110·0	315	18 38	[− 5]	29 30	PPS	19 10	PP	61·8
Granada		110·6	316	e 14 34a	P	25 1	[−14]	19 15	PP	47·3
Malaga		111·4	316	i 18 37	[+ 1]	i 29 47	PPS	21 43	PPP	48·0
Lisbon		113·4	320	e 19 46	PP	e 29 11	PS	i 35 6	SS	64·4
Seven Falls	E.	121·5	10	20 29	PP	25 53	[− 2]	30 10	PS	50·8
Shawinigan Falls	N.	121·6	11	e 18 51	[− 5]	—	—	—	—	—
Ottawa		122·0	14	18 55	[− 2]	25 55	[− 2]	20 31	PP	49·7
St. Louis		122·5	29	e 18 54	[− 4]	e 25 59	[+ 1]	e 20 32	PP	—
Cleveland		123·8	21	i 19 0k	[0]	i 26 16	[+14]	e 20 51	PP	—
Cincinnati		124·7	25	i 19 1	[− 1]	—	—	i 20 59	PP	e 66·7
Halifax		124·9	4	21 33	PP	31 43	PPS	38 37	SSP	—
Harvard		125·7	12	e 19 3	[− 1]	i 29 54	PS	i 20 54	PP	e 53·2
Pennsylvania		125·7	18	e 19 7	[+ 3]	e 26 20	[+12]	i 21 23	PP	—
Weston		125·9	12	i 19 4	[0]	e 26 12	[+ 3]	e 20 44	PP	—
Morgantown		126·0	21	i 19 4	[0]	—	—	e 20 29	PP	—
Palisades		126·6	14	e 19 4	[− 1]	e 26 26	[+15]	i 21 2	PP	e 61·1
Tacubaya		129·5	53	e 19 25	[+14]	e 29 24	PKKP	i 19 40	?	—
Puebla		130·4	53	e 29 52	PKKP	—	—	—	—	—
Vera Cruz		132·0	51	e 29 44	PKKP	—	—	—	—	—
La Plata		155·7	180	(19 52)	[− 3]	(26 58)	[− 2]	(23 52)	PP	(68·7)
Chinchina		156·5	48	i 19 58	[+ 2]	e 30 49	[− 5]	e 20 9	PKP_2	—
Bogota		157·8	47	e 20 20	PKP_2	e 28 12	[+70]	e 24 42	PP	—
Huancayo		162·6	97	i 20 5	[+ 2]	e 31 20	[− 6]	e 35 10	SKSP	e 61·8
La Paz		168·2	122	i 20 9a	[+ 1]	i 26 54	[−17]	i 21 22	PKP_2	79·7

For Notes see next page.

NOTES TO JULY 8d. 5h. 44m. 20s.

Additional readings :—
Calcutta iPePE =9m.35s., SSE =14m.37s., SSSE =15m.7s., ScSE =17m.25s.
Chatra PPPN =9m.3s., PcPN =9m.35s., PcSEZ =13m.25s., QEZ =14m.57s., iSSEZ =15m.48s.
Perth SS =16m.58s.
Hyderabad PPE =9m.19s.
Kodaikanal PPPE =10m.42s., QE =18m.36s.
New Delhi PPPEN =10m.58s., iSSEN =17m.8s., SSSEN =19m.14s.
Poona PPSE =15m.46s.
Bombay iPPN =10m.58s., PPPN =11m.33s., SSE =19m.19s., SSN =19m.26s., SSSE =20m.34s.
Riverview iN =9m.18s., iPPZ =11m.0s., iN =11m.9s., and 11m.48s., iSN =16m.25s., iPSN =16m.39s., iSSE =20m.2s., iE =20m.18s., iN =20m.38s.
Terre Adelie iPcP =12m.10s., e =12m.36s.
Yalta PcP =12m.26s., SKS =22m.35s.
Kiruna iSEN =22m.51s., iPPSN =24m.18s., eSS?N =28m.50s. and numerous unidentified readings.
Istanbul eEN =23m.27s., ePSE =23m.40s.?, eSSE =29m.15s.
Helwan eZ =13m.51s., PSN =24m.12s.
Bucharest eN =14m.12s. and 14m.49s.
Lwow i =12m.56s.
Upsala ePPE =16m.22s., eS?N =23m.40s.?, eN =27m.58s., eSSE =29m.49s., eSSS? =33m.52s., eQN =38·0m.
Skalnate Pleso e =14m.9s., 15m.1s., 25m.58s., and 29m.34s., eSSS =34m.28s.
Belgrade eNW =17m.57s., eScSNW =24m.5s.
Raciborzu eP?N =13m.12s., eSSN =29m.58s., eSSP?N =30m.16s. and other e readings without phase.
Budapest ePE =13m.19s., eSE =24m.7s., eN =45m.47s., eE =49·7m.
Resolute Bay eZ =13m.25s., eN =25m.30s. and 29m.48s.
Ogyalla e =15m.13s., 21m.6s., 22m.18s., and 24m.54s., ePPS =25m.37s., eSS =30m.26s., eSSS =34m.4s.
Copenhagen 17m.3s., i =25m.24s.
Potsdam ePN =13m.23s., iPPZ =17m.12s., ePPPEN =19m.16s., iSE =24m.27s., iPSEZ =25m.33s., eZ =38m.4s.
Cheb ePP? =17m.22s., e =18m.57s., ePPPE =19m.27s., ePSE =25m.46s., eE =27m.35s. and 29m.59s., eSSE =30m.54s., e =34m.46s., eSSS =35m.30s.
Taranto e =15m.14s.
Jena eE =13m.44s., eN =13m.58s., ePPN =17m.21s., eZ =25m.44s.
Triest iPP =17m.23s., ePS =25m.56s., ePPS =26m.47s., eSS =31m.8s.
Scoresby Sund e =17m.24s. and 19m.28s., iSKKS =24m.19s., eSS =31m.9s.
Stuttgart eZ =13m.40s., e =13m.43s., ePP =17m.35s. and 17m.42s., ePPP =19m.40s., e =21m.4s., ePS =26m.10s., ePPS =27m.5s., eSS =31m.40s., e =34m.4s., eSSS =35m.58s.
Karlsruhe eE =21m.9s.
Rome iPPZ =17m.46s., eSSN =31m.34s.?.
De Bilt ePP =17m.51s., eSS =32m.10s., eSSS =35m.40s.
Strasbourg ePP =17m.46s., ePPP =19m.45s., eSKKS? =24m.27s., ePS? =26m.19s., ePPS =27m.20s., eSS =31m.48s., eSS? =32m.21s., eSSS =36m.26s., eQ =41m.20s. and other e readings without phase.
Pavia ePP =17m.49s., i =27m.45s., eSS =31m.51s., eSSS =36m.8s.
Aberdeen iE =23m.9s., iSKKSE =24m.37s., iSE =25m.31s., iPSE =26m.33s., iE =28m.17s., iSSE =32m.30s., eSSSE =36m.10s., eE =39m.30s.
Seattle e =18m.55s., ePKS =21m.47s., eSKKS =24m.40s., eS =25m.30s., e =28m.35s., ePKKP =30m.6s., eSKKS(△ >180°) =37m.40s., e =39m.40s., ePKP, PKS =41m.25s., e =45m.21s.
Besançon e =14m.20s., 17m.23s., and 18m.9s., ePPP? =19m.46s.
Paris iPP =18m.3s., ipPP =18m.11s., eSKKS =24m.50s., e =25m.3s., iS =25m.20s., and 25m.32s., i =25m.50s., iSP =26m.56s., iSPP =27m.41s., i =28m.18s., iSS? =32m.21s., iSS =32m.44s., iSKKP =33m.42s., iSSS =37m.4s., i =38m.6s. and 40m.6s.
Kew ePS =26m.56s., eSSEN =32m.26s.
Berkeley ePKPZ =18m.10s., eSKSN =24m.23s.
Rathfarnham Castle ePSEN =27m.8s., eEN =28m.25s., eZ =29m.50s., eSSEN =32m.43s.
Pasadena eZ =20m.20s., ePSZ =27m.58s., ePPSEN =29m.16s., eSSEN =33m.46s., eQN =44m.10s.
Alicante PPP =21m.19s., PS =28m.1s., PPS =29m.8s., SS =34m.1s., Q =44m.55s.
Ivigtut 20m.56s.
Toledo e =28m.20s. and 30m.2s.
Tamanrasset ePPPZ =21m.46s., eZ =22m.55s., ePPSZ =29m.50s.
Almeria PPP =21m.26s., SS =34m.24s., SSS =38m.26s.
Granada PPP =21m.54s., S =28m.58s., SSS =34m.41s.
Lisbon EN =32m.47s., SSSEN =39m.5s., eN =58m.44s.
Seven Falls SSE =36m.58s.
Ottawa PPP =22m.56s., SKKS =27m.44s., S =30m.28s., SS =37m.20s., SSS =42m.4s.
St. Louis e =19m.0s., ePS =30m.34s.

Continued on next page.

Cleveland ePPE = 20m.54s., eSKKSN = 27m.36s., ePSE = 30m.50s.
Harvard iPPP = 22m.19s., iPPS = 31m.4s. and other unidentified readings.
Pennsylvania eN = 20m.45s., eZ = 20m.55s., eSKKSN = 27m.48s., eN = 29m.5s.
Palisades ePKS? = 22m.20s., eSKKS = 27m.57s., ePS = 31m.9s., ePPS = 32m.40s., i = 35m.54s., eSS = 38m.5s.
La Plata PKP?E = (20m.34s.), E = (27m.46s.), PPPN = (32m.22s., SS?N = (41m.52s.), PSSN = (45m.52s.), QN = (65m.52s.), readings have been increased by 1 minute.
Huancayo eSKKKS? = 32m.16s., e = 32m.48s., 35m.43s., 36m.5s., and 36m.55s., ePS? = 38m.35s., eSS? = 46m.44s., eSSS = 50m.55s.
La Paz iPPZ = 25m.4s., iSKKS = 31m.54s., iZ = 35m.55s., PPS = 39m.2s., i = 41m.20s., iSS = 45m.56s., iSSP = 46m.50s., iSSS = 52m.17s.
Long waves were also recorded at Apia and Bergen.

July 8d. 11h. Undetermined shock.

Balboa Heights ePP? = 2m.11s.
Chinchina eP = 3m.20s.
Bogota eP = 3m.37s., eS = 6m.17s.
Tacubaya eP = 3m.45s., i = 7m.22s.
Puebla e = 3m.57s. and 4m.40s.
Vera Cruz e = 5m.23s. and 5m.30s.
Huancayo e = 5m.50s.
St. Louis eP = 6m.0s., PP = 6m.23s., eS = 10m.24s.
Tucson eP = 6m.25s., e = 6m.31s.
Weston eP = 6m.51s.
Ottawa iPZ = 7m.2s.
Boulder City iP = 7m.7s.
Palomar iPZ = 7m.7s.
Riverside ePZ = 7m.13s.
Pasadena eP?Z = 7m.18s.
China Lake iPZ = 7m.22s.

July 8d. 23h. 30m. 45s. Epicentre 52°·3N. 165°·5W. (as on 1940, Aug., 22d.).
Rough.

$A = -\cdot5945$, $B = -\cdot1538$, $C = +\cdot7892$; $\delta = -8$; $h = -6$;
$D = -\cdot250$, $E = +\cdot968$; $G = -\cdot764$, $H = -\cdot198$, $K = -\cdot614$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
College		15·5	29	e 3 34	− 8	—	—	—	—
Sitka		18·0	63	i 4 11	− 2	—	—	—	—
Shasta Dam		31·4	93	e 6 26	+ 1	—	—	—	—
Hungry Horse		32·5	75	i 6 34	0	i 9 31	PcP	i 6 45	pP
China Lake	z.	37·4	96	e 7 19	+ 3	—	—	i 9 47	PcP
Boulder City		39·0	94	e 7 32	+ 2	—	—	—	—
Palomar	z.	39·5	99	e 7 47	pP	—	—	—	—
Tucson		43·9	95	e 8 12	+ 2	—	—	e 8 23	pP
Florissant		52·0	74	e 9 13	0	—	—	e 9 23	pP
St. Louis		52·2	74	e 9 14	− 1	—	—	—	—
Scoresby Sund		54·7	16	i 9 42a	+ 9	—	—	—	—
Ottawa	z.	55·8	59	i 9 42	+ 1	—	—	i 9 52	pP
Morgantown		57·4	66	i 9 53	0	—	—	—	—
Harvard		60·0	59	i 10 11	0	—	—	i 10 23	pP
Weston		60·2	59	i 10 13	+ 1	—	—	—	—
Collmberg	z.	76·7	2	e 12 9	PcP	—	—	—	—
Paris		78·7	10	i 12 19	PcP	—	—	—	—
Stuttgart	z.	79·2	5	e 12 21	PcP	—	—	—	—
Strasbourg		79·3	6	e 12 23	PcP	—	—	—	—
Besançon		80·6	7	e 12 29	PcP	—	—	—	—
Pretoria	z.	151·5	333	i 20 15?	[+25]	—	—	—	—

Additional readings :—
China Lake eZ = 7m.42s., iZ = 9m.57s.,
Tucson e = 8m.53s.
Long waves were recorded at Seattle and Berkeley.

July 8d. Readings also at 1h. (Nanking and near Athens), 3h. (Copiapo, Santa Lucia, and Tacubaya), 4h. (Puebla, Tacubaya, Vera Cruz, Riverside, China Lake, Berkeley, and near Seattle), 5h. (Apia), 7h. (Manila), 8h. (Kimberley and near Dzhergetal), 9h. (Copiapo, Grahamstown, Kimberley, Pretoria, Collmberg, Stuttgart, Strasbourg, Besançon, China Lake, and near Dzhergetal), 12h. (Apia and near Athens), 13h. (Scoresby Sund and near Copiapo), 14h. (Collmberg), 15h. (Apia, Pasadena, Riverside, Palomar, China Lake, Besançon, Paris, Strasbourg, Stuttgart, Collmberg, Ashkabad, Mary, Dzhergetal, Frunse, Krasnogorka, Rybach'e, Almata, Ili, near Obi-garin, Fergana, Khorog, Stalinabad, Andijan, Tashkent, Tchimkent, and Naryn), 16h. (near Dzhergetal), 17h. (near Huancayo), 18h. (Kimberley, and near Dzhergetal), 19h. (China Lake, Tortosa, near Ashkabad, Kizyl-Arvat and Mary). 21h. (Jena and near Collmberg), 22h. (Apia (2)), 23h. (China Lake).

July 9d. 0h. 3m. 47s. Epicentre 16°·0N. 96°·5W. (as on 1939, July 31d.).

One killed, slight damage at Miahuatlan, in the state of Oaxaca. Felt in Central and South-East Mexico.

Monthly Bulletin Tacubaya, July, 1951, p.2. Epicentre 16°08′N., 96°48′W.

A = −·1089, B = −·9556, C = +·2739 ; δ = +5 ; h = +6 ;
D = −·994, E = +·113 ; G = −·031, H = −·272, K = −·962.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		1·0	346	i 0 23k	+ 2	—	—	—	—	—
Vera Cruz		3·2	6	i 0 55k	+ 3	i 1 35	+ 3	—	—	1·7
Puebla		3·4	332	0 57	+ 2	1 37	0	—	—	1·7
Tacubaya		4·2	324	i 1 5k	− 2	—	—	—	—	2·0
Guadalajara		8·0	307	e 1 58	− 2	e 3 23	−10	—	—	—
Merida		8·1	52	i 2 6k	+ 4	i 3 40	+ 5	—	—	—
Manzanillo		8·1	293	—	—	e 3 23	−12	—	—	—
Chihuahua		15·4	326	e 2 38	−62	—	—	—	—	6·6
Miami		18·0	52	e 4 18	+ 5	e 7 43	+11	—	—	—
Balboa Heights		18·0	111	e 4 18	+ 5	—	—	—	—	—
Guantanamo Bay		20·7	75	i 5 32	PPP	e 9 26	SS	—	—	—
Tucson		20·8	324	i 4 46	+ 1	i 8 45	+12	—	—	—
Galerazamba		21·3	101	i 5 21	PP	i 9 2	+19	e 9 42	SS	12·2
Columbia		22·7	33	i 5 2	− 2	i 9 13	+ 4	—	—	—
Chinchina		23·2	115	i 5 16	+ 7	i 9 32	+14	i 5 35	PP	—
St. Louis		23·2	12	i 5 9	0	i 9 23	+ 5	i 5 36	PP	—
Florissant		23·4	12	e 5 10	− 1	i 9 25	+ 4	i 5 20	pP	—
Bogota		24·8	115	i 5 27	+ 2	i 9 54	+ 8	i 5 39	pP	11·2
Palomar		25·2	317	i 5 31a	+ 2	i 9 4	PcP	i 5 41	?	—
Cincinnati		25·3	22	i 5 30	0	i 9 59	+ 5	i 5 39	pP	—
Boulder City		25·7	324	i 5 36	+ 3	i 6 46	PP	i 6 57	PPP	—
Riverside		26·0	317	i 5 37a	+ 1	i 9 4	PcP	i 5 48	?	—
Pasadena		26·6	317	i 5 42a	0	e 10 19	+ 3	i 9 6	PcP	e 12·7
China Lake		27·3	321	i 5 48a	0	i 9 8	PcP	i 6 0	?	—
Morgantown		27·6	27	i 5 51	0	e 10 28	− 4	—	—	—
Cleveland		28·5	23	i 5 58	− 1	i 10 45	− 1	i 6 7	pP	—
Tinemaha		28·5	322	e 6 1	+ 2	—	—	—	—	—
Washington		28·5	33	i 5 58	− 1	i 12 29	SSS	—	—	—
San Juan		29·1	80	i 6 5	+ 1	e 13 1	SSS	—	—	—
Fresno		29·2	320	e 6 5a	0	—	—	e 6 21	pP	e 15·7
Pennsylvania		29·5	28	e 6 7	− 1	i 11 3	+ 1	i 7 18	PP	—
Roosevelt Roads		29·6	80	i 5 17	−52	—	—	—	—	—
Lick		30·8	319	i 6 20a	0	e 11 24	+ 1	i 9 17	PcP	e 16·9
Santa Clara	E.	31·0	319	e 6 47	+26	e 11 27	+ 1	—	—	—
Berkeley		31·5	319	e 6 25	− 1	e 11 39	+ 5	e 6 41	pP	e 16·2
Palisades		32·2	34	i 6 28	− 4	i 11 41	− 4	i 6 34	pP	e 15·8
Shasta Dam		33·3	323	i 6 40	− 1	—	—	—	—	—
Harvard		34·0	33	i 6 46	− 2	e 12 11	−2	—	—	e 16·9
Weston		34·0	33	i 6 47	− 1	—	—	—	—	—
Fort de France		34·1	87	e 6 47	− 1	—	—	—	—	e 15·6
Ottawa		34·1	27	6 48	0	12 15	+ 1	—	—	17·7
Arcata	Z.	34·4	321	e 6 53k	+ 2	—	—	—	—	—
Huancayo		34·9	142	i 6 59	+ 4	e 12 28	+ 1	i 7 10	?	14·8
Hungry Horse		35·3	340	i 6 59	0	e 12 34	+ 1	—	—	—
Shawinigan Falls	N.	36·3	27	7 6	− 1	12 46	− 2	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Saskatoon		36·9	349	—	—	12 56	− 2	—	—	—
Seven Falls	E.	37·6	28	7 18	0	13 6	− 2	8 42	PP	18·8
Seattle		38·1	332	e 7 33k	+ 1	e 13 49	PS	e 9 45	PcP	e 20·2
Victoria		39·2	332	7 41	+10	13 38	+ 6	17 41	SS	21·3
La Paz		42·7	137	i 8 4a	+ 4	i 14 27	+ 3	i 8 15	pP	21·0
Sitka		50·6	334	e 9 3	+ 1	e 16 19	+ 2	—	—	—
Ivigtut		56·7	26	i 9 46	− 2	e 17 39	− 1	—	—	27·2
Resolute Bay		58·7	1	i 9 59	− 3	e 18 3	− 3	i 10 7	pP	e 32·2
College		59·7	338	10 8	− 1	—	—	—	—	—
Scoresby Sund		69·9	20	i 11 16	+ 1	i 20 26	+ 2	e 13 49	PP	36·2
Rathfarnham Castle		77·5	38	e 13 42	?	e 23 11	PS	e 16 22	PPP	e 35·2
Lisbon		78·1	53	i 12 12	+10	21 52	− 4	28 23	SS	40·0
Aberdeen	E.	79·1	34	i 12 16	+ 8	i 22 10	+ 3	i 22 53	PS	38·0
Kew		81·4	39	i 12 29	+ 9	e 22 33	+ 2	e 15 35	PP	e 36·2
Toledo		81·8	52	i 12 23	+ 1	i 22 35	0	i 12 31	PcP	40·9
Malaga		82·2	54	i 12 25	+ 1	i 22 43	+ 4	i 15 37	PP	i 40·4
Granada		82·8	54	i 12 32a	+ 5	22 38	− 7	15 56	PP	41·6
Almeria		83·7	54	12 36	+ 4	22 33	−21	15 31	PP	43·8
Paris		83·9	42	i 12 33	0	e 22 53	− 3	e 12 41	pP	e 38·2
De Bilt		84·5	37	e 12 38	+ 2	e 22 59	− 3	e 15 52	PP	e 41·2
Alicante		84·8	52	e 12 41	+ 4	e 22 49	−16	e 15 49	PP	e 36·5
Tortosa		84·9	50	e 12 40	+ 2	e 23 6	0	—	—	—
Besançon		86·6	42	e 12 47	+ 1	—	—	i 12 57	PcP	—
Copenhagen		87·2	33	i 12 59	+10	23 13	[− 2]	16 14	PP	39·2
Strasbourg		87·3	40	e 12 51	+ 1	i 23 32	+ 3	16 15	PP	e 44·2
Basle		87·5	42	e 13 0	+ 9	—	—	e 16 30	PP	—
Karlsruhe	Z.	87·5	40	e 12 53	+ 2	—	—	e 16 17	PP	—
Upsala		87·8	28	e 16 0	PP	e 23 32	− 2	e 18 35	PPP	e 46·2
Algiers Univ.	Z.	88·0	53	e 12 54	+ 1	e 23 46	+10	e 15 53	PP	—
Stuttgart		88·1	40	e 12 54	0	e 23 39	+ 2	e 16 18	PP	e 43·2
Zürich		88·2	42	e 12 57	+ 3	—	—	e 16 13	PP	—
Jena		88·7	38	e 12 57	0	e 23 23	[− 2]	e 16 24	PP	—
Potsdam		88·9	36	e 13 8	+10	e 23 43	− 1	e 16 29	PP	e 40·2
Pavia		89·4	43	e 13 9k	+ 9	e 23 31	[+ 2]	—	—	—
Cheb		89·5	39	e 16 31	PP	e 23 33	[+ 3]	e 25 25	PPS	—
Collmberg	Z.	89·7	37	e 13 0	− 1	—	—	e 16 37	PP	—
Prague		90·7	38	i 13 8	+ 2	e 23 36	[− 1]	e 16 39	PP	—
Triest		92·2	42	e 13 57	+44	e 23 50	[+ 4]	e 25 13	PS	—
Rome		92·9	45	e 13 17	+ 1	e 23 51	[+ 1]	e 16 56	PP	—
Pulkovo		93·2	24	e 17 1	PP	e 23 51	[0]	e 25 47	PS	—
Skalnate Pleso	N.	94·4	36	e 15 19	?	e 23 26	[−32]	e 17 25	PP	—
Tamanrasset	Z.	94·5	65	e 13 25	+ 2	—	—	e 17 14	PP	—
Uzhgorod		95·9	36	—	—	e 24 6	[0]	—	—	—
Lwow		96·2	34	i 13 32	+ 1	e 24 5	[− 3]	e 17 24	PP	—
Moscow		98·8	24	e 13 43	0	e 24 19	[− 2]	e 17 44	PP	—
Yalta		104·9	35	e 18 34	PP	e 24 49	[− 1]	—	—	—
Sverdlovsk		105·0	12	e 18 29	PP	e 24 49	[− 1]	—	—	—
Kabansk		109·3	345	e 19 5	PP	e 25 13?	[+ 4]	e 26 13?	SKKS	—
Ksara		112·8	42	e 19 28	PP	—	—	29 4	PS	—
Tashkent		121·5	12	e 20 37	PP	e 25 54	[− 1]	e 30 33	PS	—
Samarkand		122·5	16	e 20 42	PP	28 48	?	22 33	PKS	—
Fergana		122·9	10	e 19 0	[+ 2]	—	—	e 20 45	PP	—
Stalinabad		124·0	14	e 20 54	PP	—	—	—	—	—
Kimberley	Z.	124·7	114	i 19 2	[0]	—	—	—	—	—
Grahamstown	Z.	126·1	120	i 19 7	[+ 3]	—	—	—	—	—
Pretoria	Z.	127·7	110	e 19 9	[+ 1]	—	—	—	—	—

Additional readings :—
Chinchina eScSEN = 16m.26s.
St. Louis iSS = 10m.14s.
Florissant iPP = 5m.35s., i = 9m.28s., eSS = 10m.7s., i = 10m.20s.
Bogota isS = 10m.9s.
Pasadena iZ = 5m.58s. and 9m.18s.
China Lake iZ = 5m.56s.
Cleveland isSE = 10m.58s., iE = 11m.48s.
Fresno eZ = 9m.22s., eE = 14m.8s.

Continued on next page.

Pennsylvania eN =11m.57s., iN =13m.8s. and 13m.25s.
Lick iZ =6m.54s. and 7m.14s., eScSZ =16m.30s.
Berkeley eZ =6m.53s., eN =12m.37s., eE =14m.19s.
Palisades iPPP? =7m.45s., e =15m.2s.
Seven Falls SSE =17m.48s.
Seattle e =7m.30s., epP? =7m.39s., e =7m.52s., 8m.2s., and 14m.21s.
La Paz iPPZ =9m.55s., iSS =18m.3s.
Resolute Bay eZ =10m.47s.
Scoresby Sund i =11m.23s., ePPP =15m.29s.
Rathfarnham Castle eEN =25m.32s., eSSEN =29m.33s., eEN =30m.43s.
Lisbon QN =33m.38s.
Aberdeen iE =18m.54s.
Kew ePS =23m.15s., eE =23m.59s.
Toledo iPP =12m.38s.
Malaga iPPP =17m.23s.
Granada PS =23m.44s., SS =28m.14s.
Almeria PPP =17m.21s., ScS =22m.45s.
Paris i =12m.53s. and 12m.59s., e =14m.23s. and 14m.44s., ePP =15m.46s., e =25m.58s., and 28m.2s., eSS =28m.44s., e =33m.2s., eQ =34m.12s.
De Bilt eP =12m.45s., eSS =28m.25s.
Alicante PPP =17m.45s., ScS =23m.19s., PS =24m.3s., SSS =32m.19s., Q =35·3m.
Besançon i =13m.4s., e =13m.26s. and 14m.55s.
Strasbourg e =12m.59s. and 13m.38s., eSKS =23m.18s., e =28m.13s., eSS =29m.13s., eSSS =33m.13s., eL? =38·2m.
Upsala eN =16m.24s., ePSN =23m.57s.
Algiers Univ. eZ =13m.1s., ipP?Z =13m.20s., isP?Z =13m.36s.
Stuttgart eZ =13m.1s., epP?Z =13m.9s., e =13m.53s., eSKS =23m.19s., eSS =29m.13s.
Jena epP?EN =13m.16s., ePP?E =16m.21s.
Potsdam ePPE =16m.32s., eSKSEN =23m.31s.
Collmberg eZ =13m.9s.
Prague esP? =13m.28s., e =13m.37s., 16m.48s., and 19m.22s., eSKS =23m.25s., eSP =24m.43s.
Triest eSKKS?E =24m.2s.
Rome eSE =24m.6s.
Skalnate Pleso eN =16m.27s. and 22m.25s., e =32m.50s. and 33m.37s.
Tamanrasset iZ =13m.34s., e =16m.25s., ePPPZ =19m.19s., eZ =20m.24s.
Lwow ePS =26m.6s.?, eSS =31m.13s.
Samarkand SKSP =30m.21s., SS =37m.13s.
Long waves were also recorded at Taranto.

July 9d. 1h. 31m. 3s. Epicentre 33°·1N. 139°·3E. Depth of focus 0·025.
(as on 1946, June 26d.).

Intensity IV at Nikko (in Tochigi Prefecture); II-III at Tokyo.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for July, 1951, Tokyo, 1951, p.158-159, with macroseismic chart p.158. Epicentre 33°·0N. 139°·3E. Depth 180km.

$A = -·6364$, $B = +·5474$, $C = +·5435$; $\delta = +4$; $h = +1$;
$D = +·652$, $E = +·758$; $G = -·412$, $H = +·354$, $K = -·839$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Hatidyozima	0·4	90	0 28	+ 2	0 49	+ 3	—	—
Osima	1·7	3	0 37k	+ 2	1 6	+ 3	—	—
Omaesaki	1·7	329	0 40k	+ 5	1 9	+ 6	—	—
Mera	1·9	14	0 38k	+ 1	1 7	+ 1	—	—
Misima	2·0	8	0 40	+ 2	1 13	+ 5	—	—
Shizuoka	2·0	338	0 42k	+ 4	1 13	+ 5	—	—
Yokohama	2·3	7	0 40	− 2	1 16	+ 2	—	—
Hunatu	2·4	350	0 46k	+ 3	1 20	+ 4	—	—
Kohu	2·6	345	0 48k	+ 3	1 27	+ 7	—	—
Tokyo	2·6	8	0 47k	+ 2	1 21	+ 1	—	—
Torisima	2·7	164	0 47	+ 1	1 20	− 2	—	—
Iida	2·7	333	0 49	+ 3	1 26	+ 4	—	—
Nagoya	2·8	318	0 51	+ 4	1 29	+ 5	—	—
Owase	2·8	290	0 49a	+ 2	1 26	+ 2	—	—
Tu	2·8	305	0 52k	+ 5	1 30	+ 6	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Titibu		2·9	356	0 51	+ 2	1 29	+ 3	—	—
Kameyama		2·9	306	0 51	+ 2	1 31	+ 5	—	—
Kumagaya		3·0	2	0 52k	+ 2	1 29	+ 1	—	—
Gihu		3·1	317	0 54	+ 3	1 36	+ 6	—	—
Tukubasan		3·2	12	0 51	− 1	1 28	− 5	—	—
Matumoto		3·3	340	−0 37	−56	0 37?	−58	—	—
Oiwake		3·3	349	0 55k	+ 2	—	—	—	—
Hikone		3·3	310	0 58	+ 5	1 42	+ 7	—	—
Maebasi		3·3	357	0 55k	+ 2	1 37	+ 2	—	—
Mito		3·4	16	0 55k	0	1 37	0	—	—
Takayama		3·4	331	1 22	+27	2 23	+46	—	—
Utunomiya		3·5	7	0 56	0	1 37	− 2	—	—
Kyoto		3·5	303	0 59	+ 3	1 44	+ 5	—	—
Osaka		3·5	297	1 6	+10	—	—	—	—
Matusiro		3·5	345	1 2	+ 6	1 45	+ 6	—	—
Tsuruga		3·7	313	0 59k	+ 1	1 45	+ 1	—	—
Nagano		3·7	345	1 0k	+ 2	1 40	− 4	—	—
Hukui		3·8	319	1 9	+ 9	1 56	+10	—	—
Kobe		3·8	296	1 3	+ 3	1 49	+ 3	—	—
Sumoto		3·9	290	1 3	+ 2	1 50	+ 2	—	—
Onahama		4·0	19	1 2	0	1 48	− 2	—	—
Toyama		4·0	334	1 5	+ 3	1 58	+ 8	—	—
Kanazawa		4·1	327	1 6	+ 3	1 58	+ 5	—	—
Shirakawa		4·1	11	1 3	0	1 51	− 2	—	—
Takada		4·1	348	1 3	0	—	—	—	—
Himeji		4·3	289	1 7	+ 1	2 0	+ 3	—	—
Toyooka		4·4	303	1 10k	+ 3	2 1	+ 2	—	—
Takamatu		4·5	285	1 26	+17	—	—	—	—
Inawasiro		4·5	9	1 7k	− 2	1 59	− 3	—	—
Hukusima		4·7	11	1 12k	+ 1	2 4	− 2	—	—
Wazima		4·7	334	1 15k	+ 4	—	—	—	—
Niigata		4·8	358	0 59	−13	1 57	−12	—	—
Koti		4·8	274	1 16	+ 4	2 8	− 1	—	—
Aikawa		5·0	350	1 17	+ 2	2 13	0	—	—
Yamagata		5·2	10	1 19	+ 1	2 17	− 1	—	—
Simidu		5·3	267	1 21	+ 2	2 23	+ 3	—	—
Sendai		5·3	14	1 18k	− 1	2 15	− 5	—	—
Matuyama		5·5	278	1 23	+ 1	2 24	− 1	—	—
Yonago		5·5	296	2 28	S	(2 28)	+ 3	—	—
Saigo		5·8	304	1 27	+ 2	2 36	+ 4	—	—
Hirosima		5·9	285	1 27	0	2 35	+ 1	—	—
Mizusawa		6·2	13	1 29	− 2	2 35	− 6	—	—
Hamada		6·3	289	1 33	+ 1	—	—	—	—
Akita		6·7	7	1 37	0	2 49	− 4	—	—
Morioka		6·8	13	1 37	− 1	2 50	− 5	—	—
Miyako		6·9	18	1 37	− 3	2 51	− 6	—	—
Kumamoto		7·2	270	3 8	S	(3 8)	+ 3	—	—
Hukuoka		7·4	275	1 50a	+ 4	3 21	+12	—	—
Hatinohe		7·6	12	1 47	− 2	3 7	− 7	—	—
Aomori		7·9	10	1 51	− 2	—	—	—	—
Mori		9·1	7	2 7	− 1	—	—	—	—
Urakawa		9·4	16	1 58	−14	—	—	—	—
Sapporo		10·1	9	2 21	0	—	—	—	—
Obihiro		10·3	17	2 24	0	4 12	− 5	—	—
Nemuro		11·3	24	4 33	S	(4 33)	− 7	—	—
College		53·3	30	9 2	+ 1	—	—	—	—
Resolute Bay	z.	66·8	14	e 10 32	− 1	—	—	—	—
Shasta Dam		74·9	51	i 11 22	+ 1	—	—	—	—
Scoresby Sund		75·8	355	i 11 29	+ 3	—	—	—	—
Hungry Horse		75·9	41	i 11 28	+ 1	—	—	—	—
Berkeley	z.	76·4	54	i 11 31a	+ 1	—	—	—	—
Lick	z.	77·1	54	i 11 34a	0	—	—	i 12 19	pP
Fresno	z.	78·7	53	i 11 43a	+ 1	—	—	—	—
Copenhagen		80·6	333	i 11 47a	− 5	—	—	—	—
China Lake		80·7	53	i 11 53a	0	—	—	i 12 7	PcP

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Pasadena		81·2	55	i 11 56a	0	—	—	e 12 13	PcP
Riverside	Z.	81·9	55	i 11 59a	0	—	—	e 12 16	PcP
Boulder City		82·4	52	i 12 3	+ 1	—	—	—	—
Palomar		82·6	55	i 12 3a	0	—	—	—	—
Collmberg	Z.	83·6	330	i 12 8	0	e 15 24	PP	e 13 0	pP
Prague		83·9	328	e 12 9	− 1	e 14 20	?	e 13 8	pP
Jena		84·5	330	e 12 12	− 1	e 22 21	0	e 15 32	PP
Stuttgart	Z.	87·1	330	e 12 25	0	—	—	e 13 12	pP
Strasbourg		87·9	331	e 12 39	+10	—	—	—	—
Besançon		89·7	330	e 12 38	+ 1	—	—	—	—
Florissant		94·9	37	e 13 2	+ 1	—	—	—	—
St. Louis		95·1	37	i 13 2	0	—	—	—	—
Ottawa	Z.	95·7	25	i 13 5	0	—	—	—	—
Harvard		99·6	23	i 13 23	0	—	—	—	—
Weston		99·8	23	e 13 24	0	—	—	—	—
La Paz		150·8	62	i 19 28	[+ 4]	i 26 11	[+ 1]	30 5	SKKS

Additional readings :—
Lick iZ = 11m.38s.
Collmberg eZ = 12m.18s.
Jena eN = 12m.21s.
La Paz PPS = 36m.17s.

July 9d. 9h. 3m. 51s. Epicentre 21°·0N. 95°·0E. (as on 1949, Nov. 13d.).

$A = -·0814$, $B = +·9308$, $C = +·3563$; $\delta = -4$; $h = +4$;
$D = +·996$, $E = +·087$; $G = -·031$, $H = +·355$, $K = -·934$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	6·4	285	e 1 38	0	i 2 43	−10	i 3 17	S*	—
Chatra		9·2	310	e 2 18	+ 2	i 3 59	− 4	2 26	PP	4·2
New Delhi		17·8	299	e 4 9	− 2	e 7 28	0	4 23	PP	—
Poona		20·0	267	i 4 36	− 1	8 25	+ 8	4 50	PP	9·0
Bombay		21·0	269	e 5 0	+13	e 8 37	0	9 5	SS	→
Collmberg	Z.	69·0	318	e 11 31	PcP	—	—	—	—	—
Jena	N.	69·9	318	e 11 15	0	—	—	e 11 37	PcP	—
Stuttgart	Z.	71·8	317	e 11 26	0	—	—	e 11 48	PcP	—
Strasbourg		72·8	317	e 11 33	+ 1	—	—	—	—	—
Paris		76·1	318	e 11 54	+ 3	—	—	—	—	—
Pretoria	Z.	79·8	237	i 11 41	−31	—	—	—	—	—
Kimberley	Z.	83·8	236	i 12 33	+ 1	—	—	—	—	—

Additional readings :—
Calcutta PPE = 1m.46s., iS*E = 3m.2s.
Chatra PPPZ = 2m.33s., P*Z = 2m.40s., P_gZ = 3m.1s., QZ = 3·8m., SSE = 4m.11s., SSSE = 4m.23s., S*E = 4m.33s., S_gE = 4m.56s.
New Delhi eSEN = 7m.13s.
Poona PPPE = 4m.38s., SE = 7m.59s., SSSE = 8m.39s., ScPE = 12m.22s., ScSE = 14m.59s.
Jena eE = 11m.27s.

July 9d. 11h. Undetermined Shock.

Swan Island eP = 37m.50s., eS = 38m.6s.
Merida eP = 38m.58s., eS = 39m.57s.
St. Louis e = 42m.23s., ePP = 42m.38s.
Florissant ePP = 42m.37s.
Harvard eP = 43m.9s.
Tucson P = 43m.16s., i = 43m.20s.
Boulder City eP = 43m.58s.
Palomar ePZ = 44m.1s.
Riverside ePZ = 44m.7s.
Pasadena ePZ = 44m.14s.
China Lake iPZ = 44m.15s.a, eZ = 48m.50s.
Lick iPZ = 44m.46s.a, iZ = 44m.52s.
Hungry Horse iP = 44m.55s.
College eP = 47m.55s.

July 9d. 21h. 17m. 0s. Epicentre 11°·0N. 85°·0W. (as given by U.S.C.G.S.).

A = +·0856, B = −·9781, C = +·1896; δ = −4; h = +6;
D = −·996, E = −·087; G = +·017, H = −·189, K = −·982.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		5·7	109	e 1 42	+14	e 2 48	+13	—	—	—
Tacubaya		16·0	303	e 3 53	+ 5	—	—	—	—	—
San Juan		19·7	64	i 4 36	+ 2	—	—	i 4 57	pP	—
Huancayo		24·8	156	e 5 25	0	—	—	—	—	e 10·1
St. Louis		27·9	352	e 5 54	0	—	—	e 6 3	pP	—
Florissant		28·1	352	e 5 56	+ 1	—	—	—	—	—
Morgantown		28·9	9	i 6 5	+ 2	—	—	e 6 15	pP	—
Tucson		31·8	316	e 6 26	− 2	e 6 44	?	e 6 55	pP	—
Harvard		33·5	19	i 6 47	+ 4	—	—	—	—	e 12·5
Ottawa		35·2	12	i 7 0	+ 2	e 15 30	SSS	—	—	20·5
Boulder City		36·7	318	e 7 11	+ 1	—	—	—	—	—
Riverside	z.	37·4	313	i 7 15	− 1	—	—	—	—	—
Pasadena		38·0	313	i 7 21	0	—	—	i 7 28	?	—
China Lake	z.	38·5	316	i 7 24	− 2	—	—	—	—	—
Fresno	z.	40·5	316	e 7 40a	− 2	—	—	—	—	—
Lick	z.	42·1	315	e 7 54a	− 1	—	—	i 8 4	?	—
Berkeley	z.	42·7	315	e 8 0a	0	—	—	e 8 10	?	—
Shasta Dam		44·3	319	e 8 11	− 2	—	—	—	—	—
Hungry Horse		44·4	333	e 8 13	− 1	—	—	i 9 55	PcP	—
College		68·7	336	e 11 4	− 3	—	—	e 11 38	PcP	—

Long waves were also recorded at Merida, Bogota, Granada, Palisades, and Scoresby Smd.

July 9d. Readings also at 1h. (China Lake, Riverside, Palomar, Kimberley, Collmberg, Stuttgart, near Triest, and near La Paz), 2h. (Santa Lucia, China Lake, Riverside, Tamanrasset, and Istanbul), 3h. (China Lake, Riverside, and Palomar), 5h. (Helwan, near Dzhergetal, Apia (3), and near Santa Clara), 6h. (near Bogota, near Malaga, and Granada), 7h. (Ksara, near Dzhergetal, Fergana, Stalinabad, Khorog, Obi-garm, Naryn, and Andijan), 8h. (near Santa Clara), 10h. (Apia, near Almata II, Krasnogorka, Ili, Andijan, and Naryn), 11h. (near Alicante), 12h. (near Naryn, Dzhergetal, Fergana, Stalinabad, Khorog, Obi-garm, Samarkand, Tashkent, and Frunse), 13h. (near Manila), 16h. (Kimberley, near Tashkent, Samarkand, Obi-garm, Stalinabad, Dzhergetal (2), Andijan, Khorog, and Fergana), 18h. (near Tananarive and Ottawa), 19h. (Apia (2)), 20h. (Collmberg), 21h. (near Dzhergetal), 22h. (Vera Cruz, near Tacubaya, Puebla, and Oaxaca), 23h. (Scoresby Smd).

July 10d. 5h. 34m. 32s. Epicentre 5°·0S. 154°·0E.

Very Rough.

A = −·8954, B = +·4367, C = −·0866; δ = −5; h = −7;
D = +·438, E = +·899; G = +·078, H = −·038, K = −·996.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		
		°	°	m. s.	s.	m. s.	s.	m. s.		
Guam		20·5	333	4 47	+ 5	—	—	—	—	—
Brisbane	z.	22·3	182	i 5 3	+ 2	—	—	—	—	—
Riverview		28·8	184	i 6 47	+45	i 11 10	+19	—	—	—
Terre Adélie		62·3	185	e 10 20	− 6	—	—	—	—	—
Kabansk		69·6	331	e 11 21	+ 8	—	—	—	—	—
Rybach'e		84·5	313	e 12 33	− 3	e 22 53	− 9	—	—	—
Murgab		85·3	309	e 12 42	+ 2	23 15	+ 5	—	—	—
Frunse		85·7	314	e 12 39	− 3	e 23 10	− 4	—	—	—
Andijan		86·9	311	12 46	− 2	i 23 22?	− 4	—	—	—
Fergana		87·3	311	e 12 46	− 4	e 23 24	− 5	—	—	—
Obi-garm		88·7	309	e 13 15?	+18	e 23 34?	− 9	e 23 41?	ScS	
Tashkent		89·3	312	e 12 58?	− 1	e 23 39	{+ 3}	—	—	—
Stalinabad		89·4	309	e 13 2	+ 2	e 23 38	{+ 1}	—	—	—
Samarkand		90·9	310	e 13 12	+ 5	e 23 48	{ 0}	—	—	—
Pasadena	z.	91·0	56	e 13 35	+28	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
China Lake	z.	91·6	54	e 13 38	+28	—	—	—	—
Riverside	z.	91·6	56	e 13 42	+32	—	—	—	—
Sverdlovsk		96·0	326	e 13 31	+ 1	24 17	{− 8}	—	—
Ashkabad		97·5	307	—	—	e 24 35	{− 1}	—	—
Collmberg	z.	123·6	332	e 19 0	[0]	—	—	—	—
Stuttgart	z.	127·1	332	e 19 5	[− 1]	—	—	—	—
La Paz		133·2	118	e 19 40	[+22]	25 56	[−32]	22 36	PP
Tamanrasset	z.	144·8	304	e 19 38	[− 1]	e 23 20	SKP	—	—

Additional readings :—
Collmberg eZ = 19m.16s.
La Paz eSKKS = 29m.18s.
Tamanrasset eZ = 19m.48s. and 20m.40s.
Long waves were also recorded at Harvard, Palisades, Merida, Puebla, Tacubaya, and Vera Cruz.

July 10d. Readings also at 1h. (Puebla, Tacubaya, Tananarive, Collmberg, Paris, Obi-garm, Tashkent, Tchimkent, near Andijan, Dzhergetal, Fergana, Khorog, Stalinabad, and near Manila), 2h. (near Dzhergetal, Khorog, Obi-garm, Stalinabad, and near Algiers Univ.), 3h. (Andijan, Samarkand, Tashkent, near Dzhergetal, Obi-garm, Stalinabad, and near Almeria), 4h. (Puebla, Tacubaya, and Vera Cruz), 5h. (China Lake, and Mount Wilson), 6h. (Pasadena, Riverside, China Lake, Puebla, Tacubaya (2), Vera Cruz, and near Obi-garm), 7h. (Andijan (2), Fergana, Tashkent, near Dzhergetal (2), Khorog (2), Obi-garm (2), Stalinabad, and near Santa Clara), 8h. (Apia, Naryn, Samarkand, near Andijan, Dzhergetal (2), Fergana, Khorog, Obi-garm, and Stalinabad), 9h. (Granada and near Malaga (3)), 10h. (Collmberg, Jena, Stuttgart, Resolute Bay, Lick, Mount Wilson, China Lake (2), La Paz, near Guam, near Malaga, and near Dzhergetal), 11h. (Auckland, Christchurch, Wellington, Terre Adélie, and near Dzhergetal (2)), 12h. (near Athens and near Dzhergetal), 13h. (Stuttgart and near Apia), 14h. (Apia and Collmberg), 16h. (Apia and near Granada), 17h. (near Alicante (5), Przhevalsk, near Almata II, Chilisk, Ili, Krasnogorka, Kurmenty, and Naryn), 18h. (Santa Lucia), 19h. (near Almeria), 22h. (Auckland, Christchurch, Wellington, Terre Adélie, Istanbul, Ksara, Collmberg, Pretoria, La Plata, and near Huancayo), 23h. (Apia, Huancayo, Rome, Potsdam, Kiruna, De Bilt, Kew, Alicante, and Granada).

July 11d. 12h. 56m. 20s. Epicentre 52°·0N. 178°·2E. Depth of focus 0·010.
(as on 1940, July 15d.).

A = −·6179, B = +·0194, C = +·7860 ; δ = −3 ; h = −6 ;
D = +·031, E = +1·000 ; G = −·786, H = +·025, K = −·618.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mitchell Field		3·2	90	i 0 51	+ 1	i 1 25	− 2	—	—
College		21·6	41	4 44	+ 1	e 8 51	sS	i 5 7	pP
Seattle		37·7	73	e 7 8	0	—	—	e 7 22	pP
Resolute Bay	z.	40·0	25	e 7 26	− 1	e 13 6	−19	7 55	pP
Shasta Dam		41·4	81	i 7 38	0	—	—	—	—
Hungry Horse		42·1	66	i 7 43	− 1	e 17 40	SSS	i 13 16	?
Berkeley	z.	43·2	85	i 7 53a	0	—	—	i 8 19	pP
Lick	z.	44·0	85	i 7 59a	0	e 9 47	PP	i 8 8	pP
Fresno	z.	45·5	84	i 8 11a	0	—	—	—	—
Tinemaha		46·2	83	i 8 18	+ 1	e 18 3	ScS	—	—
China Lake		47·4	83	i 8 27a	+ 1	e 14 53	−19	i 8 54	sP
Pasadena		48·2	85	i 8 31a	− 1	i 8 58	sP	8 49	pP
Riverside	z.	48·8	85	i 8 36a	− 1	e 13 42	ScP	e 8 55	pP
Boulder City		49·0	81	i 8 39	0	i 18 21	ScS	i 9 5	pP
Palomar		49·5	85	i 8 43a	+ 1	e 13 46	ScP	i 9 9	pP
Tucson		54·0	82	i 9 16	0	i 10 1	sP	i 9 44	pP
St. Louis		61·6	63	e 10 7	− 3	—	—	e 10 34	pP
Reykjavik	z.	63·1	10	9 50	−30	—	—	i 10 49	pP
Ottawa	z.	64·1	49	e 10 23	− 3	—	—	—	—
Cleveland		64·2	55	i 10 24a	− 3	—	—	i 10 56	pP

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Harvard		68·3	48	i 10 51	− 2	—	—	i 11 20	pP
Weston		68·4	48	i 10 52	− 1	—	—	i 11 20	pP
Collmberg		76·3	351	e 12 9	pP	—	—	—	—
Stuttgart	z.	79·2	353	e 12 23	pP	—	—	—	—
San Juan		90·4	59	i 12 52	0	—	—	i 13 21	pP
Pietermaritzburg	z.	147·3	301	i 19 36	[+ 6]	—	—	—	—
Kimberley	z.	149·5	309	i 19 41	[+ 8]	—	—	—	—

Additional readings :—
College i = 5m.53s.
Berkeley iZ = 7m.59s.
China Lake iPcPZ = 9m.56s., iZ = 10m.20s., iScPEZ = 13m.38s., iScSEN = 18m.8s.
Pasadena iZ = 9m.14s., iPP?Z = 10m.26s., eScPZ = 10m.26s., eScPZ = 13m.41s.
Boulder City i = 13m.45s., e = 13m.55s.

July 11d. 18h. 21m. 54s. Epicentre 28°·1N. 139°·9E. Depth of focus 0·070.

Intensity V at Yokohama, Tokyo, Tyosi, Utunomiya, etc.; IV at Torishima, Hatidyozima, Misima, Kumagaya, etc. Epicentre as adopted. Depth 460km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for July, 1951, Tokyo, 1951, p.160-162, with macroseismic chart p.160.

$A = -·6757$, $B = +·5690$, $C = +·4686$; $\delta = -8$; $h = +2$;
$D = +·644$, $E = +·765$; $G = -·358$, $H = +·302$, $K = -·883$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Torisima	2·4	9	1 10k	+ 4	2 0	+ 2	—	—	—
Hatidyozima	5·0	359	1 29	+ 3	2 34	− 1	—	—	—
Siomisaki	6·5	288	1 42k	+ 1	3 0	− 2	—	—	—
Nagaturo	6·6	352	2 13	+31	—	—	—	—	—
Omaesaki	6·7	348	1 45	+ 2	3 5	0	—	—	—
Osima	6·7	357	1 44a	+ 1	3 0	− 5	—	—	—
Owase	6·8	333	1 47a	+ 3	3 6	− 1	—	—	—
Hamamatu	6·9	345	1 46a	0	3 10	+ 1	—	—	—
Ajiro	7·0	355	1 49	+ 2	3 11	0	—	—	—
Shizuoka	7·0	350	1 49a	+ 2	3 8	− 3	—	—	—
Misima	7·1	354	1 48a	0	3 11	− 2	—	—	—
Muroto	7·1	318	1 49k	+ 1	3 14	+ 1	—	—	—
Tu	7·3	337	1 51a	+ 1	3 17	0	—	—	—
Wakayama	7·3	328	1 51	+ 1	3 16	− 1	—	—	—
Kameyama	7·4	338	1 52a	+ 1	3 13	− 5	—	—	—
Kashiwara	7·4	332	1 53a	+ 2	—	—	—	—	—
Yokohama	7·4	358	1 48a	− 3	3 15	− 3	—	—	—
Hunatu	7·5	353	1 51a	− 1	3 15	− 5	—	—	—
Nagoya	7·5	342	1 52a	0	3 20	0	—	—	—
Osaka	7·5	332	1 55a	+ 3	3 22	+ 2	—	—	—
Tokusima	7·5	324	1 59	+ 7	3 20	0	—	—	—
Iida	7·6	347	1 48a	− 5	3 12	−10	—	—	—
Kohu	7·6	352	1 54a	+ 1	3 21	− 1	—	—	—
Simidu	7·6	310	1 50k	− 3	3 18	− 4	—	—	—
Tokyo	7·6	359	1 52a	− 1	3 16	− 6	—	—	—
Tyosi	7·7	6	1 57a	+ 3	3 24	0	—	—	—
Gihu	7·8	341	1 54a	− 1	3 25	− 1	—	—	—
Hikone	7·8	338	1 57	+ 2	3 26	0	—	—	—
Kobe	7·8	330	1 56a	+ 1	3 24	− 2	—	—	—
Titibu	7·9	355	1 56	0	3 23	− 5	—	—	—
Himeji	8·0	325	1 59	+ 2	3 28	− 2	—	—	—
Takamatsu	8·0	323	1 59	+ 2	3 29	− 1	—	—	—
Kumagaya	8·1	357	1 56a	− 2	3 25	− 7	—	—	—
Tukubasan	8·1	1	1 56	− 2	3 20	−12	—	—	—
Tsuruga	8·2	338	2 0	+ 1	3 33	− 1	—	—	—

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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.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Uwazima	8·2	311	2 0	+ 1	3 28	− 6	—	—	—
Oiwake	8·3	352	2 1a	+ 1	3 29	− 7	—	—	—
Matumoto	8·3	349	2 2a	+ 2	3 34	− 2	—	—	—
Mito	8·3	3	2 0a	0	3 31	− 5	—	—	—
Miyazaki	8·3	300	2 1k	+ 1	3 34	− 2	—	—	—
Maebasi	8·4	355	2 0a	− 1	3 32	− 6	—	—	—
Matuyama	8·4	315	2 2k	+ 1	3 32	− 6	—	—	—
Takayama	8·4	345	1 59	− 2	3 35	− 3	—	—	—
Hukui	8·5	340	2 4a	+ 2	3 39	− 1	—	—	—
Utunomiya	8·5	0	2 1a	− 1	3 27	−13	—	—	—
Yakusima	8·5	288	2 3k	+ 1	3 39	− 1	—	—	—
Matusiro	8·6	351	2 2	− 2	3 29	−13	—	—	—
Toyooka	8·6	331	2 4a	0	3 39	− 3	—	—	—
Nagano	8·7	351	2 6	+ 1	3 39	− 5	—	—	—
Kagosima	8·8	295	2 6k	0	3 47	+ 1	—	—	—
Tottori	8·8	329	1 57	− 9	3 26	−20	—	—	—
Kanazawa	8·9	343	2 7	0	3 46	− 2	—	—	—
Onahama	8·9	5	2 7a	0	3 40	− 8	—	—	—
Toyama	8·9	346	2 6a	− 1	3 44	− 4	—	—	—
Asosan	9·0	304	2 9	+ 1	3 40	− 9	—	—	—
Hirosima	9·0	316	2 3k	− 5	3 44	− 5	—	—	—
Shirakawa	9·0	2	2 8a	0	3 35	−14	—	—	—
Takada	9·1	352	2 11	+ 2	3 50	− 1	—	—	—
Kumamoto	9·3	303	2 8k	− 3	3 49	− 6	—	—	—
Matsue	9·4	323	2 20	+ 8	4 5	+ 8	—	—	—
Hamada	9·5	318	2 14	+ 1	3 48	−11	—	—	—
Inawasiro	9·5	1	2 17a	+ 4	3 54	− 5	—	—	—
Unzendake	9·6	302	2 16k	+ 2	4 2	+ 1	—	—	—
Wazima	9·6	346	2 14a	0	3 46	−15	—	—	—
Hukusima	9·7	3	2 15a	0	3 57	− 6	—	—	—
Saga	9·7	304	2 16k	+ 1	4 3	0	—	—	—
Simonoseki	9·7	310	2 15	0	4 2	− 1	—	—	—
Hukuoka	9·8	306	2 16k	0	4 0	− 5	—	—	—
Nagasaki	9·8	301	2 16	0	4 4	− 1	—	—	—
Niigata	9·9	356	2 26a	+ 8	—	—	—	—	—
Aikawa	10·0	353	2 17	− 2	4 3	− 6	—	—	—
Sendai	10·2	4	2 20a	− 1	4 13	0	—	—	—
Yamagata	10·2	2	2 21a	0	4 9	− 4	—	—	—
Isinomaki	10·4	6	2 26	+ 3	4 15	− 2	—	—	—
Tomie	10·6	298	2 23	− 2	4 20	− 1	—	—	—
Sakata	10·8	0	2 34a	+ 7	4 27	+ 2	—	—	—
Ituhara	11·0	307	2 28	− 1	4 24	− 5	—	—	—
Mizusawa	11·1	5	2 32	+ 2	4 31	0	—	—	—
Akita	11·6	1	2 37a	+ 1	4 44	+ 4	—	—	—
Morioka	11·7	5	2 38a	+ 1	4 44	+ 2	—	—	—
Miyako	11·7	8	2 37a	0	4 45	+ 3	—	—	—
Hatinohe	12·5	6	2 43a	− 2	4 53	− 5	—	—	—
Aomori	12·7	3	2 50	+ 3	5 9	+ 7	—	—	—
Urakawa	14·2	9	3 8a	+ 5	5 38	+ 8	—	—	—
Muroran	14·3	3	3 4	0	5 33	+ 1	—	—	—
Suttsu	14·7	1	3 13	+ 5	5 42	+ 2	—	—	—
Sapporo	15·0	4	3 32a	+21	6 8	+22	—	—	—
Obihiro	15·1	9	3 14	+ 2	5 58	+11	—	—	—
Guam	15·2	162	3 20	+ 7	—	—	—	—	—
Kusiro	15·3	12	3 15	+ 1	5 57	+ 6	—	—	—
Asahigawa	15·8	6	3 22	+ 3	6 7	+ 7	—	—	—
Nemuro	15·9	15	3 23a	+ 3	6 8	+ 6	—	—	—
Abashiri	16·3	11	3 25	+ 1	6 15	+ 6	—	—	—
Vladivostok	16·4	339	i 3 26	+ 1	i 6 6	− 5	—	—	—
Zi-ka-wei	16·4	286	i 3 15	−10	6 3	− 8	e 3 19	P	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nauking		18·7	287	i 3 45k	− 3	i 6 55	+ 3	6 37	?	—
Klyuchi		31·9	22	i 5 49	+ 3	—	—	—	—	—
Kabansk		34·5	323	i 6 9	+ 1	10 59	− 4	—	—	—
Irkutsk		35·8	233	6 18	− 1	—	—	—	—	—
Mitchell Field		40·2	41	i 6 56	+ 1	—	—	i 8 33	PP	—
Chatra		46·5	281	i 7 43	− 2	e 13 44	−13	9 59	PcP	22·7
Calcutta	E.	46·7	275	i 7 45	− 1	13 55	− 5	10 10	PcP	—
Djakarta		46·7	228	i 7 46	0	e 13 55	− 5	—	—	—
Semipalatinsk		49·8	314	e 8 7	− 3	e 14 37	− 5	—	—	—
Kurmenty		51·2	304	i 8 17	− 3	—	—	—	—	—
Przhevalsk		51·2	303	i 8 19	− 1	—	—	—	—	—
Almata II		51·9	305	i 8 22	− 3	—	—	—	—	—
Ili		52·0	306	i 8 22?	− 4	i 15 7?	− 5	—	—	—
Almata		52·2	305	i 8 32?	+ 5	i 15 18?	+ 3	—	—	—
Rybach'e		52·9	303	i 8 30	− 2	e 15 19	− 5	18 9	sS	—
Naryn		53·1	302	i 8 29	− 5	i 15 20	− 7	—	—	—
Dehra Dun	N.	53·4	288	e 8 54	+18	e 15 48	+17	—	—	25·7
Frunse		53·9	304	i 8 37	− 2	i 15 34	− 4	—	—	—
New Delhi		54·6	287	i 8 41	− 3	i 15 39	− 8	i 9 55	pP	—
Murgab		55·1	299	8 46	− 2	—	—	—	—	—
Andijan		55·9	302	i 8 51	− 3	i 16 2	− 2	i 18 52	sS	—
Fergana		56·4	302	e 8 55	− 2	e 16 6	− 4	—	—	—
Brisbane		56·6	165	i 8 59k	+ 1	e 16 21	+ 8	—	—	—
Dzhergetal		57·0	300	—	—	i 18 23	sS	—	—	—
Hyderabad		57·1	273	i 8 58	− 4	i 16 13	− 6	19 4	sS	—
Khorog		57·1	298	9 1	− 1	i 16 16	− 3	—	—	—
Lunacharskoe		58·1	303	i 9 7	− 1	i 16 29	− 3	—	—	—
Tashkent		58·1	303	i 9 7	− 1	i 16 28	− 4	i 19 20	sS	—
Obi-garm		58·3	300	i 9 6	− 4	16 28	− 6	10 50	pP	—
Stalinabad		59·0	306	i 9 12	− 2	i 16 40	− 3	19 30	sS	—
Samarkand		60·1	302	i 9 21	− 1	—	—	—	—	—
Colombo	E.	60·4	262	9 25	+ 1	16 57	− 4	—	—	32·1
Poona		60·8	276	i 9 23	− 3	16 45	−21	10 55	pP	—
Kodaikanal	E.	61·0	267	i 9 26	− 2	e 17 2	− 6	11 5	pP	23·6
Sverdlovsk		61·2	322	i 9 28	− 1	i 17 6	− 5	i 19 56	sS	—
Bombay		61·5	277	i 9 29	− 2	i 17 13?	− 2	i 11 58	P	25·4
Riverview		61·9	169	i 9 38?k	+ 4	i 17 31	+11	11 18	pP	e 26·6
Apia		62·6	124	e 9 47?	+ 9	—	—	—	—	—
Perth		63·9	202	i 12 26	PP	i 17 46	+ 2	i 20 49	sS	—
Mary		64·5	302	i 9 50	0	—	—	—	—	—
Ashkabad		67·1	302	i 10 6	− 1	i 18 16	− 6	—	—	—
Kizyl-Arvat		68·3	304	10 13	− 1	18 33	− 3	—	—	—
Resolute Bay		71·6	14	i 10 35	+ 1	e 19 12	− 2	i 12 13	pP	—
Baku		72·4	307	i 10 38	0	—	—	—	—	—
Shemakha		73·2	307	i 10 41	− 2	—	—	—	—	—
Karapiro	N.	73·6	150	10 6?	−39	—	—	—	—	—
Victoria		73·7	43	e 10 50	+ 4	i 19 37	0	e 12 30	pP	—
Lenkoran		73·8	305	10 45	− 1	19 34	− 4	22 37	sS	—
Moscow		73·8	325	i 10 44	− 2	i 19 30	− 8	i 22 31	sS	—
Grozny		74·1	311	10 49	+ 1	19 38	− 4	—	—	—
Kiruna		74·5	340	i 10 49k	− 1	i 19 41	− 5	i 12 34	pP	e 35·1
Seattle		74·7	43	e 10 55a	+ 4	i 19 55	+ 7	i 11 11	PcP	—
Kirovobad		74·8	308	i 10 51	− 1	—	—	—	—	—
Tuai	N.	75·1	150	e 10 6?a	−48	—	—	—	—	—
Cobb River	E.	75·2	154	e 10 56	+ 2	e 19 56	+ 3	12 50	pP	—
Pulkovo		75·3	331	i 10 52	− 3	i 19 47	− 7	—	—	—
Tiflis		75·5	310	10 55	− 1	e 19 51	− 6	e 23 4	sS	—
Piatigorsk		75·6	313	10 57	+ 1	—	—	—	—	—
Kaimata	N.E.	76·0	156	e 10 6?	−52	—	—	—	—	—
Wellington		76·2	153	11 1	+ 1	i 20 3	− 1	e 12 52	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Arcata	Z.	76·4	51	e 11 6	+ 5	e 20 12	+ 6	i 12 51	pP	—
Leninakan		76·4	309	11 3	+ 2	20 7	+ 1	—	—	—
Zugdidi		77·1	312	11 6	+ 2	—	—	—	—	—
Christchurch		77·3	155	—	—	i 20 18	+ 2	23 27	sS	e 31·0
Helsinki		77·4	333	e 11 5?	− 1	e 20 9	− 8	e 14 13	PP	—
Sotchi		78·0	313	i 11 10	+ 1	i 20 18	− 5	—	—	—
Berkeley	Z.	79·0	53	i 11 17a	+ 2	e 20 32	− 1	i 12 59	pP	—
Santa Clara		79·5	53	e 11 20	+ 3	e 20 54	+15	e 13 13	pP	e 34·3
Lick	Z.	79·7	53	e 11 21a	+ 3	e 20 41	0	e 13 10	pP	—
Theodosia		80·1	316	e 11 19	− 1	20 39	− 6	—	—	—
Upsala		80·5	335	i 11 20	− 2	i 20 40	− 9	i 11 28	PcP	e 38·1
Scoresby Sund		80·9	354	i 11 26	+ 2	i 20 53	0	e 13 10	pP	35·1
Yalta		81·1	316	11 23	− 3	20 48	− 7	e 13 10	pP	—
Fresno		81·3	53	e 11 28a	+ 1	e 20 58	+ 1	e 13 17	pP	—
Saskatoon		81·3	35	11 30	+ 3	21 1	+ 4	14 15	sP	—
Tinemaha		82·2	52	e 11 37	+ 6	e 21 7	+ 1	—	—	—
Kishinev		82·9	321	11 33	− 2	21 7	− 6	e 13 23	pP	—
China Lake		83·3	53	i 11 38a	+ 1	e 21 16	− 1	i 13 28	pP	—
Pasadena		83·7	54	i 11 41a	+ 2	e 21 18	− 3	i 13 27	pP	e 33·3
Lwow		83·9	324	i 11 38	− 2	i 21 15	− 7	i 13 28	pP	—
Riverside		84·3	54	i 11 44a	+ 2	e 40 44	SKPP′	i 13 33	pP	—
Bergen	N.	84·4	340	—	—	i 21 24	− 3	i 24 35	sS	e 41·1
Palomar		85·0	55	i 11 48	+ 3	i 21 25	[+ 3]	i 13 38	pP	—
Copenhagen		85·3	333	i 11 45	− 1	i 21 28	[+ 4]	15 25	PP	—
Ksara		85·4	306	i 11 46k	− 1	21 20?	[− 4]	13 41	pP	—
Ushgorod		85·5	324	i 11 47	0	e 21 33	− 5	—	—	—
Bucharest		86·0	319	e 11 51	+ 1	i 21 40	− 2	e 21 29	SKS	—
Istanbul		86·1	315	e 11 49	− 1	i 21 42	− 1	e 15 25	PP	—
Reykjavik	Z.	86·1	352	i 11 56	+ 6	i 21 41	− 2	i 13 43	pP	25·1
Skalnate Pleso		86·2	325	11 53?	+ 2	e 21 41?	− 3	e 13 50?	pP	—
Raciborzu		86·6	327	i 11 52	− 1	21 45	− 3	i 15 19	PP	e 40·1
Potsdam		87·4	331	i 11 55k	− 1	i 21 37	[− 1]	i 13 45	pP	e 44·1
Budapest		87·9	324	12 0	+ 1	e 21 40	[− 1]	15 48	PP	e 35·1
Timisoara		87·9	322	e 12 7	+ 8	—	—	—	—	e 48·4
Ogyalla		88·1	325	e 12 1	+ 1	e 21 54	− 8	e 13 53	pP	—
Collmberg		88·2	329	i 11 58	− 2	e 21 59	− 4	i 13 52	pP	e 43·1
Prague		88·4	328	i 12 1	0	e 22 0	− 4	e 13 54	pP	e 41·1
Sofia		88·6	319	e 12 3	+ 1	e 21 45	[0]	e 14 0	pP	—
Vienna		88·8	326	i 12 3	0	22 7	− 1	i 23 12	SP	—
Belgrade		88·9	321	e 12 3k	− 1	i 22 3	− 6	e 14 2	pP	e 49·9
Jena		89·1	330	i 12 3	− 1	i 22 8	− 3	e 14 3	pP	e 45·1
Aberdeen		89·3	340	i 13 29	?	i 22 16	+ 3	i 14 38	pP	44·6
Cheb		89·3	330	e 12 14?	+ 9	e 22 7	− 6	e 13 56	pP	—
Sonneberg		89·7	329	e 12 8	+ 1	e 22 12	− 4	e 28 18	SS	e 43·1
Edinburgh	E.	90·6	340	—	—	22 6	[+10]	i 25 36	PPS	—
Helwan		90·7	304	i 12 9k	− 3	21 54	[− 3]	22 24	S	—
Ivigtut		90·8	4	24 15	SPP	i 22 23	− 3	i 25 35	PPS	—
De Bilt		90·9	333	e 12 11	− 2	e 22 19	− 8	e 13 58	pP	—
Durham		91·1	338	e 14 45	sP	i 21 57	[− 2]	—	—	—
Stuttgart		91·8	329	e 12 14	− 3	e 22 26	− 8	e 14 4	pP	e 48·1
Karlsruhe		91·9	330	e 12 19	+ 2	i 25 48	PPS	e 16 6	PP	e 47·1
Triest		91·9	325	i 12 22	+ 5	e 21 59	[− 5]	14 11?	pP	—
Strasbourg		92·5	330	i 12 18k	− 2	i 22 6	[− 1]	e 14 9	pP	e 47·1
Zürich		93·1	329	e 12 20k	− 3	e 22 39	− 7	—	—	—
Basle		93·4	329	e 12 24	0	e 23 2	+14	e 15 6	sP	—
Kew		93·4	336	i 12 23	− 1	e 22 12	[0]	i 14 18	pP	e 35·1
Salo		93·5	327	e 12 29	+ 4	e 22 43	− 6	e 14 9	pP	—
Tarauto		93·5	319	e 14 10	pP	e 23 0	+11	e 25 40	pPS	e 47·1
Rathfarnham Castle		93·8	340	i 12 29	+ 3	22 51	− 1	i 14 24	pP	e 48·1
Bologna		93·9	326	e 12 28a	+ 2	e 22 50	− 3	e 18 46	PPP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel		94·1	329	e 12 27	0	e 26 8	PPS	—	—	—
Besançon		94·3	330	i 12 29	+ 1	e 24 10	SP	e 14 18	pP	—
Florence		94·4	325	e 12 27	− 2	e 22 21	[+ 4]	e 15 27	sP	—
Pavia		94·4	327	e 12 28	− 1	e 22 49	− 8	e 16 26	PP	—
Prato		94·4	325	e 12 26	− 3	i 24 38	?	—	—	—
Paris		94·5	333	i 12 28	− 1	i 22 12	[− 6]	i 14 31	pP	e 48·1
Terre Adélie		94·6	179	e 12 38	+ 8	e 18 58	PPP	e 14 22	pP	—
Rocca di Papa		95·1	322	e 15 22	?	e 26 5	PPS	e 17 55	?	—
Rome		95·1	323	i 12 30k	− 2	i 22 24	[+ 3]	e 14 15	pP	—
Jersey	E.	96·0	336	e 16 0	?	e 23 9	− 1	26 33	PPS	48·1
Messina		96·0	319	i 12 34	− 2	23 31	+21	e 14 32	pP	—
Clermont-Ferrand		96·7	331	e 12 6	−33	i 16 51	PP	i 14 16	pP	—
Ottawa		100·0	25	12 57	+ 3	22 44	[− 2]	e 14 43	pP	39·8
Shawinigan Falls	N.	100·1	22	12 58	+ 3	22 44	[− 2]	e 14 47	pP	—
Seven Falls	E.	100·2	20	13 6	+11	23 47	+ 1	22 45	SKS	40·6
Barcelona		100·6	329	e 17 8	PP	30 58	SS	28 26	?	52·2
Tananarive		100·7	255	26 20	PS	22 54	[+ 5]	e 26 54	PPS	—
Cleveland		100·9	30	e 13 3a	+ 5	i 22 48	[− 2]	i 14 55	pP	—
Tortosa		101·8	329	e 16 35	?	—	—	—	—	e 48·1
Pittsburgh		102·4	30	i 17 36	PP	i 22 56	[− 1]	i 19 58	PPP	—
Morgantown		103·1	30	i 13 14	+ 7	—	—	e 15 0	pP	—
Pennsylvania		103·1	28	e 15 5	pP	i 23 0	[− 1]	e 24 0	S	—
Algiers Univ.	Z.	103·8	325	i 13 12a	+ 1	e 17 30	PP	e 15 5	pP	—
Harvard		104·0	23	e 13 17	+ 4	i 23 4	[− 1]	14 58	pP	—
Weston		104·2	23	e 13 19	+ 6	e 23 1	[− 5]	e 17 37	PP	—
Alicante		104·3	329	14 40	?	24 32	+12	19 22	PPP	e 50·5
Halifax		104·5	17	—	—	e 23 4	[− 3]	24 28	S	—
Palisades		104·5	25	e 15 0	pP	i 23 6	[− 1]	24 14	S	—
Toledo		104·5	332	e 13 26	P	e 24 13	− 8	e 17 44	PP	50·8
Almeria		106·4	329	e 16 17	?	27 41	PPS	20 21	PPP	57·6
Granada		106·6	331	(13 55k)	P	(23 34)	[+18]	(15 37)	pP	(i 53·6)
Puebla		106·9	57	e 18 19	PP	e 23 33	[+16]	—	—	—
Malaga		107·4	331	i 17 58	PP	25 8	?	20 46	PPP	51·5
Lisbon		107·6	335	e 15 9	pP	20 14	SKP	28 6	SPP	47·1
Tamanrasset	Z.	113·0	314	e 14 2	P	i 17 5	sP	e 15 57	pP	—
Pietermaritzburg	Z.	119·1	250	i 17 56	[+ 2]	—	—	—	—	—
Grahamstown	Z.	123·3	247	i 18 4	[+ 2]	i 34 32	?	i 28 2	PKKP	—
Kimberley	Z.	123·6	253	i 18 5	[+ 2]	—	—	—	—	—
Galerazamba		128·5	46	e 20 58	PP	e 22 20	?	e 21 20	pP′	—
Chinchina		132·6	51	i 18 24	[+ 4]	i 21 15	SKP	i 20 19	pP′	—
Fort de France		132·8	28	i 18 20	[0]	i 21 40	PKS	e 29 26	?	—
Bogota		133·9	50	e 18 28	[+ 6]	e 23 50	PPP	e 20 32	pPKP	—
Huancayo		143·4	71	e 18 42	[+ 2]	e 39 58	SS	e 20 34	pPKP	56·1
La Paz		151·7	71	i 18 57	[+ 5]	i 25 26	[+13]	i 20 58	pPKP	—
La Plata		163·4	119	20 6	[+60]	43 42	SS	25 0	PP	85·8

Additional readings :—
Zi-ka-wei iN =6m.16s.
Chatra PPN =9m.18s., PPPN =9m.44s., SSN =16m.33s.
Calcutta SSE =16m.41s.
New Delhi PPN =11m.10s., iN =17m.42s., sSN =18m.28s., SSN =19m.39s., iN = 20m.58s., SSSN =22m.2s.
Obi-garm isS =19m.21s.
Poona sPEZ =11m.43s., SSEZ =19m.55s.
Kodaikanal PPPE =12m.11s.
Bombay iPSEN =17m.20s., iPPSEN =17m.36s., iSSEN =20m.31s.
Riverview iPPNZ =12m.11s., iNZ =12m.18s. and 17m.47s., iE =17m.54s., iNZ =18m.7s., iE =18m.48s. and 19m.11s., isSE =20m.27s., iN =20m.32s., iE =20m.41s., iN = 20m.49s. and 21m.0s., eN =21m.6s., eSSN =21m.55s., iE =22m.9s.
Perth i =21m.11s. and 26m.23s.
Resolute Bay eZ =11m.25s., ePP =13m.7s.
Kiruna iPcPNZ =11m.6s., isP =13m.26s., iSPZ =20m.31s., isS =22m.44s., esPSN = 23m.27s., iSS?N =24m.38s., eSSS?EN =28m.41s., and many other unidentified readings.
Seattle iPP =13m.56s., eSS =24m.51s., and many other unidentified readings.
Cobb River eScSE =20m.12s.
Wellington epPP? =16m.49s., ScS? =20m.17s., isS =23m.10s.

Continued on next page.

Arcata iZ =11m.16s.
Christchurch eSEN =20m.32s., eSSEN =24m.46s.
Helsinki ePPPE =16m.29s., iE =18m.18s., eE =19m.17s., esSEN =23m.12s., eN = 23m.45s., eSSN =25m.19s., esSSEN =28m.3s.
Berkeley e =11m.20s., iZ =11m.52s., esPZ =13m.57s.
Santa Clara esSEN =23m.55s.
Lick esPZ =13m.59s.
Upsala iPP =14m.30s., isS =23m.44s., iSS =26m.7s.?, isSSE =28m.46s., and other unidentified readings.
Scoresby Sund e =13m.56s., iPPP =17m.1s., pPPP =17m.41s., e =18m.51s., isS = 24m.0s., iSS =26m.20s., isSS =28m.54s., i =32m.47s.
Yalta isS =23m.53s.
Fresno iPcPZ =11m.35s., eSKSZ =21m.3s., esSEN =24m.0s., ePKP,PKPZ =37m.43s.
Saskatoon sS =24m.2s., SSS =29m.32s.
Kishinev sS =23m.53s.
China Lake iSE =21m.11s., ePKP,PKPZ =37m.58s., eSKP,PKPZ =40m.36s.
Pasadena iZ =12m.8s. and 14m.25s., isPZ =14m.57s., iSE =21m.14s., esSN =24m.32s., ePKP,PKP =38m.4s., iSKP,PKPZ =40m.40s.
Lwow isS =24m.30s.
Riverside ePKP,PKP =38m.4s.
Bergen iN =27m.5s.
Palomar iZ =14m.4s.
Copenhagen i =11m.47s. and 13m.34s., PPP =17m.35s., iSP =22m.41s., isS =24m.41s., iSS =27m.19s., sSS =30m.5s., 34m.17s.
Ksara sP =14m.27s.
Bucharest iPSN =22m.21s., eE =24m.19s., iN =24m.49s., iE =24m.53s., eSS?N = 27m.11s.
Istanbul iPPEN =14m.32s., ePPPE =16m.45s., eSKSE =21m.56s., ePSN =22m.14s., ePPSE =22m.31s. and other unidentified readings.
Reykjavik iZ =11m.59s., 12m.23s., and 13m.49s., eZ =17m.15s.
Skalnate Pleso e =12m.22s.?, eE =14m.25s.?, eN =15m.0s.?, ePP =15m.25s.?, e = 16m.30s.?, esPP? =17m.54s., eSKS?E =21m.14s.?, eSP =22m.36s.?, e =24m.11s.?, isS =24m.58s.?, eSS =27m.30s., e =29m.30s., esSS? =30m.12s., eSSS =31m.6s.
Raciborzu iPN =11m.55s., iNZ =15m.6s., ePPPNZ =17m.20s., eE =17m.32s., eSE = 21m.38s., esSEN =25m.0s.?, eSS =27m.40s., eSSSN =37m.10s.
Potsdam epPN =13m.49s., isPEZ =14m.36s., iPPE =15m.34s., iPPPNZ =17m.49s., iSKSZ =21m.5s., eSKSE =21m.8s., iSPZ =22m.53s., iSPE =22m.56s., esSN = 23m.54s., i =25m.7s., iE =25m.53s., iSSE =27m.44s., iSSN =27m.48s., iE = 30m.6s., eE =34m.3s., iN =34m.45s., eE =34m.48s.
Budapest PPN =15m.51s., iPPSE =25m.6s., iPPSN =25m.12s., and other unidentified readings.
Ogyalla esP =14m.42s., ePP =15m.27s., ePPPE =17m.34s., esPPN =18m.8s., eSKS?E = 21m.25s., eSP =22m.52s., esS =25m.13s., esSP? =26m.6s., eSS?E =28m.24s., and other unidentified e readings.
Collmberg isPZ =14m.56s., ePPPZ =17m.19s., eSKSEN =21m.56s., eZ =23m.54s., iPPSEN =25m.12s., eEZ =25m.20s., eEN =28m.2s., eSSEN =30m.59s., eSSSE = 35m.6s.
Prague esP =14m.41s., e =14m.55s., ePP =15m.33s., epPP =17m.22s., ePPP =17m.55s., esPP? =18m.4s., eSKS? =21m.22s., e =22m.43s., eSP =23m.4s., isS =25m.6s., e =25m.46s., eSS =28m.0s., esSS =30m.53s., eSSS =31m.30s., e =33m.36s. and 35m.6s.
Sofia eEN =14m.58s., 22m.11s., and 25m.9s.
Vienna iPP =15m.0s., ePPP =17m.12s., e =24m.48s.
Belgrade eNW =16m.31s., iNE =25m.10s., iPSNW =25m.20s.
Jena iPN =12m.7s., ipPZ =13m.56s., ePP?N =15m.12s., ePP?E =15m.20s., eSKSN = 22m.4s., ePS?EN =25m.14s., iPS?N =25m.22s. and many unidentified readings.
Aberdeen iPPEN =15m.46s., iE =16m.56s., iPPPEN =17m.46s., iSKSEN =21m.46s., isSEN =25m.23s., iSSEN =28m.16s., iE =29m.56s., iN =31m.5s., iEN =35m.29s.
Helwan PPZ =14m.1s., sPZ =14m.54s., PPZ =15m.54s., PPPZ =18m.2s.
Sonneberg ePP?N =15m.2s., eE =18m.23s., eN =18m.33s., eSKS?N =22m.9s., eE = 23m.16s., ePS?N =25m.22s., ePS?E =25m.25s., eE =26m.27s., eN =26m.32s.
Cheb esP =14m.51s., ePP =15m.57s., esPP =18m.7s., eSKS? =21m.31s., eSP? = 22m.39s., esS =25m.13s., e =30m.51s.?.
De Bilt ePP? =18m.9s., epPP =19m.38s., isS =25m.36s., e =26m.37s., eSS =28m.39s., esSS =31m.28s.
Durham iEN =18m.24s., 25m.42s., and 26m.42s.
Stuttgart iZ =12m.19s. and 12m.26s., esP =14m.44s., ePP? =15m.25s., ePPP =18m.22s., eSKKS =23m.20s., e =24m.37s., esSKS =25m.28s., iPPS =25m.47s., e =26m.36s., eSS =28m.48s., e =31m.36s., eSSS? =35m.54s.
Karlsruhe eE =14m.7s.
Triest iPPZ =15m.53s., ipPPZ =17m.40s., eSKS =22m.28s., isS =25m.27s.
Strasbourg isP =14m.46s., ePP =16m.12s., ePPP =18m.24s., eS =22m.33s., eSP = 23m.51s., ePS? =25m.32s., isS =25m.49s., eSS =28m.55s., and other unidentified readings.
Basle e =12m.27s.
Kew iPcPZ =12m.34s., esP =15m.6s., epPP =18m.39s., iSEN =22m.43s., eSP =24m.2s., iSPP =25m.57s., esS =26m.59s., iSS =29m.11s.
Salo iE =12m.36s., e =25m.51s.

Continued on next page.

Rathfarnham Castle iP$_c$PZ =12m.35s., isPZ =15m.11s., iPP =16m.18s., ePPP =18m.33s., eSKSEN =22m.11s., esSEN =26m.8s., eSSEN =29m.31s., eEN =32m.10s.
Bologna e =26m.8s.
Besançon i =12m.39s. and 13m.28s., epP =14m.23s., esP =15m.20s., e =16m.7s., ePP =16m.31s., e =16m.54s., epPP =18m.2s., ePPP =19m.1s., e =24m.20s.
Pavia e =19m.0s. and 26m.12s., eSS =29m.33s.
Paris isP =15m.35s., iPP =16m.22s., ipPP =17m.57s., iPPP =18m.39s., iSP =23m.53s., isS =26m.12s., isPS =27m.14s., iSS =29m.29s., isSS =32m.31s., iSSS =33m.29s., and many unidentified readings.
Rome ePPZ =15m.7s., eZ =16m.40s., eN =18m.55s., iSKKSN =22m.58s., ePPSN =25m.6s.
Messina eZ =13m.29s. and 14m.8s., ePPZ =15m.37s., e =16m.29s.
Clermont-Ferrand i =13m.2s., 13m.19s., 13m.32s., 16m.28s., and 17m.9s.
Ottawa PP =17m.8s., PS =25m.22s., SS =30m.56s.
Shawinigan Falls PPN =17m.8s., iN =22m.56s., eN =23m.46s., PSN =25m.57s.
Seven Falls eE =14m.45s., PPE =17m.7s., PPSE =25m.15s., SSE =30m.37s., SSSE =33m.10s.
Cleveland iPP =17m.16s., iEN =19m.45s., eE =23m.1s., ePSN =25m.27s., esSKSE =26m.11s., eN =27m.27s., iN =31m.18s., eN =33m.52s.
Pittsburgh i =26m.41s.
Pennsylvania esPZ =15m.54s., iPPN =17m.26s., epPPNZ =19m.7s.?, ePPPZ =19m.49s., esPPZ =20m.12s., ipPPPN =21m.8s., epSNZ =25m.36s., isSEN =26m.28s., iSSZ =31m.10s., esSSE =34m.12s., and other unidentified readings.
Algiers Univ. eZ =16m.21s. and 16m.48s.
Harvard isP =15m.49s., iPP =17m.36s., epPP =18m.59s., isPP =20m.2s., ipPPP =21m.30s., eS =24m.23s., iSP =25m.57s., iPS =26m.31s., iSS =31m.50s., ipSS =33m.34s., esSS =34m.30s., eSSS =35m.28s.
Weston e =15m.9s., iSP =25m.58s., ePKKP =28m.59s.
Alicante PPP =21m.38s., S =25m.28s., SSP =33m.36s., SSS =37m.20s., Q =44m.30s.
Halifax e =27m.32s.
Palisades e =15m.51s., ePP =17m.39s., ePPP =19m.58s., e =26m.0s., eSS =31m.56s.
Toledo ePP =15m.7s., e =16m.44s., 26m.34s., and 26m.58s.
Almeria PP =20m.49s., SS =35m.53s.
Granada SP =(16m.52s.), iPP =(18m.7s.), pPP =(20m.4s.), iSKKS =(24m.13s.), iS =(25m.4s.), PS =(26m.46s.), sS =(28m.37s.), pPS =(29m.37s.), iSS =(31m.22s.), SSS =(35m.11s.), sSSS =(37m.42s.). Readings have been decreased by one minute.
Malaga iPP =19m.0s., SKKS =25m.42s., Q =44m.32s.
Lisbon PPZ =17m.35s., N =29m.0s., EN =30m.1s., NZ =30m.39s., EN =31m.10s., SSE =31m.51s., N =35m.58s., SSSEN =36m.27s., Q?N =40m.35s.
Tamanrasset ePKPZ =17m.56s., ePPZ =18m.37s., ePPPZ =21m.15s., eZ =22m.15s., ePKKPZ =28m.52s.
Chinchina iPP =20m.57s.
Huancayo esPKP =21m.32s., e =22m.38s. and 28m.20s., eSKP =31m.34s., e =33m.13s.
La Paz iZ =21m.20s., iPPZ =23m.6s., iPPS =37m.16s., iSS =42m.36s., SSS =49m.26s.
La Plata PKPE =21m.54s., PPPE =29m.30s., PPPN =29m.42s., SKKSN =32m.42s., SKKSE =33m.0s., SKKS($\Delta > 180°$)E =33m.54s., SKSPE =35m.48s., E =36m.54s., SKSP($\Delta > 180°$)N =38m.42s., PPSE =40m.18s., SSN =46m.42s.

July 11d. 23h. 13m. 33s. Epicentre 16°·0N. 66°·0W.

A = +·3912, B = −·8786, C = +·2739 ; δ = 0 ; h = +6 ;
D = −·914, E = −·407 ; G = +·111, H = −·250, K = −·962.

		△	Az.	P.	O−C.	S.	O−C.		Supp.	
		°	°	m. s.	s.	m. s.	s.	m.	s.	
Fort de France		4·8	105	i 2 37	?	—	—	—		—
Palisades		25·8	348	i 5 37	+ 3	i 10 6	+ 4	—		—
Morgantown		26·5	335	i 5 39	− 2	c 10 16	+ 2	—		—
Weston		26·7	352	i 5 46	+ 3	i 10 22	+ 5	i 6	8	PP
Harvard		26·8	352	i 5 47	+ 3	c 10 27	+ 8	i 6	19	PP
Cleveland		28·7	336	i 5 59	− 2	c 11 0	+10	i 6	54	PP
Ottawa	z.	30·4	347	i 11 56	S	(i 11 56)	+40	i 12	28	SS
Palomar	z.	48·9	301	i 8 48	− 2	—	—	—		—
Riverside	z.	49·4	301	i 8 52	− 1	—	—	—		—
China Lake	z.	49·8	304	i 8 55	− 1	—	—	—		—
Pasadena	z.	50·0	301	i 8 57	− 1	—	—	—		—
Fresno	z.	51·7	305	c 9 8a	− 3	—	—	—		—

Cleveland gives also eSS =11m.36s.

July 11d. Readings also at 1h. (Apia), 2h. (Collmberg and Tacubaya), 3h. (Naryn, Puebla, and Tacubaya), 4h. (Apia (2)), 5h. (Istanbul and Apia), 6h. (Apia and near Kurmenty (2), 7h. (Harvard and Prague), 8h. (Ksara and near Istanbul), 9h. (Istanbul, Apia, near Khorog, Obi-garm, Stalinabad, Dzhergetal, Murgab, Fergana, and Andijan), 10h. (Guadalajara, near Oaxaca, Puebla, Tacubaya, Vera Cruz, Mount Wilson, Riverside, Palomar, China Lake, Seattle, and Apia), 11h. (near Apia), 12h. (Apia, Fergana, Naryn, Frunse, near Dzhergetal, Obi-garm, Andijan, Stalinabad, Khorog, Murgab, and near Alicante), 13h. (Stuttgart and near Ashkabad), 14h. (near Apia and near Alicante), 15h. (near Ottawa), 16h. (Nanking and China Lake), 17h. (near Mizusawa), 18h. (Antofagasta, Santa Lucia, Huancayo, La Paz, Weston, Harvard, China Lake, Riverside, Palomar, Pasadena, Tinemaha, and Tamanrasset), 19h. (Resolute Bay), 21h. and 22h. (Apia), 23h. (Frunse, Khorog (2), Tashkent (2), near Dzhergetal (2), Obi-garm (2), Stalinabad (2), Fergana (2), Andijan (2), Murgab, and Samarkand).

July 12d. 0h. 25m. 38s. Epicentre 1°·5N. 126°·0E. (as on 1951, January 26d.).

A = −·5876, B = +·8088, C = +·0260 ; δ = +11 ; h = +7 ;
D = +·809, E = +·588 ; G = −·015, H = +·021, K = −1·000.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		22·0	56	3 57	−61	—	—	—	—	—
Brisbane	Z.	38·8	140	i 7 26a	− 2	—	—	—	—	—
Vladivostok		41·8	7	7 51	− 2	i 14 7	− 4	—	—	—
Riverview	Z.	42·4	149	i 8 55a	+57	—	—	—	—	—
Kabansk		52·9	345	9 20	0	e 16 49	+ 1	—	—	—
Irkutsk		53·7	344	e 9 25	− 1	—	—	—	—	—
Przhevalsk		58·9	321	i 10 5	+ 2	—	—	—	—	—
Almata II		60·0	321	i 10 12	+ 1	—	—	—	—	—
Almata		60·2	321	i 10 13	+ 1	—	—	—	—	—
Rybach'e		60·4	320	e 10 13	0	—	—	—	—	—
Ili		60·5	322	i 10 13	− 1	—	—	—	—	—
Frunse		61·6	319	e 10 20	− 2	e 18 44	+ 1	—	—	—
Andijan		62·1	316	10 26	+ 1	18 51	+ 2	—	—	—
Dzhergetal		62·3	315	i 10 27	+ 1	—	—	—	—	—
Fergana		62·4	316	e 10 27	0	—	—	—	—	—
Apia		63·5	106	(10 47)	+13	19 15	+ 8	—	—	—
Stalinabad		63·9	313	e 10 37	0	e 19 10	− 2	—	—	—
Tashkent		64·5	316	e 10 41	0	e 19 16	− 3	—	—	—
Ashkabad		71·5	310	e 11 28	+ 4	e 20 44	+ 1	—	—	—
Sverdlovsk		75·5	330	i 11 49	+ 1	21 20?	− 8	—	—	—
Kirovobad		81·2	311	12 20	+ 1	—	—	—	—	—
Tiflis		82·4	312	e 12 27	+ 2	—	—	—	—	—
Zugdidi		84·6	313	e 12 34	− 2	—	—	—	—	—
Sotchi		86·3	314	e 12 46	+ 1	—	—	—	—	—
Moscow		87·9	326	e 12 53	0	e 23 31	− 4	—	—	—
Ksara		89·3	303	e 12 59?	0	e 23 38	(+ 2)	—	—	—
Pulkovo		91·6	330	—	—	i 24 2	− 7	—	—	—
Kiruna		94·5	338	i 13 25	+ 2	e 24 27	− 7	e 26 43	PPS	e 52·4
Uzhgorod		97·9	319	e 13 41	+ 2	e 25 1	− 2	—	—	—
Collmberg	Z.	103·0	323	e 14 1	− 1	—	—	—	—	—
Stuttgart	Z.	106·2	322	e 17 52?	?	—	—	—	—	—
China Lake	Z.	110·3	51	e 18 40	[+ 6]	—	—	e 19 4	PP	—
Riverside	Z.	111·5	53	e 19 10	PP	—	—	—	—	—
Ottawa	Z.	129·5	19	i 19 12	[+ 1]	—	—	—	—	—
Morgantowu		132·7	27	i 19 18	[+ 1]	e 22 41	PKS	—	—	—
Harvard		133·4	17	i 19 19	[+ 1]	—	—	—	—	—
Huancayo		156·4	117	e 20 0	[+ 4]	—	—	—	—	—

Additional readings and notes :—
Apia P minutes are in error.
Kiruna eE = 24m.38s., eEN = 28m.25s.
China Lake eZ = 19m.29s.
Long waves were also recorded at Potsdam.

July 12d. 9h. 42m. 56s. Epicentre 36°·7N. 70°·5E. (as on 7d.). Depth of focus 0·020.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Khorog	1·2	48	i 0 24	− 4	i 0 44	− 5
Obi-garm	2·1	342	e 0 39	+ 2	i 1 9	+ 3
Stalinabad	2·3	323	e 0 40	0	i 1 12	+ 2
Dzhergetal	2·6	12	i 0 44	+ 1	i 1 18	+ 1
Murgab	3·2	59	0 50	− 1	e 1 28	− 2
Fergana	3·8	15	e 1 0	+ 1	1 47	+ 3
Andijan	4·3	20	e 1 6	+ 1	i 1 59	+ 4
Tashkent	4·7	349	—	—	e 2 8	+ 3
Naryn	6·4	41	e 1 33	0	i 2 46	+ 1
Frunse	6·9	26	e 1 38	− 2	e 2 59	+ 2
Mary	6·9	280	—	—	2 54	− 3
Rybach'e	7·2	35	e 1 42	− 2	3 4	0
Krasnogorka	7·5	27	e 1 48	0	—	—
Almata	8·2	35	2 0	+ 3	—	—
Almata II	8·4	37	e 2 0	0	—	—
Przhevalsk	8·4	44	1 59	− 1	—	—
Kurmenty	8·7	41	i 2 1	− 3	—	—
Ili	8·8	33	e 2 4	− 1	—	—
Ashkabad	9·8	281	—	—	e 4 4	− 2
Kizyl-Arvat	11·5	286	—	—	e 4 44	− 2

July 12d. 16h. 33m. 11s. Epicentre 39°·6N. 73°·8E. (given by stations of U.S.S.R.).

A = +·2156, B = +·7419, C = +·6349 ; δ = 0 ; h = −2 ;
D = +·960, E = −·279 ; G = +·177, H = +·610, K = −·773.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Murgab	1·2	175	0 22	− 2	—	—	—	—
Andijan	1·6	316	i 0 29	− 1	i 0 51	0	—	—
Fergana	1·7	297	e 0 30	− 1	e 0 51	− 3	e 0 56	S_g
Dzhergetal	2·0	259	i 0 36	+ 1	i 1 7	+ 5	—	—
Naryn	2·5	42	i 0 43	0	i 1 18	+ 4	i 0 46	P*
Khorog	2·7	219	i 0 49	+ 4	i 1 26	+ 7	—	—
Frunse	3·3	10	i 0 55	+ 2	1 39	+ 4	—	—
Obi-garm	3·3	254	e 0 59	P*	e 1 53	S_g	—	—
Rybach'e	3·3	31	i 0 56	+ 3	e 1 44	S*	—	—
Krasnogorka	3·8	15	e 1 2	+ 1	—	—	—	—
Lunacharskoe	3·8	298	e 1 15	P_g	i 2 1	S*	—	—
Stalinabad	4·0	257	e 1 7	+ 3	e 1 54	+ 2	—	—
Almata	4·4	32	i 1 10	0	i 2 4	+ 2	i 2 18	S*
Almata II	4·5	35	i 1 14	+ 3	—	—	—	—
Przhevalsk	4·5	49	i 1 7	− 4	—	—	—	—
Kurmenty	4·8	43	i 1 14	− 1	—	—	—	—
Ili	5·0	28	i 1 16?	− 2	i 2 26?	+ 8	i 1 28?	P*
Samarkand	5·2	273	i 1 22	+ 1	—	—	—	—
Kizyl-Arvat	13·6	273	3 18	+ 1	5 46	− 4	—	—
Sverdlovsk	19·3	338	e 4 35	+ 6	e 8 3	+ 1	—	—
Tiflis	22·1	285	e 4 57	− 2	—	—	—	—
Zugdidi	24·2	287	e 5 31	+12	—	—	—	—

Long waves were recorded at Potsdam.

July 12d. Readings also at 1h. (Almeria), 2h. (La Paz and near Huancayo), 4h. (near Dzhergetal), 5h. (Apia), 6h. (Manila, Kiruna, Collmberg, Prague, Stuttgart, Messina, Algiers Univ., and near Ksara), 7h. (Pretoria, Pavia, near Dzhergetal, Khorog, Obi-garm, and Stalinabad), 9h. (near Apia), 11h. (near Alicante (3)), 12h. (Ksara and Manila), 13h. (Collmberg, Stuttgart, and near Dzhergetal), 14h. (Bombay, Stuttgart (2), Mount Wilson, Palomar, Riverside, China Lake, Huancayo, and near La Paz), 15h. (near Dzhergetal), 16h. (Alicante (2) and near Dzhergetal), 17h. (Apia, near Kurmenty, and near Dzhergetal), 18h. (Apia), 21h. (Chatra, Prague, and near Dzhergetal), 22h. (near Obi-garm), 23h. (Prague and Tortosa).

July 13d. 6h. 36m. 0s. Epicentre 27°·5N. 96°·4E. (as on 1950, November 16d.).

$A = -·0990$, $B = +·8828$, $C = +·4593$; $\delta = +9$; $h = +3$;
$D = +·994$, $E = +·111$; $G = -·051$, $H = +·456$, $K = -·888$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		8·2	268	i 2 3	0	i 3 38	0	2 45	P_g	—
Calcutta	N.	8·8	237	e 2 20	+ 9	i 3 57	+ 4	i 4 52	S_g	—
New Delhi	E.	17·0	278	e 3 55	− 6	e 6 54	−16	7 12	SS	6·8
Hyderabad	N.	19·3	242	e 4 38	+ 9	e 8 11	+ 9	—	—	10·3
Nanking		20·0	71	4 41	+ 4	8 30	+13	—	—	10·7
Przhevalsk		20·9	320	e 4 39	− 7	—	—	—	—	—
Murgab		21·7	305	i 4 51	− 4	i 8 47	− 4	—	—	—
Naryn		21·7	315	e 4 51	− 4	e 8 46	− 5	—	—	—
Almata II		22·0	320	i 4 55	− 3	—	—	—	—	—
Almata		22·3	320	i 4 55	− 6	i 8 55	− 7	—	—	—
Rybach'e		22·3	317	i 4 57	− 4	i 8 59	− 3	—	—	—
Poona	Z.	22·5	252	i 5 10	+ 8	i 9 12	+ 7	—	—	—
Khorog		23·1	300	5 8	0	e 9 15	− 1	—	—	—
Bombay	N.	23·3	253	—	—	e 9 27	+ 7	—	—	i 12·2
Frunse		23·4	316	e 5 8	− 3	e 9 19	− 2	—	—	—
Andijan		23·8	309	5 14	− 1	9 27	− 1	—	—	—
Dzhergetal		24·0	306	e 5 15	− 2	—	—	—	—	—
Fergana		24·0	309	e 5 17	0	e 9 32	0	—	—	—
Obi-garm		24·9	304	i 5 22	− 4	e 9 39	− 8	—	—	—
Irkutsk		25·5	10	e 5 32	0	—	—	—	—	—
Stalinabad		25·6	303	e 5 31	− 1	e 9 56	− 3	—	—	—
Kabansk		25·7	13	5 35	+ 2	e 9 59	− 2	—	—	—
Tashkent		26·1	309	e 5 40	+ 3	e 10 16?	+ 9	—	—	—
Samarkand		27·2	304	i 5 46	− 1	—	—	—	—	—
Ashkabad		33·5	298	e 6 44	+ 1	12 4	− 1	—	—	—
Sverdlovsk		38·7	329	7 26	− 1	e 13 17	− 8	—	—	—
Zugdidi		46·3	304	e 8 33	+ 4	—	—	—	—	—
Moscow		50·3	321	e 9 1	+ 1	—	—	—	—	—
Ksara		51·8	293	7 0	?	e 16 36	+ 3	—	—	—
Yalta		51·9	307	e 9 12	0	e 16 30	− 5	—	—	—
Pulkovo		54·7	326	e 9 33	0	—	—	—	—	—
Lwow		58·4	314	i 10 2	+ 2	e 17 58	− 4	—	—	—
Prague		64·5	315	e 10 42	+ 1	—	—	—	—	—
Potsdam		64·8	318	e 10 45	+ 2	e 19 20?	− 3	—	—	e 35·0
Jena		66·0	316	e 10 52	+ 2	—	—	e 13 57	PP	—
Messina	Z.	66·8	303	e 10 57	+ 1	—	—	—	—	—
Stuttgart		68·1	315	e 11 5	+ 1	e 20 0	− 3	e 11 12	P	e 37·0
Strasbourg		69·1	315	e 11 10	0	—	—	—	—	—
Kew		72·9	320	—	—	e 20 57	− 2	—	—	e 39·0
Algiers Univ.	Z.	76·6	304	e 11 56	+ 2	—	—	e 12 14	PcP	—
Tamanrasset	Z.	80·5	291	e 12 17	+ 2	—	—	i 15 20	PP	—

Additional readings :—
Chatra QN = 3m.25s., SSN = 3m.51s., SSSN = 4m.2s., S*N = 4m.9s., S_gN = 4m.30s.
Calcutta iSSN = 4m.9s.
Prague e = 11m.31s. and 12m.26s.
Algiers Univ. eZ = 13m.5s.
Tamanrasset eZ = 14m.1s.
Long waves were also recorded at Copenhagen, Cheb, Paris, and Pavia.

July 13d. 19h. 53m. 56s. Epicentre 6°·18. 150°·5E. Depth of focus 0·010.
(as on 1951, May 15d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		20·3	343	5 9	+39	—	—	—	—	—
Brisbane		21·4	174	i 4 41	0	e 8 34	+ 6	i 5 13	PP	—
Riverview		27·6	178	i 5 47k	+ 7	i 10 22	+ 9	i 5 58	pP	—
Auckland	N.	37·8	147	4 22	?	—	—	—	—	16·1
Cobb River	E.	40·1	153	e 8 15	pP	e 14 11	+45	e 10 8	PP	—
Kaimata	N.E.	40·7	156	e 7 4?	?	—	—	—	—	—
Wellington		41·2	152	i 7 42	+ 6	i 13 53	+10	i 8 15	pP	19·6
Perth		41·3	227	i 13 47	S	(i 13 47)	+ 3	i 16 37	SS	i 22·1
Christchurch		42·1	156	i 7 51a	+ 7	14 5	+ 9	8 18	pP	e 19·9
Djakarta		43·4	268	8 54	+60	e 15 54	+99	e 10 39	PP	—
Zi-ka-wei	Z.	46·2	325	8 16	− 1	15 15	+20	—	—	—
Nanking		48·5	323	i 8 32a	− 3	15 26	− 1	i 15 58	PPS	—
Vladivostok		51·8	343	i 9 1	+ 1	i 16 20	+ 7	—	—	—
Terre Adelie		60·9	184	e 10 10	+ 5	i 18 25	+12	—	—	—
Klyuchi		62·8	7	e 10 20	+ 2	—	—	—	—	—
Kabansk		68·9	332	10 56	0	e 19 56	+ 4	e 24 13	SS	—
Irkutsk		70·1	332	e 11 3	− 1	20 31	PS	e 13 10	PP	—
Przhevalsk		81·1	315	e 12 3	− 3	—	—	—	—	—
Almata II		82·0	315	e 12 11	0	—	—	—	—	—
Almata		82·3	315	i 12 10	− 2	—	—	—	—	—
Naryn		82·5	313	i 12 13	0	i 22 43	ScS	—	—	—
Rybach'e		82·7	313	e 12 14	0	e 22 46	ScS	—	—	—
Murgab		83·3	309	e 12 16	− 1	e 22 25	− 3	—	—	—
Frunse		83·9	314	i 12 18	− 2	i 22 34	0	—	—	—
Andijan		85·0	312	12 24	− 2	22 45	0	—	—	—
Fergana		85·4	312	e 12 26	− 2	e 22 46	− 3	—	—	—
Obi-garm		86·6	310	e 12 36	+ 2	e 22 59	− 2	—	—	—
Stalinabad		87·3	309	e 12 36	− 1	e 23 2	− 5	—	—	—
Tashkent		87·4	312	i 12 36?	− 1	e 22 54?	[+ 1]	e 14 6?	PP	—
Samarkand		88·9	310	12 44	− 1	23 4	[+ 1]	29 27	SS	—
Mary		92·6	308	e 13 2	0	23 33	[+ 9]	e 16 44	PP	—
Seattle		92·6	43	—	—	23 50	− 5	e 25 14	PS	e 43·1
Fresno	Z.	93·4	53	e 13 42k	pP	—	—	—	—	—
Pasadena		94·5	56	e 13 19	+ 9	e 24 9	− 3	i 13 47	pP	e 43·3
Sverdlovsk		95·0	326	e 13 10	− 3	24 2	−14	17 0	PP	—
China Lake	Z.	95·1	54	e 13 19	+ 6	—	—	i 13 49	pP	—
Riverside	Z.	95·1	56	e 13 20	+ 7	—	—	e 13 48	pP	—
Ashkabad		95·4	307	e 13 14	− 1	e 23 47	[+ 7]	16 53	PP	—
Palomar	Z.	95·5	57	i 13 54	pP	—	—	—	—	—
Resolute Bay		102·2	15	—	—	e 27 4	PS	(e 32 28)	SS	e 32·5
Kirovobad		104·7	310	e 18 10	PP	e 24 22	[− 4]	—	—	—
Tiflis		105·8	312	e 18 24	PP	—	—	e 20 45	PPP	—
Moscow		107·8	327	e 18 37	PP	—	—	—	—	—
Kiruna		109·9	343	e 19 3	PP	e 25 6	[+18]	e 27 28	sS	e 50·5
Pulkovo		110·1	332	e 18 56	PP	—	—	—	—	—
Yalta		112·9	316	19 13	PP	28 34	PS	e 21 46	PPP	—
Ksara		113·8	303	e 19 23	PP	31 4	?	—	—	—
Upsala		115·6	335	e 19 35	PP	e 29 24	PS	e 28 43	PKKP	e 53·1
Kishinev		115·7	321	—	—	e 29 3	PS	—	—	—
Kimberley	Z.	117·3	234	i 18 39	[+ 5]	—	—	—	—	—
Istanbul		117·5	313	e 19 8	[+33]	e 24 40	[−38]	e 29 22	PS	56·1
Lwow		117·6	324	e 19 35	PP	—	—	—	—	—
Copenhagen		120·4	334	20 16	PP	29 46	PS	e 36 28	SS	55·1
Belgrade		122·0	319	—	—	e 37 43	SS	e 38 35	sSS	e 70·8
Cleveland	Z.	122·0	44	e 19 30k	PP	—	—	i 19 37	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Potsdam		122·2	331	e 20 20	PP	e 30 10	PS	e 20 23	PP	e 59·1
Prague		122·8	328	e 20 32	PP	e 21 42	?	—	—	e 50·1
Jena	N.	123·8	330	e 18 15?	?	—	—	e 22 28	PKS	—
Cheb		123·9	329	e 20 40	PP	e 30 50	PS	e 37 39	SS	—
Ottawa		124·0	37	18 53	[+ 6]	e 26 50	SKKS	—	—	50·6
Aberdeen	E.	124·7	343	i 20 54	PP	e 30 44	PS	i 37 54	SS	e 58·6
Triest		125·3	324	e 15 19	P	e 26 46	SKKS	i 18 54	PKP	—
De Bilt		126·0	334	e 20 34	PP	e 30 45	PS	e 37 34	SS	e 49·1
Seven Falls	E.	126·0	33	—	—	e 31 12	PS	—	—	51·5
Stuttgart		126·4	329	e 18 56	[+ 4]	e 30 34	PSKS	e 19 19	pPKP	65·1
Strasbourg		127·2	329	e 19 1	[+ 8]	e 30 54	PS	e 19 22	pPKP	e 61·1
Palisades		127·3	41	e 18 57	[+ 4]	e 22 17	PKS	e 20 57	PP	e 59·8
Harvard		128·1	38	e 19 2	[+ 7]	i 33 54	PPS	e 21 3	PP	e 60·5
Messina	Z.	128·2	315	e 18 58	[+ 3]	—	—	e 21 33	PP	—
Weston		128·3	38	e 19 16	[+21]	—	—	—	—	e 60·6
Rome		128·5	321	e 18 59	[+ 3]	e 25 53	[+ 1]	e 21 9	PP	—
Pavia		128·6	326	e 20 33	PP	e 31 3	PS	e 34 33	PPS	e 61·2
Kew		128·7	337	e 18 59	[+ 3]	e 31 15	PS	e 21 21	PP	e 46·1
Besançon		129·0	329	e 19 0	[+ 3]	e 22 40	PKS	e 19 35	pPKP	—
Rathfarnham Castle		129·3	343	e 19 18	[+21]	e 38 34	SS	e 21 25	PP	—
Paris		129·5	333	e 19 3	[+ 5]	e 25 59	[+ 4]	e 21 23	PP	e 63·1
Huancayo		131·0	111	e 19 10	[+ 9]	e 22 29	PKS	e 21 29	PP	—
La Plata		131·2	149	22 22	PP	—	—	—	—	63·4
Chinchina		134·1	88	i 19 12	[+ 6]	e 22 43	PKS	e 19 25	pPKP	—
Bogota		135·6	89	e 19 19	[+10]	—	—	e 22 7	PP	—
La Paz	Z.	135·7	121	e 19 7	[− 2]	i 22 32	PKS	i 19 20	pPKP	—
Tortosa		136·2	326	—	—	e 25 1	?	—	—	e 69·1
Alicante		138·5	325	19 46	[+32]	27 44	SKKS	34 16	PPS	e 69·3
Toledo		139·4	329	e 19 20	[+ 4]	—	—	e 22 32	PP	72·8
Almeria		140·7	325	i 19 19	[+ 1]	35 9	PPS	22 43	PP	76·9
Granada		141·1	326	19 24k	[+ 5]	26 40	[+23]	20 7	pPKP	i 77·6
Malaga		141·8	327	i 19 22	[+ 2]	i 24 4?	PP	i 20 2	PKP_2	74 3
Tamanrasset	Z.	142·4	300	e 19 21	[0]	e 29 14	SKKS	i 19 58	sPKP	—
Fort de France		147·7	72	i 19 38	[+ 7]	—	—	—	—	—

Additional readings :—
Riverview iNZ =6m.26s., isSEN =10m.39s., iZ =10m.44s., eEZ =10m.52s., iSSN = 11m.42s.
Wellington e? =8m.32s., ePPZ =9m.34s., ScP =13m.17s., iSS =17m.17s., QZ =17m.24s.
Christchurch iZ =8m.0s., PPN =9m.36s., iScSEN =17m.34s.
Irkutsk eSS =24m.9s.?.
Mary ePS =25m.22s.
Seattle eS =24m.14s.
Sverdlovsk PS =25m.58s., SS =30m.54s., SSS =34m.48s.
Kiruna eN =28m.8s., ePPSN =29m.32s., eE =31m.19s., and 33m.20s.
Upsala ePPS?N =30m.23s., eSSE =35m.42s., eSSSE =40m.4s.?, eN =44m.5s.?.
Istanbul eN =35m.58s.
Jena eN =18m.32s. and 19m.40s.
Cheb e =25m.38s., 29m.30s., 30m.26s., and 38m.15s., eSSS? =42m.14s.
Aberdeen iE =21m.54s. and 23m.39s., eE =40m.54s.
Triest iPPZ =21m.0s., eZ =28m.35s., eSPP =32m.28s.
De Bilt ePPS =32m.23s.
Stuttgart ePP =20m.48s., ePPP? =23m.26s., ePPS =32m.38s., eSS =38m.4s.?, eSSS? = 42m.4s.?, eQ =63·1m. and other unidentified e readings.
Strasbourg ePPP =24m.21s., eSP =31m.2s., eSPP =32m.44s., eSSS? =42m.34s., eL? = 58m.1s. and other unidentified e readings.
Harvard isPP =21m.28s., i =22m.39s.
Rome eSKPZ =22m.8s., ePPPZ =23m.37s., ePSKSE =31m.13s., ePPSE =33m.49s.
Pavia e =22m.21s., eSS =40m.43s., eSSS =44m.47s.
Kew e =22m.17s., eSSEN =38m.9s.
Paris eSKP =22m.27s., ePKS =22m.37s., ePPP? =24m.0s., ePPP =24m.13s., eSKKS? = 27m.47s., ePS =32m.14s., eSPP? =32m.53s., ePPS? =34m.14s., eScS,PKP? = 34m.29s., eSS? =38m.43s., eSSS =44m.57s., eSS(△ >180°)? =53m.29s., and other unidentified e readings.
La Plata PPN =22m.28s.
La Paz iZ =23m.13s.
Alicante PP =23m.40s., SSS =47m.34s., Q =60m.46s.
Toledo e =19m.38s. and 23m.13s.
Almeria PPP =25m.55s.
Granada PP =22m.19s., SKSP =31m.31s., iSS =42m.29s., Q =67m.34s.
Tamanrasset iPPZ =22m.55s., ipPPZ =23m.23s., ePPPZ =26m.17s., eZ =29m.59s.
Long waves were also recorded at Budapest, Clermont-Ferrand, Helsinki, Ivigtut, and Scoresby Sund.

July 13d. Readings also at 1h. (near Bogota), 2h. (Mount Wilson, Palomar, Riverside, China Lake, Fresno, Seattle, Victoria, Ottawa, Seven Falls, Harvard, Palisades, Halifax, Scoresby Sund, Granada, Tortosa, and near Dzhergetal (2)), 3h. (Ksara and near Dzhergetal), 4h. (near Athens), 5h. (Prague), 6h. (near Apia), 8h. (near Granada), 12h. (near Dzhergetal), 13h. (Christchurch, Cobb River, Kaimata, Karapiro, Tuai, Wellington, Frunse, Naryn, Rybach'e, near Almata, Almata II, Chilisk, Ili, Krasnogorka, and Kurmenty), 14h. (Istanbul and Ksara), 15h. (Mount Wilson, Palomar, Riverside, China Lake (2), Tinemaha, Fresno, and Seattle), 16h. (Palisades), 17h. (Khorog, near Kurmenty, near Dzhergetal, Obi-garm, and Stalinabad), 18h. (Naryn, Fergana, Tashkent, near Andijan, Dzhergetal (2), Khorog, Obi-garm, and Stalinabad), 20h. (near Mizusawa), 22h. and 23h. (Palisades).

July 14d. 6h. Undetermined shock. South Pacific.

La Plata PPEN =26m.12s., PPP?N =29m.6s., PPP?E =29m.12s., SSE =37m.36s., SSN =37m.48s., SSSN =41m.6s., SSSE =41m.24s., LE =42·9m., these readings are incompatible with those from other Southern stations and may be wrongly interpreted.
Terre Adelie eP =29m.25s.
Huancayo eP =31m.15s., eS? =39m.33s., eL =46m.30s.
La Paz P =31m.17s., S =39m.37s., iPS =39m.51s., eSKS =41m.12s., SS =43m.30s., Q =49·9m.
Chinchina eP =32m.43s., L =58m.0s.
Bogota eP =32m.47s., eS =42m.35s., eSSEN =47m.29s., LEN =57m.11s.
Riverside eZ =34m.6s.
Palomar ePZ =34m.8s.
Pasadena eP?Z =34m.8s., eQE =57·1m., eRNZ =62·3m.
China Lake ePZ =34m.16s.
Christchurch eSEN =34m.45s., eQN =37m.0s., eRZ =38m.55s.
Auckland eN =35m.36s., eLN =38·6m.
Tamanrasset iPKPZ =40m.27s.k, eZ =40m.40s.
Paris iPKP =40m.53s., ePPP =47m.26s., eSKKS =51m.30s., eL =82m. and other unidentified e and i readings.
Scoresby Sund iP =40m.56s.a.
Messina eZ =41m.2s. and 41m.42s.
Besançon ePKP =41m.4s., ePKP$_2$ =41m.14s.
Kew eZ =41m.6s., 64m.1s., and 73m.26s., eL =92m.
Stuttgart ePKPZ =41m.9s., ePKP$_2$Z =41m.20s., ePPZ =45m.2s., eZ =47m.22s., ePPS? =58m.0s.
De Bilt ePKP =41m.12s., eZ =41m.39s., eSKKS =51m.24s.
Triest ePKPZ =41m.12s., ePKP$_2$?Z =42m.31s., eSKKS =51m.23s., i =52m.27s., iSPP =58m.19s.
Strasbourg ePKP$_2$ =41m.17s., e =41m.26s., ePP =45m.3s., e =47m.16s., eSS =64m.20s., L =80m.
Rome eZ =41m.18s., 41m.54s., and 43m.50s.
Ksara e =41m.19s. and 57m.26s.
Karlsruhe eZ =41m.23s. and 47m.20s.
Potsdam eZ =41m.43s.
Taranto 42m.?.
Pavia e =44m.34s.
Palisades e =54m.56s., eQ =66m.13s., eR =72m.9s.
Long waves were also recorded at Santa Lucia, Wellington, Harvard, and Granada.

July 14d. 7h. 3m. 54s. Epicentre 48°·2N. 154°·4E.
(as on 1949, April 19d., and forerunner of the larger shock).

$A = -·6034$, $B = +·2891$, $C = +·7432$; $\delta = +2$; $h = -5$;
$D = +·432$, $E = +·902$; $G = -·670$, $H = +·321$, $K = -·669$.

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
College		34·5	39	i 6 53	+ 1	—	—	—
Shasta Dam		57·1	64	e 9 58	+ 8	—	—	—
Hungry Horse		57·2	52	e 9 50	− 1	—	—	—
Scoresby Sund		61·6	359	i 10 22$_a$	0	—	—	37·1
China Lake	z.	63·1	65	e 10 32	0	—	—	—
Riverside	z.	64·5	67	e 10 46	+ 5	—	—	—
Boulder City		64·7	64	e 10 44	+ 2	—	—	—
Tucson		69·7	64	e 11 10	− 4	—	—	—
Copenhagen		71·7	339	i 11 24	− 2	—	—	35·1
St. Louis		76·2	47	e 11 54	+ 2	—	—	—

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	L. m.
Cleveland	Z.	77·9	40	e 11 59k	− 2	—	—	—
Stuttgart	Z.	78·8	338	e 12 4	− 2	—	—	—
Strasbourg		79·4	338	e 12 6	− 3	—	—	—
Morgantown		80·2	40	e 12 9	− 5	—	—	—
Paris		80·4	342	i 12 11	− 4	—	—	—
Besançon		81·0	338	e 12 16	− 2	—	—	—
Rome		84·2	332	e 12 31	− 3	e 15 46	PP	—

Additional readings :—
China Lake iZ = 10m.38s. and 11m.5s.
Copenhagen i = 11m.37s.
Paris i = 12m.19s.

July 14d. 7h. 18m. 13s. Epicentre 48°·2N. 154°·4E. (as at 7h. 3m.).

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Klyuchi		9·0	23	e 2 39	+ 26	—	—	—	—	—
Vladivostok		16·5	261	i 3 46	− 8	i 7 12	+14	—	—	—
Kabansk		30·4	295	e 5 53	−23	—	—	—	—	—
College		34·5	39	e 6 55	+ 3	—	—	i 7 8	pP	—
Guam		35·5	196	—	—	e 16 22	Q	—	—	—
Resolute Bay		49·2	19	e 9 3	+11	e 16 18	+20	—	—	—
Ili		51·7	296	i 9 7	− 4	—	—	—	—	—
Rybach'e		53·1	295	e 9 17	− 4	e 17 5	+14	—	—	—
Seattle		53·1	57	e 9 30	+ 9	e 18 7	?	e 20 5	SS	e 26·8
Sverdlovsk		53·4	317	9 23	− 1	—	—	—	—	—
Andijan		56·4	295	e 9 45	0	—	—	—	—	—
Murgab		56·9	292	9 46	− 3	17 56	+14	—	—	—
Fergana		57·0	294	9 50?	0	—	—	—	—	—
Shasta Dam		57·1	64	e 9 53	+ 3	—	—	—	—	—
Hungry Horse		57·2	52	e 9 53	+ 2	—	—	—	—	—
Tashkent		57·9	298	—	—	e 18 8	+13	—	—	—
Dzhergetal		58·0	294	e 9 43	−14	—	—	—	—	—
Kiruna		59·2	342	e 10 8a	+ 3	i 18 22	+10	e 13 48	PPP	e 29·1
Obi-garm		59·3	294	9 43	−23	—	—	—	—	—
Stalinabad		59·9	296	10 6	− 4	—	—	—	—	—
Fresno	Z.	61·2	66	e 10 21a	+ 2	—	—	—	—	—
Scoresby Sund		61·6	359	i 10 24a	+ 2	—	—	—	—	—
China Lake	Z.	63·1	65	e 10 31	− 1	—	—	—	—	—
Pulkovo		63·2	332	e 10 33	+ 1	e 19 18	+15	—	—	—
Moscow		63·7	326	e 10 36	0	—	—	—	—	—
Pasadena		63·9	67	i 10 38	+ 1	i 19 14	+ 2	e 10 45	?	—
Riverside	Z.	64·5	67	e 10 44	+ 3	—	—	e 10 53	?	—
Boulder City		64·7	64	i 10 45	+ 3	—	—	—	—	—
Palomar	Z.	65·2	67	e 10 46	+ 1	—	—	—	—	—
Upsala		66·7	338	e 10 55	0	e 19 57	+11	e 28 47?	Q	e 32·8
Baku		69·4	308	e 11 12	0	—	—	—	—	—
Tucson		69·7	64	e 11 14	0	—	—	—	—	—
Tiflis		71·1	312	e 11 22	0	—	—	—	—	—
Gori		71·2	312	e 11 21	− 2	—	—	—	—	—
Copenhagen		71·7	339	11 27	+ 1	—	—	11 39	PcP	—
Zugdidi		71·9	313	e 11 21	− 6	—	—	—	—	—
Aberdeen	E.	73·2	347	—	—	e 22 15	?	—	—	44·8
Lwow		73·4	329	i 11 36	0	—	—	—	—	—
Yalta		73·9	320	11 38	− 1	e 21 24	+14	—	—	—
Kishinev		74·0	326	e 11 39	0	—	—	—	—	—
Potsdam		74·5	337	i 11 41	− 1	—	—	—	—	e 27·8
Florissant		76·1	47	—	—	e 21 37	+ 2	—	—	—
St. Louis		76·2	47	e 11 52	0	e 21 40	+ 4	e 12 5	PcP	—
Jena	E.	76·2	336	e 11 52	0	—	—	—	—	—
Prague		76·2	335	i 11 52k	0	e 21 35	− 1	e 12 15	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
De Bilt		76·7	341	i 11 58	+ 3	e 21 56	+15	—	—	—
Cheb	E.	76·8	336	—	—	e 19 58	?	e 26 51	SS	—
Ogyalla		77·0	331	e 12 5	+ 9	—	—	—	—	—
Ottawa		77·0	34	e 11 57	+ 1	—	—	—	—	—
Seven Falls	E.	77·2	29	—	—	e 21 54	+ 7	—	—	—
Cleveland		77·9	40	i 12 2a	+ 1	e 21 55	+ 1	—	—	—
Kew		78·4	344	i 12 3	− 1	—	—	—	—	—
Istanbul		78·8	321	e 12 9	+ 3	e 22 6	+ 2	—	—	—
Karlsruhe	Z.	78·8	338	e 12 7	+ 1	—	—	—	—	—
Stuttgart		78·8	338	e 12 6a	0	e 21 57	− 7	e 12 14	PcP	e 40·8
Belgrade	Z.	79·0	328	e 12 7a	0	—	—	—	—	—
Strasbourg		79·4	338	e 12 10	+ 1	—	—	—	—	e 38·8
Morgantown		80·2	40	i 12 13	− 1	—	—	—	—	—
Paris		80·4	342	i 12 15	0	e 22 27	+ 6	i 12 21	PcP	—
Triest	Z.	80·4	333	e 12 14	− 1	—	—	e 13 21	pP	—
Besançon		81·0	338	e 12 24	+ 6	—	—	—	—	—
Harvard		81·0	32	i 12 18	0	—	—	—	—	e 49·3
Weston		81·2	32	e 12 19	0	—	—	—	—	—
Palisades		81·4	34	i 12 21	+ 1	—	—	—	—	e 51·8
Ksara		81·6	312	e 12 22	+ 1	e 22 3	−30	—	—	—
Washington		82·0	37	e 12 28	+ 5	—	—	—	—	—
Pavia	Z.	82·1	336	e 12 26k	+ 2	—	—	—	—	—
Clermont-Ferrand		83·1	340	(e 13 47?)	?	—	—	—	—	e 13·8
Taranto		83·9	328	—	—	e 29 17	SSP	—	—	—
Rome	Z.	84·2	332	i 12 33	− 1	—	—	e 15 49	PP	—
Helwan	Z.	87·1	313	e 12 47	− 2	—	—	—	—	—
Tortosa		88·4	340	(e 16 47?)	PP	—	—	—	—	e 16·8
La Paz	Z.	133·1	62	19 23	[+ 5]	—	—	21 55	PP	—

Additional readings :—
Kiruna eSE =18m.29s., eN =21m.51s., eE =23m.15s., eSSSN =24m.58s.
China Lake jZ =10m.42s. and 10m.52s.
Aberdeen iE =23m.24s., eE =24m.27s.
Prague esP =12m.27s., e =13m.7s., esS? =22m.2s., eSS =27m.9s.
Ogyalla e =13m.10s.
Morgantown e =13m.16s.
Paris i =12m.29s.
Besançon e =13m.6s.
Washington e =12m.54s.
Rome eZ =13m.15s.
Long waves were also recorded at Ivigtut, Granada, Alicante, and Almeria.

July 14d. 9h. Undetermined shock.

Copiapo PN =41m.26s., N =41m.37s.
Kimberley iZ =46m.50s.
La Paz PPZ =47m.24s., i =47m.48s., iS? =54m.22s., i =55m.16s.
Terre Adelie eP =48m.15s.
Huancayo e =48m.46s.
Tamanrasset iPZ =50m.55sk, eZ =51m.21s. and 54m.31s.
Riverside eZ =57m.9s.
China Lake eZ =57m.13s., 63m.39s., 63m.50s., and 64m.26s.
Berkeley ePZ =57m.22s.k.
Nanking PZ =58m.8s.k.
Scoresby Sund iP =63m.34s.
Potsdam eZ =64m.51s., eLEN =96m.
De Bilt eP =65m.0s., eL =95m.
Jena eE =65m.1s.
Triest eZ =65m.1s., iZ =65m.23s.
Karlsruhe eZ =65m.14s.
Stuttgart ePZ =65m.14s.
Strasbourg eP =65m.16s., e =66m.37s.
Kew eZ =65m.20s., e =67m.4s., eEN =74m.57s., eL =95m.0s.
Besançon eP =65m.26s.
Paris eP =65m.27s., e =68m.0s., eL =91m.
Ksara eP =65m.28s., eS =75m.25s.
Rathfarnham Castle eEN =66m.20s. and 72m.50s.
Kiruna eN =72m.7s., eLEN =87m.
Long waves only were also recorded at Alicante, Granada, Cheb, and Rome.

July 14d. 13h. 18m. 16s. Epicentre 37°·8N. 141°·4E. Depth of focus 0·010.
(as on 1950, October 26d.).

Intensity V at Yoneyama, Shizugawa, and Semmaya; IV at Onahama, Sendai, Hukusima, Mito, Miyako, Sanuma, Kanayama, and Watari; II-III at Shirakawa, Utunomiya, and Morioka. Epicentre 37°·7N. 141°·4E. Depth 100km.

Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, pp. 162, 163, with macroseismic chart.

$A = -·6191$, $B = +·4942$, $C = +·6103$; $\delta = -2$; $h = -1$;
$D = +·624$, $E = +·782$; $G = -·477$, $H = +·381$, $K = -·792$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Isinomaki		0·6	354	0 20	+ 3	0 31	+ 2
Sendai		0·6	320	0 18	+ 1	0 31	+ 2
Hukusima		0·7	266	0 19k	+ 1	0 31	0
Onahama		0·9	205	0 22k	+ 3	0 37	+ 3
Yamagata		0·9	299	0 20	+ 1	0 33	− 1
Inawashiro		1·1	257	0 20k	− 2	0 35	− 3
Shirakawa		1·2	234	0 22	− 1	0 36	− 4
Mizusawa		1·4	351	i 0 27	+ 2	0 42	− 2
Mito		1·6	208	0 28	0	0 48	− 1
Sakata		1·6	311	0 35	+ 7	0 58	+ 9
Utunomiya		1·8	224	0 30a	0	0 50	− 3
Miyako		1·9	14	0 33a	+ 1	0 56	+ 1
Morioka		1·9	355	0 32	0	0 56	+ 1
Niigata		1·9	274	0 28	− 4	0 53	− 2
Tukubasan		1·9	213	0 33	+ 1	—	—
Tyosi		2·1	192	0 36	+ 2	0 58	− 2
Akita		2·2	332	1 2	S	(1 2)	0
Kumagaya		2·3	224	0 43a	+ 6	—	—
Maebasi		2·3	233	0 37a	0	1 4	− 1
Aikawa		2·5	275	0 36	− 4	1 4	− 6
Tokyo		2·5	212	0 40	0	1 8	− 2
Takada		2·6	254	0 40	− 1	1 9	− 3
Titibu		2·6	226	0 38	− 3	1 8	− 4
Hatinohe		2·7	2	0 44	+ 1	1 16	+ 2
Oiwake		2·7	237	0 41	− 2	1 12	− 2
Matusiro		2·8	244	0 43	− 1	—	—
Nagano		2·8	246	0 43	− 1	—	—
Hunatu		3·1	223	0 48k	0	1 23	− 1
Mera		3·1	204	0 49	+ 1	1 24	0
Kohu		3·2	226	0 49	− 1	1 23	− 4
Matumoto		3·2	240	0 46	− 4	—	—
Osima		3·4	208	0 52	0	1 28	− 4
Toyama		3·5	253	0 52	− 2	1 35	+ 1
Wazima		3·6	265	0 53	− 2	1 32	− 5
Iida		3·7	232	0 57	+ 1	1 37	− 2
Shizuoka		3·7	221	0 54	− 2	1 36	− 3
Kanazawa		4·0	253	1 0	0	—	—
Mori		4·3	352	1 37	S	(1 37)	−17
Nagoya		4·4	235	1 6	0	—	—
Hukui		4·5	248	1 5	− 2	—	—
Urakawa		4·5	13	1 11	+ 4	1 57	− 2
Tsuruga		4·8	245	1 10	− 1	—	—
Hikone		4·9	240	1 11	− 2	—	—
Kameyama		5·0	235	0 55	−19	—	—
Kyoto		5·3	240	1 17	− 1	—	—
Owase		5·6	230	1 16	− 6	—	—
Nemuro		6·4	29	1 38	+ 5	2 40	− 6
China Lake	z.	76·5	55	i 11 41	0	—	—
Riverside	z.	77·8	57	e 11 47	− 1	—	—
Stuttgart	z.	83·9	331	e 12 16	− 4	—	—

Mizusawa gives also iSE =46s.

July 14d. 15h. 44m. 57s. Epicentre 45°·6N. 15°·3E. (as on 1949, Aug. 19d.).

A = +·6772, B = +·1852, C = +·7121 ; δ = −1 ; h = −4 ;
D = +·264, E = −·965 ; G = +·687, H = +·188, K = −·702.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Triest		1·1	273	i 0 22	0	i 0 41	+ 2	—	—	—
Vienna		2·7	15	e 0 56	P_g	e 1 50	S_g	—	—	—
Ogyalla		3·0	41	e 1 12	P_g	e 1 34	S*	e 1 49	S_g	—
Florence		3·2	238	—	—	e 1 32	0	e 1 57	S_g	—
Prato		3·5	242	e 1 23	?	—	—	—	—	—
Rome		4·2	210	e 1 10	+ 3	e 1 55	− 2	e 1 24	P_g	e 2·4
Timisoara		4·2	86	—	—	e 2 10	S*	e 3 27	S_g	—
Pavia		4·3	267	—	—	e 2 35	S_g	—	—	e 3·3
Prague		4·5	353	e 1 11	0	e 2 8	+ 3	e 1 31	P_g	—
Zürich		5·0	293	e 1 24	+ 6	e 2 41	S_g	e 1 37	P_g	—
Stuttgart	z.	5·2	309	e 1 18?	− 3	e 2 59	S_g	e 1 41	P_g	—
Taranto		5·3	164	e 1 33	P*	—	—	—	—	—
Basle		5·7	293	e 1 26	− 2	e 3 10	S_g	e 1 59	P_g	—
Jena		5·9	336	e 1 30	− 1	e 2 45	+ 5	e 3 25	S_g	e 3·6
Strasbourg		5·9	303	e 1 56	P_g	e 2 28	−12	e 3 0	S*	—
Besançon		6·6	288	e 1 40	− 1	—	—	e 2 8	P_g	e 3·8

Additional readings :—
Ogyalla eN = 1m.17s., eE = 1m.21s., e = 1m.43s., eS_g = 1m.59s.
Prague eP_g = 1m.49s., eS = 2m.17s. and 2m.21s., eS_g = 2m.32s. and 2m.37s., i = 2m.47s. and 2m.50s.
Stuttgart eP*Z = 1m.31s., eZ = 2m.45s., eS_gZ = 3m.5s. and 3m.11s.
Jena eN = 1m.40s., eE = 2m.40s. and 2m.57s., eN = 3m.9s., eE = 3m.15s., eN = 3m.19s.
Long waves were also recorded at Potsdam.

July 14d. 22h. 11m. 18s. Epicentre 28°·0S. 70°·0W. Depth of focus 0·010. (as on 1947, October 17d.).

Intensity IV in Chile between latitudes 28° and 29°S.

F. Greve.
Boletín de año 1951, Instituto Sismológico, Universidad de Chile, Santigo, p. 29. Epicentre as adopted.

A = +·3024, B = −·8310, C = −·4670 ; δ = +10 ; h = +2 ;
D = −·940, E = −·342 ; G = −·160, H = +·439, K = −·884.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		11·6	9	e 3 17	+33	4 56	+ 4	—	—	—
La Plata		12·4	127	2 54	0	—	—	—	—	6·3
Huancayo		16·6	341	e 3 50	+ 2	—	—	—	—	—
Tacubaya		54·9	325	e 9 16	− 7	—	—	e 9 36	pP	—
Morgantown		67·9	352	e 10 50	0	—	—	—	—	—
Weston		70·0	359	e 11 5	+ 2	—	—	—	—	—
Harvard		70·2	359	i 11 6	+ 2	—	—	i 11 26	pP	—
Palomar	z.	75·5	321	i 11 35	0	—	—	e 11 57	pP	—
Riverside	z.	76·2	321	i 11 39	0	—	—	i 12 0	pP	—
Pasadena	z.	76·8	321	i 11 43	0	—	—	—	—	—
China Lake	z.	77·7	322	i 11 47k	− 1	—	—	i 12 9	pP	—
Tinemaha	z.	79·0	322	i 11 55	0	—	—	e 12 16	pP	—
Tamanrasset	z.	88·6	63	e 13 7	pP	—	—	e 13 24	sP	—

Additional readings :—
La Plata P?EZ = 3m.0s.
Palomar eZ = 11m.51s.

July 14d. Readings also at 0h. (near Dzhergetal), 1h. (Apia), 2h. (Andijan, Dzhergetal, Frunse, Khorog, Naryn, Obi-garm, Rybach'e, Tashkent, Samarkand, near Stalinabad, Mary, and Ashkabad), 3h. (Jena), 4h. (Prague, Stuttgart, and Ksara), 5h. (Bogota, Chinchina, Huancayo, and La Paz (2)), 7h. (Bombay, Kodaikanal, and near Mizusawa), 8h. (near Copiapo (2) and near Dzhergetal (2)), 9h. (Wellington, near Ashkabad, near Dzhergetal, and near Mizusawa), 10h. (Antofagasta, Santa Lucia, China Lake, Riverside, Besançon, Granada, Strasbourg, Stuttgart, Zürich, Frunse, Kurmenty, near Andijan, Dzhergetal, Fergana, Khorog, Murgab, Obi-garm, and Stalinabad), 12h. (Merida, Puebla, Tacubaya, Vera Cruz, Palomar (2), China Lake (2), and near Dzhergetal), 13h. (near Algiers Univ.), 14h. (Alicante and near Dzhergetal), 16h. (near Manila), 17h. (Seattle, Besançon, Strasbourg, Stuttgart, Paris, Kew, Granada, Scoresby Sund, and near Reykjavik), 18h. (De Bilt, Manila, near Reykjavik, near Obi-garm, and near Alicante (3)), 19h. (near Istanbul and near Dzhergetal (2)), 20h. (near Dzhergetal), 21h. (Apia, La Paz, near Copiapo, and Santa Lucia), 23h. (Krasnogorka, Samarkand, Stalinabad, near Andijan, Dzhergetal, Fergana, Kurmenty (2), and Obi-garm).

July 15d. 18h. 38m. 5s. Epicentre 43°·4N. 19°·3E.

Intensity VI at Pljevlja, Boljanici, and Kosanica ; V at Crijep. Epicentre as adopted. Macroseismic radius 22km.

M. D. Uzelac.
Annuaire macroséismic pour l'année, 1951, de l'Institut Séismologique de Beograd, New Series No. 11, Belgrade, 1953, p. 56.

$A = +\cdot6879$, $B = +\cdot2409$, $C = +\cdot6846$; $\delta = -8$; $h = -3$;
$D = +\cdot331$, $E = -\cdot944$; $G = +\cdot646$, $H = +\cdot226$, $K = -\cdot729$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		1·6	30	i 0 24k	− 6	i 0 48	− 3	i 0 28	P	—
Timisoara		2·7	30	e 0 49	+ 4	e 1 30	S_g	—	—	—
Sofia		3·0	103	e 0 54	+ 4	e 1 30	+ 3	1 41	S_g	—
Kalossa	E.	3·1	356	e 1 34	S*	—	—	—	—	e 2·2
Budapest	N.	4·1	358	e 1 32	P_g	e 2 15	S_g	—	—	3·4
Ogyalla		4·5	350	—	—	e 2 9	+ 4	e 2 33	S_g	—
Triest		4·5	301	e 1 18	+ 7	i 1 58?	− 7	e 1 38	P_g	—
Bucharest		5·0	76	e 2 2	?	e 2 22	+ 4	e 2 53	S_g	3·4
Rome	E.	5·2	256	—	—	e 2 15	− 7	e 2 54	S_g	i 3·7
Vienna		5·2	338	e 1 51	P_g	2 56	S_g	—	—	—
Bologna		5·9	284	e 1 56	P_g	3 24	S_g	—	—	—
Messina	Z.	5·9	210	e 2 12	P_g	e 2 40	0	i 3 15	S_g	—
Prato		6·0	278	e 2 26	S	(e 2 26)	−17	—	—	—
Salo		6·7	292	e 1 39	− 3	e 3 11	+11	e 2 24	P_g	—
Prague		7·5	335	e 2 50	?	e 3 24	+ 4	e 3 59	S*	e 4·7
Zürich		8·5	302	e 2 34	P*	e 3 51	+ 6	—	—	—
Stuttgart		8·8	311	e 2 4	− 7	—	—	e 2 45	P_g	e 5·2
Basle		9·2	301	e 3 0	P_g	—	—	—	—	e 4·9
Jena		9·2	328	e 3 27?	?	e 4 16	+13	e 5 5	S_g	—
Karlsruhe		9·4	310	e 3 10	P_g	e 5 13	S_g	—	—	—
Strasbourg		9·5	307	—	—	e 4 31	+21	e 5 13	S_g	e 5·6
Besançon		10·1	297	i 2 40	+11	e 5 23	S_g	e 3 4	P*	e 5·9
Paris		12·8	301	i 2 37	−29	—	—	—	—	—

Additional readings :—
Belgrade iP_gZ =0m.33s.
Sofia SEN =1m.35s., eEN =2m.15s.
Budapest PE =1m.38s., eE =2m.23s. and 2m.50s.
Ogyalla e =2m.17s. and 2m.22s.
Triest eS =2m.16s.
Bucharest eN =2m.13s., eE =2m.29s., eN =2m.33s.
Bologna e =2m.7s.
Salo eEN =1m.54s. and 2m.43s.
Prague eS*? =3m.51s., eS_g? =4m.27s.
Jena eE =3m.52s.?, eN.4m.44s.
Long waves were also recorded at other European stations.

July 15d. Readings also at 0h. and 2h. (Apia), 5h. (near Santa Lucia), 6h. (La Paz, Mount Wilson, China Lake, and near Guam), 7h. (Rome and near Dzhergetal), 8h. (Terre Adélie, Palomar, Pasadena, Riverside, China Lake, Tinemaha, near Guadalajara, Manzanillo, Puebla (2), Tacubaya (2), Vera Cruz (2), and near Alicante), 9h. (Harvard and Pallsades), 10h. (Apia, near Dzhergetal (2), and near Zürich), 12h. (near Besançon, Stuttgart, Basle, Neuchatel, and Zürich), 14h. (Palomar, Riverside, China Lake, Jena, Stuttgart, and near Seattle), 15h. (near Dzhergetal), 16h. (Apia, Wellington, and Manila), 17h. (Bombay, Poona, New Delhi, Calcutta, and Chatra), 18h. (Khorog, Lunacharskoe, Przhevalsk, Tashkent, near Almata, Almata II (4), Chilisk (4), Fergana, Frunse, Ili (4), Krasnogorka (3), Kurmenty (4), Naryn, Rybach'e, Potsdam, near Belgrade, Timsoara, near Chinchina, and near Tacubaya), 19h. (near Dzhergetal), 20h. (Apia and near Kurmenty), 21h. (Chilisk, Khorog, Kurmenty, near Almata II (2), Dzhergetal (2), Fergana (2), Frunse, Krasnogorka, Naryn, Obi-garm (2), Rybach'e, Stalinabad, and near Apia (2)), 22h. (near Dzhergetal), 23h. (near Kurmenty).

July 16d. 1h. 25m. 38s. Epicentre 35°·6N. 140°·0E. Depth of focus 0·005.
(as on 1951, January 8d.).

Intensity IV at Ajiro; II-III at Tokyo, Yokohama, Utunomiya, Osima, and Hunatu.
Epicentre 35°·6N. 140°·1E. Depth 75km.
Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, pp. 163, 164, with macroseismic chart.

A = −·6243, B = +·5239, C = +·5795; δ = +4; h = 0;
D = +·643, E = +·766; G = −·444, H = +·373, K = −·815.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Tokyo	0·2	298	0 10	− 1	0 20	+ 1
Yokohama	0·3	240	0 13	+ 1	0 22	+ 2
Tukubasan	0·6	7	0 13	− 1	0 22	− 3
Mera	0·7	191	0 15	0	0 26	− 1
Kumagaya	0·8	318	0 17	0	0 28	− 1
Ajiro	0·9	233	0 18	0	0 31	0
Mito	0·9	26	0 16	− 2	0 28	− 3
Hunatu	1·0	264	0 19k	0	0 43	+10
Misima	1·0	241	0 15	− 4	0 31	− 2
Osima	1·0	211	0 17	− 2	—	—
Utunomiya	1·0	354	0 17	− 2	0 29	− 4
Maebasi	1·1	317	0 22	+ 2	0 36	0
Kohu	1·2	272	0 21	− 1	0 36	− 2
Oiwake	1·4	302	0 25	+ 1	0 44	+ 1
Shizuoka	1·5	244	0 25	− 1	0 45	0
Onahama	1·5	29	0 31	+ 5	0 44	− 1
Matumoto	1·8	291	0 36	+ 6	0 53	+ 1
Inawasiro	2·0	3	0 37	+ 5	1 0	+ 3
Hukusima	2·2	10	0 35	0	1 1	− 1
Sendai	2·8	15	0 52	+ 8	—	—

July 16d. 10h. 40m. 20s. Epicentre 6°·0S. 146°·5E. Depth of focus 0·010.

A = −·8294, B = +·5490, C = −·1038; δ = +8; h = +7;
D = +·552, E = +·834; G = +·087, H = −·057, K = −·995.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		19·4	354	4 25	+ 4	—	—	—	—	—
Brisbane		22·2	164	i 4 49a	0	i 8 47	+ 5	i 5 18	pP	—
Riverview		28·0	171	i 5 45a	+ 1	i 10 9	−10	i 6 23	pP	—
Manila		32·5	309	i 6 20	− 3	—	—	i 6 53	pP	—
Bandong		38·6	267	i 7 12	− 3	i 12 57	− 7	—	—	—
Perth		38·6	224	e 9 26	PcP	i 13 6	+ 2	15 18	88	—
Djakarta		39·4	268	e 7 22	0	i 13 27	+11	i 8 50	PP	—
Yakusima		39·4	339	7 20	− 2	13 16	0	—	—	—
Auckland	N.	40·1	144	7 21	− 7	i 13 33	+ 7	i 7 57	pP	e 20·7
Siomisaki		40·5	348	7 31	0	13 29	− 3	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Simidu		40·7	343	7 31	− 1	13 32	− 3	—	—	—
Owase		41·0	347	7 34	− 1	13 38	− 2	—	—	—
Osima		41·1	352	7 36	0	13 38	− 3	—	—	—
Koti		41·2	343	7 35	− 1	13 40	− 3	—	—	—
Mera		41·2	352	7 37	+ 1	13 42	− 1	—	—	—
Karapiro	N.	41·3	144	e 7 40?	+ 3	—	—	—	—	—
New Plymouth	E.	41·3	147	e 8 40?	?	—	—	—	—	—
Kumamoto		41·4	340	7 43	+ 5	13 49	+ 3	—	—	—
Shizuoka		41·4	350	7 40	+ 2	13 44	− 2	—	—	—
Misima		41·5	351	7 38	− 1	13 45	− 2	—	—	—
Unzendake		41·5	340	7 34	− 5	—	—	—	—	—
Kameyama		41·7	349	7 44	+ 3	13 48	− 2	—	—	—
Osaka		41·7	346	7 44	+ 3	13 48	− 2	10 27	PPP	—
Apia		41·8	104	7 42?	+ 1	13 3	−49	8 11?	pP	—
Hunatu		41·9	350	7 39	− 3	13 50	− 3	—	—	—
Kobe		41·9	347	7 40	− 2	13 52	− 1	9 24	PP	—
Tokyo		41·9	352	7 46	+ 4	13 46	− 7	14 51	sS	—
Cobb River	E.	42·1	150	e 7 45	+ 1	e 14 0	+ 4	e 8 11	pP	—
Gihu		42·2	349	7 44	− 1	13 55	− 2	—	—	—
Hukuoka		42·2	341	7 42	− 3	13 54	− 3	—	—	—
Kaimata	N.E.	42·5	152	e 8 39	+52	e 14 52	+50	—	—	—
Kumagaya		42·5	352	7 45	− 2	13 59	− 3	—	—	—
Maebasi		42·7	352	7 49	0	14 3	− 2	—	—	—
Oiwake		42·8	352	7 50	0	14 5	− 1	—	—	—
Tuai	N.	42·8	145	e 7 53	+ 3	e 14 5	− 1	—	—	—
Hamada		42·9	343	7 48	− 2	14 8	0	—	—	—
Matusiro		43·0	351	7 51	0	14 5	− 4	9 13	PP	—
Onahama		43·0	355	7 59	+ 8	14 10	+ 1	—	—	—
Nagano		43·2	351	7 53	0	14 9	− 3	9 24	PP	—
Wellington		43·2	148	e 7 51	− 2	i 14 13	+ 1	i 8 21	pP	e 18·7
Inawasiro		43·8	353	7 52	− 6	14 18	− 3	—	—	—
Christchurch		43·9	152	i 7 57	− 2	14 21	− 1	i 8 28	pP	e 21·2
Hukusima		43·9	353	7 57	− 2	14 21	− 1	—	—	—
Zi-ka-wei	Z.	44·1	329	7 52	− 8	—	—	—	—	—
Sendai		44·3	354	8 7	+ 5	14 22	− 6	—	—	—
Sakata		45·1	353	8 0	− 8	14 10	−29	—	—	—
Mizusawa	N.	45·2	355	e 8 7	− 2	e 14 38	− 3	—	—	—
Miyako		45·6	356	8 9	− 3	14 42	− 5	—	—	—
Nanking		46·1	327	8 14k	− 2	i 14 52	− 2	—	—	—
Vladivostok		50·7	347	i 8 50	− 2	i 15 58	0	i 9 20	pP	—
Terre Adélie		60·8	182	i 10 2	− 2	i 18 11	− 1	i 10 36	pP	—
Honolulu		61·0	62	e 10 4	− 2	e 18 13	− 2	—	—	—
Klyuchi		63·2	10	i 10 22	+ 2	i 18 47	+ 5	—	—	—
Calcutta	E.	63·5	298	e 10 42	+20	i 18 52	+ 6	—	—	—
Mitchell Field		65·7	24	e 10 36	0	—	—	i 11 8	pP	—
Chatra		66·0	302	e 10 36	− 2	e 19 15	− 2	—	—	—
Kabansk		67·1	334	10 44	− 1	19 31	+ 1	—	—	—
Colombo	E.	67·7	280	10 51	+ 2	20 4	+27	—	—	28·2
Irkutsk		68·2	334	10 51	− 1	19 43	0	11 24	pP	—
Hyderabad	N.	71·1	291	e 11 15	+ 5	i 20 18	+ 1	—	—	33·0
New Delhi		74·9	302	e 11 30	− 2	e 20 55	− 5	21 42	PS	—
Poona		75·6	291	i 11 35	− 1	i 21 7	− 1	12 8	pP	—
Bombay		76·6	291	i 11 42	0	i 21 19	+ 1	22 11	PS	—
Przhevalsk		78·2	316	i 11 54	+ 4	—	—	—	—	—
Kurmenty		78·5	317	i 11 50	− 2	—	—	—	—	—
Almata		79·5	316	i 11 58	0	i 21 48	− 2	e 12 33	pP	—
Ili		79·6	317	i 11 55	− 3	i 21 46	− 5	i 12 28	pP	—
Naryn		79·6	314	e 11 58	0	i 21 50	− 1	—	—	—
Rybach'e		79·8	315	e 11 57	− 2	i 21 50	− 3	e 12 29	pP	—
Frunse		81·0	315	i 12 5	− 1	i 22 6	+ 1	e 15 19	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Khorog		81·8	308	e 12 10	0	22 12	− 1	—	—	—
Andijan		82·0	312	e 12 10	− 1	22 15	0	12 43	pP	—
Fergana		82·3	312	e 12 9	− 3	e 22 12	− 6	e 12 46	pP	—
Dzhergetal		82·5	311	e 12 17	+ 4	—	—	—	—	—
Obi-garm		83·5	310	i 12 16	− 2	i 22 28	− 2	12 51	pP	—
Stalinabad		84·2	310	i 12 19	− 3	i 22 34	− 3	12 52	pP	—
Tashkent		84·4	313	i 12 22	− 1	i 22 36	− 3	e 12 55	pP	—
College		85·3	23	12 24	− 3	22 40	[0]	—	—	—
Samarkand		85·8	310	i 12 29	− 1	22 48	− 5	15 53	PP	—
Ashkabad		92·2	308	e 13 9	+ 9	—	—	16 45	PP	—
Sverdlovsk		92·7	327	i 13 0	− 2	23 23	[− 2]	i 13 32	pP	—
Arcata		93·4	49	e 13 24a	+18	e 23 46	SKKS	e 17 8	PP	—
Kizyl-Arvat		93·9	309	e 13 13	+ 5	i 23 32	[0]	i 16 58	PP	—
Victoria		94·5	42	—	—	e 23 25	[−10]	e 24 2	S	—
Berkeley		94·6	53	e 13 13a	+ 2	i 23 37	[+ 1]	i 13 52	pP	e 43·3
Branner	z.	94·6	53	e 13 13a	+ 2	—	—	e 17 0	PP	—
Shasta Dam		94·7	49	i 13 40	pP	—	—	—	—	—
Santa Clara		94·8	53	e 17 3	PP	—	—	e 20 26?	pPPP	—
Seattle		95·2	43	e 13 17a?	+ 3	e 23 38	[− 1]	e 24 38	SKKS	e 45·7
Fresno		96·5	53	e 13 21a	+ 1	e 23 46	[0]	e 14 16	sP	—
Pasadena		97·7	56	i 13 28	+ 3	i 23 54	[+ 2]	e 13 53	pP	e 40·6
Tinemaha	z.	97·8	54	e 13 26	0	—	—	i 14 14	sP	—
China Lake		98·3	54	i 13 30	+ 2	i 23 58	[+ 2]	i 14 5	pP	—
Riverside		98·4	56	i 13 30	+ 2	e 23 56	[− 1]	e 13 58	pP	—
Palomar		98·8	57	e 13 32	+ 2	i 24 1	[+ 2]	e 14 11	sP	—
Shemakla		99·8	310	i 17 42	PP	i 26 38	PS	—	—	—
Boulder City		100·5	54	e 13 39	+ 1	e 24 11	[+ 5]	e 18 7	PP	—
Hungry Horse		100·8	42	i 13 40	+ 1	—	—	e 16 13	PP	—
Kirovobad		101·6	310	e 17 40	PP	24 7	[− 5]	—	—	—
Resolute Bay		103·1	14	e 13 45	− 4	e 24 16	[− 2]	i 14 40	sP	e 43·7
Gori		103·2	311	e 14 5?	+15	e 24 22?	[+ 3]	—	—	—
Tucson		103·9	58	e 13 56	+ 3	e 25 12	−18	17 59	PP	—
Zugdidi		104·8	312	e 18 18	PP	e 24 31?	[+ 4]	—	—	—
Saskatoon		105·1	37	—	—	e 24 26	[− 2]	e 25 19	S	—
Moscow		105·5	326	e 18 14	PP	—	—	—	—	—
Sotchi		106·3	314	e 18 28	PP	—	—	—	—	—
Pulkovo		108·2	331	18 43	PP	e 25 30	SKKS	e 19 21	pPP	—
Yalta		110·1	315	e 19 9	PP	e 28 47	PS	—	—	—
Ksara		110·4	303	i 19 4	PP	—	—	21 20	PPP	—
Helsinki	N.	110·5	333	—	—	e 34 15	SS	—	—	e 52·7
Pretoria	Z.	112·4	240	i 18 59	PP	—	—	—	—	—
Upsala		113·9	335	e 19 34	PP	e 25 58	SKKS	e 21 56	PPP	e 51·7
Istanbul		114·5	313	e 18 57	[+28]	e 25 32	[+25]	e 20 5	PP	e 53·7
Helwan	Z.	114·8	300	e 19 25	PP	e 29 5	PS	e 21 52	PPP	—
Tacubaya		114·9	71	e 20 45	?	e 25 30	[+22]	e 26 24	SKKS	—
Lwow		115·1	323	e 19 30	PP	e 28 44	PS	—	—	—
Scoresby Sund		115·2	356	e 19 20	PP	27 2	SKKS	22 38	PPP	—
Bucharest		115·7	317	e 19 10	PP	e 25 3	[− 8]	e 29 10	S	—
Uzhgorod		116·6	321	e 19 50	PP	—	—	—	—	—
Skalnate Pleso		117·7	323	—	—	e 25 34	[+15]	e 29 4	PS	—
Copenhagen		118·5	333	19 58	PP	35 58	SS	—	—	55·7
Belgrade		119·3	318	e 20 11a	PP	—	—	e 22 27	PPP	e 61·6
Ogyalla	E.	119·5	323	e 22 43	PPP	e 27 27	SKKS	e 29 46	PS	—
St. Louis		119·5	49	e 19 4	[+25]	e 25 15	[−10]	e 19 53	PP	—
Potsdam		120·1	330	e 20 0	PP	i 29 53	PS	i 20 42	pPP	e 53·7
Prague		120·6	326	e 20 11	PP	e 30 8	PS	e 20 47	pPP	e 51·7
Jena	E.	121·7	327	e 19 24	[+41]	e 26 57	SKKS	e 20 23	PP	—
Triest		123·2	322	e 21 50	?	e 25 56	[+19]	e 26 57	sSKS	—
Aberdeen		123·3	340	i 21 9	pPP	i 30 15	PS	i 37 11	SS	e 56·3
De Bilt		124·1	333	e 20 35	PP	e 30 40	PS	e 21 9	pPP	e 59·7

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Stuttgart		124·2	327	e 18 46	[− 1]	e 28 28	S	e 19 30	pPKP		e 55·7
Karlsruhe		124·4	328	e 19 22	pPKP	—	—	e 21 3	pPP		—
Cleveland		124·6	43	e 18 51 s	[+ 3]	e 25 40	[− 1]	e 19 22	pPKP		—
Strasbourg		125·0	328	e 18 50	[+ 1]	e 30 28	PS	e 19 30	pPKP		54·7
Messina	Z.	125·3	313	e 20 25	PP	e 26 13	[+30]	—	—		—
Zürich		125·3	326	e 18 37	[−13]	—	—	e 19 28	sPKP		—
Rome		125·8	318	e 20 2	?	e 27 29	SKKS	e 21 7	PP		e 60·0
Pavia		126·2	324	—	—	e 27 58	SKKS	e 29 56	S		e 61·4
Ottawa		126·3	36	18 52	[+ 1]	25 44	[− 2]	20 48	PP		—
Morgantown		126·5	45	i 18 52	[0]	—	—	i 19 26	pPKP		—
Besançon		126·8	327	e 18 52	[0]	e 20 51	PP	e 19 26	pPKP		—
Kew		127·0	335	e 20 41	PP	e 31 29	PS	e 32 31	PPS		e 49·7
Shawinigan Falls	S.	127·3	32	e 19 12	[+19]	—	—	—	—		—
Pennsylvania		127·4	42	i 18 53	[− 1]	i 21 58	SKP	i 21 31	PP		—
Paris		127·6	331	i 18 55	[+ 1]	e 27 42	SKKS	i 19 37	pPKP		e 58·7
Rathfarnham Castle		127·9	340	e 18 55?	[0]	e 31 10	PS	e 19 4	PKP_2		e 49·7
Seven Falls	E.	128·0	31	e 21 38	PKS	e 37 46	SS	—	—		—
Clermont-Ferrand		129·3	327	i 18 54	[− 3]	—	—	i 21 5	PP		e 62·7
Swan Island		129·5	72	e 22 16	PKS	—	—	i 23 40	PPP		—
Palisades		129·9	39	e 19 0	[+ 2]	e 22 11	PKS	e 21 11	PP		e 60·3
Harvard		130·5	36	i 19 1	[+ 1]	i 21 58	PKS	i 21 15	PP		e 62·4
Weston		130·7	36	i 19 1	[+ 1]	i 22 14	PKS	i 21 17	PP		—
La Plata		133·3	153	—	—	(22 28)	PKS	—	—		22·5
Halifax		133·4	29	e 21 30	PP	—	—	—	—		—
Tortosa		133·9	324	—	—	i 22 41	PKS	—	—		e 62·7
Algiers Univ.	Z.	134·7	317	e 19 6	[− 1]	e 31 15	PS	e 19 51	pPKP		—
Huancayo		134·7	114	e 18 59	[− 8]	e 32 48	PS	e 20 9	pPKP		e 55·7
Alicante		136·0	322	19 24	[+14]	25 59	[−10]	21 57	PP		e 64·7
Toledo		137·1	326	e 19 56	pPKP	e 33 5	PS	e 22 0	PP		61·5
Guantanamo Bay		137·4	67	i 22 30	PKS	—	—	—	—		—
Chinchina		138·1	89	i 19 27	[+13]	e 22 38	PKS	e 19 46	pPKP		—
Almeria		138·2	322	i 19 14	[0]	26 26	[+13]	22 8	PP		68·5
Galerazamba		138·4	81	i 23 3	PKS	i 29 51	SKKS	—	—		—
Granada		138·7	323	19 18k	[+ 3]	29 15	SKKS	22 27	PP		i 69·4
Tamanrasset	Z.	138·9	298	i 19 11	[− 4]	26 0	[−14]	e 19 50	pPKP		—
La Paz		139·1	124	i 19 18	[+ 3]	i 26 0	[−14]	i 19 51	pPKP		—
Malaga		139·5	323	i 19 19	[+ 3]	i 22 13	PP	25 17	PPP		68·9
Bogota		139·6	90	e 19 14	[− 2]	i 28 59	SKKS	e 22 35	PKS		—
Roosevelt Roads		146·4	65	i 18 43	[−45]	—	—	—	—		—
Fort de France		151·5	71	e 19 38	[+ 2]	e 30 0	SKKS	—	—		—

Additional readings :—
Brisbane iNZ = 4m.52s., iN = 5m.9s., iPPN = 5m.33s., isPN = 5m.48s., isSE = 9m.18s., iSSEN = 9m.48s.
Riverview iNZ = 6m.38s., iPPN = 6m.43s., iPPPN = 6m.57s., iPcPZ = 9m.1s., iN = 10m.37s., isSN = 11m.22s., iSSN = 11m.56s., and many i readings in the coda.
Perth SSS = 15m.42s.
Djakarta iSSEN = 15m.41s.
Auckland eN = 8m.35s., PPPN = 9m.34s., eN = 12m.30s., isS?N = 14m.13s., eSSSN = 16m.40s., QN = 17m.20s.
Osaka sS = 14m.35s., ScS = 17m.6s.
Kobe PPP = 10m.19s.
Tokyo ScS = 16m.44s.
Cobb River eE = 8m.2s., iE = 8m.28s.
Matusiro pPP = 9m.43s., sPP = 10m.16s., PPP = 10m.44s., ScP = 12m.52s., sS = 14m.57s., SS = 17m.16s.
Wellington iP?Z = 7m.55s., iPPPZ = 10m.8s., eSS = 17m.30s., iSSS? = 18m.28s., and other unidentified readings.
Christchurch iZ = 8m.40s., eZ = 10m.10s., i = 14m.56s , eSSEN = 17m 35s.
Terre Adélie iPP = 12m.17s., eScP = 14m.25s., isS = 19m.0s., eSS = 22m.5s., iSSS = 24m.46s.
Irkutsk sS = 20m.39s.
Poona sPE = 12m.19s., SSE = 22m.4s.
Obi-garm PP = 15m.23s., PPP = 17m.19s.
Stalinabad sS = 23m.26s.
Tashkent ePP = 15m.42s., esS = 23m.26s., eSS = 27m.41s.
Samarkand PPP = 17m.45s., sS = 23m.45s.
Sverdlovsk PP = 16m.44s., iPS = 25m.18s.

Continued on next page.

Berkeley iZ = 13m.28s., iPPZ = 17m.2s., eSEN = 24m.34s., iN = 25m.21s., eSSE = 30m.46s.
Seattle e = 13m.47s., 14m.27s., 17m.54s., 18m.59s., and 25m.58s., ePS = 26m.32s., ePPS = 27m.10s., eSS = 32m.8s.
Pasadena isP?Z = 14m.7s., iPPZ = 17m.28s., eE = 24m.51s., iE = 26m.45s.
Riverside isP?Z = 14m.9s.
Palomar iE = 25m.0s.
Resolute Bay ePPZ = 18m.6s., e = 18m.47s., eEN = 25m.6s., 27m.44s., and 32m.44s.
Saskatoon e = 26m.29s. and 28m.6s.
Pulkovo ePS = 28m.4s.
Upsala eE = 20m.29s., ePSE = 28m.52s., eN = 29m.24s. and 34m.40s.?, eE = 35m.42s.?, eSSSE = 39m.13s., eN = 43m.1s.
Istanbul eSKKSN = 26m.58s., eE = 28m.19s., ePSE = 29m.13s., eSSE = 35m.2s.
Helwan iZ = 19m.31s., eZ = 23m.13s., eN = 27m.0s.
Tacubaya e = 31m.10s.
Scoresby Sund e = 20m.2s., 23m.52s., and 32m.4s.
Bucharest eE = 19m.42s., eN = 19m.47s., eE = 20m.17s., eN = 27m.13s.
Skalnate Pleso e = 30m.40s.?
Belgrade eZ = 20m.33s.
Ogyalla eN = 23m.10s., eE = 24m.7s., e = 28m.57s., eN = 32m.21s., eE = 34m.5s., e = 35m.26s., eSS = 37m.17s., eSSS? = 39m.55s.
St. Louis e = 27m.36s., ePS? = 30m.24s., eSS? = 36m.42s.
Potsdam ipPPE = 20m.46s.?
Prague esPP = 21m.4s., esPPZ = 21m.10s., ePPP = 22m.56s., epPS = 30m.46s., esPSE = 31m.13s., ePPS = 31m.25s., eSS = 36m.7s., esSS = 37m.25s., eSSS = 40m.52s. and other unidentified e readings.
Jena ePP?E = 21m.10s., eE = 22m.58s.
Triest ePSKS = 30m.14s.
Aberdeen iE = 22m.20s.
De Bilt epPPP = 23m.47s., eSS = 37m.23s.
Stuttgart eZ = 19m.19s., ePP = 20m.35s., e = 21m.3s. and 22m.24s., ePPP? = 23m.50s., ePSKS = 30m.16s., esPPS? = 33m.10s., e = 35m.52s., eZ = 36m.24s., eSS = 36m.58s., esSSS? = 43m.10s.
Cleveland iPP = 20m.37s., esSKSE = 26m.36s., eSPN = 30m.35s., eEN = 31m.13s., ePPSE = 32m.2s., epPPSEN = 32m.42s., eSSN = 37m.52s.
Strasbourg ePP = 20m.40s., epPP = 21m.13s., ePPP = 23m.34s.?, eSPP = 31m.58s., ePPS = 32m.7s., e = 36m.20s., eSS = 37m.6s. and 37m.30s., eSSS = 42m.10s., e = 51m.6s.
Zürich e = 20m.34s.
Rome ePS?E = 30m.25s., eSS?E = 37m.37s.
Pavia eSS? = 37m.27s., eSSS? = 43m.38s., e = 45m.19s.
Ottawa e = 19m.21s., 21m.30s., 22m.50s., and 28m.22s., PS = 30m.45s., PPS = 32m.41s.?, SS = 37m.10s., e = 42m.10s. and 46m.22s.
Besançon epPP = 21m.26s.
Kew ePP = 21m.42s., eSSS? = 47m.49s.
Pennsylvania iZ = 20m.51s., eSSN = 38m.30s.
Paris iPP = 20m.56s., iSKP = 22m.1s., isPKS = 22m.55s., ePPP = 23m.39s., iS = 28m.31s., eSP = 30m.53s., eSPP = 32m.31s., eSS = 37m.44s. and 37m.56s., eSSP? = 38m.7s., eSSS? = 43m.10s. and many unidentified readings.
Clermont-Ferrand i = 20m.33s.
Palisades e = 19m.32s. and 22m.58s., ePS = 31m.10s., e = 33m.42s., eSS? = 38m.42s.
Harvard ipPP = 22m.14s., ipSKP = 23m.5s., ePPP = 24m.24s.
Algiers Univ. eZ = 20m.54s., ePPZ = 21m.39s., epPPZ = 22m.16s., eZ = 23m.13s.
Huancayo ePKP = 19m.14s., ePP? = 22m.30s., e = 23m.32s. and 40m.38s.
Alicante PPP = 24m.52s., PPS = 33m.56s., SS = 39m.38s., SSP = 40m.32s., SSS = 44m.50s., Q = 55m.38s.
Toledo e = 23m.44s. and 40m.2s.
Chinchina eSKKS = 28m.47s.
Almeria PPP = 25m.8s., SS = 40m.10s.
Granada pPP = 22m.47s., PPP = 25m.54s., SKSP = 32m.9s., PPS = 34m.33s., SS = 40m.1s.
Tamanrasset ePPZ = 21m.53s., eZ = 27m.49s. and 31m.28s.
La Paz iPP = 22m.8s., ipPP = 22m.45s., iSKKS = 28m.57s., PPS = 34m.48s.
Bogota e = 20m.13s., iPSKSEN = 32m.6s.
Long waves were also recorded at Ivigtut.

July 16d. Readings also at 0h. (Jena, near Almata II, Ili, and Kurmenty), 1h. (near Rybach'e), 2h. (Tacubaya), 5h. (near Apia and near Dzhergetal), 6h. (Terre Adélie), 7h. (near Manila), 8h. (Apia, Tacubaya, Mount Wilson, Palomar (2), China Lake, Resolute Bay, and near Kurmenty), 9h. (Harvard, Weston, and near Santa Lucia), 10h. (near Reykjavik), 11h. (near Reykjavik (2) and near Copiapo), 12h. (3) and 15h. (near Apia), 16h. (Harvard, near Chilisk, Dzhergetal (2), Ili, and Kurmenty), 17h. (Apia and near Kurmenty), 18h. (New Delhi, Ashkabad, Frunse, Naryn, Rybach'e, near Andijan, Dzhergetal, Fergana, Khorog, Obi-garm, Stalinabad, and Tashkent), 19h. (Khorog, Obi-garm, near Andijan, Dzhergetal, Fergana, Frunse, Samarkand, Stalinabad, and Tashkent), 20h. (Apia, Naryn, and near Kurmenty), 21h. (Apia).

July 17d. 7h. 23m. 20s. Epicentre 14°·0S. 173°·0W.

Intensity I-II at Apia. Epicentre 14°S. 173°W. (U.S.C.G.S.).
Seismic bulletin for the 3rd quarter of 1951, Apia, p. 3.

A = −·9635, B = −·1183, C = −·2404; δ = +12; h = +6;
D = −·122, E = +·992; G = +·239, H = +·029, K = −·971.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		1·2	80	i 0 23	− 1	i 0 47	+ 6	—	—	—
Auckland	N.	25·2	203	—	—	9 32	−20	—	—	—
Christchurch		31·9	200	—	—	e 14 38	?	e 16 10	Q	e 18·3
Berkeley		70·2	41	e 11 21	+ 4	e 20 35	+ 7	e 12 1	?	e 29·4
Lick	Z.	70·2	41	i 11 19a	+ 2	—	—	e 11 37	PcP	—
Pasadena		70·8	46	e 11 20	0	—	—	—	—	e 32·9
Fresno	Z.	71·1	43	e 11 24	+ 2	—	—	e 13 2	?	—
Riverside	Z.	71·2	46	e 11 23	0	—	—	—	—	—
Palomar	Z.	71·3	47	e 11 23	0	—	—	—	—	—
China Lake	Z.	72·1	45	e 11 29	+ 1	—	—	—	—	—
Boulder City		74·1	46	e 11 40	0	—	—	—	—	—
Tucson		75·1	56	e 11 46	0	—	—	—	—	—
College		80·9	11	12 17	0	—	—	—	—	—
Hungry Horse		81·1	36	i 12 19	+ 1	—	—	—	—	—
St. Louis		93·1	51	e 13 15	− 2	e 23 53	[+ 2]	e 24 29	S	—
Huancayo		94·4	104	e 13 23	0	—	—	—	—	—
La Paz		99·8	110	e 20 16	PPP	—	—	i 21 8	?	—
Prague		143·5	352	e 19 36	[− 1]	—	—	e 22 50	PP	—
Ogyalla		145·0	347	e 21 17	?	e 23 59	?	e 22 29	PP	—
Karlsruhe	Z.	145·1	358	e 19 40	[+ 1]	—	—	e 19 52	PKP_2	—
Paris		145·1	5	e 19 39	[0]	e 19 47	PKP_2	e 20 15	?	e 78·7
Stuttgart		145·3	357	e 19 39	[− 1]	e 19 52	PKP_2	e 20 13	?	e 91·7
Strasbourg		145·5	359	e 19 40	[0]	—	—	e 19 48	PKP_2	—
Besançon		146·8	1	e 19 44	[+ 2]	e 19 53	PKP_2	e 20 59	?	—
Ksara		147·2	313	e 19 48?	[+ 5]	—	—	23 16	PP	—
Malaga		155·2	22	i 20 23	PKP_2	—	—	(39 35)	P′P′	39·6
Tamanrasset	Z.	171·1	—	e 21 31	PKP_2	—	—	—	—	—

Additional readings :—
St. Louis e = 26m.43s.
Prague e = 19m.52s., 20m.47s., 21m.31s., 22m.20s., and 26m.15s.
Long waves were also recorded at Wellington, Harvard, Palisades, Potsdam, Alicante, Almeria, and Granada.

July 17d. 14h. 48m. 43s. Epicentre 14°·0S. 167°·0E. Depth of focus 0·010.
(as on 1949, November 18d.).

A = −·9458, B = +·2184, C = −·2404; δ = +3; h = +6;
D = +·229, E = +·974; G = +·234, H = −·054, K = −·971.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		18·7	222	i 4 13k	0	i 7 39	+ 4	i 5 0	sP	—
Apia		20·6	92	i 4 32	− 1	e 8 12	− 1	—	—	—
Auckland	N.	23·8	166	i 5 1	− 4	i 9 8	− 2	5 32	pP	—
Karapiro	N.	24·0	166	5 17?	+11	10 17?	88	—	—	—
Riverview		24·4	214	i 5 8k	− 2	i 9 16	− 4	i 5 44	pP	—
Wellington		28·0	168	—	—	i 9 58	−21	—	—	—
Kaimata	N.E.	28·7	174	e 1 17?	?	—	—	—	—	—
Guam		34·4	319	9 15	PcP	—	—	—	—	—
Bandong		58·7	271	e 9 52	+ 2	e 17 45	0	—	—	—
Djakarta		59·6	271	i 9 57	+ 1	e 18 2	+ 5	—	—	—
Nanking		65·0	315	e 10 37	+ 5	i 19 13	+ 9	i 11 12	pP	—
Berkeley	Z.	83·9	49	e 12 21a	+ 1	i 13 25	sP	i 13 0	pP	—
Lick	Z.	84·1	49	i 12 23a	+ 2	e 15 37	PP	i 12 59	pP	—
Pasadena		85·6	53	i 12 29a	0	e 22 23	−28	i 13 7	pP	—
College		85·7	18	12 30	+ 1	—	—	13 10	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside	Z.	86·2	54	i 12 32 a	0	e 14 17	?	i 13 10	pP	—
Palomar		86·4	55	i 12 34 a	! 1	i 15 57	PP'	i 13 12	pP	—
China Lake	Z.	86·6	52	i 12 35 a	+ 1	e 16 0	PP'	i 13 11	pP	—
Tinemaha	Z.	86·6	51	i 12 35	+ 1	—	—	i 13 13	pP	—
Seattle		87·7	41	e 12 42 a	+ 3	e 23 20?	+ 9	e 13 19	pP	—
Boulder City		88·8	53	i 12 45	+ 1	—	—	—	—	—
Tucson		90·9	57	e 12 55	+ 1	—	—	e 13 33	pP	—
Hungry Horse		93·2	41	i 13 6	+ 1	—	—	i 13 47	pP	—
Resolute Bay	Z.	105·5	15	e 29 50	PKKP	—	—	—	—	—
St. Louis		108·5	54	e 19 15	PP	e 26 15	S	e 28 14	PS	—
Ottawa		119·0	45	18 37	[− 1]	e 25 19	[− 4]	—	—	—
Kiruna		122·2	346	i 18 41	[− 3]	e 32 15	PPS	i 19 22	pPKP	—
Ksara		131·7	303	i 22 5	pPP	i 22 21	SKP	e 33 10	SPP	—
Istanbul	Z.	134·6	316	e 19 7	[− 1]	—	—	e 21 46	PP	—
Potsdam	Z.	136·4	338	e 19 15	[+ 4]	—	—	e 22 0	PP	—
Prague		137·6	335	e 19 17	[+ 4]	e 22 5	PP	e 25 33	PPP	—
Jena		138·1	337	e 19 10	[− 4]	e 23 6	PKS	e 22 5	PP	—
Stuttgart	Z.	140·8	337	e 19 16	[− 3]	e 22 25	PP	e 20 2	pPKP	—
Karlsruhe	Z.	140·9	339	e 19 11	[− 8]	—	—	—	—	—
Triest		141·2	331	—	—	e 37 48	?	e 38 4	?	—
Zürich		142·1	336	e 19 15	[− 6]	e 20 21	sPKP	e 19 59	pPKP	—
Basle		142·4	338	e 19 21	[− 1]	—	—	e 20 12	sPKP	—
Paris		143·0	344	i 19 23	[0]	e 20 17	sPKP	i 20 4	pPKP	e 74·3
Neuchatel		143·1	337	e 19 24	[+ 1]	—	—	—	—	—
Besançon		143·2	338	i 19 23	[0]	—	—	e 19 47	pPKP	—
Bologna		143·2	331	e 19 25 a	[+ 2]	—	—	e 19 50	pPKP	—
Salo		143·4	333	e 19 25	[+ 2]	e 19 59	sPKP	e 19 53	pPKP	—
Pavia		143·7	334	i 19 26	[+ 2]	—	—	e 20 3	pPKP	—
Prato		143·8	330	i 19 25	[+ 1]	—	—	—	—	—
Messina	Z.	145·1	319	i 19 35	[+ 9]	—	—	e 18 59?	?	—
Rocca di Papa		145·1	324	e 19 28	[+ 2]	—	—	e 20 28	?	—
Rome	E.	145·1	324	e 19 29	[+ 3]	—	—	—	—	—
Clermont-Ferrand		145·6	340	i 19 31	[+ 4]	i 20 29	sPKP	i 20 14	pPKP	—
Malaga		156·1	344	i 19 50	[+ 7]	—	—	—	—	90·7
Tamanrasset	Z.	160·3	300	e 19 49	[+ 1]	e 24 8	PP	e 20 30	pPKP	—

Additional readings :—
Brisbane iZ = 12m.0s.
Auckland iN = 5m.50s., eSN = 9m.1s., sS?N = 9m.55s., iScSN = 15m.58s.
Riverview iPPZ = 5m.51s., iEN = 5m.59s., iPPPZ = 6m.3s., iZ = 10m.10s., isSN = 10m.15s., iE = 10m.18s., iSSN = 10m.28s., iScS?E = 16m.3s.
Nanking iEN = 20m.16s.
Pasadena eZ = 13m.32s., iZ = 14m.13s., iEZ = 15m.51s.
Palomar eZ = 16m.30s.
Seattle i = 13m.4s., 13m.10s., and 13m.53s., ePP = 16m.25s., e = 16m.38s., eSP = 24m.22s., ePS = 24m.35s., e = 25m.27s.
St. Louis e = 24m.36s. and 25m.33s.
Kiruna eN = 28m.9s. and 29m.6s., eE = 36m.17s.?
Ksara i = 23m.30s.
Prague e = 20m.27s. and 21m.39s., epPP?E = 22m.38s., e = 23m.46s. and 25m.55s.
Jena eEZ = 19m.17s., eZ = 19m.44s., eE = 19m.50s., eZ = 20m.24s. and 22m.40s., eE = 22m.44s., eZ = 22m.52s.
Stuttgart ePKPZ = 19m.24s.
Paris i = 19m.29s., 20m.25s., 20m.33s., 20m.47s., and 20m.54s., iPP = 22m.20s., epPP = 22m.56s.
Bologna e = 19m.34s.
Pavia e = 19m.30s. and 20m.7s.
Messina eZ = 20m.59s.
Rome eN = 19m.42s., iN = 20m.10s.
Clermont-Ferrand i = 19m.41s. and 20m.35s.
Long waves were also recorded at Kew.

July 17d. Readings also at 0h. (near Dzhergetal), 4h. (Huancayo), 6h. (Besançon, near Tortosa, and near Istanbul), 7h. (Pasadena, Palomar, China Lake, Hungry Horse, Tucson, San Juan, Bogota, Chinchina, and near Apia (3)), 8h. (Apia (3)), 9h. (La Paz (2), Bogota (2), Chinchina (2), Huancayo (2), San Juan, Tucson, Boulder City, Hungry Horse, Pasadena, Riverside, Palomar, China Lake (2), Lick, College, St. Louis, Ottawa, Kiruna, Bucharest, near Istanbul, Sofia, near Shemakha, and near Athens ; several shocks), 10h. (near Apia and near Seattle), 11h. (Tacubaya, near Apia (3), and near Ashkabad), 12h. (Manila, near Apia (2), and near Ponta Delgada), 13h. (Ottawa, Apia, near Manila, and near Athens), 14h. (Apia), 15h. (Resolute Bay), 16h. (Seattle, near Concepción, and near Alicante), 19h. (Lick, Pasadena, Riverside, Palomar, China Lake, Tinemaha, Guadalajara, near Puebla, Tacubaya, and Vera Cruz), 20h. (Seattle), 21h. (near Neuchatel, Zürich, Basle, Besançon, Strasbourg, Stuttgart, and Paris), 22h. (near Obi-garm), 23h. (Besançon).

July 18d. 9h. 6m. 13s. Epicentre 0°·5N. 26°·5W. (as on 1951, March 5d.).

$A = +\cdot8949$, $B = -\cdot4462$, $C = +\cdot0087$; $\delta = +2$; $h = +7$;
$D = -\cdot446$, $E = -\cdot895$; $G = +\cdot008$, $H = -\cdot004$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
M'Bour		16·7	34	i 3 53	− 4	i 7 2	− 1	e 4 4	PP	i 9·4
Lome		28·2	76	i 6 2	+ 6	i 10 50	+ 9	i 6 56	PP	i 13·8
Fort de France		37·1	294	i 7 10	− 4	i 12 59	− 2	7 52	PP	e 19·1
Angra do Heroismo		38·0	359	e 7 25	+ 4	i 13 19	+ 5	—	—	16·3
Tamanrasset	z.	38·2	52	i 7 24k	+ 1	e 12 55	−22	i 8 42	PP	17·8
Lisbon		41·2	21	i 7 49a	+ 1	e 14 8	+ 6	7 57	pP	19·1
Malaga		41·4	27	i 7 52	+ 2	i 14 10	+ 5	i 9 28	PcP	20·4
Granada		42·2	27	i 7 58k	+ 2	i 14 21	+ 4	8 16	pP	i 21·3
Almeria		42·5	29	i 7 59	0	i 14 29	+ 7	i 9 47?	PP	i 21·6
San Juan		42·8	298	i 7 58	− 3	i 14 7	−19	9 39	PP	—
Toledo		44·2	26	i 8 14	+ 2	i 14 51	+ 5	9 59	PP	19·8
La Paz		44·4	246	i 8 14a	0	i 14 49	0	i 10 17	PP	22·0
Alicante		44·6	29	8 17	+ 1	i 14 56	+ 4	8 24	pP	e 21·4
Algiers Univ.	z.	45·3	34	i 8 22a	+ 1	e 14 46	−16	e 10 4	PP	e 18·7
La Plata		45·9	217	8 25	− 1	14 59	−12	10 11	PP	22·1
Buenos Aires		46·0	218	i 8 29	+ 2	15 14	+ 2	10 15	PP	—
Ciudad Trujillo		46·2	296	i 8 40	+12	i 15 23	+ 8	—	—	—
Tortosa		47·0	29	i 8 35	0	i 15 26	0	—	—	—
Bogota		47·7	277	i 8 41	+ 1	i 15 39	+ 3	i 10 33	PP	24·8
Barcelona		48·3	29	8 45	0	i 15 49	+ 4	10 31	PP	e 22·5
Antofagasta	E.	48·9	238	e 8 42	− 8	e 15 54	+ 1	—	—	e 26·4
Chinchina		49·2	278	i 8 45	− 7	i 15 43	−15	i 19 21	SS	22·8
Tunis		49·5	40	e 8 55	+ 1	e 16 1	− 1	i 11 33	PPP	e 24·8
Huancayo		50·1	254	i 8 58	− 1	i 16 7	− 3	e 10 52	PP	e 21·1
Copiapo	N.	50·4	234	8 59	− 2	e 16 19	+ 5	e 10 57	PP	25·7
Clermont-Ferrand		52·1	26	e 9 14	0	e 16 47	+ 9	i 11 22	PP	e 24·3
Jersey	E.	52·8	20	e 9 20	+ 1	e 16 50	+ 3	e 11 47	PP	22·9
Balboa Heights		53·5	282	i 9 22	− 2	i 16 55	− 2	—	—	—
Santa Lucia	N.	53·5	227	e 9 21	− 3	16 50	− 7	11 21	PP	24·8
Messina		53·8	41	i 9 28a	+ 2	e 16 58	− 3	i 11 26	PP	e 28·7
Rome		54·1	36	i 9 30a	+ 1	i 17 9	+ 4	i 11 35	PP	—
Rocca di Papa		54·2	37	9 31	+ 2	i 17 15	+ 9	11 36	PP	—
Paris		54·2	23	i 9 30	+ 1	i 17 8	+ 2	i 9 47	pP	i 22·0
Besançon		54·5	27	e 9 29	− 3	e 11 33	PP	i 10 3	pP	—
Pavia		54·5	30	i 9 33a	+ 1	e 17 19	+ 9	e 11 45	PP	—
Florence		54·6	33	i 9 32a	0	i 17 17	+ 6	11 45	PP	—
Prato		54·6	33	i 9 33	+ 1	i 17 23	+12	—	—	—
Neuchatel		54·7	28	i 9 33	0	e 17 18	+ 5	—	—	—
Halifax		54·9	329	9 31	− 4	17 11	− 5	12 51	PPP	25·5
Bologna		55·2	32	e 9 38a	+ 1	e 17 25	+ 5	e 11 55	PP	—
Rathfarnham Castle		55·2	15	i 9 35a	− 2	i 17 16	− 4	e 11 40	PP	e 24·6
Basle		55·4	28	e 9 39	+ 1	e 17 27	+ 5	e 11 2	PP	—
Kew		55·4	20	i 9 37a	− 1	i 17 27	+ 5	e 11 36	PP	e 23·8
Salo		55·5	31	e 9 39	0	e 17 28	+ 4	e 13 10	PPP	e 26·6
Zürich		55·8	28	e 9 38	− 3	e 17 29	+ 1	e 11 38	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		56·2	40	e 9 44	0	e 17 39	+ 6	—	—	e 31·8
Strasbourg		56·3	27	e 9 44a	− 1	i 17 32	− 2	e 10 15	pP	e 23·8
Karlsruhe		56·9	27	i 9 49	0	i 17 41	− 1	—	—	e 22·8
Concepción	N.	56·9	224	—	—	e 18 0	+18	—	—	e 27·9
Kimberley	Z.	57·0	125	i 9 54	+ 4	—	—	—	—	—
Stuttgart		57·1	28	e 9 47	− 3	e 17 47	+ 2	e 11 48	PP	e 24·8
Triest		57·2	33	i 9 48?	− 3	i 17 48?	+ 2	i 12 1	PP	—
Durham		57·8	17	i 9 56	+ 1	i 17 59	+ 5	i 13 16	PPP	—
De Bilt		57·9	23	i 9 57a	+ 1	i 18 2	+ 7	i 12 10	PP	e 28·8
Weston		57·9	322	i 9 53	− 3	e 17 49	− 6	—	—	—
Harvard		58·1	322	i 9 54	− 4	i 17 55	− 3	i 39 59	P'P'	e 23·8
Edinburgh	E.	58·4	16	e 10 9	+ 9	18 2	0	—	—	—
Fordham		58·7	320	10 1	− 1	17 58	− 8	—	—	—
Palisades		58·8	320	i 9 58k	− 4	e 18 4	− 3	i 10 10	pP	e 26·6
Pretoria	Z.	58·8	120	i 10 7	+ 5	—	—	—	—	—
Sonneberg		59·1	28	e 10 5	+ 1	e 18 9	− 2	e 13 50	PPP	e 25·8
Athens		59·3	45	i 10 7a	+ 1	e 18 4	−10	e 19 57	ScS	—
Cheb		59·5	28	i 10 6	− 1	e 18 10	− 6	e 10 53	PcP	e 25·3
Jena		59·7	28	i 10 8	− 1	i 18 19	0	e 12 16	PP	e 24·8
Aberdeen	E.	59·8	15	e 9 51	−18	—	—	i 12 8	PP	—
Washington		59·9	317	e 10 6	− 4	e 18 16	− 5	—	—	—
Grahamstown	Z.	60·1	129	i 9 46	−25	—	—	—	—	—
Vienna		60·2	32	i 10 13	+ 1	e 18 33	+ 8	e 10 52	PcP	e 30·8
Seven Falls	E.	60·3	328	10 10	− 3	18 28	+ 2	20 13	ScS	28·5
Prague		60·4	29	i 10 14a	+ 1	e 18 28	0	e 10 57	PcP	e 25·8
Belgrade		60·5	37	e 10 15k	+ 1	e 18 33	+ 4	e 13 50	PPP	e 31·3
Kalossa		60·6	34	e 10 17	+ 2	18 37	+ 7	11 4	PcP	e 29·8
Columbia		60·9	310	i 10 11	− 6	i 18 28	− 6	—	—	i 28·4
Ogyalla		61·0	33	e 10 20	+ 2	e 18 40	+ 5	e 10 53	PcP	e 29·0
Shawinigan Falls	N.	61·1	326	10 15	− 3	18 32	− 5	11 5	PcP	—
Budapest		61·2	34	10 20	+ 1	18 45	+ 7	11 7	PcP	28·8
Sofia		61·2	40	i 10 21	+ 2	i 18 45	+ 7	12 37	PP	e 30·8
Pennsylvania		61·3	318	i 10 15	− 5	i 18 35	− 4	e 12 28	PP	—
Potsdam		61·4	27	i 10 20a	0	i 18 43	+ 3	i 11 4	PcP	25·8
Timisoara		61·5	37	e 10 23	+ 2	e 18 37	− 5	e 20 10	ScS	e 32·8
Helwan		62·2	57	i 10 28a	+ 2	18 53	+ 2	14 16	PPP	—
Ottawa		62·2	323	10 22	− 4	18 47	− 4	12 44	PP	—
Raciborzu		62·3	31	e 10 26	0	i 18 27	−25	e 12 51	PP	26·8
Pittsburgh		62·6	317	i 10 35	+ 7	i 18 59	+ 3	—	—	—
Ivigtut		62·8	349	i 10 28	− 2	i 18 55	− 3	i 22 48	SS	i 26·1
Skalnate Pleso		62·9	33	10 29?	− 1	e 19 11?	+11	e 10 59?	PcP	e 26·8
Copenhagen		63·4	24	i 10 34	0	i 19 12	+ 6	12 52	PP	27·8
Reykjavik		63·6	3	i 10 36	+ 1	e 19 12	+ 4	i 12 36	PP	e 26·3
Uzhgorod		63·7	34	i 10 36	0	i 19 18	+ 8	12 58	PP	—
Bucharest		63·8	39	e 10 40	+ 4	i 19 1	−10	i 14 22	PPP	31·8
Cleveland		64·1	317	i 10 37a	− 1	e 19 14	0	—	—	—
Istanbul		64·3	44	e 10 38	− 1	i 19 15	− 2	e 11 15	PcP	e 31·8
Bergen	Z.	64·6	17	i 10 36?	− 5	i 19 28	PS	i 10 44	P	i 29·3
Merida		64·8	293	e 10 54	+11	e 19 17	− 6	—	—	—
Punta Arenas	N.	65·0	208	—	—	e 19 6	−17	—	—	e 26·9
Cincinnati		65·3	314	i 10 43	− 3	i 19 22	− 7	—	—	—
Lwow		65·3	34	10 46	0	e 19 36	+ 7	—	—	—
Kishinev		66·7	37	10 55	0	19 52	+ 6	14 56	PPP	—
Ksara		67·0	54	i 10 59a	+ 2	i 19 59	+ 9	—	—	—
Upsala		68·3	23	i 11 3a	− 2	i 20 7	+ 1	i 11 33	PcP	e 29·8
Yalta		69·1	43	11 10	0	—	—	—	—	—
St. Louis		69·4	312	e 11 6	− 6	i 20 11	− 7	i 11 14	P	—
Florissant		69·5	312	e 11 8	− 4	i 20 13	− 7	i 11 17	P	—
Scoresby Sund		69·9	2	i 11 15a	0	i 20 25	+ 1	i 21 25	ScS	—
Theodosia		70·1	42	e 11 16	0	20 32	+ 5	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vera Cruz		70·6	291	e 11 14	− 5	e 20 28	− 5	—	—	—
Helsinki		71·4	24	e 11 23a	− 1	e 20 44	+ 2	e 25 19	SS	e 28·8
Puebla		72·5	291	e 11 28	− 2	e 20 50	− 4	—	—	—
Sotchi		72·6	45	11 37	+ 6	—	—	e 21 17	ScS	—
Pulkovo		73·5	27	i 11 37	+ 1	i 21 12	+ 6	—	—	—
Tacubaya		73·5	290	e 11 35	− 1	e 20 59	− 7	—	—	—
Zugdidi		73·8	46	e 11 42	+ 4	—	—	—	—	—
Kiruna		74·5	17	i 11 41a	− 1	i 21 20	+ 3	i 14 25	PP	e 34·8
Leninakan		74·9	48	11 47	+ 3	—	—	—	—	—
Piatigorsk		75·1	45	11 49	+ 3	21 35	+11	—	—	—
Tananarive		75·1	110	i 11 57	+11	e 21 43	+19	i 22 33	PS	36·0
Erevan		75·2	49	i 11 51	+ 5	—	—	—	—	—
Gori		75·3	47	11 49	+ 2	—	—	e 12 9	PcP	—
Moscow		75·3	33	i 11 46	− 1	i 21 30	+ 4	—	—	—
Tiflis		75·8	47	e 11 51	+ 1	21 38	+ 7	i 13 54	PP	—
Kirovobad		76·7	49	i 11 57	+ 2	—	—	—	—	—
Grozny		76·8	46	e 12 2	+ 7	—	—	—	—	—
Guadalajara		77·5	292	e 11 52	− 7	e 21 38	−12	e 12 15	PcP	—
Lenkoran		78·3	51	12 4	+ 1	22 58	PPS	17 9	PPP	—
Shemakla		78·4	49	i 12 7	+ 3	—	—	—	—	—
Baku		79·3	49	i 12 15	+ 6	e 22 20	+11	—	—	—
Saskatoon		83·5	322	12 32	+ 1	22 47	− 5	23 31	PS	34·4
Resolute Bay		83·9	346	e 12 34	+ 1	e 22 55	− 1	e 15 14	PP	—
Kizyl-Arvat		84·1	51	i 12 35	+ 1	i 23 4	+ 6	—	—	—
Tucson		84·9	303	e 12 38	0	i 23 7	+ 1	15 51	PP	—
Ashkabad		85·6	53	i 12 46	+ 5	23 22	+ 9	—	—	—
Hungry Horse		88·0	319	e 12 49	− 4	e 23 19	[− 2]	i 12 52	P	—
Sverdlovsk		88·0	34	i 12 57	+ 4	23 25	[+ 4]	i 16 25	PP	—
Boulder City		88·4	306	i 12 54	− 1	—	—	—	—	—
Mary		88·4	53	i 13 0	+ 5	e 33 0	SSS	16 29	PP	—
Palomar	Z.	90·0	303	i 13 4	+ 1	—	—	—	—	—
Riverside	Z.	90·4	304	e 13 4	0	—	—	e 39 2	P'P'	—
China Lake	Z.	90·6	306	e 13 4	− 1	—	—	e 38 51	P'P'	—
Pasadena		91·1	304	i 13 7	− 1	i 24 4	0	i 16 48	PP	e 42·3
Tinemaha	Z.	91·1	307	e 13 12	+ 4	i 25 11	PS	—	—	—
Fresno		92·3	307	e 13 17a	+ 4	e 24 28	ScS	e 16 42	PP	e 44·0
Samarkand		92·4	51	i 13 19	+ 5	24 27	ScS	—	—	—
Seattle		93·6	318	e 13 20a	+ 1	e 23 41	[−12]	i 16 34	PP	e 42·2
Lick	Z.	93·8	308	e 13 24k	+ 4	e 25 45	PS	e 17 3	PP	—
Stalinabad		93·8	52	i 13 23	+ 3	i 24 31	+ 3	i 17 3	PP	—
Lunacharskoe		94·0	49	e 13 28	+ 7	—	—	—	—	—
Tashkent		94·0	49	i 13 26	+ 5	24 7	{− 4}	i 17 14	PP	—
Santa Clara		94·0	308	e 13 25	+ 4	e 24 1	[+ 5]	e 17 26	PP	e 46·9
Berkeley		94·2	308	e 13 23	+ 1	e 23 52	[− 5]	i 25 46	PS	e 44·9
Shasta Dam		94·2	311	i 13 20	− 2	—	—	—	—	—
Victoria		94·2	319	13 22	0	24 33	+ 2	—	—	40·1
Obi-garm		94·5	52	i 13 28	+ 5	i 24 49	+15	—	—	—
Fergana		96·0	50	i 13 33	+ 3	—	—	—	—	—
Khorog		96·1	53	e 13 47?	+16	24 23	{− 3}	17 52	PP	—
Andijan		96·4	50	i 13 35	+ 3	i 26 16	PS	i 17 30	PP	—
Frunse		97·8	47	i 13 41	+ 3	e 24 14	[− 2]	i 17 41	PP	—
Murgab		97·9	51	e 13 40	+ 1	—	—	—	—	—
Bombay	E.	98·7	71	i 17 49	PP	24 56	−14	20 6	PPP	47·4
Rybach'e		98·9	47	e 13 47	+ 4	23 58	[−24]	e 17 56	PP	—
Naryn		99·0	48	i 13 47	+ 3	i 17 46	PP	i 19 53	PPP	—
Almata		99·4	46	e 13 48	+ 2	e 25 16	+ 1	17 53	PP	—
Ili		99·4	45	e 13 50	+ 4	i 24 9	[−15]	—	—	—
Poona		99·7	72	i 14 52	+65	i 25 30	+12	18 1	PP	45·8
Semipalatinsk		100·2	38	e 17 57	PP	—	—	—	—	—
Przhevalsk		100·6	47	e 13 56	+ 5	—	—	i 18 4	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
New Delhi	N.	101·8	61	e 18 19	PP	i 25 34	− 1	i 27 8	PS	53·8
Dehra Dun	N.	102·3	59	—	—	e 25 35	− 5	e 33 29	SS	e 44·6
Kodaikanal	E.	103·7	79	e 15 26	P	i 27 30	PS	46 32	Q	51·8
Hyderabad	N.	104·1	72	—	—	26 7	+12	33 20	SS	44·6
Chatra	N.	110·8	61	e 18 35	[0]	26 2	{− 9}	19 16	PP	51·0
Irkutsk		113·3	31	e 14 50	P	25 52	{−36}	e 18 47	PKP	—
Kabansk		114·5	31	e 18 47	[+ 5]	35 38	SS	19 40	PP	—
Vladivostok		132·4	22	e 19 22	[+ 5]	i 26 46	[+20]	i 22 10	PP	—
Perth		132·6	135	i 22 55	PKS	i 40 0	SS	i 42 25	?	—
Djakarta		133·1	98	e 19 17	[− 1]	e 30 40	?	i 21 40	PP	—
Christchurch		133·9	200	22 17?	PP	—	—	—	—	—
Nanking	Z.	133·9	43	19 25k	[+ 6]	22 53	PKS	21 51	PP	—
Wellington		135·1	203	i 22 54	PKS	29 27	{+35}	e 39 57	SS	62·3
Zi-ka-wei	Z.	136·2	41	i 19 28	[+ 4]	—	—	i 22 2	PP	—
Manila		144·5	63	i 19 41	[+ 3]	e 23 55	PP	i 20 23	PKP_2	—
Riverview		146·8	177	i 19 42s	[0]	i 41 56	SS	e 47 8	SSS	e 69·8
Brisbane	Z.	153·2	179	i 20 9s	[+17]	e 26 59	[+ 1]	e 23 57	PP	—

Additional readings :—
M'Bour iPPP =4m.22s., i =4m.52s., 5m.47s., and 8m.2s.
Lome iPPP =7m.11s., i =7m.32s., 7m.49s., and 8m.44s., iP_cP =9m.15s., i =9m.53s., iSS =12m.21s., iP_cS =13m.5s.
Tamanrasset iSSZ =16m.10s.
Lisbon PP =9m.29s. and 9m.40s., E =11m.4s. and 15m.21s., EN =16m.40s., E =17m.2s., eSSEN =17m.8s., QN =17m.26s.
Malaga iS_cP =12m.50s.
Granada sP =8m.46s., P_cP =9m.31s., iPP =10m.6s., PPP =11m.0s., P_cS =13m.21s., sS =15m.18s., iSS =16m.51s., S_cS =17m.48s., sSS =18m.33s.
Almeria iPPP =10m.25s.
Toledo PPP =10m.40s., SS =18m.8s., SSS =19m.8s.
La Paz iZ =8m.20s., iS =14m.39s., iPS =15m.7s., iSS =iS_cS? =18m.5s., iSSS =19m.9s.
Alicante P_cP =9m.56s., PP =10m.5s., PPP =10m.43s., P_cS =13m.51s., PPS =15m.12s., SS =18m.11s., S_cS =18m.19s., SSS =19m.18s.
Algiers Univ. eZ =8m.50s., ePPPZ =10m.50s., eZ =13m.20s., $ePcSZ$ =13m.52s., eZ =15m.25s.
La Plata E =9m.17s., PPPE =10m.53s., P_cSE =14m.11s., SZ =15m.5s., QN =19·9m.
Barcelona PPP =11m.3s.
Chinchina e =16m.59s.
Tunis iP_cP =9m.18s., iPPP =11m.33s., i =12m.30s., eS =16m.7s., e =17m.45s.
Huancayo e =9m.23s. and 19m.45s.
Copiapo SSN =20m.7s.
Clermont-Ferrand i =9m.27s., 9m.57s., 11m.11s., and 12m.45s., e =20m.32s.
Jersey eE =9m.49s.
Santa Lucia eN =22m.15s.
Messina e =17m.22s.
Rome iPPPZ =12m.43s., iSSN =20m.53s.
Rocca di Papa SS? =20m.55s.
Paris iP_cP =10m.26s., iPP =11m.34s., ipPP =11m.44s., iPPP =12m.25s., iSP =17m.16s., iPS =17m.26s., iS_cS =18m.52s., iSSS =23m.38s., and many other i readings.
Besançon iP_cP =10m.22s., e =10m.55s. and 12m.6s., ePP =12m.46s., e =15m.33s.
Pavia iZ =10m.2s., ePPP =12m.47s., e =13m.15s. and 17m.28s., eSS =21m.6s.
Florence i =12m.9s., iSS =20m.59s.
Halifax e =14m.23s., S_cS =19m.13s., SSS =22m.29s.
Bologna e =10m.8s.
Rathfarnham Castle iZ =10m.18s., ePPP =13m.44s., eS_cSEN =18m.7s., eEN =19m.13s., eQEN =23m.33s.
Kew iZ =9m.58s., eS_cS =18m.4s., eSS =21m.4s.
Salo eEN =10m.4s., e =24m.19s.
Strasbourg isP? =10m.26s., i =11m.14s., iPP =11m.46s., ipPP =12m.23s., iPPP =13m.3s., $ePcS$ =14m.29s., i =14m.46s., e =15m.41s., i =16m.14s., 18m.17s., and 18m.57s., iS_cS =19m.28s., e =19m.52s., i =20m.12s. and 22m.9s.
Karlsruhe i =9m.52s., iSN =17m.29s.
Stuttgart iP =9m.50s., ePPP =13m.10s. and other unidentified readings.
Triest i =10m.18s., isS =18m.9s.
Durham iEN =13m.36s.
De Bilt iPPP =13m.32s., eSSS =24m.47s.
Palisades PKP,PKP =39m.45s.
Sonnéberg iSEN =18m.17s., eN =20m.12s., eE =20m.18s., eN =20m.58s.
Athens i =18m.17s.
Cheb! e =11m.2s., PP =12m.16s., ePPPE =13m.34s., ePPPN =13m.44s., e =16m.44s. and 20m.25s., eSS =22m.23s., eSSS =23m.17s.
Jena iPE =10m.11s., ePPP?EZ =13m.35s., eSN =17m.57s., eSE =18m.3s., iSE =18m.23s., and other unidentified readings.

Continued on next page.

Aberdeen iE =10m.8s., 11m.13s., and 13m.30s.
Vienna ePP =12m.29s., ePPP =13m.50s., eSS =22m.38s.
Seven Falls iE =12m.55s., 13m.39s., and 15m.2s., SSSE =25m.3s.
Prague ePP =12m.34s., ePPP =13m.54s., e =18m.13s., ePS =18m.44s., eSS =22m.35s., eSSS =24m.41s.
Belgrade eZ =12m.33s., iNW =12m.40s., ePPPZ =13m.55s., iSNE =18m.36s., iNE =21m.28s., iSSSNW =25m.17s.
Kalossa iE =10m.50s. and 11m.26s., ePPPE =14m.9s., PPPN =14m.12s., eSN =18m.40s., ePSSN =18m.56s., PPSE =19m.9s., PPSN =19m.12s.
Ogyalla ePP =12m.8s., ePPPN =13m.1s., eScP =14m.47s., eSN =18m.43s., ePSE =19m.1s., eScS =20m.1s., eSSE =22m.50s., eSSS =25m.5s., and other e readings.
Shawinigan Falls PPN =12m.30s., PPPN =13m.53s., PPSN =19m.5s., SSN =22m.29s., SSSN =25m.17s.
Budapest PPPN =14m.7s., PPPE =14m.10s., PSSN =19m.1s., ePSSE =19m.16s., iPPSN =19m.20s., SKSE =20m.19s., SSN =22m.55s., eSSE =23m.17s., eSSSE =25m.17s., SSSN =25m.40s.
Sofia PPPEN =14m.9s. and other unidentified eEN phases.
Pennsylvania iNZ =10m.19s.
Potsdam iPPNZ =12m.40s., iPPE =12m.43s., iPPP =14m.12s., iSZ =18m.50s., and other unidentified i readings.
Timisoara eN =13m.32s., eE =23m.13s.
Ottawa e =11m.17s., PPP =14m.17s., PPS =19m.31s., e =22m.17s., SS =23m.3s., SSS =25m.47s.
Raciborzu i =12m.19s., iZ =14m.12s., PPPN =14m.17s., ePcSZ =15m.3s., eE =18m.24s., ePSE =19m.9s., ePPSZ =19m.16s., iN =20m.36s.
Ivigtut 10m.57s. and 20m.22s.
Skalnate Pleso e =12m.9s.?, ePP =12m.58s.?, ePPP? =14m.33s.?, ePS =19m.27s.?, eSS =22m.41s., e =23m.47s., eSSS =25m.17s.
Copenhagen 11m.4s. and 14m.40s.
Reykjavik eE =10m.43s., i?Z =13m.15s., eE =13m.35s., iZ =14m.50s., iSZ =19m.17s., eE =20m.31s. and 22m.36s., eSSZ =23m.55s.
Uzhgorod PPP =14m.14s.
Bucharest iPPPE =14m.28s., iSE =19m.4s., iPSE =19m.18s., iPSN =19m.22s., iScS?N =20m.40s., iScS?E =20m.44s., iSSN =23m.7s., iSSE =23m.22s.
Istanbul ePPE =13m.1s., ePPP?N =15m.2s., ePcS?E =15m.11s., ePSEN =19m.33s., ePPSEN =19m.42s., eSKSN =20m.26s., eSSN =23m.30s., eSSSN =25m.57s. and many other unidentified e readings.
Upsala i =11m.13s., e =11m.49s.?, ePP?N =13m.23s., eE =14m.17s., ePPP =15m.12s., ePcS =15m.34s., iPPS =20m.49s.?, iN =21m.21s., eSS =24m.29s., eSSSN =27m.15s.
Scoresby Sund 11m.28s. and 13m.39s.
Vera Cruz i =12m.51s., e =12m.56s.
Puebla e =12m.26s.
Kiruna iPPN =14m.35s., iPPPE =16m.19s., iPSEN =21m.52s., iPPSEN =22m.11s., iSSE =26m.8s., eQ?N =31m.35s., and other unidentified readings.
Tananarive SS =26m.1s., eSS =26m.13s., Q =31m.49s.
Tiflis e =15m.46s.
Saskatoon SS =27m.59s.
Resolute Bay eZ =13m.31s., e =15m.46s. and 23m.46s.
Sverdlovsk PPP =18m.11s.
Boulder City i =13m.0s. and 13m.9s.
Pasadena i =13m.11s., iPPPZ =18m.3s., iSKSZ =23m.16s., iPSE =24m.59s., eSSE =29m.17s., ePKP,PKPZ =38m.51s., eQN =39·1m.
Seattle ePPP =18m.35s., ePPPP =20m.4s., eS =23m.56s., iPS =24m.51s., iSS =29m.54s., ePKKP =30m.29s., iPKKS =34m.20s., iPKP,PKP =39m.54s. and many other unidentified i readings.
Stalinabad PPP =19m.9s.
Tashkent ePPP =18m.57s., iScS =24m.42s., iPS =25m.45s., eSS =30m.59s.
Santa Clara iE =19m.55s.
Berkeley ePPZ =16m.54s., eEN =30m.53s.
Khorog SS =31m.36s.
Frunse SKKS =24m.33s., iPS =26m.32s.
Bombay iSE =25m.26s., iPSE =26m.44s., iPPSE =27m.43s., iSSE =32m.18s., QE =42m.20s.
Rybach'e eSKKS =24m.33s., ePS =26m.44s.
Poona SSN =32m.9s., SSSN =35m.30s., QN =40m.28s.
New Delhi eN =18m.57s., iSKSN =26m.37s.
Dehra Dun eN =36m.17s.
Chatra PSN =28m.39s., PPSN =29m.35s., PKKSN =33m.21s., SSN =34m.35s., SSPN =34m.58s., $SKKS_2N$ =38m.13s., $SKKKS_3N$ =40m.17s., QN =45m.17s.
Irkutsk PP =19m.31s., ePPP =21m.43s., PS =29m.8s.
Vladivostok iPKS =23m.5s., iSKKS =28m.53s.
Djakarta iPKSEN =22m.50s., iSSN =39m.36s.
Wellington e =42m.12s., eSSS =44m.42s., e =54m.47s., eQ =57·0m.
Manila i =19m.46s.
Riverview iZ =20m.9s., iNZ =20m.26s., iE =20m.38s., iN =20m.47s., eE =42m.22s., eQE =60·8m.
Brisbane eZ =22m.15s. and 29m.13s.
Long waves were also recorded at Apia and Terre Adélie.

July 18d. Readings also at 1h. (La Paz, Stuttgart, Apia, and near Manila), 5h. (Andijan, near Dzhergetal (2), Fergana, and Murgab), 6h. (Almata, Chilisk, Dzhergetal, Fergana, Krasnogorka, Kurmenty, Obi-garm, Rybach'e, Tashkent, near Andijan, Frunse, Ili, Murgab, and Naryn), 7h. (Apia, Andijan, near Dzhergetal, Khorog, and Murgab), 9h. (Prague, Cleveland, Ottawa, St. Louis, Galerazamba, Puebla, and Tacubaya), 10h. (Besançon and near Prague), 11h. (Guam, Pasadena, and China Lake), 12h. (Stuttgart, near Prague, and near Manila), 14h. (Frunse, Tashkent, near Andijan, Dzhergetal (2), Fergana, Lunacharskoe, Obi-garm, Samarkand, and Stalinabad), 16h. (Brisbane, Terre Adélie, and near Kurmenty), 17h. (Besançon and near Kurmenty), 18h. (Apia (2), Manila, Mizusawa, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, and Lick), 20h. (Apia and near Khorog), 21h. (Istanbul, Kiruna, Stuttgart, and near Ashkabad (4)), 22h. (5) and 23h. (near Ashkabad).

July 19d. 20h. 41m. 28s. Epicentre 51°·6N. 177°·8W. Depth of focus 0·005.
(as on 1948, September 19d.).

$A = -\cdot6232$, $B = -\cdot0239$, $C = +\cdot7817$; $\delta = 0$; $h = -6$;
$D = -\cdot038$, $E = +\cdot999$; $G = -\cdot781$, $H = -\cdot030$, $K = -\cdot624$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Adak		0·6	84	i 0 14	0	i 0 31	+ 6	—	—	—
Mitchell Field		0·7	77	i 0 16	+ 1	—	—	—	—	—
Klyuchi		13·4	299	e 3 17	+ 8	—	—	—	—	—
College		20·4	38	e 4 32	− 2	e 8 26	+12	—	—	—
Sitka		25·0	59	i 5 21	+ 2	e 9 43	+ 7	6 12	PPP	—
Yuzno-Sahklinsk		25·9	278	5 26	− 2	—	—	—	—	—
Nemuro		25·9	267	5 18	−10	—	—	—	—	—
Sapporo		28·6	270	5 19	−33	10 40	+ 6	—	—	14·1
Sendai		31·7	262	6 25	+ 5	11 31	+ 8	—	—	—
Tokyo		34·0	260	6 41	+ 1	12 16	+17	—	—	—
Maebasi		34·0	261	6 36	− 4	—	—	—	—	—
Kumagaya		34·0	260	6 40	0	—	—	—	—	—
Yokohama		34·3	259	6 59	+17	—	—	—	—	—
Nagano		34·3	262	6 41	− 1	11 52	−12	—	—	17·1
Matusiro		34·4	262	6 41	− 2	12 10	+ 5	7 50	PP	15·9
Oiwake		34·4	262	6 41	− 2	—	—	—	—	—
Victoria		34·4	73	6 42	− 1	12 12	+ 7	—	—	14·8
Vladivostok		34·5	275	i 6 42	− 2	e 12 5	− 2	—	—	—
Mera		34·5	260	6 39	− 5	—	—	—	—	—
Hunatu		34·8	262	6 46	0	—	—	—	—	17·0
Toyama		35·0	263	6 48	0	—	—	—	—	—
Shizuoka		35·3	260	6 50	− 1	12 22	+ 3	—	—	—
Seattle		35·4	74	i 6 55k	+ 3	i 12 34	+13	e 8 17	PP	e 17·5
Kanazawa		35·4	263	6 51	− 1	—	—	—	—	—
Nagoya		36·1	261	6 54	− 3	—	—	—	—	—
Osaka		37·1	261	7 4	− 2	—	—	—	—	—
Kobe		37·5	261	7 6	− 3	—	—	—	—	—
Shasta Dam		39·0	83	i 7 22	0	—	—	—	—	—
Resolute Bay		39·3	25	i 7 26	+ 2	e 13 28	+ 8	i 7 40	pP	—
Hungry Horse		40·0	68	i 7 30	0	i 13 34	+ 3	e 17 46	ScS	—
Berkeley		40·8	87	e 7 36k	− 1	e 13 46	+ 3	i 7 50	pP	—
Santa Clara	E.	41·3	87	—	—	e 13 48	− 2	—	—	e 19·5
Lick	Z.	41·5	87	i 7 44a	+ 2	i 8 8	sP	i 7 57	pP	—
Fresno		43·0	86	e 7 56k	+ 1	e 9 48	PcP	e 8 8	pP	—
Tinemaha		43·8	85	e 8 2	+ 1	e 14 37	+10	e 13 35	ScP	—
Kabansk		44·7	302	8 8	0	e 14 44	+ 5	—	—	—
China Lake		45·0	85	i 8 9	− 2	i 14 49	+ 5	i 8 23	pP	—
Pasadena		45·7	88	i 8 16	0	i 14 57	+ 3	i 8 30	pP	e 17·7
Irkutsk		45·8	303	8 15	− 2	—	—	—	—	—
Riverside	Z.	46·3	88	e 8 19	− 2	—	—	i 8 33	pP	—
Boulder City		46·6	84	e 8 23	0	e 15 14	+ 7	e 18 17	SS	—
Palomar		47·1	88	i 8 25	− 2	i 15 18	+ 4	i 8 40	pP	—
Zi-ka-wei	Z.	48·4	270	8 33	− 4	15 47	+15	—	—	—
Nanking		49·5	273	i 8 43a	− 3	15 51	+ 4	i 18 32	ScS	—
Tucson		51·5	84	e 9 0	− 1	e 16 22	+ 7	e 9 29	sP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		57·0	10	e 9 41	0	e 17 51	+22	e 10 34	?	—
Florissant		59·4	65	e 9 55	− 3	i 18 2	+ 2	i 18 19	sS	—
St. Louis		59·5	65	e 9 56	− 3	i 18 6	+ 4	i 18 36	sS	—
Kiruna		60·1	352	e 9 59a	− 4	e 18 14	+ 5	e 12 16	PP	e 31·3
Manila		60·9	257	i 10 3	− 5	—	—	—	—	—
Sverdlovsk		61·7	328	i 10 14	0	18 42	+12	—	—	—
Cleveland		62·3	57	i 10 17a	− 1	e 18 42	+ 5	e 20 4	ScS	—
Cincinnati		62·4	61	i 10 15	− 3	—	—	i 10 31	pP	—
Ottawa		62·4	51	10 17	− 1	18 44	+ 5	11 2	PcP	29·1
Shawinigan Falls	N.	63·0	48	10 21	− 1	—	—	20 12	ScS	—
Seven Falls	E.	63·5	46	10 26	0	18 55	+ 3	23 31	SS	29·2
Pittsburgh		63·9	57	i 10 23	− 5	i 18 59	+ 2	i 20 16	ScS	—
Morgantown		64·5	58	i 10 32	0	—	—	e 12 23	?	—
Pennsylvania		64·7	56	i 10 33	0	e 19 14	+ 7	i 11 1	pP	—
Ili		65·0	310	i 10 35	0	—	—	—	—	—
Kurmenty		65·1	309	i 10 35	− 1	—	—	—	—	—
Almata		65·5	310	i 10 38	− 1	—	—	—	—	—
Washington		66·5	57	i 10 47	+ 2	—	—	—	—	e 38·0
Harvard		66·6	50	i 10 44	− 2	e 19 37	+ 7	—	—	e 34·7
Palisades		66·6	53	i 10 44a	− 2	i 19 36	+ 6	i 11 5	pP	e 34·2
Rybach'e		66·6	310	e 10 45	− 1	e 19 37	+ 7	—	—	—
Fordham		66·7	53	i 10 46	0	i 19 38	+ 7	—	—	—
Pulkovo		66·7	345	e 10 46	0	e 19 38	+ 7	—	—	—
Weston		66·8	50	i 10 45	− 2	—	—	—	—	e 35·1
Frunse		67·0	310	i 10 47	− 1	e 19 52	+17	—	—	—
Naryn		67·4	308	i 10 50	− 1	e 19 47	+ 7	—	—	—
Tacubaya		68·0	86	i 11 6	+12	—	—	—	—	—
Upsala		68·2	352	i 10 55a	− 1	i 19 55	+ 6	e 15 5	PPP	e 35·5
Moscow		69·1	340	e 11 1	0	e 20 6	+ 6	—	—	—
Andijan		69·6	310	e 11 4	0	i 20 10	+ 4	—	—	—
Murgab		70·0	308	11 12	+ 5	20 28	+17	—	—	—
Fergana		70·2	310	e 11 7	− 1	—	—	—	—	—
Tashkent		70·7	313	i 11 10	− 1	—	—	—	—	—
Dzhergetal		71·4	310	e 11 17	+ 2	—	—	—	—	—
Aberdeen	E.	71·5	3	—	—	i 20 30	+ 2	e 29 11	SSS	e 45·2
Chatra	N.	72·4	290	e 11 6	−15	e 20 47	+ 9	—	—	—
Obigarm		72·5	311	i 11 20	− 2	e 20 44	+ 4	—	—	—
Khorog		72·6	309	e 11 24	+ 2	—	—	—	—	—
Copenhagen		72·7	355	i 11 24	+ 1	e 20 50	+ 8	21 16	PS	33·5
Samarkand		73·0	312	11 23	− 2	20 50?	+ 5	—	—	—
Stalinabad		73·1	311	i 11 23	− 2	e 20 48	+ 2	—	—	—
Calcutta	E.	75·0	287	e 11 32	− 4	21 21	+13	14 32	PP	—
Rathfarnham Castle		75·2	7	i 11 39	+ 2	e 21 22?	+12	e 14 39	PP	e 39·0
Potsdam		76·0	353	e 11 42	0	e 21 24	+ 5	e 11 49	pP	e 36·5
De Bilt		76·6	358	e 11 46	+ 1	e 21 37	+12	e 16 32	PPP	e 36·5
New Delhi	N.	76·7	300	e 11 46	0	e 21 29	+ 3	—	—	—
Mary		77·0	316	i 11 47	− 1	—	—	—	—	—
Collmberg	Z.	77·1	354	e 11 48	0	—	—	—	—	—
Lwow		77·2	346	i 11 49	0	—	—	—	—	—
Kew		77·3	2	i 11 50a	+ 1	e 21 39	+ 6	e 14 41	PP	e 38·5
Jena		77·5	353	e 11 51	+ 1	e 21 41	+ 6	e 13 15	?	—
Raciborzu		77·8	350	e 11 53	+ 1	e 21 55	ScS	e 14 42	PP	—
Kizyl-Arvat		78·2	320	e 11 55	+ 1	—	—	—	—	—
Ashkabad		78·2	318	11 55	+ 1	22 10	ScS	—	—	—
Prague		78·2	352	e 11 54	0	e 22 4	ScS	i 12 13	pP	e 38·5
Cheb		78·3	353	e 11 55	0	e 22 5	ScS	e 15 1	PP	—
Skalnate Pleso		78·4	348	e 20 50?	?	—	—	—	—	—
Uzhgorod		78·7	347	e 11 59	+ 2	—	—	—	—	—
Kishinev		79·1	343	12 0	+ 1	22 1	+ 9	—	—	—
Baku		79·4	325	e 12 2	+ 1	—	—	—	—	—
Karlsruhe	Z.	79·6	356	e 12 4	+ 2	—	—	e 15 4	PP	—
Shemakla		79·6	326	i 12 2	0	22 18	ScS	—	—	—
Stuttgart		79·8	355	e 12 2a	− 1	e 22 9	+10	e 15 20	PP	33·5
Gori		79·9	330	12 5	+ 2	e 22 9	+ 9	—	—	—
Tiflis		79·9	330	e 12 5	+ 2	e 22 6	+ 6	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Paris		80·0	0	i 12 4	0	e 22 8	+ 7	i 12 20	pP	e 46·5
Ogyalla		80·0	349	e 12 6	+ 2	e 22 22?	+21	e 12 23	pP	—
Strasbourg		80·1	356	e 12 4k	0	e 21 59	− 3	e 12 20	pP	e 40·5
Budapest		80·2	348	15 7	PP	—	—	—	—	e 51·5
Kirovobad		80·3	327	i 12 7	+ 2	e 22 12	+ 8	—	—	—
Yalta		80·4	337	12 5	− 1	e 22 11	+ 6	—	—	—
Basle		81·1	357	e 12 14	+ 4	—	—	e 23 10	PS	—
Leninakan		81·1	329	12 11	+ 1	—	—	—	—	—
Lenkoran		81·2	324	i 12 12	+ 2	—	—	—	—	—
Zürich		81·3	357	e 12 10a	− 1	e 22 18	+ 3	—	—	—
Erevan		81·4	330	e 12 15	+ 4	22 29	+13	—	—	—
Besançon		81·5	358	12 12	0	—	—	e 12 27	pP	—
Guantanamo Bay		82·2	68	e 12 17	+ 2	e 22 31	+ 7	—	—	—
Bucharest		82·2	343	e 12 19	+ 4	e 22 20	− 4	—	—	45·5
Triest		82·6	352	e 12 21	+ 4	e 22 38	+10	e 23 58	SPP	—
Belgrade		82·7	347	e 12 18	0	e 22 38	+ 9	e 23 30	PS	e 53·9
Clermont-Ferrand		83·0	359	e 12 17	− 3	i 22 48	ScS	—	—	e 30·5
Pavia		83·4	355	e 12 14	− 8	e 22 46	ScS	e 23 52	PPS	—
Bologna	z.	84·0	353	e 13 26	+61	—	—	—	—	—
Istanbul		84·8	340	e 12 28	− 1	e 22 52	+ 2	e 15 43	PP	e 40·5
Hyderabad	N.	84·8	291	—	—	i 22 54	+ 4	—	—	—
Rome		86·4	353	e 12 36	0	e 23 11	+ 6	e 24 28	PS	—
Poona		86·5	295	i 12 38	+ 1	e 23 16	+10	—	—	—
Tortosa		87·9	2	12 46	+ 2	—	—	—	—	e 45·5
San Juan		88·5	62	e 12 48	+ 1	—	—	i 24 43	PS	—
Toledo		88·7	5	i 12 50	+ 3	—	—	e 19 4	PPP	39·4
Messina	z.	89·8	350	e 12 52	− 1	—	—	—	—	—
Ksara		89·9	333	i 12 51	− 2	—	—	25 3	PS	—
Alicante		90·4	2	13 15	pP	24 12	sS	16 54	PP	e 46·2
Granada		91·4	3	i 13 2a	+ 2	24 8	sS	25 26	PS	i 51·1
Almeria		91·8	5	(i 13 11)	+ 9	(24 13)	sS	(18 57)	PPP	(52·0)
Malaga		91·8	4	i 13 1	− 1	e 23 25	[− 2]	i 16 45	PP	48·6
Fort de France		94·2	60	—	—	e 24 0	[+19]	—	—	—
Helwan		94·9	335	e 13 17	+ 1	23 50	[+ 6]	e 17 2	PP	—
Bogota		94·9	75	e 13 17	+ 1	e 23 48	[+ 4]	e 17 32	PP	—
Tamanrasset	z.	105·9	356	14 8	+ 3	e 18 30	PP	e 18 21	PKP	—
Huancayo		107·1	87	e 28 12	PS	e 24 57	[+14]	e 26 20	S	e 44·8
La Paz		115·0	84	e 19 2	[+28]	26 22	SKKS	19 52	PP	56·5
Pretoria	z.	147·5	312	i 19 38	[+ 4]	—	—	—	—	—
Kimberley	z.	151·6	314	i 19 47	[+ 7]	—	—	—	—	—

Additional readings and note :—
Matusiro SS =14m.49s.
Seattle ePPP =8m.42s., iPcP =9m.22s., eSS =14m.47s. and other unidentified readings.
Resolute Bay ePPEN =9m.3s., iZ =9m.44s.
Berkeley ePcP? =9m.35s., e =16m.56s., eZ =18m.38s.
China Lake iEZ =13m.41s.
Scoresby Sund e =13m.21s.
St. Louis iP =9m.59s., i =10m.47s., e =17m.14s.
Kiruna eZ =12m.48s., ePPP?N =13m.52s., eZ =14m.18s., eS?Z =18m.25s., ePPSN = 18m.36s., eE =19m.32s., eSSSE =24m.23s., eN =25m.0s.
Ottawa ScS =20m.8s.
Seven Falls eE =13m.36s., SSSE =26m.19s.
Pennsylvania isPZ =11m.10s., iN =19m.26s.
Palisades eScS =20m.39s.
Upsala eN =20m.34s.? and 21m.39s.
Aberdeen iE =23m.6s., eE =35m.42s. and 40m.2s.
Copenhagen e =25m.50s.
Calcutta PPPE =16m.20s.
Rathfarnham Castle eEN =34m.22s.
Potsdam eSE =21m.30s.
De Bilt ePS =22m.14s., eSS =26m.52s.
Kew ePS =22m.33s., eSS =27m.19s., eSSS =30m.45s.
Raciborzu e =12m.2s., eScSE =22m.3s., ePPSN =22m.38s.
Prague iE =11m.58s., esP =12m.21s., e =12m.43s., 15m.39s., and 17m.21s., ePS = 22m.43s., e =26m.2s. and 26m.44s.
Cheb ePSN =23m.49s.
Stuttgart ePcPZ =12m.18s., ePS =22m.57s., eSS =27m.38s.

Continued on next page.

Paris i = 12m.50s., e = 15m.16s., iSKS = 22m.22s., esS = 22m.30s., iPS = 23m.8s., isSP = 23m.18s., i = 24m.8s., e = 25m.2s. and 25m.56s., eSS = 27m.28s., eSSS = 31m.56s., i = 38m.8s.
Ogyalla e = 13m.41s., ePSN = 23m.11s., e = 23m.42s.
Strasbourg e = 12m.56s., ePP = 15m.4s., e = 18m.56s. and 22m.6s., eS = 22m.24s., ePS = 23m.9s., eSS = 27m.58s., eSSS = 31m.2s.
Belgrade eSKKSNW = 23m.12s.
Pavia e = 14m.20s. and 36m.40s.
Istanbul eN = 19m.21s., ePSN = 23m.45s., eEN = 26m.27s., eSSE = 28m.26s., eSSSE = 31m.53s.
Rome ePPN = 14m.56s., eSSN = 29m.6s.
Toledo i = 12m.58s.
Alicante PPS = 26m.2s., SS = 30m.4s., SSS = 34m.4s., Q = 37m.52s.
Granada SS = 30m.38s., SSS = 34m.48s.
Almeria readings have been increased by 20 minutes.
Malaga ePPP = 19m.7s.
Helwan eZ = 20m.51s., SN = 24m.2s.
Bogota eSSEN = 31m.11s.
Huancayo eSS = 32m.49s., eSSS = 37m.53s.
La Paz SS = 35m.17s.
Long waves were also recorded at Auckland, Christchurch, Bombay, Taranto, Ivigtut, and La Plata.

July 19d. 21h. 7m. 8s. Epicentre 51°·6N. 177°·8W. (as at 20h.). Depth of focus 0·005.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Adak		0·6	84	0 16	+ 2	i 0 31	+ 6	—	—	—
Mitchell Field		0·7	77	i 0 17	+ 2	i 0 33	+ 6	—	—	—
College		20·4	38	e 4 35	+ 1	—	—	—	—	—
Shasta Dam		39·0	83	e 7 19	− 3	—	—	—	—	—
Hungry Horse		40·0	68	i 7 30	0	—	—	—	—	—
Tinemaha	z.	43·8	85	e 8 2	+ 1	—	—	—	—	—
China Lake	z.	45·0	85	e 8 10	− 1	—	—	—	—	—
Mount Wilson	z.	45·7	88	e 8 17	+ 1	—	—	—	—	—
Boulder City		46·6	84	e 8 24	+ 1	—	—	—	—	—
Palomar	z.	47·1	88	e 8 26	− 1	—	—	—	—	—
Tucson		51·5	84	e 9 0	− 1	—	—	—	—	—
Florissant		59·4	65	e 9 55	− 3	—	—	—	—	—
St. Louis		59·5	65	e 9 58	− 1	—	—	c 10 12	pP	—
Cleveland		62·3	57	i 10 18	0	—	—	—	—	—
Morgantown		64·5	58	i 10 32	0	—	—	—	—	—
Weston		66·8	50	i 10 47	0	—	—	—	—	—
Stuttgart	z.	79·8	355	e 12 4	+ 1	—	—	—	—	—
Paris		80·0	0	i 12 4	0	—	—	—	—	—
Strasbourg		80·1	356	e 12 6	+ 2	—	—	—	—	—
Besançon		81·5	358	e 12 12	0	—	—	—	—	—
La Paz		115·0	84	—	—	35 10	SS	—	—	53·9
Pretoria	z.	147·5	312	i 19 43	[+ 9]	—	—	—	—	—

Long waves were also recorded at Seattle.

July 19d. 22h. 27m. 21s. Epicentre 27°·1N. 51°·7E.

A = +·5525, B = +·6996, C = +·4531 ; δ = 0 ; h = +2 ;
D = +·785, E = −·620 ; G = +·281, H = +·356, K = −·892.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Ashkabad	12·2	26	e 2 58	0	—	—
Kirovobad	14·3	343	3 26	0	—	—
Ksara	15·2	300	i 8 44	PcP	e 6 50	+22
Tiflis	15·6	341	e 3 43	0	—	—
Gori	16·1	339	e 3 48	− 1	—	—
Stalinabad	18·2	46	i 4 15	− 1	7 32	− 5
Obi-garm	19·0	47	e 4 19	− 7	—	—
Tashkent	20·3	40	i 4 40	0	e 8 23	0
Murgab	21·8	53	e 4 56	0	—	—
Andijan	21·8	46	e 4 55	− 1	8 47	− 5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Yalta		22·4	325	e 4 59	− 3	e 8 59	− 5
Frunse		21·1	11	i 5 23	+ 2	—	—
Rybach'e		25·1	45	e 5 32	+ 4	—	—
Ili		26·5	43	i 5 41	0	—	—
Moscow		30·4	345	6 16	0	—	—
Tamanrasset	z.	41·9	276	e 8 4	+10	—	—

Long waves were also recorded at Helwan.

July 19d. 23h. Undetermined shock.

Chinchina iP =38m.34s., eS? =40m.29s.
Bogota iP =38m.56s., eS =41m.11s.
Huancayo e =40m.16s., 43m.51s., and 44m.42s.
La Paz P =41m.35s.
Tacubaya e =41m.35s.
Palomar iPZ =44m.20s., iZ =44m.27s.
Ottawa iZ =44m.21s. and 44m.28s., L =60·3m.
Riverside eZ =44m.22s.
Mount Wilson ePZ =44m.28s., eZ =44m.35s.
Harvard eL =57·3m.

July 19d. 23h. 47m. 52s. Epicentre 51°·6N. 177°·8W. (as at 21h.). Depth of focus 0·005.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Adak		0·6	84	i 0 15	+ 1	i 0 26	+ 1	—	—	—
College		20·4	38	e 4 35	+ 1	e 8 27	+ 13	—	—	—
Shasta Dam		39·0	83	e 7 23	+ 1	—	—	—	—	—
Hungry Horse		40·0	68	i 7 30	0	—	—	—	—	—
Lick	z.	41·5	87	i 7 46s	+ 1	—	—	i 7 58	pP	—
Palomar	z.	47·1	88	e 8 25	− 2	—	—	i 8 40	pP	—
Tucson		51·5	84	e 9 1	0	—	—	e 9 17	pP	—
Florissant		59·4	65	e 9 55	− 3	e 18 2	+ 2	—	—	—
St. Louis		59·5	65	e 9 58	− 1	e 18 7	+ 5	e 10 1	P	—
Cleveland	z.	62·3	57	i 10 18	0	—	—	—	—	—
Morgantown		64·5	58	i 9 31	−61	—	—	—	—	—
Harvard		66·6	50	e 10 44	− 2	—	—	—	—	e 35·0
Weston		66·8	50	i 10 47	0	—	—	—	—	—
Rathfarnham Castle		75·2	7	i 10 37	−60	—	—	i 10 56	pP	—
Collmberg	z.	77·1	354	e 11 47	− 1	—	—	—	—	—
Jena	z.	77·5	353	e 11 51	+ 1	—	—	—	—	—
Stuttgart	z.	79·8	355	e 12 3	0	—	—	—	—	—
Paris		80·0	0	i 12 4	0	—	—	—	—	e 47·1
Strasbourg		80·1	356	e 12 5	+ 1	—	—	—	—	—
Besançon		81·5	358	e 12 12	0	—	—	—	—	—
Alicante		90·4	2	12 56	+ 1	e 23 46	+ 3	16 36	PP	e 43·6
Pretoria	z.	147·5	312	i 19 37	[+ 3]	—	—	—	—	—
Kimberley	z.	151·6	314	i 19 45	[+ 5]	—	—	—	—	—

Alicante gives also SS =29m.46s., SSS =33m.37s., Q =37m.52s.
Long waves were recorded at Kiruna, Pavia, Rome, Malaga, Granada, Kew, Ksara, and Seattle.

July 19d. Readings also at 0h. (near Ashkabad (4)), 1h. (Ahnata, Krasnogorka, near Chilisk, Ili, Andijan, Rybach'e, Naryn, Frunze, near Ashkabad, and near Dzhergetal), 2h. (near Dzhergetal), 4h. (near Ashkabad), 5h. (Apia), 6h. (Palomar, Riverside, China Lake, Mineral, Fresno, Pasadena, Triest, near Rome, Rocca di Papa, and near Ashkabad), 7h. (Apia, Grahamstown, and near Fort de France), 8h. (near Dzhergetal), 9h. (Mount Wilson, China Lake, Riverside, Palomar, and near Dzhergetal), 10h. (Tortosa), 12h. (near Ashkabad and near Dzhergetal), 13h. (Stuttgart and near Santa Lucia), 14h. (near Seattle), 16h. (Apia, Tacubaya, near Ashkabad, near Dzhergetal, and near Alicante (3)), 17h. (near Djakarta, Bandong, Strasbourg, Pasadena, and China Lake (2)), 18h. (Prague, Murgab, near Stalinabad, Khorog, Obi-garm, and Dzhergetal), 19h. (Tacubaya), 20h. (Wellington and Apia), 22h. (Ksara and near Dzhergetal).

July 20d. 15h. 25m. 29s. Epicentre 46°·6N. 8°·6E.

Intensity IV at St. Gotthard, Airolo, Andermatt, Gurtnellen, and Goschenen.
Epicentre as adopted (Strasbourg).

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

$A = +·6818$, $B = +·1031$, $C = +·7243$; $\delta = +9$; $h = -4$;
$D = +·150$, $E = -·989$; $G = +·716$, $H = +·108$, $K = -·699$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zürich		0·8	359	i 0 16 a	− 2	i 0 28	− 3	—	—	—
Basle		1·2	324	e 0 23	− 1	e 0 39	− 2	—	—	—
Neuchatel		1·2	289	i 0 23	− 1	i 0 40	− 1	—	—	—
Ravensburg	z.	1·4	30	e 0 28	+ 1	e 0 48	+ 2	—	—	—
Besançon		1·9	290	e 0 36	+ 2	e 1 1	+ 2	—	—	e 1·2
Strasbourg		2·1	344	—	—	e 1 0	− 4	e 1 11	S_g	—
Stuttgart	z.	2·2	10	e 0 37	− 1	e 1 11	+ 5	e 0 45	P_g	—
Jena	E.	4·8	23	—	—	e 2 38	S_g	—	—	—
Prague		5·2	46	—	—	e 2 53	S_g	—	—	e 3·0

Stuttgart gives also eZ = 43s., eSZ = 1m.1s., eS*?Z = 1m.13s., eZ = 1m.15s., eS_gZ = 1m.18s.

July 20d. Readings also at 0h. (Manila, Weston, Morgantown, and Besançon), 1h. (near Kurmenty), 2h. (Apia), 3h. (Ksara (2), Apia, and near Dzhergetal), 4h. (Apia, Palomar, and Weston), 5h. (Apia, near Dzhergetal, and near Kurmenty), 6h. (Apia, near Victoria, and near Seattle), 7h. (Tamanrasset, Strasbourg, near Adak, and near Ashkabad), 8h. (Tacubaya and Tortosa), 9h. (Mizusawa and Istanbul), 10h. (Bogota, Chinchina, Huancayo, La Paz, Christchurch, Kaimata, near Tuai, Cobb River, and Wellington), 11h. (Manila, Zi-ka-wei, near Alicante, and near Istanbul), 12h. (Rome and near Rocca di Papa), 14h. (Apia), 15h. (Santa Lucia and Stuttgart), 16h. (Victoria and near Dzhergetal), 17h. (near Victoria (6) and near Dzhergetal), 18h. (Victoria, Alicante (2), Triest, Prague (2), Jena, Besançon, Strasbourg, Stuttgart, Basle, Bologna, Pavia, near Zürich, Sale, near Dzhergetal (2), and near Antofagasta), 19h. (near Dzhergetal), 21h. (Huancayo, Mount Wilson, Riverside, Palomar, Haiwee, Tinemaha, and Lick), 22h. (3) and 23h. (near Victoria).

July 21d. 1h. 32m. 24s. Epicentre 28°·7N. 96°·6E. (as on 1950, September 12d.).

$A = -·1010$, $B = +·8727$, $C = +·4777$; $\delta = 0$; $h = +2$;
$D = +·993$, $E = +·115$; $G = -·055$, $H = +·475$, $K = -·879$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		8·6	259	i 2 7	− 2	i 3 42	− 6	2 42	P_g	—
Calcutta		9·7	232	i 2 28	+ 6	i 4 12	− 3	i 4 24	SS	—
New Delhi		17·0	274	3 59	− 2	e 6 59	−11	4 11	PP	7·4
Nanking		19·4	75	i 4 32 a	+ 2	8 8	+ 4	i 8 16	SS	—
Hyderabad	N.	20·1	239	i 4 37	− 1	i 8 38?	+19	—	—	10·9
Przhevalsk		20·2	317	i 4 39	0	—	—	—	—	—
Chilisk		20·8	320	i 4 45	0	e 8 35	+ 2	—	—	—
Naryn		21·1	313	i 4 47	− 1	i 8 36	− 3	—	—	—
Murgab		21·2	303	4 48	− 1	8 41	0	—	—	—
Almata II		21·2	319	i 4 50	+ 1	e 8 42	+ 1	—	—	—
Rybach'e		21·5	314	i 4 52	0	e 8 45	− 2	—	—	—
Almata		21·5	319	i 4 52	0	i 8 49	+ 2	—	—	—
Zi-ka-wei		21·6	77	4 54	0	8 51	+ 5	—	—	—
Ili		21·8	320	4 55	− 1	8 53	+ 1	—	—	—
Krasnogorka		22·5	316	e 5 2	0	—	—	—	—	—
Khorog		22·6	298	i 5 2	− 1	i 9 8	+ 1	—	—	—
Frunse		22·7	314	i 5 4?	0	i 9 14?	+ 5	—	—	—
Poona	E.	23·1	249	i 5 9	+ 1	9 16	0	5 47	PPP	11·0
Andijan		23·2	307	i 5 10	+ 1	i 9 19	+ 1	—	—	—
Dzhergetal		23·5	303	i 5 12	0	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fergana		23·5	307	i 5 13	+ 1	e 9 20	− 3	—	—	—
Bombay		23·8	251	i 5 1	−14	i 9 33	+ 5	i 10 37	SSS	—
Irkutsk		24·2	11	i 5 21	+ 2	e 9 40	+ 5	—	—	—
Obi-garm		24·4	302	i 5 23	+ 2	e 9 39	0	—	—	—
Stalinabad		25·1	301	i 5 28	0	i 9 52	+ 1	—	—	—
Tashkent		25·5	307	i 5 33	+ 1	e 9 57	0	—	—	—
Kodaikanal	E.	25·7	229	e 5 24	− 9	—	—	—	—	—
Samarkand		26·7	302	i 5 42	− 1	—	—	—	—	—
Vladivostok		31·7	54	i 6 28	+ 1	i 11 36	− 1	—	—	—
Ashkabad		33·1	297	i 6 40	0	12 0	+ 1	—	—	—
Djakarta	E.N.	36·0	162	e 7 10	+ 5	—	—	—	—	17·9
Bandong	E.	37·0	160	i 7 9	− 4	—	—	i 8 27	PP	—
Sverdlovsk		37·8	328	i 7 20	0	i 13 8	− 3	—	—	—
Baku		39·8	300	e 7 39	+ 3	e 13 45	+ 3	—	—	—
Kirovobad		42·5	301	e 7 47	−12	—	—	—	—	—
Grozny		43·0	304	8 5	+ 2	—	—	—	—	—
Tiflis		43·7	302	e 8 8	0	—	—	—	—	—
Gori		44·2	302	e 8 9	− 3	—	—	—	—	—
Sotchi		47·4	305	e 8 37	− 1	15 30	− 2	—	—	—
Moscow		49·4	321	i 8 54	+ 1	i 15 57	− 3	—	—	—
Petropavlovsk		51·0	42	i 9 4	− 2	e 16 16	− 6	—	—	—
Ksara		51·5	292	e 7 51	?	i 16 31	+ 2	—	—	—
Pulkovo		53·8	326	i 9 26	0	i 16 57	− 4	—	—	—
Kishinev		54·8	309	9 27	− 7	—	—	—	—	—
Istanbul	Z.	55·5	302	e 9 31	− 8	—	—	—	—	—
Helwan	N.	56·2	289	e 13 10	PPP	i 17 28	− 5	i 17 41	PS	—
Helsinki		56·5	326	e 9 45	− 1	e 17 33	− 4	—	—	e 24·6
Bucharest		57·1	307	e 9 54	+ 4	—	—	e 18 24	PPS	31·6
Lwow		57·7	313	i 9 53	− 2	i 17 48	− 5	—	—	—
Kiruna		58·6	335	i 9 57a	− 4	i 18 0	− 4	e 13 22	PPP	e 32·6
Uzhgorod		59·0	311	10 1	− 3	i 18 2	− 8	—	—	—
Upsala		60·2	326	i 10 10a	− 2	e 18 19	− 6	i 13 52	PPP	e 29·6
Skalnate Pleso		60·2	313	e 10 12	0	e 18 26	+ 1	e 22 36	SS	—
Timisoara		60·2	309	e 10 0?	−12	e 18 27	+ 2	e 10 50	PcP	—
Belgrade		61·0	308	e 10 16	− 2	e 18 32	− 3	e 12 44	PP	e 41·1
Raciborzu		61·4	315	e 10 23	+ 3	e 18 44	+ 4	i 11 7	PcP	—
Ogyalla		61·8	312	e 10 22	− 1	e 18 47	+ 1	e 12 29	PP	—
Copenhagen		63·6	322	i 10 34a	− 1	i 19 7	− 1	20 31	ScS	31·6
Prague		63·7	315	i 10 34	− 2	19 6	− 4	e 12 57	PP	e 28·6
Potsdam		64·0	318	i 10 36a	− 2	i 19 10	− 3	e 13 5	PP	e 30·6
Collmberg	Z.	64·3	317	e 10 39	0	—	—	—	—	—
Taranto		64·4	304	10 8	−32	19 14	− 4	—	—	—
Cheb		65·0	316	e 10 39	− 5	e 19 25	− 1	e 14 54	PPP	—
Jena		65·3	316	e 10 45	− 1	e 19 26	− 3	e 13 6?	PP	—
Triest		65·3	310	i 10 45	− 1	i 19 27	− 2	i 13 5	PP	—
Messina		66·3	302	i 10 51	− 1	e 18 46	−56	e 9 48k	?	—
Bologna		67·3	310	e 10 30	−29	e 20 5	+11	—	—	—
Stuttgart		67·4	315	e 10 51	− 8	e 19 54	− 1	i 10 58	P	e 27·6
Rome		67·4	306	e 10 35	−24	e 19 46	− 9	e 24 9	SS	—
Salo		67·5	310	e 13 5	PP	e 21 59	?	—	—	—
Witteveen	Z.	67·7	320	i 11 2k	+ 1	—	—	i 11 16	PcP	—
Karlsruhe		67·8	316	i 11 1	− 1	e 20 0	0	—	—	—
Zürich		68·2	314	e 10 45	−19	e 20 1	− 3	—	—	—
Strasbourg		68·3	315	i 11 5	0	e 20 5	− 1	e 10 57	?	e 36·6
Pavia		68·6	311	e 10 42	−25	e 20 10	+ 1	e 27 4	SSS	—
De Bilt		68·7	319	e 11 7	0	e 20 10	0	e 21 11	SKS	e 32·6
Basle		68·8	314	e 10 54	−14	e 20 24	+13	—	—	—
Besançon		69·9	314	i 11 14	− 1	—	—	e 11 0	?	—
Aberdeen	E.	70·8	326	i 11 17	− 3	i 20 35	0	i 25 18	SS	e 38·5
Durham	N.	71·5	323	—	—	i 20 41	− 2	—	—	—
Paris		71·5	316	e 11 19	− 5	i 20 40	− 3	i 13 58	PP	e 36·1
Scoresby Sund		72·0	343	i 11 28	0	20 54	+ 5	e 14 10	PP	37·6
Kew		72·2	320	i 11 29	0	e 20 50	− 1	i 11 40	PcP	e 37·6
Rathfarnham Castle		74·7	323	i 11 42	− 1	e 22 16?	PPS	e 14 36	PP	e 37·6
Tortosa		76·1	309	e 11 13	−38	i 21 31	− 4	—	—	—

Continued on next page.

		∧	Az.	P.	O−C.	S.	O−C.	Supp.		L.
				m. s.	s.	m. s.	s.	m. s.		m.
		°	°							
Algiers Univ.	z.	76·1	305	i 11 49	− 2	—	—	c 12 17	PcP	—
Resolute Bay		76·6	4	i 11 53	− 1	c 21 37	− 3	c 12 5	PcP	c 40·2
Alicante		77·9	307	e 12 3	+ 2	i 22 10	+16	23 1	PPS	e 38·2
Toledo		79·6	310	i 12 12	+ 2	i 22 12	0	15 10	PP	—
Almeria		80·0	306	i 12 11	− 2	i 22 7	−10	15 11	PP	43·6
Tamanrasset	z.	80·6	291	i 12 15	− 1	i 18 29	?	i 13 45	?	—
Granada		80·6	307	i 11 30	−46	i 22 24	+ 1	15 21	PP	i 45·6
Malaga		81·4	307	i 11 32	−48	i 22 12	−19	i 15 10	PP	51·1
Pietermaritzburg	z.	85·8	233	i 12 44	+ 2	—	—	—	—	—
Ivigtut		86·0	344	i 12 41	− 2	c 23 2	[− 5]	—	—	—
Kimberley	z.	89·3	236	i 12 59	0	—	—	—	—	—
Lick	z.	105·1	30	e 18 33 a	PP	—	—	—	—	—
Ottawa		105·9	355	18 26	[+ 1]	24 50	[− 5]	19 6	PP	56·6
Fresno	z.	106·5	29	e 18 34 a	[+ 8]	e 22 16	PKS	e 18 47	PP	—
Tinemaha	z.	106·8	28	e 18 49	PP	—	—	—	—	—
Pasadena	z.	109·4	29	e 19 10	PP	—	—	—	—	—
Riverside	z.	109·9	29	e 19 7	PP	—	—	—	—	—
Palomar	z.	110·6	29	e 19 13	PP	—	—	—	—	—
Palisades		110·9	351	e 19 7	PP	e 28 25	PS	e 21 27	PPP	—
Chinchina		145·7	345	i 19 34	[− 6]	—	—	i 19 44	PKP_2	—
Bogota		145·7	343	i 19 43	[+ 3]	i 29 53	{− 1}	—	—	—
La Paz		161·4	308	e 20 12	[+10]	31 18	{− 2}	20 50	PKP_2	—
Huancayo		161·8	334	e 20 8	[+ 5]	—	—	—	—	e 76·4

Additional readings :—
Chatra PPN =2m.15s., PPPN =2m.20s., P*N =2m.29s., QN =3m.38s., SSN =3m.54s., SSSN =4m.2s., S*N =4m.14s., S_gN =4m.37s.
New Delhi eEN =6m.47s., SSSEN =7m.16s.
Poona iP*?E =5m.15s., iS?E =9m.25s., iE =9m.36s., QE =10m.3s., PcSE =12m.10s., ScSE =15m.54s.
Bombay PcSE =12m.17s.
Kiruna iEZ =10m.9s., eE =11m.5s., eZ =11m.47s., eScSE =19m.42s.?, eE =21m.2s., eSSSE =24m.31s., eZ =27m.12s., eE =27m.24s., eZ =29m.52s.
Upsala iE =10m.18s. and 10m.28s., eN =11m.7s., eScSE =19m.58s., eSSN =22m.36s., eQ?N =25·9m.
Skalnate Pleso e =10m.21s., ePS =18m.41s., e =20m.7s., eSSS =24m.42s.
Timisoara eN =11m.35s.
Belgrade eP?Z =9m.49s. a.
Raciborzu ePEZ =10m.9s., eZ =13m.6s., ePcSN =15m.5s., eScS =20m.7s., eScSE =20m.10s.
Ogyalla eScS =20m.16s., e =21m.36s., eSS =22m.48s., eSSS =25m.0s.
Copenhagen 19m.21s.
Prague e =10m.46s. and 10m.52s., ePS =19m.18s., eScS =20m.28s., eSS =23m.15s.
Potsdam iEZ =10m.49s., iSE =19m.13s., iPSN =19m.23s., iSKSE =20m.33s., eSSN =23m.24s., eN =25m.36s.
Cheb eScS? =20m.20s., e =20m.53s., eSSE =23m.36s.
Jena eEZ =10m.58s., eE =20m.40s.
Triest iPZ =10m.21s. a, ipP? =11m.15s., iPS =19m.41s., esS? =20m.43s., eSS =23m.47s.
Stuttgart e =11m.11s., 11m.56s., 14m.36s., and 20m.6s., eScS =20m.57s., e =23m.36s., eSS =24m.14s., ePKP,PKPZ =39m.34s.
Rome eSSSN =27m.19s.?
Strasbourg ePcP =11m.18s., e =11m.35s., ePP =13m.35s., eScS =21m.2s., e =22m.48s., eSSS =27m.36s.
Pavia e =12m.58s. and 15m.51s.
Besançon ePcP =11m.28s., e =11m.49s.
Aberdeen iE =23m.26s., eE =29m.8s.
Paris iP? =11m.35s., iPcP =11m.44s. and 12m.55s., i =13m.53s. and 14m.3s., iPP? =14m.13s., ePPP =16m.6s., e =16m.32s., 22m.32s., and 22m.48s., eSS =25m.24s.
Scoresby Sund e =15m.53s.
Kew ePPPZ =16m.2s., ePSEN =21m.2s., eSKS?EN =21m.37s., eScSEN =21m.56s., eSS =26m.44s.
Rathfarnham Castle iZ =11m.49s.
Resolute Bay ePP =14m.47s., eE =21m.52s.
Alicante Q =33m.15s.
Almeria SS =27m.26s.
Granada PS =23m.12s., SS =27m.39s., SSS =31m.42s.
Malaga PPP =17m.12s.
Ottawa PS =28m.0s.
La Paz PP =24m.42s.
Long waves were also recorded at Clermont-Ferrand and Harvard.

July 21d. 2h. 57m. 8s. Epicentre 13°·9N. 56°·7E. (as on 1947, June 16d.).

A = +·5332, B = +·8117, C = +·2385; δ = +4; h = +6;
D = +·836, E = −·549; G = +·131, H = +·199, K = −·971.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad		24·0	4	5 24	+ 7	9 37	+ 5	—	—	—
Mary		24·1	10	5 18	0	e 9 25	− 9	—	—	—
Lenkoran		25·8	347	—	—	10 13	+11	—	—	—
Stalinabad		26·8	21	i 5 43	− 1	10 10	− 9	—	—	—
Samarkand		27·2	16	e 5 46	− 1	—	—	—	—	—
Ksara		27·4	319	—	—	10 42?	+14	—	—	—
Leninakan		29·1	339	—	—	e 11 21	+25	—	—	—
Fergana		29·5	24	—	—	e 10 50	−12	—	—	—
Tashkent		29·5	19	e 6 8	0	e 10 49?	−13	—	—	—
Andijan		30·1	24	6 14	+ 1	e 11 2	−10	—	—	—
Ili		34·7	26	6 53	− 1	—	—	—	—	—
Sverdlovsk		43·0	3	e 8 2	− 1	e 14 26	−13	—	—	—
Messina	z.	43·7	312	i 7 10	−58	—	—	—	—	—
Moscow		44·3	345	e 8 17	+ 4	—	—	—	—	—
Triest	z.	48·0	321	i 8 43	0	e 19 19	SS	—	—	—
Tamanrasset	z.	49·2	288	e 8 53	+ 1	—	—	—	—	—
Prague		49·8	326	e 8 50	− 6	—	—	e 10 59	PP	—
Potsdam	z.	51·7	328	e 9 10?	− 1	—	—	—	—	—
Kimberley	z.	52·4	215	i 9 21	+ 5	—	—	—	—	—
Algiers Univ.	z.	52·8	306	e 9 17	− 2	—	—	—	—	—
Strasbourg		53·0	322	e 9 20	− 1	e 17 0	+10	e 9 24	P	—
Besançon		53·6	320	e 9 23	− 2	—	—	—	—	—
Paris		56·3	320	e 9 43	− 2	—	—	—	—	—
Malaga		58·7	305	i 9 58	− 4	—	—	—	—	—

Additional readings :—
Prague e = 9m.58s.
Paris e = 9m.48s., 9m.58s., and 10m.22s.

July 21d. 3h. 1m. 50s. Epicentre 13°·9N. 56°·7E. (as at 2h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		27·4	319	—	—	e 11 10	SS	e 16 10	?	—
Helwan	N.	28·3	308	e 7 16	PPP	e 10 48	+ 5	—	—	—
Bucharest		40·1	326	e 7 46	+ 7	e 13 44	− 2	—	—	—
Timosoara		43·6	324	e 8 32	+24	—	—	e 9 47	PP	—
Messina		43·7	312	i 8 6	− 2	—	—	—	—	—
Skalnate Pleso		46·1	328	e 8 33	+ 5	e 18 18	SS	e 10 45	?	—
Rome	N.	47·3	316	e 8 39	+ 2	e 19 13	SS	e 10 45	PP	—
Triest		48·0	321	i 8 39	− 4	e 15 35	− 6	e 19 16	SS	—
Tamanrasset	z.	49·2	288	i 8 50	− 2	—	—	—	—	—
Prague		49·8	326	e 8 43	−13	e 18 25	ScS	e 10 50	PP	e 24·6
Pavia		50·8	319	e 9 59	+55	e 21 18	SSS	e 11 32	PPP	—
Potsdam	z.	51·7	328	e 9 10	− 1	—	—	—	—	—
Jena		51·8	326	e 9 7	− 5	—	—	e 9 49	?	—
Kimberley	z.	52·4	215	i 9 19	+ 3	—	—	—	—	—
Algiers Univ.	z.	52·8	306	e 9 15	− 4	—	—	—	—	—
Strasbourg		53·0	322	e 9 19	− 2	e 16 46	− 4	e 9 6	P	—
Besançon		53·6	320	e 9 27	+ 2	—	—	e 9 20	P	—
Copenhagen		53·8	331	11 40	PP	17 2	+ 1	20 20	SS	30·2
Paris		56·3	320	e 9 39	− 6	—	—	i 9 50	P	—
Malaga		58·7	305	i 10 0	− 2	—	—	—	—	—
Scoresby Sund		73·2	340	e 11 32	− 3	e 21 0	− 2	—	—	—

Additional readings :—
Skalnate Pleso e = 11m.37s.
Prague e = 10m.15s. and 11m.37s., eE = 14m.50s., eN = 15m.1s. and 23m.52s.
Jena eE = 9m.14s., eZ = 9m.18s., eE = 9m.31s.
Paris e = 10m.6s.
Long waves were also recorded at Helsinki.

July 21d. 3h. 22m. 57s. Epicentre 13°·9N. 56°·7E. (as at 3h.1m.).

A = +·5332, B = +·8117, C = +·2385; δ = +4; h = +6;
D = +·836, E = −·549; G = +·131, H = +·199, K = −·971.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bombay	E.	16·2	70	i 3 58	+ 8	i 7 28	+37	9 11	PcP	11·6
Poona		17·1	72	i 4 8	+ 6	i 7 28	+16	—	—	—
Kodaikanal	E.	20·6	98	i 5 6	PP	i 9 33	SSS	—	—	10·8
Hyderabad	N.	21·2	76	e 8 56	PcP	—	—	—	—	—
Colombo	E.	23·8	104	5 24	+ 9	—	—	9 3?	PcP	—
New Delhi	N.	24·0	49	i 5 18	+ 1	i 9 39	+ 7	—	—	i 13·0
Mary		24·1	10	i 5 16	− 2	—	—	—	—	—
Stalinabad		26·8	21	5 43	− 1	10 22	+ 3	—	—	—
Samarkand		27·2	16	e 5 49?	+ 2	10 33?	+ 8	—	—	—
Obi-garm		27·3	22	e 5 56	+ 8	e 10 39	+12	—	—	—
Ksara		27·4	319	e 5 48?	− 1	—	—	—	—	e 16·0
Tashkent		29·5	19	e 6 8?	0	e 10 57?	− 5	—	—	—
Tiflis		29·6	342	e 6 27?	+18	—	—	—	—	—
Gori		30·0	342	e 6 14	+ 2	—	—	—	—	—
Andijan		30·1	24	6 14	+ 1	11 15	+ 3	—	—	—
Calcutta	E.	31·2	68	i 7 53	PPP	i 11 46	+17	—	—	—
Frunse		32·8	24	6 39	+ 2	i 12 2	+ 8	—	—	—
Rybach'e		33·0	26	e 6 42	+ 3	i 12 5	+ 8	—	—	—
Almata		34·1	26	e 6 50	+ 2	e 12 19	+ 5	—	—	—
Ili		34·7	26	i 6 55	+ 1	—	—	—	—	—
Bucharest	E.	40·1	326	e 7 43	+ 4	e 13 44	− 2	e 9 12	PP	—
Sverdlovsk		43·0	3	i 8 1	− 2	14 21	− 8	—	—	—
Taranto		43·4	315	e 8 25	+19	e 14 21	−14	—	—	—
Belgrade		43·5	322	e 8 4k	− 3	e 14 32	− 4	e 9 47	PP	e 30·1
Timisoara		43·6	324	e 8 18	+10	—	—	e 8 25	?	—
Messina	Z.	43·7	312	i 8 7	− 1	—	—	—	—	—
Moscow		44·3	345	8 11	− 2	14 43	− 5	—	—	—
Lwow		44·7	330	i 8 13	− 3	—	—	—	—	—
Uzhgorod		44·8	329	e 8 17	0	e 14 48	− 7	—	—	—
Skalnate Pleso		46·1	328	e 8 31	+ 3	e 15 13	− 1	e 19 34?	SSS	—
Ogyalla		46·5	325	e 8 31	0	e 15 23?	+ 4	e 10 21	PP	—
Rome	E.	47·3	316	e 8 30	− 7	—	—	—	—	—
Raciborzu		47·8	328	e 8 38	− 3	e 15 37	− 1	e 10 34	PP	—
Triest		48·0	321	i 8 40	− 3	i 15 36	− 5	i 10 37	PP	—
Bologna		49·1	319	e 8 50	− 1	e 15 56	0	e 11 15	PPP	—
Tamanrasset	Z.	49·2	288	e 8 51	− 1	e 16 22	+24	i 10 54	PP	—
Prague		49·8	326	e 8 49	− 7	e 15 48	−18	e 11 5	PP	—
Pavia		50·8	319	e 9 2	− 2	e 16 18	− 2	e 21 32	SSS	—
Cheb		50·9	325	e 9 4	− 1	e 16 14	− 7	11 9	PP	—
Collmberg	Z.	51·2	326	e 9 5	− 2	—	—	—	—	—
Potsdam		51·7	328	e 9 9	− 2	e 16 19?	−13	—	—	e 26·0
Jena		51·8	326	e 9 8	− 4	e 16 30?	− 3	e 11 11	PP	—
Zürich		52·0	320	e 9 9	− 4	—	—	—	—	—
Stuttgart		52·2	322	e 9 8	− 7	e 16 31	− 8	e 11 13	PP	29·0
Kimberley	Z.	52·4	215	i 9 22	+ 6	—	—	—	—	—
Algiers Univ.	Z.	52·8	306	i 9 15k	− 4	—	—	e 10 49	PP	—
Strasbourg		53·0	322	e 9 17	− 4	e 16 39	−11	e 11 28	PP	e 26·4
Besançon		53·6	320	9 22	− 3	—	—	e 11 25	PP	—
Copenhagen		53·8	331	—	—	16 58	− 3	—	—	25·0
Irkutsk		53·8	34	e 9 28?	+ 2	e 17 3?	+ 2	—	—	—
Upsala		54·1	337	e 9 30	+ 1	e 17 5?	0	e 12 25	PPP	e 29·0
Kabansk		55·0	36	e 9 38	+ 3	17 21	+ 4	—	—	—
Tortosa		55·6	310	e 9 45	+ 5	e 19 2	ScS	—	—	—
Alicante		55·9	307	9 55	+13	17 46	+17	12 5	PP	27·2
De Bilt		55·9	323	e 9 43	+ 1	—	—	—	—	—
Paris		56·3	320	i 9 41	− 4	i 17 29	− 5	e 11 47	PP	e 27·0
Almeria		57·2	305	9 54	+ 3	18 10	+24	12 14	PP	35·1
Granada		58·1	305	i 9 57a	− 1	18 3	+ 5	13 48	PPP	i 33·6
Malaga		58·7	305	i 10 1	− 1	e 18 25	+19	i 12 35	PP	30·0
Kew		58·9	323	e 10 0	− 3	e 17 58	−10	e 22 19	SS	e 32·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Aberdeen	E.	61·7	329	i 10 29	+ 7	e 18 26	−18	i 14 3	PPP	e 35·0
Rathfarnham Castle		62·9	324	i 10 29	− 1	e 25 23	SSS	i 10 42	?	—
Vladivostok		69·9	49	i 11 30	+15	i 20 38	+14	—	—	—
Scoresby Sund		73·2	340	e 11 35	0	e 21 2	0	—	—	40·0
Mizusawa	E.	77·1	52	—	—	29 19	?	—	—	—
Resolute Bay		89·8	353	e 25 5	PS	e 23 33	[+ 1]	e 24 1	S	e 31·2

Additional readings :—
Bucharest eN =7m.51s. and 9m.15s., eS?N =13m.53s.
Skalnate Pleso e =8m.49s., eSN =15m.16s., e =16m.8s., 19m.3s., 18m.33s., and 22m.27s.
Ogyalla eN =11m.29s., eE =15m.40s., e =16m.38s., eE =18m.9s., eSS? =19m.15s.
Raciborzu eP?N =8m.44s., ePcPN =10m.8s., ePPPE =11m.19s., eScSE =18m.33s., eN =19m.47s.
Triest ipP?Z =9m.10s., ePcP? =9m.45s., iPcS =13m.29s., esS? =16m.32s., eSS =19m.18s., esSS? =20m.31s.
Tamanrasset eZ =10m.17s.
Prague e=9m.51s., ePP=10m.50s., e=15m.36s. and 17m.17s., eSS=20m.18s., eSSS=22m.3s.
Pavia e =15m.33s. and 17m.46s.
Cheb eSS? =20m.3s., eSSS =21m.45s.
Jena eE =9m.16s., 9m.37s., and 10m.8s., ePPE =11m.19s.
Stuttgart e =9m.15s., eSSS =21m.5s.
Algiers Univ. iZ =9m.22s., eZ =9m.35s.
Strasbourg e =10m.34s., 11m.39s., 16m.30s., 17m.26s., and 22m.55s.?
Upsala eSE =16m.47s., e =18m.26s., eE =19m.25s., eQN =22·2m.
Alicante PPP =13m.20s., PcS =14m.56s., PS =17m.57s., ScS =19m.28s., SS =21m.32s., SSS =23m.34s.
Paris i =9m.47s., ePcP =10m.49s., e =10m.57s., iPPP =13m.9s., iPS =17m.44s., iPPS =17m.57s., i =18m.18s., eScS =19m.29s., eSSS? =23m.43s.
Granada PcS =14m.59s., SS =21m.48s.
Malaga ePPP =13m.49s.
Aberdeen iE =10m.54s., iPPE =11m.42s.
Resolute Bay eEN =29m.46s.
Long waves were also recorded at Tananarive, La Plata, and Huancayo.

July 21d. 4h. 6m. 34s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·020 (as on 12d.).

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.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Khorog	1·2	48	i 0 22	− 6	i 0 43	− 6	—	—	—
Obi-garm	2·1	342	i 0 40	+ 3	i 1 10	+ 4	—	—	—
Stalinabad	2·3	323	i 0 41	+ 1	i 1 13	+ 3	—	—	—
Dzhergetal	2·6	12	i 0 44	+ 1	e 1 18	+ 1	—	—	—
Murgab	3·2	59	e 0 49	− 2	e 1 27	− 3	—	—	—
Fergana	3·8	15	e 1 0	+ 1	i 1 46	+ 2	—	—	—
Samarkand	4·1	319	i 1 6	+ 3	—	—	—	—	—
Andijan	4·3	20	e 1 5	0	1 55	0	—	—	—
Tashkent	4·7	349	e 1 13	+ 3	i 2 8	+ 3	—	—	—
Naryn	6·4	41	—	—	i 2 42	− 3	—	—	—
Frunse	6·9	26	i 1 42	+ 2	i 3 0	+ 3	—	—	—
Rybach'e	7·2	35	e 1 43	− 1	—	—	—	—	—
Almata II	8·4	37	e 2 3	+ 3	—	—	—	—	—
Ili	8·8	33	i 2 2	− 3	e 3 40	− 3	—	—	—
New Delhi	9·8	143	e 2 10	− 8	4 13	+ 7	2 41	P_g	—

Additional readings :—
New Delhi QEN =3m.19s., eE =3m.39s., iEN =3m.46s.

July 21d. 20h. 25m. 49s. Epicentre 45°·0N. 107°·5E. (as given by U.S.S.R.).

A = −·2133, B = +·6767, C = +·7047 ; δ = +2 ; h = −4 ;
D = +·954, E = +·301 ; G = −·212, H = +·672, K = −·709.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kabansk	7·1	356	e 1 55?	+ 7	3 4?	− 6	—	—	—
Irkutsk	7·6	344	e 1 56	+ 1	e 3 20?	− 3	—	—	—
Nanking	15·7	142	e 4 34	+50	e 8 4	?	—	—	e 9·8
Kurmenty	21·0	275	i 4 47	0	—	—	—	—	—
Almata II	21·6	277	e 4 51	− 3	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ili		21·7	278	4 50	− 5	—	—	—	—	—
Almata		21·9	277	e 4 55?	− 2	e 8 39?	−15	—	—	—
Rybach'e		22·8	274	e 5 10	+ 5	—	—	—	—	—
Naryn		23·1	272	e 5 7	− 1	9 5	−11	—	—	—
Murgab		25·8	266	e 5 37	+ 3	e 9 57	− 5	—	—	—
Andijan		26·0	272	e 5 50?	+14	—	—	—	—	—
Fergana		26·5	272	e 5 37	− 4	—	—	—	—	—
Dzhergetal		27·4	271	e 5 50	+ 1	—	—	—	—	—
Obi-garm		28·7	270	e 5 59	− 2	—	—	—	—	—
Stalinabad		29·4	271	e 6 11	+ 4	10 56	− 5	—	—	—
Sverdlovsk		31·2	309	e 6 23	0	—	—	—	—	—
Kiruna		48·3	330	—	—	e 19 17	SS	—	—	e 24·2
Ksara		54·8	284	—	—	e 20 2	SS	—	—	e 24·2
Istanbul		55·3	296	—	—	e 21 47	SS	—	—	e 24·4
Cheb		60·1	312	—	—	e 21 43	SS	e 25 5	SSS	e 31·7

Long waves were also recorded at other European stations.

July 21d. Readings also at 0h. (near Dzhergetal (2)), 1h. (Tamanrasset and Algiers Univ.), 2h. (Apia), 3h. (Raciborzu and near Copiapo), 4h. (near La Paz), 5h. (near Dzhergetal (2)), 6h. (Ksara), 8h. (Seattle), 9h. (Apia), 10h. (Mizusawa), 11h. (Huancayo, Tamanrasset, Collmberg, Stuttgart, near Zürich, and Basle), 12h. (Santa Lucia), 14h. (Almata, Andijan, near Ili, Naryn, Krasnogorka, Kurmenty, near Dzhergetal, and near Apia), 18h. (near Dzhergetal), 19h. (Copiapo), 20h. (near Istanbul and near Dzhergetal), 22h. (near Kurmenty).

July 22d. 9h. 0m. 55s. Epicentre 51°·7N. 178°·5W. (as on 1944, February 23d.).

Suggested deep, 60km.

$A = -·6221$, $B = -·0163$, $C = +·7828$; $\delta = +5$; $h = -6$;
$D = -·026$, $E = +1·000$; $G = -·782$, $H = -·020$, $K = -·622$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mitchell Field		1·2	79	i 0 27	+ 3	i 0 43	+ 2	—	—	—
College		20·6	38	4 45	+ 2	—	—	—	—	—
Victoria		34·9	73	6 54	− 1	—	—	—	—	—
Shasta Dam		39·4	83	i 7 32	− 1	—	—	—	—	—
Hungry Horse		40·4	68	i 7 41	0	—	—	—	—	—
Tinemaha	z.	44·2	84	e 8 27	+15	—	—	—	—	—
Haiwee	z.	45·0	85	e 8 32	+13	—	—	—	—	—
Mount Wilson	z.	46·2	87	e 8 28	0	—	—	e 8 38	pP	—
Boulder City		47·0	84	e 8 33	− 2	—	—	—	—	—
Palomar	z.	47·5	88	e 8 37	− 1	—	—	—	—	—
Tucson		52·0	84	e 9 11	− 2	—	—	—	—	—
Florissant		59·7	65	e 10 8	− 1	e 18 16	− 3	—	—	—
St. Louis		59·9	65	e 10 18	+ 8	e 18 26	+ 5	e 10 32	pP	—
Cleveland		62·6	57	i 10 28k	0	—	—	i 10 46	pP	—
Ottawa		62·7	50	i 10 28	− 1	—	—	—	—	39·1
Morgantown		64·8	58	i 10 41	− 2	—	—	i 10 57	pP	—
Harvard		66·9	50	i 10 43	−13	—	—	e 26 59	Q	e 40·7
Fordham		67·0	53	i 10 56	− 1	—	—	i 11 12	pP	—
Weston		67·1	50	i 10 58	+ 1	—	—	—	—	—
Collmberg	z.	76·9	353	e 11 59	+ 3	—	—	—	—	—
Stuttgart	z.	79·7	356	e 12 14	+ 3	—	—	—	—	—
Paris		79·9	0	i 12 15	+ 3	—	—	e 12 28	pP	—
Strasbourg		79·9	356	i 12 16	+ 4	—	—	—	—	—
Besançon		81·4	358	e 12 23	+ 3	—	—	e 12 48	pP	—
Ksara		89·7	332	e 13 25	pP	e 24 33	PS	—	—	—
Kimberley	z.	151·2	314	i 19 58	[+ 9]	—	—	—	—	—

Paris gives also esP? = 12m.45s., e = 12m.59s.
Long waves were also recorded at Scoresby Sund.

July 22d. 11h. 19m. 54s. Epicentre 39°·6N. 71°·3E. (as on 1951, May 19d.).

A = +·2477, B = +·7318, C = +·6349; δ = −2; h = −2;
D = +·947, E = −·321; G = +·204, H = +·601, K = −·773.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Dzhergetal	0·4	190	i 0 6	− 7	—	—	—	—
Fergana	0·9	25	i 0 16	− 4	i 0 29	− 5	—	—
Andijan	1·4	35	e 0 26?	− 1	i 0 48	+ 2	—	—
Obi-garm	1·5	234	i 0 28	0	—	—	i 0 35	P_g
Khorog	2·1	172	e 0 37	0	e 1 8	+ 4	—	—
Stalinabad	2·2	242	i 0 42	+ 4	i 1 12	+ 6	—	—
Tashkent	2·3	318	i 0 42	+ 2	i 1 14	+ 5	—	—
Tchimkent	3·0	335	e 0 55	P*	1 35	S*	—	—
Samarkand	3·3	271	i 1 0	P*	1 30	− 5	i 1 4	P_g
Naryn	4·0	61	e 1 5	+ 1	2 18	S_g	i 1 13	P*
Frunse	4·1	36	e 1 16	P*	i 2 12	S_g	—	—
Rybach'e	4·6	50	e 1 26	P*	i 2 40	S_g	—	—
Krasnogorka	4·7	37	e 1 13	− 1	—	—	—	—
Almata	5·6	47	i 1 46	P*	i 3 0	S_g	—	—
Almata II	5·8	49	e 1 32	+ 3	—	—	i 1 51	P_g
Ili	6·1	43	i 1 34	0	—	—	i 1 49	P*
Kurmenty	6·3	51	i 1 35	− 1	—	—	—	—
Mary	7·7	258	—	—	3 16	− 9	—	—
Ashkabad	10·2	265	—	—	e 4 26	− 1	—	—

Additional readings:—
Samarkand S* —1m.36s., S_g —1m.46s.
Naryn iS* —2m.5s.

July 22d. Readings also at 0h. (Oaxaca, Puebla, Tacubaya, and Vera Cruz), 1h. (Apia, Harvard, Messina, La Paz, near Antofagasta, Copiapo (2), and near Dzhergetal), 2h. (Stuttgart and near Apia), 3h. (Collmberg, Stuttgart, Jena, Weston, Mount Wilson, Palomar, Tinemaha, near Mitchell Field, Almata II, Dzhergetal, Fergana, Frunse, Ili, Kurmenty, Murgab, Naryn, Samarkand, Tchimkent, near Obi-garm, Khorog, Stalinabad, and Tashkent), 5h. (near Apia), 6h. (Shemakha and near Dzhergetal), 7h. (near Alicante (2)), 8h. (Besançon and near Apia), 9h. (near Almata II, Chilisk, and Kurmenty), 10h. (near Athens), 11h. (near La Paz (4)), 12h. (Prague, Huancayo, near La Paz, and near Alicante), 13h. (Andijan, Naryn, Tchimkent, near Dzhergetal, Fergana, Khorog, Murgab, Obi-garm, Stalinabad, and near Alicante (2)), 14h. (Ksara), 15h. (Granada), 16h. (Apia, Christchurch, La Paz, Jena, and near Dzhergetal), 17h. (Ksara, Strasbourg, and Triest (2)), 18h. (Copiapo, Santa Lucia, and near Dzhergetal), 19h. (Almata II), 21h. (Messina, Fergana, Naryn, Samarkand, Stalinabad, Tchimkent, near Andijan, Dzhergetal (2), Khorog, Obi-garm; also Frunse, near Chilisk, Ili, and Krasnogorka, several shocks), 22h. (Victoria, near Tacubaya, and near Dzhergetal), 23h. (Guam and Tacubaya).

July 23d. 16h. 40m. 3s. Epicentre 13°·9N. 56°·7E. (as on 21d.).

A = +·5332, B = +·8117, C = +·2385; δ = +4; h = +6;

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bombay	E.	16·2	70	e 3 57?	+ 7	—	—	—	—	—
Ashkabad		24·0	4	i 5 19	+ 2	i 9 31	− 1	—	—	—
Mary		24·1	10	5 23	+ 5	—	—	—	—	—
Lenkoran		25·8	347	5 31	− 3	—	—	—	—	—
Stalinabad		26·8	21	i 5 52	+ 8	i 10 31	+12	—	—	—
Baku		27·1	348	e 5 47	+ 1	—	—	—	—	—
Samarkand		27·2	16	i 5 46	− 1	10 27	+ 2	—	—	—
Ksara		27·4	319	e 5 49	0	e 10 59	+31	—	—	—
Kirovobad		28·2	345	e 5 55	− 1	i 11 44	88	—	—	—
Erevan		28·3	341	e 5 55	− 2	e 10 37	− 6	—	—	—
Helwan		28·3	308	e 5 55	− 2	11 21	+38	7 5	PP	—
Murgab		28·8	28	e 6 7	+ 5	e 10 55	+ 4	—	—	—
Fergana		29·5	24	e 6 18?	+10	—	—	—	—	—
Tashkent		29·5	19	e 6 8	0	i 11 3	+ 1	—	—	—
Andijan		30·1	24	i 6 12	− 1	e 11 13	+ 1	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tchimkent		30·4	19	i 6 15	− 1	i 11 17	+ 1	—	—	—
Frunse		32·8	21	—	—	i 12 0	+ 6	—	—	—
Rybach'e		33·0	26	e 6 42	+ 3	e 12 3	+ 6	—	—	—
Almata		34·1	26	—	—	i 12 16	+ 2	—	—	—
Istanbul		36·2	324	e 7 1	− 5	e 12 41	− 6	e 8 29	PP	e 22·0
Kishinev		40·4	331	e 7 39	− 2	—	—	—	—	—
Moscow		44·3	345	e 8 11	− 2	e 14 42	− 6	—	—	—
Lwow		44·7	330	i 8 13	− 3	e 14 44	−10	—	—	—
Uzhgorod		44·8	329	e 8 14	− 3	—	—	—	—	—
Pretoria	z.	48·2	215	i 12 24?	?	—	—	—	—	—
Tamanrasset	z.	49·2	288	e 8 49	− 3	—	—	e 10 15	PcP	—
Prague		49·8	326	e 9 6	+10	e 16 5	− 1	e 10 52	PP	—
Pulkovo		49·8	343	e 8 53	− 3	e 15 59	− 7	—	—	—
Potsdam		51·7	328	e 9 8	− 3	e 16 29	− 3	e 16 33	S	e 29·0
Jena		51·8	326	e 9 8	− 4	—	—	—	—	—
Stuttgart		52·2	322	e 9 10?	− 5	—	—	—	—	e 30·0
Kimberley	z.	52·4	215	i 9 19	+ 3	—	—	—	—	—
Algiers Univ.	z.	52·8	306	e 9 17	− 2	—	—	—	—	—
Strasbourg		53·0	322	e 9 27	+ 6	e 21 27	?	e 12 27	PP	e 32·0
Besançon		53·6	320	e 9 33	+ 8	—	—	—	—	—
Copenhagen		53·8	331	—	—	17 3	+ 2	—	—	—
Irkutsk		53·8	34	e 9 27	+ 1	e 16 58	− 3	—	—	—
Kabansk		55·0	36	e 9 36	+ 1	e 17 17	0	—	—	—
Alicante		55·9	307	10 23	?	18 46	?	12 41	PP	e 29·6
Paris		56·3	320	e 9 49	+ 4	—	—	—	—	—
Granada		58·1	305	i 9 57k	− 1	e 17 57	− 1	10 10	pP	e 24·8
Kiruna		58·8	346	—	—	e 18 1?	− 6	e 18 20	PS	e 29·0
Vladivostok		69·9	49	e 11 13	− 2	—	—	—	—	—

Additional readings :—
Helwan iZ =6m.37s.
Prague e =11m.19s. and 12m.27s.
Jena eZ =9m.19s., eE =9m.46s.
Besançon e =9m.9s.
Alicante PPP =14m.23s., PcS =15m.19s., PS =18m.57s., ?, SS =22m.44s.
Granada PcP =10m.45s.
Kiruna eSN =18m.8s., eSSE =21m.48s., eSSN =21m.56s., eSSSEN =24m.14s., eE = 25m.46s. and 26m.29s.

July 23d. 19h. 16m. 42s. Epicentre 12°·98. 172°·7W. Depth of focus 0·010.
(as on 1951, March 22d.).

Intensity I-II at Apia. Epicentre 12°·58. 172°W. (U.S.C.G.S.). Depth 100km.
Quarterly Seismological Bulletin for Apia, 3rd quarter, p. 4.

A = −·9672, B = −·1239, C = −·2218 ; δ = +2 ; h = +7 ;
D = −·127, E = +·992 ; G = +·220, H = +·028, K = −·975.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		
		°	°	m. s.	s.	m. s.	s.	m. s.		
Apia		1·3	135	i 0 24	0	i 0 51	+ 9	—	—	
Branner	z.	68·9	41	e 10 58a	+ 2	—	—	—	—	
Berkeley	z.	69·2	41	i 10 59a	+ 1	—	—	e 11 34	pP	
Pasadena	z.	69·8	46	i 11 2	0	—	—	e 11 11	pP	
Fresno	z.	70·1	43	e 11 4	0	—	—	—	—	
Palomar	z.	70·3	47	i 11 5	0	—	—	—	—	
Riverside	z.	70·3	46	i 11 4	− 1	—	—	e 11 34	pP	
Shasta Dam		70·8	38	i 11 9	+ 1	—	—	—	—	
China Lake		71·1	45	e 11 9	− 1	—	—	—	—	
Tinemaha	z.	71·3	43	i 11 12	+ 1	—	—	—	—	
Boulder City		73·1	56	i 11 22	0	e 20 59	+19	—	—	
Tucson		74·2	51	i 11 28	0	—	—	e 11 58	pP	
College		79·8	11	11 58	− 1	—	—	—	—	
Hungry Horse		80·0	36	i 11 59	− 1	—	—	—	—	
Collmberg	z.	141·4	354	e 19 8	[−12]	—	—	—	—	
Jena		141·9	355	e 19 10	[−11]	—	—	e 19 13	PKP	
Prague		142·5	353	e 19 15	[− 7]	e 21 30	PP	e 19 46	pPKP	
Paris		144·0	6	i 19 18	[− 6]	—	—	e 19 50	pPKP	
Stuttgart	z.	144·2	358	e 19 18	[− 7]	—	—	e 19 48	pPKP	
Strasbourg		144·4	359	e 19 19	[− 6]	e 19 56	sPKP	e 19 49	pPKP	

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Besançon	145·7	1	e 19 22	[− 5]	—	—	—	—
Ksara	146·7	314	e 19 26?	[− 3]	e 35 48	PPS	—	—
Clermont-Ferrand	147·1	5	e 19 32	[+ 2]	—	—	e 19 50	pPKP
Tamanrasset z.	170·0	—	e 19 45	[−11]	—	—	e 21 11	$pPKP_2$

Additional readings :—
Berkeley iZ = 11m.5s. and 11m.9s.
Paris e = 19m.27s., 20m.10s., and 20m.19s.
Besançon iPKP = 19m.26s.
Clermont-Ferrand e = 20m.26s.

July 23d. Readings also at 0h. (Messina), 1h. (Tacubaya and Victoria), 2h. (Grahamstown and near Dzhergetal), 4h. (Mizusawa, Besançon, Paris, Stuttgart, Prague, Collmberg, Copenhagen, Morgantown, Weston, and Mount Wilson), 8h. (near Antofagasta), 9h. (near Sofia (2) and near Manila), 10h. (near Apia), 11h. (Manila), 12h. (near Sofia), 15h. (Malaga), 16h. (Tchimkent, near Andijan, Dzhergetal (2), Obi-garm, Stalinabad, and near Fort de France), 17h. (Istanbul, Prague, near Belgrade, Bucharest, Sofia, Timisoara, and near Granada (2)), 18h. (Collmberg, near Dzhergetal, and near Tananarive), 20h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Harvard, Weston, Morgantown, Palisades, and Kew), 21h. (near Apia), 22h. (near Dzhergetal, Fergana, Khorog, Obi-garm, Stalinabad, and near Tchimkent), 23h. (Budapest and near Dzhergetal).

July 24d. 9h. 27m. 58s. Epicentre 46°·3N. 7°·5E. (as on 1951, January 14d.).

Intensity V-VI at Montana ; V at Sion Leukerbad Kandesteg, and Adelboden ; IV at Chateau-d'Oex and Val de Bagnes.
Epicentre 46°·3N. 7°·5E. Macroseismic radius 30km.

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

A = +·6874, B = +·0905, C = +·7206 ; δ = −3 ; h = −4 ;
D = +·131, E = −·991 ; G = +·714, H = +·094, K = −·693.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel	0·8	332	i 0 18	0	i 0 29	− 2	0 16	P*	—
Basle	1·3	3	i 0 25	0	e 0 42	− 2	—	—	—
Zürich	1·3	35	i 0 26a	+ 1	i 0 44	0	—	—	—
Besançon	1·4	312	e 0 26	− 1	i 0 46	0	i 0 30	P_g	—
Pavia	1·6	134	i 0 34	+ 4	i 0 47	− 4	e 0 55	S_g	—
Ebingen	2·1	28	e 0 41	+ 4	e 1 9	S_g	—	—	—
Ravensburg	2·1	44	i 0 42k	+ 5	i 1 10	S_g	e 1 9	S_g	—
Strasbourg	2·3	5	e 0 39	− 1	e 1 6	− 3	i 0 51	P_g	—
Stuttgart	2·7	24	i 0 44a	− 1	i 1 21	+ 2	i 0 52	P_g	—
Karlsruhe	2·8	13	e 0 51	+ 4	i 1 32	S_g	e 1 8	?	i 1·7
Clermont-Ferrand	3·1	260	i 1 1	P_g	i 1 34	S*	—	—	—
Bologna	3·2	124	e 1 16	P_g	—	—	—	—	e 1·8
Paris	4·2	308	i 1 6	− 1	i 1 54	− 3	i 1 24	P_g	—
Triest	4·4	97	—	—	e 2 5	+ 3	—	—	e 2·6
Cheb	5·0	39	e 1 34	P_g	e 2 25	+ 7	e 2 39	S_g	e 2·8
Jena	5·3	29	e 1 34?	P*	e 2 53	S_g	e 1 45	P_g	—
Prague	6·0	48	e 1 30	− 2	e 2 35	− 8	e 2 2	P_g	—
Collmberg	6·2	34	e 1 37	+ 2	e 3 17	S*	e 1 59	P_g	—
Raciborzu	8·1	58	e 2 29	P*	e 3 36	+ 1	e 4 24	S_g	—

Additional readings :—
Besançon i = 36m. and 41s., iS_g = 56s.
Ebingen e = 1m.12s., eS_g? = 1m.20s.
Strasbourg eP* = 45s., i = 1m.1s., iS* = 1m.14s., iS_g = 1m.17s.
Stuttgart eP*Z = 48s., iSZ = 1m.12s., iSZ = 1m.16s., iS*Z = 1m.24s., iS_gZ = 1m.30s., and many other i readings.
Paris iP* = 1m.14s., iS_g = 2m.21s. and other i readings.
Jena eP*?N = 1m.41s., eE = 1m.50s. and 2m.0s., eN = 2m.48s., eE = 2m.56s., eEN = 3m.1s.
Prague i = 1m.54s., eS* = 3m.4s., eS_g = 3m.19s. and other unidentified e readings.
Collmberg eEZ = 1m.51s., eZ = 2m.6s., 3m.21s., eE = 3m.24s., eZ = 3m.29s., eE = 3m.39s., eS_gZ = 3m.41s.
Raciborzu eS_gE = 4m.21s.
Long waves were also recorded at De Bilt, Potsdam, and Skalnate Pleso.

July 24d. 14h. 0m. 3s. Epicentre 36°·4N. 141°·1E. Depth of focus 0·005.
(as on 1948, August 14d.).

Intensity IV at Onahama, Mito, Manabe (Ibaragi), Numata (Gumma), and Batto ; II-III at Inawashiro and Hukusima. Epicentre 36°·3N. 141°·2E. Depth 50km.
Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, pp. 164, 165, with macroseismic chart.

$A = -\cdot6279$, $B = +\cdot5067$, $C = +\cdot5908$; $\delta = +5$; $h = 0$;
$D = +\cdot628$, $E = +\cdot778$; $G = -\cdot460$, $H = +\cdot371$, $K = -\cdot807$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Mito	0·5	268	0 12k	− 1	0 20	− 3
Onahama	0·6	343	0 13k	− 1	0 21	− 4
Tyosi	0·7	196	0 15	0	0 24	− 3
Tukubasan	0·8	257	0 16	− 1	0 27	− 2
Shirakawa	1·0	315	0 19	0	0 31	− 2
Utunomiya	1·0	279	0 18	− 1	0 33	0
Tokyo	1·3	237	0 23k	0	0 40	0
Hukusima	1·4	339	0 24k	0	0 41	− 2
Inawasiro	1·4	326	0 24a	0	0 42	− 1
Kumagaya	1·4	260	0 26k	+ 2	0 40	− 3
Yokohama	1·5	231	0 28	+ 2	—	—
Maebasi	1·6	270	0 28k	+ 1	0 44	− 3
Titibu	1·7	256	0 29	+ 1	0 49	− 1
Mera	1·8	215	0 21	− 9	0 37	−15
Sendai	1·9	355	0 29	− 2	0 52	− 2
Isinomaki	2·0	1	0 31	− 1	0 56	− 1
Yamagata	2·0	342	0 32	0	0 57	0
Ajiro	2·1	230	0 40	+ 6	—	—
Hunatu	2·1	245	0 36	+ 2	1 10	+11
Oiwaka	2·1	268	0 36	+ 2	—	—
Osima	2·1	221	0 37	+ 3	1 11	+12
Kohu	2·2	249	0 37	+ 2	1 9	+ 7
Matusiro	2·3	274	0 39	+ 2	1 6	+ 2
Nagano	2·3	277	0 39	+ 2	—	—
Sakata	2·3	338	0 50	+13	1 27	+23
Takada	2·4	287	0 46	+ 8	—	—
Matumoto	2·5	266	0 43	+ 4	—	—
Shizuoka	2·6	237	0 43	+ 2	—	—
Iida	2·8	252	0 50	+ 6	1 26	+ 9
Mizusawa	2·9	0	0 41	− 4	1 10	− 9
Omaesaki	3·0	232	0 55	+ 8	—	—
Hamamatu	3·2	239	0 53	+ 4	—	—
Toyama	3·2	275	0 55	+ 6	1 38	+11
Miyako	3·3	12	0 50	− 1	—	—
Morioka	3·3	1	0 50	− 1	—	—
Akita	3·4	346	0 55	+ 3	1 43	+11
Hatidyozima	3·4	198	1 45	S	(1 45)	+13
Nagoya	3·5	250	0 59	+ 5	1 47	+13
Wazima	3·5	289	0 54	0	—	—
Hukui	3·9	266	0 55	− 4	—	—
Hatinohe	4·1	4	0 59	− 3	1 46	− 3
Hikone	4·1	255	1 5	+ 3	1 57	+ 8
Kameyama	4·1	249	1 13	+11	2 4	+15
Tsuruga	4·2	261	1 9	+ 6	2 6	+14
Aomori	4·4	357	1 13	+ 7	—	—
Owase	4·6	242	1 25	+16	—	—
Mori	5·7	356	1 40	+16	—	—
Urakawa	5·9	12	2 6	?	—	—

July 24d. 17h. 45m. 41s. Epicentre 19°·5N. 101°·5W.

A = −·1881, B = −·9244, C = +·3318; δ = −1; h = +5;
D = −·980, E = +·199; G = −·066, H = −·325, K = −·943.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guadalajara		2·1	305	0 58	S	(0 58)	− 6	i 1 18	S_g	1·6
Tacubaya		2·2	93	0 44	+ 6	1 3	− 3	—	—	—
Manzanillo		2·7	260	1 2	P_g	i 1 13	− 6	i 1 26	S*	1·7
Puebla		3·1	99	0 55	+ 4	—	—	i 1 8	P_g	2·6
Oaxaca		5·1	118	1 23	+ 3	—	—	i 1 35	P*	2·4
Vera Cruz		5·1	92	1 26	+ 6	2 23	+ 3	i 1 36	P*	2·5
Merida		11·3	81	e 4 10	?	e 4 32	−22	—	—	i 5·7
Tucson		15·2	328	e 3 43	+ 5	e 6 50	+22	—	—	—
Palomar		19·4	318	e 4 31	+ 1	—	—	—	—	—
Boulder City		20·2	327	e 4 40	+ 1	—	—	—	—	e 10·8
Riverside	Z.	20·2	318	i 4 39$_a$	0	—	—	—	—	—
Pasadena		20·8	318	i 4 45	0	e 8 41	+ 8	—	—	i 12·9
St. Louis		21·4	23	i 4 53	+ 2	i 8 54	+ 9	i 5 10	pP	i 14·8
Florissant		21·5	23	e 4 54	+ 2	e 8 57	+10	e 5 15	pP	—
China Lake		21·6	323	e 4 52	− 2	—	—	—	—	—
Tinemaha	Z.	22·8	323	i 5 5	0	—	—	—	—	—
Fresno		23·5	322	e 5 11	− 1	—	—	e 5 35	pP	e 13·3
Lick		25·0	320	e 5 26	− 1	—	—	—	—	—
Berkeley		25·7	320	e 5 39	+ 6	e 10 53	+52	—	—	e 13·1
Morgantown		27·3	37	i 6 6	pP	e 10 28	+ 1	—	—	—
Shasta Dam		27·6	325	e 6 12	pP	—	—	—	—	—
Cleveland		27·7	32	e 5 53$_a$	+ 1	i 10 32	− 1	i 6 11	pP	e 12·4
Hungry Horse		30·5	344	i 6 16	− 1	—	—	i 9 10	PcP	—
Bogota		30·6	114	e 6 13	− 5	e 11 17	− 3	—	—	—
Palisades		31·8	41	e 6 26	− 2	—	—	e 6 51	pP	—
San Juan		33·4	84	i 6 37	− 5	—	—	i 6 58	pP	—
Ottawa		33·5	32	6 42	− 1	11 59	− 6	8 26	PPP	—
Harvard		34·1	40	i 7 10	pP	—	—	—	—	—
Weston		34·2	40	e 7 10	pP	—	—	—	—	—
Huancayo		40·6	137	e 7 44	+ 1	—	—	e 7 54	pP	e 17·6
La Paz		48·5	134	i 8 42	− 4	15 43	− 5	—	—	—
College		54·7	338	9 29	− 4	—	—	i 9 46	pP	—
Granada		84·5	53	i 12 34$_a$	− 2	23 4	+ 2	12 49	PcP	—
Alicante		86·4	50	12 44	− 1	23 22	+ 1	16 14	PP	e 44·0
Besançon		87·1	40	e 12 44	− 5	—	—	—	—	—
Tamanrasset	Z.	97·3	63	e 13 32	− 4	—	—	e 13 48	PcP	—
Ksara		113·2	38	e 9 41	?	e 22 27	PKS	e 29 26	PS	—

Additional readings :—
Guadalajara S = 1m.30s.
Puebla i = 1m.19s.
Oaxaca i = 1m.55s.
Palomar i = 4m.35s., iZ = 5m.14s.
Riverside iZ = 4m.54s., 4m.59s., and 5m.18s.
Pasadena i = 5m.0s., iNZ = 5m.5s., i = 5m.21s., eEZ = 7m.2s.
St. Louis isP = 5m.22s.
Florissant esP = 5m.23s., isS = 9m.28s.
China Lake iEN = 5m.46s., iE = 6m.1s., eN = 7m.16s.
Tinemaha iZ = 5m.21s. and 5m.28s.
Cleveland ipPZ = 6m.14s., esSN = 11m.32s.
San Juan i = 6m.48s.
Ottawa i = 7m.2s., SS = 14m.35s.
Alicante PPP = 18m.14s., ScS = 23m.52s.
Long waves were also recorded at Seattle.

July 24d. Readings also at 0h. (Apia and Brisbane), 1h. (Brisbane, Jena, and near Dzhergetal), 2h. (Santa Lucia), 3h. (near Apia), 4h. (near Huancayo, near Kurmenty, and near Dzhergetal), 5h. (Palomar, Pasadena, Tinemaha, near Santa Clara, near Mizusawa, near Dzhergetal, and near Kurmenty), 6h. (Huancayo and near Santa Clara), 8h. (Mount Wilson, Palomar, Tinemaha, and near Dzhergetal), 9h. (Almata, Frunse, Naryn, Rybach'e, near Almata II, Chilisk, Ili, Krasnogorka, and Kurmenty (2)), 10h. (near Ashkabad), 11h. (near Alicante), 12h. (Mizusawa and near Dzhergetal), 14h. (near Istanbul), 15h. (near Almata, Almata II, Chilisk, Ili, and Kurmenty), 16h. (near Huancayo), 17h. (Manila and near Alicante), 18h. (near Yalta), 19h. (Seattle and Victoria), 20h. (Manila), 21h. (near Krasnogorka and near Apia), 22h. (Victoria), 23h. (Victoria, Puebla, Vera Cruz, near Tacubaya, and near Khorog).

July 25d. 10h. 47m. 30s. Epicentre 46°·5N. 27°·5W. (as on 1950, Feb. 8d.).

$A = +\cdot6127$, $B = -\cdot3189$, $C = +\cdot7231$; $\delta = -3$; $h = -4$;
$D = -\cdot462$, $E = -\cdot887$; $G = +\cdot641$, $H = -\cdot334$, $K = -\cdot691$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rathfarnham Castle		15·3	56	i 3 33	− 6	e 6 23	− 7	e 3 46	PP	e 7·0
Durham	E.	18·3	54	i 4 18	+ 1	—	—	—	—	—
Aberdeen	E.	18·9	45	e 4 19	− 5	e 8 1	+ 8	—	—	e 9·3
Granada		20·2	110	i 4 41a	+ 2	8 29	+ 8	5 11	PPP	10·6
Paris		20·3	73	i 4 41	+ 1	i 8 29	+ 6	i 4 55	PP	e 9·3
Almeria		21·0	108	i 4 50	+ 3	8 30?	− 7	—	—	—
Clermont-Ferrand		21·2	81	e 4 46	− 3	—	—	e 5 8	PP	—
Alicante		21·5	102	4 51	− 1	8 49	+ 2	5 30?	PPP	e 10·7
De Bilt		21·9	62	—	—	e 9 4	+10	—	—	e 11·5
Besançon		22·8	76	e 5 5	0	—	—	e 5 10	P	—
Witterveen	Z.	22·9	59	i 5 6	0	—	—	—	—	—
Strasbourg		23·8	71	e 5 8	− 7	e 9 35	+ 7	e 5 40	PP	e 11·3
Scoresby Sund		24·2	3	e 5 17	− 2	9 48	+13	—	—	15·9
Stuttgart		24·7	71	e 5 23	− 1	e 9 40	− 4	e 11 30?	Q	12·5
Jena	E.	25·9	67	e 5 34?	− 1	—	—	e 6 38	PPP	—
Potsdam		26·8	62	e 5 51?	+ 7	—	—	—	—	e 13·5
Prague		27·9	67	e 6 4	+10	—	—	e 6 51	PP	—
Weston		31·3	280	e 6 25	+ 1	—	—	—	—	—
Tamanrasset	Z.	35·6	120	i 7 4k	+ 3	e 8 29	PP	i 7 35	?	—
Istanbul	Z.	40·5	77	e 7 41	− 1	—	—	—	—	—
Ksara		48·8	82	e 5 0	?	—	—	e 13 1	?	—
Tinemaha	Z.	64·7	299	e 10 47	+ 5	—	—	—	—	—
China Lake	E.	65·1	297	e 10 46	+ 1	—	—	—	—	—

Additional readings :—
Rathfarnham Castle ipP?Z =3m.39s.
Paris iPP =4m.47s., i =5m.2s., e =5m.11s., i =5m.18s., and 5m.50s.
Alicante SS =9m.29s., PcS =12m.21s.
Strasbourg e =5m.13s., 5m.20s., and 6m.37s.
Stuttgart eZ =5m.35s. and 5m.40s., e =9m.54s.
Jena eEN =5m.41s., eN =5m.56s.?, eE =5m.59s.
Prague e =6m.19s. and 10m.30s.
Long waves were also recorded at Palisades.

July 25d. 12h. Undetermined shock.

Bogota ePEN =22m.5s., eSEN =26m.3s.
Tacubaya eP =22m.42s., eS =25m.44s.
Huancayo e =24m.0s., eL =30m.10s.
Cleveland iPEZ =24m.40s.k.
Morgantown iP =24m.24s., e =25m.14s.
Palisades iP =24m.50s.
Ottawa i =25m.21s.
Palomar iPZ =25m.24s., eZ =25m.37s., ePcPZ =27m.54s.
Riverside iPZ =25m.29s., iPcPZ =27m.55s.
Pasadena iPZ =25m.34s.
China Lake ePEN =25m.40s.
Tinemaha iPcPZ =28m.5s.
Long waves were also recorded at Scoresby Sund.

July 25d. 17h. 13m. 32s. Epicentre 42°·5N. 143°·7E. Depth of focus 0·030.

Intensity V at Otu, Hiroo, Nisibetu, Attoko, Turui, and Siranuka ; IV at Kusiro, Obihiro, Urakawa, Nemuro, Kenebetu, Misono, Akabetu, Chanai, etc., ; II-III at Hatinohe, Morioka, Nemuro, and Sibutami. Epicentre as adopted. Depth between 30 and 100km.

Seismological Bulletin of the C.M.O., Japan, for July, 1951, Tokyo, 1951, pp.165-166, with macroseismic chart.

$A = -\cdot5960$, $B = +\cdot4378$, $C = +\cdot6731$; $\delta = -5$; $h = -3$;
$D = +\cdot592$, $E = +\cdot806$; $G = -\cdot542$, $H = +\cdot398$, $K = -\cdot740$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Obihiro		0·6	319	0 18	−12	0 33	−21	—	—	—
Kusiro		0·7	47	0 14a	−17	0 28	−27	—	—	—
Urakawa		0·8	243	0 23a	− 8	0 45	−11	—	—	—
Abashiri		1·6	15	0 33	− 4	—	—	—	—	—
Asahigawa		1·6	323	0 22	−15	0 43	−23	—	—	—
Sapporo		1·8	288	0 29	−10	0 50	−19	—	—	—
Muroran		2·0	275	0 34	− 7	1 1	−11	—	—	—
Mori		2·4	260	0 39	− 6	1 10	− 9	—	—	—
Hatinohe		2·5	220	0 43	− 3	1 18	− 3	—	—	—
Aomori		2·8	229	0 46	− 3	1 23	− 4	—	—	—
Miyako		3·1	205	0 52	0	1 32	− 1	—	—	—
Wakkanai		3·3	334	0 42	−13	1 15	−22	—	—	—
Morioka		3·4	215	0 53k	− 3	1 36	− 3	—	—	—
Akita		3·9	226	1 6	+ 4	1 52	+ 2	—	—	—
Mizusawa	E.	3·9	211	1 2	0	i 1 50	0	—	—	—
Isinomaki		4·5	205	1 13	+ 4	2 3	0	—	—	—
Sakata		4·7	221	0 47	−25	—	—	—	—	—
Sendai		4·7	208	1 14	+ 2	2 13	+ 5	—	—	—
Yamagata		5·0	212	0 53	−23	—	—	—	—	—
Hukusima		5·3	209	1 19	0	2 22	+ 1	—	—	—
Inawasiro		5·6	210	1 23	0	2 32	+ 4	—	—	—
Niigata		5·8	220	1 34	+ 8	2 40	+ 8	—	—	—
Onahama		6·0	202	1 32	+ 4	2 43	+ 6	—	—	—
Aikawa		6·1	225	1 31	+ 1	2 46	+ 7	—	—	—
Mito		6·6	204	1 39	+ 3	2 57	+ 6	—	—	—
Utunomiya		6·6	208	1 38	+ 2	2 58	+ 7	—	—	—
Tukubasan		6·9	205	1 44	+ 4	3 4	+ 6	—	—	—
Maebasi		7·1	212	1 42	0	3 7	+ 5	—	—	—
Tyosi		7·1	199	1 46	+ 4	—	—	—	—	—
Kumagaya		7·2	209	1 48	+ 4	3 11	+ 6	—	—	—
Nagano		7·2	218	1 46	+ 2	3 0	− 5	—	—	—
Wazima		7·3	228	1 48	+ 3	3 13	+ 6	—	—	—
Titibu		7·4	210	2 18	+32	—	—	—	—	—
Tokyo		7·5	206	1 51	+ 4	3 16	+ 4	—	—	—
Matumoto		7·7	217	1 54	+ 4	—	—	—	—	—
Toyama		7·7	223	1 54	+ 4	—	—	—	—	—
Yokohama		7·7	206	1 59	+ 9	—	—	—	—	—
Kohu		7·9	212	1 59	+ 6	3 30	+ 9	—	—	—
Hunatu		8·0	211	1 59	+ 5	3 30	+ 7	—	—	—
Kanazawa		8·1	225	1 57	+ 2	—	—	—	—	—
Mera		8·2	203	2 9	+12	3 34	+ 6	—	—	—
Misima		8·2	208	2 6	+ 9	3 38	+10	—	—	—
Ajiro		8·3	207	3 37	S	(3 37)	+ 7	—	—	—
Osima		8·4	205	3 35	S	(3 35)	+ 3	—	—	—
Nagoya		9·0	218	2 10	+ 3	—	—	—	—	—
Omaesaki		9·0	210	2 32	+25	—	—	—	—	—
Hamamatu		9·1	213	3 0	+52	—	—	—	—	—
Tsuruga		9·1	224	2 12	+ 4	—	—	—	—	—
Hikone		9·3	222	2 15	+ 4	—	—	—	—	—
Kameyama		9·5	219	3 32	?	—	—	—	—	—
Hatidyozima		9·8	199	4 7	S	(4 7)	+ 2	—	—	—
Resolute Bay	z.	56·9	16	e 9 20	− 4	—	—	—	—	—
Kiruna		62·0	339	e 9 54	− 4	—	—	—	—	e 34·5
Fresno	z.	70·5	57	e 10 52a	0	—	—	—	—	—
Tinemaha	z.	71·3	57	i 10 58	+ 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Haiwee	z.	72·0	57	e 11 3	+ 2	—	—	—	—	—
Pasadena	z.	73·2	59	e 11 8	0	—	—	—	—	—
Copenhagen		73·8	334	i 11 11k	− 1	—	—	—	—	39·5
Palomar	z.	74·5	59	e 11 16	0	—	—	—	—	—
Collmberg	z.	77·2	331	e 11 51	PcP	—	—	—	—	—
Prague		77·7	330	e 11 34	+ 1	e 12 49	sP	e 13 16	?	—
Jena		78·0	331	e 11 36	+ 1	—	—	e 12 8	pP	—
Stuttgart		80·7	332	e 11 49	0	—	—	—	—	e 43·5
Rathfarnham C.	z.	81·1	343	e 11 49	− 3	—	—	—	—	—
Strasbourg		81·3	339	e 11 54	+ 1	—	—	—	—	e 43·5
Paris		82·9	336	i 12 2	+ 1	—	—	—	—	e 47·5
Besançon		83·1	339	e 12 2	0	—	—	—	—	—
Rome		85·2	326	—	—	e 34 18	?	—	—	e 48·8
Ottawa		85·7	27	i 12 14	− 1	—	—	—	—	—
Harvard		89·6	25	i 12 35	+ 2	—	—	—	—	—
Weston		89·8	25	i 12 35	+ 1	—	—	—	—	—
Tamanrasset	z.	104·4	320	17 51	PP	—	—	—	—	—

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

July 25d. 18h. 42m. 19s. Epicentre 14°·5N. 90°·5W. Depth of focus 0·005.
(as on **1951**, February 13d.).

$A = -\cdot0085$, $B = -\cdot9685$, $C = +\cdot2488$; $\delta = -3$; $h = +6$;
$D = -1\cdot000$, $E = +\cdot009$; $G = -\cdot002$, $H = -\cdot249$, $K = -\cdot969$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida	6·4	7	i 1 50k	+16	i 3 2	+16	—	—	—
Oaxaca	6·5	293	1 32	− 3	2 42	− 7	—	—	—
Vera Cruz	7·1	312	—	—	e 3 0	− 4	—	—	—
Puebla	8·6	303	e 2 5	+ 1	e 3 35	− 6	—	—	—
Tacubaya	9·6	302	e 2 22	+ 4	—	—	—	—	—
Guantanamo Bay	15·7	68	i 3 53	PP	—	—	—	—	—
Bogota	18·9	118	i 3 23	−55	i 8 3	SS	i 4 41	PP	—
Columbia	21·2	21	i 4 46	+ 4	—	—	—	—	—
St. Louis	24·0	1	i 5 11	+ 1	e 9 20	+ 1	i 5 40	pP	—
Florissant	24·2	1	e 5 11	0	e 9 22	0	e 5 38	pP	—
Tucson	25·6	318	i 5 25	0	—	—	e 9 6	PcP	—
Morgantown	26·4	18	i 5 36	+ 4	—	—	i 6 21	pP	—
Cleveland	28·0	14	i 5 48a	+ 1	e 10 26	+ 1	e 6 29	PP	—
Pennsylvania	28·4	21	i 5 50	0	i 10 32	+ 1	i 6 46	PPP	—
City College, N.Y.	29·9	27	i 6 5	+ 1	e 10 59	+ 4	—	—	—
Palisades	30·1	27	i 6 7	+ 1	i 11 1	+ 3	i 6 37	pP	—
Huancayo	30·4	149	i 6 10	+ 2	—	—	i 6 35	pP	e 13·5
Boulder City	30·5	320	i 6 10	+ 1	e 12 38	SS	i 9 5	PcP	—
Riverside z.	31·1	314	i 6 14a	0	e 12 40	ScP	i 9 6	PcP	—
Pasadena	31·7	314	i 6 20a	0	i 12 42	ScP	i 9 7	PcP	—
China Lake	32·2	318	i 6 24a	0	e 12 42	ScP	i 9 9	PcP	—
Harvard	32·3	28	i 6 27	+ 2	—	—	—	—	e 19·7
Weston	32·3	28	i 6 27	+ 2	—	—	—	—	—
Ottawa	33·2	19	6 34	+ 1	11 49	+ 2	7 5	pP	—
Tinemaha	33·4	318	i 6 34	0	—	—	i 9 13	PcP	—
Fresno	34·2	317	e 6 40a	− 1	e 7 40	?	e 6 59	pP	—
Lick	35·8	316	e 6 56	+ 1	—	—	—	—	—
Berkeley z.	36·5	316	e 7 1a	0	—	—	—	—	—
La Paz	37·9	143	e 7 13	0	e 12 57	− 2	—	—	—
Shasta Dam	38·1	320	i 7 13	− 1	—	—	i 9 25	PcP	—
Hungry Horse	38·9	336	e 7 20	− 1	e 13 6	− 8	i 9 29	PcP	—
Resolute Bay	60·2	359	e 10 0	− 4	—	—	—	—	e 23·7
College	63·4	337	i 10 21	− 4	—	—	i 10 53	pP	—
Stuttgart z.	85·5	41	e 12 31	− 1	—	—	e 13 1	pP	—
Jena	86·3	39	e 12 34	− 2	—	—	e 13 6	pP	—
Prague	88·3	39	—	—	e 32 1?	?	e 32 14	SSS	—
Ksara	109·9	45	e 14 47	P	e 24 55	[− 1]	—	—	—

For Notes see next page.

NOTES TO JULY 25d. 18h. 42m. 19s.

Additional readings :—
St. Louis i = 5m.14s., e = 9m.50s.
Florissant eSS = 10m.20s.
Cleveland esSN = 11m.36s.
Palisades iPP = 7m.8s.
Boulder City i = 6m.47s. and 7m.1s.
Riverside eZ = 6m.31s.
Pasadena eZ = 6m.41s. and 10m.0s.
China Lake iN = 6m.37s. and 6m.49s.
Ottawa PP = 7m.54s., PPP = 8m.3s., SS = 13m.55s., SSS = 14m.25s.

July 25d. 20h. 33m. 55s. Epicentre 29°·8N. 131°·2E. (as on 1951, June 5d.).
Intensity II-III at Yakusima, Miyazaki, Kumamoto, and Kagosima.
Epicentre 29°·8N. 131°·9E. Depth 60km.
Seismological Bulletin of the Cent. Met. Obs., Japan, for July, 1951, Tokyo, 1951, pp. 167-168 with macroseismic chart.

$A = -\cdot5725$, $B = +\cdot6540$, $C = +\cdot4945$; $\delta = 0$; $h = +2$;
$D = +\cdot752$, $E = +\cdot659$; $G = -\cdot326$, $H = +\cdot372$, $K = -\cdot869$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yakusima		0·9	317	0 26a	+ 6	0 41	+ 7	—	—	—
Miyazaki		2·1	5	0 39k	+ 2	1 3	− 1	—	—	—
Kumamoto		3·0	352	0 55	+ 5	1 29	+ 2	—	—	—
Asosan		3·1	357	0 56	+ 5	—	—	—	—	—
Nagasaki		3·1	339	0 53a	+ 2	1 32	+ 3	—	—	—
Simidu		3·3	27	0 55	+ 2	1 30	− 5	—	—	—
Saga		3·5	347	1 3	P*	—	—	—	—	—
Hukuoka		3·8	349	1 5	+ 4	1 49	+ 2	—	—	—
Kôti		4·2	27	1 7k	0	1 50	− 7	—	—	—
Matuyama		4·2	17	1 2	− 5	1 40	−17	—	—	—
Muroto		4·3	35	1 6	− 2	—	—	—	—	—
Hirosima		4·7	12	1 22	P*	2 10	0	—	—	—
Hamada		5·1	8	1 21	+ 1	2 15	− 5	—	—	—
Takamatsu		5·1	27	1 19	− 1	—	—	—	—	—
Siomisaki		5·4	46	1 25	+ 1	—	—	—	—	—
Sumoto		5·5	34	1 24k	− 1	2 17	−13	—	—	—
Kobe		5·9	33	1 29k	− 2	—	—	—	—	—
Owase		6·0	44	1 29	− 3	2 33	−10	—	—	—
Toyooka		6·4	27	1 37	− 1	2 49	− 4	—	—	—
Kameyama		6·7	40	1 40	− 2	—	—	—	—	—
Hikone		6·9	37	1 46	+ 1	—	—	—	—	—
Tsuruga		7·1	34	1 47	− 1	—	—	—	—	—
Gihu		7·2	38	1 50	+ 1	—	—	—	—	—
Nagoya		7·2	41	1 50	+ 1	—	—	—	—	—
Hamamatu		7·4	47	1 51	− 1	—	—	—	—	—
Hukui		7·5	33	1 53	0	—	—	—	—	—
Omaesaki		7·6	49	1 54	− 1	—	—	—	—	—
Kanazawa		8·1	33	1 51	−11	—	—	—	—	—
Misima		8·4	47	1 46	−20	—	—	—	—	—
Hunatu		8·5	46	2 5k	− 2	—	—	—	—	—
Kohu		8·5	45	2 8	+ 1	—	—	—	—	—
Matumoto		8·5	39	2 8	+ 1	—	—	—	—	—
Osima		8·5	52	2 7	0	—	—	—	—	—
Toyama		8·5	35	2 9	+ 2	—	—	—	—	—
Zi-ka-wei	z.	8·5	281	2 9	+ 2	c 4 0	+15	—	—	—
Matusiro		8·9	39	2 10	− 2	—	—	—	—	—
Wazima		8·9	31	2 13	+ 1	—	—	—	—	—
Nagano		9·0	38	2 13	0	—	—	—	—	—
Titibu		9·0	45	2 17	+ 4	—	—	—	—	—
Yokohama		9·1	49	2 14	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kumagaya		9·3	45	2 18	+ 1	—	—	—	—	—
Maebasi		9·3	43	2 16	− 1	—	—	—	—	—
Tokyo		9·3	48	2 19	+ 2	—	—	—	—	—
Utunomiya		9·9	45	2 25	0	—	—	—	—	—
Shirakawa		10·5	43	2 10	−25	—	—	—	—	—
Nanking		10·9	285	2 42a	+ 2	e 4 43	− 1	—	—	5·3
Hukusima		11·0	42	1 59	−43	—	—	—	—	—
Sendai		11·7	41	2 50	− 1	—	—	—	—	—
Mizusawa	E.	12·4	39	(2 58)	− 3	2 58	P	—	—	—
Vladivostok		13·3	2	i 3 12	− 1	e 6 4	SS	—	—	—
Irkutsk		29·9	326	e 6 12?	0	e 11 11?	+ 2	—	—	—
Andijan		48·4	300	e 8 48	+ 2	—	—	—	—	—
Tchimkent		50·3	303	e 8 59	− 1	—	—	—	—	—
Stalinabad		51·5	298	i 9 9	0	—	—	—	—	—
Samarkand		52·7	299	e 9 15	− 3	—	—	—	—	—
Sverdlovsk		55·1	321	i 9 35	− 1	e 17 20?	+ 2	—	—	—
Ashkabad		59·6	299	e 10 13	+ 5	—	—	—	—	—
Kirovobad		67·6	305	i 11 1	0	—	—	—	—	—
Pulkovo		69·9	328	e 11 15	0	e 20 21	− 3	—	—	—
Kiruna		70·1	338	e 11 13	− 3	e 20 23	− 4	—	—	e 36·1
Resolute Bay	z.	71·5	12	e 11 22k	− 2	—	—	—	—	—
Lwow		77·8	321	e 12 2	+ 1	e 21 52	− 1	—	—	—
Scoresby Sund		78·2	352	i 12 2	− 1	e 21 58	+ 1	—	—	—
Copenhagen		80·2	330	i 12 14	0	e 22 18	− 1	—	—	42·1
Potsdam		82·0	328	e 16 56	PPP	e 22 35	− 2	—	—	e 45·1
Collmberg	z.	82·7	326	e 12 27	0	—	—	e 12 39	PcP	—
Jena	E.	83·6	326	e 12 32?	+ 1	—	—	e 12 36	PcP	—
Stuttgart		86·2	326	e 12 43	− 1	e 23 19	0	e 12 56	PcP	e 47·1
Strasbourg		87·0	326	e 12 51	+ 3	—	—	e 13 1	PcP	e 48·6
Tinemaha	z.	87·0	49	i 12 46	− 2	—	—	—	—	—
China Lake		88·1	49	e 12 51	− 3	—	—	—	—	—
Besançon		88·8	326	e 12 56	− 1	—	—	—	—	—
Mount Wilson	z.	88·8	51	e 12 56	− 1	—	—	—	—	—
Paris		89·3	329	i 12 59	0	—	—	i 13 12	?	e 49·1
Huancayo		149·7	61	e 19 52	[+ 5]	—	—	—	—	—

Jena gives also eN =12m.39s., eE =12m.45s.
Long waves were also recorded at Ksara, Kew, and De Bilt.

July 25d. Readings also at 0h. (Potsdam, Palisades, Harvard, near Seven Falls, Shawinigan Falls, and Ottawa), 2h. (near Seattle, Almata, Frunse, Kurmenty, near Rybach'e, Krasnogorka, Almata II, Ili, and Chilisk), 3h. (near Dzhergetal), 4h. (Tacubaya, near Apia, near Dzhergetal, near Tananarive, and near Antofagasta), 5h. (near Dzhergetal), 6h. (Ottawa, Shawinigan Falls, and near Seven Falls), 9h. (Rybach'e, Krasnogorka, Kurmenty, Tashkent, Samarkand, Almata II, near Murgab, Khorog, Naryn, Andijan, Dzhergetal, Fergana, and Obi-garm), 10h. (Bogota, Huancayo, Apia, and near Dzhergetal), 12h. (Sverdlovsk, Ashkabad, Dzhergetal, Krasnogorka, Almata, Almata II, Kurmenty, Ili, Chilisk, Rybach'e, near Khorog, Obi-garm, Stalinabad, Murgab, Fergana, Andijan, Samarkand, and Tashkent), 13h. (Ksara and Strasbourg), 14h. (near Lwow), 15h. (near Ottawa and near Kurmenty), 17h. (Nanking (2), Zi-ka-wei (2), Ashkabad, Naryn, Frunse, Rybach'e, Krasnogorka, Tchimkent, Almata, Almata II, near Dzhergetal, Khorog, Obi-garm, Stalinabad, Murgab, Samarkand, Fergana, Andijan, and Tashkent). 18h. (Potsdam, Stuttgart, Strasbourg, Paris, Kew, De Bilt, Copenhagen, Kiruna, and near Dzhergetal), 19h. (near Algiers Univ.), 20h. (Stuttgart and Apia), 21h. (near Mizusawa (2) and near Dzhergetal), 22h. (near Ashkabad, near Dzhergetal (2), near Chilisk, Almata II, and Ili), 23h. (Santa Lucia, near Ashkabad, Kizyl-Arvat, and Mary).

July 26d. 9h. 59m. 59s. Epicentre 40°·9N. 142°·7E. Depth of focus 0·005.
(as on 1951, June 6d.).

Intensity V at Shibutami, Okunakayama, and Hanawa; IV at Hatinohe, Miyako, Urakawa, and Morioka. Epicentre 40°·7N. 143°·6E. Depth 60km.
Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, pp. 168-170, with macroseismic chart.

$A = -\cdot6030$, $B = +\cdot4594$, $C = +\cdot6522$; $\delta = +2$; $h = -2$;
$D = +\cdot606$, $E = +\cdot795$; $G = -\cdot519$, $H = +\cdot395$, $K = -\cdot758$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hatinohe	0·9	247	0 16	− 2	0 33	+ 2	—	—	—
Urakawa	1·3	3	0 23	0	0 44	+ 4	—	—	—
Miyako	1·4	203	0 18k	− 6	0 36	− 7	—	—	—
Aomori	1·5	267	0 27	+ 1	0 49	+ 4	—	—	—
Morioka	1·7	224	0 24	− 4	0 46	− 4	—	—	—
Muroran	1·9	318	0 35	+ 4	1 0	+ 6	—	—	—
Mori	2·0	307	0 36a	+ 4	1 4	+ 7	—	—	—
Mizusawa	2·1	214	i 0 33	− 1	i 0 55	− 4	—	—	—
Obihiro	2·1	10	0 34	0	1 0	+ 1	—	—	—
Akita	2·3	239	0 38k	+ 1	1 8	+ 4	—	—	—
Kusiro	2·4	31	0 40	+ 2	1 9	+ 2	—	—	—
Sapporo	2·4	235	0 38	0	1 8	+ 1	—	—	—
Suttsu	2·6	316	0 10	?	0 35	?	—	—	—
Isinomaki	2·7	203	0 39	− 3	1 9	− 5	—	—	—
Ashigawa	2·9	355	0 51	+ 6	1 15	− 4	—	—	—
Sakata	3·0	227	0 51	+ 4	1 27	+ 5	—	—	—
Sendai	3·0	208	0 44k	− 3	1 16	− 6	—	—	—
Nemuro	3·2	41	0 48a	− 1	1 21	− 6	—	—	—
Yamagata	3·2	214	0 48	− 1	1 28	+ 1	—	—	—
Abashiri	3·3	21	0 47	− 4	1 25	− 4	—	—	—
Hukusima	3·6	209	0 53	− 2	1 41	+ 4	—	—	—
Inawasiro	3·9	212	0 57	− 2	—	—	—	—	—
Niigata	4·1	225	1 17	+15	—	—	—	—	—
Onahama	4·2	200	1 0a	− 3	1 50	− 2	—	—	—
Shirakawa	4·2	208	1 3	0	1 54	+ 2	—	—	—
Aikawa	4·5	232	1 6	− 1	2 9	+10	—	—	—
Wakkanai	4·6	351	1 13	+ 4	2 25	+23	—	—	—
Mito	4·8	202	1 6	− 6	2 15	+ 8	—	—	—
Utunomiya	4·9	208	1 10	− 3	—	—	—	—	—
Tukubasan	5·1	204	1 11	− 5	—	—	—	—	—
Maebasi	5·3	214	1 17	− 2	2 27	+ 8	—	—	—
Tyosi	5·3	196	1 22	+ 3	2 31	+12	—	—	—
Kumagaya	5·4	210	1 19	− 1	2 21	− 1	—	—	—
Nagano	5·5	221	1 22	+ 1	2 37	+13	—	—	—
Matusiro	5·6	220	1 22	− 1	2 41	+14	—	—	—
Oiwake	5·6	217	1 23	0	2 37	+10	—	—	—
Titibu	5·7	211	1 23	− 1	2 43	+14	—	—	—
Tokyo	5·7	205	1 21	− 3	2 23	− 6	—	—	—
Wazima	5·7	234	1 27	+ 3	2 36	+ 7	—	—	—
Matumoto	5·9	220	1 28	+ 1	2 45	+11	—	—	—
Yokohama	5·9	204	1 31	+ 4	—	—	—	—	—
Toyama	6·0	227	1 31k	+ 3	—	—	—	—	—
Yuzno-Sakhlinsk	6·0	0	1 31	+ 3	—	—	—	—	—
Hunatu	6·2	211	1 29a	− 2	2 51	+10	—	—	—
Kohu	6·2	213	1 39	+ 8	2 58	+17	—	—	—
Kanazawa	6·4	229	1 29	− 5	—	—	—	—	—
Mera	6·4	202	1 16	−18	—	—	—	—	—
Takayama	6·4	224	1 27	− 7	2 52	+ 6	—	—	—
Misima	6·5	208	1 20	−15	—	—	—	—	—
Osima	6·6	204	1 32	− 5	2 42	− 9	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shizuoka		6·8	211	1 37	− 2	—	—	—	—	—
Hukui		7·0	228	2 29	+47	—	—	—	—	—
Gihu		7·2	222	1 25	−20	—	—	—	—	—
Nagano		7·2	220	1 50	PP	—	—	—	—	—
Omaesaki		7·2	211	1 52	+ 7	3 31	+25	—	—	—
Hamamatu		7·3	214	2 2	+16	3 37	+28	—	—	—
Tsuruga		7·4	227	1 47	− 1	—	—	—	—	—
Hikone		7·6	225	1 51	+ 1	3 23	+ 7	—	—	—
Kameyama		7·8	221	1 50	− 3	—	—	—	—	—
Tu		7·9	220	1 52	− 3	3 25	+ 2	—	—	—
Kyoto		8·0	225	1 57	+ 1	—	—	—	—	—
Hatidyozima		8·1	197	1 56	− 1	—	—	—	—	—
Toyooka		8·2	232	1 58	− 1	3 33	+ 2	—	—	—
Vladivostok		8·3	289	i 2 3	+ 3	i 3 50	+17	—	—	—
Kashiwara		8·4	223	2 24	+22	—	—	—	—	—
Osaka		8·4	224	2 9	+ 7	3 46	+10	—	—	—
Kobe		8·6	226	2 6	+ 2	—	—	—	—	—
Owase		8·6	219	2 13	+ 9	—	—	—	—	—
Sumoto		9·0	226	2 11	+ 1	3 56	+ 5	—	—	—
Yonago		9·2	236	2 23	+11	—	—	—	—	—
Matsue		9·3	237	2 24	+10	—	—	—	—	—
Siomisaki		9·3	219	2 15	+ 1	—	—	—	—	—
Takamatu		9·5	229	2 30	+13	—	—	—	—	—
Hamada		10·3	238	2 29	+ 2	—	—	—	—	—
Kôti		10·3	228	2 27	0	4 38	+16	—	—	—
Hirosima		10·4	235	2 29	0	4 31	+ 6	—	—	—
Simidu		11·2	227	2 40	0	—	—	—	—	—
Hukuoka		12·2	237	2 53	6	5 27	+19	—	—	—
Kumamoto		12·5	234	3 20	+23	—	—	—	—	—
Saga		12·5	236	3 14	+17	—	—	—	—	—
Kagosima		13·5	230	3 11	+ 1	—	—	—	—	—
Klyuchi		19·4	31	e 4 22	− 1	—	—	—	—	—
Zi-ka-wei		19·7	248	i 4 23	− 4	e 7 54	− 6	—	—	e 9·6
Nanking		21·1	254	i 4 39a	− 2	8 24	− 3	(i 8 42)	PS	i 8·7
Kabansk		27·0	307	i 5 39	+ 1	10 20	+11	—	—	—
Guam		27·4	176	—	—	10 7	− 8	—	—	—
Irkutsk		28·4	307	i 5 53	+ 3	10 41?	+10	—	—	—
Manila		32·4	224	i 7 56	PPP	e 13 15	SS	i 8 21	pPPP	—
College		45·3	35	8 14	+ 1	i 14 53	+ 5	—	—	—
Kurmenty		46·9	295	e 8 25	− 1	—	—	—	—	—
Ili		47·4	297	8 30	0	15 25	+ 7	—	—	—
Almata II		47·4	297	e 8 34	+ 4	—	—	—	—	—
Almata		47·7	297	i 8 34	+ 2	—	—	—	—	—
Rybach'e		48·6	295	i 8 40	+ 1	e 15 44	+ 9	—	—	—
Naryn		49·0	294	i 8 44	+ 2	e 15 53	+13	—	—	—
Frunse		49·5	297	i 8 47	+ 1	—	—	—	—	—
Andijan		51·8	294	9 6	+ 3	16 30	+11	—	—	—
Murgab		51·8	291	9 2	− 1	e 16 27	+ 8	—	—	—
Fergana		52·4	294	i 9 8	0	—	—	—	—	—
Sitka		52·7	43	e 9 14	+ 4	i 16 44	+13	—	—	—
Sverdlovsk		53·0	317	i 9 14	+ 2	i 16 43	+ 7	—	—	—
Tchimkent		53·1	298	i 9 14	+ 1	—	—	—	—	—
Dzhergetal		53·3	293	i 9 17	+ 2	—	—	—	—	—
Tashkent		53·7	297	i 9 19	+ 1	—	—	—	—	—
Obi-garm		54·6	294	i 9 24	0	e 17 7	+10	—	—	—
Stalinabad		55·3	294	i 9 31	+ 2	i 17 17	+11	—	—	—
Resolute Bay		58·6	15	i 9 52a	− 1	e 17 56	+ 6	e 10 18	pP	23·5
Hyderabad	N.	59·4	267	—	—	18 25	PS	—	—	—
Mary		60·5	297	i 10 8	+ 2	—	—	—	—	—
Ashkabad		62·7	298	10 25	+ 5	e 18 56	+14	—	—	—
Victoria		63·1	48	10 25	+ 2	e 24 55	?	—	—	—
Kiruna		63·3	340	i 10 25a	− 1	e 18 50	0	i 10 48	pP	e 32·3
Seattle		64·2	49	e 10 33k	+ 3	e 19 10	+ 9	e 10 41	pP	e 43·0
Moscow		64·8	323	i 10 36	+ 2	19 14	+ 6	—	—	—
Pulkovo		65·4	329	i 10 39	+ 1	e 19 22	+ 6	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		66·9	305	e 10 50	+ 3	—	—	—	—	—
Helsinki		67·2	332	e 10 49	0	e 19 41	+ 3	—	—	e 33·0
Grozny		67·7	309	e 10 54	+ 1	—	—	—	—	—
Shasta Dam		68·0	55	e 10 54	0	—	—	—	—	—
Hungry Horse		68·3	45	i 10 57	+ 1	—	—	—	—	—
Scoresby Sund		68·4	355	i 10 58 a	+ 1	i 20 0	+ 8	—	—	32·0
Lenkoran		68·5	303	11 0	+ 2	—	—	—	—	—
Kirovobad		68·9	306	i 11 12	+12	—	—	—	—	—
Tiflis		69·2	308	e 11 4	+ 2	e 20 10	+ 9	—	—	—
Gori		69·5	308	e 11 5	+ 1	—	—	—	—	—
Berkeley		69·8	58	e 11 7 a	+ 2	e 20 14	+ 6	e 21 6	PS	e 32·2
Upsala		69·9	334	e 11 3?	− 3	e 20 14	+ 4	i 13 40	PP	e 34·0
Branner	z.	70·1	58	e 11 9 a	+ 2	—	—	e 11 36	pP	—
Erevan		70·3	307	i 11 12	+ 3	—	—	—	—	—
Leninakan		70·4	308	e 11 15	+ 6	—	—	—	—	—
Zugdidi		70·5	311	e 11 15	+ 5	—	—	—	—	—
Sotchi		71·1	312	e 11 17	+ 4	—	—	—	—	—
Fresno		72·0	57	e 11 29 a	+10	e 20 40	+ 6	e 11 55	pP	—
Tinemaha	z.	72·8	56	e 11 29	+ 6	—	—	e 12 2	pP	—
Yalta		73·6	315	11 30	+ 2	e 21 0	+ 8	—	—	—
China Lake		74·0	56	e 11 34	+ 4	e 21 1	+ 5	—	—	—
Kishinev		74·6	320	11 37	+ 3	—	—	—	—	—
Pasadena		74·7	58	e 11 29	− 5	i 21 10	+ 6	e 12 3	pP	33·0
Lwow		74·8	324	i 11 38	+ 3	e 21 13	+ 8	—	—	—
Copenhagen		74·9	334	i 11 38	+ 2	e 21 16	+10	i 21 47	ScS	37·5
Riverside	z.	75·3	58	e 11 39	+ 1	—	—	—	—	—
Boulder City		75·6	55	i 11 41	+ 1	—	—	—	—	—
Palomar	z.	76·0	58	e 11 43	+ 1	—	—	—	—	—
Uzhgorod		76·5	324	i 11 48	+ 3	e 21 32	+ 8	—	—	—
Skalnate Pleso		77·0	326	11 50	+ 2	e 21 34	+ 5	e 12 6	pP	—
Raciborzu		77·2	328	e 11 51	+ 2	e 22 5	SP	e 12 11	pP	—
Potsdam		77·4	332	i 11 50	0	i 21 41	+ 7	e 12 11	pP	e 41·0
Bucharest		77·8	319	e 11 55	+ 3	e 22 4	SP	—	—	—
Aberdeen	E.	77·9	342	i 22 30	SP	i 21 49	+10	i 23 38	PPS	e 42·6
Collmberg	z.	78·3	330	i 11 56	+ 1	—	—	e 12 9	pP	—
Istanbul		78·6	315	e 11 58	+ 2	e 21 57	+10	e 14 59	PP	e 43·0
Prague		78·7	329	11 57	0	e 21 51	+ 3	e 12 11	pP	e 42·0
Budapest		78·8	325	e 11 58	+ 1	e 22 14	ScS	e 22 23	SP	e 43·5
Ogyalla		78·9	325	e 12 46	pPcP	e 22 7	ScS	e 15 11	PP	—
Jena		79·1	331	e 12 2	+ 3	22 13	ScS	e 12 24	pP	—
Timisoara		79·1	322	e 12 4?	+ 5	21 57	+ 5	e 14 54	PP	e 50·0
Witteveen	z.	79·2	335	i 12 3	+ 3	—	—	i 12 16	pP	—
Cheb		79·5	331	e 12 41	pPcP	e 22 3	+ 7	e 14 57	PP	—
Kalossa		79·5	324	e 12 16	+15	—	—	e 12 43	pP	—
Ksara		79·7	306	i 12 4	+ 2	22 38	SP	12 30	pP	—
Belgrade		80·2	322	e 11 58 a	− 7	e 22 27	ScS	e 12 42	sP	e 45·7
De Bilt		80·3	335	i 12 7 a	+ 2	e 22 12	+ 8	e 12 22	pP	e 39·0
Tucson		80·5	56	e 12 8	+ 1	e 22 14	+ 7	—	—	—
Stuttgart		81·7	331	i 12 15 a	+ 2	e 22 25	+ 6	e 12 39	pP	e 45·0
Rathfarnham Castle		82·4	342	i 12 25	+ 9	e 21 51	−35	e 12 39	pP	e 42·0
Strasbourg		82·4	332	e 12 17 a	+ 1	e 22 33	+ 7	e 12 39	pP	e 42·0
Triest		82·5	327	—	—	e 22 47	+20	e 23 44	PPS	—
Zürich		83·1	331	e 12 21 a	+ 1	e 22 40	+ 7	e 15 13	PP	—
Basle		83·4	331	e 12 25	+ 3	e 13 45	?	—	—	—
Paris		84·0	335	i 12 26	+ 1	e 22 46	+ 4	i 12 44	pP	40·0
Besançon		84·2	332	e 12 28	+ 2	e 12 41	?	e 12 53	pP	—
Pavia		84·7	329	—	—	e 22 56	+ 7	—	—	e 45·2
Helwan		85·2	306	i 12 33 a	+ 2	22 55	+ 1	i 12 48	pP	—
Rome		86·1	325	i 12 35	0	e 23 14	+11	e 15 58	PP	—
St. Louis		87·3	39	e 12 43	+ 2	e 23 19	+ 5	i 12 55	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seven Falls	E.	87·4	23	—	—	23 18	+ 3	32 28	SSS	42·3
Ottawa		87·5	27	12 42	0	23 18	+ 2	24 48	SPP	—
Cleveland		88·7	32	e 12 49a	+ 2	i 23 32	+ 5	e 13 2	pP	—
Pennsylvania		90·7	30	i 12 57	0	e 23 48	+ 3	i 13 29	pP	—
Morgantown		90·9	32	i 13 0	+ 2	—	—	e 13 59	pP	—
Harvard		91·4	25	i 13 3	+ 3	e 25 21	PS	—	—	e 45·9
Weston		91·6	25	e 13 3	+ 2	—	—	—	—	e 44·8
Tortosa		91·7	332	16 26	PP	24 26	+32	—	—	—
Palisades		92·0	27	i 13 3	0	e 24 3	+ 6	e 25 26	PS	e 46·6
Toledo		94·1	334	e 13 13	+ 1	—	—	—	—	45·8
Alicante		94·2	333	13 24	+11	24 33	+17	17 25	PP	e 46·5
Almeria		96·3	332	13 27	+ 5	24 41	+ 7	17 23	PP	52·6
Granada		96·4	333	13 6a	−17	23 30	[−23]	i 17 18	PP	48·2
Tamanrasset	Z.	105·2	320	e 18 27	PP	e 19 15	pPP	e 20 52	PPP	—
Bogota		123·6	45	—	—	e 21 53	PKS	e 37 27	SS	e 67·8

Additional readings :—
Manila isP = 8m.37s., esPP = 10m.16s., eS = 14m.13s., esS = 15m.1s.
Resolute Bay eZ = 10m.5s., e = 18m.25s.
Kiruna eE = 12m.23s., i = 12m.41s., esPP?N = 13m.37s., eS?E = 18m.43s., iSEN = 18m.56s., eN = 19m.18s., eEZ = 19m.29s., esSN = 19m.34s., eSSEN = 23m.17s., eN = 25m.24s.
Seattle i = 10m.45s.$_2$, e = 12m.7s., 12m.36s., and 20m.49s.
Berkeley eZ = 11m.14s. and 12m.5s.
Upsala ePPP?E = 15m.34s., eN = 20m.26s., iPS?E = 20m.36s., eSSN = 24m.47s., eQE = 29·0m.
Branner eZ = 11m.19s. and 12m.1s.
Pasadena eZ = 11m.43s.
Copenhagen i = 14m.27s. and 21m.39s., SS = 26m.12s.
Skalnate Pleso esP = 12m.15s., e = 12m.27s., 14m.27s., 14m.49s., 15m.1s., 16m.29s., and 17m.28s., esS? = 22m.1s., ePSN = 22m.14s., e = 23m.22s., eSS = 26m.47s.
Raciborzu ePPPZ = 16m.31s., ePPSN = 22m.38s., eE = 26m.36s.
Potsdam iPN = 11m.53s., ePP = 14m.44s., isSE = 21m.59s., isSN = 22m.4s., esSZ = 22m.7s.
Istanbul eSKSEN = 22m.12s., eSSE = 26m.59s.
Budapest ePN = 12m.14s., eN = 14m.30s., eE = 16m.39s., eN = 19m.29s., eE = 20m.14s. and 40m.31s.
Prague esP = 12m.20s., e = 12m.30s. and 12m.41s., ePP = 14m.50s., e = 21m.58s., epS = 22m.11s., esS = 22m.19s., e = 22m.37s., ePS = 23m.12s., eSS = 27m.27s.
Ogyalla e = 13m.11s.
Jena ePP?E = 15m.6s.?, ePP?N = 15m.14s., eS?E = 22m.25s.
Timisoara ePS?N = 22m.25s.
Cheb e = 22m.19s. and 22m.32s., eSS? = 28m.1s.
De Bilt iPP = 15m.12s., esS = 22m.31s.
Stuttgart ePcP? = 12m.27s., e = 13m.35s., ePP = 15m.17s., ePS? = 22m.55s., ePPS = 23m.31s., eSSS? = 32m.13s.
Rathfarnham Castle e = 15m.29s., eZ = 16m.24s., eSSEN = 27m.31s.
Strasbourg e = 13m.16s., ePP = 15m.32s., ePPP = 17m.10s., eS? = 22m.40s., iS? = 22m.52s., eSP = 23m.20s., ePS = 23m.33s., eSS = 27m.32s., eSSS = 31m.32s.
Paris i = 12m.41s. and 13m.28s., e = 15m.31s., ePP = 15m.42s., e = 19m.16s., eScS = 23m.0s., isS? = 23m.18s., ePS = 23m.48s., isPS? = 24m.23s., i = 24m.47s., e = 27m.7s., eSS? = 28m.29s., e = 33m.22s. and 35m.10s.
Helwan eZ = 13m.49s. and 16m.10s.
St. Louis ePP = 16m.20s., eSKKS = 23m.6s., i = 23m.50s., ePS = 24m.21s., eSS = 29m.8s
Seven Falls QE = 34m.49s.
Pennsylvania iZ = 13m.5s. and 13m.44s.
Alicante SSP = 31m.17s., SSS = 34m.36s., Q = 39m.31s.
Almeria PPS = 26m.51s.
Granada PPS = 27m.0s., SS = 31m.18s.
Long waves were also recorded at Bombay, Christchurch, Wellington, Santa Clara, Ivigtut, Clermont-Ferrand, Malaga, and Huancayo.

July 26d. 18h. 39m. 56s. Epicentre 35°·1N. 135°·7E. (as on 1937, November 22d.).

Intensity V at Togo (Osaka Pref.); IV at Hikone, Kyoto, Temmo, Hachiman (Shiga Pref.), Minakuchi, and Imazu; II-III at Osaka, Kobe, Sumoto, Tsuruga, Nagoya, and Matuzaka. Epicentre as adopted. Shallow.

Seismo. Bull. Cent. Met. Obs., Japan, July, 1951, Tokyo, 1951, pp. 170, 171, with macroseismic chart.

$A = -\cdot5869$, $B = +\cdot5727$, $C = +\cdot5724$; $\delta = +8$; $h = 0$;
$D = +\cdot698$, $E = +\cdot716$; $G = -\cdot410$, $H = +\cdot400$, $K = -\cdot820$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Hikone	0·5	70	0 19k	+ 5	0 28	+ 5
Osaka	0·5	197	0 10	− 4	0 16	− 7
Kashiwara	0·6	172	0 14k	− 1	0 20	− 6
Kobe	0·6	225	0 12k	− 3	0 18	− 8
Tsuruga	0·6	29	0 21	+ 6	0 31	+ 5
Kameyama	0·7	112	0 19	+ 2	0 29	+ 1
Toyooka	0·8	301	0 20	+ 2	0 31	0
Tu	0·8	119	0 20k	+ 2	0 32	+ 1
Gihu	0·9	71	0 26	+ 6	0 40	+ 6
Sumoto	1·0	222	0 18	− 3	0 29	− 7
Wakayama	1·0	207	0 30	+ 9	—	—
Hukui	1·1	26	0 33	+11	0 45	+ 6
Nagoya	1·1	86	0 28	+ 6	0 44	+ 5
Owase	1·1	158	0 24	+ 2	0 37	− 2
Himeji	1·2	241	0 18	− 6	0 29	−12
Kanazawa	1·6	28	0 48	S	(0 48)	− 3
Siomisaki	1·6	178	0 37	P_g	0 55	S_g
Takamatsu	1·6	240	0 38	P_g	0 53	S_g
Takayama	1·6	50	0 38	P_g	1 2	S_g
Hamamatu	1·7	103	0 38	P_g	—	—
Iida	1·8	77	0 45	P_g	1 7	S_g
Toyama	2·0	38	0 48	P_g	1 16	S_g
Omaesaki	2·1	104	0 47	P_g	1 19	S_g
Matumoto	2·2	58	0 52	P_g	1 24	S_g
Muroto	2·2	214	0 44	P_g	2 3	?
Shizuoka	2·2	93	0 44	P_g	1 19	S_g
Kobu	2·4	77	0 57	P_g	1 26	S_g
Kôti	2·4	229	0 45	P_g	1 15	+ 3
Hunatu	2·5	81	0 56	P_g	1 32	S_g
Matusiro	2·5	55	0 55	P_g	1 28	S_g
Nagano	2·5	52	0 58	P_g	1 35	S_g
Oiwake	2·5	62	0 59	P_g	—	—
Matuyama	2·7	242	0 40	− 5	1 14	− 5
Misima	2·7	90	0 55	P_g	1 34	S_g
Titibu	2·9	72	1 3	P_g	—	—
Hamada	3·0	266	0 55	P*	1 33	S*
Maebasi	3·0	65	1 5	P_g	1 44	S_g
Kumagaya	3·2	71	1 8	P_g	1 47	S_g
Simidu	3·2	224	1 5	P_g	—	—
Yokohama	3·2	84	1 9	P_g	—	—
Mera	3·4	92	1 22	P_g	—	—
Tokyo	3·4	79	1 14	P_g	1 56	S_g
Mito	4·1	71	2 1	S*	—	—
Hukuoka	4·6	253	1 29a	P_g	2 23	S*
Saga	4·8	249	2 1	S	(2 1)	−11

July 26d. Readings also at 2h. (near Athens), 3h. (near Andijan), 4h. (near Granada, Malaga, and near Santa Clara), 6h. (Auckland, Cobb River, Kaimata, New Plymouth, and Wellington), 7h. (Besançon, Collmberg (2), Strasbourg, Stuttgart, and Christchurch), 8h. (near Klyuchi), 9h. (La Paz and near Mizusawa), 11h. (La Paz, Collmberg, Jena, and near Athens), 12h. (Victoria (2), Pasadena, Riverside, Palomar, Seattle, near Sofia, and near Fergana), 13h. (Huancayo), 14h. (Apia (2)), 15h. (near Ottawa), 16h. (Victoria, Tamanrasset, Ksara, Prague, Jena, Collmberg, Stuttgart, near Triest, near Granada, and near Dzhergetal), 17h. (Granada, Tortosa, Rome, Paris, Istanbul, near Zürich, and near Ili), 18h. (Victoria), 20h. (near Ashkabad), 21h. (Rome, Tortosa, and Victoria), 22h. (near Athens), 23h. (Victoria).

July 27d. 0h. 3m. 4s. Epicentre 7°·6S. 120°·7E. Depth of focus 0·020.
(as on 1949, April 23d.).

A = −·5061, B = +·8524, C = −·1314; δ = −1; h = +7;
D = +·860, E = +·511; G = +·067, H = −·113, K = −·991.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		13·0	272	e 3 56	+56	i 7 5	L	—	—	(i 7·1)
Brisbane	z.	36·4	127	i 6 57	+ 7	—	—	—	—	—
Riverview		38·4	138	i 8 47a	PP	i 12 56	+ 6	i 13 58	sS	(i 20·0)
Kabansk		60·6	349	9 59	+ 3	e 17 59	+ 1	—	—	—
Irkutsk		61·3	348	10 4	+ 3	18 11	+ 5	—	—	—
Khorog		64·1	317	e 10 19	0	—	—	—	—	—
Almata II		64·1	326	i 10 20	+ 1	—	—	—	—	—
Almata		64·3	326	i 10 21	+ 1	—	—	—	—	—
Ili		64·7	326	i 10 22	− 1	—	—	—	—	—
Dzhergetal		65·3	319	e 10 27	0	—	—	—	—	—
Frunse		65·4	324	i 10 28	0	—	—	—	—	—
Andijan		65·5	320	10 28	0	—	—	—	—	—
Fergana		65·6	320	i 10 28	− 1	—	—	—	—	—
Stalinabad		66·6	318	i 10 33	− 2	e 19 4	− 8	—	—	—
Tashkent		67·7	320	e 10 42	0	i 19 20?	− 5	—	—	—
Tchimkent		68·1	321	i 10 43	− 1	i 19 24	− 6	—	—	—
Samarkand		68·3	318	—	—	e 19 19	−13	—	—	—
Ashkabad		73·5	313	11 18	+ 1	20 30	− 2	—	—	—
Sverdlovsk		80·7	331	i 11 56	− 1	e 21 44	− 5	—	—	—
Tiflis		84·6	313	e 12 17	+ 1	—	—	—	—	—
Zugdidi		86·9	313	e 12 29	+ 1	—	—	—	—	—
Pretoria	z.	89·0	245	i 12 36	− 2	—	—	—	—	—
Collmberg	z.	106·9	321	e 20 37	PPP	—	—	—	—	—
Tinemaha	z.	119·2	51	i 18 35	[+ 5]	—	—	—	—	—
Pasadena		119·9	54	i 18 36	[+ 5]	—	—	e 20 20	PP	—
China Lake		120·0	52	i 18 37	[+ 5]	—	—	—	—	—
Riverside	z.	120·6	54	i 18 37	[+ 4]	—	—	—	—	—
Palomar	z.	121·1	55	i 18 38	[+ 4]	—	—	—	—	—
Ottawa	z.	139·8	17	i 19 4	[− 5]	—	—	i 22 29	PP	—
Harvard		143·6	14	i 19 18	[+ 2]	—	—	—	—	—
Weston		143·8	14	i 19 18	[+ 2]	—	—	i 22 38	PP	—
Palisades		144·3	19	i 19 19	[+ 2]	—	—	i 22 40	PP	—

Additional readings :—
Pasadena iZ = 21m.47s.
Ottawa iZ = 19m.12s.
Long waves were also recorded at Christchurch, Wellington, and Kiruna.

July 27d. 0h. 23m.5s. Epicentre 39°·1N. 75°·0E. (U.S.S.R.).

A = +·2014, B = +·7516, C = +·6281; δ = −3; h = −1;
D = +·966, E = −·259; G = +·163, H = +·607, K = −·778.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Murgab	1·1	229	0 17	− 5	—	—	—	—
Andijan	2·6	309	0 46	+ 2	i 1 30	S_g	e 0 51	P_g
Fergana	2·8	297	e 0 47	0	e 1 36	S_g	—	—
Dzhergetal	2·9	272	i 0 51	+ 3	i 1 42	S_g	—	—
Khorog	3·1	239	e 0 52	+ 1	1 34	S*	—	—
Rybach'e	3·4	14	i 0 55	0	1 44	S*	i 1 4	P*
Frunse	3·8	356	i 1 2	+ 1	i 2 2	S_g	—	—
Krasnogorka	4·2	2	i 1 5	− 2	i 2 14	S_g	—	—
Obi-garm	4·2	266	e 1 5	− 2	i 2 18	S_g	—	—
Almata	4·4	19	1 7	− 3	e 2 17	S*	e 2 33	S_g
Almata II	4·5	23	e 1 20	P*	i 2 21	S*	—	—
Kurmenty	4·7	31	1 8	− 6	i 2 24	S*	i 1 23	P*
Stalinabad	4·9	265	e 1 33	P_g	i 2 29	S*	—	—
Tashkent	4·9	299	e 1 32	P_g	e 2 27	S*	—	—
Chilisk	5·1	29	1 16	− 4	e 2 37	S*	—	—
Ili	5·1	17	1 15	− 5	e 2 37	S*	—	—
Tchimkent	5·2	310	i 1 20	− 1	i 2 55	S_g	i 1 41	P_g

July 27d. 0h. 59m. 22s. Epicentre 31°·3N. 142°·2E.

A = −·6764, B = +·5246, C = +·5170; δ = +1; h = +1;
D = +·613, E = +·790; G = −·409, H = +·317, K = −·856.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	7·9	354	e 2 2	+ 3	3 4	−26	—	—	—
Zi-ka-wei	Z.	17·8	276	4 12	+ 1	e 7 30	+ 2	—	—	—
Guam		17·9	173	4 8	− 4	9 0	L	—	—	(9·0)
Nanking		19·9	279	e 4 34	− 2	e 8 14	− 1	—	—	e 8·8
Kabansk		33·2	319	6 39	− 1	e 11 57	− 3	—	—	—
Irkutsk		34·6	319	e 6 44?	− 9	—	—	—	—	—
Kurmenty		51·1	302	i 9 15	+ 9	—	—	—	—	—
Almata II		51·8	303	i 9 15	+ 3	—	—	—	—	—
Ili		51·9	304	i 9 16	+ 4	—	—	—	—	—
Almata		52·1	303	i 9 15	+ 1	—	—	—	—	—
Andijan		55·9	300	9 42	0	—	—	—	—	—
Fergana		56·4	300	e 9 46	+ 1	—	—	—	—	—
Dzhergetal		57·2	299	e 9 54	+ 3	—	—	—	—	—
Tchimkent		57·6	303	e 10 0	+ 6	—	—	—	—	—
Tashkent		58·0	302	e 9 57	0	e 17 57	0	—	—	—
Stalinabad		59·2	299	i 10 8	+ 3	e 18 17	+ 5	—	—	—
Brisbane	Z.	59·4	169	e 10 13	+ 7	—	—	—	—	—
Sverdlovsk		59·9	322	10 8	− 2	e 18 16	− 5	—	—	—
Samarkand		60·2	301	e 9 16	−56	—	—	—	—	—
Ashkabad		67·1	302	11 1	+ 4	e 19 56	+ 5	—	—	—
Resolute Bay		68·0	14	e 10 58	− 5	e 19 53	− 9	—	—	—
Victoria		70·0	45	11 12	− 3	—	—	—	—	—
Baku		72·1	307	—	—	e 20 51	+ 1	—	—	—
Kiruna		72·1	341	—	—	20 44?	− 6	e 25 11	SS	e 41·0
Kirovobad		74·3	308	—	—	e 21 12	− 3	—	—	—
Reno	Z.	76·4	52	e 11 52a	− 1	—	—	e 12 3	PcP	—
Fresno	Z.	77·8	55	e 11 58a	− 3	—	—	e 12 37	?	—
Scoresby Sund		77·9	355	—	—	e 21 50	− 4	—	—	—
Tinemaha	Z.	78·7	54	e 12 4	− 2	—	—	—	—	—
Haiwee	Z.	79·3	55	e 12 8	− 1	—	—	—	—	—
Pasadena	Z.	80·2	57	e 12 13	− 1	—	—	—	—	—
Palomar	Z.	81·5	57	e 12 18	− 3	—	—	—	—	—
Kishinev		81·7	321	—	—	e 22 30	− 4	—	—	—
Lwow		82·4	325	e 12 27	+ 2	e 22 35	− 6	—	—	—
Copenhagen		83·3	334	i 12 32	+ 2	—	—	—	—	44·6
Ksara		85·1	307	e 12 43	+ 4	e 23 20	+12	e 18 16	PPP	—
Collmberg	Z.	86·4	331	e 12 45	0	—	—	—	—	—
Jena	E.	87·3	331	e 12 47	− 3	—	—	—	—	—
Witteveen	Z.	87·7	335	e 12 51	− 1	—	—	e 13 13?	—	—
Pavia		92·7	329	—	—	e 24 13	−5	—	—	—
Palisades		100·7	18	—	—	(e 27 1)	PS	—	—	e 27·0
Granada		104·7	333	13 50a	−19	—	—	20 45	PPP	59·0

Additional readings :—
Jena eN = 12m.50s.?, eEN = 13m.2s., eE = 13m.15s.
Long waves were also recorded at other European stations.

July 27d. 15h. 53m. 41s. Epicentre 31°·3N. 142°·2E. (as at 0h. 59m.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		14·4	328	e 3 15	−12	e 5 43	−26	—	—	—
Zi-ka-wei	Z.	17·8	276	4 14	+ 3	e 7 37	+ 9	—	—	—
Guam		17·9	173	4 43	+31	—	—	—	—	—
Nanking		19·9	279	e 4 35	− 1	e 8 1	−14	—	—	—
Irkutsk		34·6	319	e 6 48	− 5	e 12 11?	−11	—	—	—
Almata II		51·8	303	e 9 10	− 2	—	—	—	—	—
Rybach'e		52·8	302	e 9 18	− 1	—	—	—	—	—
Andijan		55·9	300	e 9 41	− 1	e 17 31	+ 2	—	—	—
Fergana		56·4	300	e 9 43	− 2	—	—	—	—	—
Tchimkent		57·6	303	e 9 53	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		58·0	302	e 9 57?	0	e 17 58?	+ 1	—	—	—
Stalinabad		59·2	299	e 10 6	+ 1	—	—	—	—	—
Resolute Bay	z.	68·0	14	e 11 2	− 1	—	—	—	—	—
Kiruna		72·1	341	—	—	e 20 40	−10	e 21 32	ScS	e 40·8
Berkeley	N.	75·5	55	—	—	e 32 2	Q	—	—	—
Reno	z.	76·4	52	e 11 59a	+ 6	—	—	—	—	—
Tinemaha	z.	78·7	54	e 12 13	+ 7	—	—	—	—	—
China Lake		79·7	55	e 12 17	+ 6	—	—	—	—	—
Pasadena	z.	80·2	57	e 12 18	+ 4	—	—	—	—	—
Palomar	z.	81·5	57	e 12 26	+ 5	—	—	—	—	—
Collmberg	z.	86·4	331	e 12 45	0	—	—	e 16 11	PP	—
Paris		92·5	335	e 13 23	+ 9	e 24 13	− 4	e 16 57	PP	e 53·3

Additional readings :—
Kiruna eE = 28m.53s.
Paris eSKS? = 23m.47s., ePS? = 25m.20s.
Long waves were also recorded at other European stations.

July 27d. Readings also at 0h. (Palomar, Pasadena, Helwan, Ksara, Paris, Strasbourg, Stuttgart, and near Apia), 3h. (Palomar, Tinemaha, near Chilisk, Almata II, Dzhergetal (2) and Kurmenty), 4h. (Huancayo and near Dzhergetal), 11h. (Stuttgart), 12h. (Apia), 13h. (Palomar, Tinemaha, Ili, -near Almata II, Chilisk, Kurmenty, and near Bogota), 15h. (Collmberg, Strasbourg, and Tacubaya), 16h. (Antofagasta), 17h. (Apia (2), near Alicante (4), near Dzhergetal (2), and near Istanbul), 18h. (Oaxaca, near Puebla, Tacubaya, and Vera Cruz), 19h. (near Tananarive), 20h. (Apia and near Athens), 21h. (near Dzhergetal), 23h. (near Tacubaya and near Apia).

July 28d. 19h. 15m. 20s. Epicentre 31°·5N. 142°·6E.

A = −·6786, B = +·5188, C = +·5199 ; δ = −5 ; h = +1 ;
D = +·607, E = +·794 ; G = −·413, H = +·316, K = −·854.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	7·7	351	3 3	+67	e 3 41	+16	—	—	—
Vladivostok		14·4	327	i 3 21	− 6	—	—	—	—	—
Zi-ka-wei	z.	18·1	276	e 4 13	− 1	e 7 40	+ 5	—	—	—
Kabansk		33·3	319	e 6 40	− 1	e 11 58?	− 4	—	—	—
Irkutsk		34·7	319	e 6 52	− 2	e 12 20	− 4	—	—	—
Ili		52·0	304	i 9 13	0	—	—	—	—	—
Rybach'e		53·0	302	e 9 20	− 1	—	—	—	—	—
Frunse		54·0	303	i 9 28	0	e 17 4	+ 1	—	—	—
Andijan		56·1	300	9 44	+ 1	17 33	+ 1	—	—	—
Fergana		56·6	300	e 9 46	− 1	—	—	—	—	—
Tchimkent		57·7	303	e 9 57	+ 2	—	—	—	—	—
Tashkent		58·2	302	e 9 59	+ 1	e 17 59	0	—	—	—
Stalinabad		59·4	299	i 10 7	+ 1	—	—	—	—	—
Sverdlovsk		60·0	322	e 10 8	− 3	—	—	—	—	—
Ashkabad		67·3	302	e 11 0	+ 1	—	—	—	—	—
Resolute Bay		67·7	14	e 10 59	− 2	e 19 52	− 6	e 12 48	PP	e 38·7
Victoria		69·6	45	11 12	− 1	—	—	—	—	—
Kiruna		72·0	341	—	—	e 20 13	−36	e 21 28	ScS	e 41·7
Berkeley		75·1	55	e 11 46	0	e 22 28	PPS	—	—	—
Lick	z.	75·8	55	i 11 48a	− 2	—	—	—	—	—
Reno	z.	76·0	52	e 11 51a	0	—	—	—	—	—
Fresno	z.	77·4	55	e 11 58a	0	—	—	e 13 46	?	—
Scoresby Sund		77·7	355	i 12 0	0	—	—	—	—	—
Tinemaha	z.	78·3	54	e 12 3	0	—	—	e 14 12	?	—
China Lake	z.	79·4	55	e 12 10	+ 1	—	—	e 12 30	PcP	—
Pasadena	z.	79·8	56	i 12 11	− 1	—	—	e 12 31	PcP	—
Riverside	z.	80·5	56	e 12 15	0	—	—	e 12 35	PcP	—
Palomar	z.	81·2	57	e 12 19	0	—	—	e 12 39	PcP	—
Collmberg	z.	86·4	331	e 12 46	+ 1	—	—	e 14 32	?	—
Jena		87·3	332	e 12 50	0	—	—	e 13 1	PcP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Witteveen	z.	87·7	335	i 12 54	+ 2	—	—	—	—	—
Stuttgart		89·9	332	e 13 2	0	—	—	—	—	e 51·7
Paris		92·5	335	e 13 13	− 1	—	—	—	—	e 58·7

Additional readings :—
Resolute Bay eN = 20m.29s.
Berkeley eZ = 13m.3s., eEN = 23m.4s.
Lick iZ = 12m.22s., 13m.39s., and 13m.59s.
China Lake eZ = 13m.57s.
Pasadena eZ = 14m.3s.
Palomar eZ = 14m.7s.
Jena eZ = 14m.36s.
Long waves were also recorded at Potsdam and De Bilt.

July 28d. 20h. 57m. 55s. Epicentre 31°·5N. 142°·6E. (as at 19h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		7·7	351	e 1 50	− 6	5 54	?	1 53	P	—
Vladivostok		14·4	327	i 3 22?	− 5	—	—	—	—	—
Yuzno-Sakhlinsk		15·4	0	e 3 37	− 3	—	—	—	—	—
Zi-ka-wei	z.	18·1	276	i 4 12	− 2	e 7 30	− 5	—	—	—
Guam		18·1	173	5 0	+46	7 56	+21	—	—	—
Manila		26·0	235	e 5 21	−15	—	—	—	—	—
Kabansk		33·3	319	6 40	− 1	e 12 4	+ 2	—	—	—
Irkutsk		34·7	319	e 6 52	− 2	12 21?	− 3	—	—	—
Kurmenty		51·3	302	e 9 9	+ 1	—	—	—	—	—
Almata II		51·9	303	e 9 13	+ 1	—	—	—	—	—
Ili		52·0	302	i 9 13	0	—	—	—	—	—
Almata		52·2	303	i 9 14	− 1	—	—	—	—	—
Rybach'e		53·0	302	i 9 21	0	—	—	—	—	—
Frunse		54·0	303	i 9 29	+ 1	—	—	—	—	—
Murgab		55·6	298	i 9 42	+ 2	—	—	—	—	—
Andijan		56·1	300	9 44	+ 1	17 34	+ 2	—	—	—
Fergana		56·6	300	i 9 46	− 1	—	—	—	—	—
Tchimkent		57·7	303	i 9 54	− 1	—	—	—	—	—
Tashkent		58·2	302	i 9 59	+ 1	—	—	—	—	—
Obi-garm		58·7	299	e 9 59	− 3	e 18 3	− 3	—	—	—
Stalinabad		59·4	299	i 10 7	+ 1	i 18 18	+ 3	—	—	—
Sverdlovsk		60·0	322	i 10 8	− 3	e 18 20	− 3	—	—	—
Samarkand		60·4	301	10 11	− 2	18 25	− 3	—	—	—
Ashkabad		67·3	302	11 1	+ 2	19 59	+ 5	—	—	—
Resolute Bay		67·7	14	e 11 1	0	e 19 56	− 2	e 11 40	PcP	e 26·1
Victoria		69·6	45	e 11 14	+ 1	—	—	10 46	?	—
Kiruna		72·0	341	—	—	e 20 47	− 2	e 25 4	SS	e 40·1
Moscow		72·3	325	i 11 29	0	20 50	− 2	—	—	—
Baku		72·3	307	e 11 31	+ 2	20 53	+ 1	—	—	—
Shemakla		73·0	307	i 11 31	− 2	—	—	—	—	—
Pulkovo		73·5	331	e 11 35	− 1	e 21 3	− 3	—	—	—
Grozny		73·7	311	11 41	+ 3	—	—	—	—	—
Kirovobad		74·5	308	11 42	0	21 17	0	—	—	—
Berkeley		75·1	55	e 11 49k	+ 3	e 21 25	+ 1	—	—	—
Lick	z.	75·8	55	e 11 53k	+ 3	—	—	i 12 29	?	—
Reno		76·0	52	e 11 53	+ 2	e 16 20	PPP	e 11 25	?	—
Erevan		76·0	310	11 52	+ 1	21 36	+ 2	—	—	—
Zugdidi		76·5	312	11 56	+ 2	—	—	—	—	—
Fresno	z.	77·4	55	e 12 0	+ 2	—	—	e 11 32	?	—
Scoresby Sund		77·7	355	i 12 2a	+ 2	—	—	—	—	—
Tinemaha	z.	78·3	54	i 12 6	+ 3	—	—	—	—	—
Upsala		78·4	335	—	—	e 21 51	− 9	e 26 43	SS	e 46·1
China Lake	z.	79·4	55	e 12 11	+ 2	—	—	e 11 43	?	—
Mount Wilson	z.	79·9	56	e 12 16	+ 4	—	—	e 11 47	?	—
Yalta		80·2	316	12 14	0	22 17	− 2	—	—	—
Riverside	z.	80·5	56	e 11 48	−27	—	—	—	—	—
Palomar	z.	81·2	57	e 12 21	+ 2	—	—	e 11 53	?	—
Lwow		82·4	325	i 12 25	0	e 22 40	− 1	—	—	—
Copenhagen		83·3	334	i 12 30	0	—	—	—	—	40·1
Uzhgorod		84·1	325	e 12 35	+ 1	e 22 59	+ 1	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		85·2	307	i 12 42	+ 3	24 11	PS	—	—	—
Istanbul		85·3	316	e 12 40	0	e 23 7	− 3	—	—	—
Potsdam		85·5	332	i 12 41	0	e 23 4	− 8	—	—	e 46·1
Collmberg		86·4	331	e 12 45	0	—	—	e 12 17	?	—
Ogyalla		86·6	327	e 13 11	+25	e 23 25	+ 2	e 23 52	ScS	—
Prague		86·7	330	e 12 48	+ 1	e 23 20	− 4	e 13 34	pP	—
Jena	N.	87·3	332	e 12 49	− 1	—	—	e 13 14	?	—
Belgrade		87·6	323	e 12 51 a	0	e 23 33	+ 1	e 26 49	?	—
Witteveen	Z.	87·7	335	i 12 54	+ 2	—	—	—	—	—
De Bilt		88·7	335	—	—	e 23 45	+ 2	—	—	e 47·1
Stuttgart		89·9	232	e 13 3	+ 1	e 23 52	− 2	e 13 35	?	e 50·1
Triest		90·3	327	e 13 35	+31	e 23 58	+ 1	e 16 43	PP	—
Strasbourg		90·6	332	e 13 5	0	e 16 39	PP	e 13 35	?	e 47·1
Helwan	Z.	90·7	306	13 5	− 1	—	—	e 16 43	PP	—
Besançon		92·4	332	e 13 14	0	—	—	—	—	—
Paris		92·5	335	e 13 15	+ 1	i 25 29	PS	e 16 56	PP	e 52·1
Rome		93·7	325	e 13 42	+22	e 25 45	PS	e 16 32	PP	—
Tamanrasset	Z.	112·2	318	e 18 50?	[+12]	—	—	e 19 18	PP	—
La Paz		148·3	68	e 19 33	[−12]	—	—	i 19 55	PKP_2	—

Additional readings :—
Resolute Bay eEN =20m.58s.
Fresno eZ =12m.33s.
Upsala eSN =21m.55s.
Prague e =13m.16s., 14m.13s., and 14m48s., eS −23m.11s., e =23m.57s.
Ogyalla epP?N =13m.31s., e =14m.19s. and 16m.41s., esS? =24m.31s., e =26m.18s.
Triest eS =23m.39s., esS? =24m.41s., eSSS =35m.20s.
Paris e =21m.14s.
La Paz i =20m.31s.
Long waves were also recorded at Alicante, Tortosa, Granada, Pavia, and Kew.

July 28d. 23h. 4m. 33s. Epicentre 37°·5N. 143°·0E. (as on 1938, December 3d.).

Intensity IV at Inawasiro and Hurukawa ; II-III at Hukusima, Toyama, and Hirano.
Seismological Bulletin of the Cent. Met. Obs., Japan, for July, 1951, Tokyo, 1951, pp. 171-173, with macroseismic chart on p. 171.
Tokyo gives epicentre 37°·5N. 143°·5E.

A = −·6352, B = +·4786, C = +·6062 ; δ = +2 ; h = −1 ;
D = +·602, E = +·799 ; G = −·484, H = +·365, K = −·795.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Isinomaki	1·6	305	0 34	+ 4	0 59	+ 8	—	—	—
Onahama	1·8	256	0 31 a	− 1	1 2	+ 6	—	—	—
Sendai	1·8	295	0 34 a	+ 2	1 6	+10	—	—	—
Hukusima	2·0	277	0 37 a	+ 2	1 9	+ 7	—	—	—
Yamagata	2·2	290	0 37	− 1	1 14	+ 8	—	—	—
Mizusawa	2·2	318	0 40	+ 2	1 23	+17	—	—	—
Inawasiro	2·3	272	0 43 a	+ 3	1 17	+ 8	—	—	—
Shirakawa	2·3	260	0 39	− 1	—	—	—	—	—
Miyako	2·3	339	0 41 a	+ 1	1 23	+14	—	—	—
Mito	2·3	241	0 38 a	− 2	1 18	+ 9	—	—	—
Morioka	2·6	327	0 47 a	+ 3	1 39	+22	—	—	—
Tukubasan	2·7	241	0 42	− 3	—	—	—	—	—
Utunomiya	2·7	249	0 43 a	− 2	1 16	− 3	—	—	—
Sakata	2·9	299	0 54	+ 6	1 49	+25	—	—	—
Kumagaya	3·2	245	0 49 a	− 3	1 33	+ 1	—	—	—
Niigata	3·2	278	0 55	+ 3	—	—	—	—	—
Hatinohe	3·2	345	0 56	+ 4	—	—	—	—	—
Tokyo	3·2	235	0 49	− 3	1 37	+ 5	—	—	—
Akita	3·2	314	0 54	+ 2	1 39	+ 7	—	—	—
Maebasi	3·3	251	0 53 a	0	1 43	+ 8	—	—	—
Yokohama	3·4	233	0 52 a	− 3	1 48	+11	—	—	—
Titibu	3·5	244	0 55 a	− 2	1 41	+ 1	—	—	—
Mera	3·6	224	0 55	− 3	—	—	—	—	—
Aomori	3·7	332	1 5	+ 5	2 2	+17	—	—	—
Aikawa	3·8	278	1 1	0	1 56	+ 9	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oiwake		3·8	252	0 59	− 2	—	—	—	—	—
Takada		3·8	264	1 8	+ 7	—	—	—	—	—
Matusiro		3·9	256	1 3a	+ 1	2 2	+12	—	—	—
Nagano		3·9	258	1 4a	+ 2	2 2	+12	—	—	—
Ajiro		4·0	232	1 2	− 2	—	—	—	—	—
Osima		4·0	227	0 59	− 5	—	—	—	—	—
Kohu		4·0	242	1 2	− 2	1 57	+ 5	—	—	—
Misima		4·0	234	1 1	− 3	2 5	+13	—	—	—
Hunatu		4·0	240	1 1a	− 3	1 56	+ 4	—	—	—
Matumoto		4·2	253	0 48	−19	1 51	− 6	—	—	—
Shizuoka		4·5	236	1 9	− 2	2 6	+ 1	—	—	—
Urakawa		4·6	358	1 17	+ 5	2 15	+ 8	—	—	—
Iida		4·6	245	1 13	+ 1	2 8	+ 1	—	—	—
Toyama		4·7	260	1 15a	+ 1	2 28	+18	—	—	—
Omaesaki		4·8	233	1 9	− 6	2 4	− 8	—	—	—
Takayama		4·8	251	1 15	0	2 34	+22	—	—	—
Wazima		4·9	269	1 17	0	2 28	+13	—	—	—
Mori		5·0	337	1 25	+ 7	2 44	+26	—	—	—
Hatidyozima		5·1	213	1 23	+ 3	2 23	+ 3	—	—	—
Muroran		5·1	341	1 11	− 9	—	—	—	—	—
Hamamatu		5·1	237	1 17	− 3	—	—	—	—	—
Kanazawa		5·2	260	1 20	− 1	2 43	+21	—	—	—
Gihu		5·4	248	1 23	− 1	2 37	+ 9	—	—	—
Nagoya		5·4	246	1 21	− 3	2 48	+20	—	—	—
Hukui		5·6	259	1 25	− 2	—	—	—	—	—
Kusiro		5·6	11	1 22	− 5	2 32	− 1	—	—	—
Sapporo		5·7	348	1 35	+ 7	2 59	+24	—	—	—
Hikone		5·9	250	1 30	− 1	2 51	+11	—	—	—
Tsuruga		5·9	254	1 30a	− 1	2 53	+13	—	—	—
Tu		5·9	244	1 29	− 2	2 52	+12	—	—	—
Kameyama		5·9	245	1 26	− 5	2 52	+12	—	—	—
Nemuro		6·2	19	1 34	− 1	—	—	—	—	—
Asahigawa		6·3	357	1 54	P*	—	—	—	—	—
Kyoto		6·4	247	2 8	+30	3 36	+43	—	—	—
Owase		6·5	240	1 28	−11	—	—	—	—	—
Osaka		6·7	247	1 40	− 2	3 17	+17	—	—	—
Toyooka		6·9	256	1 43	− 2	3 21	+16	—	—	—
Kobe		6·9	249	1 44	− 1	3 10	+ 5	—	—	—
Siomisaki		7·2	238	1 51	+ 2	—	—	—	—	—
Sumoto		7·3	247	1 47	− 3	—	—	—	—	—
Himeji		7·6	249	1 57	+ 2	—	—	—	—	—
Yonago		8·0	259	2 12	+12	4 4	+31	—	—	—
Matsue		8·3	258	2 11	+ 7	4 5	+25	—	—	—
Muroto		8·4	242	2 2	− 4	—	—	—	—	—
Koti		8·7	246	2 7	− 3	—	—	—	—	—
Hirosima		9·1	253	2 8	− 6	—	—	—	—	—
Hamada		9·2	257	2 9	− 7	4 5	+ 2	—	—	—
Simidu		9·5	243	2 17	− 3	—	—	—	—	—
Yuzno-Sakhlinsk		9·5	359	i 2 22	+ 2	—	—	—	—	—
Ooita		10·2	249	2 36	+ 5	—	—	—	—	—
Vladivostok		10·2	307	i 2 31	0	i 4 42	+15	—	—	—
Hukuoka		11·0	253	2 38a	− 4	—	—	—	—	—
Kumamoto		11·1	249	2 42	− 1	—	—	—	—	—
Saga		11·2	252	2 56	+12	—	—	—	—	—
Kagosima		11·8	244	2 51a	− 2	—	—	—	—	—
Yakusima		12·5	240	2 58	− 4	—	—	—	—	—
Zi-ka-wei	Z.	18·9	256	i 4 18	− 6	7 33	−20	—	—	i 10·1
Kabansk		29·3	311	i 6 6	0	11 5	+ 6	—	—	—
Manila		30·1	327	e 5 38	−35	—	—	—	—	—
Irkutsk		30·7	312	i 6 18	− 1	11 29	+ 8	—	—	—
Chatra		47·8	273	e 8 39	− 2	e 15 35	− 3	—	—	e 28·0
College		48·0	32	8 43	0	18 35	ScS	—	—	—
Kurmenty		48·6	297	i 8 47	0	—	—	—	—	—
Calcutta	E.	49·0	269	e 8 54	+ 4	i 15 58	+ 3	10 48	PP	23·2
Ili		49·2	299	i 8 51	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata II		49·2	299	e 8 51	− 1	—	—	—	—	—
Almata		49·5	299	e 8 54	0	—	—	—	—	—
Rybach'e		50·3	297	i 8 59	− 1	—	—	—	—	—
Krasnogorka		50·7	299	e 9 2	− 1	—	—	—	—	—
Frunse		51·2	299	i 9 7	0	e 16 31	+ 6	—	—	—
Murgab		53·3	294	e 9 23	0	e 16 55	+ 1	—	—	—
Andijan		53·5	297	9 24	0	i 17 1	+ 4	—	—	—
Fergana		54·1	297	i 9 27	− 2	—	—	—	—	—
New Delhi		54·9	281	e 9 31	− 4	e 17 15	− 1	e 20 13	SS	31·0
Tchimkent		54·9	300	i 9 33	− 2	i 17 14	− 2	—	—	—
Khorog		55·3	293	e 9 37	− 1	—	—	—	—	—
Tashkent		55·5	299	i 9 38	− 1	i 17 26	+ 2	—	—	—
Sverdlovsk		55·6	319	i 9 39	− 1	i 17 26	+ 1	—	—	—
Obi-garm		56·2	296	i 9 42	− 2	e 17 34	+ 1	—	—	—
Stalinabad		56·9	296	i 9 49	0	i 17 44	+ 2	—	—	—
Samarkand		57·7	298	i 9 53	− 2	17 54	+ 1	—	—	—
Resolute Bay		61·8	15	i 10 23a	0	e 18 47	+ 1	e 20 15	ScS	e 31·4
Bombay		63·2	274	—	—	e 19 8	+ 5	—	—	—
Ashkabad		64·5	299	i 10 43	+ 2	i 19 26	+ 7	—	—	—
Seattle		66·2	47	i 11 5	+13	e 19 48	+ 8	e 19 55	PPS	e 33·4
Kiruna		66·5	340	i 10 53	− 1	e 19 43	− 1	e 13 16	PP	e 30·8
Moscow		67·6	324	i 11 0	− 1	19 57	0	—	—	—
Pulkovo		68·4	330	i 11 7	+ 1	i 20 5	− 2	—	—	—
Baku		69·0	305	e 11 10?	+ 1	e 20 15	+ 1	—	—	—
Shemakla		69·7	305	11 13	− 1	—	—	—	—	—
Shasta Dam		69·8	54	i 11 17	+ 3	—	—	—	—	—
Grozny		70·0	309	i 11 17	+ 2	—	—	—	—	—
Mineral	z.	70·5	54	i 11 28k	+10	—	—	i 11 38	PcP	—
Hungry Horse		70·6	44	i 11 20	+ 1	—	—	—	—	—
Kirovobad		71·1	307	i 11 22	0	e 20 36?	− 2	—	—	—
Berkeley		71·4	56	e 11 26a	+ 2	e 20 45	+ 3	e 30 3	Q	e 33·8
Scoresby Sund		71·8	355	e 11 34	+ 8	e 20 51	+ 5	e 21 34	PPP	34·5
Lick	z.	72·1	56	i 11 39a	+11	—	—	—	—	—
Reno	N.	72·1	53	e 11 4	−24	—	—	—	—	—
Erevan		72·6	308	11 32	+ 1	20 56	0	—	—	—
Zugdidi		72·9	311	e 11 34	+ 1	—	—	—	—	—
Upsala		73·1	335	e 13 58	PP	e 21 0	− 1	e 15 52	PPP	e 34·4
Sotchi		73·5	313	e 11 36	0	—	—	—	—	—
Fresno	z.	73·7	56	e 11 36k	− 2	e 21 39	PS	e 14 30	PP	—
Tinemaha	z.	74·5	55	i 11 53	PcP	—	—	—	—	—
China Lake	z.	75·7	56	e 11 51	+ 2	—	—	i 11 59	PcP	—
Yalta		76·1	316	11 50	− 1	21 34	− 1	—	—	—
Pasadena		76·3	57	e 11 54	+ 2	i 21 36	− 1	i 12 3	PcP	e 29·4
Riverside	z.	76·9	57	e 11 57	+ 1	—	—	e 12 5	PcP	—
Kishinev		77·3	321	11 58	0	21 47	− 1	—	—	—
Palomar		77·6	58	e 12 2	+ 2	e 21 58	+ 7	i 12 11	PcP	—
Lwow		77·7	325	i 12 0	0	e 21 50	− 2	—	—	—
Copenhagen		78·1	334	i 12 3	+ 1	i 21 59	+ 3	i 12 13	PcP	39·4
Uzhgorod		79·4	325	e 12 10	+ 1	e 22 9	− 1	—	—	—
Skalnate Pleso		79·9	326	e 12 17	+ 5	e 22 20	+ 4	e 15 19	PP	—
Potsdam		80·4	332	i 12 15	0	i 22 20	− 1	e 15 18	PP	e 40·4
Bucharest		80·5	320	e 12 21	+ 6	e 21 45	−37	—	—	—
Aberdeen	E.	81·2	342	i 16 22	PcS	i 22 29	0	i 22 53	ScS	e 44·9
Ivigtut		81·2	6	—	—	22 32	+ 3	—	—	38·4
Istanbul		81·2	316	e 12 19	0	e 22 31	+ 2	e 12 29	pP	e 45·4
Collmberg		81·3	331	e 12 19	− 1	—	—	e 12 29	PcP	—
Budapest		81·7	325	e 12 29	+ 7	e 22 34	0	e 12 36	PcP	e 45·0
Prague		81·7	330	12 21	− 1	e 22 35	+ 1	e 15 32	PP	e 33·4
Ogyalla		81·8	326	e 12 9?	−13	e 22 27	− 8	e 17 1	PPP	—
Ksara		81·9	307	i 12 24	+ 1	22 46	+10	12 34	pP	—
Timisoara		82·0	323	12 27?	+ 4	22 38	+ 1	e 12 50	PcP	e 47·4
Jena		82·2	331	e 12 23?	− 1	—	—	e 12 35	PcP	—
Tucson		82·3	55	e 12 27	+ 2	e 22 43	+ 3	15 41	PP	—
Witteveen	z.	82·4	335	i 12 27a	+ 2	—	—	i 12 38	pP	—
Cheb		82·5	331	e 12 27	+ 1	e 22 46	+ 4	e 15 27	PP	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		83·0	323	e 12 27 k	− 1	e 22 50	+ 3	e 15 26	PP	e 46·5
De Bilt		83·5	336	i 12 32	+ 1	e 22 52	0	e 15 40	PP	e 40·4
Stuttgart		84·8	331	i 12 38 a	+ 1	e 22 57	− 8	i 12 59	PcP	e 45·4
Karlsruhe		84·9	332	e 12 39	+ 1	—	—	i 12 50	PcP	e 45·4
Triest		85·5	327	e 12 40	− 1	i 23 2	−10	e 12 50	pP	—
Strasbourg		85·5	332	e 12 41 a	0	i 23 15	+ 3	e 15 58	PP	e 43·4
Rathfarnham Castle		85·7	342	i 12 46	+ 4	e 23 37	+23	i 12 56	PcP	—
Kew		85·8	338	i 12 42 a	0	e 23 16	+ 1	e 24 18	PS	e 40·4
Zürich		86·2	331	e 12 44 a	0	e 23 14	− 5	e 16 6	PP	—
Basle		86·4	332	e 12 44	− 1	—	—	—	—	—
Paris		87·2	335	i 12 49	0	i 23 30	+ 2	i 13 1	pP	e 44·4
Besançon		87·3	332	e 12 49	− 1	—	—	e 13 0	pP	—
Helwan		87·4	306	i 12 49	− 1	e 23 27	− 3	e 15 33	PP	—
Pavia		87·8	330	e 18 41	PPP	e 23 21	[+ 2]	e 34 45	Q	e 44·6
Rome		89·0	324	e 12 52	− 6	e 23 25	[− 2]	e 16 26	PP	—
St. Louis		89·8	39	e 13 2	0	i 23 53	0	e 30 8	SSP	—
Seven Falls	E.	90·5	23	—	—	e 23 52	− 7	e 30 5	SS	—
Cleveland		91·5	33	—	—	i 23 9	[−33]	—	—	—
Morgantown		93·7	33	e 13 21	+ 1	—	—	—	—	—
Tortosa		94·8	332	—	—	i 24 2	[+ 2]	—	—	e 50·4
Palisades		94·9	27	—	—	e 24 18	{+ 1}	—	—	—
Alicante		97·4	332	13 36	− 1	25 1	+ 2	17 44	PP	e 46·6
Almeria		99·4	333	17 45	PP	24 57	{+ 7}	31 55	SS	54·4
Granada		99·5	334	i 17 57 a	PP	25 9	− 7	32 15	SS	54·6
Lisbon		99·9	338	—	—	36 7	SSS	36 20	?	—
Malaga		100·2	334	e 17 25	PP	i 27 15	PS	20 23	PPP	58·3
Tamanrasset	Z.	107·9	319	17 55?	?	28 43	PS	e 21 6	PPP	—
La Paz		145·5	61	i 19 45	[+ 5]	29 49	{− 4}	e 35 33	PPS	—

Additional readings :—
Calcutta PPPE =11m.54s., PcSE =14m.18s., SSE =19m.23s.
Resolute Bay eZ =10m.34s.
Seattle e =11m.33s. and 11m.46s., ePPS =20m.15s., eScS =20m.51s., eSSS =25m.55s., e =29m.41s.
Kiruna eZ =11m.39s., ePPZ =13m.20s., ePPPN =15m.6s., eScSN =20m.49s., iZ =21m.4s., eSSEN =24m.1s., eE =26m.12s., eSSSN =27m.18s.
Lick eZ =11m.43s., iZ =12m.3s.
Upsala e =22m.16s., eSS?N =26m.27s.?.
Copenhagen 15m.0s.
Skalnate Pleso e =22m.37s., 24m.27s., and 26m.46s., eSS? =27m.43s.
Potsdam ePN =12m.21s.
Aberdeen iE =31m.57s.
Istanbul ePPE =15m.26s., eSKSN =22m.37s.
Budapest eE =15m.50s., eSN =22m.21s.
Prague epP? =12m.33s., esP? =12m.41s., e =12m.53s., and 13m.7s., ePPP =18m.9s., ePS =23m.38s., eSS =27m.54s.
Ogyalla e =12m.53s., 13m.40s., 14m.59s., and 15m.15s.
Ksara PS =23m.32s.
Timisoara eN =13m.23s.
Jena eE =13m.11s.
Belgrade iZ =12m.39s., eZ =22m.21s.
De Bilt eSS =28m.57s.
Stuttgart e =13m.5s., ePP =15m.57s., eSSS =33m.15s., e =36m.51s., and 37m.45s.
Triest ePPZ =16m.1s., esPP?Z =16m.19s., eSKS? =23m.16s., ePS? =24m.9s., eSS? =28m.59s.
Strasbourg i =12m.52s., e =12m.58s. and 13m.57s., eSSS =32m.43s., eQ =35·6m.
Kew eZ =12m.54s.
Zürich i =12m.54s.
Paris i =15m.56s., iPP =16m.13s., e =16m.24s., iPPP =18m.11s., iSKS =23m.18s. ePS =24m.21s., e =24m.34s., ePPS? =25m.5s., e =25m.12s., 25m.34s., 25m.53s., 26m.29s., and 27m.2s., eSS =29m.8s., eSSP =29m.22s., ePSPS =30m.18s., eSSS =32m.54s., e =33m.6s., 34m.34s., 34m.50s., and 35m.12s.
Rome ePSN =24m.37s., eSSN =29m.45s.
St. Louis eSKS =23m.30s., i =27m.23s.
Seven Falls eE =33m.51s.
Alicante PPS =27m.18s., SS =31m.38s., SSP =31m.53s., Q =40m.38s.
Granada SKS =24m.36s., PS =27m.24s., SSS =34m.27s.
Tamanrasset ePPZ =18m.46s.
La Paz i =20m.7s., SS =41m.53s.
Long waves were also recorded at Clermont-Ferrand, Toledo, and Huancayo.

July 28d. 23h. 14m. 27s. Epicentre 37°·5N. 143°·0E. (as at 23h. 4m.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa		2·2	318	0 37	− 1	1 22	+16	0 40	P*
Resolute Bay	z.	61·8	15	e 10 20	− 3	—	—	—	—
China Lake	z.	75·7	56	e 11 48	− 1	—	—	i 11 57	PcP
Pasadena	z.	76·3	57	e 11 57	+ 5	—	—	—	—
Riverside	z.	76·9	57	e 12 3	+ 7	—	—	—	—
Palomar	z.	77·6	58	e 12 8	+ 8	—	—	—	—
Collmberg	z.	81·3	331	e 12 17	− 3	—	—	—	—
Jena		82·2	331	e 12 21	− 3	—	—	e 12 41	PcP
Witteveen	z.	82·4	335	e 12 25	0	—	—	—	—
Stuttgart	z.	84·8	331	e 12 36	− 1	—	—	e 12 47	PcP
Paris		87·2	335	i 12 48	− 1	—	—	i 12 59	pP
St. Louis		89·8	39	e 13 1	− 1	e 23 54	+ 1	—	—
Bogota		125·7	48	i 23 27	PPP	—	—	—	—

Paris also gives e =17m.41s. and 17m.58s.
Long waves were also recorded at Cheb.

July 28d. Readings also at 0h. (La Paz, Harvard, and near Tacubaya), 2h. (Bogota, Kimberley, and near Dzhergetal), 4h. (Palomar, Riverside, and near Dzhergetal), 5h. (Pretoria), 7h. (near Dzhergetal (2)), 8h. (Apia, Reno, and near Obi-garm), 11h. (Durham and Algiers Univ.), 12h. (near Djakarta and Bandong). 13h. (Auckland, New Plymouth, Kaimata, near Cobb River, Tuai, Wellington, Christchurch, and near Dzhergetal), 14h. (Scoresby Sund, and near Obi-garm), 15h. (near Dzhergetal (2)), 16h. (near Andijan, Fergana, Tchimkent, Khorog, Stalinabad, Obi-garm, Ili, Rybach'e, Frunse, Murgab, near Athens, and near Istanbul), 17h. (Stuttgart (2), near Istanbul, near Athens (3), Ksara, Rome, Triest, Pavia, Bucharest, Timisoara, and Potsdam), 18h. (Apia (2), China Lake, Mount Wilson, Scoresby Sund, Stalinabad, Fergana, Irkutsk, Vladivostok, Kabansk, Sverdlovsk, and near Mizusawa), 19h. (near Athens), 20h. (Apia), 21h. (Reno, Fresno, Victoria, and near Obi-garm), 23h. (Victoria).

July 29d. 10h. 53m. 46s. Epicentre 36°·7N. 121°·1W. (as on 1949, Nov. 10d.).

Intensity VI at Bitterwater, Pinnacles (slight damage), San Benito, and Soledad ; V at Aptos, Bradley, Gonzales, Greenfield, and Hollister. Epicentre 36°35′N. 121°11′W. Macroseismic Area 10,000sq.m.

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial No. 762, Washington, 1953, p. 12.

A = −·4151, B = −·6881, C = +·5951 ; δ = −7 ; h = 0 ;
D = −·856, E = +·517 ; G = −·308, H = −·509, K = −·804.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha		2·3	81	i 0 43	+ 3	—	—	—	—	—
Santa Barbara		2·5	154	e 0 41	− 2	—	—	—	—	—
Haiwee	z.	2·6	103	i 0 45	+ 1	—	—	—	—	—
China Lake		3·0	107	i 0 48	− 2	—	—	—	—	—
Pasadena		3·5	136	i 0 53	− 4	i 1 37	− 3	—	—	—
Tucson		9·6	114	e 2 19	− 2	—	—	i 2 22	P	—
Seattle		11·0	356	e 2 47	+ 5	e 4 17	−30	—	—	e 5·7
Hungry Horse		12·8	22	e 3 10	+ 4	—	—	—	—	e 6·6
Rapid City		15·5	56	e 3 48	+ 6	—	—	—	—	e 8·0
Florissant		24·4	73	e 5 20	− 1	e 9 43	+ 4	—	—	e 13·0
St. Louis		24·5	73	e 5 21	− 1	e 9 42	+ 2	e 6 22	PPP	e 13·0
Morgantown		32·3	71	i 6 32	− 1	—	—	—	—	e 16·8
College		32·4	338	e 6 36	+ 2	—	—	—	—	e 17·1
Resolute Bay		40·1	10	—	—	e 13 51	+5	—	—	e 21·5
Collmberg	z.	83·6	26	e 11 44	−47	—	—	—	—	—

Additional readings :—
Seattle e =3m.6s. and 3m.46s.
Long waves were also recorded at Saskatoon, Bozeman, Victoria, Palisades, Scoresby Sund, Paris, Potsdam, and Stuttgart.

July 29d. 23h. 32m. 43s. Epicentre 5°·0S. 129°·2E. (as on 1950, Oct. 12d.).

$A = -·6296$, $B = +·7720$, $C = -·0866$; $\delta = -12$; $h = +7$;
$D = +·775$, $E = +·632$; $G = +·055$, $H = -·067$, $K = -·996$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		Z.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		21·5	265	e 4 54	+ 2	i 9 3	+16	i 5 19	PP	—
Djakarta	z.	22·3	267	e 5 2	+ 1	i 9 14	+12	—	—	—
Perth		29·6	203	—	—	i 11 7	+ 3	i 12 20	SS	i 16·6
Riverview		35·2	149	i 6 55a	− 3	i 12 28	− 3	i 14 47	SS	e 16·7
Yakusima		35·3	3	6 58	− 1	12 30	− 3	—	—	—
Kagosima		36·4	3	7 8	0	12 46	− 4	—	—	—
Zi-ka-wei	z.	36·8	350	7 10	− 1	e 13 12	+16	—	—	—
Kumoto		37·6	3	7 21	+ 3	13 6	− 2	—	—	—
Saga		38·1	2	7 36	+14	—	—	—	—	—
Nanking		38·2	346	i 7 23k	0	i 13 16	− 1	—	—	—
Simidu		38·3	6	7 17	− 7	13 4	−15	—	—	—
Hukuoka		38·4	3	7 24	− 1	13 17	− 3	9 5	PP	20·0
Kôti		38·6	6	7 26	0	13 19	− 4	—	—	—
Owase		39·4	10	7 29	− 4	—	—	—	—	—
Sumoto		39·5	9	7 34	0	12 41	−56	—	—	16·9
Kobe		39·9	9	7 34	− 3	13 50	+ 7	—	—	—
Osaka		39·9	9	7 29	− 8	—	—	—	—	—
Kameyama		40·2	10	7 19	−21	—	—	—	—	—
Nagoya		40·6	10	7 42	− 1	13 49	− 5	—	—	—
Osima		40·7	13	7 44	0	—	—	—	—	—
Shizuoka		40·7	12	7 51	+ 7	13 49	−6	—	—	—
Mera		41·0	13	8 4	+18	—	—	—	—	—
Hunatu		41·3	12	7 46	− 3	—	—	—	—	—
Yokohama		41·4	13	8 8	+18	—	—	—	—	—
Tokyo		41·7	13	7 54	+ 2	—	—	—	—	—
Matumoto		41·8	10	7 55	+ 2	14 17	+ 6	—	—	—
Kanazawa		41·9	9	8 1	+ 7	—	—	—	—	—
Kumagaya		42·0	13	7 56	+ 2	—	—	—	—	—
Oiwake		42·0	11	7 58	+ 4	14 11	− 3	—	—	—
Toyama		42·1	10	7 58	+ 3	—	—	—	—	—
Maebasi		42·2	13	8 5	+ 9	14 10	− 7	—	—	—
Matusiro		42·2	11	7 57	+ 1	—	—	9 53	PPP	20·9
Nagano		42·3	10	7 58	+ 1	14 13	− 6	—	—	—
Mito		42·5	14	8 4	+ 5	—	—	—	—	—
Utunomiya		42·5	13	8 6	+ 7	14 10	−12	—	—	—
Wazima		42·8	10	8 0	− 1	—	—	—	—	—
Onahama		43·1	14	8 2	− 2	—	—	—	—	—
Inawashiro		43·6	12	8 11	+ 3	—	—	—	—	—
Niigata		43·7	12	8 10	+ 2	—	—	—	—	—
Hukusima		43·8	15	8 7	− 2	14 36	− 4	—	—	—
Sendai		44·4	13	8 11	− 3	14 43	− 6	—	—	—
Mizusawa		45·3	13	8 20	− 1	14 54	− 8	—	—	—
Akita		45·6	13	8 22	− 2	—	—	—	—	—
Aomori		46·8	13	8 43	+10	—	—	—	—	—
Vladivostok		48·0	4	e 8 41	− 2	i 15 36	− 5	—	—	—
Calcutta	E.	48·4	306	e 9 4	?	i 15 46	0	i 18 39	SS	—
Sapporo		49·1	12	8 55	+ 4	—	—	—	—	—
Colombo	E.	50·6	283	9 6	+ 4	19 3?	SS	—	—	30·3
Auckland	N.	52·4	133	i 9 39	+23	i 16 40	− 2	11 38	PP	25·3
Kodaikanal	E.	53·7	287	e 9 19	− 7	—	—	—	—	—
Christchurch		54·2	143	i 10 23k	+54	e 17 2	− 4	e 22 12	SSS	e 25·8
Wellington		54·4	139	e 9 26	− 5	e 17 7	− 2	e 19 42	ScS	28·3
Poona		59·3	295	i 10 5	− 1	i 18 14	0	10 41	PcP	—
Kabansk		60·0	345	i 10 10	− 1	e 18 21	− 2	—	—	—
New Delhi		60·1	307	e 10 9	− 2	e 18 18	− 6	i 14 53	PcS	25·6
Bombay	E.	60·4	295	e 10 13	0	i 18 26	− 2	i 12 31	PP	—
Irkutsk		60·9	343	i 10 16	− 1	18 34	0	—	—	—
Terre Adélie		62·3	174	e 10 27	+ 1	i 18 50	− 2	—	—	—
Kurmenty		66·3	321	e 10 53	+ 1	—	—	—	—	—
Klyuchi		66·4	19	e 10 28	−25	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Murgab		66·9	315	i 10 55	− 1	i 19 49	0	—	—	—
Almata II		67·0	323	e 10 57	0	—	—	—	—	—
Almata		67·3	323	i 10 57	− 2	—	—	—	—	—
Rybach'e		67·4	320	e 10 58?	− 1	e 19 56?	+ 1	—	—	—
Ili		67·5	322	i 10 59	− 1	i 19 54	− 2	—	—	—
Khorog		68·1	313	e 11 5	+ 1	—	—	—	—	—
Krasnogorka		68·4	321	i 11 5	− 1	—	—	—	—	—
Frunse		68·6	320	i 11 6	− 1	—	—	—	—	—
Andijan		69·0	317	11 10	+ 1	e 20 16	+ 2	—	—	—
Fergana		69·3	317	i 11 10	− 1	—	—	—	—	—
Obi-garm		70·0	314	i 11 18	+ 3	i 20 28	+ 2	—	—	—
Stalinabad		70·6	315	i 11 20	+ 1	i 20 33	0	21 26	ScS	—
Tashkent		71·4	317	i 11 24	0	i 20 41	− 1	—	—	—
Samarkand		72·3	314	i 11 27	− 2	20 55	+ 3	15 43	PPP	—
Mary		75·4	311	i 11 49	+ 2	—	—	e 12 4	PcP	—
Ashkabad		78·1	310	i 12 6	+ 4	e 22 1	+ 5	—	—	—
Sverdlovsk		82·6	329	i 12 26	0	i 22 40	− 3	i 15 36	PP	—
Baku		85·1	311	i 12 42	+ 3	e 23 10	+ 2	—	—	—
Shemakla		86·1	311	i 12 27	−17	—	—	—	—	—
Grozny		88·6	314	e 13 0	+ 4	—	—	—	—	—
Erevan		89·1	310	i 13 0	+ 2	i 23 47	+ 1	—	—	—
Tiflis		89·1	311	e 12 58	0	e 23 28	[+ 1]	i 23 50	ScS	—
Gori		89·7	312	13 4	+ 3	—	—	—	—	—
Zugdidi		91·4	311	e 13 16	+ 7	e 23 42	[+ 1]	—	—	—
Moscow		95·0	325	e 13 24	− 2	e 24 1	[0]	e 17 0	PP	—
Ksara		95·5	303	e 13 29	+ 1	26 40	PPS	—	—	—
Yalta		97·1	314	e 13 34	− 1	e 17 34	PP	e 19 38	PPP	—
Helwan	Z.	99·3	299	e 13 48	+ 3	e 16 37	PcS	e 17 52	PP	—
Kishinev		100·7	317	e 13 51	− 1	—	—	e 18 4	PP	—
Istanbul		100·9	311	e 17 57	PP	e 25 27	− 1	e 20 14	PPP	—
Kiruna		101·6	338	e 13 51	− 5	e 24 28	[− 7]	e 18 4	PP	e 50·3
Lwow		103·6	320	e 18 21	PP	e 24 45	[+ 1]	—	—	—
Uzhgorod		104·9	319	e 14 24	+14	—	—	27 50	PS	—
Upsala	N.	105·1	331	—	—	e 33 55	SS	—	—	e 55·3
Resolute Bay		105·9	10	e 14 24	+ 9	e 24 50	[− 5]	—	—	e 31·8
Seattle		106·1	41	e 18 40	PP	e 24 57	[+ 2]	e 25 42	SKKS	—
Timisoara		106·1	316	18 17?	[− 8]	—	—	—	—	44·3
Berkeley		107·7	52	e 14 23k	P	e 24 28	[−34]	e 18 23	PKP	—
Ogyalla		107·7	319	e 19 40	PP	e 26 29	+ 2	e 21 36	PPP	—
Copenhagen		109·0	328	—	—	33 53	SS	—	—	53·3
Prague		109·6	322	e 18 30	[− 2]	e 25 11	[0]	e 19 1	PP	e 56·3
Potsdam		109·7	324	e 19 15	PP	e 28 23	PS	e 21 29	PPP	e 52·3
Taranto		109·9	311	—	—	e 28 47	PS	—	—	—
Collmberg	Z.	110·1	323	e 18 24?	[− 9]	e 23 44	?	e 19 29	PP	—
Cheb	E.	110·8	322	e 19 27	PP	e 28 36	PS	e 29 16	PKKP	—
Tinemaha	Z.	110·9	52	e 18 25	[−10]	—	—	—	—	—
Jena		111·1	322	e 18 7?	[−28]	—	—	e 19 9	PP	—
Triest		111·2	317	e 19 2	[+26]	29 31	PS	30 23	PPS	—
Pasadena		111·5	55	e 18 36	[0]	44 59	Q	i 19 12	PP	e 50·4
Messina	Z.	111·6	309	e 18 41	[+ 5]	—	—	e 19 49	PP	—
China Lake	Z.	111·7	53	e 18 37	[0]	e 27 19	{+62}	e 14 35	P	—
Scoresby Sund		112·0	351	e 19 23	PP	25 17	[− 3]	e 28 53	PS	—
Riverside	Z.	112·2	55	e 18 37	[0]	e 19 20	PP	e 29 24	PKKP	—
Rome		113·1	314	e 19 17	PP	e 27 15	{+48}	e 21 53	PKS	—
Stuttgart		113·2	322	e 18 40	[0]	e 29 4	PS	e 19 43	PP	e 51·3
Witteveen	Z.	113·2	327	i 19 27	PP	—	—	—	—	—
Strasbourg		114·2	322	e 18 40	[− 1]	e 29 13	PS	e 19 28	PP	e 56·7
De Bilt		114·3	326	e 19 41	PP	e 29 12	PS	—	—	e 57·3
Pavia		114·4	318	e 19 48	PP	e 29 44	PKKP	—	—	e 65·2
Besançon		115·8	321	e 18 45	[0]	—	—	e 18 57	pPKP	—
Paris		117·3	323	e 18 44	[− 3]	e 26 52	{− 4}	i 20 2	PP	e 58·3
Kew		117·6	327	e 19 52	PP	e 29 42	PS	—	—	e 57·3
Clermont-Ferrand		118·2	320	e 19 53	PP	—	—	—	—	—
Rathfarnham Castle		119·7	331	e 19 37	PP	e 30 5	PS	—	—	e 57·3
Tortosa		122·0	316	e 20 35	PP	—	—	—	—	e 63·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Tamanrasset	Z.	122·9	294	i 19 0	[+ 2]	e 32 16	PPS	e 21 1	PP		—
Alicante		123·6	314	19 21	[+21]	28 56	S	22 40	PKS		e 48·3
Toledo		125·5	316	e 19 5	[+ 2]	—	—	e 20 55	PP		—
Almeria		125·7	313	20 46	PP	32 38	PPS	22 46	PPP		71·5
Granada		126·3	313	19 5k	[0]	26 17	[+ 7]	20 42	PP		68·5
Malaga		127·1	313	i 19 7	[+ 1]	i 25 3	[−69]	21 3	PP		82·6
Ottawa		134·3	24	i 19 18	[− 2]	i 22 49	PKS	i 21 53	PP		—
Cleveland		134·5	32	i 19 21k	[+ 1]	i 22 51	PKS	e 21 49	PP		—
Shawinigan Falls	N.	134·5	20	e 19 21	[+ 1]	e 22 48	PKS	e 29 33	SKKS		—
Seven Falls	E.	134·6	18	e 19 26	[+ 5]	e 22 51	PKS	—	—		—
Pennsylvania		136·9	30	19 17?	[− 8]	—	—	—	—		—
Harvard		138·3	22	i 19 19	[− 8]	—	—	—	—		—
Weston		138·5	22	e 19 18	[−10]	—	—	e 22 14	PP		e 65·6
Palisades		138·6	26	i 19 28	[0]	i 23 6	PKS	e 22 18	PP		e 65·0
La Plata		139·7	171	23 11	PKS	33 35	PS	45 59	SSS		76·6
Huancayo		150·3	125	e 19 55	[+ 7]	e 27 25	[+31]	e 20 45	PKP_2		e 72·7
La Paz		152·6	143	i 19 56a	[+ 5]	30 17	{−16}	20 9	PKP_2		—
Galerazamba		155·1	75	e 21 11	?	e 24 17	PP	—	—		—
Chinchina		155·3	88	e 19 53	[− 2]	—	—	i 20 18	PKP_2		—
Bogota		156·8	89	e 20 1	[+ 4]	e 32 7	{+71}	e 24 7	PKS		—

Additional readings :—
Riverview iN =14m.54s., iE =15m.4s., iN =15m.10s.
Hukuoka e =16m.15s.
Calcutta iE =12m.1s.
Auckland iPcSN =13m.59s.
Christchurch e?Z =11m.32s., eSEN =18m.2s., eQEN =23m.17s.
Wellington Q =23·3m.
Poona PPE =12m.21s., PcSE =14m.34s., PSE =18m.31s., PPSE =18m.41s., ScSE =19m.32s., SSE =22m.3s., SSSE =24m.42s.
New Delhi SSN =22m.9s.
Istanbul eSKSN =24m.32s., eN =24m.55s., eSSN =32m.32s.
Kiruna eZ =22m.35s., eE =23m.16s., eSKKSE =24m.55s., eN =26m.2s. and 30m.58s., eSSE =32m.48s., eSSN =32m.57s., eE =37m.4s., eN =37m.56s., eE =38m.54s.
Seattle e =18m.51s. and 19m.27s., eL =27·8m.
Berkeley eZ =14m.33s. and 28m.6s.
Ogyalla e =22m.34s., QE =25m.23s.
Prague e =19m.37s. and 21m.6s., PPP =21m.22s., eSKKS? =25m.55s., e =27m.24s., ePSN =28m.11s., ePSE =28m.30s., e =30m.36s., eSS =34m.35s., eSSS =38m.35s.
Potsdam eZ =19m.50s. and 21m.33s., eE =28m.30s.
Cheb eE =27m.31s.
Jena eE =18m.13s., e =18m.37s., eN =18m.56s., eZ =19m.15s.
Rome eE =23m.47s., eSN =28m.47s.?, ePSN =34m.35s.?
Stuttgart ePPP=22m.1s., eSS=35m.35s., eSSS=39m.29s., and other unidentified e readings.
Strasbourg e =18m.54s., 24m.2s., 24m.53s., and 29m.42s., ePPS =30m.17s., eSS? =34m.53s., eSSS? =39m.9s.
De Bilt eZ =20m.7s., e =29m.41s.
Pavia e =20m.48s. and 24m.11s.
Paris eSKP =22m.13s., ePPP =22m.33s., eS? =28m.2s., eSP =29m.40s., ePSKS? =29m.52s., eSPP =31m.20s., ePcP,PKP? =32m.52s., eSS =36m.14s. and other unidentified readings.
Tamanrasset iZ =19m.13s., ePPPZ =23m.21s., ePKKP?Z =28m.52s.
Alicante PPP =24m.49s., PS =30m.39s., PPS =31m.29s., SSP =35m.35s., Q =43m.5s.
Almeria PPP =25m.26s., SS =39m.58s.
Granada pPP =21m.38s., PPP =24m.17s., SKKS =27m.53s., S =29m.29s., PS =31m.24s., PPS =32m.50s., SS =37m.56s., SSS =42m.22s.
Malaga PPS? =32m.5s.
Ottawa iZ =19m.31s.
Cleveland iZ =19m.29s., eN =22m.2s.
Shawinigan Falls eN =19m.50s.
La Plata QN =68·8m.
Huancayo e =21m.54s.
La Paz iPPZ =23m.39s., i =24m.35s., iSS =44m.47s., SSS =49m.27s.
Bogota e =36m.39s.

July 29d. Readings also at 2h. (Collmberg, Triest, and Zürich), 5h. (Apia and Palisades), 6h. (Auckland and Potsdam), 8h. (Ksara, Bucharest, Pavia, Prato, Triest, Potsdam, Stuttgart, Paris, Tamanrasset, near Athens, near Messina, Taranto, and near Apia), 9h. (Rome and near Dzhergetal), 11h. (Huancayo, La Paz, Bogota, Chinchina, Palomar, Pasadena, China Lake, Tinemaha, and near Santa Clara), 12h. (La Paz), 13h. (near Santa Clara and near Apia (2)), 14h. (near Ashkabad (2) and Stalinabad), 18h. (Triest), 19h. (near Dzhergetal), 20h. (near Dzhergetal (2) and Kurmenty), 21h. (Bogota, Chinchina, and China Lake), 22h. (near Sofia, near Apia, and near Santa Clara).

July 30d. 4h. 16m. 37s. Epicentre 6°·8S. 127°·5E. Depth of focus 0·040.
(as on 1950, September 21d.).

A = −·6045, B = +·7878, C = −·1176; δ = −12; h = +7;
D = +·793, E = +·609; G = +·072, H = −·093, K = −·993.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandoug		19·7	270	e 4 10	+ 1	i 7 40	+ 9	—	—	—
Riverview		34·7	143	i 6 26a	+ 1	i 14 14	SS	i 16 7	ScS	—
Mizusawa	E.	47·4	15	8 5	− 3	—	—	e 9 22	pP	—
Vladivostok		49·9	5	i 8 23	− 3	i 15 3	−10	—	—	—
Auckland	N.	52·4	133	—	—	i 15 46	− 1	—	—	—
Cobb River	E.	52·7	140	e 8 23?	−24	—	—	—	—	—
Tuai	N.	54·8	134	e 8 55	− 7	e 16 7	−12	—	—	—
Terre Adélie		60·7	173	i 9 45	+ 2	e 17 34	− 2	i 9 56	?	—
Kabansk		61·3	346	e 9 46	− 1	i 17 38	− 6	—	—	—
Irkutsk		62·1	345	9 51	− 1	17 48	− 5	—	—	—
Kurmenty		66·7	324	e 10 23	+ 1	—	—	—	—	—
Almata II		67·4	323	e 10 26	0	—	—	—	—	—
Almata		67·6	323	i 10 28	0	i 18 58	− 2	—	—	—
Rybach'e		67·7	322	—	—	i 18 56	− 6	—	—	—
Ili		67·9	324	i 10 29	0	—	—	—	—	—
Frunse		68·9	321	i 10 36	0	i 19 9	− 7	—	—	—
Andijan		69·2	318	e 10 38	+ 1	i 19 14	− 5	i 20 3	sS	—
Dzhergetal		69·3	317	e 10 39	+ 1	—	—	—	—	—
Fergana		69·4	318	e 10 38	− 1	—	—	—	—	—
Obi-garm		70·1	316	i 10 43	0	—	—	—	—	—
Stalinabad		70·7	315	i 10 48	+ 2	i 19 29	− 7	i 20 18	sS	—
Tashkent		71·5	318	i 10 52	+ 1	i 19 40	− 6	—	—	—
Samarkand		72·4	315	e 10 57	0	—	—	—	—	—
Erevan		89·0	310	—	—	22 46	+ 1	—	—	—
Tiflis		89·1	312	12 22	− 2	—	—	—	—	—
Ksara		95·1	303	e 17 58	pPP	e 25 4	SP	—	—	—
Stuttgart	Z.	113·6	321	e 21 0	PPP	e 28 3	SP	e 30 43	pPPS	—
Mount Wilson	Z.	114·0	56	i 18 6	[+ 1]	i 21 6	SKP	i 28 58	PS	—
China Lake	Z.	114·1	53	e 18 6	[+ 1]	i 21 7	SKP	e 19 16	pPKP	—
Riverside	Z.	114·6	56	e 18 6	[0]	e 21 7	SKP	—	—	—
Paris		117·7	323	i 18 12	[0]	i 21 13	SKP	e 28 39	PKKP	—
Tamanrasset	Z.	122·0	293	i 18 22k	[+ 2]	e 21 22	SKP	—	—	—
Ottawa	Z.	136·6	23	e 21 34	PP	i 21 44	SKP	i 21 49	SKP	—
Harvard		140·7	21	e 18 53	[− 3]	e 21 19	?	i 22 1	PP	—
Weston		140·8	21	e 18 47	[− 9]	i 21 55	SKP	—	—	—
Palisades		141·0	26	i 18 48	[− 8]	i 21 55	SKP	—	—	—
La Paz	Z.	152·2	150	e 19 35	[+21]	—	—	—	—	—

Additional readings:—
China Lake eZ = 19m.50s. and 28m.50s., iZ = 28m.59s.
Riverside eZ = 18m.33s. and 26m.53s.
Paris e = 23m.54s., 24m.7s., and 24m.16s., ePPS? = 31m.3s., e = 31m.24s.

July 30d. 16h. 51m. 30s. Epicentre 10°·4N. 85°·7W. Depth of focus 0·010
(as on May 6d.).

A = +·0738, B = −·9810, C = +·1794; δ = −1; h = +6;
D = −·997, E = −·075; G = +·013, H = −·179, K = −·984.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights	6·2	104	i 1 21	− 9	e 2 41	0	—	—	—
Oaxaca	12·6	303	e 3 37	PP	—	—	—	—	—
Bogota	12·9	116	i 3 9	+ 8	i 5 42	SS	—	—	—
Puebla	14·8	307	e 3 34	+ 9	—	—	—	—	—
Tacubaya	15·8	305	e 3 44	+ 6	e 6 37	+ 7	i 7 12	SSS	—
Huancayo	24·6	157	e 5 9	− 3	—	—	—	—	e 9·6
St. Louis	28·4	353	e 5 45	− 2	e 5 52	P	e 9 5	PcP	—
Morgantown	29·6	9	i 5 58	0	—	—	—	—	—
Cleveland	31·2	6	i 6 10k	− 2	—	—	e 6 18	pP	—
Tucson	31·8	317	e 6 17	0	—	—	e 6 44	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palisades		32·2	19	i 6 19	− 2	—	—	i 6 49	pP	e 17·1
Ottawa		35·9	12	i 6 51	− 1	—	—	—	—	e 17·3
Palomar	z.	36·6	315	i 6 59	+ 1	—	—	—	—	—
Boulder City		36·7	320	e 7 0	0	—	—	—	—	—
Riverside	z.	37·3	314	i 7 5	+ 1	—	—	—	—	—
Pasadena	z.	38·0	314	i 7 10	0	—	—	—	—	—
China Lake	z.	38·4	318	i 7 14	+ 1	—	—	—	—	—
Tinemaha	z.	39·6	318	e 7 24	+ 1	—	—	—	—	—
Fresno	z.	40·4	317	e 7 30k	0	—	—	—	—	—
Berkeley	z.	42·7	316	e 7 50a	+ 1	—	—	—	—	—
Mineral	z.	43·6	320	e 7 55k	− 1	—	—	—	—	—
Hungry Horse		44·7	334	e 8 3	− 2	—	—	i 9 46	PP	—
College		69·0	337	10 55	− 2	—	—	—	—	—
Alicante		79·9	53	11 57	− 3	21 45	− 9	22 39	PS	e 37·7

Alicante also gives PPP = 16m.57s., PPS = 23m.11s., SS = 27m.19s., SSS = 30m.28s., Q = 32m.45s.
Long waves were also recorded at Weston and Scoresby Sund.

July 30d. Readings also at 0h. (Manila, Paris, Khorog, Frunse, Almata II, Rybach'e, Stalinabad, Tashkent, near Murgab, Fergana, Andijan, Dzhergetal, Obi-garm, and Ili), 1h. (near Dzhergetal), 2h. (Pasadena, Riverside, China Lake, Seattle, near La Paz, near Khorog, Obi-garm, Dzhergetal, and Stalinabad), 3h. (Mineral, Strasbourg, and near Apia), 4h. (Berkeley), 6h. (Stuttgart, Triest, Timisoara, Obi-garm, Frunse, Rybach'e, Ili, Almata, Samarkand, near Dzhergetal, Fergana Andijan, Khorog, Stalinabad, and Tashkent), 8h. (Dzhergetal, Frunse, Khorog, near Fergana, Obi-garm, Andijan, Murgab, Stalinabad, Tashkent, and Samarkand), 9h. (Manzanillo, Guadalajara, Tacubaya, Pasadena, Riverside, Palomar, China Lake, Tinemaha, and near Dzhergetal), 10h. (near Khorog and near Yalta), 11h. (near Dzhergetal (2), near Tacubaya, and Puebla), 12h. (Obi-garm, Krasnogorka, Frunse, Samarkand, Ili, near Dzhergetal, Fergana, Andijan, Stalinabad, Khorog, Tashkent, and Murgab), 13h. (Dzhergetal, Obi-garm, Fergana, near Andijan, Tashkent, Stalinabad, Samarkand, and near Mizusawa), 14h. (near Athens, near Fergana, Andijan, Dzhergetal, Obi-garm, and near Khorog), 15h. (Santa Lucia), 17h. (near Dzhergetal (2)), 18h. (Apia, near Athens (2), and near Dzhergetal), 19h. (Apia (2), Triest, Stuttgart, Pretoria, Tamanrasset, Fresno, Tinemaha, China Lake, Pasadena, Riverside, Palomar, Harvard, Huancayo, La Paz, and Antofagasta), 20h. (near Dzhergetal), 21h. (near Kurmenty), 23h. (Apia).

July 31d. 13h. 28m. 36s. Epicentre 8°·0S. 112°·0E. Depth of focus 0·010.
(as on 1943, Aug. 6d.).

A = −·3710, B = +·9183, C = −·1383; δ = +4; h = +7;
D = +·927, E = +·375; G = +·052, H = −·128, K = −·990.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Djakarta		5·4	289	i 1 31	+11	e 2 51	+30	—	—	—
Zi-ka-wei	z.	40·0	12	i 7 30	+ 3	e 12 26	−59	—	—	—
Brisbane	z.	43·3	121	i 7 53k	− 1	—	—	—	—	—
Riverview		44·3	131	i 8 0k	− 2	i 14 23	− 5	i 17 37	ScS	—
Poona		45·9	305	i 8 17	+ 3	14 52	+ 1	9 58	PcP	—
Vladivostok		54·0	18	i 9 16	0	i 16 44	+ 1	i 9 48	pP	—
Mizusawa	E.	54·1	28	(9 17)	0	9 17	P	—	—	—
Murgab		58·2	325	i 9 47	+ 1	i 17 36	− 2	—	—	—
Kurmenty		59·3	332	i 9 55	+ 1	—	—	—	—	—
Almata II		60·0	331	i 10 0	+ 1	—	—	—	—	—
Kabansk		60·0	356	i 10 0	+ 1	e 18 3	+ 1	i 10 33?	pP	—
Rybach'e		60·0	330	i 9 57	− 2	—	—	—	—	—
Almata		60·2	331	i 10 1	+ 1	—	—	—	—	—
Dzhergetal		60·3	324	e 10 3	+ 2	—	—	—	—	—
Irkustk		60·4	354	10 3	+ 2	18 9	+ 2	—	—	—
Ili		60·6	332	i 10 3	0	i 18 8	− 2	—	—	—
Andijan		60·7	326	10 4	+ 1	i 18 9	− 2	e 10 39	pP	—
Fergana		60·8	326	i 10 5	+ 1	19 43	ScS	e 12 25	PP	—
Obi-garm		60·9	323	i 10 7	+ 2	i 18 11	− 2	—	—	—
Frunse		61·0	329	i 10 7	+ 1	i 18 16	+ 1	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stalinabad		61·3	323	i 10 8	0	18 13	− 5	e 12 31	PP	—
Terre Adélie		62·1	166	i 10 10	− 3	—	—	—	—	—
Tashkent		62·8	325	i 10 18	0	i 18 36	− 1	—	—	—
Samarkand		63·1	321	i 10 21	+ 1	20 2	ScS	—	—	—
Tchimkent		63·3	326	i 10 21	0	18 42	− 2	—	—	—
Mary		65·2	318	i 10 33	0	—	—	—	—	—
Baku		74·6	315	—	—	e 21 1	+ 5	—	—	—
Lenkoran		74·8	313	—	—	i 20 58	− 1	—	—	—
Shemakha		75·6	315	11 30	− 6	i 20 56	−12	—	—	—
Sverdlovsk		77·0	333	i 11 44	0	21 22	− 1	—	—	—
Kirovobad		77·3	315	i 11 46	0	i 21 24	− 2	—	—	—
Erevan		78·4	313	e 11 52	0	21 36	− 2	—	—	—
Grozny		78·7	317	11 57	+ 4	21 41	0	—	—	—
Tiflis		78·7	315	i 11 56	+ 3	i 21 40	− 1	—	—	—
Pietermaritzburg z.		78·8	241	i 11 57	+ 3	—	—	—	—	—
Pretoria	z.	81·0	254	i 12 9	+ 3	—	—	—	—	—
Ksara		83·0	305	i 12 18	+ 2	e 22 39	+14	—	—	—
Helwan		85·9	300	12 33	+ 3	22 54	0	13 3	pP	—
Moscow		87·9	327	i 12 42	+ 2	i 23 12	− 1	e 13 13	pP	—
Istanbul		89·9	312	e 22 51	?	e 23 8	[− 1]	i 23 33	S	—
Lwow		94·7	320	e 13 13	+ 2	i 23 35	[− 1]	e 24 9	S	—
Uzhgorod		95·7	318	e 17 1?	PP	i 23 40	[− 2]	—	—	—
Timisoara		96·2	315	e 18 24	PPP	i 23 45	[0]	—	—	—
Prague		100·9	320	e 17 49	PP	i 24 6	[− 2]	e 25 28	S	—
Triest		101·4	315	e 16 27	?	i 24 9	[− 2]	e 17 27	PP	—
Potsdam		101·7	322	e 17 56?	PP	i 24 11	[− 1]	—	—	—
Copenhagen		101·9	326	—	—	i 24 11	[− 2]	—	—	—
Stuttgart		104·4	319	e 17 54?	PKP	e 24 23	[− 2]	—	—	—
Zürich		104·9	317	e 17 17	PP	e 24 24	[− 3]	—	—	—
Strasbourg		105·4	319	e 18 20	PP	—	—	e 18 54	pPP	—
Tamanrasset	z.	108·2	292	e 18 50	PP	—	—	—	—	—
Paris		108·8	319	e 18 31	[+14]	i 27 58	PS	—	—	—
Mineral	z.	122·6	47	e 18 46a	[+ 2]	—	—	i 22 8	PKS	—
Lick	z.	123·5	50	i 18 48a	[+ 2]	—	—	i 18 54	?	—
Reno	z.	124·2	47	e 18 52	[+ 5]	—	—	e 22 10	PKS	—
Fresno	z.	125·1	50	e 19 26a	[+37]	—	—	—	—	—
Tinemaha	z.	126·1	50	e 18 59	[+ 8]	—	—	—	—	—
China Lake	z.	127·0	50	e 18 55	[+ 2]	—	—	i 22 18	PKS	—
Pasadena	z.	127·1	52	i 18 55	[+ 2]	—	—	i 22 18	PKS	—
Riverside	z.	127·8	52	i 18 53	[− 1]	—	—	e 22 0	PKS	—
Palomar	z.	128·4	53	i 22 3	PKS	—	—	—	—	—
Ottawa	z.	142·2	9	i 22 28	PP	—	—	22 46	PKS	—
Harvard		145·5	4	i 19 30	[+ 3]	—	—	e 22 46	PP	—
Weston		145·6	4	i 19 29	[+ 2]	—	—	i 20 4	pPKP	—
Palisades		146·7	7	i 19 33	[+ 4]	i 22 53	PKS	i 20 3	pPKP	—
Tacubaya		147·7	67	e 19 41	[+10]	—	—	i 20 26	pPKP	—
La Paz		155·7	179	e 19 59	[+17]	—	—	—	—	—
Huancayo		158·8	161	e 19 50	[+ 4]	—	—	—	—	—

Additional readings : —
Riverview iN =15m.5s., iE =18m.14s.
Poona PPPE =10m.40s., SSE =17m.57s.
Vladivostok isS =17m.27s.
Andijan esS =18m.55s., iScS =19m.43s.
Fergana ePPP =13m.46s.?.
Stalinabad sS =19m.2s.
Helwan PPZ =14m.49s.
Istanbul N =23m.11s., eN =24m.26s.
Prague e =24m.21s.
Triest i =24m.55s.
Stuttgart e =18m.14s., eZ =18m.44s.
Mineral iZ =18m.54s.
China Lake eZ =19m.29s., iZ =21m.59s.
Pasadena iZ =19m.0s., 19m.32s., and 22m.1s.
Riverside iZ =19m.34s.

July 31d. 22h. 41m. 17s. Epicentre 31°·2N. 95°·5E.

A = −·0821, B = +·8530, C = +·5155; δ = +9; h = +1;
D = +·995, E = +·096; G = −·049, H = +·513, K = −·857.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chatra		8·5	241	i 2 16	+ 9	—	—	—	—	e 4·8
Calcutta	E.	10·7	218	e 3 8	+30	e 5 12	?	i 5 26	SS	—
New Delhi	N.	16·1	265	e 3 47	− 2	i 6 59	+10	—	—	—
Kurmenty		18·1	316	e 4 14	0	—	—	—	—	—
Almata II		18·7	316	e 4 21	− 1	—	—	—	—	—
Almata		19·0	316	i 4 25	− 1	i 8 1	+ 6	—	—	—
Murgab		19·1	298	e 4 25	− 2	—	—	—	—	—
Rybach'e		19·1	311	i 4 26	− 1	i 8 0	+ 3	—	—	—
Ili		19·3	317	4 25	− 4	—	—	—	—	—
Frunse		20·3	311	i 4 36	− 4	i 8 21	− 2	—	—	—
Andijan		21·0	303	4 46	− 1	i 8 40	+ 3	—	—	—
Dzhergetal		21·3	299	—	—	i 8 51	+ 8	—	—	—
Irkutsk		22·0	13	4 55	− 3	8 55	− 1	—	—	—
Kabansk		22·4	15	4 59	− 3	e 8 59	− 5	—	—	—
Obi-garm		22·4	297	e 5 3	+ 1	—	—	—	—	—
Stalinabad		23·1	297	i 5 9	+ 1	i 9 18	+ 2	—	—	—
Tashkent		23·3	303	i 5 11	+ 1	i 9 23	+ 3	—	—	—
Tchimkent		23·4	306	5 12	+ 1	—	—	—	—	—
Bombay	E.	23·9	244	e 5 25	+ 9	e 9 48	+18	11 8	SS	i 13·0
Samarkand		24·6	298	i 5 25	+ 2	9 47	+ 5	—	—	—
Mary		28·4	294	i 5 58	0	—	—	—	—	—
Sverdlovsk		35·2	327	i 6 57	− 1	e 12 33	+ 2	—	—	—
Shemakha		38·7	298	e 7 17	−10	—	—	—	—	—
Kirovobad		40·4	298	e 7 43	+ 2	—	—	—	—	—
Grozny		40·8	302	i 7 40	− 5	—	—	—	—	—
Tiflis		41·6	300	e 7 51	0	—	—	—	—	—
Moscow		46·9	320	e 8 33	− 1	—	—	—	—	—
Ksara		49·7	290	i 8 58	+ 2	16 22	+18	—	—	—
Pulkovo		51·2	325	e 9 5	− 2	e 16 25	0	—	—	—
Helwan	Z.	54·6	287	e 9 34	+ 2	—	—	e 10 38	PcP	—
Lwow		55·3	312	i 9 36	− 2	e 17 21	0	—	—	—
Potsdam		61·5	317	e 10 20?	− 1	e 23 55?	+13	—	—	e 32·7
Triest		63·0	309	i 10 31	0	e 13 21	PP	e 14 31	PPP	—
Stuttgart	Z.	65·0	314	e 10 43	− 1	—	—	—	—	—
Paris		69·1	316	e 11 8	− 2	—	—	—	—	e 36·7
Tamanrasset	Z.	78·5	290	e 12 6	+ 2	—	—	—	—	—

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

July 31d. Readings also at 0h. (Triest, Stalinabad, near Dzhergetal, Fergana, Khorog, Murgab, Obi-garm, and near Kurmenty), 1h. (near Ottawa and near Dzhergetal), 2h. (near Athens (2)), 3h. (Kurmenty, near Almata, Almata II, Chilisk, Frunse, Ili, and Krasnogorka), 4h. (Mount Wilson, Riverside, and China Lake), 8h. (Collmberg, Prague, Stuttgart, near Ravensburg, Basle, Zürich, and near Djakarta), 9h. (Riverside, China Lake, Berkeley, Lick, Mineral, Reno, Huancayo, La Plata, near Dzhergetal, Khorog, Murgab, and near Mizusawa), 10h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Fresno, Reno, Mineral, Morgantown, Weston, Copenhagen, Stuttgart, Andijan, near Dzhergetal, Fergana, Khorog, Obi-garm, and Stalinabad), 12h. (Apia, near Dzhergetal (2), and near Erevan), 13h. (Almata, Almata II, Frunse, Ili, Kurmenty, Obi-garm, near Andijan, Dzhergetal, Fergana, and Murgab), 14h. (Pasadena and China Lake), 15h. (Apia and Mizusawa), 16h. (Resolute Bay, near Andijan, Dzhergetal, Obi-garm, and Stalinabad), 18h. (Ksara and Mitchell Field), 19h. (near Obi-garm and near Stalinabad), 20h. (Apia), 22h. (Zi-ka-wei).

Aug. 1d. 0h. 55m. 11s. Epicentre 4°·8N. 61°·6E. (as on 1951, April 11d.).

$A = +\cdot4740$, $B = +\cdot8766$, $C = +\cdot0831$; $\delta = +1$; $h = +7$;
$D = +\cdot880$, $E = -\cdot476$; $G = +\cdot040$, $H = +\cdot073$, $K = -\cdot997$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kodaikanal	E.	16·6	68	i 4 6	+10	i 7 51	+51	—	—	—
Bombay	E.	17·8	37	i 4 5	− 6	c 8 40	88	—	—	—
Poona		18·1	39	i 4 20	+ 6	8 14	+39	4 45	PP	9·6
Colombo	E.	18·3	82	4 30	+13	—	—	—	—	—
Hyderabad	N.	20·7	51	i 4 52	+ 8	c 8 55	+24	—	—	11·0
Tananarive		27·3	211	—	—	c 9 45	−42	—	—	c 13·8
New Delhi	N.	27·9	28	7 16	?	c 10 49	+12	9 12	PcP	—
Stalinabad		34·2	10	i 6 52	+ 3	—	—	—	—	—
Samarkand		35·1	7	6 57	0	12 29	− 1	—	—	—
Lenkoran		35·8	343	c 6 51	−12	—	—	—	—	—
Fergana		36·6	13	c 7 11	+ 1	—	—	—	—	—
Tashkent		37·0	10	i 7 15	+ 2	i 13 3	+ 4	—	—	—
Ksara		37·5	323	c 7 19?	+ 2	c 13 17?	+10	—	—	—
Helwan	Z.	37·9	314	e 7 22	+ 2	—	—	—	—	—
Tchimkent		38·0	9	e 7 21?	0	i 13 16?	+ 2	—	—	—
Frunse		39·6	15	—	—	c 13 46	+ 8	—	—	—
Rybach'e		39·6	17	e 7 39	+ 4	c 13 44	+ 6	—	—	—
Tiflis		39·7	340	e 7 34	− 2	—	—	—	—	—
Gori		40·2	340	e 7 39	− 1	—	—	—	—	—
Almata II		40·8	17	e 7 49	+ 4	—	—	—	—	—
Chilisk		41·4	17	e 7 52	+ 2	—	—	—	—	—
Istanbul		46·4	325	—	—	c 15 13	− 5	c 18 25	SS	—
Kimberley	Z.	48·6	225	i 8 57	+10	—	—	—	—	—
Sverdlovsk		51·9	359	9 13	+ 1	16 28	− 7	—	—	—
Messina	Z.	53·4	315	e 9 23	− 1	—	—	e 10 28	PcP	—
Belgrade	Z.	53·7	324	e 9 32a	+ 6	—	—	e 9 49	?	—
Moscow		54·3	344	9 27	− 3	—	—	—	—	—
Tamanrasset	Z.	57·0	294	i 9 50k	0	—	—	c 12 2	PP	—
Triest		58·1	323	i 9 57?	− 1	—	—	i 10 23	?	—
Kabansk		60·0	30	e 10 19	+ 8	—	—	—	—	—
Prague		60·0	327	e 10 8	− 3	—	—	e 12 35	PP	—
Collmberg	Z.	61·4	328	e 10 19	− 1	—	—	—	—	—
Potsdam	Z.	62·0	329	e 10 24	0	—	—	—	—	—
Stuttgart	Z.	62·3	324	e 10 23	− 3	—	—	—	—	—
Strasbourg		63·1	323	e 10 31	− 1	—	—	e 10 55	PcP	—
Besançon		63·6	322	e 10 35	0	—	—	—	—	—
Witteveen	Z.	65·6	328	i 10 46	− 2	—	—	—	—	—
Paris		66·4	322	e 10 52	− 1	—	—	e 11 16	PcP	—

Additional readings :—
Poona PPPE = 4m.54s., QE = 8m.34s., SSE = 8m.54s., SSSE = 9m.6s., ScPE = 11m.36s., ScSE = 15m.16s.
Tamanrasset eZ = 11m.19s.
Prague e = 10m.29s., 11m.2s., and 11m.52s.
Strasbourg e = 11m.55s.
Long waves were also recorded at Kiruna, La Plata, and Huancayo.

Aug. 1d. 3h. 13m. 44s. Epicentre 29°·0N. 96°·0E. (as on 1951, Jan. 1d.).

$A = -\cdot0916$, $B = +\cdot8712$, $C = +\cdot4823$; $\delta = -1$; $h = +2$;
$D = +\cdot995$, $E = +\cdot105$; $G = -\cdot051$, $H = +\cdot480$, $K = -\cdot876$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Almata II	20.7	318	e 4 40	− 4	—	—
Almata	20·9	318	e 4 45	− 1	—	—
Rybach'e	21·0	314	e 4 47	0	—	—
Ili	21·2	320	e 4 45	− 4	—	—
Andijan	22·6	307	5 5	+ 2	9 2	− 5
Fergana	22·9	306	e 5 6	0	e 9 2	−11
Stalinabad	24·5	301	i 5 28	+ 6	9 36	− 4
Tashkent	25·0	306	e 5 33?	+ 6	e 9 46	− 3
Samarkand	26·1	301	5 43?	+ 6	10 7?	0

Long waves, only, were recorded at Bombay.

Aug. 1d. 3h. 22m. 31s. Epicentre 2°·6N. 84°·3W. (as on 1950, April 24d.).

$A = +·0992$, $B = -·9941$, $C = +·0450$; $\delta = +10$; $h = +7$;
$D = -·995$, $E = -·099$; $G = +·004$, $H = -·045$, $K = -·999$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		7·9	36	2 2	+ 3	—	—	—	—	—
Chinchina		9·0	75	i 2 13	0	e 4 2	+ 4	e 2 18	pP	—
Bogota		10·3	79	i 2 37	+ 5	i 5 0	+30	—	—	i 5·7
Galerazamba		12·1	47	e 3 24	+27	i 5 24	+10	—	—	i 6·8
Swan Island		14·7	1	e 3 32	+ 1	—	—	e 3 58	PPP	—
Huancayo		17·1	149	e 4 59	+57	—	—	—	—	e 8·5
Merida		19·0	344	e 4 29	+ 3	—	—	—	—	—
Guantanamo Bay		19·4	28	e 4 34	+ 4	—	—	—	—	—
Vera Cruz		20·2	326	e 4 46	+ 7	e 8 35	+14	e 9 6	SSS	—
Puebla		21·3	321	e 4 50	0	e 8 57	SS	—	—	—
Tacubaya		22·2	320	e 5 6	+ 6	e 8 53	− 7	e 9 28	SSS	e 11·2
Miami		23·5	10	i 4 17	−55	—	—	—	—	—
San Juan		23·7	47	i 5 16	+ 2	e 9 39	+12	—	—	—
Roosevelt Roads		24·0	47	i 4 24	−53	—	—	—	—	—
La Paz		24·8	140	i 5 29	+ 4	e 9 49	+ 3	i 5 51	pP	13·1
Fort de France		25·8	60	e 5 22	−12	10 16	+14	—	—	—
Columbia		31·4	5	i 6 24	− 1	i 11 23	− 9	—	—	—
Bermuda		34·9	29	e 6 56	+ 1	—	—	—	—	e 17·1
Washington		36·7	11	e 7 15	+ 5	—	—	—	—	—
Morgantown		37·1	6	i 7 12	− 2	—	—	e 8 45	PP	—
Pennsylvania		38·5	7	e 7 23	− 3	e 13 9	−13	e 8 55	PP	—
Tucson		38·6	323	e 7 25	− 1	e 13 32	+ 9	—	—	—
Cleveland		38·8	2	i 7 26 a	− 2	e 13 24	− 2	i 7 34	pP	—
Palisades		39·4	14	e 7 32	− 1	e 13 32	− 3	e 8 56	PP	e 18·6
Harvard		41·3	15	i 7 48	− 1	e 13 51	−13	—	—	e 20·3
Weston		41·3	15	e 7 49	0	e 13 59	− 5	—	—	—
Palomar	z.	43·2	319	e 8 4	0	—	—	e 9 54	PcP	—
Ottawa		43·3	9	8 3	− 2	14 31	− 2	8 10	pP	21·0
Boulder City		43·6	323	i 8 7	− 1	—	—	i 9 56	PcP	—
Riverside	z.	43·9	319	i 8 10	0	—	—	e 9 56	PcP	—
Pasadena		44·5	319	i 8 14	− 1	e 14 47	− 4	i 9 57	PcP	e 21·5
La Plata	N.	44·8	148	—	—	14 53	− 2	—	—	18·8
China Lake		45·2	321	i 8 19	− 1	—	—	—	—	—
Seven Falls	E.	45·9	13	8 23	− 3	15 8	− 3	18 44	SS	34·5
Tinemaha	z.	46·4	322	i 8 30	0	—	—	i 10 5	PcP	—
Fresno	z.	47·1	321	e 8 33 a	− 2	—	—	—	—	—
Lick	z.	48·7	320	i 8 48 a	0	—	—	i 8 53	?	—
Berkeley		49·4	320	e 8 52 a	− 1	e 15 58	− 2	e 10 15	PcP	—
Mineral	z.	50·5	323	e 9 0 k	− 2	—	—	e 10 19	PcP	—
Hungry Horse		52·2	335	i 9 13	− 2	—	—	i 10 25	PcP	—
Seattle		55·6	330	e 9 45	+ 5	—	—	—	—	e 29·5
Resolute Bay		72·3	357	11 27	− 2	e 20 49	− 3	e 11 33	PcP	e 37·5
College		76·6	337	e 11 52	− 2	—	—	e 14 48	PP	—
Malaga		80·4	53	i 12 15	0	18 47	?	—	—	—
Rathfarnham Castle		80·8	36	—	—	e 24 32	?	e 30 39	SSS	—
Alicante		83·5	51	12 50	+19	23 5	+13	15 55	PP	e 40·5
Paris		86·0	42	e 12 42	− 1	—	—	i 12 51	PcP	e 40·5
Besançon		88·3	43	e 12 55	0	—	—	—	—	—
Witteveeu	z.	88·5	37	i 12 56	0	—	—	i 13 2	PcP	—
Tamanrasset	z.	88·8	67	i 12 57 a	0	—	—	i 13 4	PcP	—
Strasbourg		89·4	42	e 13 0	0	—	—	e 13 21	PcP	—
Stuttgart	z.	90·4	42	e 13 4	0	—	—	e 13 11	PcP	—
Ksara		113·2	51	e 20 21	?	e 32 41	?	—	—	—

Additional readings and note :—
Galerazamba L is given as S.
La Paz iPP = 6m.16s., iS = 9m.58s., i = 10m.16s., iS_cS = 16m.45s.
Cleveland ePPN = 8m.52s., iSN = 13m.27s.
Palisades ePcP = 9m.38s.
Palomar iZ = 8m.10s.
Ottawa e = 18m.5s.

Continued on next page.

Riverside iZ =8m.16s.
Pasadena iZ =8m.21s., eE =18m.41s.
Seven Falls eE =16m.59s., SSSE =19m.47s.
Tinemaha iZ =10m.12s.
Berkeley ePP?NZ =11m.7s.
Resolute Bay eZ =11m.39s.
Alicante PPP =17m.55s., ScS =23m.34s., PPS =24m.34s., SS =28m.40s., SSS =32m.7s., Q =34m.59s.
Paris e =12m.57s.
Tamanrasset ePPZ =14m.23s., ePPPZ =16m.27s.
Long waves were also recorded at Scoresby Sund, Kew, and Rome.

Aug. 1d. 9h. 55m. 38s. Epicentre 46°·3N. 7°·5E. (as on 1951, July 24d.).

Intensity V at Montana, Sion ; IV at Val de Bagnes, Chateau d'Oex, and Adelboden. Epicentre as adopted. Macroseismic radius 30km.

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

$A = +·6874$, $B = +·0905$, $C = +·7206$; $\delta = -3$; $h = -4$;
$D = +·131$, $E = -·991$; $G = +·714$, $H = +·094$, $K = -·693$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel		0·8	332	e 0 16	− 2	e 0 29	− 2	—	—	—
Basle		1·3	3	e 0 24	− 1	e 0 42	− 2	—	—	—
Zürich		1·3	35	e 0 26	+ 1	e 0 46	+ 2	—	—	—
Besançon		1·4	312	i 0 28	+ 1	—	—	i 0 33	P_g	i 1·1
Pavia		1·6	134	e 0 35	P_g	i 0 56	S_g	—	—	—
Ravensburg		2·1	44	e 0 42	P_g	e 1 9	S*	e 1 12	S_g	—
Strasbourg		2·3	5	e 0 38	− 2	i 1 7	− 2	e 0 44	P_g	i 1·4
Stuttgart		2·7	24	e 0 44a	− 1	e 1 17	− 2	e 0 53	P_g	—
Karlsruhe		2·8	13	e 0 42	− 5	—	—	i 0 56	P_g	i 1·6
Bologna		3·2	124	—	—	e 1 44	S_g	—	—	—
Paris		4·2	308	i 1 7	0	i 1 56	− 1	i 1 23	P_g	—
Jena		5·3	29	e 1 43?	P_g	e 2 51	S*	2 59	S_g	—
Prague		6·0	48	i 1 53	P_g	e 2 44	+ 1	e 3 17	S_g	—
Collmberg		6·2	34	e 2 2	P_g	e 3 24	S_g	—	—	—
Jersey	E.	7·1	298	e 1 48	0	—	—	—	—	—
Potsdam	N.	7·1	29	—	—	i 3 59	S_g	—	—	—
Raciborzu		8·1	58	e 3 5	?	e 4 16	S*	e 4 39	S_g	e 4·8

Additional readings :—
Pavia i =39s., e =1m.25s. and 2m.24s.
Strasbourg e =51s., i =57s. and 1m.4s., iS* =1m.15s., eS_g =1m.18s.
Stuttgart eZ =47s., 58s., and 1m.25s., iS_gZ =1m.30s., eZ =1m.32s., iZ =1m.36s.
Karlsruhe eZ =45s.
Paris i =1m.10s., iP* =1m.16s., i =1m.30s., 1m.44s., and 2m.3s., iS* =2m.7s., i =2m.17s., iS_g =2m.20s.
Jena eEN =1m.46s., eN =1m.55s., eE =2m.0s. and 2m.54s., eEN =3m.12s.
Prague e =2m.2s., eE =2m.11s., eS =2m.26s., eS*N =2m.56s., e =3m.23s., 3m.37s., and 3m.43s.
Collmberg eP*?E =2m.13s., eP_g?E =2m.26s., eE =3m.35s. and 3m.43s., eS_g?E = 3m.51s.

Aug. 1d. 13h. 37m. 23s. Epicentre 31°·2N. 95°·5E. (as on July 31d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	10·7	218	e 3 52	?	e 4 46	+ 7	—	—	—
New Delhi	N.	16·1	265	e 3 52	+ 3	e 6 41	− 8	7 1	SS	7·4
Kurmenty		18·1	316	i 4 14	0	—	—	—	—	—
Almata II		18·7	316	e 4 21?	− 1	—	—	—	—	—
Almata		19·0	316	i 4 23	− 3	—	—	—	—	—
Rybach'e		19·1	311	i 4 28	+ 1	e 8 2	+ 5	—	—	—
Ili		19·3	317	i 4 26	− 3	—	—	—	—	—
Fruuse		20·3	311	i 4 40	0	i 8 25	+ 2	—	—	—
Hyderabad	N.	20·7	232	i 4 48	+ 4	—	—	—	—	—
Khorog		20·7	293	4 44	0	8 31	0	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		21·0	303	4 47	0	i 8 42	+ 5	—	—	—
Fergana		21·2	303	e 4 49	0	e 8 45	+ 4	—	—	—
Dzhergetal		21·3	299	i 4 51?	+ 1	i 8 45?	+ 2	—	—	—
Irkutsk		22·0	13	e 4 57	− 1	e 8 56	0	—	—	—
Zi-ka-wei	z.	22·2	82	—	—	e 9 10	+10	—	—	i 13·5
Obi-garm		22·4	297	i 5 0	− 2	e 9 5	+ 1	—	—	—
Stalinabad		23·1	297	i 5 9	+ 1	i 9 17	+ 1	—	—	—
Poona		23·3	242	i 5 16	+ 6	9 15	− 5	5 43	PP	9·6
Tashkent		23·3	303	i 5 11	+ 1	i 9 21	+ 1	—	—	—
Bombay	E.	23·9	244	e 5 22	+ 6	i 9 34	+ 4	—	—	11·4
Samarkand		24·6	298	i 5 25	+ 2	9 47	+ 5	—	—	—
Mary		28·4	294	i 5 49	− 9	—	—	—	—	—
Vladivostok		31·1	57	e 6 25	+ 3	—	—	—	—	—
Sverdlovsk		35·2	327	e 6 57	− 1	e 12 27	− 4	—	—	—
Tiflis		41·6	300	e 7 59	+ 8	—	—	—	—	—
Gori		42·1	300	e 8 2	+ 7	—	—	—	—	—
Moscow		46·9	320	e 8 34	0	—	—	—	—	—
Ksara		49·7	290	i 9 1	+ 5	e 17 5	?	—	—	—
Pulkovo		51·2	325	e 9 7	0	e 16 29	+ 4	—	—	—
Kiruna		55·9	333	i 9 39a	− 3	—	—	e 24 59	Q	e 26·6
Stuttgart		65·0	314	e 10 42	− 2	—	—	—	—	e 40·6
Witteveen	z.	65·1	319	e 11 18	+33	—	—	—	—	—
Strasbourg		65·9	314	e 10 50	0	—	—	—	—	—
Paris		69·1	316	e 20 46	PS	e 21 1	ScS	e 27 37?	SSS	e 40·6
Tamanrasset	z.	78·5	290	e 12 7	+ 3	—	—	—	—	—

Additional readings :—
Poona PPPE =5m.54s., SSN =9m.54s., SSSE =10m.6s.
Paris e =21m.15s.
Long waves were also recorded at Copenhagen, Potsdam, and De Bilt.

Aug. 1d. Readings also at 0h. (Apia), 2h. (Prague), 6h. (Bucharest (2), Rome, Taranto, Triest (2), Ksara, near Athens (2), and Istanbul (2)), 7h. (near Dzhergetal), 9h. (Copiapo and Paris), 10h. (Huancayo, La Paz, Palomar, Pasadena, Tinemaha, Grahamstown, Kimberley, Pretoria, Pietermaritzburg, near Almata II, Chilisk, Kurmenty, and near Erevan), 11h. (Stuttgart and Dzhergetal), 12h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Fresno, Lick, Mincral, and Huancayo), 14h. (near Strasbourg), 15h. (near Klyuchi), 16h. (Apia, Dzhergetal, Paris (2), and near Strasbourg), 18h. (Palisades and near Dzhergetal), 19h. (Apia), 21h. (Tamanrasset).

Aug. 2d. 3h. 40m. 34s. Epicentre 4°·1S. 154°·8E. Depth of focus 0·070.

A = −·9025, B = +·4247, C = −·0710 ; δ = −8 ; h = +7 ;
D = +·426, E = +·905 ; G = +·064, H = −·030, K = −·997.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		20·1	329	4 3	+ 2	—	—	—	—	—
Brisbane		23·1	184	i 4 24k	− 5	i 7 56	− 9	i 5 41	pP	—
Riverview		29·8	186	i 5 20k	− 8	i 9 55	+ 4	i 6 43	pP	—
Auckland	N.	37·4	153	i 9 50	?	i 10 36	?	i 15 0	SS	—
Cobb River	E.	40·2	158	e 6 46	− 9	e 12 14	−14	e 8 20	pP	—
Kaimata	N.E.	41·0	160	e 6 54	− 8	e 12 24	−15	—	—	—
Wellington		41·1	157	—	—	i 12 24	−17	e 15 9	sS	19·0
Osima		41·3	341	i 7 6	+ 2	e 12 42	− 2	e 8 54	pP	—
Mera		41·3	341	e 7 7	+ 3	e 12 46	+ 2	—	—	—
Omaesaki		41·5	340	e 7 8	+ 2	—	—	—	—	—
Yakusima		41·5	327	7 8	+ 2	12 49	+ 2	—	—	—
Shizuoka		41·8	340	7 9	+ 1	12 52	+ 1	8 56	pP	—
Misima		41·8	341	7 9	+ 1	12 49	− 2	8 56	pP	14·8
Owase		41·8	337	7 8	0	i 11 51	−60	—	—	—
Tokyo	N.	42·0	342	7 13	+ 3	13 6	+12	8 13	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Simidu		42·1	333	7 11	+ 1	e 12 55	0	—	—	—
Kagosima		42·2	329	7 16	+ 5	e 13 2	+ 5	—	—	—
Hunatu		42·2	341	i 7 12	+ 1	12 55	− 2	—	—	—
Christchurch		42·3	161	i 7 4	− 8	i 12 43	−15	i 8 48	pP	—
Kohu		42·4	341	e 7 15	+ 2	e 12 59	0	—	—	—
Mito		42·4	343	7 16	+ 3	13 2	+ 3	—	—	—
Kameyama		42·4	339	e 7 19	+ 6	—	—	—	—	—
Titibu		42·5	342	i 7 17	+ 3	—	—	—	—	—
Nagoya		42·5	339	e 7 15	+ 1	e 13 1	0	—	—	—
Koti		42·5	333	i 7 17	+ 3	e 13 3	+ 2	e 9 2	pP	—
Kumagaya		42·6	342	7 16	+ 2	i 13 2	0	—	—	—
Osaka		42·6	336	e 7 18	+ 4	e 13 3	+ 1	—	—	—
Sumoto		42·6	335	i 7 16	+ 2	i 13 1	− 1	15 20	?	—
Kobe		42·8	336	i 7 17	+ 1	e 13 5	0	e 8 32	pP	—
Onahama		42·8	345	7 20	+ 4	i 12 8	−57	—	—	—
Utunomiya		42·8	343	e 7 17	+ 1	e 13 5	0	—	—	—
Gihu		42·8	340	7 17	+ 1	13 10	+ 5	—	—	—
Kyoto		42·8	338	e 7 17	+ 1	e 13 5	0	—	—	e 16·4
Hikone		42·9	339	7 20	+ 3	—	—	—	—	—
Maebasi		42·9	342	i 7 17	0	e 13 6	− 1	—	—	—
Oiwake		43·0	342	7 19	+ 2	13 10	+ 2	—	—	—
Ooita		43·1	331	e 7 24	+ 6	e 13 10	+ 1	—	—	—
Shirakawa		43·2	342	e 7 19	0	e 13 14	+ 3	e 9 10	pP	—
Matusiro		43·3	341	7 20	0	13 8	− 4	9 3	pP	—
Kumamoto		43·3	330	e 7 24	+ 4	13 16	+ 4	—	—	—
Nagano	E.	43·4	340	e 7 21	0	e 13 15	+ 1	—	—	—
Hukusima		43·7	344	7 24	+ 1	i 13 20	+ 2	—	—	—
Inawasiro		43·7	342	e 7 15	− 8	e 13 15	− 3	—	—	—
Kanazawa		43·8	339	e 7 23	− 1	e 13 22	+ 3	—	—	—
Hukuoka		44·0	331	e 7 26	+ 1	i 13 26	+ 4	—	—	—
Sendai		44·1	345	7 26	0	i 13 25	+ 1	—	—	—
Hamada	Z.	44·3	333	i 7 31	+ 3	i 13 33	+ 7	—	—	—
Wazima		44·5	340	e 7 31	+ 2	e 13 31	+ 2	—	—	—
Aikawa		44·6	342	e 7 30	0	13 31	0	—	—	—
Mizusawa	E.	44·8	345	7 33	+ 1	13 30	− 3	e 13 36	S	—
Sakata		45·0	344	e 7 41	+ 8	13 40	+ 4	—	—	—
Miyako		45·1	346	e 7 33?	− 1	e 13 32?	− 6	—	—	—
Akita		45·7	344	i 7 40	+ 2	13 49	+ 3	—	—	—
Perth		45·8	228	—	—	i 16 49	SS	i 19 41	?	i 21·8
Aomori		46·5	346	e 7 59	+14	14 3	+ 6	—	—	—
Bandong		47·0	265	i 7 40	− 8	i 13 58	− 6	—	—	—
Urakawa		47·3	349	e 7 51	0	i 14 13	+ 5	—	—	e 19·2
Mori	N.	47·8	346	e 7 54	− 1	e 14 19	+ 4	—	—	—
Djakarta		47·8	266	i 7 49	− 6	e 14 9	− 6	i 9 0	pP	—
Obihiro		48·0	349	e 8 0	+ 4	e 14 21?	+ 3	—	—	—
Sapporo		48·5	347	e 7 59	− 1	e 14 26	+ 1	—	—	—
Nanking		49·6	319	e 8 5	− 3	i 14 40	0	—	—	—
Vladivostok		51·4	339	i 8 22	+ 1	i 15 8	+ 4	—	—	—
Yuzno-Sakhlinsk		51·9	349	8 25	0	—	—	—	—	—
Honolulu		52·6	59	e 10 6	pP	e 15 16	− 4	—	—	—
Petropavlovsk		57·1	2	i 9 0	− 2	i 16 18	− 1	—	—	—
Klyuchi		60·4	4	e 9 21	− 3	17 0	− 1	—	—	—
Terre Adélie		63·3	185	i 9 34	− 9	e 17 26	−11	—	—	—
Kabansk		69·2	330	i 10 20	+ 1	i 18 52	+ 5	e 12 1	pP	—
Irkutsk		70·5	330	e 10 26	− 1	i 19 4	+ 2	e 12 10	pP	—
Colombo	E.	75·6	278	10 54	− 2	—	—	14 12	PP	—
College		80·5	21	i 11 17	− 5	—	—	e 13 5	pP	—
New Delhi		81·1	300	i 11 23	− 3	i 20 50	− 5	25 36	SS	33·1
Sitka		82·6	31	e 11 33	0	i 21 8	− 2	—	—	—
Poona		82·7	289	i 11 32	− 2	i 21 7	− 4	e 14 13	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kurmenty		83·0	315	i 11 34	− 1	—	—	—	—	—
Bombay		83·7	289	e 11 28	−11	i 21 18	− 3	i 21 30	?	—
Almata II		83·7	315	i 11 38	− 1	—	—	—	—	—
Ili		84·0	316	i 11 38	− 2	—	—	—	—	—
Almata		84·0	315	i 11 40	0	i 21 25	+ 2	—	—	—
Rybach'e		84·5	313	i 11 43	0	21 30	+ 2	e 13 31	pP	—
Frunse		85·6	313	i 11 47	− 1	i 21 41	+ 2	i 13 37	pP	—
Berkeley		86·9	52	e 13 40	pP	i 21 31	[− 3]	e 14 31	PP	—
Andijan		86·9	311	11 52	− 2	21 51	0	i 13 42	pP	—
Santa Clara		87·1	52	e 13 40	pP	i 21 33	[− 3]	i 21 50	S	—
Shasta Dam		87·2	49	i 11 52	− 4	—	—	i 13 43	pP	—
Fergana		87·3	310	i 11 54	− 2	e 21 53	− 2	e 13 45	pP	—
Lick	z.	87·3	52	i 11 54a	− 2	—	—	i 13 43	pP	—
Dzhergetal		87·6	309	i 11 57	0	—	—	—	—	—
Victoria		87·6	42	—	—	i 21 30	[− 9]	—	—	—
Mineral	z.	87·8	49	e 11 0k	−58	—	—	e 13 46	pP	—
Seattle		88·2	43	e 11 59	− 1	i 22 7	+ 4	e 13 48	pP	—
Obi-garm		88·7	309	i 12 1	− 2	—	—	—	—	—
Fresno	z.	88·8	53	e 11 59k	− 4	e 21 40	[− 6]	e 13 48	pP	—
Tashkent		89·3	311	i 12 4	− 1	i 22 12	− 1	i 13 54	pP	—
Stalinabad		89·4	309	i 12 6	0	22 14	0	e 13 56	pP	—
Pasadena		89·8	56	i 12 4	− 4	i 22 18	+ 1	i 13 54	pP	—
Tinemaha	z.	90·0	54	i 12 9	0	—	—	e 13 59	pP	—
China Lake		90·4	55	i 12 6	− 4	e 22 19	− 3	i 13 56	pP	—
Riverside	z.	90·5	56	i 12 7	− 4	—	—	i 13 58	pP	—
Palomar		90·8	57	i 12 10	− 2	i 21 56	[− 2]	i 14 0	pP	—
Samarkand		90·9	309	i 12 12	− 1	22 26	− 1	21 54	SKS	—
Boulder City		92·7	54	i 12 18	− 3	—	—	i 14 8	pP	—
Hungry Horse		93·8	42	i 12 23	− 3	i 22 11	[− 3]	—	—	—
Mary		94·8	308	i 12 30	− 1	—	—	—	—	—
Sverdlovsk		95·7	326	e 16 33	PP	i 23 4	− 4	e 29 49	SS	—
Tucson		95·9	58	e 12 32	− 4	e 22 41	[+16]	—	—	—
Resolute Bay		99·2	14	12 47	− 3	23 36	− 1	14 38	pP	—
Kirovobad		106·6	311	e 17 47	PP	—	—	—	—	—
Goris		106·8	310	e 17 48	PP	—	—	—	—	—
Gori		108·1	313	e 18 0	PP	—	—	—	—	—
Erevan		108·1	311	e 18 13	PP	—	—	—	—	—
Moscow		108·4	328	—	—	i 23 23	[− 1]	i 24 18	SKKS	—
Kiruna		109·3	343	e 19 59	PPP	e 24 59	− 2	e 28 5	sS	e 35·1
Pulkovo		110·3	334	e 18 19	PP	e 23 28	[− 4]	e 24 28	SKKS	—
Scoresby Sund		113·7	1	i 17 41	[− 2]	i 23 44	[− 1]	i 24 54	SKKS	—
Upsala		115·5	338	e 14 18	P	i 23 46	[− 6]	e 27 44	SP	e 36·4
Ksara		116·2	306	i 19 3	PP	—	—	22 37	PPP	—
Cleveland		117·5	45	e 28 15	SP	i 23 56	[− 3]	e 25 16	SKKS	—
Lwow		118·4	326	17 49	[− 4]	e 23 58	[− 4]	e 19 51	pPKP	—
Istanbul		119·1	316	e 19 11	PP	e 24 0	[− 5]	e 20 56	pPP	—
Morgantown		119·3	47	i 17 50	[− 5]	—	—	19 16	PP	—
Ottawa		119·8	38	17 51	[− 4]	24 4	[− 3]	20 42	PPP	—
Reykjavik	z.	120·0	2	i 17 53	[− 3]	i 26 56	S	i 19 53	pPKP	—
Uzhgorod		120·0	326	e 17 56	[0]	i 25 37	SKKS	—	—	—
Pretoria	z.	120·4	238	i 17 53	[− 4]	—	—	—	—	—
Copenhagen		120·4	337	i 17 54	[− 3]	24 9	[0]	i 35 15	SS	—
Helwan	z.	120·9	303	18 6	[+ 8]	e 27 34	SKKS	19 35	pPKP	—
Seven Falls	E.	121·9	35	—	—	24 6	[− 8]	25 46	SKKS	—
Timisoara		122·1	324	e 18 26?	[+26]	e 24 14	[0]	—	—	—
Potsdam		122·4	334	i 17 58a	[− 2]	i 24 13	[− 2]	e 19 44	PP	—
Palisades		123·0	43	i 17 58	[− 3]	e 24 16	[− 1]	e 20 25	pPKP	—
Prague		123·3	331	e 15 38	P	e 24 33	[+15]	e 28 57	SP	—
Harvard		123·8	40	e 17 59	[− 4]	—	—	—	—	—
Collmberg	E.	123·8	333	e 18 0	[− 3]	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Jena	E.	124·1	333	e 18 2	[− 1]	—	—	e 19 44	PP	—
Weston		124·1	40	i 18 0	[− 3]	—	—	e 19 51	PP	—
Witteveen	z.	124·8	337	i 18 4	[− 1]	—	—	—	—	—
De Bilt		125·9	338	i 20 36	pPKP	i 36 26?	SS	i 29 10	PS	—
Triest		126·5	327	i 18 5	[− 3]	e 26 14	SKKS	e 36 52	SS	—
Stuttgart		126·7	333	i 18 6k	[− 2]	e 26 17	SKKS	e 20 4	pPKP	—
Karlsruhe	z.	127·2	334	18 8	[− 1]	—	—	—	—	—
Huancayo		127·4	109	i 18 9	[− 1]	e 26 9	SKKS	e 21 30	PKS	e 55·3
Strasbourg		127·5	334	i 18 8	[− 2]	e 21 40	PKS	e 29 32	SP	—
Zürich		128·0	332	e 18 7	[− 4]	—	—	e 20 39	pPKP	—
Basle		128·3	332	e 18 9	[− 3]	—	—	e 20 43	pPKP	—
Kew		128·4	341	e 20 44	pPKP	e 26 26	SKKS	e 30 22	SP	e 49·4
Bologna		128·5	328	e 18 8k	[− 4]	—	—	e 20 47	pPKP	—
Rathfarnham Castle		128·5	346	i 18 7	[− 5]	e 24 27	[− 6]	e 20 6	pPKP	—
Prato		129·1	327	e 18 8	[− 5]	e 27 54	?	—	—	—
Pavia		129·2	329	e 18 12k	[− 1]	e 31 18	PS	e 20 36	pPKP	—
Besançon		129·3	333	e 18 12	[− 1]	e 20 49	PP	e 20 11	pPKP	—
Rome		129·5	324	18 11k	[− 3]	31 20	PS	e 20 8	pPKP	61·5
Paris		129·6	337	e 18 11	[− 3]	e 37 21	SS	e 20 13	pPKP	e 65·4
Chinchina		129·7	87	i 18 6	[− 8]	i 20 44	SKP	—	—	—
Messina	z.	129·7	319	e 18 10	[− 4]	i 20 49	SKP	—	—	—
Clermont-Ferrand		131·7	334	e 15 59	P	—	—	—	—	—
Bogota		131·7	87	i 18 17	[− 1]	i 20 57	SKP	—	—	—
La Paz		132·9	117	i 18 19	[− 1]	i 24 35	[− 9]	i 20 14	pPKP	—
Bermuda		133·6	48	i 21 2	PP	—	—	—	—	—
Tortosa		136·7	331	—	—	i 32 46	PS	e 37 26	SS	—
San Juan		137·6	67	i 18 17	[−12]	—	—	e 21 13	PP	—
Roosevelt Roads		138·0	67	i 20 20	pPKP	e 25 44	SKKS	—	—	—
Algiers Univ.	z.	138·4	325	e 18 19	[−12]	—	—	i 21 17	PP	—
Alicante		139·1	331	16 53	?	—	—	—	—	e 59·9
Malaga		142·3	333	i 18 31	[− 7]	—	—	i 21 31	PP	—
Tamanrasset	z.	145·0	306	i 18 41s	[− 1]	e 22 7	PP	e 20 38	pPKP	—

Additional readings :—
Brisbane eN =6m.42s., iN =8m.33s. and 10m.28s., iE =10m.59s.
Riverview isPZ =7m.44s., iSNZ =9m.38s., isSE =12m.15s., isSN =12m.23s., iScSE = 14m.51s., and other unidentified i readings.
Auckland iScSN =15m.46s.
Wellington iScS =15m.59s.
Misima sS =14m.15s.
Tokyo ePPP?N =9m.37s., eScP?N =11m.47s., ePcS?N =12m.21s., sSN =15m.3s., eScS? =16m.4s., SSN =16m.30s.
Christchurch esP?Z =9m.36s., eNZ =10m.56s., eSSEN =15m.26s., eScS =16m.4s.
Koti e =7m.32s.
Kobe epP?N =7m.38s., eZ =7m.44s., eN =14m.0s.
Matusiro epP?E =8m.25s., eZ =11m.20s., iSE =13m.11s., iSS? =16m.24s.
Kabansk PP =13m.1s.
Poona eE =11m.37s. and 21m.14s.
Rybach'e SKS =21m.17s.
Frunse iSKS =21m.23s., sS =24m.54s.
Berkeley iEZ =22m.52s.
Andijan iSKS =21m.30s.
Fergana eSKS =21m.32s.
Lick iZ =12m.34s., eZ =16m.58s.
Seattle i =13m.55s., e =14m.36s., iSKS =21m.43s., e =22m.38s., esS =25m.16s.
Fresno ePKP,PKPZ =37m.32s.
Tashkent esS =25m.38s.
Pasadena e =17m.13s., iSKSEN =21m.47s., eSPZ =23m.22s.
China Lake eSKSEN =21m.50s., eS?E =22m.7s.
Palomar iE =14m.48s., eE =17m.4s., iE =17m.48s., iSE =22m.18s., eE =22m.29s., iSPEZ =23m.32s.
Sverdlovsk iSKS =22m.20s.
Resolute Bay eZ =15m.52s., eE =16m.56s., eZ =17m.5s. and 18m.0s., eEN =22m.36s., 25m.8s., and 26m.8s., eZ =29m.34s., eE =30m.49s.
Kiruna iSKSEN =23m.22s., iEN =24m.22s., eE =25m.58s., iSPEN =26m.51s., ePPSE = 29m.3s., ePPSN =29m.6s., eSSN =32m.52s., eSSE =32m.55s.
Scoresby Sund e =18m.38s., 20m.21s., and 27m.34s.
Upsala i =25m.2s., eE =28m.29s.?., eN =28m.53s. and 32m.29s.?, eSSE =34m.0s.
Lwow eSKKS =25m.25s., eSKSP =28m.10s.

Continued on next page.

Istanbul esPPE =21m.46s., eEN =25m.27s., eS?EN =26m.26s., eE =28m.20s., eN = 29m.46s., eSSE =34m.50s., eN =35m.12s., eSSSN =39m.8s.
Ottawa i =19m.50s., SKKS =25m.34s., iZ =28m.2s.
Reykjavik i?Z =20m.26s., 27m.46s., and 30m.53s.
Copenhagen 21m.11s., 25m.39s., and 28m.30s.
Helwan eZ =19m.17s., 20m.42s., 21m.11s., 21m.46s., and 28m.36s., SS?N =35m.32s.
Seven Falls SSE =35m.51s., eE =38m.38s.
Potsdam eSKSE =24m.16s., eZ =28m.44s., eSPPZ =30m.17s., eSPPE =30m.21s., eSSE =35m.44s.
Prague e =23m.56s., eN =25m.1s., eSKKS? =25m.32s., eN =26m.38s., e =28m.4s., eSS =35m.43s., eSSS =40m.32s.
Jena eE =18m.38s.
Triest iPKS? =21m.23s.
Stuttgart ePPZ =19m.56s., eZ =20m.36s., epPP?Z =22m.8s., ePS? =31m.1s., ePPS? = 32m.38s., e =36m.39s. and 39m.18s.
Huancayo eSKSP? =29m.50s., eSS =36m.43s., eSSS =41m.54s.
Strasbourg e =18m.49s., ePP =20m.41s., e =20m.58s. and 21m.59s., ePS? =30m.58s.?, e =34m.56s., eSS =36m.42s., e =39m.2s., eSSS? =43m.26s., e =48m.26s.
Kew eSSEN =39m.26s.
Rathfarnham Castle iZ =19m.1s., ePP? =20m.36s., iZ =22m.2s., ePPPZ =23m.7s., eSP?EN =29m.31s., ePPS?EN =32m.29s., eSSEN =39m.26s.
Pavia e =22m.5s. and 37m.11s.
Rome PKP_2? =20m.49s., PP =23m.18s., SKS =27m.55s.
Paris e =18m.21s., iPP =20m.49s., iPKS =21m.38s., ePPP =23m.20s., eSP =29m.43s., eSPP =31m.17s., ePPS =32m.43s., e =39m.35s.
La Paz iPPZ =21m.2s.
Algiers Univ. eZ =18m.27s.
Tamanrasset iZ =19m.0s.
Long waves were also recorded at Almeria and Granada.

Aug. 2d. 9h. 57m. 17s. Epicentre 37°·1N. 138°·1E. (as on 1947, April 13d.).

Intensity VI at Yasuzuka ; V at Takada, Matsudai, Naoetsu, Okozu, etc. ; IV at Nagano, Santo, Takahama, Akakura, Sanjo, Tsukayama, etc. Epicentre 37°·1N, 138°·5E.
Slight damage in the Epicentral Region.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for August, 1951, Tokyo, 1951, p.189-190, with a Macroseismic Chart on p.189.

$A = -·5951$, $B = +·5339$, $C = +·6006$; $\delta = -9$; $h = -1$;
$D = +·668$, $E = +·744$; $G = -·447$, $H = +·401$, $K = -·800$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Takada	0·1	90	0 5	− 3	0 8	− 5
Nagano	0·4	170	0 12k	− 1	0 20	− 1
Matusiro	0·6	170	0 13	− 2	0 21	− 5
Oiwake	0·8	155	0 17	− 1	0 28	− 3
Toyama	0·9	240	0 21a	+ 1	0 37	+ 3
Aikawa	0·9	7	0 16	− 4	0 29	− 5
Matumoto	0·9	187	0 19	− 1	0 33	− 1
Wazima	1·0	285	0 24	+ 3	0 43	+ 7
Niigata	1·1	42	0 20	− 2	0 32	− 7
Maebasi	1·1	138	0 17k	− 5	0 28	−11
Kanazawa	1·3	244	0 34	+ 9	0 54	+10
Titibu	1·4	145	0 22	− 5	0 40	− 6
Kumagaya	1·4	133	0 21k	− 6	0 39	− 7
Kohu	1·5	166	0 29	+ 1	0 50	+ 1
Utunomiya	1·5	111	0 23	− 5	0 42	− 7
Iida	1·6	188	0 29k	− 1	0 50	− 1
Inawasiro	1·7	74	0 24	− 7	0 41	−13
Shirakawa	1·7	90	0 25	− 6	0 44	−10
Hunatu	1·7	161	0 30	− 1	0 54	0
Tukubasan	1·8	119	0 28	− 4	0 50	− 6
Gihu	2·0	212	0 37a	+ 2	1 7	+ 5
Tokyo	2·0	137	0 31k	− 4	0 53	− 9
Mito	2·0	111	0 30	− 5	0 54	− 8
Hukusima	2·0	71	0 29a	− 6	0 54	− 8
Misima	2·1	161	0 36	− 1	1 4	0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Shizuoka		2·1	174	0 38	+ 1	1 9	+ 5
Nagoya		2·1	205	0 39	+ 2	1 13	+ 9
Yokohama		2·1	143	0 40k	+ 3	1 1	− 3
Ibukisan		2·2	219	0 47	+ 9	1 29	+23
Sakata		2·2	38	0 40	+ 2	1 19	+13
Onahama		2·2	94	0 35	− 3	1 2	− 4
Tsuruga		2·2	228	0 41	+ 3	1 23	+17
Hamamatu		2·4	187	0 48	+ 7	1 19	+ 7
Hikone		2·4	219	0 47	+ 6	1 29	+17
Omaesaki		2·5	178	0 43	0	1 18	+ 4
Sendai		2·5	62	0 38	− 5	1 7	− 7
Tyosi		2·6	125	0 41	− 3	1 14	− 3
Kameyama		2·6	210	0 49	+ 5	1 31	+14
Osima		2·6	156	0 45	+ 1	—	—
Mera		2·6	147	0 50	+ 6	1 27	+10
Tu		2·7	208	0 59	+14	1 32	+13
Kyoto		2·8	223	0 52	+ 5	1 40	+18
Isinomaki		2·9	65	0 38	−10	—	—
Akita		3·0	31	1 22	S	(1 22)	− 5
Toyooka		3·1	242	0 56	+ 5	1 47	+18
Mizusawa		3·1	50	0 49	− 2	1 30	+ 1
Osaka		3·2	220	1 2	+10	1 50	+18
Kobe		3·4	226	1 8	+13	1 58	+21
Morioka		3·5	42	0 53	− 4	1 43	+ 3
Sumoto		3·8	224	1 15	+14	2 12	+25
Himeji		4·0	230	1 3	− 1	1 53	+ 1
Miyako		4·0	49	1 7?	+ 3	1 50?	− 2
Siomisaki		4·1	208	1 17	+12	2 17	+22
Aomori		4·3	29	2 2	S	(2 2)	+ 2
Hatinohe		4·4	37	0 46	−24	—	—
Koti		5·2	228	1 46	+25	2 50	+28
Simidu		6·0	226	2 2	+30	—	—
Sapporo		6·4	22	1 37	− 1	3 1	+ 8
Obihiro		7·0	32	1 35	−11	—	—
Hukuoka		7·2	243	3 37	?	4 25	?
Stuttgart	Z.	83·2	329	e 12 27	− 2	—	—
La Paz		149·0	55	(i 20 0)	[+14]	—	—
Punta Arenas	N.	154·2	138	e 20 39	PKP_2	30 20	{−21}

La Paz readings have been increased by 10 minutes.

Aug. 2d. 10h. 16m. 0s. Epicentre 50°·0S. 115°·0W. (as on 1948, May 21d.).

A = −·2727, B = −·5848, C = −·7639; $\delta = -10$; $h = -5$;
D = −·906, E = +·423; G = +·323, H = +·692, K = −·645.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Punta Arenas	N.	27·3	113	—	—	11 37	SS	—	—	—
Santa Lucia	N.	36·4	80	e 7 18	+10	e 12 51	+ 1	e 10 58	?	e 15·4
Christchurch		48·2	248	e 8 44	0	15 48	+ 5	e 10 42	PP	e 22·2
Wellington		48·2	252	i 9 17	+33	i 15 49	+ 6	—	—	22·0
Huancayo		49·9	55	e 8 58	+ 1	e 16 6	− 1	e 10 45	PP	e 21·3
La Paz		50·3	66	i 9 4	+ 4	16 15	+ 2	—	—	—
Auckland	N.	50·8	258	—	—	i 16 30	+10	i 18 49	ScS	23·5
Apia		58·4	287	—	—	24 38	SSS	—	—	25·0
Chinchina		64·5	45	e 10 36	− 5	e 19 16	− 3	—	—	27·0
Bogota		64·9	46	i 10 47	+ 4	i 19 26	+ 2	i 13 9	PP	30·9
Riverview		67·2	244	e 10 57	− 1	e 19 57	+ 5	i 11 22	PcP	e 31·0
Brisbane		70·7	250	—	—	i 20 44	+10	—	—	e 32·7
Fort de France		79·9	53	e 13 6	?	—	—	—	—	—
San Juan		80·6	46	e 12 11	− 5	—	—	—	—	—
Miami		81·6	31	e 10 46	?	—	—	e 17 35	PPP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		82·0	4	e 12 17	− 6	e 22 58	+21	—	—	—
Palomar	Z.	83·0	359	e 12 26	− 2	—	—	—	—	—
Riverside	Z.	83·7	358	e 12 28	− 4	—	—	—	—	—
Pasadena		83·8	358	e 12 32	0	e 22 58	+ 3	e 27 48	SS	e 38·9
China Lake	Z.	85·5	358	e 12 38	− 3	—	—	—	—	—
Boulder City		85·6	1	e 12 39	− 2	—	—	e 12 45	PcP	—
Fresno	Z.	86·5	356	e 12 45	− 1	e 23 38	+16	—	—	e 41·1
Tinemaha	Z.	86·8	358	e 12 48	+ 1	—	—	—	—	—
Santa Clara		87·2	355	e 16 18	PP	e 23 39	+11	—	—	e 41·2
Lick	Z.	87·2	355	e 12 47 a	− 2	—	—	—	—	—
Berkeley		87·7	355	e 12 54	+ 2	e 23 41	+ 8	29 24	SS	e 40·8
Columbia		88·9	28	e 19 48	?	—	—	—	—	e 38·8
Reno	Z.	89·3	357	e 12 58	− 1	—	—	—	—	—
Mineral	Z.	90·2	355	e 13 3	− 1	—	—	—	—	—
Bermuda		93·4	41	—	—	e 23 57	[+ 5]	e 30 55	SS	e 42·8
Washington		94·6	29	i 15 49	?	—	—	i 18 11	?	—
Cleveland	N.	95·7	25	e 26 9	PS	e 24 10	[+ 5]	—	—	—
Palisades		97·5	31	e 26 31	PS	e 24 21	[+ 7]	e 41 14	Q	e 47·0
Seattle		97·5	355	e 26 35	PS	—	—	—	—	e 46·0
Hungry Horse		98·0	1	e 13 40	+ 1	—	—	e 17 38	PP	—
Victoria		98·4	354	—	—	e 23 24	[−55]	—	—	47·1
Harvard		99·7	32	—	—	e 32 0	SSS	—	—	—
Ottawa		101·0	27	—	—	e 25 30	+ 1	e 32 30	SS	—
Seven Falls	E.	104·0	30	—	—	e 26 5	+11	e 33 8	SS	—
College		117·3	345	e 18 50	[+ 3]	—	—	e 19 59	PP	—
Tamanrasset	Z.	126·6	98	e 19 2	[− 3]	—	—	e 20 50	PP	—
Algiers Univ.	Z.	134·3	83	e 19 22	[+ 2]	—	—	—	—	—
Scoresby Sund		137·0	30	e 19 25	[0]	—	—	e 22 3	PP	62·0
Rathfarnham Castle		137·3	57	e 19 39?	[+13]	—	—	—	—	e 58·0
Paris		140·4	67	e 19 30	[− 1]	e 26 23	[−17]	e 22 29	PP	66·0
Aberdeen	E.	141·0	53	i 23 34	PKS	i 42 3	SSP	i 36 22	PPS	e 59·3
Besançon		141·8	71	e 19 36	[+ 2]	—	—	—	—	—
Pavia		142·8	75	e 22 27	PP	—	—	i 25 28	PPP	—
De Bilt		143·3	63	e 19 30	[− 6]	e 41 30	SS	e 22 48	PP	e 61·0
Rome		143·3	82	19 32	[− 4]	26 54	[+10]	23 18	PP	—
Strasbourg		143·4	70	e 19 37	[+ 1]	e 41 37	SS	e 22 56	PP	e 60·0
Karlsruhe	Z.	144·0	69	e 19 36	[− 1]	—	—	—	—	—
Stuttgart		144·4	70	e 19 31	[− 7]	e 27 15	[+29]	e 23 18	PP	e 72·0
Witteveen	Z.	144·4	62	e 19 33	[− 5]	—	—	—	—	—
Taranto		145·6	88	e 20 14	[+34]	—	—	—	—	—
Triest		145·9	77	i 19 41	[0]	29 58	{+ 3}	e 23 20	SKP	—
Jena	N.	146·6	68	e 19 40	[− 2]	—	—	—	—	—
Poona		146·8	197	i 19 45	[+ 3]	—	—	—	—	—
Collmberg	E.	147·6	68	e 19 45	[+ 1]	—	—	—	—	—
Helwan	Z.	147·7	116	i 19 46k	[+ 2]	e 24 6	PKS	—	—	—
Potsdam		147·9	65	e 19 52	[+ 8]	e 30 6	{ 0}	e 46 36	SSS	e 71·0
Prague		148·0	70	e 19 50	[+ 6]	e 30 12	{+ 5}	e 23 20	PP	e 64·0
Bombay		148·3	195	—	—	e 40 0?	?	—	—	—
Copenhagen		148·4	59	e 19 48	[+ 3]	e 27 8	[+16]	42 30	SS	67·0
Ogyalla		149·6	76	e 20 9	PKP_2	—	—	e 24 8	PP	—
Belgrade		149·8	83	e 19 52k	[+ 5]	—	—	e 27 11	PPP	—
Timisoara	E.	150·7	82	e 19 58	[+10]	—	—	e 24 25	PP	—
Kiruna	Z.	151·8	34	e 19 54	[+ 4]	—	—	—	—	—
Bucharest		153·2	87	e 19 36	[−16]	37 0	PPS	e 21 10	?	—
Ksara		153·2	117	e 20 3?	[+11]	e 23 4	PKS	—	—	—
Istanbul		153·5	96	e 19 32?	[−20]	e 26 25	[−33]	e 23 45	PP	e 70·0
Strasbourg		143·4	70	e 19 37	[+ 1]	e 41 37	SS	e 22 56	PP	e 60·0
Karlsruhe	Z.	144·0	69	e 19 36	[− 1]	—	—	—	—	—
Stuttgart		144·4	70	e 19 31	[− 7]	e 27 15	[+29]	e 23 18	PP	e 72·0
Witteveen	Z.	144·4	62	e 19 33	[− 5]	—	—	—	—	—
Taranto		145·6	88	e 20 14	[+34]	—	—	—	—	—
Triest		145·9	77	i 19 41	[0]	29 58	{+ 3}	e 23 20	SKP	—
Jena	N.	146·6	68	e 19 40	[− 2]	—	—	—	—	—
Poona		146·8	197	i 19 45	[+ 3]	—	—	—	—	—
Collmberg	E.	147·6	68	e 19 45	[+ 1]	—	—	—	—	—
Helwan	Z.	147·7	116	i 19 46k	[+ 2]	e 24 6	PKS	—	—	—
Potsdam		147·9	65	e 19 52	[+ 8]	e 30 6	{ 0}	e 46 36	SSS	e 71·0
Prague		148·0	70	e 19 50	[+ 6]	e 30 12	{+ 5}	e 23 20	PP	e 64·0
Bombay		148·3	195	—	—	e 40 0?	?	—	—	—
Copenhagen		148·4	59	e 19 48	[+ 3]	e 27 8	[+16]	42 30	SS	67·0
Ogyalla		149·6	76	e 20 9	PKP_2	—	—	e 24 8	PP	—
Belgrade		149·8	83	e 19 52k	[+ 5]	—	—	e 27 11	PPP	—
Timisoara	E.	150·7	82	e 19 58	[+10]	—	—	e 24 25	PP	—
Kiruna	Z.	151·8	34	e 19 54	[+ 4]	—	—	—	—	—
Bucharest		153·2	87	e 19 36	[−16]	37 0	PPS	e 21 10	?	—
Ksara		153·2	117	e 20 3?	[+11]	e 23 4	PKS	—	—	—
Istanbul		153·5	96	e 19 32?	[−20]	e 26 25	[−33]	e 23 45	PP	e 70·0

Additional readings :—
Christchurch eEN =18m.30s., eSS?NZ =19m.35s., eQEN =20m.0s.
Wellington iPPZ =11m.11s., i =18m.11s., Q =20·0m.
Huancayo eSS =19m.35s.
Auckland QN =21·4m.
Riverview iPPZ =13m.29s., esSN =20m.14s., iPSE =20m.22s., eQE =28·6m.
Pasadena eQE =35·0m.
Berkeley eZ =14m.36s., eSP?Z =24m.41s.
Bermuda ePS =24m.27s.

Continued on next page.

Tamanrasset iZ = 19m.10s.
Rathfarnham Castle e = 24m.29s., eEN = 29m.40s., 30m.47s., and 36m.3s.
Paris ePKS? = 23m.25s., e = 23m.52s., P_cPPKP? = 28m.38s., ePPS? = 34m.43s., eSS = 41m.15s., eQ = 49·6m.
Aberdeen eE = 46m.17s.
Strasbourg ePPS? = 36m.10s., eSSS = 47m.0s.?, eQ = 51·0m. and other unidentified readings.
Stuttgart ePKP = 19m.36s., eSS = 41m.54s., and other unidentified e readings.
Prague ePPP = 26m.40s., eSS = 42m.24s. and many other e readings.
Triest iPPP? = 28m.26s., ePSKS = 34m.13s.
Jena eEZ = 19m.44s., eN = 19m.49s., eE = 19m.58s., eZ = 20m.2s., eE = 20m.34s.
Poona iZ = 19m.51s., 19m.54s., and 20m.5s.
Helwan eZ = 20m.0s., 21m.21s., and 22m.6s.
Ogyalla eE = 20m.29s., e = 21m.15s., 22m.18s., 22m.27s., 26m.18s., and 28m.10s.
Belgrade eZ = 20m.41s., eNW = 21m.58s., eZ = 22m.34s.
Timisoara eEN = 20m.11s., eN = 25m.5s., eE = 25m.43s., eN = 25m.49s.
Istanbul ePKP$_2$N = 20m.13s.
Long waves were also recorded at Weston.

Aug. 2d. 12h. 51m. 3s. Epicentre 42°·8N. 13°·3E. (as on 1950, September 3d.).

Felt in the Provinces of Teramo, Ascoli, Piceno, and Terni.
Monthly Bulletin of the I.N.G., Rome, August, 1951, page 3.

A = +·7163, B = +·1693, C = +·6770; δ = +8; h = −3;
D = +·230, E = −·973; G = +·659, H = +·156, K = −·736.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rome		1·1	214	0 17	− 5	i 0 35	S_g	i 0 22	P_g	—
Prato		1·9	304	e 0 34	0	e 1 6	+ 7	—	—	—
Bologna		2·2	321	e 0 43	+ 5	e 1 8	+ 2	e 1 17	S_g	—
Triest		2·9	6	e 0 55	P_g	i 1 20	− 4	e 1 12	?	—
Pavia		3·8	310	—	—	e 1 42	− 5	e 2 12	S_g	—
Zürich		5·6	325	e 1 25	− 2	—	—	—	—	—
Basle		6·2	321	e 1 42	+ 7	e 2 42	− 6	—	—	—
Stuttgart	z.	6·6	336	e 1 47?	+ 6	e 3 23	S*	e 1 52	P*	e 4·0
Besançon		6·8	313	e 1 43	− 1	e 3 0	− 3	—	—	—
Strasbourg		7·0	328	e 1 42	− 6	e 3 2	− 6	e 3 20	SS	—
Prague		7·3	6	—	—	e 3 5	−10	e 4 0	S_g	e 4·2
Jena		8·2	352	e 2 44?	P_g	e 3 48	+10	e 4 42	S_g	—
Collmberg	E.	8·5	359	—	—	e 4 22	S*	—	—	e 5·6
Potsdam		9·6	359	—	—	e 5 15	S_g	e 5 27	?	e 5·6

Additional readings :—
Stuttgart eS?Z = 2m.27s., eS_g?Z = 3m.45s.
Prague e = 3m.10s. and 3m.26s., eSSS = 3m.33s., e = 3m.44s., eS_g = 3m.54s. and 4m.0s.
Jena eP_g?E = 2m.48s.

Aug. 2d. 15h. 52m. 53s. Epicentre 44°·0S. 167°·2E.

Intensity V in epicentral region. Epicentre 44°S. 167°·25E.

R. C. Hayes.
Earthquake Origins in New Zealand during the year 1951, New Zealand Journal of Science and Technology, Sec. B, Vol. 34, No. 4, January, 1953, p. 225.

A = −·7038, B = +·1600, C = −·6922; δ = +8; h = −4;
D = +·222, E = +·975; G = +·675, H = −·153, K = −·722.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Kaimata	N.E.	3·4	67	e 0 55	0	i 1 31	− 6
Christchurch		4·0	85	e 0 59	− 5	i 1 40	−12
Cobb River	E.	5·0	57	e 1 18	0	e 2 15	− 3
Wellington		6·2	67	e 1 33	− 2	e 2 40	− 8
New Plymouth	E.	7·2	49	e 1 53?	+ 4	e 3 10	− 3
Auckland	N.	9·2	42	—	—	e 3 37	−26

August 2d. 20h. 30m. 17s. Epicentre 13°·0N. 87°·8W. Focus at base of Superficial Layers. (as on 1951, May 11d.).

$A = +\cdot0374$, $B = -\cdot9740$, $C = +\cdot2235$; $\delta = +3$; $h = 0$.
$D = -\cdot999$, $E = -\cdot038$; $G = +\cdot009$, $H = -\cdot223$, $K = -\cdot975$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Swan Island		5·7	39	e 1 28	+ 4	3 4	+34	—	—	—
Balboa Heights		9·0	115	2 9	− 2	4 9	+17	—	—	—
Oaxaca		9·5	296	e 2 54	P*	e 4 22	+18	—	—	e 5·2
Vera Cruz		10·1	309	—	—	i 5 17	?	—	—	e 5·8
Puebla		11·6	302	—	—	e 5 7	SS	e 5 42	SSS	e 6·3
Galerazamba		12·5	99	—	—	e 5 23	SS	—	—	6·4
Tacubaya		12·6	302	e 3 26	PPP	e 5 44	SS	e 6 2	SS	e 6·4
Chinchina	E.	14·4	122	i 3 19	− 4	e 6 1	− 2	e 6 29	SS	—
Miami		14·7	28	i 3 29	+ 2	i 6 1	− 9	—	—	—
Bogota		15·9	120	i 3 43	0	i 6 39	+ 1	i 3 48	pP	8·7
San Juan		21·5	74	i 4 41	− 7	e 8 54	+15	—	—	—
Columbia		21·8	15	i 4 53	+ 2	i 8 51	+ 6	—	—	—
Roosevelt Roads		22·0	71	e 3 50	−63	e 7 14	−95	—	—	—
Fort de France		25·9	84	i 5 23	− 8	i 10 13	+17	—	—	e 13·3
Morgantown		27·4	13	e 5 41	− 3	—	—	e 8 6	?	—
Washington		27·5	19	i 5 52	+ 7	—	—	6 16	PP	—
Huancayo		27·8	155	e 5 46	− 2	e 10 37	+10	e 6 26	PP	—
Tucson		28·5	317	e 5 58	+ 4	e 11 15	+37	—	—	—
Chicago		28·7	359	e 8 10	?	—	—	—	—	e 10·3
Cleveland		28·9	9	i 5 54k	− 4	e 10 41	− 4	e 12 22	SS	—
City College, N.Y.		30·3	22	—	—	e 11 6	− 1	—	—	e 12·7
Fordham		30·3	22	—	—	e 11 9	+ 2	—	—	—
Palisades		30·4	22	i 6 12	+ 1	i 11 10	+ 2	—	—	—
Harvard		32·6	23	i 6 32	+ 1	e 11 42	− 1	—	—	e 13·1
Weston		32·6	23	e 6 27	− 4	e 11 44	+ 1	e 6 55	pP	—
Palomar	Z.	33·3	313	e 6 44	+ 7	—	—	—	—	—
Boulder City		33·4	317	e 6 37	− 1	—	—	i 6 44	?	—
Rapid City		33·7	340	e 7 15	pP	e 12 29	sS	—	—	—
Ottawa		33·9	15	6 38	− 4	12 5	+ 2	—	—	—
Riverside	Z.	34·0	314	e 6 50	+ 7	—	—	—	—	—
Pasadena		34·7	314	e 6 54	+ 5	—	—	—	—	e 16·5
China Lake	Z.	35·1	317	e 6 50	− 2	e 8 20	PP	i 6 57	P	—
La Paz		35·2	146	e 7 5	+12	i 15 1	SS	—	—	17·7
Tinemaha	Z.	36·3	318	e 7 9	+ 7	—	—	e 8 40	PPP	—
Seven Falls	E.	36·9	19	—	—	12 43	− 7	15 13	SS	—
Bozeman		38·1	335	e 7 27	+10	e 13 11	+ 3	—	—	—
Reno	Z.	38·6	319	e 7 23	+ 1	—	—	—	—	—
Lick	Z.	38·7	316	e 7 14k	− 8	—	—	e 7 39	pP	—
Santa Clara		38·9	316	e 7 20	− 4	—	—	—	—	e 20·1
Berkeley		39·4	316	—	—	e 13 39	+12	e 16 55	SSS	e 22·4
Mineral	Z.	40·2	319	e 7 39a	+ 4	—	—	—	—	—
Hungry Horse		41·4	334	e 7 42	− 3	—	—	—	—	—
Seattle		44·9	328	e 8 15	+ 2	—	—	e 8 24	pP	e 28·2
Victoria		45·9	328	e 8 29	+ 8	—	—	—	—	26·9
Resolute Bay		61·8	358	10 12	− 6	18 38	+ 1	10 41	pP	e 33·0
College		65·8	337	e 10 40	− 4	—	—	e 13 13	PP	—
Scoresby Sund		69·8	19	e 11 5	− 4	e 20 13	− 2	—	—	30·7
Toledo		77·0	52	e 11 46	− 5	e 21 21	−15	e 22 6	PS	—
Malaga		77·1	54	i 11 54	+ 2	i 23 24	PPS	15 40	?	40·7
Granada		77·7	54	10 55	−60	20 50	−54	15 25	PP	36·3
Kew		78·4	40	—	—	e 21 45	− 6	e 29 43	SSS	—
Almeria		78·6	55	i 11 59	− 1	e 21 59	+ 6	15 3	PP	43·0
Alicante		80·0	53	12 17	+ 9	21 55	−13	15 15	PP	e 37·9
Paris		80·5	42	e 12 8	− 2	—	—	—	—	e 36·7
Clermont-Ferraud		81·4	46	e 17 20	PPP	—	—	—	—	e 39·2
Witteveen	Z.	82·4	37	e 12 21	+ 1	—	—	—	—	—
Besançon		83·1	43	e 12 23	− 1	—	—	—	—	—
Strasbourg		84·0	41	e 12 24	− 4	—	—	e 12 34	pP	e 34·7
Kiruna		84·8	21	—	—	e 22 55	− 2	e 36 9	Q	e 41·3
Stuttgart		84·9	41	e 12 29	− 4	—	—	e 15 51	PP	e 36·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copenhagen		85·1	34	—	—	23 13	+14	—	—	38·7
Potsdam	N.	86·3	38	—	—	e 23 19	+ 8	—	—	e 36·7
Collmberg	E.	86·6	39	11 49	−52	—	—	—	—	—
Prague		87·8	39	e 12 57	+10	e 22 51	[−18]	e 13 15	pP	e 42·7
Tamanrasset	Z.	88·0	67	e 12 50	+ 2	—	—	e 16 5	PP	—
Rome		88·9	47	e 15 0	?	e 22 53	[−24]	e 24 28	PS	—
Istanbul	E.	100·8	44	—	—	e 26 42	PS	—	—	e 49·7
Ksara		109·0	48	e 13 2	?	e 31 2	?	—	—	—

Additional readings :—
Bogota iSSEN =8m.10s.
Berkeley eQEN =19·2m.
Seattle e =8m.18s.
Resolute Bay eZ =10m.16s., eN =17m.55s., eE =25m.34s., and 29m.3s.
Malaga PPP =17m.18s.
Granada SS =24m.19s.
Alicante PPP =17m.9s., PS =22m.59s., Q =32m.53s.
Paris e =12m.13s., 12m.46s., 28m.22s., and 34m.6s.
Prague e =15m.29s., 17m.31s., 19m.48s., 30m.58s., and 38m.25s.
Rome eN =17m.33s.
Long waves were also recorded at De Bilt, Tortosa, Pavia, Guadalajara, Ivigtut Bucharest, Triest, and Timisoara.

Aug. 2d. Readings also at 0h. (Copiapo and near Ottawa), 1h. (Samarkand), 3h. (La Paz, Huancayo, Chinchina, Bogota, and Galerazamba), 4h. (Scoresby Sund), 5h. (Apia and Santa Clara), 6h. (near Strasbourg), 7h. (near Algiers Univ.), 8h. (Puebla, near Tacubaya, and near Taranto), 9h. (Stuttgart, Triest, and near Athens), 11h. (Apia, Kodaikanal, and La Paz), 12h. (Barcelona), 14h. (near Kurmenty), 15h. (Samarkand, near Tchimkent, Andijan, Fergana, Stalinabad, Scoresby Sund, Palomar, China Lake, Tinemaha, Mount Wilson, and near Nanking), 16h. (Copenhagen and near Kurmenty), 17h. (Stuttgart, Strasbourg, and Fort de France), 18h. (Apia), 19h. (Rome, near Ashkabad, and near Dzhergetal), 21h. (near Dzhergetal), 23h. (Palomar, Riverside, Pasadena, China Lake, Reno, Lick, Mineral, Boulder City, Shasta Dam, Tucson, and College).

Aug. 3d. 0h. 23m. 58s. Epicentre 13°·0N. 87°·8W. Focus at base of superficial layers. (as on 2d.).

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Swan Island	5·7	39	e 1 24	0	—	—	1 45	PP	—
Balboa Heights	9·0	115	2 7	− 4	4 5	+13	—	—	—
Oaxaca	9·5	296	e 2 23	+ 5	e 4 22	sS	e 4 50	?	—
Vera Cruz	10·1	309	e 2 36	+10	e 4 30	+11	i 4 48	sS	—
Puebla	11·6	302	2 50	+ 4	i 5 8	+12	e 5 29	sS	—
Galerazamba	12·5	99	e 3 18	PPP	i 5 22	+ 5	—	—	—
Tacubaya	12·6	302	e 3 1?	+ 1	e 5 20	0	i 5 50	SSS	i 6·1
Chinchina	14·4	122	i 3 18	− 5	i 6 4	+ 1	i 3 45	PPP	6·8
Miami	14·7	28	i 3 24	− 3	i 6 3	− 7	—	—	—
Bogota	15·9	120	i 3 42	− 1	i 6 38	0	i 4 0	pP	—
Guadalajara	16·7	299	e 3 56	+ 3	—	—	—	—	e 8·1
San Juan	21·5	74	i 4 39	− 9	i 8 51	+12	—	—	—
Columbia	21·8	15	i 4 48	− 3	i 8 58	+13	—	—	—
Fort de France	25·9	84	i 5 24	− 7	i 10 16	sS	—	—	e 13·4
Morgantown	27·4	13	i 5 45	+ 1	e 11 14	SS	—	—	—
Washington	27·5	19	i 5 47	+ 2	—	—	—	—	—
Huancayo	27·8	155	e 5 45	− 3	e 10 34	+ 7	e 6 29	PP	e 12·8
Tucson	28·5	317	e 5 56	+ 2	e 11 6	sS	—	—	—
Bermuda	28·6	45	e 5 57	+ 2	—	—	—	—	—
Chicago	28·7	359	e 5 56	0	e 10 37	− 5	—	—	—
Cleveland	28·9	9	i 5 56a	− 2	e 10 47	+ 2	e 12 20	SS	—
Pennsylvania	29·0	15	i 6 0	+ 1	e 10 46	0	i 6 8	pP	—
Fordham	30·3	22	e 6 14	+ 4	e 11 10	+ 3	—	—	—
City College, N.Y.	30·3	22	i 6 16	+ 6	i 11 7	0	—	—	—
Palisades	30·4	22	i 6 9	− 2	e 11 10	+ 2	—	—	e 14·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Harvard		32·6	23	i 6 28	− 3	i 11 45	+ 2	—	—	e 14·1
Weston		32·6	23	i 6 28	− 3	e 11 44	+ 1	i 6 59	pP	—
Palomar	Z.	33·3	313	e 6 40	+ 3	—	—	—	—	—
Boulder City		33·4	317	i 6 38	0	—	—	i 6 51	pP	—
Rapid City		33·7	340	i 7 17	pP	e 12 34	sS	—	—	—
Vermont		33·8	19	e 6 44	+ 3	e 12 20	+18	—	—	—
Ottawa		33·9	15	6 39	− 3	12 4	+ 1	—	—	—
Riverside	Z.	34·0	314	e 6 44	+ 1	—	—	—	—	—
Pasadena		34·7	314	e 6 51	+ 2	e 12 22	+ 6	e 8 13	PP	e 16·5
China Lake	Z.	35·1	317	e 6 54	+ 2	e 8 24	PP	i 6 59	pP	—
La Paz		35·2	146	7 14?	+21	12 36	sS	8 13	PP	17·3
Shawinigan Falls	N.	35·8	18	e 6 56	− 2	—	—	—	—	—
Tinemaha	Z.	36·3	318	e 7 4	+ 2	—	—	e 8 37	PPP	—
Seven Falls	E.	36·9	19	e 7 5	− 2	12 50	0	15 17	SS	—
Fresno	Z.	37·1	316	e 7 12k	+ 3	—	—	—	—	—
Halifax		37·7	29	—	—	e 13 2	0	e 15 32	SS	16·9
Bozeman		38·1	335	e 7 17	0	e 13 12	+ 4	—	—	—
Reno	Z.	38·6	319	e 7 20k	− 2	e 13 57	+42	—	—	—
Lick	Z.	38·7	316	i 7 25k	+ 3	—	—	—	—	—
Santa Clara		38·9	316	—	—	e 13 45	sS	—	—	e 20·1
Berkeley		39·4	316	e 7 29k	+ 1	e 13 37	+10	e 16 53	SSS	e 21·7
Mineral	Z.	40·2	319	e 7 38a	+ 3	—	—	—	—	—
Shasta Dam		41·0	319	e 7 39	− 3	—	—	—	—	—
Hungry Horse		41·4	334	i 7 54	+ 9	e 18 55	?	—	—	—
Saskatoon		41·9	343	—	—	e 14 7	+ 2	—	—	17·3
Arcata	Z.	42·1	318	e 7 57a	+ 7	—	—	—	—	—
Seattle		44·9	328	e 8 13	0	i 18 36	ScS	e 8 33	pP	e 20·7
Victoria		45·9	328	8 26	+ 5	15 16	sS	—	—	25·8
Ivigtut		56·0	22	—	—	22 56	SSS	—	—	27·0
Resolute Bay		61·8	358	10 14	− 4	18 38	+ 1	e 25 38	SSS	e 32·9
College		65·8	337	e 10 40	− 4	—	—	e 13 13	PP	—
Scoresby Sund		69·8	19	e 11 5	− 4	e 20 15	0	—	—	28·0
Rathfarnham Castle		74·6	38	e 11 27	−11	e 20 52	−18	—	—	—
Aberdeen	E.	76·9	34	i 12 29	+38	i 21 26	− 9	i 26 19	SS	e 37·5
Toledo		77·0	52	e 11 45	− 6	e 21 29	− 7	14 35	PP	32·9
Malaga		77·1	54	i 12 9	+17	i 21 43	+ 6	14 51	PP	36·5
Granada		77·7	54	12 5k	pP	21 47	+ 3	27 8	SS	36·4
Kew		78·4	40	i 11 55	− 4	e 22 17	sS	e 14 59	PP	e 31·0
Almeria		78·6	55	12 20	+20	22 22	sS	15 22	PP	41·3
Alicante		80·0	53	12 10	+ 2	e 22 5	− 3	17 2	PPP	e 38·0
Tortosa		80·4	50	—	—	22 11	− 1	—	—	34·6
Paris		80·5	42	e 12 3	− 7	e 22 7	− 6	i 12 12	pP	e 37·0
Clermont-Ferrand		81·4	46	e 12 16	+ 1	e 23 26	SPP	—	—	—
De Bilt		81·7	38	—	—	e 22 22	− 3	e 27 2	SS	e 35·0
Witteveen	Z.	82·4	37	e 12 17	− 3	—	—	e12 27	pP	—
Besançon		83·1	43	e 12 19	− 5	—	—	e 12 26	pP	—
Strasbourg		84·0	41	e 12 24	− 4	e 22 51	+ 2	e 23 42	PS	—
Basle		84·1	43	e 12 26	− 3	—	—	—	—	—
Karlsruhe	Z.	84·3	40	e 12 31	+ 1	—	—	—	—	—
Kiruna		84·8	21	e 12 31	− 1	i 22 56	− 1	e 28 27	SS	e 34·2
Zürich		84·8	43	e 12 28	− 4	—	—	—	—	—
Stuttgart		84·9	41	e 12 29	− 4	e 23 4	+ 6	e 15 52	PP	e 34·0
Copenhagen		85·1	34	i 12 39	+ 5	22 51	[− 1]	—	—	37·0
Pavia		85·7	45	—	—	e 22 58	[+ 1]	e 27 9	?	—
Jena	Z.	85·8	39	e 12 34	− 3	—	—	e 12 46?	pP	—
Potsdam		86·3	38	e 12 45	+ 5	e 23 8	− 3	e 16 26	pPP	e 37·0
Upsala	N.	86·4	29	—	—	e 23 15	+ 3	e 24 41	PPS	e 36·0
Collmberg		86·6	39	e 12 37	− 4	—	—	e 12 47	pP	—
Prague		87·8	39	e 12 46	− 1	e 23 22	− 4	e 16 19	PP	e 38·0
Tamanrasset	Z.	88·0	67	e 12 37	−11	e 16 9	PP	i 12 51	pP	—
Triest		88·7	44	e 12 57	+ 6	i 23 31	− 3	e 23 44	ScS	e 42·3
Rome		88·9	47	12 59	+ 7	23 33	− 3	e 24 41	PS	40·2
Istanbul	E.	100·8	44	e 17 56	PP	e 25 2	−16	e 26 47	SP	e 46·0
Ksara		109·0	48	e 19 1	PP	28 45	SPP	—	—	—

For Notes see next page.

NOTES TO AUGUST 3d. 0h. 23m. 58s.

Additional readings :—
Vera Cruz iSS =5m.18s.
Puebla iSS =5m.46s.
Tacubaya i =3m.8s.
Bogota iSS =7m.20s.
Pasadena eZ =7m.18s.
La Paz iSS =15m.0s.
Berkeley eQEN =19·5m.
Seattle eP? =8m.17s., esP? =8m.43s. and other unidentified readings.
Resolute Bay eZ =10m.51s.
Rathfarnham Castle Z =12m.37s., eEN =27m.2s.
Aberdeen iE =12m.47s. and 18m.6s., iSE =22m.53s., iE =25m.1s., iSSE =28m.27s.
Toledo e =15m.40s., PS? =22m.22s.
Malaga PPP =16m.41s.
Granada SSS =30m.38s.
Kew ePSEN =23m.26s., eSSEN =26m.52s.
Alicante PS =22m.57s.. SS =27m.17s., SSS =30m.27s.
Paris e =12m.9s., ipP? =12m.17s., isP? =12m.33s., e =13m.4s., ePP =15m.12s., e =15m.29s., epPPP =17m.33s., e =20m.13s., ePS? =22m.27s., ePPS? =23m.32s., e =24m.39s., 25m.37s., and 26m.3s., eSS =27m.3s.
Clermont-Ferrand e =24m.32s. aud 25m.2s.?.
Strasbourg e =12m.31s., epP =12m.56s., e =13m.56s., eSS =28m.26s., eSSS =32m.2s.
Kiruna eEN =25m.29s.
Stuttgart e =14m.20s., ePPP =27m.26s., eSKS =22m.28s., ePPS =24m.8s.
Jena eE =12m.38s.
Prague i =12m.53s., esP? =13m.12s., e =13m.32s., and 14m.27s., eS =23m.37s., esS? =24m.13s., eSP =24m.41s., eSS =29m.20s., eSSS =32m.2s.
Tamanrasset eZ =15m.0s.
Triest eS =24m.25s., eSS =30m.19s.
Rome e =23m.49s.
Istanbul epPPE =18m.17s., eSKSE =24m.7s., eSSEN =32m.12s.
Long waves were also recorded at Christchurch and Wellington.

Aug. 3d. 5h. 25m. 44s. Epicentre 13°·0N. 87°·8W. Focus at base of superficial layers. (as at 0h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Swan Island		5·7	39	e 1 50	+26	e 2 32	+ 2	—	—	—
Balboa Heights		9·0	115	2 7	− 4	—	—	—	—	—
Oaxaca		9·5	296	—	—	e 4 32	SSS	—	—	e 4·7
Vera Cruz		10·1	309	e 2 35	+ 9	e 4 56	+37	—	—	i 6·0
Puebla		11·6	302	e 2 57	+11	e 5 40	SSS	—	—	e 6·7
Tacubaya		12·6	302	i 3 6	+ 6	—	—	—	—	e 6·2
Chinchina		14·4	122	(i 3 42)	+19	(i 6 28)	+25	—	—	(e 6·9)
Miami		14·7	28	i 3 21	− 6	e 6 6	− 4	—	—	—
Bogota		15·9	120	i 3 41	− 2	i 6 34	− 4	—	—	—
Columbia		21·8	15	i 4 53	+ 2	i 8 57	+12	—	—	—
Roosevelt Roads		22·0	71	e 4 49	− 4	—	—	—	—	—
Fort de France		25·9	84	e 5 21	−10	i 10 11	sS	—	—	e 13·3
Morgantown		27·4	13	i 5 46	+ 2	—	—	—	—	—
Huancayo		27·8	155	e 5 46	− 2	e 10 35	+ 8	e 6 21	PP	e 12·8
Tucson		28·5	317	e 5 59	+ 5	e 10 56	sS	—	—	—
Chicago		28·7	359	—	—	(e 10 41)	− 1	—	—	e 10·7
Cleveland		28·9	9	i 5 59a	+ 1	e 10 50	+ 5	—	—	—
Fordham		30·3	22	e 9 32	PcP	e 11 15	+ 8	—	—	—
City College, N.Y.		30·3	22	—	—	e 11 9	+ 2	—	—	—
Harvard		32·6	23	e 6 35	+ 4	e 11 45	+ 2	—	—	e 14·3
Weston		32·6	23	e 6 29	− 2	e 11 43	0	—	—	—
Palomar	Z.	33·3	313	e 6 46	+ 9	—	—	—	—	—
Ottawa		33·9	15	6 40	− 2	12 4	+ 1	—	—	—
China Lake	Z.	35·1	317	e 6 43	− 9	—	—	—	—	—
La Paz		35·2	146	e 7 0	+ 7	i 14 16?	SS	—	—	17·6
Shawinigan Falls	N.	35·8	18	e 6 56	− 2	—	—	—	—	—
Tinemaha	Z.	36·3	318	e 7 8	+ 6	—	—	—	—	—
Seven Falls	E.	36·9	19	—	—	e 12 53	+ 3	e 15 21	SS	—
Lick	Z.	38·7	316	i 7 26k	+ 4	—	—	i 8 16	?	—
Santa Clara		38·9	316	—	—	e 16 31	SSS	—	—	e23·2

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Mineral	z.	40·2	319	e 7 36 k	; 1	—	—	—	—	—
Hungry Horse		41·4	334	e 7 31	−14	—	—	—	—	—
Victoria		45·9	328	e 8 30	pP	—	—	—	—	25·4
Resolute Bay		61·8	358	—	—	e 18 37	0	e 25 22	SSS	e 32·9
College		65·8	337	e 10 42	− 2	—	—	e 10 21	?	—
Scoresby Sund		69·8	19	e 11 11	+ 2	—	—	—	—	32·3
Granada		77·7	54	11 40 a	−15	—	—	—	—	36·4
Paris		80·5	42	e 19 9	?	—	—	—	—	e 37·3
Strasbourg		84·0	41	e 12 31	+ 3	—	—	—	—	e 34·3
Kiruna		84·8	21	—	—	e 35 6	?	e 43 4	Q	e 43·7
Stuttgart		84·9	41	e 12 31	− 2	—	—	—	—	e 36·3
Tamanrasset	z.	88·0	67	12 49	+ 1	—	—	16 19	PP	—
Rome	N.	88·9	47	—	—	e 23 49	sS	—	—	—
Taranto		92·8	48	—	—	e 23 1	?	e 34 21	SSS	e 48·1
Istanbul	N.	100·8	44	e 22 22	?	e 26 28	SP	e 28 16?	PPS	—
Ksara		109·0	48	—	—	e 30 19?	?	—	—	e 41·3

Additional readings and note :—
Tacubaya e = 3m.33s., i = 7m.4s.
Chinchina readings have been reduced by 6 minutes.
Huancayo i = 10m.51s.
Resolute Bay eE = 18m.58s., eEN = 21m.34s., eE = 28m.28s., eEN = 30m.40s.
Long waves were also recorded at Guadalajara, Rapid City, Pasadena, Vermont, Washington, Seattle, Ivigtut, Alicante, Kew, Copenhagen, Potsdam, and Prague.

Aug. 3d. 23h. 35m. 30s. Epicentre 39°·2N. 71°·5E.

$A = +·2465$, $B = +·7368$, $C = +·6295$; $\delta = -9$; $h = -1$;
$D = +·948$, $E = -·317$; $G = +·200$, $H = +·597$, $K = -·770$.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Dzhergetal	0·2	274	i 0 5	P_g	—	—	—	—	—
Fergana	1·2	11	i 0 23	− 1	0 41	0	—	—	—
Obi-garm	1·5	250	i 0 28	0	e 0 53	+ 4	—	—	—
Andijan	1·7	23	0 31	0	i 0 56	+ 2	—	—	—
Khorog	1·7	177	i 0 29	− 2	0 52	− 2	—	—	—
Stalinabad	2·2	253	i 0 41	P*	i 1 14	S_g	—	—	—
Lunacharskoe	2·7	323	i 0 52	P_g	i 1 22	+ 3	—	—	—
Tashkent	2·7	322	i 0 48	+ 3	i 1 28	S_g	—	—	—
Tchimkent	3·4	335	i 0 58	+ 3	i 1 40	+ 3	—	—	—
Samarkand	3·5	289	i 0 58	+ 1	1 51	S*	—	—	—
Frunse	4·4	31	i 1 10	0	i 2 1	− 1	i 2 4	S*	—
Rybach'e	4·7	45	i 1 15	+ 1	—	—	—	—	—
Krasnogorka	4·9	33	e 1 17	0	—	—	—	—	—
Almata	5·8	44	i 1 29	0	i 2 59	S*	—	—	—
Almata II	6·0	46	e 1 33	+ 1	e 2 43	0	—	—	—
Przhevalsk	6·2	56	1 35	0	i 3 15	S*	—	—	—
Ili	6·3	40	i 1 35	− 1	i 3 15	S*	—	—	—
Kurmenty	6·4	51	i 1 36	− 2	—	—	—	—	—
Mary	7·7	261	1 42	−14	4 21	S_g	—	—	—
Ashkabad	10·4	267	2 33	− 1	4 25	− 7	—	—	—
New Delhi	11·6	154	e 2 45	− 5	i 4 55	− 6	3 4	PP	4·7
Kizyl-Arvat	11·8	274	e 2 49	− 4	e 6 5	+59	—	—	—
Lenkoran	17·7	277	e 4 8	− 2	—	—	—	—	—
Sverdlovsk	19·0	341	4 23?	− 3	e 7 59?	+ 4	—	—	—
Kirovobad	19·3	283	4 32	+ 3	i 8 6	+ 4	—	—	—
Goris	19·5	279	e 4 30	− 1	—	—	—	—	—
Tiflis	20·4	286	4 41	0	—	—	—	—	—
Poona	20·7	175	i 4 42	− 2	8 11	−20	8 53	SS	9·3
Erevan	20·8	282	e 4 46	+ 1	—	—	—	—	—
Calcutta E.	22·0	135	i 12 27	PcS	e 8 59	+ 3	i 9 29	SS	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Irkutsk		26·1	49	—	—	e 10 22	+15	—	—	—
Kabansk		27·5	50	e 5 56	+ 6	—	—	—	—	—
Moscow		27·9	318	e 5 52?	− 2	e 10 31?	− 6	—	—	—
Ksara		29·0	271	—	—	e 12 37	88	—	—	e 17·0
Kodaikanal	E.	29·3	169	—	—	e 10 31	−28	—	—	—
Kishinev		31·8	300	e 6 24	− 4	—	—	—	—	—
Istanbul	N.	32·2	287	e 10 0	?	e 13 24	88	—	—	e 14·6
Pulkovo		33·0	322	e 6 38	− 1	—	—	—	—	—
Lwow		34·9	304	e 6 56	+ 1	—	—	—	—	—
Uzhgorod		36·1	302	e 7 13	+ 8	—	—	—	—	—
Kiruna		39·9	333	i 7 35k	− 2	e 16 39	88	e 17 51	ScS	e 21·3
Copenhagen		41·8	314	e 7 57	+ 4	—	—	—	—	22·5
Collmberg	E.	41·9	307	e 7 53	− 1	—	—	e 9 58	PcP	—
Jena		42·8	306	e 8 0?	− 1	—	—	e 9 47	PP	—
Messina	Z.	43·1	288	e 8 4	0	e 18 24	888	e 9 0	?	—
Rome		44·1	293	—	—	e 14 54	+ 9	—	—	e 22·1
Stuttgart		44·7	305	e 8 15	− 1	—	—	—	—	e 25·5
Strasbourg		45·7	305	e 8 22	− 2	—	—	—	—	—
Besançon		47·1	303	e 8 35	0	—	—	e 8 40	P	—
Paris		49·0	306	e 8 48	− 2	—	—	e 8 54	P	e 29·5
Tamanrasset	Z.	57·7	274	i 9 54k	− 1	—	—	—	—	—

Additional readings :—
New Delhi iS?E = 4m.50s., SSSN = 5m.18s.
Poona QE = 8m.17s., SSE = 8m.41s.
Kiruna eN = 19m.3s., eE = 19m.35s.
Jena eE = 8m.5s. and 9m.19s.
Long waves were also recorded at Bombay, Upsala, Potsdam, De Bilt, Kew, Alicante, and Granada.

Aug. 3d. Readings also at 0h. (Victoria, Harvard, Ottawa, Shawinigan Falls, Mount Wilson, Riverside, Palomar, China Lake, Lick, Mineral, Reno, Tamanrasset, Stuttgart, San Juan, Tucson, and Boulder City), 1h. (Tacubaya, Vera Cruz, Oaxaca, and Puebla), 2h. (Galerazamba, near Chilisk, Ili, and Almata II), 3h. (Djakarta), 5h. (Besançon, Paris, and Strasbourg), 6h. (Paris, and near Dzhergetal), 8h. (near Rome), 11h. (near Alicante, and near Dzhergetal), 13h. (Pasadena, Riverside, Palomar, China Lake, Tinemaha, Fresno, Lick, Mineral, Reno, Boulder City, Shasta Dam, Tucson, College, and Apia (2)), 14h. (near Apia (3) and near Mizusawa), 15h. (Apia, near Santa Clara and near Bogota), 16h. (Oaxaca, Vera Cruz, Puebla, Tacubaya, Bogota, Galerazamba, Huancayo, Palisades (2), Harvard, Pasadena, Palomar, China Lake, Lick, Kew, near Alicante, Tortosa, Toledo, Malaga, Granada, and Almeria), 17h. (Weston, Seattle, Resolute Bay, Scoresby Sund, and Paris), 18h. (near Dzhergetal), 19h. (Seattle, Harvard, Pasadena, R;verside, Palomar, China Lake, Tinemaha, Fresno, Lick, Reno, Tucson, Boulder City, San Juan, Shasta Dam, Hungry Horse, College, and Ashkabad (2)), 20h. (Ksara, Rybach'e, Ili, Obi-garm, Almata, Tchimkent, Tashkent, near Andijan, Frunse, Krasnogorka, Dzhergetal, Przhevalsk, Almata II, Kurmenty (2), and near New Delhi), 21h. (Apia), 22h. (near Almata, Almata II, Kurmenty, Chilisk, and Ili), 23h. (Apia, Stalinabad, Samarkand, near Obi-garm, Andijan, Dzhergetal (5), and near Almata II).

Aug. 4d. 0h. 16m. 6s. Epicentre 39°·0N. 71°·8E. (as on 1951, April 14d.).

$A = +·2434$, $B = +·7402$, $C = +·6268$; $\delta = +2$; $h = -1$;
$D = +·950$, $E = -·312$; $G = +·196$, $H = +·595$, $K = -·779$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Dzhergetal	0·5	296	0 8	− 6	—	—	—	—	—
Fergana	1·4	359	i 0 24	− 3	0 42	− 4	—	—	—
Khorog	1·5	186	i 0 30	+ 2	i 0 51	+ 2	—	—	—
Obi-garm	1·7	260	i 0 31	0	e 0 56	+ 2	—	—	—
Andijan	1·8	14	i 0 33	+ 1	i 0 58	+ 2	—	—	—
Stalinabad	2·4	259	i 0 43	+ 2	i 1 17	+ 5	—	—	—
Tchimkent	3·7	333	i 0 59	− 1	i 1 51	+ 6	—	—	—
Samarkand	3·8	281	i 1 2	+ 1	1 55	S*	—	—	—
Frunse	4·4	28	i 1 14	+ 4	i 2 5	+ 3	—	—	—
Rybach'e	4·7	42	i 1 17	+ 3	i 2 10	0	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Krasnogorka		5·0	30	i 1 20	+ 2	—	—	—	—	—
Almata		5·7	41	e 1 54	P_g	e 3 9	S_g	—	—	—
Almata II		6·0	43	e 1 36	+ 4	e 3 9	S_g*	—	—	—
Przhevalsk		6·1	53	1 36	+ 2	i 3 17	S_g	i 1 54	P*	—
Ili		6·3	37	i 1 37	+ 1	i 3 15	S_g	—	—	—
Kurmenty		6·3	48	i 1 40	+ 4	i 3 21	S_g	—	—	—
Chilisk		6·7	45	i 1 43	+ 1	i 3 29	S*	—	—	—
Mary		7·9	263	1 55	− 4	e 4 18	S_g	—	—	—
Ashkabad		10·6	269	2 35	− 1	4 34	− 3	—	—	—
New Delhi		11·3	155	e 2 46	0	i 4 51	− 3	—	—	—
Kizyl-Arvat		12·1	275	e 2 51	− 6	5 1	−13	—	—	—
Lenkoran		17·9	277	—	—	7 21	− 9	—	—	—
Shemakla		17·9	283	e 4 8	− 4	—	—	—	—	—
Sverdlovsk		19·3	341	i 4 25	− 4	—	—	—	—	—
Kirovobad		19·6	283	i 4 34	+ 2	8 8	0	—	—	—
Goris		19·7	279	e 4 38	+ 4	—	—	—	—	—
Poona		20·5	175	i 4 43	+ 1	8 32	+ 5	8 55	SS	9·6
Tiflis		20·7	286	e 4 44	0	—	—	—	—	—
Erevan		21·0	282	e 4 50	+ 3	—	—	—	—	—
Calcutta	E.	21·6	135	—	—	i 7 23	?	—	—	i 12·2
Irkutsk		26·1	48	—	—	e 9 54	−13	—	—	—
Moscow		28·2	318	e 5 55	− 1	—	—	—	—	—
Ksara		29·2	271	—	—	e 13 34	Q	—	—	e 18·2
Pulkovo		33·3	322	e 6 42	+ 1	11 59	− 3	—	—	—
Kiruna		40·1	333	e 7 38	− 1	—	—	e 16 33	SS	i 20·5
Collmberg	E.	42·2	307	e 9 27	PP	—	—	—	—	—
Jena		43·1	306	e 8 4	0	—	—	—	—	—
Messina	Z.	43·4	288	e 8 6	0	—	—	—	—	—
Stuttgart	Z.	45·0	305	e 8 17	− 2	—	—	—	—	—
Strasbourg		46·0	305	e 8 25	− 2	—	—	—	—	23·9
Besançon		47·4	303	e 8 36	− 2	—	—	—	—	—
Paris		49·3	306	e 8 51	− 2	—	—	—	—	e 30·9
Tamanrasset	Z.	57·9	275	e 9 56	0	—	—	—	—	—

Additional readings :—
Poona QEZ =8m.39s., SSSEZ =9m.11s.
Kiruna eN =15m.38s., eE =16m.22s., eN =17m.56s. and 18m.22s., eE =20m.17s.
Strasbourg eP =8m.29s., e =8m.36s.
Besançon eP =8m.40s.
Long waves were also recorded at other European stations.

Aug. 4d. 1h. 42m. 2s. (I) } Epicentre 36°·9N. 70°·8E. Depth of focus 0·025.
7h. 9m. 54s. (II) } (as on 1951, May 9d.).

A = +·2636, B = +·7570, C = +·5978 ; δ = −10 ; h = −1 ;
D = +·944, E = −·329 ; G = +·197, H = +·565, K = −·802.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
I	Khorog	0·9	48	i 0 26	− 2	i 0 46	− 5
II		0·9	48	i 0 28	0	i 0 51	0
I	Obi-garm	2·2	335	i 0 42	+ 1	e 1 12	0
II		2·2	335	i 0 39	− 2	e 1 10	− 2
I	Dzhergetal	2·3	8	0 42	0	1 14	0
II		2·3	8	i 0 41	− 1	i 1 15	+ 1
I	Stalinabad	2·3	316	i 0 45	+ 3	i 1 18	+ 4
I	Fergana	3·6	12	i 0 56	− 1	i 1 39	− 2
II		3·6	12	i 0 58	+ 1	i 1 43	+ 2
I	Andijan	4·0	17	e 1 1	− 1	i 1 48	− 2
II		4·0	17	1 4	+ 2	i 1 54	+ 4
I	Samarkand	4·1	314	e 1 4	+ 1	—	—
II		4·1	314	1 2	− 1	1 52	− 1
II	Lunacharskoe	4·6	346	i 1 9	− 1	i 2 4	0
I	Tashkent	4·6	346	—	—	i 2 6	+ 2
II		4·6	346	i 1 10	0	i 2 5	+ 1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
I	Tchimkent	5·5	351	e 1 22	0	i 2 25	0
II		5·5	351	i 1 40?	+18	i 2 43?	+18
II	Frunse	6·6	25	i 1 38	+ 2	2 55	+ 5
I	Rybach'e	6·9	35	e 1 38	− 2	—	—
II		6·9	35	e 1 39	− 1	—	—
I	Krasnogorka	7·2	27	i 1 42	− 2	—	—
I	Mary	7·2	279	e 1 45	+ 1	4 10	+65
II		7·2	279	e 1 39	− 5	2 56	− 9
I	Almata	7·9	35	i 1 51	− 2	—	—
II		7·9	35	1 53	0	i 3 23	+ 2
I	Almata II	8·1	36	i 1 53	− 2	—	—
II		8·1	36	e 1 51?	− 4	—	—
I	Prezhevalsk	8·1	44	i 1 51	− 4	—	—
II		8·1	44	i 1 55	0	—	—
I	Kurmenty	8·4	41	i 1 54?	− 5	—	—
I	Ili	8·6	32	i 1 57?	− 5	—	—
II		8·6	32	1 59	− 3	—	—
I	Chilisk	8·8	39	e 2 0?	− 5	—	—
II		8·8	39	e 2 2	− 3	—	—
I	Ashkabad	9·9	280	2 24	+ 5	—	—
II		9·9	280	e 2 16	− 3	i 4 2	− 6
II	Kizyl-Arvat	11·7	285	e 2 37	− 5	4 42	− 8

II Mary gives also i = 2m.45s.

Aug. 4d. 11h. 20m. 42s. Epicentre 19°·6N. 120°·6E. (as on 1948, March 16d.).

A = −·4799, B = +·8115, C = +·3334; δ = −1; h = +5;
D = +·861, E = +·509; G = −·170, H = +·287, K = −·943.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Manila		5·0	176	i 1 16	− 2	—	—	—	—	—
Zi-ka-wei	z.	11·6	5	e 3 1	+11	—	—	—	—	—
Nanking		12·5	353	e 3 13	+11	e 5 38	+15	—	—	e 6·2
Vladivostok		25·3	20	e 4 47	−43	—	—	—	—	—
Kabansk		34·2	344	e 6 53	+ 4	—	—	—	—	—
Irkutsk		35·0	343	e 6 57	+ 1	e 12 26	− 2	—	—	—
Przhevalsk		42·2	312	7 57	+ 1	—	—	—	—	—
Kurmenty		42·5	313	i 8 1	+ 2	—	—	—	—	—
Almata II		43·2	314	e 8 4	0	—	—	—	—	—
Almata		43·5	314	i 8 7	0	—	—	—	—	—
Ili		43·6	314	i 8 7	− 1	—	—	—	—	—
Rybach'e		43·8	312	i 8 9	0	—	—	—	—	—
Frunse		45·0	312	i 8 20	+ 1	e 15 6	+ 8	—	—	—
Andijan		46·1	309	i 8 27	− 1	e 15 22	+ 8	—	—	—
Fergana		46·4	309	e 8 29	− 1	—	—	—	—	—
Tashkent		48·5	309	i 8 47	+ 1	—	—	—	—	—
Stalinabad		48·7	306	8 44?	− 4	—	—	—	—	—
Samarkand		49·9	306	i 8 56	− 1	16 13	+ 6	—	—	—
Brisbane	z.	56·4	145	i 9 48k	+ 3	—	—	—	—	—
Sverdlovsk		57·5	327	i 9 53	0	17 49	− 1	—	—	—
Kirovobad		65·7	307	i 10 48	0	19 39	+ 5	—	—	—
Goris		65·9	305	e 10 48	− 2	—	—	—	—	—
Tiflis		66·8	309	e 10 56	0	—	—	—	—	—
Erevan		67·2	307	e 10 58	0	—	—	—	—	—
Gori		67·3	309	e 10 50?	− 9	—	—	—	—	—
Leninakan		67·6	308	e 11 6	+ 5	—	—	—	—	—
Moscow		70·1	324	i 11 16	0	e 20 26	− 1	—	—	—
Pulkovo		73·4	329	e 11 28	− 8	e 20 55	−10	—	—	—
Yalta		74·1	312	e 11 38	− 2	—	—	—	—	—
Kiruna		75·8	337	i 11 51k	+ 1	i 21 38	+ 7	i 12 1	PcP	e 33·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lwow		79·4	319	i 12 8	− 1	—	—	—	—	—
Uzhgorod		80·8	318	e 12 18	+ 1	—	—	—	—	—
Prague		85·1	323	e 12 52	+13	—	—	—	—	—
Collmberg	E.	85·4	323	e 12 40	0	—	—	—	—	—
Jena	E.	86·3	324	e 12 44	− 1	—	—	e 13 25	?	—
Triest		87·4	319	i 12 49	− 1	—	—	i 16 5	PP	—
Terre Adélie		87·5	171	e 1 24	?	—	—	—	—	—
Stuttgart		88·7	323	e 12 56	− 1	—	—	—	—	e 51·3
Strasbourg		89·6	323	e 13 2	+ 1	—	—	—	—	—
China Lake	Z.	102·1	45	(i 18 51)	PP	—	—	(i 19 9)	pPKP	—
Palomar	Z.	104·0	48	(i 18 47)	PP	—	—	(i 19 5)	pPKP	—
Tucson		108·7	45	(i 19 4)	PP	—	—	(i 19 22)	pPKP	—

Additional readings and note :—
Kiruna iSE = 21m.41s., eZ = 21m.53s., eSSSN = 30m.6s.
Prague e = 13m.0s., 13m.14s., and 13m.58s.
The American readings have been increased by 10m.
Long waves were also recorded at Bombay, Calcutta, and other European stations.

Aug. 4d. Readings also at 0h. (Messina, Fergana, near Andijan, Dzhergetal (5), Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 1h. (Apia, Samarkand, Tashkent, Tchimkent, near Andijan, Dzhergetal (2), Fergana, Obi-garm, Stalinabad, also Krasnogorka, near Almata, Almata II, Chilisk, Ili, Przhevalsk, and Kurmenty—two shocks), 2h. (Apia (2)), 3h. (Bombay, Colombo, Kodaikanal, Ksara, Messina, Collmberg, Jena, Prague, Stuttgart, Strasbourg, Paris, Besançon, Tamanrasset, Pretoria, Terre Adélie, Scoresby Sund, Frunse, Stalinabad, Tashkent, near Andijan, Dzhergetal, Fergana, Khorog, and Obi-garm, several shocks), 4h. (Pasadena, Riverside, China Lake, Tinemaha, Rome, Messina, Granada, Fergana, Samarkand, Tashkent, Tchimkent, near Andijan, Dzhergetal (2), Khorog, Obi-garm, and Stalinabad), 5h. (Besançon, Strasbourg, Stuttgart, Rome, Tortosa, near Alicante, near Messina (2), and near Apia), 6h. (Kew, Paris, Copenhagen, Potsdam, Pavia, and near Tchimkent), 7h. (near Copiapo), 8h. (near Dzhergetal (2)), 9h. (Cobb River, Kaimata, Christchurch, near Tuai, Wellington, and near Yalta), 10h. (near Yalta), 11h. (near Calcutta), 13h. (near Bandong and Djarkarta), 14h. (near Dzhergetal), 15h. (near Dzhergetal (2)), 16h. (Chilisk, near Almata II, Ili, and Kurmenty), 17h. (Alicante, near Manila, and near Dzhergetal (2)), 18h. (Alicante (3), Fergana, Khorog, Samarkand, Tashkent, near Andijan, Dzhergetal (2), Obi-garm, Stalinabad, Tchimkent, and near Reykjavik), 19h. and 20h. (2) (near Dzhergetal), 22h. (Manila, Palomar, and China Lake), 23h. (Cobb River, Kaimata, Tuai, and Wellington).

Aug. 5d. 11h. 7m. 13s. Epicentre 41°·0N. 79°·0E. (as on 1946, November 10d.).

$A = +·1444$, $B = +·7430$, $C = +·6535$; $\delta = -4$; $h = -2$;
$D = +·982$, $E = -·191$; $G = +·125$, $H = +·641$, $K = -·757$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Przhevalsk	0·6	343	i 0 23	+ 8	—	—	—	—	—
Almata II	2·6	332	0 43	− 1	—	—	—	—	—
Almata	2·7	326	i 0 45	0	i 1 18	− 1	—	—	—
Chilisk	2·7	351	i 0 40	− 5	—	—	—	—	—
Ili	3·3	335	i 0 51	− 2	i 1 32	− 3	—	—	—
Krasnogorka	3·6	310	i 0 59	+ 1	i 1 51	S*	—	—	—
Frunse	3·8	302	1 3	+ 2	1 40	− 7	2 0	S*	—
Fergana	5·5	266	e 1 31	+ 6	e 3 10	S_g	—	—	—
Dzhergetal	6·3	256	1 47	P*	3 44	?	—	—	—
Khorog	6·8	241	e 1 57	P*	—	—	—	—	—
Tchimkent	7·2	284	i 2 16	P_g	—	—	—	—	—
Obi-garm	7·5	255	e 2 0	+ 7	—	—	—	—	—
Stalinabad	8·3	256	i 2 10	+ 6	—	—	—	—	—
Sverdlovsk	19·8	328	—	—	e 7 46	−27	—	—	—
Pulkovo	35·3	319	e 6 55	− 4	—	—	—	—	—
Kiruna	41·0	330	i 7 42	− 4	—	—	—	—	e 24·0

Kiruna gives also eNZ = 21m.10s., e = 21m.20s., eN = 22m.21s., eZ = 22m.29s., eE = 22m.38s.
Long waves were also recorded at Potsdam.

Aug. 5d. 15h. 12m. 7s. Epicentre 34°·2N. 36°·0E.

Felt throughout the Lebanon, at Ksara, Chtaura, Tanail, Zahle, Baalbeck, and strongly in the region of the Cedar trees. Damage at Saïdé.
Strasbourg gives epicentre as adopted.

A = +·6706, B = +·4872, C = +·5595 ; δ = +11 ; h = 0 ;
D = +·588, E = −·809 ; G = +·453, H = +·329, K = −·829.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		0·4	204	i 0 7	− 6	—	—	—	—	—
Helwan		5·9	224	1 29	− 2	e 2 39	− 1	1 39	P*	—
Istanbul		8·8	323	e 2 19	+ 8	3 37	−16	e 2 51	P_g	e 5·1
Erevan		9·0	46	—	—	4 51	S_g	—	—	—
Nakhichevan		9·0	54	e 2 41?	+28	—	—	—	—	—
Gori		10·1	37	e 3 1?	+32	i 5 37?	S_g	—	—	—
Tiflis		10·2	40	e 2 46	PPP	—	—	—	—	—
Yalta		10·4	353	e 2 24	−10	—	—	—	—	—
Kirovobad		10·5	49	—	—	i 5 37	+62	—	—	—
Simferopol		10·8	353	e 2 40?	+ 1	—	—	—	—	—
Grozny		11·8	37	e 3 7	PP	—	—	—	—	—
Bucharest		12·7	326	—	—	5 53	SSS	15 53	ScS	—
Timisoara		16·1	320	—	—	6 27	−22	—	—	—
Messina	Z.	17·0	290	e 4 1	0	e 7 0	−10	—	—	—
Uzhgorod		17·7	329	i 4 9	− 1	i 7 38	+12	—	—	—
Lwow		17·9	334	i 4 13	+ 1	—	—	—	—	—
Ashkabad		18·4	72	e 4 18	0	—	—	—	—	—
Ogyalla		19·1	321	e 5 26	?	e 8 6	+ 9	e 7 17	?	—
Rome		20·0	300	e 7 26	?	—	—	—	—	e 21·7
Mary		21·2	70	e 4 47	− 2	—	—	—	—	—
Prague		22·4	322	5 1	− 1	i 9 10	+ 6	e 5 29	PP	—
Pavia		23·3	307	—	—	e 9 31	+11	—	—	e 15·2
Collmberg	E.	23·9	322	e 5 15	− 1	—	—	—	—	—
Jena		24·4	321	e 5 19	− 2	e 6 29	?	e 6 20	PPP	—
Potsdam		24·5	325	—	—	e 9 52	+12	—	—	e 13·9
Stuttgart		24·6	314	e 5 21	− 2	e 9 46	+ 4	—	—	e 13·9
Samarkand		25·3	67	e 5 29	− 1	10 11	+17	—	—	—
Strasbourg		25·4	313	e 5 30	− 1	e 10 3	+ 7	e 7 12	?	—
Besançon		26·0	309	e 5 36	0	—	—	e 6 19	PP	—
Stalinabad		26·7	69	—	—	e 10 34	+17	—	—	—
Tashkent		27·1	63	e 5 49	+ 3	e 10 46	+22	—	—	—
Paris		28·8	311	e 6 22	+20	—	—	—	—	—
Tamanrasset	Z.	29·0	255	e 6 5	+ 1	e 11 4	+10	6 57	PP	—
Andijan		29·4	67	e 6 14	+ 7	e 16 28	ScS	—	—	—
Kiruna		34·8	351	—	—	e 15 27	SSS	—	—	e 18·7

Additional readings :—
Helwan P_gZ = 1m.51s., SZ = 2m.25s.
Istanbul eS*EN = 4m.11s., eS_gEN = 4m.37s.
Prague e = 5m.7s. and 5m.13s., eE = 5m.57s., eN = 6m.7s., e = 9m.19s. and 9m.29s., eSS = 9m.53s.
Besançon e = 5m.41s. and 5m.56s.
Tamanrasset eZ = 11m.28s.
Long waves were also recorded at Taranto and Copenhagen.

\ug. 5d. 15h. U.S.C.G.S. suggests epicentre 13°·5S. 176°·0W. Depth 300km.ca.

Apia eP =33m.11s., S? =33m.34s., L =34m.0s.?.
Brisbane iPZ =38m.40s.
Auckland eN =39m.19s., eSN =41m.39s., SSN =42m.36s., LN =43m.45s.
Christchurch eSN =43m.50s., eQEN =45m.15s., eLZ =47m.5s.
Fresno ePZ =43m.52s.
Pasadena eZ =43m.55s.
Lick ePZ =43m.56s.a, iZ =44m.2s. and 44m.9s.
Berkeley ePZ =43m.56s.k, eZ =44m.7s. and 47m.6s., eSEN =53m.22s., eQEN =62·5m.
China Lake eZ =43m.58s.
Riverside eZ =44m.1s.
Shasta Dam eP =44m.1s.
Tinemaha eZ =44m.7s.
Palomar eZ =44m.8s.
Boulder City e =44m.11s., i =44m.20s.
Wellington e =44m.13s., iZ =45m.22s., eQ =47m.0s., eLZ =48m.20s.
Tucson eP =44m.19s.
College eP =44m.39s.
Hungry Horse eP =44m.49s.
Stuttgart ePKPZ =51m.57s., eZ =52m.25s., eL =108m.
Paris ePKP =52m.1s., i =52m.7s., e =52m.10s. and 52m.31s., eL =112·0m.
Strasbourg ePKP =52m.4s., e =52m.15s. and 52m.29s.
Ksara ePKP =52m.19s., PP =56m.1s.?.
Tamanrasset ePKPZ =52m.37s.
Alicante PKP =52m.47s., PP =56m.28s., SKS =58m.43s., PPS =68m.37s., SS =74m.27s., SSP =75m.23s., Q =94m.45s., eL =102m.25s.
Long waves were also recorded at Almeria, Granada, Pavia, Rome, Copenhagen, Potsdam, Scoresby Sund, De Bilt, and Kew.

Aug. 5d. Readings also at 0h. (Palomar, China Lake, Tchimkent, Tashkent, near Dzhergetal, Fergana, Khorog, Obi-garm, Andijan, and Stalinabad), 1h. (Rathfarnham Castle), 2h. (near Dzhergetal), 3h. (Tashkent, Ili, Kurmenty, Almata II, Samarkand, near Dzhergetal (3), Fergana, Khorog, Obi-garm, Andijan, and Stalinabad), 5h. (Kimberley, La Paz, Terre Adélie, and near Ili), 6h. (Scoresby Sund, Huancayo, Brisbane, Tamanrasset, Ksara, Taranto, Rome, Paris, Kew, near Zürich, near Lenkoran, Gori, Kirovobad, Goris, Tiflis, Nakichevan, Grozny, and near Dzhergetal (2)), 7h. (Puebla, Vera Cruz, near Tacubaya, and near Dzhergetal (2)), 8h. (Santa Clara, near Bogota, Chinchina, and near Manila). 9h. (near Dzhergetal), 10h. (near Algiers Univ. and near Dzhergetal (2)), 11h. (near Alicante, near Messina, and near Bogota) 12h. (Pasadena, Riverside, Palomar, China Lake, Tinemaha, and Lick), 13h. (China Lake, La Paz, and Bogota), 14h. (near Dzhergetal), 15h. (Tamanrasset, Messina, Almata, near Chilisk, Ili, Kurmenty, Almata II, and near Dzhergetal). 16h. (Kiruna, Victoria, and China Lake), 17h. (near Dzhergetal), 18h. (near Dzhergetal, Obi-garm, and Andijan), 19h. (near Almata II), 21h. (near Dzhergetal (3)), 23h. (Apia, Tchimkent, near Dzhergetal, Fergana, Khorog, Obi-garm, Andijan, and Stalinabad).

Aug. 6d. 7h. 28m. 34s. Epicentre 42°·4N. 137°·6E. Depth of focus 0·040.

A = −·5470, B = +·4995, C = +·6718 ; δ = +2 ; h = −3 ;
D = +·674, E = +·738 ; G = −·496, H = +·453, K = −·741.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa	4·2	139	1 9	+ 1	e 1 59	− 3	—	—
Vladivostok	4·3	282	i 1 9	0	i 2 4	0	—	—
Yuzno-Sakhlinsk	5·8	37	1 28	+ 1	2 33	− 2	—	—
Petropavlovsk	17·7	43	e 3 47	− 2	e 6 54	0	—	—
Kabansk	23·0	305	4 39	− 2	—	—	—	—
Chilisk	42·5	293	e 7 30	+ 1	—	—	—	—
Kurmenty	42·8	291	i 7 31	0	—	—	—	—
Ili	43·3	294	i 7 35	0	—	—	—	—
College	46·2	34	i 7 59	+ 1	—	—	—	—
Andijan	47·6	290	8 11	+ 2	—	—	—	—
Fergana	48·3	290	i 8 13	− 1	—	—	—	—
Dzhergetal	49·2	289	e 8 21	0	—	—	—	—
Sverdlovsk	49·2	315	i 8 20	− 1	—	—	—	—
Obi-garm	50·5	290	i 8 30	− 1	—	—	—	—
Samarkand	51·9	292	i 8 42	+ 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		69·8	42	i 10 42	+ 1	—	—	—	—	
Shasta Dam		70·2	52	i 10 45	+ 1	—	—	—	—	
Copenhagen		71·8	330	i 10 53	0	—	—	—	—	
Tinemaha	z.	75·0	53	i 11 13	+ 1	—	—	—	—	
China Lake	z.	76·3	53	i 11 20	+ 1	—	—	e 12 29	pP	
Mount Wilson	z.	77·1	55	e 11 24	+ 1	—	—	—	—	
Boulder City		77·8	52	i 11 28	+ 1	—	—	—	—	
Palomar	z.	78·4	55	e 11 30	0	—	—	—	—	
Stuttgart	z.	78·5	327	e 11 31	0	—	—	—	—	
Tucson		82·8	52	e 11 55	+ 2	—	—	—	—	
Ottawa		87·7	22	i 12 17	0	—	—	—	—	
Harvard		91·5	20	e 12 35	0	—	—	—	—	
Weston		91·7	20	e 12 38	+ 2	—	—	—	—	

Long waves were recorded at Victoria.

Aug. 6d. 8h. 8m. 56s. Epicentre 13°·0N. 87°·8W. Focus at base of superficial layers. (as on 3d.).

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Swan Island	5·7	39	i 1 28	+ 4	e 2 40	+10	—	—	—
Merida	8·1	348	e 2 10	+12	e 3 40	+10	—	—	e 4·3
Balboa Heights	9·0	115	2 3	− 8	e 3 30	−22	—	—	—
Oaxaca	9·5	296	e 2 41	+23	e 4 38	+34	—	—	—
Vera Cruz	10·1	309	e 3 58	?	e 4 57	+38	e 5 31	SS	e 5·9
Puebla	11·6	302	e 3 0	+14	e 5 15	+19	e 5 52	SS	e 6·7
Tacubaya	12·6	302	e 3 16	+16	i 5 54	+34	—	—	6·6
Guantanamo Bay	14·0	59	i 3 8	−10	e 5 56	+ 3	—	—	—
Chinchina	14·4	122	i 3 12	−11	i 5 53	−10	—	—	6·7
Miami	14·7	28	e 2 35	−52	e 5 9	−61	—	—	—
Bogota	15·9	120	i 3 39	− 4	e 6 9	−29	i 3 54	pP	—
San Juan	21·5	74	i 4 40	− 8	e 10 46	?	—	—	—
Columbia	21·8	15	i 4 45	− 6	i 8 57	+12	—	—	—
Fort de France	25·9	84	e 5 26	− 5	i 10 6	+10	—	—	—
Morgantown	27·4	13	e 5 44	0	—	—	e 6 26	sP	—
Washington	27·5	19	e 5 46	+ 1	—	—	e 6 22	sP	—
Huancayo	27·8	155	e 5 47	− 1	—	—	e 5 52	?	—
Tucson	28·5	317	e 5 55	+ 1	—	—	—	—	—
Cleveland	28·9	9	i 5 56k	− 2	e 10 47	+ 2	—	—	—
City College, N.Y.	30·3	22	—	—	e 11 10	+ 3	—	—	e 12·4
Palisades	30·4	22	e 6 12	+ 1	e 11 13	+ 5	—	—	e 17·0
Harvard	32·6	23	e 6 30	− 1	—	—	—	—	—
Weston	32·6	23	e 6 33	+ 2	—	—	—	—	—
Boulder City	33·4	317	i 6 40	+ 2	—	—	—	—	—
Ottawa	33·9	15	e 6 40	− 2	12 14	+11	—	—	—
Riverside z.	34·0	314	e 6 40	− 3	—	—	—	—	—
Pasadena	34·7	314	e 6 51	+ 2	—	—	—	—	e 16·5
China Lake z.	35·1	317	e 6 55	+ 3	—	—	—	—	—
La Paz	35·2	146	8 24	PP	13 31	+68	9 8	PcP	20·1
Shawinigan Falls N.	35·8	18	e 6 58	0	—	—	—	—	—
Tinemaha z.	36·3	318	e 7 5	+ 3	—	—	—	—	—
Seven Falls E.	36·9	19	7 8	+ 1	12 54	+ 4	e 15 10	SS	—
Fresno z.	37·1	316	e 7 14	+ 5	—	—	—	—	—
Lick z.	38·7	316	i 7 26a	+ 4	—	—	i 7 42	pP	—
Hungry Horse	41·4	334	i 7 45	0	—	—	—	—	—
Seattle	44·9	328	e 8 16	+ 3	—	—	—	—	e 28·2
Resolute Bay	61·8	358	10 16	+ 2	18 42	+ 5	—	—	—
College	65·8	337	e 10 41	− 3	—	—	—	—	—
Kew	78·4	40	—	—	e 26 4	SS	—	—	—
Alicante	80·0	53	11 55	−13	—	—	—	—	e 36·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tortosa		80·4	50	—	—	e 22 10	− 2	—	—	e 34·1
Kiruna		84·8	21	—	—	e 22 59	+ 2	e 28 31	SS	e 41·1
Tamanrasset	z.	88·0	67	e 12 44	− 4	—	—	—	—	—
Rome		88·9	47	—	—	e 23 45	+ 9	e 24 41	PS	e 37·2
Taranto		92·8	48	—	—	e 27 21	?	—	—	—

Additional readings :—
Merida e =3m.10s.
La Paz SS =17m.4s.
Lick iZ =7m.29s.
Kiruna eEZ =24m.40s., eN =24m.59s. and 25m.50s., ePKKP?N =30m.32s., eN = 34m.56s., eEN =38m.47s.
Long waves were also recorded at Victoria, Ivigtut, Scoresby Sund, and other European stations.

Aug. 6d. 13h. 10m. 48s. Epicentre 39°·6N. 73°·8E. (as on July 12d.).

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m.	
Andijan	1·6	316	0 30	0	i 0 53	+ 2	—	—
Dzhergetal	2·0	259	i 0 35	0	i 1 1	− 1	—	—
Khorog	2·7	219	e 0 50	+ 5	1 23	+ 4	—	—
Frunse	3·3	10	i 0 59	P*	e 1 45	S_g	—	—
Obi-garm	3·3	254	i 0 58	P*	i 1 43	S*	—	—
Rybach'e	3·3	31	e 1 3	P_g	e 1 30	− 5	i 1 54	S_g
Krasnogorka	3·8	15	e 1 5	P*	e 2 5	S_g	—	—
Lunacharskoe	3·8	298	e 1 12	P_g	e 1 48	+ 1	—	—
Tashkent	3·9	298	e 1 10	P*	e 2 0	S*	—	—
Stalinabad	4·0	257	i 1 13	P*	—	—	i 1 20	P_g
Tchimkent	4·2	312	e 1 6	− 1	i 1 54	− 3	—	—
Almata	4·4	32	e 1 16	P*	i 2 24	S_g	—	—
Ili	5·0	28	e 1 21?	+ 3	i 2 43	S_g	—	—
Samarkand	5·2	273	1 18	− 3	—	—	—	—
Chilisk	5·3	40	i 1 35	P*	e 2 25	0	—	—

Rybach'e gives also eS* =1m.40s.

Aug. 6d. 15h. 10m. 42s. Epicentre 6°·5S. 153°·2E. (as on 1949, October 19d.).

A = −·8870, B = +·4480, C = −·1125 ; δ = +13 ; h = +7 ;
D = +·451, E = +·893 ; G = +·100, H = −·051, K = −·994.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		20·9	181	i 4 46k	0	i 8 39	+ 4	i 5 8	PP	e 11·1
Riverview		27·2	183	i 5 52a	+ 5	i 10 25	0	i 6 33	PP	e 13·4
Auckland	N.	36·1	149	—	—	e 12 54	+ 9	—	—	e 15·7
Wellington		39·6	155	7 40	+ 5	i 13 36	− 2	e 8 54	PP	19·3
Christchurch		40·6	158	7 46	+ 3	e 13 48	− 6	e 9 28	PP	e 19·6
Djakarta	E.	46·1	269	i 9 51	PP	—	—	—	—	—
Nanking		50·4	322	8 58k	− 3	i 16 13	− 1	—	—	—
Vladivostok		53·0	341	e 9 17	− 4	i 16 46	− 4	—	—	—
Petropavlovsk		59·6	3	i 10 6	− 2	—	—	—	—	—
Terre Adélie		60·8	185	e 10 16	0	—	—	—	—	—
Klyuchi		62·9	5	e 10 31	+ 1	—	—	—	—	—
Kabansk		70·5	332	11 16	− 2	e 20 31	− 1	—	—	—
Irkutsk		71·8	331	e 11 23	− 3	e 20 44	− 2	—	—	—
Bombay		83·1	290	—	—	e 22 18?	−30	—	—	—
College		83·3	21	e 12 26	− 4	22 46	− 4	—	—	—
Almata		84·5	315	i 12 34	− 2	i 23 6?	+ 4	—	—	—
Ili		84·6	316	i 12 34	− 2	i 23 2	− 1	—	—	—
Rybach'e		84·9	314	e 12 36	− 2	e 23 8	+ 2	—	—	—
Sitka		85·7	31	e 12 45	− 3	e 23 14	0	—	—	—
Frunse		86·1	314	i 12 42	− 2	e 23 21	+ 3	e 13 19	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		87·3	311	12 48	− 2	i 23 33	+ 4	13 26	pP	—
Fergana		87·7	311	i 12 50	− 2	23 34	+ 1	—	—	—
Obi-garm		89·0	309	e 13 5?	+ 7	—	—	—	—	—
Tchimkent		89·6	313	i 12 58	− 3	i 23 53	+ 2	—	—	—
Stalinabad		89·7	309	i 12 58	− 3	i 23 52	0	—	—	—
Tashkent		89·7	312	i 13 0	− 1	i 23 56	+ 4	e 13 36	pP	—
Berkeley	Z.	89·7	52	e 13 1	0	—	—	—	—	—
Santa Clara	E.	89·8	52	—	—	e 23 57	+ 4	e 25 36	PPS	e 41·1
Shasta Dam		90·0	49	e 13 3	0	—	—	—	—	i 49·9
Lick	Z.	90·1	52	e 13 6k	+ 3	—	—	—	—	—
Victoria		90·4	41	—	—	e 32 54	SSS	—	—	—
Seattle		91·0	42	e 13 10a	+ 3	i 23 59	− 4	i 23 50	SKKS	e 43·3
Samarkand		91·2	310	13 7	− 1	24 5	0	23 36	SKS	—
Fresno	Z.	91·5	53	e 13 10k	0	—	—	—	—	—
Reno	Z.	91·8	51	e 13 12a	+ 1	—	—	e 14 10	?	—
Pasadena		92·5	56	i 13 15	+ 1	e 23 36	[−11]	i 13 40	?	e 38·4
China Lake	Z.	93·1	54	i 13 18	+ 1	—	—	i 13 22	PcP	—
Riverside	Z.	93·1	56	i 13 19	+ 2	—	—	i 13 42	?	—
Palomar	Z.	93·5	57	i 13 22	+ 3	—	—	—	—	—
Boulder City		95·4	54	i 13 29	+ 1	—	—	e 17 18	PP	—
Hungry Horse		96·7	42	i 13 33	0	—	—	e 16 36	?	—
Sverdlovsk		96·8	326	e 13 31	− 3	24 12	[+ 1]	i 17 32	PP	—
Tucson		98·5	58	e 17 42	PP	e 26 38	PPS	—	—	—
Resolute Bay		101·9	15	e 18 6	PP	e 24 35	[− 1]	e 27 8	PS	e 47·7
Baku		104·3	310	e 18 16	[− 6]	—	—	—	—	—
Kirovobad		107·0	311	—	—	e 28 7	PS	—	—	—
Tiflis		108·0	311	e 19 6	PP	—	—	—	—	—
Moscow		109·6	327	e 19 10	PP	28 28	PS	—	—	—
Kiruna		111·1	343	i 18 56	[+21]	e 25 18	[+ 1]	i 19 18	PP	e 50·9
Pulkovo		111·7	333	e 19 22	PP	e 24 55	[−24]	e 21 40	PPP	—
Scoresby Sund		116·0	358	e 19 55	PP	e 29 30	PS	—	—	—
Ksara		116·2	304	e 18 55	[+10]	—	—	i 20 0	PP	—
Kimberley	Z.	119·2	233	i 18 52	[+ 1]	—	—	—	—	—
Lwow		119·5	325	e 18 51	[− 1]	—	—	—	—	—
Istanbul		119·7	314	e 20 15	PP	e 29 57	PS	e 36 24	SS	—
Cleveland		120·4	45	—	—	e 30 9	PS	e 30 12	PS	—
Helwan	Z.	120·8	301	e 20 24	PP	—	—	e 22 40	PKS	—
Uzhgorod		121·1	324	e 19 4	[+ 9]	e 25 56	[+ 2]	—	—	—
Copenhagen		121·9	335	e 18 58	[+ 2]	—	—	—	—	55·3
Morgantown		122·1	48	i 18 58	[+ 1]	—	—	—	—	—
Ottawa		123·0	39	18 58	[0]	—	—	i 19 3	PKP_2	—
Potsdam		123·8	332	i 20 49	PP	e 30 36	PS	e 37 30	SS	e 58·3
Prague		124·6	329	e 20 35	PP	e 31 36	PS	e 23 39	PPP	—
Jena		125·5	331	e 19 4	[+ 1]	e 22 28	PKS	e 20 55	PP	—
Palisades		125·8	43	e 19 4	[0]	—	—	—	—	—
Witteveen	Z.	126·3	336	e 19 5	[0]	—	—	e 20 57	PP	—
Harvard		126·7	40	i 19 6	[0]	—	—	—	—	e 66·2
Weston		126·9	40	i 19 7	[+ 1]	—	—	—	—	—
De Bilt		127·5	336	i 19 10	[+ 3]	e 31 0	PS	i 21 8	PP	e 59·3
Triest		127·6	325	e 19 7	[0]	e 25 50	[−23]	e 21 14	PP	—
Stuttgart		128·1	331	e 19 7	[− 1]	e 28 18	{+10}	e 21 11	PP	e 64·3
Taranto		128·1	318	e 19 38	[+30]	—	—	—	—	—
Huancayo		128·3	111	e 19 12	[+ 3]	—	—	—	—	—
Strasbourg		128·9	332	i 19 10	[0]	e 22 38	PKS	i 21 12	PP	64·3
Kew		130·1	339	e 21 13	PP	e 41 25	?	e 31 25	PS	e 59·3
Pavia		130·4	327	e 21 36	PP	e 31 43	PS	e 22 36	PKS	e 63·9
Rathfarnham Castle		130·4	344	e 21 24	PP	e 22 36	PKS	e 41 18	?	e 62·3
Rome		130·5	322	e 19 16	[+ 3]	e 22 36	PKS	e 21 28	PP	—
Besançon		130·7	331	e 19 14	[+ 1]	—	—	—	—	—
Paris		131·1	335	e 19 13	[− 1]	i 22 39	PKS	i 21 35	PP	e 67·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chinchina		131·4	89	i 19 17	[+ 2]	—	—	i 22 42	PKS	—
La Paz		133·2	120	e 19 28	[+10]	—	—	—	—	—
Tortosa		138·0	328	e 19 55	[+28]	—	—	—	—	e 50·3
San Juan		139·9	69	e 19 23	[− 7]	—	—	i 19 31	PKP	—
Alicante		140·3	327	e 19 28	[− 3]	26 19	[−21]	22 32	PP	e 63·0
Almeria		142·5	327	19 32	[− 3]	22 44	PP	25 46	PPP	69·4
Granada		142·9	329	i 19 59a	[+23]	30 12	(+34)	20 12	PKP_2	69·6
Tamanrasset	z.	144·9	301	i 19 38a	[− 1]	e 23 31	PKS	e 22 55	PP	—
Fort de France		145·3	74	i 19 42	[+ 2]	—	—	—	—	—

Additional readings :—
Brisbane ePE =4m.49s.
Riverview iN =10m.17s. and 10m.47s., iZ =10m.52s.
Wellington i?Z =10m.49s., eSSS =16m.57s.
Christchurch ePPP =10m.10s., sS =13m.58s., eSS =16m.53s.
Frunse esS =24m.26s.
Andijan isS =24m.33s.
Tashkent iSKKS =23m.37s.
Lick iZ =13m.12s. and 13m.45s.
Seattle e =24m.16s., ePS =25m.55s.
Sverdlovsk PS =26m.13s., SS =31m.36s., SSS =35m.42s.
Resolute Bay eEN =32m.54s., eN =36m.24s., eE =37m.24s.
Kiruna ePKP?N =19m.4s., ePKP?E =19m.10s., ePKS?EN =22m.5s., iSKKSEN = 26m.14s., iPS =28m.40s., ePPS?NZ =29m.55s., ePPS?E =30m.0s., eSS =34m.16s., eEN =36m.11s., eSSSE =38m.58s., eQEN =45·1m.
Istanbul eE =24m.58s.
Helwan eZ =23m.3s.
Potsdam ePPSZ =32m.0s.
Prague ePP =20m.47s., e =21m.14s., 21m.56s., and 22m.57s., eSS =38m.0s.
Triest e =29m.42s.
Stuttgart eZ =19m.13s., ePPZ =21m.17s., eZ =21m.34s., ePS =31m.24s., ePPS = 32m.18s.
Strasbourg i =19m.15s., ePP? =21m.20s., eSKP =22m.44s., e =30m.44s., ePPS = 32m.48s., e =33m.39s., eSS =38m.16s., e =41m.18s.
Kew e =22m.37s. and 23m.14s.
Pavia e =24m.6s. and 39m.3s.
Rome eSS?N =38m.58s.
Paris ePKP =19m.20s., e =19m.46s. and 21m.15s., ePPP =24m.17s., ePS =31m.45s., e =35m.21s. and 36m.41s., eSS =38m.41s., ePSS =39m.9s.
Alicante PPP =25m.27s., PPS =33m.54s., SSP =39m.54s., Q =55m.46s.
Granada iPP =23m.3s., SKSP =32m.51s.
Tamanrasset eZ =25m.18s., ePPPZ =26m.16s.
Long waves were also recorded at Perth.

Aug. 6d. Readings also at 0h. (Ksara), 2h. (Tortosa, Tchimkent, near Andijan, Dzhergetal, Obi-garm, Samarkand, and near Stalinabad). 5h. (Apia), 6h. (near Manila), 9h. (Seattle, China Lake, near Haiwee, Pasadena, Santa Barbara, Tinemaha, near Oaxaca, Puebla, Tacubaya, Vera Cruz, and near Dzhergetal), 10h. (Mount Wilson, Riverside, China Lake, Seattle, Victoria, Tamanrasset, Brisbane, Copiapo, La Paz (2), and near Antofagasta), 11h. (Pasadena, Riverside, China Lake, Tinemaha, and Tamanrasset), 12h. (Apia), 13h. (near Santa Clara (2)), 14h. (Apia), 16h. (Palomar, Pasadena, Riverside), Tucson, Boulder City, Hungry Horse, College, Ili, Krasnogorka, Stalinabad, Tashkent, near Almata, Andijan, Chilisk, Dzhergetal (2), Fergana, Frunse, Kurmenty, Przhevalsk, Rybach'e, near Santa Lucia, near Puebla, Tacubaya, Manzanillo, and Guadalajara), 17h. (China Lake, Tinemaha, Fresno, Lick, Reno, Harvard, Weston, Tacubaya, and Vera Cruz), 18h. (Almata II, Dzhergetal, Frunse, Ili, Khorog, Kurmenty, Przhevalsk, Ryabach'e, Samarkand, near Andijan, Fergana, Lunacharskoe, Obi-garm, and Tashkent), 19h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Lick, Reno, Huancayo, Bogota, Chinchina, La Paz, Tamanrasset, and near Obi-garm), 21h. (Scoresby Sund and near Tacubaya), 23h. (Palisades, Shawinigan Falls, near Ottawa, near Tacubaya, near Andijan, Dzhergetal, and Obi-garm).

Aug. 7d. 12h. 2m. 28s. Epicentre 41°·3N. 143°·1E. (as on 1951, May 24d.).

Intensity IV at Muroran, Hiroo, Misawa, Shichinohe, and Yasumiya ; II-III at Urakawa, Hatinohe, Aomori, Kenebetsu, and Sannohe.
Epicentre 41°·5N. 142°·4E.
Seismological Bulletin of the Central Meteorological Observatory, Japan, for August, 1951, Tokyo, 1951, p. 191, with macroseismic chart.

$A = -·6026$, $B = +·4524$, $C = +·6575$; $\delta = +10$; $h = -2$;
$D = +·600$, $E = +·800$; $G = -·526$, $H = +·395$, $K = -·753$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Urakawa		0·9	344	0 19	− 1	0 31	− 3	—	—
Hatinohe		1·4	237	0 21k	− 6	0 36	−10	—	—
Obihiro		1·6	3	0 38	+ 8	0 54	+ 3	—	—
Aomori		1·8	255	0 28	− 4	0 50	− 6	—	—
Kusiro		1·9	29	0 33	− 1	—	—	—	—
Miyako		1·9	207	0 29?	− 5	0 50?	− 9	—	—
Muroran		1·9	303	0 28	− 6	0 47	−12	—	—
Mori		2·1	293	0 30	− 7	0 53	−11	—	—
Morioka		2·2	223	0 35	− 3	0 59	− 7	—	—
Sapporo		2·2	324	0 34k	− 4	0 51	−15	—	—
Asahigawa		2·5	348	0 53	+10	—	—	—	—
Mizusawa		2·6	215	e 0 42	− 2	1 10	− 7	0 45	P
Suttsu		2·6	305	0 38	− 6	1 16	− 1	—	—
Akita		2·8	235	0 43	− 4	1 15	− 7	—	—
Sendai		3·5	210	0 53	− 4	1 39	− 1	—	—
Yamagata		3·7	216	1 7	+ 7	—	—	—	—
Hukusima		4·1	211	1 10	+ 5	1 50	− 5	—	—
Inawasiro		4·4	213	1 10	0	2 4	+ 2	—	—
Niigata		4·6	224	1 38	P_g	—	—	—	—
Onahama		4·7	202	1 29	P_g	2 18	+ 8	—	—
Shirakawa		4·7	209	1 20	+ 6	2 9	− 1	—	—
Aikawa		4·9	231	1 13	− 4	—	—	—	—
Mito		5·3	204	1 56	P_g	—	—	—	—
Utunomiya		5·4	209	1 27	+ 3	2 20	− 8	—	—
Tukubasan		5·6	206	0 54	−33	1 55	−38	(1 55)	P_g
Maebasi		5·8	214	1 31	+ 2	2 40	+ 2	—	—
Kumagaya		5·9	211	1 36	+ 5	2 43	+ 3	—	—
Matusiro		6·0	220	1 41	+ 9	—	—	—	—
Nagano		6·0	221	1 33	+ 1	2 41	− 2	—	—
Titibu		6·1	212	1 52	P*	—	—	—	—
Tokyo		6·2	206	1 44	+ 9	2 44	− 4	—	—
Wazima		6·2	233	1 33	− 2	—	—	—	—
Hunatu		6·7	212	1 42	0	3 3	+ 3	—	—
Kohu		6·7	213	1 32	−10	—	—	—	—
Mera		6·9	203	—	—	3 7	+ 2	—	—
Misima		7·0	209	1 52	+ 6	—	—	—	—
Osima		7·1	205	2 23	P_g	—	—	—	—
Shizuoka		7·3	212	2 44	?	—	—	—	—
Gihu		7·7	222	2 1	+ 5	—	—	—	—
Nagoya		7·8	220	2 22	P*	—	—	—	—
Tsuruga		7·8	227	1 12	−46	—	—	—	—
Tinemaha	z.	72·3	56	e 11 28	− 1	—	—	—	—
China Lake	z.	73·5	57	e 11 31	− 5	—	—	e 11 46	PcP
Stuttgart	z.	81·5	331	e 12 12	− 9	—	—	e 12 30	PcP

Aug. 7d. Readings also at 0h. (near Andijan), 1h. (near Obi-garm, Stalinabad, Dzhergetal, Samarkand, and near Tananarive), 2h. (Sverdlovsk, Krasnogorks, Andijan, Fergana, Dzhergetal, Khorog, Tashkent, Obi-garm, Stalinabad, Samarkand, Frunse, Przhevalsk, Almata II, Almata, and Ili), 3h. (Kimberley and near Dzhergetal), 4h. (Huancayo, Bogota, Chinchina, La Paz, Morgantown, Palisades, San Juan, Tucson, Boulder City, Butte, Shasta Dam, Hungry Horse, Palomar, Riverside, Harvard, Pasadena, Fresno, Lick, Berkeley, Reno, China Lake, Tinemaha, Shawinigan Falls, Ottawa, and College), 5h. (Mount Wilson, Riverside, China Lake, San Juan, Tucson, Boulder City, Hungry Horse, College, Tinchama, Reno, Bogota, La Paz, near Huancayo, Samarkand, Frunse, near Dzhergetal, Fergana, Obi-garm, Andijan, Tashkent, and Tchimkent), 8h. (near Apia), 10h. (Przhevalsk, Almata, Almata II, Ili, Rybach'e, Frunse, Andijan, Dzhergetal, Obi-garm, Tchimkent, Stalinabad, Tashkent, Samarkand, and Apia), 11h. (Auckland, Christchurch, Wellington, and Apia), 12h. (near Dzhergetal and near Tananarive), 13h. (near Dzhergetal), 15h. (La Paz, Apia, and near Manila), 16h. (Kimberley, and near Alicante (2)), 17h. (near Manila), 18h. (Apia), 19h. (Krasnogorka, Almata, Przhevalsk, Kurmenty, Ili, near Dzhergetal, Fergana, Khorog, Obi-garm, Stalinabad, Lunacharskoe, Tashkent, Tchimkent, Samarkand, Frunse, and Rybach'e), 20h. (Mizusawa), 21h. (Timisoara, near Kurmenty, Almata II, and Ili), 22h. (Strasbourg), 23h. (Tacubaya and near Dzhergetal).

Aug. 8d. 8h. 40m. 35s. Epicentre 35°·9N. 31°·1E. (as on 1948, April 30d.).

A = +·6952, B = +·4194, C = +·5838 ; δ = +2 ; h = 0 ;
D = +·517, E = −·856 ; G = +·500, H = +·302, K = −·812.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		4·4	117	e 1 12	+ 2	i 2 0	− 2	—	—	—
Istanbul		5·4	343	e 1 21	− 3	e 2 19	− 9	e 1 51	P_g	—
Helwan	z.	6·0	178	1 33	+ 1	2 40	− 3	—	—	—
Yalta		8·9	14	2 9	− 3	3 52	− 3	—	—	—
Bucharest		9·3	338	e 2 19	+ 2	e 4 22	SSS	—	—	5·4
Tiflis		12·1	57	e 2 54	− 3	—	—	—	—	—
Timisoara		12·3	326	—	—	5 55	SSS	—	—	—
Goris		12·6	69	e 3 4	+ 1	5 28	+ 2	—	—	—
Kirovobad		12·9	63	3 5	− 2	—	—	—	—	—
Uzhgorod		14·3	336	e 3 29	+ 3	—	—	—	—	—
Lenkoran		14·4	73	e 3 36	+ 9	—	—	—	—	—
Lwow		14·8	342	e 3 38	+ 6	e 6 25	+ 7	—	—	—
Zürich		20·3	312	e 4 43	+ 3	—	—	—	—	—
Stuttgart		20·6	317	e 4 38	− 5	e 8 31	+ 2	e 4 54	PP	12·7
Strasbourg		21·3	316	e 4 57	+ 7	—	—	e 5 29	PPP	—
Besançon		21·8	310	e 4 54	− 2	e 5 8	PP	e 5 26	PPP	—
Algiers Univ.	z.	22·6	280	e 5 2	− 1	—	—	—	—	—
Tamanrasset	z.	25·8	247	i 5 35a	+ 1	e 7 3	?	e 5 49	?	—

Additional readings :—
Istanbul eP*Z = 1m.32s., eSE = 2m.41s., eS_gEN = 2m.59s.
Helwan eZ = 2m.21s., S*Z = 3m.11s.
Long waves were also recorded at Potsdam.

Aug. 8d. 20h. 56m. 31s. Epicentre 42°·6N. 13°·5E. (as on 1950, Sept. 5d.).

Felt in the provinces of Teramo, Aquila, Ascoli Piceno, Terni, Ricti, and Rome; some damage in central Italy. Epicentre as adopted. Energy 10^{22}ergs.
Monthly Bulletin of the I.G.N., Rome, Aug., 1951, p.7.

$A = +\cdot7180$, $B = +\cdot1724$, $C = +\cdot6744$; $\delta = +6$; $h = -3$;
$D = +\cdot233$, $E = -\cdot972$; $G = +\cdot656$, $H = +\cdot157$, $K = -\cdot738$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rocca di Papa		1·0	214	i 0 20 a	− 1	i 0 35	− 1	—	—	—
Rome		1·0	230	i 0 17 a	− 4	i 0 32	− 4	—	—	—
Prato		2·2	306	i 0 35	− 3	i 1 2	− 4	—	—	—
Bologna		2·5	323	i 0 46 a	+ 3	e 1 10	− 4	e 1 23	S_g	—
Triest		3·1	3	i 0 50	− 1	i 1 33	+ 4	e 1 41	S_g	—
Taranto		3·5	126	0 48	− 9	e 1 54	S_g	i 3 4	?	—
Salo		3·7	325	e 1 5k	+ 5	i 1 47	+ 2	i 1 18	P_g	—
Pavia		4·1	311	e 1 6	+ 1	e 1 53	− 2	e 1 21	P_g	e 2·2
Messina	z.	4·7	160	i 1 13k	− 1	i 2 8	− 2	i 1 28	P*	—
Belgrade		5·5	65	e 1 38 a	P*	e 2 39	+ 9	e 1 53	P_g	—
Kalossa		5·5	43	e 2 4	?	i 2 29?	− 1	i 2 56	S_g	3·2
Ravensburg		5·9	332	e 1 31?	0	2 59	S*	e 1 46	P*	—
Zürich		5·9	325	e 1 29k	− 2	e 2 40	0	—	—	—
Vienna		6·0	19	e 1 34	+ 2	e 2 43	0	—	—	—
Kecskemet		6·1	44	e 2 24	?	e 2 48	+ 3	3 20	S_g	—
Ogyalla		6·2	31	e 1 55	P*	e 2 46	− 2	2 5	P_g	—
Budapest		6·3	37	2 13	P_g	i 2 57	+ 7	3 11	S*	3·5
Ebingen		6·4	332	e 2 9?	P_g	e 3 9	S*	—	—	—
Neuchatel		6·4	315	e 1 37	− 1	e 2 50	− 3	—	—	—
Timisoara		6·4	58	e 1 45?	+ 7	e 3 18	S*	i 2 12	P_g	e 4·5
Basle		6·5	321	e 1 38	− 1	e 2 43	−12	e 1 42	P	—
Stuttgart		6·9	335	e 1 42	− 3	e 3 1	− 4	e 2 19	P_g	e 4·5
Besançon		7·1	314	e 1 45	− 3	i 3 12	+ 2	i 3 35	S*	—
Sofia		7·2	86	1 53	+ 4	e 3 7	− 6	e 2 23	P_g	i 4·3
Strasbourg		7·2	328	i 1 48k	− 1	e 3 3	−10	e 2 21	P_g	5·0
Karlsruhe		7·3	333	e 1 47	− 3	e 3 19	+ 4	e 2 25	P_g	e 4·7
Cheb		7·5	355	e 2 10	P*	e 3 30	+10	e 3 40	S*	—
Prague		7·5	5	e 1 53	0	e 3 19	− 1	e 2 33	P_g	—
Clermont-Ferrand		8·1	296	i 2 1	− 1	—	—	—	—	—
Skalnate Pleso		8·1	33	e 1 44	−18	—	—	e 1 56	P	—
Raciborzu		8·2	22	e 2 7	+ 4	e 3 45	+ 7	e 2 14	PP	—
Jena		8·4	352	e 2 7	+ 1	e 3 46	+ 3	i 4 42	S_g	—
Uzhgorod		8·6	43	e 2 12	+ 3	—	—	—	—	—
Athens		9·1	117	e 2 15 a	+ 1	i 3 57	− 3	e 3 54	?	—
Bucharest		9·3	75	e 2 22	+ 5	e 4 10	+ 5	—	—	—
Potsdam		9·8	358	—	—	e 4 29	SS	i 5 26	S_g	e 5·5
Algiers Univ.	z.	9·9	237	e 2 23	− 2	e 4 27	+ 7	—	—	—
Paris		9·9	313	e 2 26	+ 1	i 4 18	− 2	e 4 31	SS	e 6·3
Tortosa		9·9	264	e 2 35	PP	i 5 49	L	—	—	(i 5·8)
Lwow		10·3	42	i 2 34	+ 2	e 4 34	+ 4	—	—	—
De Bilt		11·0	332	—	—	e 4 47	0	—	—	e 6·0
Witteveen	z.	11·2	338	e 3 3	PP	e 5 26	SSS	—	—	e 6·0
Alicante		11·5	253	e 2 47	− 1	5 29	SSS	3 4	PP	e 6·5
Kishinev		11·7	63	2 53	+ 2	5 14	+10	—	—	—
Istanbul		11·7	92	e 2 50	− 1	e 5 5	+ 1	—	—	e 5·8
Jersey	E.	12·7	307	e 3 1	− 4	—	—	—	—	—
Kew		12·9	318	i 3 6	− 1	e 5 40	+ 7	—	—	e 8·5
Copenhagen		13·1	357	e 3 11	+ 1	5 59	SSS	—	—	7·0
Almeria		13·5	250	i 3 15	0	6 7	SS	3 31	PP	8·0
Toledo		13·5	264	i 3 12	− 3	—	—	—	—	e 7·3
Granada		14·2	253	i 3 22 a	− 2	5 38	−26	—	—	7·2
Malaga		15·0	253	i 3 41	+ 6	e 5 52	−31	—	—	8·9
Yalta		15·1	76	3 35	− 1	—	—	—	—	—
Rathfarnham C.	z.	17·0	317	i 3 31?	−30	—	—	—	—	—
Upsala		17·5	5	i 3 55k	−12	7 42	SS	—	—	e 9·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Helwan	z.	19·1	126	4 33	+ 6	8 15	SS	5 2	PPP		—
Ksara		19·6	109	i 4 33	+ 1	e 8 17	+ 9	—	—		—
Pulkovo		20·1	25	e 4 39	+ 1	e 8 18	− 1	—	—		—
Moscow		20·4	41	e 4 40	− 1	e 8 26	+ 1	—	—		—
Tamanrasset	z.	20·8	201	i 4 44 a	− 1	e 8 14	−19	e 5 1	PP		—
Tiflis		22·1	81	e 5 10	+11	—	—	—	—		—
Gori		22·6	81	5 5?	+ 2	—	—	—	—		—
Leninakan		22·7	83	e 5 20?	PP	—	—	—	—		—
Erevan		23·3	85	e 5 14	+ 4	9 33	+13	—	—		—
Kirovobad		24·5	82	5 27	+ 5	9 48	+ 8	—	—		—
Goris		24·9	85	e 5 29	+ 3	9 55	+ 8	—	—		—
Kiruna		25·6	7	i 5 32	0	e 10 8	+ 9	e 11 18	SS		e 13·5
Shemakha		26·2	80	e 5 59	+21	—	—	—	—		—
Sverdlovsk		32·9	48	i 6 37	− 1	11 55	− 1	—	—		—
Ashkabad		34·2	82	e 6 53	+ 4	—	—	—	—		—
Samarkand		39·8	76	7 37	+ 1	e 13 41?	− 1	—	—		—
Tchimkent		40·7	70	e 7 46	+ 2	—	—	—	—		—
Tashkent		40·9	72	7 48	+ 2	—	—	—	—		—
Stalinabad		41·6	76	e 7 51	0	—	—	—	—		—
Dzhergetal		43·0	73	e 8 4	+ 1	—	—	—	—		—
Andijan		43·2	72	e 8 6	+ 2	—	—	—	—		—
Frunse		44·0	68	e 8 13	+ 2	—	—	—	—		—
Ili		45·3	65	8 25	+ 4	—	—	—	—		—
Almata		45·4	66	i 8 25	+ 3	—	—	—	—		—
Almata II		45·7	66	e 8 28	+ 4	—	—	—	—		—
Przhevalsk		46·7	67	i 8 35	+ 3	—	—	—	—		—
Kimberley	z.	71·8	170	i 11 23	− 3	—	—	—	—		—

Additional readings :—
Bologna iZ = 53s., e = 58s.
Triest iP_g = 1m.8s., e = 1m.45s., iS_gS_g? = 1m.49s.
Salo iN = 1m.40s.
Pavia e = 1m.33s. and 2m.5s.
Messina iZ = 1m.45s., e = 3m.2s., i = 3m.23s.
Belgrade eP*NW = 1m.41s., iS_gNE = 2m.47s., iNE = 3m.14s., iNW = 3m.27s., iNE = 3m.32s.
Ravensburg e = 1m.39s., 2m.9s., 2m.51s., and 3m.36s.
Kecskemet S*N = 3m.36s.
Ogyalla e = 2m.23s., 2m.36s., and 2m.55s., eS* = 3m.13s., eS_g = 3m.28s., e = 3m.44s., eE = 3m.59s., eN = 4m.8s.
Budapest S?E = 3m.25s.
Timisoara iSE = 3m.37s., iS*N = 4m.22s.
Stuttgart eZ = 1m.47s., 1m.54s., 2m.0s., and 2m.9s., eS = 2m.58s., e = 3m.15s. and 3m.19s.
Besançon i = 1m.56s., iP* = 2m.0s., e = 2m.9s., iP_g = 2m.18s., i = 2m.32s., iS = 2m.54s., i = 3m.4s., e = 3m.19s., i = 4m.0s.
Sofia eEN = 2m.11s. and 2m.32s., eSEN = 3m.26s., eEN = 3m.54s.
Strasbourg i = 1m.56s., eP* = 2m.0s., eP_g = 2m.13s., e = 2m.56s. and 3m.21s., iS* = 3m.36s., eS* = 3m.43s., iS_g = 3m.55s., e = 4m.9s., 4m.12s., and 4m.21s.
Karlsruhe eZ = 1m.58s., 2m.34s., and 2m.55s., eSEN = 2m.58s., eEZ = 3m.22s., eEN = 3m.34s., eE = 4m.15s.
Cheb eP_g = 2m.40s., eS_g = 4m.18s.
Prague i = 2m.0s., iP*? = 2m.19s., eP_g = 2m.40s., i = 2m.51s. and 2m.57s., e = 3m.4s., 3m.25s. and 3m.37s., iS*? = 3m.48s., e = 4m.4s., eS_g = 4m.18s.
Skalnate Pleso e = 2m.51s., 3m.6s., 3m.12s., 4m.16s., and 4m.51s.
Raciborzu ePE = 2m.10s., eSSSE = 4m.4s., eS_gN = 4m.41s., iE = 4m.47s., iZ = 4m.55s., iE = 5m.43s., iZ = 6m.1s., iN = 6m.15s., iPcPN = 8m.34s., eEN = 12m.1s., eN = 15m.47s.
Jena eP*?N = 2m.31s., eP_g?N = 2m.48s., eN = 3m.22s., SN = 3m.37s., eN = 4m.14s., eE = 4m.18s., iE = 4m.57s., 5m.3s., and 5m.16s., iN = 5m.19s.
Potsdam eZ = 4m.35s., e = 5m.4s.
Algiers Univ. eZ = 2m.56s. and 3m.15s., eSZ = 3m.50s., eZ = 4m.6s.
Paris e = 2m.31s., iPP = 2m.38s., iPPP = 2m.44s., i = 2m.48s., iP* = 2m.54s., i = 3m.2s. and 3m.10s., iP_g? = 3m.19s., i = 3m.33s., and 4m.8s., iSSS = 4m.44s., iS* = 4m.49s., iS_g = 5m.29s.
Alicante PPP = 3m.14s., SSS = 6m.0s.
Jersey eE = 1m.49s. and 2m.22s.
Kew eZ = 7m.1s., eS = 7m.23s.
Tamanrasset iZ = 4m.48s. and 4m.53s., ePPPZ = 5m.11s.
Kiruna ePPP?N = 6m.37s., eN = 10m.24s., eEN = 13m.6s.
Long waves were also recorded at Barcelona, Aberdeen, Helsinki, Seattle, Scoresby Sund, and Bermuda.

Aug. 8d. 22h. 28m. 26s. Epicentre 44°·5N. 129°·7W. (as on 1951, June 17d.).

A = −·4571, B = −·5506, C = +·6985 ; δ = 0 ; h = −3 ;
D = −·769, E = +·639 ; G = −·446, H = −·537, K = −·716.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Arcata		5·5	129	e 1 34	+ 9	e 3 10	?	—	—	—
Victoria		5·9	45	e 1 34	+ 3	—	—	—	—	e 3·0
Seattle		6·0	56	e 1 44	PP	e 2 52	SS	i 1 53	?	e 3·5
Shasta Dam		6·6	122	e 1 34	− 7	e 2 42	−16	—	—	—
Berkeley		8·7	137	e 2 14	+ 4	e 3 28	−22	1 35k	?	e 4·1
Santa Clara	E.	9·2	138	e 3 0	?	e 3 52	−11	—	—	e 5·1
Lick	Z.	9·4	137	i 2 15k	− 3	—	—	—	—	—
Fresno	Z.	10·8	132	e 2 27	−12	—	—	e 3 22	?	—
Tinemaha	Z.	11·4	126	e 2 47	0	—	—	—	—	—
Hungry Horse		11·5	65	e 2 47	− 1	—	—	—	—	—
Butte		12·2	77	e 2 54	− 4	—	—	—	—	—
China Lake	Z.	12·7	129	e 2 57	− 8	e 3 18	?	i 3 2	P	—
Pasadena		13·6	135	e 3 17	0	—	—	e 3 22	PP	e 6·2
Boulder City		14·2	122	e 3 20	− 4	—	—	i 3 31	PP	—
Riverside	Z.	14·2	133	e 3 23	− 1	—	—	—	—	—
Palomar	Z.	14·9	134	e 3 27	− 7	—	—	i 3 34	P	—
Tucson		19·1	124	e 4 23	− 4	e 8 8	+11	—	—	—
College		22·8	340	e 5 21	+16	—	—	—	—	—
Cleveland		35·0	78	e 6 58 a	+ 2	e 11 29	−59	—	—	—
Morgantown		36·8	81	e 7 12	+ 1	—	—	e 8 38	PP	—
Ottawa		37·6	69	7 21	+ 3	13 12	+ 4	8 51	PP	18·6
Seven Falls	E.	40·3	65	—	—	13 51	+ 2	—	—	20·8
Reykjavik		57·9	30	i 10 15	+19	—	—	—	—	—

Seattle gives also other unidentified readings.
Long waves were also recorded at Palisades, Weston, and Bombay.

Aug. 8d. Readings also at 1h. (Seattle), 3h. (Apia (2), near Almata II, and near Dzhergetal), 4h. (near Khorog and Dzhergetal), 5h. (Stalinabad, Andijan, Tchimkent, and near Obi-garm), 8h. (Prague), 9h. (Huancayo, Palisades, La Paz, near Ottawa, Shawinigan Falls, and Seven Falls), 11h. (near Dzhergetal), 12h. (Scoresby Sund, Pasadena, Riverside, Palomar, China Lake, Tinemaha, Lick, Fresno, Mineral, La Paz, Santa Clara, Horseshoe Bay, Shasta Dam, Hungry Horse, Butte, Boulder City, College, Tucson, Morgantown, Ottawa, Victoria, near Seattle, and near Yalta), 13h. (Palisades, near Istanbul, near Dzhergetal, and near Mizusawa), 14h. (Nanking, Zi-ka-wei, Djarkarta, Hungry Horse, Shasta Dam, College, Tucson, Palisades, China Lake, Pasadena, Horseshoe Bay, Victoria, Seattle, and near Kurmenty), 16h. (Apia and near Santa Clara), 17h. (Tamanrasset), 18h. (Kimberley, Tamanrasset, and Ksara), 19h. (Dzhergetal, Morgantown, China Lake (2), Tinemaha, Lick, near Apia, College, Philadelphia, Hungry Horse, Tucson, Miami, San Juan, and near Swan Island), 20h. (Apia and near Manila), 21h. (Rocca di Papa and near Roma), 22h. (near Rocca di Papa (2) and Rome (2)), 23h. (Victoria, Seattle, and near Rome).

Aug. 9d. Readings at 0h. (Ksara and Prague), 1h. (Apia (2) and Tacubaya), 4h. (Rome and near Dzhergetal), 5h. (Rome, Mount Wilson, Riverside, Palomar, China Lake, Tinemaha, Lick, Santa Lucia, La Paz, Copiapo, and near Antofagasta), 6h. (Manila), 8h. (Dehra Dun (2) and Apia), 9h. (Dehra Dun), 10h. (near Dzhergetal and near Manila (3)), 11h. (Apia, near Manila (2), and near Mizusawa), 12h. (near Khorog, Obi-garm, and Dzhergetal), 14h. (Rome), 15h. (Besançon, Paris, Stuttgart, Obi-garm, Samarkand, Tchimkent, near Dzhergetal (2), Fergana, Khorog, Stalinabad, Andijan, and near Apia), 16h. (Strasbourg), 17h. (Apia, near Alicante, and near Dzhergetal), 20h. (Horseshoe Bay), 22h. (Kimberley and Dzhergetal), 23h. (Kimberley, Strasbourg, and Dzhergetal).

Aug. 10d. 0h. 5m. 24s. Epicentre 14°·0S. 77°·0W. (as on 1942, July 21d.).

Intensity IV-V at Pisco, Paracas, and Cerro Azul ; IV at Cañete ; III-IV at Chincha and Ica ; III at Nasca and Mala.

E. Silgado.
Datos Sismologicos del Peru, 1951, Boletin No. 8, Lima, Peru, 1953, p. 16.

$A = +·2184$, $B = -·9458$, $C = -·2404$; $\delta = +3$; $h = +6$;
$D = -·974$, $E = -·225$; $G = -·054$, $H = +·234$, $K = -·971$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		2·5	40	i 0 45	+ 2	—	—	—	—	i 1·4
La Paz		8·9	108	i 2 12	0	i 3 54	− 1	i 2 28	PPP	4·3
Bogota		18·7	9	e 4 29	+ 7	e 7 54	+ 6	e 4 44	PP	—
Chinchina		18·9	6	(i 4 27?)	+ 3	(i 7 50)	− 3	(i 4 43)	PP	—
Galerazamba		24·7	5	e 5 56	PP	e 9 56	+12	—	—	—
San Juan		33·9	18	e 6 44	− 3	—	—	—	—	—
Washington		52·6	0	i 9 19	+ 1	—	—	—	—	—
Morgantown		53·4	357	i 9 21	− 3	—	—	—	—	—
Tucson		56·2	325	i 9 46	+ 2	—	—	—	—	—
Weston		56·3	5	i 9 43	− 2	—	—	—	—	—
Harvard		56·4	5	i 9 44	− 1	—	—	—	—	—
Ottawa		59·1	2	i 10 2	− 2	—	—	—	—	—
Shawinigan Falls	N.	60·4	4	e 10 11	− 2	—	—	—	—	—
Palomar	Z.	60·5	322	i 10 16a	+ 2	—	—	e 10 30	?	—
Boulder City		61·2	326	i 10 20	+ 1	e 15 43	ScP	—	—	—
Riverside	Z.	61·3	322	i 10 21a	+ 1	—	—	e 10 21	pP	—
Pasadena	Z.	61·9	322	i 10 25a	+ 1	—	—	e 10 36	pP	—
China Lake		62·7	323	i 10 30a	+ 1	—	—	e 10 41	pP	—
Tinemaha	Z.	64·0	323	i 10 38a	0	—	—	e 10 47	pP	—
Fresno	Z.	64·6	322	e 10 40	− 1	—	—	—	—	—
Lick	Z.	66·1	322	i 10 53a	+ 2	—	—	i 11 6	?	—
Reno	Z.	66·5	325	e 10 56	+ 2	—	—	—	—	—
Butte		67·8	334	i 11 3	+ 1	—	—	i 11 16	?	—
Mineral	Z.	68·1	324	e 11 5	+ 1	—	—	—	—	—
Shasta Dam		68·8	324	i 11 7	− 1	—	—	—	—	—
Hungry Horse		70·3	335	i 11 17	0	—	—	—	—	—
Tamanrasset	Z.	88·6	66	e 12 56k	0	e 16 26	PP	e 13 10	?	—
College		94·7	336	13 24	0	—	—	—	—	—

Additional readings and note :—
Chinchina readings have been increased by 3 minutes.
Riverside eZ = 10m.37s.
China Lake iZ = 10m.47s.

Aug. 10d. 5h. 32m. 31s. Epicentre 8°·9N. 39°·8W. (as on 1949, April 8d.).

$A = +·7592$, $B = -·6325$, $C = +·1537$; $\delta = +6$; $h = +7$;
$D = -·640$, $E = -·768$; $G = +·118$, $H = -·098$, $K = -·988$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France	21·7	287	i 4 53	− 2	i 9 1	+10	—	—	e 11·3
San Juan	27·2	294	i 5 45	− 2	e 10 26	+ 1	e 6 11	PP	—
Bermuda	32·8	319	i 6 41	+ 4	i 11 59	+ 5	i 7 48	PP	e 13·7
Bogota	34·3	266	i 6 50	0	i 12 21	+ 4	i 6 59	?	e 16·8
Chinchina	35·8	267	(i 6 58?)	− 5	(i 12 39)	− 2	(i 8 17)	PP	(17·1)
La Paz	37·7	228	i 7 17a	− 2	i 13 15	+ 5	i 8 45	PP	18·5
Huancayo	41·0	240	e 7 45	− 1	e 14 9	+10	e 9 25	PP	e 16·8
Halifax	41·1	335	—	—	e 14 5	+ 4	e 16 59	SS	—
Miami	42·0	299	e 8 7	+13	e 13 39	PcS	—	—	—
Granada	43·2	43	i 8 11a	+ 7	i 14 38	+ 6	9 56	PcP	i 22·0
Weston	43·3	326	e 8 13	+ 8	e 14 33	0	—	—	—
Harvard	43·6	326	e 8 9	+ 1	i 14 39	+ 1	—	—	e 18·5
Swan Island	43·7	286	i 8 4	− 4	e 13 22	?	9 38	PP	—
Almeria	43·8	44	i 8 9	0	i 14 59	+19	9 53	PP	23·8
Fordham	43·9	323	e 8 12	+ 2	i 14 48	+ 6	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palisades		44·0	323	i 8 14a	+ 3	i 14 41	− 2	—	—	e 20·2
Toledo		44·3	40	i 8 16	+ 3	e 14 58	+10	e 10 7	PP	19·3
Washington		44·8	319	e 8 20	+ 3	e 15 7	+12	—	—	—
Tamanrasset	Z.	45·5	66	e 8 22	− 1	e 14 57	− 8	e 10 6	PP	—
Alicante		45·9	43	8 30	+ 4	e 15 12	+ 1	10 20	PP	e 21·8
Seven Falls	E.	46·3	331	e 8 26	− 3	15 24	+ 8	18 24	ScS	23·5
La Plata		46·8	200	—	—	15 23	− 1	18 47	SS	23·8
Shawinigan Falls	N.	46·9	329	e 8 35	+ 1	—	—	i 8 43	?	—
Morgantown		47·1	316	e 8 36	+ 1	—	—	e 9 22	?	—
Algiers Univ.	Z.	47·7	47	i 8 41k	+ 1	e 10 28	PP	i 8 49	?	—
Ottawa		47·7	327	e 8 39	− 1	15 39	+ 3	10 6	PcP	21·8
Tortosa		47·8	41	—	—	i 15 42	+ 4	—	—	—
Cleveland		49·0	319	i 8 50k	0	e 15 57	+ 2	e 11 35	PP	—
Cincinnati		50·0	314	9 1	+ 3	i 16 9	C	—	—	e 24·3
Jersey	E.	51·0	31	—	—	16 49	PPS	—	—	—
Clermont-Ferrand		51·9	38	9 17	+ 5	—	—	—	—	—
Rathfarnham Castle		51·9	24	i 9 10	− 2	e 16 30	− 5	e 19 49	SS	e 22·5
Paris		53·2	34	e 9 27	+ 5	i 16 59	+ 7	e 10 31	PcP	e 23·5
Kew		53·3	30	e 9 24	+ 1	i 17 2	+ 8	e 12 21	PPP	e 23·5
St. Louis		54·0	312	e 9 25	− 3	e 17 4	+ 1	—	—	—
Florissant		54·1	312	e 9 26	− 3	e 17 4	− 1	—	—	—
Besançon		54·4	37	e 9 33	+ 2	e 10 44	PcP	e 9 38	?	—
Pavia		55·4	40	e 12 57	PPP	e 17 25	+ 3	—	—	e 26·4
Strasbourg		56·1	37	i 9 44	+ 1	e 17 38	+ 6	e 11 48	PP	e 25·5
Aberdeen	E.	56·3	23	—	—	i 17 45	+11	e 23 49	Q	24·9
Rome		56·4	45	e 9 45	0	i 17 39	+ 3	e 21 33	SS	26·7
De Bilt		56·5	31	e 9 47	+ 1	e 17 43	+ 6	—	—	e 25·5
Karlsruhe	Z.	56·7	35	e 9 45	− 3	e 11 39	PP	e 11 19	?	—
Stuttgart		57·0	37	e 9 49	− 1	e 17 48	+ 5	e 11 59	PP	e 26·5
Tacubaya		58·3	287	i 10 19	+20	—	—	e 17 12	?	—
Triest		58·6	41	—	—	e 18 10	+ 6	e 22 6	SS	—
Jena		59·4	35	e 10 5	− 1	—	—	e 10 42	PcP	—
Tarauto		59·4	48	e 7 49	?	—	—	e 13 23	PPP	25·0
Potsdam		60·9	33	e 10 20	+ 3	e 18 35	+ 1	—	—	e 24·5
Copenhagen		62·0	30	—	—	e 18 48	0	25 29	SSS	28·5
Scoresby Sund		62·6	6	e 10 28	0	e 18 51	− 5	20 23	ScS	27·5
Belgrade	Z.	62·8	44	e 10 30k	0	—	—	—	—	—
Timisoara		63·6	43	10 29	− 6	—	—	—	—	—
Uzhgorod		65·1	40	e 10 51	+ 6	e 19 29	+ 2	—	—	—
Lwow		66·5	39	e 10 55	+ 1	e 19 40	− 4	—	—	—
Istanbul	E.	68·3	49	e 11 4	− 1	e 20 4	− 2	—	—	e 32·5
Helwan		69·3	62	e 11 12	+ 1	e 20 50	PPS	e 11 38	PcP	—
Tucson		69·3	302	e 11 10	− 1	e 20 39	PS	—	—	—
Kiruna		70·8	21	i 11 29	+ 9	i 20 37	+ 2	e 20 59	PS	e 32·2
Kimberley	Z.	72·6	123	i 11 22	− 9	—	—	—	—	—
Resolute Bay		72·6	347	11 32	+ 1	20 56	0	e 21 47	PPS	e 29·1
Boulder City		72·7	305	e 11 31	− 1	—	—	i 11 34	P	—
Hungry Horse		72·9	318	i 11 31	− 2	—	—	—	—	—
Ksara		73·2	57	e 11 40	+ 5	21 16	+14	—	—	—
Palomar	Z.	74·4	302	i 11 42	0	—	—	i 11 51	PcP	—
Pretoria	Z.	74·5	119	i 11 49	+ 7	—	—	—	—	—
Riverside	Z.	74·8	303	e 11 45	+ 1	—	—	i 11 53	PcP	—
China Lake	Z.	75·0	305	e 11 46	+ 1	—	—	i 11 54	PcP	—
Pasadena		75·5	303	e 11 47	− 1	—	—	e 11 57	PcP	e 35·2
Tinemaha	Z.	75·5	306	e 11 58	PcP	—	—	i 12 7	?	—
Moscow		75·6	34	e 11 51	+ 3	—	—	—	—	—
Grahamstown	Z.	75·7	127	i 11 57	PcP	—	—	—	—	—
Fresno	Z.	76·7	306	e 11 54k	− 1	—	—	—	—	—
Reno	Z.	76·7	309	e 11 56a	+ 1	—	—	—	—	—
Pietermaritzburg	Z.	77·5	123	e 12 6	PcP	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mineral	Z.	78·1	310	e 12 0a	− 2	—	—	—	—	—
Lick	Z.	78·2	307	e 12 4a	+ 1	—	—	i 12 13	PcP	—
Seattle		78·4	317	e 12 17	PcP	e 22 59	PPS	—	—	e 40·5
Berkeley		78·7	307	e 12 7k	+ 1	e 22 11	+ 8	i 12 15	PcP	—
Shasta Dam		78·7	310	e 12 6	0	—	—	—	—	—
Victoria		79·2	318	e 12 5	− 3	e 22 26	+18	—	—	38·0
Erevan		80·0	50	e 12 16	+ 3	e 22 26	+ 9	—	—	—
Goris		81·4	51	e 12 21	+ 1	22 39	+ 8	—	—	—
Kirovobad		81·4	50	—	—	22 34	+ 3	—	—	—
Sverdlovsk		88·3	33	13 1	+ 6	23 25	[+ 3]	16 39	PP	—
College		89·5	337	e 13 9	0	e 16 31	PP	i 13 8	?	—
Ashkabad		91·0	52	e 13 16	+ 9	—	—	—	—	—
Tashkent		98·2	46	—	—	e 25 19	+14	—	—	—

Additional readings and note :—
Chinchina eSS =(13m.37s.) ; readings have been increased by 3 minutes.
Granada SS =18m.35s.
Almeria PPP =10m.35s.
Tamanrasset ePPPZ =10m.42s.
Alicante PPP =11m.6s., PPS =15m.30s., Q =18m.48s., SSS =19m.12s.
La Plata SSN =18m.59s., QE =22·2m.
Ottawa iZ =8m.49s., PP =10m.40s.
Cleveland eN =9m.4s., ePPPE =11m.31s.
Rathfarnham Castle iZ =9m.50s.
Paris e =10m.7s., 10m.37s., and 10m.55s., ePP =11m.31s., ePPP =12m.29s., iPS = 17m.23s., e =21m.15s.
Kew eSS =20m.21s.
Strasbourg i =10m.3s., ePcP =10m.38s., ePP? =11m.40s. and 12m.0s., e =12m.38s. ePPP =13m.10s., ePcS =14m.36s., ePS =17m.56s., eSS =21m.42s.
Stuttgart eSS =21m.29s.
Triest eScS =20m.36s.
Jena eZ =10m.13s., and 11m.20s.
Scoresby Sund e =19m.3s.
Belgrade eZ =10m.43s. and 11m.45s.
Helwan eZ =13m.19s. and 14m.49s.
Kiruna eEN =22m.0s., eSSE =25m.0s., eN =25m.34s. and 26m.5s.
Resolute Bay eZ =12m.5s., eN =15m.23s.
Seattle e =12m.34s. and 13m.38s.
Shasta Dam i =12m.12s., e =12m.57s.
Sverdlovsk PS =24m.39s., SS =29m.45s.
Long waves were also recorded at Ivigtut and Upsala.

Aug. 10d. 23h. 0m. 22s. Epicentre 46°·0N. 143°·8E. Depth of focus 0·040.
(as on 1950, Feb. 28d.).

Intensity V at Sitinohe ; IV at Kusiro, Hatinohe, Nosappu, Esan, Hiroo, Sibeta, Sanbongi, and Okumakama ; II-III at Nemuro, Urakawa, Aomori, Miyako, Morioka, Misawa, Oda, Otu, etc. Epicentre 45°·7N. 143°·5E. Depth 320km.

Seismological Bulletin of the C.M.O., Japan, for August, 1951, Tokyo, 1951, pp.192-194, with macroseismic chart.

$A = -·5625$, $B = +·4117$, $C = +·7170$; $\delta = -1$; $h = -4$;
$D = +·591$, $E = +·807$; $G = -·579$, $H = +·423$, $K = -·697$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Wakkanai	1·6	291	0 49	+ 6	1 24	+ 8	—	—	—
Abashiri	2·0	170	0 54	+ 8	1 31	+ 9	—	—	—
Asahigawa	2·4	205	0 56	+ 7	1 35	+ 7	—	—	—
Kusiro	3·0	171	1 2	+ 7	1 46	+ 8	—	—	—
Nemuro	3·0	155	1 2	+ 7	1 43	+ 5	—	—	—
Obihiro	3·1	188	1 2	+ 6	1 45	+ 5	—	—	—
Sapporo	3·4	211	1 4a	+ 5	1 49	+ 3	—	—	—
Urakawa	3·9	191	1 6a	+ 1	1 57	+ 1	—	—	—
Suttsu	4·1	220	1 8a	+ 1	—	—	—	—	—
Muroran	4·2	210	1 9a	+ 1	1 59	− 3	—	—	—
Mori	4·5	212	1 12	0	2 6	− 2	—	—	—
Aomori	5·6	206	1 26a	+ 1	2 30	− 1	—	—	—
Hatinohe	5·7	197	1 25a	− 1	2 27	− 6	—	—	—
Miyako	6·5	192	1 36a	0	2 45	− 6	—	—	—
Morioka	6·6	198	1 37a	0	2 49	− 4	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Akita	E.	6·8	205	1 39 a	0	2 55	− 2	—	—	—
Mizusawa		7·1	197	i 1 43	0	i 2 59	− 5	—	—	—
Sakata		7·7	204	1 51	+ 1	3 15	− 2	—	—	—
Isinomaki		7·8	194	1 48	− 4	3 10	−10	—	—	—
Sendai		8·0	196	1 56 a	+ 2	3 19	− 5	—	—	—
Yamagata		8·2	199	1 56	− 1	3 20	− 8	—	—	—
Hukusima		8·6	198	2 1 a	− 1	3 35	− 2	—	—	—
Niigata		8·8	205	1 39	−25	3 15	−27	—	—	—
Inawasiro		8·9	199	2 4 a	− 1	3 42	− 2	—	—	—
Aikawa		9·0	209	2 4	− 3	3 38	− 8	—	—	—
Onahama		9·3	194	2 11	+ 1	3 47	− 6	—	—	—
Shirakawa		9·3	198	2 10	0	3 46	− 7	—	—	—
Takada		9·8	207	2 0	−16	3 59	− 5	—	—	—
Mito		9·9	196	2 18	0	4 2	− 4	—	—	—
Utunomiya		9·9	199	2 16	− 2	4 1	− 5	—	—	—
Wazima		10·0	213	2 18 a	− 1	4 4	− 5	—	—	—
Maebasi		10·2	202	2 21 a	− 1	4 10	− 3	—	—	—
Nagano		10·2	206	2 13	− 9	4 11	− 2	—	—	—
Tukubasan		10·2	197	2 21	− 1	4 2	−11	—	—	—
Matusiro		10·3	206	2 22	− 1	4 14	− 1	—	—	—
Kumagaya		10·4	200	2 22 a	− 2	4 13	− 5	—	—	—
Oiwake		10·4	204	2 24	0	—	—	—	—	—
Toyama		10·5	210	2 25	0	4 18	− 2	—	—	—
Titibu		10·6	201	2 26	0	4 17	− 5	—	—	—
Matumoto		10·7	206	2 28 a	0	4 23	− 1	—	—	—
Tokyo		10·8	198	2 27 a	− 2	4 21	− 5	—	—	—
Kanazawa		10·9	212	2 28	− 2	4 22	− 7	—	—	—
Yokohama		11·0	198	2 35	+ 4	4 31	0	—	—	—
Kohu		11·1	203	2 32	− 1	4 27	− 6	—	—	—
Hunatu		11·2	202	2 32 a	− 2	4 30	− 6	—	—	—
Hukui		11·4	212	2 37	+ 1	—	—	—	—	—
Iida		11·4	205	2 36	0	4 37	− 3	—	—	—
Mera		11·5	197	2 35	− 3	4 39	− 3	—	—	—
Misima		11·5	200	2 35	− 3	4 36	− 6	—	—	—
Osima		11·7	198	2 39	− 1	4 36	−11	—	—	—
Gihu		11·9	209	2 40 a	− 3	4 48	− 3	—	—	—
Tsuruga		11·9	212	2 39	− 4	4 46	− 5	—	—	—
Ibukisan		12·0	210	2 44	0	4 49	− 4	—	—	—
Nagoya		12·0	208	2 42	− 2	4 47	− 6	—	—	—
Petropavlovsk		12·0	48	2 49	+ 5	i 5 1	+ 8	—	—	—
Hikone		12·1	211	2 44	− 1	4 49	−7	—	—	—
Omaesaki		12·2	202	2 40	− 6	—	—	—	—	—
Kameyama		12·5	209	2 51	+ 1	5 1	− 3	—	—	—
Toyooka		12·5	216	2 48 k	− 2	4 57	− 7	—	—	—
Tu		12·5	209	2 49	− 1	5 4	0	—	—	—
Kobe		13·0	213	2 54	− 2	5 12	− 3	—	—	—
Osaka		13·0	212	2 50	− 6	5 0	−15	—	—	—
Hatidyozima		13·2	195	3 1	+ 3	5 18	− 2	—	—	—
Owase		13·3	209	2 58 k	− 2	5 16	− 6	—	—	—
Sumoto		13·5	213	2 58 a	− 4	5 18	− 8	—	—	—
Siomisaki		14·0	209	3 5	− 3	5 30	− 7	—	—	—
Hirosima		14·5	221	3 10	− 4	5 44	− 4	—	—	—
Kôti		14·7	216	3 15	− 1	5 49	− 4	—	—	—
Klyuchi		14·8	40	3 21	+ 3	6 5	+10	—	—	—
Matuyama		14·8	219	3 15	− 3	5 50	− 5	—	—	—
Simidu		15·6	216	3 24	− 3	6 7	− 5	—	—	—
Ooita		15·8	220	3 30	+ 1	6 15	− 1	—	—	—
Huknoka		16·1	224	3 29 k	− 3	6 17	− 6	—	—	—
Saga		16·4	224	3 35 k	− 1	6 15	−13	—	—	—
Miyazaki		17·0	218	3 44	+ 2	6 47	+ 7	—	—	—
Nagasaki		17·0	224	3 52	+10	—	—	—	—	—
Kagosima		17·7	220	3 46	− 3	6 54	0	—	—	—
Zi-ka-wei	Z.	22·8	237	i 4 36 a	− 3	8 19	− 5	i 5 29	pP	—
Kabansk		24·9	298	4 54	− 5	8 51	− 8	5 53	pP	—
Irkutsk		26·3	299	5 7	− 4	9 11?	−11	6 10	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		36·7	220	i 6 39	− 3	i 12 1	− 2	i 7 44	pP	—
College		40·7	37	i 7 15	+ 1	13 1	− 2	i 8 23	pP	—
Ili		46·0	293	i 7 52	− 5	—	—	—	—	—
Almata II		46·1	293	i 7 54	− 4	—	—	—	—	—
Almata		46·4	293	i 7 59	− 1	—	—	—	—	—
Frunse		48·1	293	i 8 10	− 3	i 14 41	− 8	i 9 16?	pP	—
Sverdlovsk		49·9	315	i 8 22	− 4	i 15 3	−10	9 32	pP	—
Andijan		50·6	292	i 8 29	− 3	i 15 15	− 8	—	—	—
Fergana		51·2	292	i 8 32	− 4	—	—	—	—	—
Tchimkent		51·6	295	i 8 35	− 4	i 15 27	−10	9 46	pP	—
Dzhergetal		52·1	291	i 8 39	− 4	i 15 34	− 9	—	—	—
Tashkent		52·3	294	i 8 41	− 3	i 15 38	− 8	e 9 48	pP	—
Khorog		52·9	288	e 8 45	− 4	—	—	—	—	—
Obi-garm		53·4	291	i 8 47	− 5	i 15 51	−10	—	—	—
Stalinabad		54·1	292	i 8 56	− 1	i 16 4	− 6	—	—	—
New Delhi		54·2	276	i 8 53a	− 5	i 15 59	−13	10 2	pP	—
Samarkand		54·6	294	i 8 58	− 3	16 8	− 9	—	—	—
Kiruna		58·8	338	e 9 27	− 3	i 17 3	− 9	e 10 42	pP	—
Mary		59·1	294	i 9 30	− 2	—	—	—	—	—
Victoria		59·1	51	i 9 33a	+ 1	—	—	e 10 50	pP	—
Seattle		60·2	51	i 9 43a	+ 3	—	—	—	—	—
Ashkabad		61·1	297	i 9 44	− 2	—	—	—	—	—
Moscow		61·2	322	—	—	i 17 34	− 8	i 19 46	sS	—
Pulkovo		61·4	329	—	—	e 17 37	− 8	—	—	—
Kizyl-Arvat		61·8	298	i 9 47	− 3	i 17 40	−10	—	—	—
Poona	Z.	63·0	269	i 9 55	− 3	—	—	—	—	—
Scoresby Sund		63·4	356	i 9 58	− 3	i 18 3	− 7	e 20 19	sS	—
Arcata	Z.	63·8	58	e 10 4a	0	—	—	—	—	—
Hungry Horse		64·1	46	i 10 7	+ 1	—	—	e 38 48	P'P'	—
Shasta Dam		64·5	57	i 10 10	+ 2	—	—	i 11 26	pP	—
Shemakla		65·3	304	e 10 32?	+19	18 45?	+12	—	—	—
Upsala		65·7	334	i 14 43	PPP	i 18 29	− 9	—	—	—
Lenkoran		66·4	302	10 29?	+ 9	—	—	—	—	—
Berkeley	Z.	66·4	59	i 10 21a	+ 1	e 12 5	sP	i 11 38	pP	—
Kirovobad		66·6	305	i 10 19	− 2	i 18 41	− 7	—	—	—
Reno		66·8	57	i 10 24a	+ 1	e 18 54	+ 3	e 10 40	pP	—
Gori		67·0	307	e 10 22	− 2	18 48	− 5	—	—	—
Lick	Z.	67·1	59	i 10 26a	+ 2	—	—	i 11 43	pP	—
Goris		67·4	303	e 10 25	− 1	18 53	− 5	—	—	—
Erevan		68·0	305	e 10 30	0	19 1	− 4	—	—	—
Nakhichevan		68·1	303	e 10 27?	− 4	i 18 57?	− 9	—	—	—
Fresno	Z.	68·6	59	e 10 35a	+ 1	—	—	e 11 52	pP	—
Tinemaha		69·3	58	i 10 41a	+ 3	—	—	i 11 58	pP	—
China Lake		70·6	58	i 10 47a	+ 1	i 19 37	+ 2	i 12 4	pP	—
Yalta		70·6	315	e 10 42	− 4	—	—	e 11 55	pP	—
Lwow		71·2	323	i 10 47	− 3	e 19 32	−10	—	—	—
Pasadena		71·3	60	i 10 51a	+ 1	—	—	i 12 9	pP	—
Riverside	Z.	71·9	60	i 10 55a	+ 1	—	—	i 12 12	pP	—
Boulder City		72·1	57	i 10 40?	−15	e 19 56	+ 4	i 12 14	pP	—
Ivigtut		72·7	7	—	—	i 19 55	− 4	—	—	34·6
Palomar		72·7	60	i 10 59a	+ 1	—	—	i 1218	pP	—
Uzhgorod		72·8	324	e 11 6	+ 7	e 19 55	− 5	—	—	—
Skalnate Pleso		73·2	326	e 11 44	+43	e 20 5	0	—	—	—
Potsdam		73·3	332	e 11 0	− 2	i 19 58	− 8	—	—	—
Collmberg		74·2	330	i 11 4	− 3	e 20 6	− 8	e 12 20	pP	—
Prague		74·7	330	e 11 3	− 7	e 20 14	− 7	e 12 15	pP	—
Jena		75·0	331	e 11 10	− 2	e 20 16	− 8	e 12 25	pP	—
Ogyalla		75·1	326	e 16 26	PPP	e 20 24	− 2	e 22 17	sS	—
Istanbul		75·6	315	—	—	e 20 26	− 5	—	—	—
Timisoara	E.	75·6	322	—	—	e 20 24?	− 7	—	—	—
Tucson		77·0	57	i 11 25	+ 2	—	—	i 12 44	pP	—
Ksara		77·4	306	e 11 23	− 2	e 20 41	− 9	—	—	—
Stuttgart		77·7	331	e 11 23	− 4	e 20 45	− 8	e 12 43	pP	—
Rathfarnham Castle		77·8	342	i 11 22	− 5	e 20 36	−18	e 14 28	PP	e 29·1
Kew		78·1	338	i 11 26	− 3	e 20 52	− 6	e 12 40	pP	e 29·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Strasbourg		78·3	333	e 11 28	− 2	e 20 55	− 5	e 12 46	pP	—
Triest		78·7	327	e 22 47	PPS	i 20 55	− 9	i 21 16	?	—
Paris		79·7	336	i 11 36	− 1	i 21 6	− 8	i 12 56	pP	—
Besançon		80·0	333	e 11 37	− 2	—	—	e 12 58	pP	—
Pavia		80·8	330	—	—	i 21 14	−12	—	—	—
Taranto		81·6	321	—	—	e 21 26	− 8	—	—	—
Rome		82·3	326	—	—	i 21 34	− 7	e 22 24	SP	—
Seven Falls	E.	82·4	23	—	—	21 36	− 6	—	—	—
Shawingian Falls	N.	82·4	24	11 51	0	21 41	− 1	—	—	—
Ottawa		82·5	27	i 11 51	− 1	21 38	− 5	—	—	—
St. Louis		82·8	40	i 11 52	− 1	—	—	13 9	pP	—
Helwan	Z.	82·9	306	11 52	− 2	21 38	− 9	13 8	pP	—
Cleveland		84·0	33	e 12 0	+ 1	i 22 49	SP	—	—	—
Morgantown		86·2	33	i 12 11	+ 1	e 22 2	[− 4]	i 13 27	pP	—
Harvard		86·4	26	i 12 11	0	i 22 6	[− 1]	i 13 27	pP	—
Weston		86·6	26	i 12 12	0	—	—	—	—	—
Palisades		87·1	28	i 12 13a	− 2	i 22 9	[− 3]	e 13 32	pP	—
City College, N.Y.		87·2	28	i 12 14	− 1	i 22 9	[− 4]	—	—	—
Washington		87·9	31	i 12 4	−14	—	—	—	—	—
Alicante		90·1	333	12 42	+13	i 22 54	− 1	18 32	PPP	e 42·1
Almeria		92·1	333	13 3	+25	23 55	+43	16 39	PP	45·8
Granada		92·1	334	13 11k	+33	23 21	+ 9	25 29	PPS	44·0
Tamanrasset	Z.	101·8	321	14 30	pP	—	—	e 16 46	?	—
La Paz		140·3	52	e 18 46	[− 9]	—	—	—	—	—

Additional readings :—
Zi-ka-wei isS?Z −9m.56s.
Kabansk sS =10m.41s.
Irkutsk sS =11m.1⁶s.
Sverdlovsk isS =17m.14s.
Tashkent esS =17m.51s.
New Delhi sPN =10m.59s., sSN =18m.5s.
Kiruna eZ =11m.33s., iScSEN =18m.43s., isSN =19m.19s., isSE =19m.22s., iSSEN = 21m.1s., eSSSE =23m.50s., eEN =27m.27s., eE =28m.35s. and 31m.51s.
Seattle i =9m.49s. and 10m.28s.
Scoresby Sund e =10m.32s. and 11m.12s., iScS =19m.18s., SSS =25m.32s.
Reno ePPZ =14m.3s.
Lick iZ =10m.34s., 10m.51s., and 12m.47s.
Skalnate Pleso eN =16m.53s., e =20m.44s.
Collmberg eZ =11m.32s. and 12m.55s.
Prague e =13m.18s., ePP =14m.3s., e =20m.33s., eSP =20m.47s.
Jena eE =13m.7s.
Ogyalla eN =17m.56s. and 19m.53s., eSPN =21m.10s., e =22m.52s., eSS =26m.14s.
Stuttgart ePS =21m.10s., e =31m.26s. and 32m.44s.
Rathfarnham Castle eZ =11m.34s., eEN =22m.28s.
Kew ePcP?Z =11m.36s., eScS?EN =21m.4s., ePSEN =23m.11s., eSSEN =25m.56s.
Strasbourg e =11m.50s., eS =20m.52s., eSKS =21m.19s.
Paris i =11m.46s., e =12m.51s. and 13m.4s., eSKS =21m.32s., eSS? =27m.12s.
Morgantown esP =14m.3s., ePKP? =15m.16s.
Harvard iS =22m.18s.
Alicante ScS =23m.10s., PS =25m.10s., SS =29m.3s., SSS =32m.30s., Q =36m.58s.

Aug. 10d. Readings also at 0h. (near Istanbul, and near Dzhergetal), 1h. (Jena, Frunse, near Obi-garm, Stalinabad, Khorog, Dzhergetal, Samarkand, Fergana, and Andijan), 2h. (Dzhergetal, Frunse, Krasnogorka, Mary, Almata, Almata II, Ili, Lunacharskoe, near Obi-garm, Stalinabad, Khorog, Samarkand, Fergana, Andijan, and Tashkent), 4h. (Obi-garm, Ili, Frunse, Almata II, Samarkand, Almata, near Fergana, Andijan, and Dzhergetal), 5h. (Obi-garm, Frunse, near Dzhergetal, Andijan, Khorog, Tashkent, and Samarkand), 6h. (Palisades, Shawinigan Falls, Seven Falls, and near Ottawa), 10h. (Alicante and near Istanbul), 11h. (Seattle, Palomar, near La Jolla, Riverside, and Pasadena), 13h. (Tamanrasset, Ksara, Harvard, and Dzhergetal), 14h. (Santa Lucia (2)), 15h. (Horseshoe Bay, Palisades, and Apia), 16h. (Palisades and near Apia), 17h. (Apia, Mount Wilson, Palomar, China Lake, Tinemaha, Oaxaca, Vera Cruz, Merida (2), Puebla, and Tacubaya), 18h. (Piatigorsk, Goris, Nakhichevan, near Tiflis, Gori, Grozny, Leninakan, Kirovobad, and Erevan), 19h. (Palisades, Mount Wilson, Palomar, China Lake, and Tinemaha), 20h. (near Messina), 21h. (Brisbane, Palomar, China Lake, College, Boulder City, Hungry Horse, and Tacubaya), 22h. (near Frunse, near Ili, and near Huancayo), 23h. (Mount Wilson, Riverside, Palomar, China Lake, Tinemaha, and near Dzhergetal).

Aug. 11d. 9h. 54m. 16s. Epicentre 55°·0N. 161°·6E. (as on 1950, Feb. 21d.).

$A = -\cdot5468$, $B = +\cdot1818$, $C = +\cdot8173$; $\delta = +2$; $h = -7$;
$D = +\cdot316$, $E = +\cdot949$; $G = -\cdot776$, $H = +\cdot258$, $K = -\cdot576$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Klyuchi		1·4	340	0 53	?	i 1 0	?	—	—
College		26·4	48	i 5 38	− 2	—	—	—	—
Hungry Horse		49·7	61	e 8 54	− 2	—	—	—	—
Shasta Dam		50·4	74	i 9 0	− 1	—	—	—	—
Mineral	z.	51·1	74	e 9 4	− 2	—	—	e 13 12	?
Butte		52·0	62	e 9 14	+ 1	—	—	—	—
Reno	z.	52·7	72	e 9 16	− 2	—	—	—	—
Tinemaha	z.	55·3	74	i 9 37	− 1	—	—	—	—
China Lake	z.	56·6	74	i 9 47k	0	—	—	i 10 7	sP
Pasadena	z.	57·5	76	i 9 52k	− 1	—	—	e 10 14	sP
Boulder City		58·0	72	i 9 56	− 1	—	—	—	—
Riverside	z.	58·0	76	i 9 55k	− 2	—	—	e 10 18	sP
Palomar	z.	58·8	76	i 10 1k	− 1	—	—	—	—
Tucson		62·9	73	i 10 30	0	—	—	—	—
Ottawa		68·9	40	11 6	− 3	—	—	—	—
Collmberg	z.	70·9	341	i 11 23	+ 2	—	—	—	—
Jena	N.	71·5	341	e 11 28	+ 4	—	—	—	—
Rathfarnham Castle		71·6	353	i 11 28	+ 3	e 20 4	−40	i 11 40	PcP
Prague		71·8	340	e 11 26	0	—	—	e 11 52	PcP
Morgantown		72·1	46	i 10 28	−60	—	—	—	—
Harvard		72·9	39	i 11 32	− 1	—	—	—	—
Weston		73·1	39	i 11 33	− 1	—	—	—	—
Stuttgart	z.	74·0	342	e 11 42	+ 3	—	—	—	—
Strasbourg		74·5	343	i 11 45	+ 3	—	—	—	—
Paris		75·1	347	i 11 49	+ 3	e 14 31	PP	i 12 15	pP
Besançon		76·1	344	i 11 54	+ 3	—	—	e 12 39	?
Ksara		80·1	317	i 12 19	+ 6	e 29 7	?	—	—
Tamanrasset	z.	99·9	338	13 51	+ 3	—	—	e 17 35	PP
La Paz		126·0	65	e 18 56	[− 8]	e 26 16	[+ 7]	38 14	SS

Additional readings :—
Strasbourg e = 12m.5s., 12m.12s., and 12m.53s.
La Paz e = 28m.8s., PPS = 32m.20s.

Aug. 11d. Readings also at 0h. (Pietermaritzburg, Kimberley (2), Pretoria (2), Apia, and near Dzhergetal), 1h. (La Paz, Huancayo (2), near Obi-garm, Andijan, Fergana, Stalinabad, Khorog, and Dzhergetal (2)), 2h. (Apia (2)), 5h. (near Lunacharskoe, Samarkand, Tashkent, Tchimkent, Frunse, Krasnogorka, Almata, Przhevalsk, Obi-garm, Andijan, Fergana, Khorog, and Dzhergetal), 6h. (Copiapo, near Apia, near Krasnogorka, Frunse, Tchimkent, Almata II, Tashkent, Dzhergetal, Fergana, and Andijan), 7h. (Messina), 8h. (Triest, Tacubaya, and near Mizusawa), 9h. (near Ashkabad, near Obi-garm, Andijan, Tchimkent, and Dzhergetal), 11h. (near Alicante), 12h. (near Dzhergetal), 13h. (near Reykjavik), 14h. (Apia), 15h. (near Tchimkent, Dzhergetal, Krasnogorka, Almata II, Fergana, Kurmenty, Ili, and Andijan), 16h. (Triest), 17h. (Apia and near Dzhergetal), 18h. (Rome and Dzhergetal), 19h. (Triest and Zürich), 20h. (Apia and Tamanrasset), 21h. (near Ili, Almata, Przhevalsk, and Kurmenty), 22h. (Alicante, Toledo, Malaga, Almeria, and near Granada), 23h. (China Lake and Palomar).

Aug. 12d. 20h. 51m. 9s. Epicentre 43°·7N. 13°·8E. (as given by Rome).

Intensity IV at Ancona.

Monthly Bulletin of the I.G.N., Rome, Aug., 1951, p.10. Epicentre 43°40′N. 13°50′E.

$A = +\cdot7047$, $B = +\cdot1735$, $C = +\cdot6880$; $\delta = +5$; $h = -3$;
$D = +\cdot239$, $E = -\cdot971$; $G = +\cdot668$, $H = +\cdot164$, $K = -\cdot726$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		I.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bologna	2·0	294	e 0 40	P_g	e 1 12	S_g	—	—	—
Prato	2·0	275	e 0 37	+ 2	i 1 2	0	—	—	—
Rome	2·0	208	0 39 a	P_g	i 1 9	S_g	—	—	i 1·2
Triest	2·0	359	e 0 41	P_g	i 1 9	S_g	e 0 45	P_gP_g	—
Salo	3·1	310	e 0 58	P*	i 1 41	S_g	i 1 14	?	e 2·1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pavia		3·7	297	e 1 26	P_g	e 1 45	0	—	—	e 2·4
Belgrade	z.	4·9	74	e 1 43a	P_g	e 2 4	−11	e 1 50	—	e 3·9
Ravensburg	z.	5·1	326	e 1 20?	0	e 2 17	− 3	e 2 31	S*	—
Ogyalla		5·2	34	—	—	e 2 33	S*	e 2 50	S_g	e 3·9
Zürich		5·2	317	e 1 24	+ 3	—	—	—	—	—
Timisoara	E.	5·7	65	—	—	e 3 15	SSS	—	—	e 3·8
Basle		5·9	314	e 1 30	− 1	e 2 25	−15	—	—	—
Stuttgart	z.	6·0	330	e 1 33	+ 1	e 2 36	− 7	e 3 27	S_g	e 3·7
Prague		6·4	3	e 2 8	P_g	e 2 57	+ 4	i 3 38	S_g	i 3·7
Karlsruhe	z.	6·5	327	e 2 8	P_g	e 3 16	S*	e 3 2	SS	—
Strasbourg		6·5	322	e 1 40	+ 1	e 2 58	+ 3	e 2 14	P_g	—
Besançon		6·6	306	e 1 41	0	e 2 54	− 4	e 1 58	P*	—
Raciborzu		7·1	23	e 1 55	PP	e 3 36	S*	e 4 1	S_g	—
Jena		7·4	350	e 1 43?	− 9	e 3 10	− 8	e 1 56	PP	e 4·0
Collmberg		7·7	4	e 1 55	− 1	e 3 21	− 4	e 3 59	S*	e 4·2
Paris		9·4	307	i 2 32	PPP	i 3 58	− 9	i 2 46	P*	—
Jersey	E.	12·3	303	e 1 21	?	—	—	—	—	—

Additional readings :—
Triest iS_gS_g = 1m.18s.
Belgrade eZ = 2m.56s., eNE = 3m.5s. and 3m.15s., eNW = 3m.44s.
Ravensburg $eS_g?Z$ = 2m.22s.
Ogyalla e = 3m.1s., 3m.20s., and 3m.49s.
Jena eP_gE = 2m.6s., eP_gN = 2m.9s., eE = 3m.52s.
Stuttgart $eP_g?Z$ = 1m.39s., eZ = 2m.31s. and 3m.31s.
Prague e = 2m.18s., eS = 2m.45s., eS* = 3m.24s.
Strasbourg e = 2m.24s., 2m.44s., 2m.54s., 3m.5s., 3m.15s., 3m.23s., and 3m.29s., $eS_g?$ = 3m.35s., e = 3m.47s.
Besançon e = 2m.5s., eP_g = 2m.15s., e = 2m.27s., eS* = 3m.18s., $eS_g?$ = 3m.31s., e = 3m.45s. and 4m.2s.
Raciborzu eS_gE = 4m.6s.
Collmberg eP*EZ = 2m.41s., eSE = 3m.34s.
Paris i = 3m.1s., eP_g = 3m.14s.
Long waves were also recorded at Granada.

Aug. 12d. 21h. 9m. 57s. Epicentre 3°·8S. 140°·3E.

A = −·7677, B = +·6374, C = −·0658 ; δ = −3 ; h = +7 ;
D = +·639, E = +·769 ; G = +·051, H = −·042, K = −·998.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		26·5	154	i 5 42k	+ 1	e 10 14	0	—	—	—
Riverview		31·5	163	—	—	i 11 43	+ 9	—	—	e 16·2
Zi-ka-wei	z.	39·2	334	7 33	+ 2	13 33	+ 1	—	—	i 16·6
Nanking		41·1	332	7 48	+ 1	13 59	− 2	—	—	i 17·2
Cobb River	E.	47·2	146	i 9 37	+61	—	—	—	—	—
Vladivostok		47·3	352	i 8 36	− 1	i 15 28	− 3	—	—	—
Petropavlovsk		58·8	12	10 1	− 1	—	—	—	—	—
Kabansk		62·5	337	10 28	0	e 18 51	− 3	—	—	—
Terre Adélie		62·9	179	e 10 30	0	e 19 0	0	—	—	26·0
Irkutsk		63·6	336	e 10 33	− 2	19 8	0	—	—	—
Honolulu		65·5	65	e 10 44	− 3	—	—	—	—	—
Przhevalsk		72·3	318	i 11 31	+ 2	—	—	—	—	—
Almata		73·6	318	i 11 37	0	—	—	—	—	—
Andijan		76·0	313	e 11 51	0	21 31	− 3	—	—	—
Dzhergetal		76·4	312	e 11 54	+ 1	e 21 35	− 3	—	—	—
Obi-garm		77·4	311	e 12 0	+ 2	—	—	—	—	—
Stalinabad		78·0	311	i 12 2	0	i 21 52	− 3	—	—	—
Tashkent		78·4	313	e 12 3	− 1	e 21 55	− 5	—	—	—
Tchimkent		78·4	314	12 3	− 1	—	—	—	—	—
Samarkand		79·7	311	—	—	22 5	− 8	—	—	—
Mary		83·2	308	—	—	e 22 45	− 4	—	—	—
College		85·9	24	e 12 39	− 4	—	—	i 13 14	?	—
Ashkabad		86·0	308	—	—	i 23 24	+ 7	—	—	—
Sverdlovsk		87·5	327	12 53	+ 2	23 28	− 3	—	—	—
Kizyl-Arvat		87·7	309	—	—	i 23 31	− 2	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seattle		97·8	43	e 13 43	+ 5	—	—	—	—	e 46·0
Shasta Dam		98·0	50	i 13 37	− 2	—	—	e 19 49	PPP	—
Berkeley		98·2	53	e 13 39	− 1	e 32 15	SS	e 17 7	?	e 44·6
Lick	z.	98·7	53	i 13 41k	− 1	—	—	i 13 47	pP	—
Fresno	z.	100·2	53	e 13 49	0	—	—	e 17 21	PP	—
Mount Wilson	z.	101·8	56	e 13 55	− 1	—	—	e 17 53	PP	—
China Lake	z.	102·0	54	e 13 47	−10	—	—	e 18 7	PP	—
Riverside	z.	102·7	56	e 13 57	− 3	—	—	—	—	—
Palomar	z.	102·8	57	e 14 4	+ 3	—	—	—	—	—
Hungry Horse		103·2	41	i 14 2	− 1	—	—	e 17 6	?	—
Ksara		104·3	303	e 18 40	PP	e 28 32	PPS	—	—	—
Boulder City		104·3	54	e 18 25	PP	—	—	—	—	—
Butte		104·6	43	e 14 10	+ 1	—	—	—	—	—
Tucson		108·0	57	e 14 58	P	—	—	e 18 42	PP	—
Istanbul	E.	108·4	312	—	—	e 27 3?	?	—	—	e 58·0
Stuttgart		118·9	325	e 18 52	[+ 1]	—	—	e 20 15	PP	e 65·0
Paris		122·6	329	e 20 45	PP	—	—	—	—	e 60·0
Cleveland		127·0	39	i 21 3	PP	e 25 20	[−52]	—	—	—
Ottawa		128·0	32	19 8	[0]	—	—	21 8	PP	60·0
Morgantown		129·0	41	e 19 10	[0]	—	—	e 21 16	PP	—
Alicante		130·4	320	19 18	[+ 5]	26 26	[+ 5]	21 36	PP	e 62·3
Columbia		131·2	46	e 22 40	PKS	—	—	—	—	—
Washington		131·3	39	e 21 29	PP	—	—	—	—	—
Tamanrasset	z.	132·4	298	e 19 20	[+ 3]	e 32 3	PS	e 21 38	PP	—
Weston		132·4	32	e 19 17	[0]	—	—	e 21 33	PP	—
Huancayo		141·2	115	e 19 34	[+ 1]	—	—	—	—	—
La Paz		145·4	127	i 19 43a	[+ 3]	26 31	[−16]	i 19 51	PKP_2	—
Bogota		145·7	87	i 19 36	[− 4]	—	—	—	—	e 68·2

Additional readings :—
Stuttgart ePKKP? =29m.3s., eQ =59·0m.
Alicante P? =16m.24s., SSP =39m.19s., Q =54m.15s.
Tamanrasset ePPZ =21m.50s., eZ =24m.8s., ePPPZ =24m.51s.
La Paz iZ =20m.10s.
Long waves were also recorded at Perth, Wellington, Christchurch, Triest, Kiruna, Kew, De Bilt, Potsdam, Collmberg, Granada, Palisades, Pasadena, Scoresby Sund, Fort de France, and Bermuda.

Aug. 12d. 21h. 19m. 40s. Epicentre 44°·2N. 10°·2E. (as on 1951, June 11d.).

Intensity V in Tuscany between Garfagnana and the Apennines.
Epicentre 44°08′N. 10°12′E. (Rome).
Monthly Seismic Bulletin of the I.N.G., Rome, Aug., 1951, p.10.

$A = +·7079$, $B = +·1274$, $C = +·6947$; $\delta = -4$; $h = -3$;
$D = +·177$, $E = -·984$; $G = +·684$, $H = +·123$, $K = -·719$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Prato		0·7	116	i 0 8	P_g	i 0 17	S_g	—	—	—
Bologna		0·8	70	e 0 15	P_g	i 0 33	+ 2	i 0 27	S_g	—
Pavia		1·2	323	e 0 30	+ 6	i 0 51	+10	—	—	—
Salo		1·4	9	i 0 29	+ 2	i 0 50	+ 4	i 0 33	P_g	i 0·9
Rome		2·8	144	e 0 48	+ 1	i 1 25	+ 3	0 56	P_g	i 2·6
Triest		2·9	60	e 0 45	− 3	e 1 34	+10	e 0 55	P_g	—
Zürich		3·4	340	e 0 55	0	e 1 49	S_g	—	—	—
Ravensburg		3·6	354	e 1 4	P*	e 1 53	S*	e 2 4	S_g	—
Basle		3·8	332	e 1 1	0	e 2 9	S_g	—	—	—
Besançon		4·2	317	i 1 9	+ 2	i 1 57	0	e 1 19	P*	—
Stuttgart	z.	4·6	352	e 1 11	− 1	e 2 10	+ 3	e 1 29	P_g	—
Strasbourg		4·7	340	i 1 13	− 1	i 2 10	0	i 1 32	P_g	—
Karlsruhe		5·0	345	e 1 32	P*	e 2 28	S*	e 1 44	P_g	—
Clermont-Ferrand		5·2	290	i 0 26	−55	i 2 28	+ 6	i 2 52	S_g	—
Sonneberg		6·2	6	e 1 56?	P*	e 2 48	0	e 2 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.
Prague		6·5	25	e 1 52?	P*	e 2 58	+ 3	e 3 32	S_g	—
Jena		6·8	9	c 1 44?	0	c 3 0	− 3	e 2 12	P_g	—
Paris		7·0	314	i 1 47	+ 1	i 3 9	+ 1	i 2 18	P_g	—
Collmberg		7·3	14	e 1 47	− 3	e 3 17	+ 2	e 2 28	P_g	—
Belgrade	z.	7·4	81	—	—	e 3 6	−12	e 3 46	S*	—
Raciborzu		8·0	40	e 2 30	P_g	e 4 7	S*	e 4 30	S_g	e 4·8
Istanbul	z.	14·2	96	e 3 30	+ 6	—	—	—	—	—
Tamanrasset	z.	21·7	193	i 4 54k	− 1	—	—	i 5 27	PPP	—

Additional readings :—
Pavia iZ = e = 0m.57s. and 1m.5s.
Salo iN = 56s.
Rome iS_g = 1m.38s.
Ravensburg e = 1m.8s., 1m.16s., and 2m.14s.
Besançon i = 1m.27s., iP_g = 1m.33s., i = 1m.44s., iS = 2m.5s., iS* = 2m.22s., iS_g = 2m.36s., i = 2m.42s. and 3m.5s.
Stuttgart eP_g?Z = 1m.39s., eZ = 2m.4s., 2m.20s., and 2m.36s., eS_g?Z = 2m.46s. and 2m.53s., eZ = 3m.4s.
Strasbourg e = 1m.38s., i = 1m.44s., iS? = 2m.2s., i = 2m.17s. and 2m.26s., eS* = 2m.31s., e = 2m.39s., iS_g? = 2m.46s.
Karlsruhe e = 2m.43s.
Clermont-Ferrand i = 1m.49s.
Sonneberg eN = 2m.42s., eE = 3m.12s., eS_gE = 3m.23s., eS_gN = 3m.26s., eE = 4m.40s.
Prague iP_g = 2m.16s., e = 2m.24s., 2m.37s., and 2m.46s., eS = 2m.49s., e = 3m.6s., eS* = 3m.12s., e = 3m.23s., eS_g = 3m.38s.
Jena eN = 2m.20s., eE = 2m.33s., eS?E = 2m.56s., eS_gE = 3m.37s., eS_gN = 3m.40s., eN = 3m.49s., eE = 3m.57s., eN = 4m.6s., and 4m.32s.
Paris i = 1m.55s., 2m.1s., 2m.30s., 3m.0s., and 3m.3s., iS_g = 3m.57s., e = 4m.13s., i = 4m.21s., and 4m.30s.
Collmberg eZ = 3m.29s., eEZ = 3m.45s., eZ = 3m.55s., eE = 4m.6s., eZ = 4m.12s., eS*EZ = 4m.20s.
Belgrade eZ = 4m.1s. and 5m.3s.
Raciborzu eZ = 3m.55s., eS_g?Z = 4m.33s., eZ = 4m.59s.
Long waves were also recorded at Ogyalla, Timisoara, Potsdam, and Kew.

Aug. 12d. Readings also at 0h. (near Granada), 1h. (Tacubaya), 2h. (near Mizusawa and near Dzhergetal), 3h. (Apia and near Ashkabad), 5h. (La Paz and near Huancayo), 6h. (Santa Lucia, near Khorog, Andijan, Samarkand, Dzhergetal, and Obi-garm), 7h. (La Paz, Poona, near New Delhi, and near Dzhergetal), 8h. (Apia and Brisbane), 9h. (Copiapo and Apia (2)), 10h. (near Istanbul), 11h. (near Apia), 12h. (near Alicante), 13h. (Kimberley), 14h. (Dzhergetal and near Obi-garm), 15h. (Kimberley, Mary, near Lunacharskoe, Frunse, Krasnogorka, Almata II, Tchimkent, Tashkent, Khorog, Andijan, Samarkand, and Stalinabad), 18h. (Apia), 19h. (near Dzhergetal), 20h. (near Istanbul), 21h. (Brisbane, near Obi-garm, Tchimkent, Tashkent, Khorog, Andijan, Stalinabad, and Dzhergetal), 22h. (Pavia and Weston), 23h. (Apia, Tuai, Wellington, Palomar, Mount Wilson, La Paz, and near Huancayo).

Aug. 13d. 6h. 30m. 53s. Epicentre 42°·3N. 142°·4E. Depth of focus 0·005.
(as on 1950, Jan. 12d.).

Intensity IV at Urakawa, Ogifushi, Hiroo ; II-III at Obihiro, Hatinohe, Misono, and Shimamatu. Epicentre 42°·2N. 142°·2E. Depth 50km.

Seismo. Bull. Cent. Met. Obs., Japan, Aug., 1951, Tokyo, 1951, p.194, with macroseismic chart.

A = −·5878, B = +·4527, C = +·6706 ; δ = +15 ; h = −3 ;
D = +·610, E = +·792 ; G = −·531, H = +·409, K = −·742.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Urakawa	0·3	118	0 11 a	− 1	0 18	− 2
Obihiro	0·9	44	0 16	− 2	0 28	− 3
Muroran	1·1	272	0 19	− 1	0 31	− 5
Sapporo	1·1	315	0 11	− 9	0 27	− 9
Ashigawa	1·5	359	0 37	+11	0 52	+ 7
Kusiro	1·6	65	0 27	0	—	—
Aomori	1·9	219	0 31	0	0 55	+ 1
Hatinohe	1·9	200	0 29	− 2	0 50	− 4
Abashiri	2·2	39	0 42	+ 7	—	—
Nemuro	2·6	66	0 39	− 2	1 9	− 3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Miyako		2·7	187	0 38	− 4	1 7	− 7
Morioka		2·8	200	0 42	− 2	1 13	− 4
Akita		3·1	215	0 49	+ 1	1 26	+ 2
Mizusawa	E.	3·3	197	0 51	0	1 25	− 4
Isinomaki		3·9	192	1 10	+11	1 46	+ 2
Sakata		3·9	210	1 7	+ 8	2 4	+20
Sendai		4·2	198	1 1	− 2	1 43	− 9
Hukusima		4·8	200	1 20	+ 8	2 4	− 3
Inawasiro		5·1	201	1 19	+ 3	2 23	+ 9
Mito		6·1	196	2 19	?	—	—
Utunomiya		6·1	200	2 31	S	(2 31)	− 8
Maebasi		6·4	205	1 36	+ 2	3 2	+16
Kumagaya		6·6	202	1 41	+ 4	2 47	− 4
Oiwake		6·7	208	1 40	+ 2	—	—
Tokyo		6·9	198	2 55	S	(2 55)	− 4
Hunatu		7·3	204	3 12	S	(3 12)	+ 3
Misima		7·7	202	1 51	− 1	3 15	− 4

Mizusawa gives also eSN = 1m.35s.

Aug. 13d. 18h. 33m. 30s. Epicentre 40°·8N. 33°·4E. (as on 1947, Dec. 19d.).

Destructive Earthquake in Anatolia, particularly near Kursunlu. Much damage to buildings and many casualties.

Mlle. N. Pinar.
Etude géologique et macroséismique du tremblement de terre de Kursunlu du 13 Août, 1951. Revue de la Faculté des Sciences. Université d'Istanbul, Série A, Tome 18, fasc. 2, 1953, pp.131-142, with isoseismic map.

Mlle. N. Pinar.
Le tremblement de terre de Kursunlu du 13 Août, 1951. Symposuim on Seismic studies. Bulletin of Information U.G.G.I., second year, 1953, pp. 264-267.

Mlle. H. Labrouste et Mlle. N. Pinar.
Etude microséismique des tremblements de terre du 23 Juillet, 1949, et du 13 Août, 1951, en Turquie. Symposium on Seismic studies, Bulletin of information, U.G.G.I., 1953, pp.267-269.

Epicentre 40°50′·5N. 33°16′·5E. (Labrouste and Pinar.
40°·9 N. 33°·2 E. (Strasbourg).
40°36′ N. 33°37′·5E. (Istanbul).

The epicentre based on observations would lie appreciably further west than that adopted. The macroseismic evidence for this position is so definite that it is necessary to regard the residuals in the observations as due to some effect distinct from that of error in determination.

$A = +·6338$, $B = +·4179$, $C = +·6509$; $\delta = +1$; $h = -2$;
$D = +·550$, $E = -·835$; $G = +·543$, $H = +·358$, $K = -·759$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul	z.	3·3	275	i 0 47	− 6	—	—	—	—	—
Yalta		3·7	9	0 59	− 1	1 48	+ 3	—	—	—
Simferopol		4·2	7	e 1 5	− 2	—	—	—	—	—
Theodosia		4·5	19	i 1 12	+ 1	—	—	—	—	—
Sotchi		5·5	57	i 1 32	+ 7	—	—	—	—	—
Bucharest		6·5	306	i 1 30	− 9	i 2 28	−27	i 1 54	P*	—
Zugdidi		6·6	72	1 44	+ 3	—	—	—	—	—
Kishinev		7·0	334	1 39	− 7	—	—	—	—	—
Ksara		7·2	164	i 1 52k	+ 3	—	—	—	—	—
Piatigorsk		7·8	63	2 2	+ 4	—	—	—	—	—
Sofia		7·8	288	i 1 48	−10	i 3 22	− 6	2 28	P_g	i 3·8
Leninakan		7·9	87	e 2 8	+ 9	—	—	—	—	—
Athens		8·0	252	e 1 52a	− 8	e 3 27	− 6	i 2 7	PP	—
Gori		8·1	78	2 9	+ 7	—	—	—	—	—
Erevan		8·5	90	i 2 14	+ 7	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tiflis		8·6	80	i 2 17	+ 8	i 3 55	+ 7	—	—	—
Kirovobad		9·8	86	i 2 33	+ 9	—	—	—	—	—
Goris		10·0	93	i 2 36	+ 9	—	—	—	—	—
Timisoara		10·2	303	i 2 21	−10	i 4 10	−17	—	—	—
Belgrade		10·3	297	i 2 26a	− 6	i 4 33	+ 3	i 3 15	P_g	—
Helwan		11·0	188	i 2 38a	− 4	e 4 39	− 8	—	—	—
Uzhgorod		11·1	319	2 34	− 9	—	—	—	—	—
Lwow		11·2	327	i 2 33	−11	—	—	—	—	—
Kecskemet		11·6	306	e 2 45	− 5	—	—	—	—	e 5·9
Kalossa		11·9	304	e 2 47	− 7	5 35	+26	2 53	PP	i 6·2
Lenkoran		12·0	95	i 3 3	+ 8	—	—	—	—	—
Budapest		12·3	308	2 48	−11	5 40	+22	3 0	PP	—
Taranto		12·3	274	2 50	− 9	5 14	− 4	—	—	e 6·9
Skalnate Pleso		12·5	317	2 54	− 8	e 5 17	− 6	e 3 22	PP	e 6·5
Baku		12·6	87	i 3 11	+ 8	—	—	—	—	—
Ogyalla		13·0	308	2 59	−10	e 5 37	+ 2	e 3 27	PP	e 6·6
Messina	z.	14·0	265	i 3 13a	− 9	i 6 19	+20	—	—	i 7·4
Raciborzu		14·1	316	e 3 13	−10	i 5 54	− 8	i 3 26	PP	—
Vienna		14·2	307	e 3 16	− 8	i 6 13	+ 9	—	—	—
Triest		15·1	295	i 3 28	− 8	i 6 14	−11	i 4 43	PPP	i 8·7
Moscow		15·2	9	i 3 33	− 5	i 6 16	−12	—	—	—
Rome		15·7	281	i 3 36k	− 8	i 6 46	+ 7	i 3 50	PP	8·1
Prague		16·2	311	i 3 40k	−10	e 6 46	− 5	e 4 18	PP	e 7·5
Bologna		16·6	290	e 3 48	− 8	i 6 16	−44	i 4 22	PP	e 9·0
Prato		16·7	288	i 3 48	− 9	i 7 9	+ 6	—	—	—
Salo		17·3	295	e 4 2k	− 2	i 7 32	+16	i 4 16	PP	i 9·4
Cheb		17·4	310	3 58	− 8	e 7 15	− 4	e 4 17	PP	e 7·9
Collmberg		17·6	313	i 3 58	−10	i 7 24	+ 1	e 4 40	PP	—
Kizyl-Arvat		17·6	86	i 4 13	+ 5	i 7 31	+ 8	—	—	—
Potsdam		18·1	317	i 4 4k	−10	i 7 27	− 8	i 4 22	PP	9·5
Jena		18·2	314	e 4 6	−10	i 7 34	− 3	i 4 30	PP	i 9·0
Pavia		18·2	293	e 4 7k	− 9	—	—	e 4 16	PP	—
Tunis		18·6	266	e 4 18	− 3	i 7 46	0	i 4 23	PP	10·2
Sonneberg		18·7	309	i 4 8	−14	i 7 38	−10	i 4 29	PP	i 9·3
Stuttgart		18·9	304	i 4 16k	− 8	i 7 50	− 3	i 4 34	PP	i 9·0
Zürich		19·0	300	e 4 15k	−11	e 7 50	− 5	—	—	—
Pulkovo		19·1	356	i 4 19	− 8	—	—	—	—	—
Karlsruhe		19·4	306	i 4 22	− 8	i 7 58	− 6	i 4 44	PP	e 10·3
Ashkabad		19·5	90	i 4 35	+ 4	—	—	—	—	—
Basle		19·7	300	e 4 24k	−10	e 8 5	− 5	—	—	—
Strasbourg		19·8	304	i 4 27	− 8	i 8 5	− 8	i 9 0	PcP	e 9·9
Helsinki		20·1	348	e 4 31	− 7	e 7 54	−25	i 4 52	PP	e 9·8
Copenhagen		20·3	326	e 4 31	− 9	e 8 5	−18	—	—	—
Besançon		20·7	297	i 4 35	− 9	i 8 29	− 2	i 5 21	PP	—
Marseilles		20·9	287	e 4 44	− 2	e 8 33	− 2	i 4 52	PP	e 10·5
Heerlen		21·5	309	i 4 49	− 3	—	—	—	—	—
Upsala		21·5	339	i 4 46k	− 6	i 8 31?	−16	i 5 9	PP	e 9·5
Witteveen	z.	21·8	315	i 4 51	− 5	—	—	—	—	—
De Bilt		22·3	312	i 4 53k	− 8	e 8 54	− 8	—	—	e 10·9
Clermont-Ferrand		22·5	296	i 4 56	− 6	i 8 53	−12	i 5 15	PP	e 11·6
Paris		23·2	301	e 5 1	− 8	i 9 6	−12	i 5 14	pP	e 11·0
Barcelona		23·5	284	i 5 6	− 6	i 9 19	− 4	—	—	e 10·6
Sverdlovsk		23·8	39	i 5 17	+ 2	9 29	+ 1	—	—	—
Algiers Univ.	z.	23·9	270	i 5 8k	− 8	e 9 31	+ 1	e 5 49	PP	—
Bagnères		24·8	287	e 5 17	− 8	e 9 40	− 6	i 5 57	PP	e 11·8
Tortosa		24·8	281	i 5 19	− 6	i 9 39	− 7	—	—	—
Kew		25·5	307	i 5 24k	− 8	i 9 48	− 9	i 5 54	PP	e 13·5
Alicante		26·1	277	i 5 34	− 3	i 10 10	+ 3	5 44	pP	e 12·3
Bergen		26·2	329	i 5 38k	0	i 10 10	+ 1	i 6 8	PP	—
Jersey	E.	26·3	302	e 5 30	− 9	e 10 3	− 8	e 6 15	PP	13·0
Tashkent		26·9	77	e 5 49	+ 4	—	—	—	—	—
Durham		27·0	313	e 5 45	0	i 10 38	+16	—	—	i 14·0
Tchimkent		27·0	74	i 5 47	+ 2	—	—	—	—	—
Stalinabad		27·2	82	i 5 50	+ 3	10 54	+29	—	—	—
Obi-garm		27·9	82	e 5 56	+ 2	e 10 35	− 2	—	—	—

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.	28·0	319	i 5 46	− 9	i 10 16	−22	i 6 25	PP	17·5
Kiruna		28·0	352	i 5 51k	− 4	i 10 24	−14	i 6 25	PP	—
Almeria		28·1	274	i 5 53	− 2	i 10 35	− 5	i 6 39	PP	i 16·4
Edinburgh	E.	28·2	315	i 5 51	− 5	i 10 34	− 7	i 6 33	PP	—
Toledo		28·4	281	i 5 53	− 5	i 10 35	−10	6 38	PP	13·2
Granada		28·8	276	i 5 56a	− 6	i 10 38	−13	6 17	pP	i 15·5
Dzhergetal		28·9	80	i 6 6	+ 3	—	—	—	—	—
Andijan		29·3	78	i 6 10	+ 4	—	—	—	—	—
Rathfarnham Castle		29·4	310	i 5 59k	− 8	i 10 41	−20	i 6 50	PP	e 14·5
Tamanrasset	Z.	29·5	242	i 6 3k	− 5	i 11 21	+19	e 13 1	PcS	15·5
Malaga		29·6	276	i 6 8	− 1	i 11 2	− 2	7 2	PP	13·8
Frunse		30·5	72	i 6 21	+ 4	—	—	—	—	—
Naryn		31·9	73	i 6 28	− 1	—	—	—	—	—
Ili		32·1	69	i 6 32	+ 1	—	—	—	—	—
Almata		32·2	72	i 6 35	+ 3	—	—	—	—	—
Almata II		32·5	72	e 6 38	+ 4	—	—	—	—	—
Lisbon		32·6	281	i 6 34k	− 1	i 11 44	− 7	i 7 38	PP	e 14·9
Przhevalsk		33·4	71	6 45	+ 3	—	—	—	—	—
Dehra Dun	N.	37·4	91	(e 7 18)	+ 2	(e 13 18)	+13	(e 16 12)	SSS	(e 20·5)
New Delhi		37·7	95	i 7 26	+ 7	i 13 17	+ 7	8 53	PP	18·4
Reykjavik		39·2	326	i 7 29	− 2	e 13 34	+ 2	e 8 34	PP	e 18·4
Bombay		40·1	111	e 7 42	+ 3	i 13 47	+ 1	9 27	PP	19·0
Scoresby Sund		40·7	335	i 7 43	− 1	i 13 47	− 8	i 9 22	PP	19·5
Poona		41·1	110	i 7 50	+ 3	13 53	− 8	9 38	PP	20·0
Lome		44·9	231	i 8 4	−14	i 14 50	− 6	i 9 50	PP	e 21·4
Hyderabad	E.	45·1	107	i 8 28	+ 8	i 15 3	+ 4	18 28	SS	22·0
Irkutsk		48·2	51	e 8 46	+ 2	—	—	—	—	—
Kodaikanal	E.	49·3	115	e 8 57	+ 4	i 16 9	+10	11 11	PP	23·3
Calcutta	E.	49·4	94	i 9 0a	+ 7	i 16 9	+ 9	10 22	PcP	23·4
M'Bour		51·0	254	i 9 3	− 3	i 16 5	−17	e 11 16	PP	25·7
Ivigtut		51·4	322	i 9 6	− 3	i 16 17	−11	10 37	PcP	22·1
Colombo	E.	53·4	116	9 29	+ 5	17 2	+ 7	—	—	30·0
Tananarive		60·8	165	10 23?	+ 7	e 18 48	+15	12 44	PP	e 26·8
Pretoria	Z.	66·4	185	i 10 51	− 2	—	—	—	—	—
Nanking		66·7	68	10 59k	+ 4	i 19 50	+ 4	—	—	—
Halifax		67·1	310	10 58	+ 1	19 46	− 5	13 32	PP	—
Vladivostok		68·8	52	i 11 7	− 1	—	—	—	—	—
Zi-ka-wei	Z.	69·0	67	e 11 10a	+ 1	20 12	− 2	—	—	—
Seven Falls	E.	69·6	316	11 8	− 5	20 15	− 6	15 19	PPP	29·5
Kimberley	Z.	69·7	188	i 11 10	− 4	—	—	—	—	—
Pietermaritzburg	Z.	70·1	182	i 11 20	+ 4	—	—	—	—	—
Shawinigan Falls	N.	71·0	316	11 22	0	20 30	− 7	14 3	PP	—
Harvard		72·9	311	i 11 34	+ 1	i 21 9	+10	i 14 14	PP	e 33·2
Weston		72·9	311	e 11 29	− 4	e 20 56	− 3	e 25 30	SS	—
Wakkanai		72·9	45	e 11 42	+ 9	e 19 50	−69	e 14 5	PP	e 39·7
Ottawa		73·3	317	11 32	− 3	21 5	+ 1	14 20	PP	—
Hukuoka		73·7	60	e 11 47	+ 9	21 16	+ 8	26 12	SS	35·3
Saga		73·8	60	e 11 45	+ 7	—	—	—	—	—
Hamada		73·9	58	11 43	+ 4	e 21 19	+ 9	e 11 51	PcP	42·2
Nagasaki		73·9	61	e 11 52	+13	—	—	—	—	35·4
Grahamstown	Z.	74·0	186	i 16 43?	PPP	—	—	—	—	—
Kumamoto		74·3	61	e 12 12	+31	21 33	+18	—	—	30·1
Sapporo		74·3	47	e 11 35	− 6	e 20 58	−17	e 11 40	PcP	e 36·8
Mori	E.	74·4	48	i 11 53	+11	e 23 6	?	—	—	40·5
Hirosima		74·5	58	e 11 46	+ 4	e 21 19	+ 2	—	—	e 35·0
College		74·7	1	i 11 40	− 3	i 22 51	?	—	—	—
Ooita		74·7	60	e 11 52	+ 9	e 22 6	?	—	—	37·9
Kagosima		75·0	62	e 11 50	+ 5	21 32	+ 9	e 29 49	SSS	34·9
Matuyama		75·0	59	e 11 54	+ 9	e 21 32	+ 9	—	—	—
Bermuda		75·1	301	i 11 46	0	i 21 16	− 8	i 14 40	PP	e 34·5
Abasiri		75·2	44	e 11 57	+11	21 30	+ 5	—	—	41·1
Fordham		75·3	312	e 11 43	− 4	i 21 24	− 2	—	—	37·5
Palisades		75·3	312	i 11 47k	0	i 21 12	−14	—	—	e 35·2
Toyooka		75·3	56	i 11 50	+ 3	21 34	+ 8	—	—	—
City College, N.Y.		75·4	312	e 11 45	− 2	i 21 13	−14	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Aomori		75·4	49	e 11 59	+12	i 21 33	+ 6	i 13 52	PP	—
Obihiro		75·4	46	e 11 58	+11	—	—	—	—	—
Wazima		75·4	53	e 11 55	+ 8	—	—	—	—	e 42·8
Kôti		75·7	58	e 11 56	+ 7	e 21 29	− 1	e 26 28	SS	36·7
Urakawa		75·7	48	e 11 56	+ 7	e 21 31	+ 1	e 15 6	PP	e 34·4
Yakusima		75·7	63	e 11 54	+ 5	—	—	—	—	—
Aikawa		75·8	52	e 11 31	−19	21 19	−12	—	—	39·8
Kanazawa		75·8	55	e 11 56	+ 6	e 21 29	− 2	—	—	e 37·7
Simidu		75·8	59	12 3	+13	21 38	+ 7	—	—	37·0
Hatinohe		76·0	49	e 11 59	+ 8	e 21 34	0	e 14 45	PP	e 35·6
Kusiro		76·0	46	e 11 57	+ 6	e 21 44	+10	—	—	i 43·3
Toyama		76·0	54	e 11 55	+ 4	e 21 24	−10	e 12 21	pP	e 40·9
Tsuruga		76·0	56	11 57	+ 6	e 21 38	+ 4	—	—	42·7
Kobe		76·1	57	e 11 54	+ 3	e 21 46	+11	e 13 10	PcP	e 44·6
Sumoto		76·1	57	11 56	+ 5	21 33	− 2	—	—	e 30·8
Kyoto		76·2	56	e 12 0	+ 8	e 21 37	+ 1	—	—	e 30·5
Sakata		76·2	50	i 12 7	+15	21 46	+10	14 34	PP	—
Niigata		76·3	52	11 33	−19	21 37	0	—	—	—
Osaka		76·3	57	e 11 59	+ 7	e 21 52	+15	—	—	e 39·0
Morioka		76·4	50	e 11 59	+ 6	e 21 38	0	—	—	e 30·9
Takayama		76·4	55	e 12 4	+11	e 21 38	0	—	—	—
Gihu		76·6	55	e 12 0	+ 6	e 21 40	0	—	—	—
Nagano	N.	76·6	54	e 12 0	+ 6	e 21 44	+ 4	26 42	SS	44·0
Matusiro		76·7	53	11 59	+ 4	21 44	+ 3	16 52	PPP	43·4
Kameyama		76·8	56	11 59	+ 4	21 44	+ 2	—	—	e 43·3
Matumoto		76·8	54	e 11 48	− 7	e 21 49	+ 7	e 12 41	PcP	e 27·2
Miyako		76·9	49	e 11 58	+ 2	e 21 42	− 1	—	—	—
Nagoya		76·9	55	11 58	+ 2	e 21 37	− 6	—	—	e 43·1
Tu		76·9	56	12 5	+ 9	21 54	+11	—	—	38·4
Oiwake		77·1	54	e 12 6	+ 9	22 30	+44	—	—	—
Owase		77·1	57	12 5	+ 8	22 20	+34	—	—	—
Sendai		77·2	51	e 11 59	+ 2	21 42	− 5	21 57	ScS	—
Siomisaki		77·2	58	e 11 47	−10	e 21 53	+ 6	i 15 27	PP	e 27·2
Hukusima		77·3	52	12 4	+ 6	21 51	+ 3	—	—	e 32·5
Maebasi	z.	77·3	54	i 12 3	+ 5	—	—	—	—	—
Kohu		77·5	55	e 12 6	+ 7	—	—	—	—	—
Pennsylvania		77·6	314	i 11 58	− 2	i 21 50	− 1	e 14 45	PP	—
Titibu		77·6	54	e 12 7	+ 7	—	—	—	—	—
Kumagaya		77·7	54	12 5	+ 5	21 48	− 4	—	—	i 43·8
Utunomiya		77·7	53	e 12 4	+ 4	—	—	—	—	—
Hunatu		77·8	54	12 3	+ 2	21 53	0	—	—	31·1
Omaesaki		78·0	55	12 9	+ 7	22 3	+ 8	—	—	44·2
Misima		78·1	54	12 2	0	22 1	+ 5	12 12	PcP	35·0
Onahama		78·1	53	12 14	+12	22 8	+12	—	—	—
Tukubasan		78·1	54	e 11 58	− 4	e 22 0	+ 4	—	—	—
Mito		78·2	53	12 9	+ 6	i 22 1	+ 4	—	—	—
Tokyo		78·2	54	12 10	+ 7	22 0	+ 3	e 15 9	PP	—
Washington		78·5	312	e 12 6	+ 2	—	—	—	—	—
Osima		78·6	55	e 12 5	0	e 21 59	− 3	—	—	41·0
New Kensington		78·8	315	e 11 59	− 7	i 21 53	−11	—	—	—
Manila		78·8	81	i 12 12	+ 6	e 21 47	−17	e 14 54	PP	e 27·5
Pittsburgh		79·0	315	i 12 9	+ 2	e 22 1	− 5	i 15 9	PP	—
Cleveland		79·1	317	e 12 7k	− 1	e 22 1	− 6	—	—	34·9
Morgantown		79·6	313	i 12 9	− 1	e 22 12	0	—	—	—
Saskatoon		81·1	337	12 23	+ 5	22 25	− 3	26 45	SS	39·7
Djakarta		81·6	106	i 12 25	+ 4	i 22 42	+ 9	i 29 43	SSP	e 35·7
Chicago		82·0	321	e 12 14	− 9	e 22 15	−22	e 16 42	PP	—
Sitka		82·1	354	e 12 28	+ 4	i 18 38	?	15 55	PP	—
Cincinnati		82·4	317	i 12 26	+ 1	i 22 30	−11	—	—	e 44·5
Bandong		82·7	105	e 12 26	− 1	e 22 44	0	e 25 17	?	34·3
Fort de France		83·9	284	i 12 31	− 2	i 22 57	+ 1	—	—	—
Columbia		84·2	311	e 12 35	+ 1	e 22 50	− 9	—	—	—
San Juan		85·1	290	e 12 40	+ 1	—	—	e 16 31	PP	—
Florissant		85·6	320	e 12 42	+ 1	i 23 10	− 3	e 23 0	SKS	—
St. Louis		85·7	320	e 12 39	− 3	i 23 11	− 3	e 15 39	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hungry Horse		86·7	340	i 12 44	− 3	e 23 32	+ 8	e 23 1	SKS	—
Rapid City		86·9	331	e 12 29	−19	e 22 50	[−23]	—	—	—
Bozeman		88·2	337	e 12 58	+ 4	e 23 31	− 7	—	—	—
Butte		88·4	338	i 12 53	− 2	e 23 42	+ 2	—	—	—
Victoria		88·7	345	e 12 54	− 3	23 36	− 7	e 16 34	PP	36·9
Seattle		89·3	344	i 13 3k	+ 4	i 23 54	+ 6	e 16 37	PP	e 38·5
Shasta Dam		96·0	342	i 13 27	− 3	e 26 19	PS	—	—	—
Galerazamba		96·8	291	e 16 52	PP	e 24 55	+ 1	e 31 15	SS	39·5
Boulder City		98·2	335	e 13 41	+ 1	—	—	—	—	—
Tinemaha	z.	98·3	337	e 13 44	+ 3	e 30 49	SS	—	—	—
Berkeley		98·6	341	e 13 53k	+11	e 24 30	[+10]	e 17 52	PP	e 45·1
Lick	z.	98·9	341	e 13 46k	+ 3	—	—	i 17 13	PP	—
Fresno		99·0	339	e 13 45a	+ 1	e 24 26	[+ 4]	e 17 34	PP	e 51·9
Santa Clara	E.	99·0	341	—	—	e 25 23	+11	—	—	e 46·2
China Lake	z.	99·2	337	e 13 46	+ 1	e 30 45	PKKP	i 17 51	PP	—
Bogota		100·1	286	i 16 44	PP	e 24 11	[−16]	e 27 37	PPS	46·5
Tucson		100·2	330	e 13 51	+ 2	e 26 58	PS	18 8	PP	—
Riverside	z.	100·8	336	e 13 59	+ 7	—	—	—	—	—
Pasadena		101·0	336	e 13 53	0	e 24 12	[−20]	e 17 49	PP	e 40·5
Chinchina		101·0	287	i 13 53	0	i 24 23	[− 9]	i 18 1	PP	49·9
Palomar	z.	101·3	335	e 13 57	+ 3	i 30 13	PKKP	—	—	—
Perth		104·9	120	—	—	i 36 25	SSS	—	—	e 47·6
Tacubaya		105·7	314	e 18 35	PP	e 24 29	[−25]	i 20 20	PPP	—
La Paz		109·2	266	e 14 42	P	i 28 45	PS	19 12	PP	45·9
Huancayo		111·9	274	e 18 45	[+ 8]	e 27 12	S	e 15 58	?	e 45·5
La Plata		112·7	244	15 54	P	28 36	PS	20 48	PP	47·0
Brisbane	z.	129·2	95	i 19 19k	[+ 9]	—	—	—	—	—
Riverview		130·9	103	i 22 43	PKS	e 26 11	[−11]	e 33 23	PPS	e 64·3
Terre Adélie		133·7	149	e 19 23	[+ 4]	—	—	—	—	—
Apia		145·3	46	19 50	[+10]	—	—	e 22 11	PKS	—
Kaimata	N.E.	148·8	108	e 20 11	[+26]	—	—	—	—	—
Cobb River	E.	149·5	104	e 19 54	[+ 7]	—	—	e 19 59	PKP_2	—
Christchurch		149·9	110	i 20 4	[+17]	e 30 20	PKKP	e 24 5	PP	e 75·0
Karapiro	N.	150·7	97	e 19 30?	[−18]	—	—	—	—	—
Wellington		151·0	104	i 20 4	[+15]	i 33 57	SP	20 28	PKP_2	e 80·9
Tuai	N.	152·2	99	e 20 8	[+17]	—	—	e 20 24	PKP_2	—

Additional readings :—
Bucharest iP*EN =1m.45s., iN =2m.51s.
Sofia iEN =2m.8s., 2m.52s., and 3m.6s.
Athens iSS? =3m.45s.
Belgrade iZ =2m.36s., 3m.0s., and 3m.44s., iNE =5m.9s.
Kecskemet eE =3m.3s., eN =3m.21s., 4m.15s., and 4m.38s.
Kalossa PPN =2m.57s., PPPE =3m.7s., PPPN =3m.12s. and other i readings.
Budapest PPPEN =3m.13s., SN =5m.45s., SSN =6m.2s., SSSE =6m.20s., SSSN = 6m.27s.
Taranto e =4m.44s.
Skalnate Pleso e =3m.52s. and 4m.44s., eN =4m.50s., eE =5m.54s.
Ogyalla e =4m.10s., 4m.27s., 4m.47s., 5m.10s., 5m.30s., and 6m.0s.
Messina iZ =4m.17s. and 5m.45s.
Raciborzu iPZ =3m.16s., iPPZ =3m.29s., iPPPE =3m.35s., iPPPN =3m.38s., iSNZ = 5m.59s., iSSE =6m.16s., iSSSE =6m.29s.
Bologna i =5m.40s. and 7m.13s.
Salo iE =4m.11s., iN =5m.5s.?.
Cheb e =4m.41s., 5m.0s., 6m.3s., and 6m.40s.
Collmberg eEN =5m.26s. and 7m.13s.
Potsdam iPPEN =4m.36s., iEN =5m.7s., iSSEN =7m.59s., iSSSE =8m.5s.
Jena iPN =4m.9s., iN =4m.18s. and 4m.33s., iE =4m.59s., iS?E =5m.26s., iE =7m.43s.
Pavia eZ =4m.33s. and 5m.39s., iN =6m.45s., iE =6m.49s.
Tunis iPPP =4m.36s., i =4m.54s., iSS =8m.10s., i =9m.30s.
Stuttgart i =5m.53s., iSS =8m.39s.
Karlsruhe iEZ =4m.38s., iZ =5m.11s. and 6m.7s., iNZ =6m.42s., iE =7m.37s. and 7m.44s., iSS =8m.46s.
Strasbourg i =5m.15s., 5m.40s., 6m.5s., 6m.23s., 6m.33s., and 9m.17s.
Helsinki iPPPZ =5m.1s., iZ =5m.46s., iN =7m.59s., eN =8m.30s.?, eZ =8m.47s.
Copenhagen i =4m.36s.
Besançon i =6m.30s. and 7m.35s.
Marseilles i =4m.56s., 5m.42s., 6m.29s., and 6m.44s., eSS? =9m.11s., e =9m.52s.
Upsala iN =4m.57s. and 5m.51s., iSS =8m.55s., iSSS =9m.14s.
Clermont-Ferrand i =6m.6s., 6m.25s., 6m.37s., 6m.59s., 7m.4s., and 8m.36s., e =9m.21s.
Paris i =5m.4s., iPP =5m.24s., iPPP =5m.36s., iSS =9m.45s. and other unidentified i readings.

Continued on next page.

Algiers Univ. iZ =5m.14s. and 8m.16s., ePcPZ =8m.44s.
Bagnères eP =5m.20s., ePPP =6m.4s. and other unidentified readings.
Kew i =5m.32s., iPPP =6m.4s., i =7m.33s., iSS =10m.59s., eSSS =11m.57s.
Alicante PP =6m.14s., PPP =6m.26s., PcP =9m.6s., i =10m.20s., SS =11m.12s., PcS = 13m.0s.
Bergen eZ =6m.34s., iZ =6m.42s. and 8m.54s., iZ =10m.20s., iN =10m.27s.?.
Jersey eE =7m.16s.
Durham eN =5m.41s., iEN =5m.58s., iN =10m.18s., iE =10m.42s.
Aberdeen iE =5m.53s., 7m.26s., 8m.4s., 10m.33s., 11m.1s., and 12m.26s.
Kiruna i =5m.56s., iZ =5m.59s., iSSZ =11m.35s.
Almeria iPcP =9m.7s.
Toledo PPP =6m.53s., i =10m.54s., SS =11m.55s., SSS =12m.10s., i =12m.33s., ScS = 16m.35s.
Granada iPP =6m.44s., PcP =8m.20s., sS =11m.8s., iSS =12m.55s.
Rathfarnham Castle iPPP =7m.2s., iZ =7m.47s., eSEZ =10m.46s., iSSEN =11m.57s., iSSSEN =12m.14s., eEN =13m.41s.
Malaga iPcP =9m.2s., iPcS =12m.24s., iScS =15m.24s.
Lisbon iPPPEN =7m.56s., eQE =13m.13s.
Dehra Dun readings increased by 3·5m. as suggested in Bulletin.
New Delhi SSN =15m.56s., QN =16m.7s., SSSN =16m.25s.
Reykjavik eE =7m.34s., eZ =8m.42s., i =9m.15s., eEN =10m.3s., eE =11m.14s., eSN =13m.42s., eEN =16m.10s.
Bombay PPPEN =9m.56s., iPSEN =14m.1s., Q =17m.3s.
Scoresby Sund i =7m.46s.
Poona PPPN =10m.12s., ScPN =13m.21s., PSN =14m.25s., SSN =17m.27s.
Lome iPPP =10m.21s., iPS =14m.2s., eScS =17m.8s., eSS =17m.55s., eSSS =19m.22s., and other unidentified readings.
Kodaikanal SSE =19m.44s., QE =20m.56s.
Calcutta PPE =10m.54s., SSE =19m.37s., SSSE =21m.7s.
M'Bour ePPP? =12m.18s., ePS? =16m.54s., eScS =19m.20s., eSS =20m.14s., e = 20m.41s., iQ =20m.47s.
Ivigtut 11m.39s.
Tananarive e =10m.33s. and 10m.41s., PS =19m.9s., ScS =20m.30s., SSS =25m.45s.
Halifax PPP =15m.0s., e =20m.24s., ScS =20m.52s., e =24m.0s., SSS =27m.12s.
Seven Falls iE =20m.27s., ScSE =21m.15s., SSE =24m.45s., SSSE =28m.27s.
Shawinigan Falls SSSN =28m.18s.
Harvard i =13m.40s. and 15m.18s.
Weston iP =11m.34s.
Wakkanai ePPP =16m.15s.
Ottawa i =11m.36s. and 15m.38s., PPP =16m.6s., PS =21m.45s., SS =25m.52s., SSS = 28m.36s.
Hukuoka e =21m.38s., SSS =29m.28s.
Hamada PEN =11m.47s., pP =12m.46s., ePPN =15m.0s., eSPPN =16m.26s., eScS = 21m.40s.
Sapporo eSS =25m.28s., e =29m.40s.
College i =12m.16s.
Bermuda iSS =26m.11s.
Fordham iP =11m.48s.
Aomori i =14m.52s., e =18m.43s.
Urakawa ePPP =16m.51s., eSS =25m.53s., eQ =30m.20s.
Toyama esP =12m.41s., e =30m.4s.
Kobe eZ =12m.2s., eEN =12m.27s., ePPZ =14m.52s., eSZ =22m.24s., eQZ =30m.29s.
Nagano epPN =13m.2s., esPN =13m.42s., Q =30m.35s.
Matusiro i =22m.9s., SS =26m.47s., SSS =30m.34s., i =32m.45s., Q =37m.49s.
Sendai SSE =26m.42s.
Pennsylvania iZ =12m.3s. and 12m.28s., iScSN =22m.20s., iN =22m.55s., eN =30m.14s.
Misima PP =13m.32s., PPP =14m.34s., ScS =22m.7s., SS? =27m.30s.
Tokyo iPPP =16m.33s., SE =22m.3s., e =23m.37s., i =23m.59s., eSS?E =27m.8s.
Manila i =12m.20s.
Saskatoon Q =32m.36s.
Djakarta eSKSN =24m.37s.
Florissant i =23m.17s.
St. Louis iP =12m.43s., iSKS =23m.1s., i =23m.18s.
Hungry Horse ePKKP? =30m.46s., ePKP,PKP,PKP? =62m.43s.
Seattle epPP =16m.54s., esPP =17m.0s., ePPP =18m.24s., iSKS =23m.38s., iPPS = 25m.13s., eSS =29m.34s., ePKKS =34m.20s. and other unidentified readings.
Berkeley eZ =14m.56s. and 16m.56s., iPSN =26m.40s., eSSE =32m.0s.
Lick iZ =14m.16s. and 14m.50s.
Fresno eZ =17m.22s., ePSZ =26m.38s., eZ =30m.15s., ePKKP?Z =30m.42s., eSSZ = 31m.36s.
China Lake eZ =31m.12s.
Pasadena iPPNZ =18m.0s., eSN =26m.54s., iPKKPZ =30m.14s., eZ =30m.37s., iZ = 31m.28s.
Chinchina iSEN =25m.23s., iPSEN =27m.11s.
Palomar eZ =30m.38s.
La Paz iPZ =16m.12s., i =25m.46s., iPPS =30m.2s., iSS =34m.10s., iSSS =37m.42s.
Huancayo e =20m.25s., ePKS? =21m.57s., e =25m.56s., ePS =29m.1s., ePPS =30m.0s., eSS =34m.48s., eSSS =40m.6s.

Continued on next page.

La Plata Z = 21m.54s., NZ = 22m.24s., Z = 23m.36s., PPE = 24m.0s., PSE = 28m.42s., E = 32m.42s., SSN = 34m.54s., SSSN = 39m.36s.
Riverview iE = 26m.23s., eSSSE = 43m.42s., eQN = 55m.24s.
Christchurch iZ = 20m.45s., ePPPZ = 26m.30s., eSKSPE = 33m.40s., ePPSEZ = 36m.40s., eEZ = 42m.15s., eSSEN = 42m.50s., eSSSEN = 48m.45s., eSSSSEN = 53m.0s., eQN = 63m.10s.
Wellington eSS? = 43m.0s., i = 55m.0s., eQ = 62·5m.
Long waves were also recorded at Auckland and Santa Lucia.

Aug. 13d. 22h. 58m. 42s. Epicentre 40°·8N. 33°·4E. (as at 18h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul	Z.	3·3	275	e 0 43?	−10	—	—	—	—	—
Yalta		3·7	9	e 0 52	− 8	1 38	− 7	—	—	—
Simferopol		4·2	7	1 4	− 3	i 1 51	− 6	—	—	—
Theodosia		4·5	19	—	—	2 1	− 4	—	—	—
Sotchi		5·5	57	e 1 28	+ 3	—	—	—	—	—
Bucharest	N.	6·5	306	e 1 44	+ 5	e 2 40	−15	e 2 3	P_g	—
Zugdidi		6·6	72	e 1 47?	+ 6	—	—	—	—	—
Kishinev		7·0	334	1 40	− 6	2 53	−15	—	—	—
Ksara		7·2	164	e 2 8	P*	i 3 29	+16	—	—	—
Piatigorsk		7·8	63	e 2 1	+ 3	—	—	—	—	—
Tiflis		8·6	80	e 2 12	+ 3	—	—	—	—	—
Kirovobad		9·8	86	2 27	+ 3	e 4 19	+ 2	—	—	—
Timisoara	N.	10·2	303	—	—	e 4 55	+28	—	—	e 6·5
Uzhgorod		11·1	319	e 2 39	− 4	—	—	—	—	—
Lwow		11·2	327	i 2 37	− 7	i 4 34	−18	—	—	—
Shemakla		11·6	86	2 51	+ 1	—	—	—	—	—
Lenkoran		12·0	95	e 3 2	+ 7	—	—	—	—	—
Baku		12·6	87	e 3 6	+ 3	—	—	—	—	—
Raciborzu		14·1	316	e 3 38	PP	e 5 54	− 8	e 3 44	PPP	—
Triest		15·1	295	e 3 36	0	—	—	—	—	e 8·7
Moscow		15·2	9	e 3 41	+ 3	—	—	—	—	—
Collmberg		17·6	313	e 4 4	− 4	—	—	—	—	—
Jena		18·2	314	e 4 16	0	—	—	—	—	—
Stuttgart	Z.	18·9	304	e 4 19	− 5	—	—	—	—	—
Pulkovo		19·1	356	—	—	7 42	−15	—	—	—
Strasbourg		19·8	304	e 4 32	− 3	e 5 17	?	—	—	—
Besançon		20·7	297	e 4 41	− 3	—	—	—	—	—
Paris		23·2	301	e 5 3	− 6	—	—	—	—	e 11·3
Sverdlovsk		23·8	39	i 5 16	+ 1	i 9 36	+ 8	—	—	—
Samarkand		25·6	82	e 5 28	− 4	—	—	—	—	—
Tashkent		26·9	77	e 5 48	+ 3	—	—	—	—	—
Kiruna		28·0	352	—	—	e 10 59	+21	e 14 19	Q	e 17·4
Dzhergetal		28·9	80	e 6 3	0	—	—	—	—	—
Tamanrasset	Z.	29·5	242	e 6 8	0	—	—	—	—	—

Additional readings :—
Bucharest ePN = 1m.54s.
Raciborzu eZ = 6m.44s., eNZ = 10m.53s.
Besançon e = 4m.46s. and 6m.10s.
Paris e = 5m.23s. and 5m.42s.
Kiruna eEN = 15m.19s., e = 17m.6s.
Long waves were also recorded at Belgrade, Taranto, Rome, Potsdam, China Lake, and Victoria.

Aug. 13d. Readings also at 0h. (Kaimata, Cobb River, and near Messina), 1h. (Apia), 2h. (Tacubaya), 3h. (Granada, Ottawa, Vera Cruz, near Oaxaca, Puebla, and Tacubaya), 4h. (Nanking and near Zi-ka-wei), 5h. (Apia and near Dzhergetal), 8h. (Lome, Tamanrasset, near M'Bour, and near Tacubaya), 10h. (Kimberley, Pretoria, Pietermaritzburg, Tamanrasset, Ksara, Mount Wilson, Palomar, Riverside, China Lake, and Tinemaha), 11h. (Stuttgart), 13h. (Apia and Calcutta), 14h. (near Dzhergetal), 16h. (Frunse, Obi-garm, Stalinabad, near Andijan, Samarkand, Tashkent, Tchimkent, Alicante, La Paz, and near Huancayo), 17h. (La Plata, Santa Lucia, Antofagasta, Besançon, Paris, Strasbourg, Stuttgart, near Zürich, and near Dzhergetal), 18h. (Alicante (3), Tananarive, Grahamstown (2), Christchurch, Wellington, Terre Adélie, near Horseshoe Bay, and Victoria), 19h. (Istanbul (4)), 20h. (Istanbul (2), Copiapo, and near Antofagasta), 21h. (Aberdeen, Istanbul (2), near Bandong, and Djakarta), 22h. (Jena, Lwow, Istanbul, Kishinev, Tiflis, Sotchi, Theodosia, near Simferopol, Yalta, Apia, Victoria, and near Horseshoe Bay), 23h. (Apia, Auckland, Wellington, Ksara, Istanbul, Tamanrasset, Timisoara, Collmberg (2), Jena (2), Prague, Rome, Taranto, Stuttgart (2), and near Triest).

Aug. 14d. 12h. 12m. 40s. Epicentre 39°·1N. 144°·7E. Depth of focus 0·010.

Intensity II-III at Miyako, Hatinohe, Morioka, Nemuro, Sanuma, etc.
Epicentre as adoptcd. Depth 80km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for Aug., 1951, Tokyo, 1951, pp.194-195, with macroseismic chart on p.194.

$A = -·6351$, $B = +·4496$, $C = +·6281$; $\delta = 0$; $h = -2$;
$D = +·578$, $E = +·816$; $G = -·513$, $H = +·363$, $K = -·778$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.
Miyako		2·2	284	0 33	− 3	0 58	− 4
Isinomaki		2·7	256	0 41	− 2	—	—
Hatinohe		2·8	300	0 40	− 4	1 10	− 7
Mizusawa	E.	2·8	271	0 43	− 1	1 12	− 5
Morioka		2·8	288	0 43a	− 1	1 13	− 4
Sendai		3·1	255	0 45	− 3	1 20	− 4
Urakawa		3·4	335	0 50	− 2	1 26	− 6
Aomori		3·5	301	0 54	0	—	—
Akita		3·6	281	1 2	+ 7	—	—
Hukusima		3·6	249	0 53	− 2	1 32	− 5
Onahama		3·7	235	1 3	+ 7	1 39	0
Inawasiro		3·9	248	1 4	+ 5	1 47	+ 3
Shirakawa		4·1	241	1 1	− 1	1 46	− 3
Mito		4·3	232	1 3	− 2	1 50	− 4
Nemuro		4·3	10	1 7	+ 2	—	—
Tukubasan		4·6	233	1 9	0	2 1	0
Maebasi		5·2	240	1 17a	0	2 14	− 2
Kumagaya		5·2	236	1 18	+ 1	2 12	− 4
Tokyo		5·2	230	1 15	− 2	2 13	− 3
Yokohama		5·4	229	1 17	− 3	—	—
Hunatu		5·9	235	1 27	+ 1	2 34	+11
Matumoto		6·1	243	1 33	+ 4	—	—
Misima		6·1	231	1 30	+ 1	2 41	+ 3
Osima		6·1	226	1 29	0	2 34	− 4
Wazima		6·4	256	1 35	+ 2	—	—
Nagoya		7·3	240	1 41	− 5	—	—

Aug. 14d. 18h. 46m. 0s. Epicentre 40°·8N. 33°·4E. (as on 13d.).

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Istanbul		3·3	275	e 0 51	− 2	e 1 39	+ 4	—	—	—
Yalta		3·7	9	0 57	− 3	i 1 41	− 4	1 37	S*	—
Theodosia		4·5	19	1 9	− 2	2 0	− 5	—	—	—
Sotchi		5·5	57	e 1 26	+ 1	—	—	—	—	—
Bucharest		6·5	306	e 1 40	+ 1	i 2 42	−13	i 3 12	S*	—
Kishinev		7·0	334	1 40	− 6	2 50	−18	—	—	—
Ksara		7·2	164	e 2 7	+18	i 3 35	+22	—	—	—
Sofia		7·8	288	e 2 0	+ 2	i 3 50	S*	4 9	S_g	e 5·0
Gori		8·1	78	e 2 8	+ 6	—	—	—	—	—
Erevan		8·5	90	e 2 13	+ 6	—	—	—	—	—
Nakhichevan		9·3	96	e 2 35?	+18	—	—	—	—	—
Kirovobad		9·8	86	e 2 32	+ 8	i 4 30	+13	—	—	—
Goris		10·0	93	e 2 28	+ 1	—	—	—	—	—
Timisoara	N.	10·2	303	e 2 38	+ 7	e 5 2	S*	—	—	e 6·0
Belgrade		10·3	297	e 3 4a	+32	e 5 19	S*	—	—	e 7·3
Helwan		11·0	188	e 2 45	+ 3	—	—	e 3 38	?	e 7·6
Uzhgorod		11·1	319	i 2 40	− 3	—	—	—	—	—
Shemakla		11·6	86	3 0	+10	—	—	—	—	—
Kalossa		11·9	304	e 4 46	?	—	—	—	—	e 9·5
Budapest		12·3	308	e 4 27	?	e 5 55	SSS	—	—	9·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Skalnate Pleso		12·5	317	e 3 3	+ 1	e 5 27	+ 4	e 3 14	PP	—
Ogyalla		13·0	308	e 3 26	PPP	e 6 16	SSS	e 3 44	?	—
Messina	Z.	14·0	265	e 3 18	− 4	—	—	—	—	—
Raciborzu		14·1	316	e 3 20	− 3	e 6 26	SSS	e 3 45	PPP	e 8·6
Triest		15·1	295	e 3 34	− 2	e 6 26	+ 1	i 8 22	S_gS_g	e 8·8
Moscow		15·2	9	e 3 32?	− 6	e 6 9?	−19	—	—	—
Rome		15·7	281	e 3 48	+ 4	e 6 48	+ 9	—	—	e 9·0
Prague		16·2	311	e 3 49	− 1	e 6 57	+ 6	e 4 11	PP	e 9·5
Potsdam		18·1	317	e 4 11	− 3	i 7 39	+ 4	—	—	e 10·0
Jena		18·2	314	e 4 13	− 3	—	—	e 4 23	PP	e 9·2
Pavia		18·2	293	e 5 30	?	e 7 29	− 8	—	—	e 10·4
Stuttgart		18·9	304	e 4 19	− 5	e 7 50	− 3	e 5 17	?	e 11·0
Zürich		19·0	300	e 4 13	−13	e 7 43	−12	—	—	—
Karlsruhe		19·4	306	e 4 27	− 3	—	—	—	—	e 11·0
Ashkabad		19·5	90	e 4 33	+ 2	i 8 16	+10	—	—	—
Basle		19·7	300	e 4 25	− 9	e 8 12	+ 2	—	—	—
Strasbourg		19·8	304	e 4 20a	−15	e 8 16	+ 3	e 4 50	PP	e 10·3
Helsinki	E.	20·1	348	—	—	e 8 10	− 9	—	—	e 10·2
Copenhagen		20·3	326	e 4 53	+13	e 8 24	+ 1	—	—	9·6
Besançon		20·7	297	e 4 40	− 4	—	—	e 5 6	PP	—
Upsala		21·5	339	—	—	e 8 33	−14	—	—	e 11·0
De Bilt		22·3	312	e 5 0	− 1	e 9 0	− 2	—	—	e 13·0
Paris		23·2	301	e 5 17	+ 8	e 9 17	− 1	e 5 50	PP	e 11·0
Sverdlovsk		23·8	39	i 5 19	+ 4	e 9 29	+ 1	—	—	—
Kew		25·5	307	e 1 38	?	e 9 54	− 3	e 10 32	SS	e 14·0
Samarkand		25·6	82	e 5 36	+ 4	—	—	—	—	—
Alicante		26·1	277	5 26	−11	9 51	−16	6 24	PPP	e 12·4
Jersey	E.	26·3	302	e 5 30	− 9	—	—	e 6 30	PPP	12·0
Tashkent		26·9	77	e 5 48	+ 3	—	—	—	—	—
Stalinabad		27·2	82	e 5 51	+ 4	—	—	—	—	—
Aberdeen	E.	28·0	319	i 5 44	−11	e 10 20	−18	i 5 29	?	e 17·7
Kiruna		28·0	352	e 5 51	− 4	i 10 40	+ 2	e 12 0	SS	e 13·0
Dzhergetal		28·9	80	e 6 4	+ 1	—	—	—	—	—
Andijan		29·3	78	e 6 6	0	—	—	—	—	—
Rathfarnham Castle		29·4	310	e 5 55	−12	e 10 45	−16	—	—	e 15·0
Tamanrasset	Z.	29·5	242	e 6 6	− 2	—	—	e 7 18	PPP	—
Ottawa	Z.	73·3	317	—	—	e 24 46	?	—	—	—
College		74·7	1	e 11 41	− 2	—	—	—	—	—
Hungry Horse		86·7	340	e 12 45	− 2	—	—	—	—	—

Additional readings :—
Bucharest iS*E = 2m.57s., iS_gE = 3m.16s.
Timisoara eE = 5m.8s. and 5m.50s.
Belgrade eZ = 3m.30s., iNE = 5m.54s., iS_gNE = 6m.40s.
Kalossa eN = 6m.10s., eE = 7m.4s. and 8m.13s.
Budapest eE = 7m.14s. and 8m.0s., eN = 8m.28s.
Skalnate Pleso eE = 3m.8s., e = 4m.45s., 5m.45s., 6m.10s., and 6m.25s.
Ogyalla e = 7m.29s. and 7m.44s.
Raciborzu ePE = 3m.24s.
Triest eZ = 3m.56s.
Prague e = 4m.34s., 5m.13s., and 7m.27s.
Jena eN = 4m.26s.
Strasbourg ePPP = 4m.59s., e = 5m.18s., 5m.40s., 6m.29s., and 7m.1s., eSS = 8m.51s., eSSS = 9m.13s.
Besançon e = 4m.47s., ePP = 4m.58s.
Paris e = 6m.54s., 7m.17s., and 9m.33s., eSS = 10m.7s., eSSS = 10m.34s.
Kew eSS? = 12m.40s.
Alicante PP = 6m.0s., SS = 10m.51s., SSS = 11m.14s., PcS = 12m.43s., ScS = 16m.29s.
Kiruna ePP?EN = 6m.24s., iEN = 10m.51s.
Long waves were also recorded at Taranto, Granada, and Scoresby Sund.

Aug. 14d. 20h. 1m. 28s. Epicentre 5°·2N. 74°·5W. Depth of focus 0·030.
(as on 1948, Aug. 6d.).

A = +·2661, B = −·9597, C = +·0901 ; δ = −5 ; h = +7 ;
D = −·964, E = −·267 ; G = +·024, H = −·087, K = −·996.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Bogota		0·7	146	i 0 31	0	i 0 53	− 2	i 0 39	P_g
Chinchina		1·1	252	i 0 8	−25	i 0 16	−43	—	—
Galerazamba		5·6	353	i 1 28	+ 5	i 2 51	+23	—	—
Huancayo		17·2	182	e 3 48	0	—	—	—	—
Harvard		37·2	4	e 7 0	+ 9	—	—	—	—
Ottawa	z.	40·0	359	i 7 22	+ 7	—	—	—	—
Palomar	z.	48·3	312	i 8 16	− 4	—	—	—	—
Riverside	z.	49·0	312	i 8 21	− 5	—	—	—	—
Mount Wilson	z.	49·6	312	e 8 26	− 4	—	—	—	—
China Lake	z.	49·9	314	i 8 29	− 4	—	—	—	—
Victoria		59·8	324	e 9 42	− 2	—	—	—	—

Additional reading :—
Bogota i = 1m.27s.

Aug. 14d. 20h. 23m. 8s. Epicentre 40°·8N. 33°·4E. (as at 18h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Istanbul	z.	3·3	275	e 0 51	− 2	e 1 39	+ 4	—	—
Yalta		3·7	9	1 0	0	1 41	− 4	—	—
Theodosia		4·5	19	e 1 13	+ 2	—	—	—	—
Bucharest		6·5	306	—	—	(i 2 51)	− 4	(e 2 45)	?
Kishinev		7·0	334	1 47	+ 1	2 59	− 9	—	—
Ksara		7·2	164	(e 1 51)	+ 2	(i 3 19)	+ 6	—	—
Gori		8·1	78	—	—	e 3 37	+ 2	—	—
Lwow		11·2	327	e 2 42	− 2	e 4 41	−11	—	—
Besançon		20·7	297	e 4 47	+ 3	—	—	e 4 56?	?
Ottawa		73·3	317	—	—	e 29 24	SSS	—	—

Bucharest readings have been reduced by 10m. and Ksara readings by 2m.

Aug. 14d. Readings also at 0h. (Istanbul, Granada, Rome, Palisades, and near Apia), 1h. (Tamanrasset, Collmberg, Istanbul, near Djakarta, and near Tacubaya), 2h. (Istanbul, near Bandong, and Djakarta), 3h. (Rome, Istanbul, Ksara, and Victoria), 4h. (near Apia), 5h. (Upsala, Copiapo, and near Antofagasta), 6h. (near Zürich, Basle, Stuttgart, and Besançon), 7h. (Istanbul, Collmberg, Ksara, near Zugdidi, Tiflis, Goris, Kirovobad, Nakhichevan, Gori, Leninakan, and Grozny), 8h. (College, Shasta Dam, Hungry Horse, Boulder City, Palomar, Riverside, Tinemaha, Pasadena, Lick, Kimberley, Pretoria, Terre Adélie, Tamanrasset, Huancayo, and near La Paz (2)), 9h. (Palomar, Pasadena, Riverside, Tinemaha, Victoria (2), Harvard, and Ottawa), 12h. (near Djakarta, and Bandong), 13h. (Sverdlovsk, Istanbul, Palisades, Lick, Pasadena, Tinemaha, and Harvard), 14h. (Istanbul), 15h. (Palisades and near Istanbul), 17h. (Huancayo, Palomar, Riverside, Pasadena, Tinemaha, Dzhergetal, Messina, and near Alicante), 18h. (Bucharest, Tamanrasset, Harvard, Palisades, La Paz, Copiapo, near Antofagasta, and near Athens (2)), 19h. (Apia), 21h. (La Paz, Tacubaya, Puebla, Vera Cruz, Oaxaca, Merida, and Palomar), 22h. (Palisades), 23h. (Wellington).

Aug. 15d. Readings at 0h. (Andijan, Rybach'e, Przhevalsk, Almata, near Frunse, Naryn, Krasnogorka, and Dzhergetal (2)), 4h. (Tacubaya), 5h. (La Paz), 6h. (Copiapo), 7h. (Palisades and near Dzhergetal), 9h. (near Apia (2)), 11h. (Apia), 15h. (Apia, Collmberg, Stuttgart, Strasbourg, Paris, and Besançon), 16h. (Alicante and near Mizusawa), 17h. (Alicante, near Ottawa, and near Dzhergetal), 18h. (La Paz, and Huancayo), 19h. (Kimberley, Tamanrasset, Apia, Ksara, and near Dzhergetal), 22h. (Samarkand, Tchimkent, near Khorog, Obi-garm, and Dzhergetal), 23h. (Puebla and near Tacubaya).

Aug. 16d. 16h. Undetermined shock.

Tuai eP?N =6m.58s., iSN =9m.23s.
Karapiro eN =7m.0s.
Wellington eP =7m.26s., i =7m.34s., eS =10m.15s.
Cobb River ePE =7m.32s., eS?E =10m.20s., iE =10m.27s.
Kaimata ePEN =7m.49s., SNE =10m.48s.
Christchurch eP =7m.56s., eS =11m.7s.
Lick iPZ =15m.35s.a.
Pasadena iPEZ =15m.36s.a.
Riverside iPZ =15m.37s.a.
Fresno ePZ =15m.38s.a.
Palomar iPZ =15m.38s.a.
China Lake iPZ =15m.43s.a.
Mineral iPZ =15m.44s.k.
Tinemaha ePZ =15m.44s.
Victoria e =16m.3s.

Aug. 16d. 19h. 43m. 2s. Epicentre 29°·5S. 68°·0W.

Intensity III in Chile between South latitudes 27° & 28°. Felt with same intensity at Jachal, province of San Juan, see the Buenos Aires seismic bulletin. Epicentre as adopted.

F. Greve.
Boletin del año 1951, Instituto sismológico, Universidad de Chile, Santiago, p.32.

$A = +\cdot3266$, $B = -\cdot8083$, $C = -\cdot4899$; $\delta = +2$; $h = +2$;
$D = -\cdot927$, $E = -\cdot375$; $G = -\cdot184$, $H = +\cdot454$, $K = -\cdot872$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copiapo	N.	3·0	315	i 0 57	P*	i 1 34	S*	1 52	?	—
Santa Lucia	E.	4·6	210	1 9	− 3	2 4	− 3	—	—	—
Antofagasta	E.	6·2	339	e 1 48	P*	e 3 4	S*	i 3 25	S_g	—
La Plata		10·1	125	2 22	− 7	4 22	− 3	2 40	PP	5·1
La Paz		13·0	359	i 3 14	+ 5	i 6 29	+54	7 4	?	8·0
Huancayo		18·7	336	i 4 27	+ 5	e 8 32	SSS	—	—	e 9·0
Morgantown		69·7	350	i 11 15	+ 1	—	—	—	—	—
Weston		71·6	358	i 11 26	+ 1	—	—	—	—	—
Harvard		71·7	358	i 11 26	0	—	—	—	—	e 38·6
Ottawa		74·9	354	11 44	0	—	—	—	—	—
Palomar	z.	77·8	320	i 12 0	− 1	—	—	—	—	—
Boulder City		78·6	323	i 12 5	0	—	—	—	—	—
Pasadena	z.	79·1	320	i 12 7	− 1	—	—	—	—	—
China Lake	z.	80·0	321	i 12 13	0	—	—	—	—	—
Tinemaha	z.	81·2	321	i 12 19	0	—	—	—	—	—
Shasta Dam		86·1	322	i 12 42	− 2	—	—	—	—	—
Tamanrasset	z.	87·7	62	i 12 55k	+ 3	—	—	—	—	—
Hungry Horse		87·8	332	i 12 52	0	—	—	—	—	—

Aug. 16d. 23h. 52m. 10s. Epicentre 28°·0N. 57°·0E. (as on 1949, Nov. 22d.).

$A = +\cdot4816$, $B = +\cdot7416$, $C = +\cdot4670$; $\delta = 0$; $h = +2$;
$D = +\cdot839$, $E = -\cdot545$; $G = +\cdot254$, $H = +\cdot392$, $K = -\cdot884$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad	10·0	6	2 38	PP	—	—	—	—	—
Mary	10·4	22	2 39	+ 5	4 46	SS	—	—	—
Kizyl-Arvat	11·0	357	i 2 46	+ 4	—	—	—	—	—
Lenkoran	12·7	330	i 3 8	+ 3	—	—	—	—	—
Baku	13·7	336	i 3 25	+ 7	e 6 11	SS	—	—	—
Samarkand	14·3	33	i 3 24	− 2	—	—	—	—	—
Shemakla	14·4	333	i 3 29	+ 2	—	—	—	—	—
Stalinabad	14·4	40	i 3 28	+ 1	i 6 17	+ 8	—	—	—
Goris	14·5	325	3 6	−22	i 6 0	−11	—	—	—
Obi-garm	15·0	42	i 3 34	− 1	i 6 28	+ 5	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kirovobad		15·4	328	i 3 43	+ 3	—	—	—	—	—
Khorog		15·5	49	3 40	− 2	—	—	—	—	—
Erevan		15·9	323	i 3 53	+ 6	—	—	—	—	—
Dzhergetal		16·3	43	i 3 49	− 3	i 6 55	+ 2	—	—	—
Leninakan		16·7	323	i 4 4?	+ 7	—	—	—	—	—
Lunacharskoe		16·7	34	e 4 1	+ 4	i 7 13	+10	—	—	—
Tashkent		16·7	34	i 3 55	− 2	e 7 5	+ 2	—	—	—
Tiflis		16·9	327	i 4 3	+ 4	—	—	—	—	—
Bombay		17·1	118	i 3 53	− 9	i 7 10	− 2	—	—	8·1
Fergana		17·3	40	i 3 28?	−36	e 6 37?	−39	—	—	—
Gori		17·5	326	i 4 11	+ 4	—	—	—	—	—
Tchimkent		17·6	33	i 4 5	− 3	—	—	—	—	—
Grozny		17·8	332	i 4 16	+ 5	—	—	—	—	—
New Delhi		17·8	83	e 4 4	− 7	i 7 26	− 2	8 5	SS	—
Andijan		17·9	41	i 4 11	− 1	i 7 36	+ 6	—	—	—
Poona		18·1	118	i 4 7	− 7	7 30	− 5	4 25	PP	—
Dehra Dun	N.	18·5	77	—	—	e 6 50	−54	—	—	e 10·0
Ksara		19·0	291	i 4 26	0	i 8 2	+ 7	—	—	—
Zugdidi		19·0	323	e 4 30	+ 4	—	—	—	—	—
Piatigorsk		19·5	328	4 38	+ 7	—	—	—	—	—
Naryn		20·5	44	i 4 39	− 3	—	—	—	—	—
Frunse		20·6	40	i 4 40	− 3	i 8 36	+ 7	—	—	—
Rybach'e		21·2	41	i 4 48?	− 1	e 8 42?	− 1	—	—	—
Almata		22·2	41	i 4 57	− 3	—	—	—	—	—
Almata II		22·4	41	i 4 59	− 3	—	—	—	—	—
Hyderabad	E.	22·4	113	i 4 54	− 8	e 9 0	− 4	—	—	—
Helwan		22·5	281	i 5 2k	0	9 10	+ 5	—	—	—
Przhevalsk		22·6	44	i 5 1	− 2	—	—	—	—	—
Kurmenty		22·8	43	i 5 3	− 2	—	—	—	—	—
Chilisk		23·2	40	e 5 9	0	—	—	—	—	—
Theodosia		24·2	321	e 5 16	− 3	—	—	—	—	—
Yalta		24·6	318	5 23	0	9 45	+ 3	—	—	—
Simferopol		24·9	319	5 27	+ 1	9 51	+ 4	—	—	—
Kodaikanal	E.	26·1	128	e 5 32	− 5	—	—	—	—	—
Istanbul		26·3	307	e 5 38	− 1	e 10 13	+ 2	e 5 48	pP	e 14·4
Sverdlovsk		28·9	4	6 2	− 1	i 10 54	+ 1	—	—	—
Kishinev		29·1	319	6 3	− 1	10 55	− 1	—	—	—
Athens		29·5	298	e 6 16k	+ 8	—	—	—	—	—
Bucharest		29·6	313	e 6 11	+ 2	e 11 8	+ 4	e 7 6	PP	e 14·8
Sofia		30·9	307	e 6 25	+ 5	—	—	—	—	—
Moscow		31·0	339	i 6 22	+ 1	i 11 26	0	—	—	—
Timisoara		33·3	313	i 6 43	+ 2	e 12 7	+ 5	e 8 0	PP	—
Belgrade		33·5	310	i 6 45	+ 2	i 12 7	+ 2	e 7 54	PP	e 15·2
Uzhgorod		33·7	317	i 6 47	+ 2	12 13	+ 5	—	—	—
Taranto		34·9	302	e 6 50?	− 5	—	—	—	—	—
Skalnate Pleso		35·2	318	6 58	0	e 12 31	0	e 9 30	PcP	—
Budapest	E.	35·3	315	6 51	− 8	12 27	− 6	8 16	PP	e 22·3
Messina	Z.	35·9	298	i 7 4a	0	e 13 4	+22	i 7 14	pP	—
Ogyalla		36·0	315	e 7 5	0	e 12 46	+ 2	e 17 18	ScS	—
Pulkovo		36·6	339	e 7 10	0	i 12 59	+ 6	—	—	—
Raciborzu		36·8	319	e 7 10	− 1	e 12 45	−11	e 8 33	PP	e 20·4
Triest		38·3	310	i 7 23a	− 1	i 13 25	+ 6	e 8 57	PP	—
Rome		38·6	303	i 7 26k	0	i 13 23	0	i 7 33	pP	e 21·4
Helsinki		38·8	336	e 7 25	− 3	e 13 25	− 1	e 9 3	PP	e 19·8
Prague		39·0	317	e 7 28k	− 2	e 13 28	− 1	e 9 3	PP	e 22·3
Bologna		39·8	319	e 7 37k	+ 1	e 13 44	+ 2	—	—	—
Prato		39·9	317	e 7 36	− 1	i 13 42	− 1	—	—	—
Cheb		40·3	316	e 10 16	?	e 13 58	+ 9	e 17 44	ScS	—
Potsdam		40·6	320	i 7 44k	+ 1	i 13 55?	+ 1	e 9 22	PP	e 19·8
Jena		41·0	317	e 7 45	− 1	e 14 0	+ 1	e 9 24	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pavia		41·4	309	i 7 40k	−10	i 14 7	+ 2	e 17 13	SS	—
Upsala		41·6	332	e 7 53?	+ 2	e 14 5	− 3	e 9 29	PP	e 19·6
Stuttgart		42·0	314	i 7 54k	0	e 14 11	− 3	e 9 36	PP	e 23·8
Copenhagen		42·1	324	i 7 55	0	e 14 16	0	17 53	SSS	23·8
Zürich		42·2	311	e 7 54	− 2	e 14 8	− 9	e 9 33	PP	—
Irkutsk		42·5	41	7 56	− 3	14 17	− 5	—	—	—
Karlsruhe		42·6	315	e 7 57	− 2	e 14 20	− 3	e 9 39	PP	e 23·8
Basle		42·8	311	e 8 0	− 1	e 14 24	− 2	—	—	—
Strasbourg		42·9	313	i 7 59	− 3	e 14 18	− 9	e 9 40	PP	e 20·8
Neuchatel		43·2	311	i 8 3	− 1	e 14 28	− 4	—	—	—
Besançon		43·9	311	i 8 9	− 1	e 14 43	+ 1	i 9 55	PP	—
Kabansk		43·9	43	8 8	− 2	e 14 32?	−10	—	—	—
Witteveen	z.	44·5	320	i 8 15	0	—	—	e 10 4	PP	—
De Bilt		45·2	318	e 8 29	+ 9	e 15 1	0	e 10 11	PP	e 20·8
Kiruna		45·4	343	e 8 21	− 1	i 15 2	− 2	i 10 49	PPP	e 24·8
Clermont-Ferrand		45·7	308	i 8 26	+ 2	e 15 11	+ 3	e 10 16	PP	—
Algiers Univ.	z.	45·9	296	i 8 24k	− 2	e 8 40	?	e 10 11	PP	—
Paris		46·4	312	i 8 28	− 2	i 15 16	− 2	i 8 35	pP	21·8
Tamanrasset	z.	46·5	276	i 8 30k	− 1	e 15 20	+ 1	e 10 19	PP	—
Tortosa		47·6	302	i 8 46	+ 7	i 15 42	+ 7	—	—	—
Alicante		48·5	299	i 8 47	+ 1	i 15 47	− 1	10 51	PP	e 23·4
Kew		48·5	316	i 8 45	− 1	i 15 47	− 1	i 16 1	SP	e 22·8
Durham	E.	49·6	320	16 0	S	(16 0)	− 3	—	—	—
Aberdeen	E.	50·3	323	i 9 7	+ 7	i 16 7	− 6	i 18 48	ScS	e 28·5
Almeria		50·3	297	i 8 58	− 2	16 15	+ 2	10 59	PP	24·0
Granada		51·1	297	i 9 4a	− 2	i 16 24	0	18 57	ScS	25·9
Toledo		51·1	300	i 9 6	0	i 16 23	− 1	11 6	PP	—
Malaga		51·8	297	i 9 8	− 4	i 16 31	− 2	11 16	PP	e 25·7
Rathfarnham Castle		52·3	319	i 9 13	− 2	e 16 40	0	e 9 40	?	e 23·8
Scoresby Sund		60·2	339	i 10 11k	− 1	e 18 33	+ 8	—	—	33·8
Pietermaritzburg	z.	62·7	206	i 10 22	− 7	—	—	—	—	—
Kimberley	z.	64·3	212	i 10 32	− 7	—	—	—	—	—
Grahamstown	z.	67·5	207	i 10 54	− 6	—	—	—	—	—
Resolute Bay		75·9	353	11 52	+ 2	21 33	+ 1	e 22 0	PS	e 39·1
College		85·4	11	e 12 37	− 3	—	—	—	—	—
Seven Falls	E.	91·7	328	—	—	e 23 36	[− 7]	—	—	—
Ottawa		95·2	329	13 26	− 1	e 23 56	[− 6]	—	—	—
Palisades		97·6	325	—	—	e 24 7	[− 8]	—	—	—
Bermuda		98·3	313	—	—	e 24 11	[− 8]	—	—	e 53·8
Hungry Horse		103·6	353	e 14 3	− 1	—	—	e 17 55	?	—
La Paz		128·3	270	e 19 2	[− 7]	e 37 50	SS	e 27 23	PcP,P′	58·1

Additional readings :—
New Delhi PPEN =4m.19s., iN =7m.39s.
Poona PPPE =4m.31s., SSE =7m.55s., SSSE =8m.6s.
Helwan eZ =6m.2s., eE =10m.32s., eN =13m.5s.
Istanbul ePPE =6m.21s., ePPPE =6m.34s., ePcPN =8m.58s.?, eSSN =11m.17s., eSSE =11m.22s., eSSSE =11m.40s.
Bucharest eSSN =12m.32s.
Timisoara eE =7m.32s., eN =7m.42s.
Belgrade eZ =7m.36s., eNE =10m.32s., eScSNW =17m.6s.
Skalnate Pleso e =7m.9s., 7m.18s., and 7m.34s., ePPP? =8m.25s., eSN =12m.35s., eSS =14m.39s., eSSS =15m.8s.
Budapest PPPN =8m.43s., PPPE =9m.27s., iN =17m.8s.
Messina iZ =7m.59s., iPPPZ =8m.43s.
Ogyalla e =7m.15s. and 7m.30s., ePP =8m.12s., e =8m.34s., 8m.58s., 10m.2s., 11m.4s., and 13m.23s., eSS? =14m.19s., eSSS? =15m.8s., e =16m.2s.
Raciborzu ePPPN =8m.53s., ePcPN =9m.31s., eZ =13m.1s., ePcSE =13m.20s., eSSSN =15m.56s., eScSE =17m.25s.
Triest ePcP =9m.34s., eSS =15m.38s., iScS =17m.29s.
Rome ePPP =9m.10s., eSS =16m.45s.
Prague iP =7m.31s., e =7m.42s., and 7m.55s., ePPP =9m.20s., e =11m.14s., eS =13m.20s., eSSS =15m.30s., eScS =17m.38s.
Bologna e =8m.1s. and 9m.41s.
Cheb e =13m.16s., eS? =13m.25s., eSS =15m.17s.
Potsdam iSZ =13m.58s., iSSSE =17m.25s., iScSN =17m.44s., eScSZ =17m.50s., iN =17m.55s.?.
Jena epP?Z =7m.53s., ePPE =9m.17s., eZ =14m.16s., eE =14m.24s., eN =17m.46s.

Continued on next page.

Pavia e =7m.56s., ePPP =9m.46s., e =13m.45s.
Upsala ePcP =9m.38s., ePPPE =10m.1s., eSE =14m.16s., eSSN =17m.4s. eE = 17m.18s., eScSN =17m.58s.
Stuttgart eSSS =18m.6s.
Karlsruhe eZ =8m.49s.
Strasbourg ePPP =10m.20s. and 10m.30s., ePS =14m.40s., eSS =17m.34s., eQ = 17m.55s., eScS =18m.12s. and other unidentified readings.
Besançon i =8m.14s., e =8m.38s. and 9m.6s., ePPP =10m.20s., e =10m.51s. and 12m.29s.
De Bilt eSS =18m.11s.
Kiruna i =8m.28s., e =8m.55s. and 9m.41s., iPP? =10m.18s., i =10m.26s., e =11m.39s., iPcSNZ =13m.47s., iPPSN =15m.22s., iEN =17m.59s., iScSEN =18m.9s., iSSEN = 18m.25s.
Clermont-Ferrand i =8m.48s., e =10m.24s. and 15m.39s.
Paris i =8m.45s., ePP =10m.28s., epPP =10m.34s., eScS =13m.52s. and 18m.19s., eQ =19m.4s., eSSS =19m.33s., i =19m.46s.
Tamanrasset ePPPZ =10m.54s.
Alicante PcP =10m.19s., PPP =11m.29s., PcS =14m.13s., PPS =16m.7s., ScS =18m.41s., Q =20m.13s., SSS =20m.33s.
Kew iZ =8m.54s., iPP =10m.53s., eScS =18m.46s.
Aberdeen eSSSE =20m.25s.
Almeria PcP =10m.15s., PcS =14m.11s.
Granada PcP =10m.29s., PP =10m.51s., SS =20m.54s.
Toledo i =9m.22s. and 9m.39s.
Resolute Bay eZ =12m.13s., eN =26m.14s., 28m.24s., and 29m.39s.
Long waves were also recorded at Bergen, Weston, and Huancayo.

Aug. 16d. Readings also at 2h. (Harvard, Palisades, Seattle, and near Tananarive), 3h. (near Dzhergetal), 4h. (near Oaxaca, Vera Cruz, Tacubaya, and Puebla), 7h. (Copenhagen and Apia), 8h. (near Istanbul), 9h. (near Ksara), 11h. (Alicante, Obi-garm, Stalinabad, near Fergana, Khorog, and Dzhergetal), 12h. (near Istanbul), 13h. (Ksara), 14h. (near Dzhergetal), 15h. (Palisades), 16h. (Alicante, La Paz, Galerazamba, Huancayo, near Chinchina, and Bogota, Riverside, near La Jolla, Pasadena, and Palomar), 17h. (near Alicante (4) and near Dzhergetal), 18h. (near Dzhergetal), 19h. (Paris and near Mizusawa), 21h. (near Ottawa), 22h. (Victoria), 23h. (Apia, Harvard, Almata, Stalinabad, near Fergana, Andijan, Naryn, Frunse, Krasnogorka, Dzhergetal, Almata II, Kurmenty, Obi-garm, Przhevalsk, and Chilisk).

Aug. 17d. 5h. 50m. 57s. Epicentre 63°·5S. 172°·0E.

$A = -\cdot4442$, $B = +\cdot0624$, $C = -\cdot8937$; $\delta = -9$; $h = -10$;
$D = +\cdot139$, $E = +\cdot990$; $G = +\cdot885$, $H = -\cdot124$, $K = -\cdot449$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Terre Adélie		13·2	242	i 3 10	− 1	e 5 26	−14	3 23	PP	6·0
Christchurch		20·0	2	4 38	+ 1	e 8 23	+ 6	—	—	e 10·0
Kaimata	N.E.	21·0	359	e 4 49	+ 2	—	—	—	—	e 11·6
Wellington		22·3	6	i 5 1	0	i 9 13	+11	e 10 38	SS	e 12·6
Riverview		32·4	327	—	—	i 11 54	+6	—	—	e 14·6
Brisbane	Z.	38·1	332	i 7 20a	− 2	—	—	—	—	—
Grahamstown	Z.	79·7	209	i 12 9	− 2	—	—	—	—	—
Ksara		139·8	243	—	—	e 43 6	SSP	e 54 27	Q	—
Resolute Bay		150·2	32	19 52	[+ 4]	—	—	e 20 11	PKP_2	e 80·4
Besançon		161·9	212	e 20 54	PKP_2	—	—	—	—	—

Wellington gives also e?Z =7m.23s.
Long waves were also recorded at Kew.

Aug. 17d. Readings also at 0h. (Apia), 1h. (Apia, Palomar, Pasadena, China Lake, Tinemaha, Tamanrasset, Paris, Strasbourg, and Besançon), 3h. (near Malaga), 4h. (Tortosa), 5h. (Almata II, Frunse, Naryn, near Andijan, Dzhergetal, and Fergana), 7h. (Istanbul), 8h. (Besançon, Collmberg, Lwow, Bucharest, Timisoara, Goris, Uzhogord, Ksara, near Istanbul, Simferopol, and Yalta), 10h. (Strasbourg, Zürich, Helwan, Ksara (2), and near Istanbul), 11h. (Alicante (2)), 12h. (Triest, Obi-garm, Samarkand, near Andijan, Dzhergetal (2), Khorog, and Stalinabad), 15h. (Apia, near Copiapo, and near Dzhergetal), 16h. (Alicante, Prague, Erevan, Goris, Zugdidi, near Abastumanj, Gori, Grozny, Kirovobad, Leninakan, Piatigorsk, and Tiflis), 17h. (Alicante), 18h. (Tamanrasset), 21h. (La Paz), 22h. (La Paz, Bermuda, and near Athens), 23h. (Alberni, Horseshoe Bay, Victoria, and near Bogota).

Aug. 18d. 3h. 38m. 10s. Epicentre 0°·5N. 126°·0E. (as on 1938, Oct. 7d.).

$A = -\cdot5878$, $B = +\cdot8090$, $C = +\cdot0087$; $\delta = +7$; $h = +7$;
$D = +\cdot809$, $E = +\cdot588$; $G = -\cdot005$, $H = +\cdot007$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		14·8	341	i 3 42	+10	—	—	—	—	—
Bandong		19·7	248	e 4 29	− 5	e 7 56	−14	—	—	—
Perth		33·7	196	i 8 53	?	i 12 12	+ 4	—	—	—
Nagoya		36·0	15	e 7 6	+ 1	—	—	—	—	—
Hunatu		36·8	17	7 12	+ 1	e 12 57	+ 1	—	—	—
Oiwake		37·5	15	e 7 16	− 1	—	—	—	—	—
Toyama		37·5	14	e 7 39	+22	—	—	—	—	—
Matusiro		37·6	15	e 7 6	−12	e 13 28	+20	16 3	SS	17·3
Nagano	E.	37·7	15	e 7 18	− 1	e 13 7	− 3	e 7 51	pP	—
Brisbane		38·1	139	i 7 21k	− 1	e 13 1	−15	e 8 48	PP	e 15·8
Hukusima		39·4	18	7 33	0	e 13 33	− 2	—	—	—
Sendai	N.	40·0	18	e 7 40	+ 2	13 44	0	—	—	—
Akita		41·1	17	e 7 56	+ 9	—	—	—	—	—
Riverview		41·5	148	i 7 50a	0	i 14 2	− 5	i 17 2	SS	e 20·3
Calcutta	E.	42·7	304	e 8 2	+ 2	—	—	i 10 15	SSS	—
Sapporo		44·6	15	e 8 12	− 4	e 14 48	− 4	e 8 29	?	—
Obihiro		45·0	16	e 8 32	+13	—	—	—	—	—
New Delhi		54·3	306	e 9 27	− 3	e 16 57	−10	19 13	ScS	—
Irkutsk		54·7	344	9 32	− 1	—	—	—	—	—
Bombay		55·2	293	—	—	e 16 50?	−30	—	—	—
Auckland	N.	58·5	134	—	—	e 18 4	+ 1	—	—	—
Petropavlovsk		59·0	21	e 10 2	− 2	e 18 11	+ 1	—	—	—
Kurmenty		60·1	322	i 10 8	− 3	—	—	—	—	—
Chilisk		60·3	323	e 10 13	0	—	—	—	—	—
Christchurch		60·4	143	e 10 15	+ 2	e 19 15	+47	e 26 20	Q	e 31·8
Almata II		60·7	322	e 10 15	0	—	—	—	—	—
Naryn		60·7	319	i 10 14	− 1	18 26	− 6	—	—	—
Murgab		60·8	315	e 10 16	0	e 18 29	− 4	—	—	—
Almata		61·0	322	i 10 17	− 1	e 18 31?	− 4	—	—	—
Rybach'e		61·2	319	i 10 17	− 2	—	—	—	—	—
Ili		61·3	323	i 10 18	− 2	e 18 38	− 1	—	—	—
Khorog		62·1	313	—	—	e 18 44	− 5	—	—	—
Frunse		62·3	320	i 10 25	− 1	e 18 52	0	—	—	—
Klyuchi		62·3	22	e 10 26	0	—	—	—	—	—
Andijan		62·9	316	10 28	− 2	18 54	− 6	—	—	—
Fergana		63·1	317	e 10 28	− 4	e 18 57	− 5	—	—	—
Obi-garm		63·9	314	e 10 36	− 1	e 19 9	− 3	—	—	—
Stalinabad		64·5	314	i 10 39	− 2	i 19 15	− 4	i 11 17	PcP	—
Tashkent		65·2	316	e 10 40	− 5	19 19	− 9	—	—	—
Tchimkent		65·4	318	i 10 44	− 3	i 19 26	− 4	—	—	—
Samarkand		66·2	314	10 50	− 2	19 36	− 4	—	—	—
Terre Adélie		68·1	172	i 11 2	− 2	e 19 59	− 4	i 11 25	PcP	—
Mary		69·4	311	i 11 11	− 1	20 14	− 4	—	—	—
Ashkabad		72·2	310	i 11 12	−17	—	—	—	—	—
Sverdlovsk		76·3	330	i 11 52	0	—	—	—	—	—
Lenkoran		79·7	309	i 12 11	0	—	—	—	—	—
Goris		81·7	309	—	—	i 22 38	+ 4	—	—	—
Kirovobad		81·8	311	i 12 24	+ 2	—	—	—	—	—
Erevan		82·8	310	i 12 32	+ 5	22 47	+ 2	—	—	—
Tiflis		83·1	312	i 12 29	0	e 22 43?	− 5	—	—	—
Gori		83·6	312	12 30	− 1	—	—	—	—	—
Leninakan		83·7	311	e 12 36	+ 4	—	—	—	—	—
Abastumanj		84·6	311	e 12 37	+ 1	—	—	—	—	—
Zugdidi		85·3	312	i 12 43	+ 3	—	—	—	—	—
College		87·9	25	12 50	− 3	—	—	—	—	—
Moscow		88·7	326	e 12 55	− 2	i 23 37	− 6	—	—	—
Ksara		89·8	304	e 13 3	+ 1	e 24 3	+10	—	—	—
Pulkovo		92·4	330	e 13 13	− 1	e 24 13	− 3	—	—	—
Helwau		93·8	300	e 13 21	+ 1	e 23 50	[− 4]	e 13 50	?	—
Istanbul	N.	94·9	312	e 13 25	0	e 24 26	{+ 9}	e 23 56	SKS	e 38·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kiruna		95·4	338	e 13 38	+10	i 24 26	{+ 5}	e 17 16	PP	e 48·8
Bucharest		96·7	315	e 17 30	PP	—	—	—	—	—
Lwow		97·3	320	e 13 37	+ 1	e 25 5	+ 7	i 17 38	PP	—
Upsala		98·7	331	—	—	i 24 14	[− 7]	e 26 50?	PS	e 50·8
Uzhgorod		98·7	319	e 13 43	+ 1	e 24 19	[− 2]	—	—	—
Timisoara		99·9	316	—	—	e 24 21	[− 6]	—	—	—
Kimberley	z.	100·1	242	i 13 48	− 1	—	—	—	—	—
Resolute Bay		101·1	10	17 57	PP	25 16	−14	e 24 15	SKS	e 51·8
Copenhagen		102·7	328	—	—	i 24 39	[− 1]	—	—	51·8
Prague		103·3	322	e 18 6	PKP	e 25 35	−13	e 21 3	PPP	e 54·8
Potsdam		103·4	325	e 18 20	PP	e 25 56	+ 7	—	—	e 50·8
Collmberg	z.	103·8	323	e 14 5	0	—	—	e 18 26	PP	—
Taranto		103·9	312	—	—	e 24 55	[+ 9]	—	—	—
Jena		104·8	323	e 18 27	[+ 4]	e 25 52	− 8	e 22 3	PKS	—
Triest		105·0	318	e 18 36	[+13]	e 26 2	0	e 24 46	SKS	—
Messina	z.	105·7	310	e 14 18	+ 4	—	—	e 18 26	PKP	—
Scoresby Sund		106·1	349	e 14 26	+11	28 0	PS	e 18 5	PKP	50·8
Rome		107·0	313	e 14 15	− 4	e 24 55	[− 4]	e 18 39	PP	e 51·8
Stuttgart		107·0	322	e 18 52	PP	e 24 54	[− 5]	e 21 0	PPP	e 58·8
Strasbourg		107·9	322	e 18 56	PP	e 25 2	[− 1]	e 28 55	SP	—
De Bilt		108·0	326	e 18 50	PP	e 25 3	[− 1]	—	—	e 55·8
Pavia		108·2	319	—	—	e 24 43	[−22]	e 28 17	PS	e 43·6
Besançon		109·5	321	e 19 15	PP	—	—	—	—	—
China Lake	z.	110·9	51	e 18 37	[+ 2]	—	—	—	—	—
Mount Wilson	z.	111·0	53	e 18 57	[+22]	—	—	—	—	—
Paris		111·0	324	e 18 39	[+ 4]	i 28 38	PS	e 19 32	PP	e 57·8
Kew		111·3	327	e 19 37	PP	e 25 14	[− 4]	e 23 42	PKS	e 56·8
Riverside	z.	111·5	53	e 19 18	PP	—	—	—	—	—
Palomar	z.	112·1	53	e 19 26	PP	—	—	—	—	—
Rathfarnham Castle		113·4	331	e 19 20	PP	e 29 5	PS	—	—	e 61·8
Tucson		117·3	53	e 20 23	PP	—	—	—	—	—
Alicante		117·5	315	e 19 3	[+15]	25 41	[0]	20 38	PP	e 57·8
Tamanrasset	z.	117·7	296	e 18 52	[+ 4]	—	—	e 20 1	PP	—
Almeria		119·6	314	e 20 26	PP	29 6	PS	e 22 22	PPP	67·7
Granada		120·3	315	21 21k	?	25 51	[0]	30 3	PS	65·9
Seven Falls	E.	130·3	15	e 22 14	?	—	—	—	—	—
Ottawa		130·4	20	e 19 13	[0]	—	—	e 22 54	PKS	—
Tacubaya		131·5	63	e 24 30	PPP	e 25 17	[−67]	—	—	—
Puebla		132·5	63	e 24 4	?	—	—	e 24 58	PPP	—
Morgantown		133·5	29	i 19 19	[0]	e 22 48	PKS	—	—	—
Vera Cruz		134·3	62	e 25 0	PPP	—	—	—	—	—
Harvard		134·4	17	i 19 18	[− 2]	e 23 3	PKS	e 34 13	PPS	e 70·5
Oaxaca		134·4	63	e 23 32	PKS	—	—	—	—	—
Weston		134·5	17	e 20 32	[+72]	—	—	—	—	—
Palisades		134·9	20	e 19 25	[+ 4]	—	—	i 22 52	PKS	—
Washington		135·4	25	e 19 35	[+13]	—	—	—	—	—
Bermuda		145·8	16	i 19 41	[0]	—	—	—	—	e 79·8
Huancayo		155·9	120	e 20 1	[+ 5]	e 49 33	SSS	—	—	e 60·4
Chinchina		157·7	73	i 20 8	[+10]	—	—	—	—	—
La Paz		158·9	141	20 2	[+ 2]	27 18	[+14]	i 20 26	pPKP	—

Additional readings :—
Matusiro Q =16m.19s.
Brisbane iZ =7m.50s., iPPPE =9m.10s., iPcS?E =13m.10s.
New Delhi SSN =20m.35s., SSSN =22m.27s.
Terre Adélie PP =11m.53s.
Kiruna ePE =13m.41s., ePPPE =19m.14s., ePPPNZ =19m.28s., eN =22m.40s., iSKS =23m.54s., eEN =25m.12s., ePS =25m.47s., eEZ =27m.37s., eSSEN =31m.1s., eEN =32m.40s., eSSSE =34m.53s., eQ =43·8m.
Upsala eE =37m.58s.
Resolute Bay PS =27m.0s., SS =32m.19s.
Prague epPKP? =18m.56s., esPKP? =19m.15s., esPPP? =21m.41s., eSE =25m.38s., esS =26m.55s., eSPP? =28m.17s., eSS? =32m.30s .and other unidentified e readings.
Collmberg eZ =16m.52s.
Jena ePKP?N =18m.31s.
Stuttgart iZ =19m.2s., eS =26m.21s., ePS? =28m.50s., eSS =33m.50s., eSSS =38m.38s.
Paris e =18m.50s., ePPS =29m.44s., e =32m.12s., ePSS =35m.4s., eSSS? =40m.23s., e =44m.30s.

Continued on next page.

Kew ePKSEN =26m.20s., ePPP =28m.40s., eSKS =29m.45s., ePS =36m.9s., ePPS = 37m.46s., e =40m.46s., eSS? =44m.42s., phases wrongly identified.
Alicante PPP =23m.1s., PS =30m.14s., SS =36m.49s., SSS =41m.23s., Q =50m.30s.
Tamanrasset ePPPZ =22m.26s., ePKKP?Z =29m.12s.
Almeria PPS =33m.42s., SS =39m.14s.
Granada SS =41m.15s.
Harvard eSS? =40m.22s.
Huancayo e =20m.30s., 31m.33s., and 53m.7s.
La Paz PPZ =24m.8s., ipPPZ =24m.42s., SKKS =31m.12s., PPS =37m.26s.
Long waves were also recorded at Wellington, Pasadena, Seattle, and Aberdeen.

Aug. 18d. 12h. 55m. 44s. Epicentre 43°·9N. 146°·2E. Depth of focus 0·005.
(as on 1951, Feb. 10d.).

Intensity IV at Attoko, Noshappu ; II-III at Nemuro and Kusiro.
Epicentre 43°N. 146°E. Depth 45km.

Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, p.195, with macroseismic chart.

A = −·6007, B = +·4021, C = +·6909 ; δ = −13 ; h = −3 ;
D = +·556, E = +·831 ; G = −·574, H = +·384, K = −·723.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Nemuro		0·7	218	0 13a	− 2	0 20	− 7
Abashiri		1·4	275	0 28	+ 4	0 47	+ 4
Kusiro		1·6	235	0 25	− 2	0 41	− 6
Obihiro		2·4	246	0 38	0	1 3	− 4
Urakawa		3·0	235	0 48	+ 1	1 26	+ 4
Sapporo		3·6	260	0 58	+ 3	1 37	0
Aomori		5·1	235	1 17	+ 1	2 4	−10
Morioka		5·6	224	1 17	− 6	2 13	−14
Mizusawa	E.	6·1	221	—	—	2 24	−15
Sendai		6·9	218	2 41	+60	—	—
Hukusima		7·5	218	1 52	+ 3	2 58	−16
Tokyo		9·6	214	3 42	S	(3 42)	−23

Aug. 18d. Readings also at 0h. (Apia), 6h. (near Dzhergetal, Obi-garm, and Stalinabad), 7h. (Murgab, near Dzhergetal, Obi-garm, Samarkand, Stalinabad, Tchimkent, near Concepción and near Huancayo), 8h. (Andijan, Murgab, Samarkand, Tchimkent, near Dzhergetal, Khorog, and Obi-garm), 9h. (near Obi-garm), 10h. (Cobb River, Tuai, Wellington, and China Lake), 11h. (Apia, Brisbane, Terre Adélie, Tacubaya, Bermuda, Alberni, near Horseshoe Bay, and Victoria), 12h. (Apia), 14h. (Apia, Huancayo, and near Victoria), 15h. (near Klyuchi and near Copiapo), 16h. (Huancayo and near Kurmenty), 17h. (Alicante (3) and Besançon), 18h. (Tortosa, near Alberni, Horseshoe Bay, Victoria, and near Malaga), 19h. (Andijan, Frunse, near Almata II, Chilisk, Ili, Kurmenty, Naryn, Przhevalsk, and Rybach'e), 20h. (near Apia (2)), 23h. (Victoria).

Aug. 19d. 6h. 25m. 53s. Epicentre 38°·8N. 69°·7E. (as on 1945, Dec. 20d.).

A = +·2711, B = +·7328, C = +·6240 ; δ = −13 ; h = −1 ;
D = +·938, E = −·347 ; G = +·217, H = +·585, K = −·781.

	△	Az.	P.	O−C.	S.	O−C.		Supp.
	°	°	m. s.	s.	m. s.	s.	m.	s.
Obi-garm	0·1	—	i 0 5	− 3	e 0 10	− 3	—	—
Stalinabad	0·8	251	i 0 19	+ 1	i 0 34	+ 3	—	—
Dzhergetal	1·2	71	i 0 16	− 8	i 0 30	−11	—	—
Khorog	2·0	132	i 0 34	− 1	i 1 4	+ 2	—	—
Fergana	2·3	45	0 53?	P_g	i 1 24?	S_g	—	—
Samarkand	2·3	292	i 0 45	+ 5	1 26	S_g	—	—
Lunacharskoe	2·5	353	i 0 47	+ 4	i 1 21	S_g	—	—
Tashkent	2·5	353	e 0 45	+ 2	e 1 18	S*	—	—
Andijan	2·8	46	e 0 47	0	i 1 24	+ 2	—	—
Tchimkent	3·5	359	e 0 55	− 2	i 1 40	0	—	—

Continued on next page.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.	
Frunse	5·5	41	e 1 26	+ 1	i 2 34	+ 4	i 2 53	S*
Naryn	5·5	60	e 1 24	− 1	—	—	—	—
Krasnogorka	6·1	41	e 1 30	− 4	i 3 10	S*	—	—
Rybach'e	6·1	51	i 1 37	+ 3	—	—	—	—
Almata	7·0	49	e 1 46	0	—	—	—	—
Almata II	7·3	50	e 1 49	− 1	—	—	—	—
Ili	7·6	45	e 1 49	− 6	—	—	—	—
Kurmenty	7·7	54	e 1 53	− 3	—	—	—	—

Aug. 19d. 15h. 38m. 46s. Epicentre 36°·9N. 70°·8E. (as on 4d.). Depth of focus 0·030.

Felt at Gulmerg. Epicentre 36°·5N. 70°·5E. (Strasbourg). Depth 220km.
Seismo. Bull. Gov. of India Met. Depart,. Aug., 1951, p.8.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Khorog		0·9	48	i 0 32	0	—	—	—	—	—
Obi-garm		2·2	335	i 0 42	− 1	—	—	—	—	—
Dzhergetal		2·3	8	i 0 44	0	i 1 19	+ 2	—	—	—
Stalinabad		2·3	316	i 0 45	+ 1	—	—	—	—	—
Murgab		2·9	59	0 48	− 2	—	—	—	—	—
Andijan		4·0	17	i 1 4	+ 1	e 1 55	+ 3	—	—	—
Samarkand		4·1	314	i 1 6	+ 2	—	—	—	—	—
Lunacharskoe		4·6	346	i 1 12	+ 1	—	—	—	—	—
Tashkent		4·6	346	i 1 12	+ 1	e 2 6	+ 1	—	—	—
Tchimkent		5·5	351	i 1 21	− 1	2 25	− 1	—	—	—
Naryn		6·1	40	i 1 27	− 3	—	—	—	—	—
Frunse		6·6	25	i 1 36	0	i 2 51	0	—	—	—
Rybach'e		6·9	35	i 1 40	0	e 2 56	− 2	—	—	—
Krasnogorka		7·2	27	e 1 42	− 2	—	—	—	—	—
Almata		7·9	35	i 1 51	− 2	i 3 19	− 2	i 2 48	?	—
Almata II		8·1	36	i 1 54	− 1	—	—	—	—	—
Przhevalsk		8·1	44	1 54	− 1	—	—	—	—	—
Ili		8·6	32	i 1 58	− 4	—	—	—	—	—
Chilisk		8·8	39	e 2 3	− 1	—	—	—	—	—
Ashkabad		9·9	280	e 2 23	+ 5	—	—	—	—	—
New Delhi		9·9	145	i 2 10a	− 8	i 3 53	−14	2 26	PP	4·4
Baku		16·7	288	e 3 45	+ 3	—	—	—	—	—
Lenkoran		17·5	283	i 3 53	+ 2	—	—	—	—	—
Shemakla		17·7	290	i 3 56	+ 3	—	—	—	—	—
Bombay		18·0	174	e 4 4	+ 7	i 7 15	+ 8	7 35	SS	—
Poona		18·5	171	i 4 0	− 2	7 7	− 9	4 8	PP	—
Goris		19·4	283	4 13	+ 2	—	—	—	—	—
Kirovobad		19·4	289	4 5	− 6	—	—	—	—	—
Grozny		20·2	296	i 4 24	+ 5	e 8 1	+13	—	—	—
Hyderabad	N.	20·5	159	—	—	7 51	− 2	—	—	—
Tiflis		20·7	291	e 4 25	+ 1	—	—	—	—	—
Calcutta	E.	20·8	128	e 4 2	−23	i 8 0	+ 1	—	—	—
Erevan		20·8	287	e 4 29	+ 4	—	—	—	—	—
Sverdlovsk		21·1	344	i 4 29?	+ 1	i 8 11?	+ 7	—	—	—
Gori		21·2	292	4 34	+ 5	—	—	—	—	—
Leninakan		21·3	289	e 4 35	+ 5	—	—	—	—	—
Abastumanj		22·1	290	e 4 43	+ 6	—	—	—	—	—
Ksara		28·6	273	e 5 36	− 2	e 10 27	+19	—	—	—
Moscow		29·3	321	e 5 42	− 2	—	—	—	—	—
Pulkovo		34·5	325	i 6 29	0	—	—	—	—	—
Lwow		35·8	307	i 6 40	0	—	—	—	—	—
Uzhgorod		36·9	305	6 47	− 2	—	—	—	—	—
Kiruna		41·7	334	i 7 28	0	i 16 48	SS	e 10 10	PPP	e 22·2
Prague		42·0	307	e 7 30	− 1	e 10 14	PPP	e 9 22	PP	—
Collmberg		42·8	309	e 7 37	0	—	—	e 9 27	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Triest	z.	43·0	301	e 7 35	− 4	—	—	e 9 26	PP	—
Jena	E.	43·7	308	e 7 44	− 1	—	-	e 9 32	PP	—
Stuttgart		45·5	306	e 7 58	− 1	—	—	e 9 14	sP	e 23·0
Strasbourg		46·5	306	e 8 7	0	—	—	e 9 24	sP	—
Besançon		47·9	304	e 8 16	− 1	e 10 14	PP	e 9 33	sP	—
Paris		49·9	307	e 8 32	− 1	—	—	e 9 48	sP	—
Rathfarnham C.	z.	54·2	314	e 9 16	+12	—	—	—	—	—
Tamanrasset	z.	57·3	276	i 9 24k	− 2	e 10 42	sP	e 10 12	pP	—
Pretoria	z.	74·1	219	i 10 39	−34	—	—	—	—	—

Additional readings :—
New Delhi iEN =3m.32s., SSEN =4m.4s.
Poona PPPE =4m.21s., SSSE =7m.43s., PcPE =8m.22s.
Kiruna iEZ =10m.16s., iN =17m.4s., e =19m.0s.
Prague e =7m.48s., and 11m.57s.
Collmberg eEZ =10m.33s.
Jena eE =10m.38s.
Strasbourg e =8m.21s.
Besançon e =8m.50s., epPP =10m.50s.
Paris e =8m.53s. and 9m.29s.
Rathfarnham Castle iZ =9m.20s.
Tamanrasset ePPZ =11m.38s., ePPPZ =12m.54s.

Aug. 19d. Readings also at 1h. (Huancayo and Ashkabad), 2h. (Huancayo), 3h. (Copenhagen), 4h. (Harvard, Tacubaya, near Ashkabad (2), and near Kurmenty), 6h. (near Apia), 7h. (Alicante (2), La Paz, near Apia, and near Dzhergetal), 9h. (Huancayo and near Messina), 10h. (Apia (2), Santa Lucia, Tamanrasset, near Algiers Univ., and near Kurmenty), 11h. (Alicante (2) and La Paz), 12h. (Pavia, near Apia, and near Obi-garm), 16h. (La Paz, Antofagasta, and near Copiapo), 17h. (Ashkabad), 18h. (Copiapo, La Paz, La Plata, Santa Lucia, and Huancayo), 20h. (Apia and near Dzhergetal (3)), 22h. (Andijan, Fergana, Khorog, Murgab, Samarkand, near Dzhergetal, Obi-garm, Stalinabad, and near Tacubaya), 23h. (Besançon, China Lake, and near New Delhi).

Aug. 20d. 5h. 49m. 57s. Epicentre 23°·3N. 108°·5W.

A = −·2917, B = −·8719, C = +·3933 ; δ = −2 ; h = +4 ;
D = −·948, E = +·317 ; G = −·125, H = −·373, K = −·919.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mazatlan		1·9	93	e 0 42	+ 8	—	—	—	—	1·2
Guadalajara		5·4	118	—	—	e 2 5	?	—	—	3·0
Chinchina		5·7	22	e 1 31	+ 3	i 2 31	− 4	—	—	i 2·9
Tucson		9·1	347	e 2 14	0	i 3 55	− 5	—	—	—
Tacubaya		9·5	112	e 2 33	P*	—	—	—	—	5·2
Puebla		10·5	112	e 2 43	PP	—	—	—	—	i 5·8
Vera Cruz		12·2	107	e 3 10	PP	—	—	—	—	6·4
Palomar	z.	12·4	325	e 3 1	0	—	—	—	—	—
Riverside	z.	13·2	326	e 3 16	+ 5	—	—	—	—	—
Pasadena		13·7	324	e 3 19	+ 1	i 5 53	+ 1	i 3 27	PP	e 6·8
Boulder City		13·8	338	e 3 19	0	—	—	—	—	—
China Lake	z.	14·8	330	e 3 33	+ 1	—	—	—	—	—
Tinemaha	z.	16·1	331	e 3 52	+ 3	—	—	—	—	—
Fresno	z.	16·6	327	e 3 56a	0	—	—	—	—	—
Lick	z.	18·0	326	e 4 14a	+ 1	—	—	—	—	—
Santa Clara		18·2	326	e 4 28	+12	e 7 48	+11	—	—	e 9·0
Berkeley		18·7	326	e 4 21	− 1	i 8 1	+13	—	—	e 9·2
Mineral	z.	20·3	331	i 4 39a	− 1	—	—	—	—	—
Rapid City		21·2	12	e 4 55	+ 6	e 8 51	+10	—	—	—
Bozeman		22·4	357	e 5 3	+ 1	e 9 17	+13	—	—	—
Butte		22·9	354	i 5 11	+ 5	e 9 16	+ 3	—	—	—
Hungry Horse		25·4	353	i 5 28	− 3	—	—	—	—	—
Columbia		26·3	58	e 5 47	+ 8	—	—	—	—	—
Victoria		27·8	339	5 47	− 6	—	—	—	—	—
Saskatoon		28·8	3	—	—	e 11 15	+24	—	—	15·0

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Cleveland	28·9	44	i 6 5k	+ 2	e 10 52	− 1	i 6 35	PP	15·0
Morgantown	29·1	50	i 6 7	+ 3	e 14 38	L	—	—	(e 14·6)
Pittsburgh	29·5	47	—	—	e 11 2	0	i 15 48	L	(i 15·8)
Washington	30·9	52	e 6 23	+ 3	—	—	—	—	e 16·6
Philadelphia	32·6	51	—	—	e 11 42	− 9	—	—	—
Fordham	33·9	50	e 6 40	− 7	e 12 9	− 2	—	—	—
Palisades	33·9	50	i 6 47	0	e 12 10	− 1	e 17 52	Q	i 18·1
Ottawa	34·5	42	6 50	− 2	12 15	− 5	e 8 33	PcP	17·8
Harvard	36·1	48	i 7 6	+ 1	e 12 40	− 5	e 17 11	ScS	—
Weston	36·2	48	e 7 7	+ 1	e 13 45	− 2	—	—	—
Chinchina	36·6	113	e 7 44	+34	—	—	—	—	—
Bogota	38·1	113	e 7 15	− 7	e 13 14	− 2	e 8 13	PP	e 18·8
San Juan	39·8	88	i 7 35	− 1	—	—	—	—	—
Huancayo	48·6	133	e 8 44	− 3	e 15 51	+ 2	—	—	e 19·8
College	48·7	339	8 47	− 1	—	—	—	—	—
La Paz	55·9	130	e 9 39	− 3	—	—	—	—	—
Paris	85·6	39	e 12 31?	−10	e 13 45	?	e 12 57	PcP	e 42·0
Alicante	88·9	48	12 51	− 7	—	—	—	—	e 42·8
Tamanrasset z.	101·2	60	18 10	PP	—	—	—	—	—
Ksara	113·9	33	e 17 35	[−66]	e 32 11	?	—	—	—

Additional readings :—
Berkeley iZ = 4m.24s., eZ = 6m.5s.
Cleveland eN = 11m.36s.
Bogota ePPPEN = 9m.0s., eScPEN = 13m.42s., eSSEN = 16m.13s.
Long waves were also recorded at Ivigtut, Scoresby Sund, Oaxaca, and other European stations.

Aug. 20d. 7h. 23m. 46s. Epicentre 39°·8N. 77°·4E.

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

A = +·1681, B = +·7518, C = +·6376 ; $\delta = -1$; $h = -2$;
D = +·976, E = −·218 ; G = +·139, H = +·622, K = −·770.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Naryn	1·9	327	i 0 32	− 2	i 0 57	− 2	i 0 36	P*
Przhevalsk	2·8	16	0 46	− 1	1 24	+ 2	—	—
Rybach'e	2·8	339	e 0 54	P_g	e 1 22	0	—	—
Murgab	3·1	242	e 0 55?	P*	i 1 37?	S*	—	—
Almata	3·5	354	i 1 3	P*	i 1 44	+ 4	—	—
Almata II	3·5	0	e 0 55	− 2	i 1 44	+ 4	—	—
Frunse	3·7	326	e 0 59	− 1	e 1 51	S*	—	—
Krasnogorka	3·8	335	i 1 9	P*	i 1 54	S*	—	—
Andijan	4·0	285	1 9	P*	2 10	S_g	—	—
Ili	4·2	357	i 1 5	− 2	i 2 3	+ 6	—	—
Fergana	4·3	279	e 1 12?	+ 4	2 21?	S_g	—	—
Dzhergetal	4·8	265	e 1 18	+ 3	—	—	—	—
Obi-garm	6·1	262	i 1 31	− 3	—	—	—	—
Tchimkent	6·4	295	e 2 0?	P_g	i 3 16	S*	—	—
Stalinabad	6·8	262	—	—	e 3 43	S_g	—	—

Aug. 20d. 8h. 55m. 45s. Epicentre 19°·6N. 69°·4W. (as on 1951, Feb. 10d.).

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

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Port au Prince	3·0	249	e 0 57	P_g	i 1 27	0	i 1 7	?	i 1·6
San Juan	3·3	111	e 0 56	+ 3	—	—	i 1 9	P_g	—
Fort de France	9·2	120	e 3 1	P_g	—	—	—	—	—
Palisades	21·7	351	—	—	e 8 54	+ 3	—	—	—
Morgantown	21·9	338	i 5 3	+ 6	i 9 6	+12	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Weston		22·8	357	e 5 19	+14	e 9 14	+ 3	—	—	—
Harvard		22·9	357	e 5 7	+ 1	e 9 13	0	—	—	—
Ottawa		26·3	350	—	—	e 10 34	+23	—	—	—
Huancayo		32·0	192	e 6 29	− 1	—	—	—	—	—
La Paz		35·9	178	e 7 0	− 4	12 41	− 1	—	—	—
Tucson		39·1	298	e 7 31	0	—	—	—	—	—
Boulder City		43·0	303	e 8 3	0	—	—	—	—	—
Butte		44·1	319	e 8 12	0	—	—	—	—	—
Palomar	z.	44·3	299	e 8 11	− 2	—	—	—	—	—
Riverside	z.	44·8	300	e 8 17	0	—	—	—	—	—
China Lake	z.	45·2	302	e 8 18	− 2	—	—	—	—	—
Mount Wilson	z.	45·4	300	e 8 22	0	—	—	—	—	—
Hungry Horse		45·9	320	e 8 24	− 2	—	—	—	—	—
Tinemaha	z.	45·9	304	e 8 24	− 2	—	—	—	—	—
Fresno	z.	47·0	304	e 8 34a	− 1	—	—	e 8 54	?	—
Mineral	z.	49·0	307	e 8 55	+ 5	—	—	—	—	—

Long waves were also recorded at Granada and Tortosa.

Aug. 20d. 12h. 25m. 21s. Epicentre 3°·8S. 33°·6E.

Strong at Nzega, Iringa, Shinyanga (Tanganyika), moderate strength at Kericho and Mau Summit (Kenya). Suggested epicentre 5°·5S. 33°E.

J. P. Henderson.
Some notes on earth tremors in East Africa.
East African Meteorological Department, Technical Memorandum No. 4, pp. 9, 22, and 23.

$A = +·8311$, $B = +·5522$, $C = -·0658$; $\delta = -2$; $h = +7$;
$D = +·553$, $E = -·833$; $G = -·055$, $H = -·036$, $K = -·998$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pretoria	z.	22·4	192	i 4 59	− 3	—	—	—	—	—
Pietermaritzburg	z.	25·9	186	i 5 33	− 2	—	—	—	—	—
Kimberley	z.	26·2	197	i 5 38	0	—	—	—	—	—
Grahamstown	z.	30·1	192	e 5 40	−33	—	—	—	—	—
Helwan		33·5	357	e 6 42	− 1	—	—	e 6 49	?	e 17·5
Ksara		37·5	3	i 7 19	+ 2	e 13 47?	+40	—	—	—
Tamanrasset	z.	38·1	316	i 7 23	+ 1	e 14 25	?	e 9 26	PcP	e 19·4
Lenkoran		44·6	18	8 16	0	—	—	—	—	—
Goris		44·7	15	e 8 19	+ 3	—	—	—	—	—
Erevan		44·9	12	e 8 20	+ 2	—	—	—	—	—
Messina	z.	45·0	340	e 8 20	+ 1	—	—	—	—	—
Poona	z.	45·4	59	e 7 22	−60	—	—	—	—	—
Kirovcbad		45·8	14	e 8 26	+ 1	—	—	—	—	—
Shemakla		46·3	15	e 8 35?	+ 6	—	—	—	—	—
Tiflis		46·4	12	i 8 30	0	—	—	e 10 23	PP	—
Zugdidi		46·7	10	e 8 35	+ 3	—	—	—	—	—
Ashkabad		47·5	27	e 8 39	+ 1	—	—	—	—	—
Algiers Univ.	z.	49·4	328	e 8 53	0	—	—	—	—	e 27·2
Rome		49·4	339	e 8 52	− 1	—	—	—	—	—
Belgrade	z.	49·8	348	e 8 57a	+ 1	—	—	e 10 41	PP	—
Samarkand		53·0	32	9 15	− 6	—	—	—	—	—
Stalinabad		53·2	34	i 9 22	0	e 16 50	− 2	—	—	—
Granada		53·5	323	8 34a	−50	17 3	+ 6	21 46	SSS	26·2
Obi-garm		53·9	34	i 9 26	− 1	—	—	e 10 42	PcP	—
Dzhergetal		55·1	35	e 9 38	+ 2	—	—	—	—	—
Tashkent		55·4	32	i 9 38	0	e 17 25?	+3	—	—	—
Fergana		56·2	35	e 9 38	− 6	—	—	—	—	—
Besançon		56·3	338	e 9 44	− 1	—	—	—	—	—
Stuttgart	z.	56·5	341	e 9 44	− 2	e 17 41	+ 4	e 11 51	PP	e 32·6
Andijan		56·7	35	9 47	− 1	—	—	i 13 25	PPP	—
Strasbourg		56·8	340	i 9 47	− 1	—	—	—	—	—
Karlsruhe		57·0	340	e 9 46	− 4	—	—	—	—	—
Paris		59·0	336	i 10 3	− 1	—	—	e 11 12	PcP	e 35·6
Naryu		59·3	36	i 10 4	− 2	—	—	i 12 21	PP	—
Frunse		59·4	34	i 10 4	− 2	e 12 18	PP	e 11 11	PcP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S	O−C.	Supp.		L
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Moscow		59·4	3	e 10 4	− 2	—	—	—	—	—
Witteveen	Z.	60·8	342	i 10 18	+ 2	—	—	—	—	—
Almata II		61·2	34	i 10 18	− 1	—	—	—	—	—
Przhevalsk		61·4	36	i 10 18	− 2	—	—	—	—	—
Kurmenty		61·6	36	i 10 19	− 3	—	—	—	—	—
Sverdlovsk		64·3	16	i 10 38	− 1	e 19 16	− 1	—	—	—
China Lake	Z.	138·5	324	e 19 30	[+ 2]	—	—	—	—	—
Haiwee	Z.	138·5	324	e 19 31	[+ 3]	—	—	—	—	—

Additional readings :—
Belgrade eZ = 10m.23s.
Besançon e = 10m.0s.
Stuttgart eQ = 30·6m.
Strasbourg e = 9m.52s.
Long waves were also recorded at Almeria, Alicante, De Bilt, and Bombay.

Aug. 20d. 19h. 48m. 32s. Epicentre 46°·3N. 7°·5E. (as on 1d.).

Intensity V at Montana, Sion ; IV at Adelboden, Chateau-d'Oex.
Macroseismic radius 20km. Epicentre as adopted.

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Neuchatel		0·8	332	i 0 16	− 2	e 0 27	− 4	—	—	e 0·5
Basle		1·3	3	e 0 25	0	e 0 42	− 2	—	—	—
Zürich		1·3	35	e 0 25	0	i 0 46	+ 2	—	—	—
Besançon		1·4	312	i 0 28	+ 1	e 0 46	0	i 0 49	S_g	i 0·9
Ravensburg		2·1	44	e 0 40	+ 3	e 1 10	+ 6	—	—	—
Strasbourg		2·3	5	0 45	P_g	e 1 6	− 3	i 1 17	S_g	i 1·4
Stuttgart	Z.	2·7	24	e 0 44	− 1	e 1 8	−11	e 0 52	P_g	e 1·6
Karlsruhe		2·8	13	e 0 45	− 2	e 1 26	S*	e 0 50	P*	i 1·5
Paris		4·2	308	i 1 8	+ 1	e 1 55	− 2	i 1 27	P_g	—
Jena	E.	5·3	29	—	—	e 2 39?	S_g	—	—	—
Prague		6·0	48	—	—	e 2 48	+ 5	e 3 18	S_g	—

Additional readings :—
Strasbourg i = 49s. and 55s., eS*? = 1m.11s., e = 1m.21s.
Stuttgart eZ = 55s., 59s., and 1m.4s., eS_gZ = 1m.27s. and 1m.30s.
Paris P* = 1m.16s., i = 1m.48s. and 2m.5s., iS_g? = 2m.19s. and 2m.23s.
Jena eN = 2m.51s., eS_g?N = 2m.55s.
Prague e = 3m.13s., 3m.28s., and 3m.43s.

Aug. 20d. 22h. 51m. 43s. Epicentre 34°·7N. 24°·1E. (as on 1950, Feb. 12d.).

A = + ·7521, B = + ·3364, C = + ·5667 ; δ = −3 ; h = 0 ;
D = + ·408, E = − ·913 ; G = + ·517, H = + ·231, K = − ·824.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		3·3	355	i 0 55	+ 2	i 1 36	+ 1	i 1 41	S*	—
Helwan		7·8	126	e 2 2	+ 4	3 23	− 5	2 20	P*	—
Taranto		7·9	319	—	—	e 3 39	+ 9	—	—	e 4·3
Sofia		8·0	356	e 1 53	− 7	e 3 45	+12	—	—	4·7
Ksara		9·8	92	e 2 29	+ 5	5 37	L	—	—	(5·6)
Bucharest		9·8	9	e 2 25	+ 1	e 5 0	S*	e 2 32	P_g	—
Belgrade		10·5	346	e 2 43a	+ 8	e 5 13	+38	e 3 34	P_g	i 6·4
Timisoara		11·3	350	e 3 53	+67	e 5 56	+62	—	—	e 7·3
Rome		11·6	312	e 3 48	+58	e 5 5	+ 4	—	—	e 6·3
Kalossa	E.	12·5	343	—	—	e 5 37	+14	—	—	e 6·7
Yalta		12·5	35	3 3	+ 1	—	—	—	—	—
Kishinev		12·8	14	3 3	− 3	5 37	+ 7	—	—	—
Budapest		13·3	345	e 3 25	+12	—	—	—	—	e 6·6
Triest		13·5	327	e 3 11	− 4	e 5 34	−13	e 6 8	SSS	e 7·6
Bologna		13·9	319	e 4 13	+52	e 6 7	+10	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ogyalla		13·9	343	e 4 52	?	e 6 36	+39	—	—	e 8·3
Uzhgorod		14·0	355	3 34	+12	6 22	+23	—	—	—
Skalnate Pleso	N.	14·8	350	e 3 33	+ 1	—	—	—	—	—
Salo	E.	15·0	321	e 3 53	+18	—	—	—	—	—
Zugdidi		15·9	55	e 3 52	+ 5	—	—	—	—	—
Raciborzu		16·0	346	e 3 51	+ 3	e 6 57	+11	—	—	e 9·0
Abastumanj		16·3	59	e 3 54	+ 2	—	—	—	—	—
Prague		16·9	338	e 4 0	+ 1	e 7 2	− 5	e 4 28	PP	e 8·8
Erevan		17·1	65	e 4 6	+ 4	7 22	+10	—	—	—
Algiers Univ.	Z.	17·2	282	e 4 9	+ 6	e 7 39	+25	—	—	—
Zürich		17·2	321	e 4 2a	− 1	e 7 18	+ 4	—	—	—
Gori		17·3	60	e 3 57	− 7	—	—	—	—	—
Cheb		17·6	335	—	—	e 6 59	−24	—	—	—
Nakhichevan		17·6	70	e 4 27?	+19	e 7 45?	+22	—	—	—
Tiflis		17·7	60	4 9	− 1	—	—	—	—	—
Basle		17·8	321	e 4 11	0	—	—	—	—	—
Neuchatel		17·8	320	e 4 8	− 3	—	—	—	—	—
Stuttgart		17·9	327	e 4 9	− 3	e 7 31	+ 1	e 4 27	PP	e 10·3
Sonneberg		18·3	334	e 4 26?	+ 3	e 7 41	+ 2	—	—	—
Goris		18·4	60	4 18	0	i 7 47	+ 6	—	—	—
Karlsruhe	Z.	18·4	327	e 4 17	− 1	—	—	—	—	—
Strasbourg		18·4	324	e 4 18	0	e 7 41	0	e 4 34	PP	e 10·3
Besançon		18·5	318	e 4 16	− 3	—	—	—	—	—
Jena		18·6	335	e 4 19	− 2	e 7 47	+ 1	—	—	—
Kirovobad		18·6	63	4 21	0	7 47	+ 1	—	—	—
Grozny		18·9	56	4 30	+ 6	—	—	—	—	—
Potsdam		19·4	339	i 4 27	− 3	i 8 6	+ 2	—	—	e 10·3
Alicante		20·1	288	i 4 58	+20	9 2	88	5 22	PP	e 10·6
Tamanrasset	Z.	20·1	240	i 4 36a	− 2	e 8 31	+12	—	—	—
Lenkoran		20·2	70	4 37	− 2	8 24	+ 3	—	—	—
Shemakha		20·3	65	e 4 43	+ 3	—	—	—	—	—
Baku		21·2	66	e 4 54	+ 5	e 8 52?	+11	—	—	—
Paris		21·3	318	i 4 49	− 1	i 8 47	+ 1	i 5 2	pP	e 13·3
Almeria		21·6	284	i 4 58	+ 4	e 9 6	+17	5 30	PP	10·1
Wittevecn	Z.	22·0	333	i 4 56	− 2	—	—	—	—	—
De Bilt		22·1	329	i 4 58	− 1	e 9 6	+ 8	e 12 22	PcS	e 11·3
Copenhagen		22·5	343	i 5 0	− 2	e 9 4	− 1	—	—	12·5
Granada		22·5	285	i 5 6k	+ 4	i 9 7	+ 2	6 0	PP	15·4
Moscow		23·0	19	e 5 5	− 2	e 9 13	− 1	—	—	—
Kew		24·3	322	i 5 20	0	e 9 41	+ 4	—	—	e 14·3
Pulkovo		25·4	8	5 30	− 1	e 9 59	+ 3	—	—	—
Upsala		25·5	352	e 5 28	− 4	e 9 36	−21	e 11 35	SSS	e 14·3
Kizyl-Arvat		26·0	69	i 5 41	+ 5	i 10 16	+10	—	—	—
Ashkabad		27·7	73	e 5 54	+ 2	—	—	—	—	—
Rathfarnham Castle		28·4	321	i 5 56	− 2	e 10 57	+12	e 6 40	PP	e 15·3
Sverdlovsk		33·1	36	i 6 38	− 2	e 11 58	− 1	—	—	—
Kiruna		33·2	358	e 6 37	− 3	e 11 57	− 3	e 9 22	PcP	e 19·9
Samarkand		34·3	69	—	—	12 7	−10	—	—	—
Stalinabad		35·8	69	i 7 3	0	—	—	—	—	—
Tashkent		35·9	65	e 7 2	− 2	e 12 39?	− 3	—	—	—
Tchimkent		36·1	63	i 7 3	− 2	—	—	—	—	—
Obi-garm		36·5	69	i 7 8?	− 1	—	—	—	—	—
Dzhergetal		37·6	68	e 7 19	+ 1	e 13 4	− 4	—	—	—
Andijan		38·3	67	i 7 24	0	e 13 16	− 3	—	—	—
Frunse		39·7	62	i 7 37	+ 1	i 13 35	− 5	—	—	—
Rybach'e		40·8	63	i 7 46	+ 1	—	—	—	—	—
Naryn		40·9	65	e 7 47	+ 1	e 13 56	− 2	—	—	—
Almata		41·4	61	i 7 50	0	—	—	—	—	—
Ili		41·4	60	i 7 52	+ 2	—	—	—	—	—
Chilisk		42·4	61	i 7 58	0	—	—	—	—	—
Przhevalsk		42·5	63	i 7 59	0	—	—	—	—	—
Scoresby Sund		43·5	340	i 8 6k	− 1	—	—	—	—	—
Kimberley	Z.	63·1	179	e 10 30	− 2	—	—	—	—	—

For Notes see next page.

NOTES TO AUGUST 20d. 22h. 51m. 43s.

Additional readings :—
Belgrade eZ =3m.21s., eS_gNE =6m.3s.
Budapest ePE =3m.31s.
Skalnate Pleso eN =3m.48s., 4m.36s., and 4m.51s.
Salo eE =4m.27s. and 5m.12s.
Prague e =4m.40s., 5m.3s., and 5m.37s., eS =7m.6s., e =7m.23s. and 8m.3s.
Algiers Univ. iZ =4m.14s. and 4m.21s.
Stuttgart e =4m.42s.
Strasbourg e =4m.47s., 4m.55s., and 6m.17s., eS =7m.49s., $ePcP$ =8m.42s.
Besançon e =4m.20s., 4m.52s , 5m.34s., and 5m.59s.
Jena eSE =7m.35s.?.
Potsdam eSSE =8m.11s., eSSSZ =8m.17s.
Alicante PPP =5m.40s., SSS =9m.44s., PcS =12m.41s.
Paris ePP =5m.6s., ePPP =5m.16s., i =5m.40s., iSS =9m.10s., i =9m.18s., $iPcS$ = 12m.30s.
Kiruna iZ =7m.0s., eSSE =14m.14s., eEN =15m.4s., $eScSEZ$ =17m.2s., eN =17m.11s., eEN =18m.53s., iE =19m.10s.
Long waves were also recorded at Pavia.

Aug. 20d. Readings also at 0h. (near Malaga), 1h. (Apia and near Tacubaya), 2h. (near Victoria), 4h. (Oaxaca and near Tacubaya), 5h. (Puebla, Vera Cruz, near Mazatlan, and near Dzhergetal), 6h. (Chinchina, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tucson, Boulder City, Berkeley, Lick, Hungry Horse, Seattle, Columbia, Harvard, Ottawa, Seven Falls, Shawinigan Falls, Halifax, and Resclute Bay), 8h. (near Ashkabad), 9h. (Alberni, Horseshoe Bay, Victoria, and near Manila), 10h. (Besançon and near Manila), 11h. (Mount Wilson, Palomar, China Lake, Tinemaha, Palisades, near Alicante, Puebla, near Tacubaya, Oaxaca, Vera Cruz, and near Dzhergetal), 12h. (Kew, Seattle, Pasadena, Palomar, Riverside, China Lake, and near Ashkabad), 13h. (Kiruna, Stuttgart, Mizusawa, and near Almata II), 14h. (near Calcutta), 17h. (Apia), 19h. (La Plata), 20h. (Ashkabad), 21h. (Apia), 22h. (Victoria, near Kurmenty, and near Dzhergetal), 23h. (Huancayo).

Aug. 21d. 10h. 56m. 58s. Epicentre 19°·2N. 155°·5W. (as on April 23d.).

Damage on the coast of Kona at Hookena, Kainaliu, Napoopoo, and Kealakekua, with crevasses 15cm. wide on the coastal road.

L. M. Murphy and W. K. Cloud.
United States Earthquakes, 1951, Serial No. 762, Washington, 1953, p.19.
Epicentre 19°·75N. 156°W.

G. A. Macdonald and C. K. Wentworth.
Hawaiian Volcanoes during 1951. A contribution to General Geology, Geological Survey, Bulletin 996-D, Washington, 1954, p.175-176, 185-213, 4 photos, 2 figures, 2 maps with epicentres.

G. A. Macdonald and C. K. Wentworth.
The Tsunami of Nov. 4d., 1952, on the Island of Hawaii, Bulletin of the Seismological Society of America, Vol. 44, 1954, p.463-469.

G. A. Macdonald and C. K. Wentworth.
The Kona Earthquake of Aug. 21d., 1951, and its aftershocks, Pacific Science, Vol. 6, 1952, No. 4, p.269-287, 1 diagram, 13 figures.

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

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Hawaii Volcanic Obs.		0·3	43	e 0 12	+ 1	0 21	+ 3	—	—	—
Honolulu		3·0	314	i 0 40	−10	—	—	—	—	—
Berkeley		34·4	51	e 6 51a	0	i 12 20	+ 1	i 9 28	PcP	e 14·3
Santa Clara		34·4	51	e 6 52	+ 1	i 12 29	+10	—	—	e 14·7
Lick		34·6	51	i 6 53a	0	e 12 26	+ 4	e 9 27	PcP	e 14·6
Shasta Dam		35·5	45	i 7 1	+ 1	—	—	—	—	—
Fresno	z.	35·8	52	e 7 4a	+ 1	—	—	—	—	—
Mineral	z.	35·9	46	e 7 4a	0	—	—	—	—	—
Pasadena		36·3	58	i 7 7a	0	e 12 49	+ 1	e 8 26	PP	e 15·0
Apia		36·5	207	e 7 1?	− 7	12 56	+ 5	—	—	15·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside		36·9	58	i 7 13 a	+ 1	—	—	e 9 36	PcP	—
Tinemaha		37·1	54	i 7 16 a	+ 2	—	—	—	—	—
China Lake		37·2	54	e 7 15 a	0	—	—	—	—	—
Palomar		37·2	59	i 7 15 a	0	—	—	—	—	—
Victoria		39·0	34	7 30 a	0	13 38	+ 9	9 2	PP	16·5
Seattle		39·1	36	i 7 34 a	+ 3	i 13 34	+ 3	—	—	e 19·5
Boulder City		39·4	55	i 7 34	+ 1	—	—	—	—	—
Sitka		41·1	17	e 7 47	0	e 13 58	− 3	—	—	—
Tucson		42·0	62	i 7 56	+ 2	i 13 46	−28	—	—	—
Hungry Horse		44·3	38	i 8 13	0	—	—	—	—	—
Bozeman		45·1	44	i 8 19	− 1	i 15 6	+ 7	—	—	—
Chihuahua		45·9	68	i 8 24 a	− 2	e 15 26	PPS	e 10 14	PP	21·2
College		45·9	4	8 22	− 4	15 7	− 4	—	—	—
Guadalajara		48·9	78	e 8 54	+ 4	e 16 8	PPS	e 10 48	PP	—
Petropavlovsk		48·9	326	8 46	− 4	15 52	− 1	—	—	—
Klyuchi		49·3	329	e 8 57	+ 4	—	—	—	—	—
Saskatoon		50·2	37	8 57	− 3	16 12	+ 1	18 50	Sc8	22·5
Tacubaya		52·9	79	i 9 24 a	+ 4	e 16 59	+11	e 17 17	PPS	e 24·2
Puebla		53·9	79	e 9 30	+ 3	e 17 12	+10	e 11 34	PP	—
Oaxaca		55·6	80	e 13 6	PPP	e 18 15	PPS	e 27 24	Q	e 28·7
Vera Cruz		55·8	79	e 9 39	− 2	e 17 27	− 1	e 11 48	PP	e 25·2
Wakkanai		57·6	313	e 9 49	− 5	e 17 52	+ 1	—	—	e 25·8
Sapporo		57·6	310	e 9 49	− 5	e 17 48	− 3	—	—	e 27·4
Sendai		57·8	304	e 10 6	+11	17 46	− 8	11 48	PP	25·2
Akita		58·5	305	e 9 58	− 2	e 18 1	− 2	—	—	e 26·5
Mera		58·8	300	e 10 30	+28	e 19 10	+63	—	—	—
Tokyo		58·8	301	10 7	+ 5	i 18 11	+ 4	i 12 59	—	e 25·6
Yokohama		58·9	300	10 23	+20	—	—	—	—	—
Kumagaya		59·1	301	e 10 0	− 4	e 18 10	− 1	—	—	e 26·9
Maebasi		59·3	301	e 10 8	+ 2	e 19 2	?	—	—	—
Hunatu		59·6	300	e 10 33	+25	—	—	—	—	—
Shizuoka		59·9	300	e 10 33	+23	e 18 19	− 2	—	—	—
Matusiro		60·0	302	i 10 6	− 5	i 18 26	+ 3	22 38	88	25·4
Nagano	E.	60·0	302	e 10 7	− 4	—	—	—	—	—
Toyama		60·8	302	e 10 18	+ 2	e 18 34	+ 1	—	—	—
Merida		61·5	75	e 10 23	+ 2	e 18 20	−22	e 23 10	SS	—
Hikone		61·7	300	e 10 11	−11	—	—	—	—	—
Osaka		62·3	299	e 10 27	+ 1	—	—	—	—	—
Tuai	N.	63·1	204	e 10 2?	−30	—	—	—	—	—
Cincinnati		63·6	54	i 10 33	− 2	19 9	+ 1	—	—	—
Koti		64·1	298	e 10 41	+ 3	e 18 6	−68	—	—	25·1
Vladivostok		64·6	310	i 10 35	− 6	i 19 19	− 2	—	—	—
Cleveland		65·7	52	i 10 46 k	− 2	i 19 34	0	—	—	—
Wellington		66·2	204	i 10 49	− 3	i 19 41	+ 1	i 13 32	PP	e 29·0
Columbia		66·9	60	i 10 54	− 2	i 19 54	+ 5	—	—	—
Pittsburgh		67·0	53	i 10 58	+ 1	i 19 55	+ 5	—	—	i 34·0
Morgantown		67·1	54	i 10 57	0	e 19 59	+ 8	—	—	—
New Kensington		67·2	53	e 10 57	− 1	e 19 59	+ 7	—	—	—
Swan Island		67·5	78	i 11 3	+ 3	—	—	13 33	PP	—
Brisbane		68·1	229	i 11 3 k	− 1	i 20 8	+ 5	e 13 25	PP	—
Pennsylvania		68·5	52	i 11 5	− 1	i 20 11	+ 3	—	—	e 28·6
Miami		68·9	68	i 11 11	+ 2	i 20 21	+ 8	—	—	—
Christchurch		68·9	204	i 11 8 k	− 1	20 12	− 1	e 24 57	SS	33·6
Washington		69·4	54	e 11 0	−12	e 19 28	−50	—	—	—
Ottawa		69·5	48	11 11	− 1	20 22	+ 2	13 52	PP	33·6
Shawinigan Falls	N.	71·4	45	11 27	+ 3	20 42	0	—	—	32·4
Palisades		71·4	52	i 11 23	− 1	e 20 46	+ 4	—	—	e 36·8
Fordham		71·5	52	e 11 23	− 1	e 20 50	+ 7	—	—	—
Seven Falls	E.	72·6	45	11 30	− 1	20 57	+ 1	14 14	PP	30·7
Harvard		72·9	50	i 11 31	− 2	i 20 56	− 3	i 14 21	PP	—
Weston		73·1	50	i 11 33	− 1	e 21 3	+ 2	i 21 47	PS	—
Riverview		73·2	224	i 11 33 k	− 2	i 21 6	+ 4	i 14 21	PP	e 33·6
Guantanamo Bay		75·0	73	i 11 50	+ 5	—	—	—	—	—
Galerazamba		77·4	82	i 12 8	+10	i 22 4	+15	i 12 22	pP	—
Halifax		78·1	46	11 57	− 5	21 51	− 5	16 45	PPP	37·8

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		79·3	282	e 12 5	− 4	e 20 50	−79	e 12 17	PcP	—
Kabansk		79·8	321	12 9	− 3	22 12?	− 2	—	—	—
Bogota		80·4	88	i 12 19	+ 4	e 22 26	+ 5	i 15 36	PP	—
Bermuda		80·6	59	i 12 15	− 1	i 22 30	+ 7	i 15 26	PP	—
Irkutsk		81·1	322	e 12 16	− 2	22 26	− 2	—	—	—
Ivigtut		81·4	28	i 12 29	+ 9	i 22 34	+ 3	i 23 51	PPS	40·0
San Juan		83·6	73	e 12 30	− 1	—	—	e 15 50	PP	—
Roosevelt Roads		84·0	72	e 11 39	−54	—	—	13 2	?	—
Huancayo		84·8	105	e 12 43	+ 6	e 23 8	+ 3	e 16 2	PP	e 35·8
Scoresby Sund		84·9	15	e 12 37	− 1	i 23 5	− 1	e 28 25	SS	40·0
Fort de France		89·2	75	i 12 49	−10	i 23 33	−14	e 16 19	PP	—
La Paz		92·9	106	i 13 18 a	+ 2	i 23 58	[+ 8]	i 17 2	PP	45·0
Kiruna		93·2	1	e 13 13	− 4	i 23 49	[− 2]	e 19 3	PPP	e 45·3
Terre Adélie		97·5	200	i 27 18	PPS	i 24 18	[+ 4]	i 25 12	S	—
Sverdlovsk		98·4	341	i 13 48	+ 7	i 25 6	− 1	—	—	—
Bandong		98·7	266	e 17 30	PP	e 24 14	[− 7]	e 26 26	PS	—
Djakarta		99·2	266	e 17 32	PP	e 25 11	− 3	e 24 11	SKS	—
Aberdeen	E.	100·7	13	i 20 16	PPP	i 24 26	[− 4]	i 32 29	SS	51·7
Helsinki		100·9	0	—	—	e 24 31	[0]	e 25 24	S	—
Upsala		101·0	3	e 18 2	PP	e 24 31	[− 1]	e 32 27	SS	e 54·0
Pulkovo		101·2	357	e 14 1	+ 7	e 24 26	[− 7]	e 18 10	PP	—
Almata		101·4	324	e 13 55	0	—	—	—	—	—
Rybach'e		102·4	323	e 18 13	PP	i 24 40	[+ 1]	i 25 44	S	—
Frunse		102·7	324	i 14 0	0	i 25 43	0	i 27 17	PS	—
Durham		103·0	14	—	—	i 24 44	[+ 3]	—	—	—
Naryn		103·1	322	e 18 12?	PP	i 24 43	[+ 1]	i 25 46	SKKS	—
Rathfarnham Castle		103·1	17	e 18 46	PP	e 24 41	[− 1]	e 28 39	PPS	e 41·7
Moscow		104·6	353	e 14 15	+ 6	i 25 59	0	e 18 32	PP	—
Copenhagen		104·7	6	e 18 21	PP	i 25 58	− 2	24 53	SKS	50·0
Andijan		105·6	324	e 14 14	+ 1	26 12	+ 5	18 34	PP	—
Tchimkent		106·0	327	i 18 34	PP	i 24 53	[− 2]	—	—	—
Fergana		106·2	324	e 18 37	PP	—	—	—	—	—
Murgab		106·3	321	e 18 39	PP	25 1	[+ 5]	—	—	—
Kew		106·4	14	i 18 39	[+13]	e 25 1	[+ 4]	e 28 1	PS	e 43·0
La Plata		106·8	122	22 38	PPPP	25 2	[+ 4]	28 14	PS	49·9
Taslıkent		106·9	327	e 14 18	− 1	i 25 0?	[+ 1]	e 18 36	PP	—
De Bilt		107·0	12	e 18 22	[− 5]	e 25 5	[+ 6]	i 18 45	PP	e 50·0
Potsdam		108·0	7	i 18 57	PP	e 25 2	[− 2]	i 34 3	SS	58·0
Stalinabad		109·1	325	18 57	PP	26 11	{+12}	28 23	PS	—
Samarkand		109·3	326	28 19	PS	25 10	[+ 1]	—	—	—
Jena	E.	109·3	7	e 18 41	[+ 9]	—	—	e 19 7	PP	—
Paris		109·5	14	e 18 19?	[−13]	i 25 15	[+ 5]	i 19 3	PP	e 51·0
New Delhi	N.	110·4	312	e 19 13	PP	25 9	[− 5]	28 24	PS	—
Prague		110·5	6	e 18 29?	[− 5]	e 25 16	[+ 2]	e 19 20	PP	e 55·0
Strasbourg		110·9	11	e 19 18	PP	e 25 21	[+ 5]	e 28 45	PS	e 46·7
Stuttgart		111·0	10	e 18 50	[+15]	e 25 22	[+ 6]	e 19 12	PP	60·0
Lwow		111·3	0	e 19 28	PP	e 26 19	{+ 5}	e 21 38	PPP	—
Besançon		111·8	12	e 18 50	[+13]	—	—	e 19 23	PP	—
Skalnate Pleso		111·8	2	e 19 40	PP	e 25 31	[+11]	e 17 11	?	—
Uzhgorod		112·4	1	e 19 41	PP	25 29	[+ 7]	i 22 21	PKS	—
Clermont-Ferrand		112·5	16	e 19 24	PP	e 30 14	PPS	e 29 26	PKKP	e 35·1
Ogyalla		113·0	4	e 20 14	?	e 29 44	PPS	e 22 14	PKS	—
Pavia		114·4	11	e 19 28	PP	i 35 32	SS	e 34 38	?	e 49·8
Triest		114·7	8	e 17 55	[−47]	e 25 33	[+ 2]	i 19 42	PP	—
Timisoara		115·3	2	e 20 2	PP	—	—	—	—	—
Toledo		115·5	23	e 18 40	[− 4]	25 35	[+ 1]	e 19 40	PP	54·0
Yalta		116·0	351	e 19 57	PP	—	—	—	—	—
Shemakha		116·4	340	e 19 41?	PP	—	—	—	—	—
Tiflis		116·5	343	e 19 46	PP	e 26 26	{−24}	e 35 14	SS	—
Bucharest		116·7	358	e 18 44	[− 2]	e 26 32	{−20}	e 19 52?	PP	48·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Lenkoran		118·6	338	e 20 13	PP	—	—	—		—	—
Granada		118·0	25	18 48 a	[− 1]	25 54	[+11]	20	2	PP	53·6
Goris		118·1	340	e 20 16	PP	i 28 8	?	—		—	—
Erevan		118·1	343	e 20 7	PP	28 2	?	24	1	?	—
Alicante		118·1	21	18 55	[+ 6]	i 25 50	[+ 7]	20	5	PP	e 58·4
Rome		118·2	9	e 19 57	PP	e 36 23	SS	e 29	41	PS	e 51·0
Almeria		118·7	24	(i 18 44)	[− 6]	(36 8)	SS	(20	0)	PP	55·4
Poona	E.	118·7	305	18 36	[−14]	25 46	[+ 1]	20	4	PP	—
Bombay		119·3	306	i 20 17	PP	i 25 50	[+ 2]	i 29	57	SKSP	—
Istanbul	N.	119·9	355	e 20 8	PP	e 25 57	[+ 7]	e 27	18	S	e 66·0
Taranto		120·3	6	19 37	[+44]	e 25 27	[−24]	35	32	SS	—
Ksara		126·2	348	19 2	[− 3]	—	—	21	2	PP	—
Helwan		130·8	351	19 23	[+ 9]	22 39	SKP	21	38	PP	—
Tamanrasset	Z.	134·3	25	e 19 21	[+ 1]	—	—	e 24	47	PPP	—
Grahamstown	Z.	165·8	187	i 32 33	?	—	—	—		—	—
Pietermaritzburg	Z.	168·3	206	i 30 30	?	—	—	—		—	—
Kimberley	Z.	170·5	181	i 20 1	[− 8]	—	—	—		—	—
Pretoria	Z.	172·7	207	i 29 55	PPP	i 32 25	[+ 8]	—		—	—

Additional readings :—
Berkeley eZ =7m.25s. and 9m.49s.
Lick eZ =7m.23s., iZ =10m.22s.
Pasadena iPcPZ =9m.40s.
Seattle i =7m.39s. and 7m.42s., iPP =8m.3s., iPPP =8m.21s., i =13m.9s., 13m.41s., 14m.5s., and 14m.12s.
Chihuahua eS? =14m.50s.
Guadalajara e =10m.26s.
Saskatoon SS =19m.47s.
Tacubaya i =9m.32s., eQ =21m.40s.
Puebla e =9m.54s.
Vera Cruz ePP =11m.40s., eSS =21m.12s.
Sendai PPPE =12m.53s., SS =22m.8s., Q =23m.42s.
Tokyo iN =14m.10s., eSS?E =21m.7s.
Matusiro ePcP =11m.18s., PP =12m.7s., PPP =13m.21s., i =19m.35s.
Wellington ipP?Z =11m.40s., isS? =20m.51s., eSS =23m.33s.
Christchurch ePPNZ =14m.17s., ePPPZ =15m.42s., eScSE =21m.12s., eQE =29m.17s.
Ottawa Q =28·9m.
Seven Falls PPPE =15m.57s., SSE =25m.48s., SSSE =28m.45s.
Harvard e =13m.41s., ePPP =16m.0s., e =17m.34s. and 20m.39s., i =22m.36s., eSS =26m.15s., eSSS =29m.26s.
Riverview iPPPZ =16m.6s., iSKSEN =21m.33s., iScSN =21m.38s., iPSE =21m.43s.
Halifax PS =22m.37s., PPS =22m.55s., Q =32·9m.
Bermuda i =23m.8s.
Ivigtut 15m.47s. and 22m.58s., SS =28m.32s., SSS =31m.26s.
Huancayo iPPS =24m.22s., eSS =28m.48s., eSSS =31m.48s.
Scoresby Sund e =12m.45s., 31m.31s.
La Paz iZ =13m.38s. and 17m.31s., iPS =25m.48s., iPPS =26m.12s., SS =30m.54s.
Kiruna ePE =13m.17s., iNZ =13m.23s., eNZ =14m.46s., eE =14m.52s., ePPNZ =16m.46s., ePPE =16m.51s., iNZ =17m.57s., ePPPE =18m.58s., i =22m.11s., iSKKSEZ =24m.9s., iSEN =24m.24s., eNZ =25m.31s., iPSEN =25m.54s., eSSEN =30m.47s., eSSZ =30m.51s., eSSS =34m.23s., eE =34m.32s., eN =35m.58s., iE =36m.56s., eQN =42·0m.
Terre Adélie iSS =32m.8s.
Aberdeen iPPPE =21m.29s., iSKSE =25m.30s., iSKKSE =26m.25s., iSE =27m.6s., iPSE =28m.48s., iPPSE =30m.16s., eSSE =34m.31s., iE =40m.25s., eE =43m.16s.
Helsinki eE =30m.21s.
Upsala eN =22m 45s , eS =25m.27s., eN =27m.10s., eE =29m.27s., eSSE =32m.2s.?, eE =37m.45s., eN =41m.18s.
Pulkovo S =25m.32s., PS =27m.2s.
Rybach'e ePS =27m.27s.
Rathfarnham Castle ePS?EN =26m.29s., eSSEN =32m.22s.
Moscow ePPP =20m.30s., ePKS =21m.55s.
Copenhagen ePS =27m.23s.
Andijan PPP =20m.48s., SKS =24m.57s., PS =27m.41s.
Kew iPP =18m.58s., eSKKSEN =26m.11s., eSSEN =33m.44s.
La Plata SKKSN =26m.32s., PPSN =31m.38s., SSS?N =38m.38s., SSS?E =38m.56s.
Tushkent ePPP =20m.50s., eS =26m.16s., eSS =33m.15s.
De Bilt ePPP =20m.50s., iS? =26m.20s., iPS =28m.9s., ePPS =29m.13s., eSS =33m.32s. eSSS =37m.38s.
Potsdam iSKSN =25m.11s., iSKKSN =25m.58s., iSE =26m.30s., iPSNZ =28m.21s.
Paris ipPP? =20m.11s., iPPP =21m.19s., iS? =26m.13s., iSP? =28m.4s., iPS =28m.32s., iSPP =29m.5s., iPPS =29m.39s., iSS =34m.23s., iSSP =34m.35s., and many unidentified readings.

Continued on next page.

New Delhi SKKSN =26m.9s., eN = 29m.22s., SSN =34m.21s., iN =39m.21s.
Prague ePPP =22m.10s., eSKKS =26m.3s., e = 26m.45s., ePS = 28m.38s., ePPS = 29m.32s., eSS =34m.42s., eSSS =39m.14s.
Strasbourg e =19m.26s. and 20m.27s., ePPP =21m.29s., eSKKS =26m.13s., e =26m.20s., eS =26m.57s., ePPS =30m.8s., eSS =34m.26s., e =34m.37s., 37m.54s., and 38m.16s., eSSS =38m.47s.
Stuttgart e =20m.17s., ePPP =21m.25s., eSKKS =26m.18s., eS =26m.56s., ePS = 28m.40s., ePPS =29m.39s., eSS =34m.42s., eSSS =39m.2s.
Lwow ePS =28m.30s.?, eSS =38m.38s.?.
Skalnate Pleso e =17m.25s., ePPP =22m.34s., e =24m.37s., eSKKS =26m.26s., e =26m.36s., ePS =28m.56s., ePPS =30m.20s., eSS? =34m.2s., e =37m.8s.
Uzhgorod eSKKS =26m.29s., iPS =29m.1s.
Triest e =20m.31s., iSKKS =26m.40s., eS =27m.8s., iPS =29m.16s., eSS =34m.28s.
Toledo PPP =22m.1s., e =29m.28s. and 29m.55s., SS =35m.40s., e =47m.55s.
Granada PPP =23m.5s., S =28m.3s., PS =30m.2s., SS =36m.27s.
Alicante PPP =22m.23s., PS =29m.45s., PPS =30m.57s., SS =36m.18s., SSP =36m.41s., SSS =41m.56s., Q =50m.23s.
Rome e =21m.49s., ePPS =31m.27s.
Almeria PPP =(22m.30s.), S =(27m.48s.), readings have been reduced by 1m.
Poona PKSE =22m.13s., PPPE =22m.26s., SKKSE =26m.43s., PSE =29m.31s., SKSPE =29m.39s., PPSE = 30m.51s., SSE =36m.3s., SSSE =40m.21s.
Taranto e =27m.57s.
Helwan eZ =21m.15s.
Tamanrasset eZ =19m.30s. and 19m.44s., ePPZ =21m.49s.
Kimberley iZ =20m.33s., iPPPZ =31m.9s.
Long waves were also recorded at Auckland, Calcutta, and Malaga.

Aug. 21d. 18h. 57m. 0s. Epicentre 7°·08S. 13°·0W.

$A = +·9672$, $B = -·2233$, $C = -·1211$; $\delta = 0$; $h = +7$;
$D = -·225$, $E = -·974$; $G = -·118$, $H = +·027$, $K = -·993$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tamanrasset	Z.	34·7	30	e 6 53	− 1	—	—	—	—	—
Kimberley	Z.	41·7	125	i 7 51	− 1	—	—	—	—	—
Grahamstown	Z.	45·0	130	i 8 17	− 2	—	—	—	—	—
Rome		54·0	23	e 9 15	−13	e 17 15	+12	e 14 0	PcS	—
Helwan	Z.	56·2	47	e 9 45	+ 1	e 17 48	+15	e 11 48	PP	—
Besançon		56·6	15	e 9 52	+ 5	—	—	—	—	—
Strasbourg		58·3	16	e 10 29	PcP	e 22 0?	SS	—	—	e 27·0
Stuttgart		58·8	17	e 10 0	− 2	e 18 5	− 2	e 21 54	SS	e 29·0
Kew		59·2	9	—	—	e 18 0	−12	—	—	—
De Bilt		60·9	12	—	—	e 18 29	− 5	e 22 39	SS	e 25·0
Cheb		61·0	18	e 10 39	+21	e 18 40	+ 5	e 22 16	SS	e 30·0
Istanbul	N.	61·5	35	e 14 0?	PPP	e 18 35	− 7	—	—	—
Ksara		61·6	45	10 24	+ 2	22 28	SS	12 16	PP	—
Prague		61·6	19	e 10 23	+ 1	—	—	e 10 34	pP	—
Harvard		72·5	319	e 11 31	+ 1	—	—	—	—	—
Palisades		73·4	317	e 21 44	PS	—	—	—	—	—
Ottawa		76·4	320	i 11 54	+ 1	—	—	—	—	—
Kiruna		78·3	13	i 12 11	+ 8	e 21 58	− 1	—	—	e 35·0

Additional readings :—
Cheb e =11m.6s., 15m.29s., and 16m.55s.
Prague e =11m.42s. and 13m.31s.
Long waves were also recorded at Bogota, Huancayo, La Paz, Bermuda, and several European stations.

Aug. 21d. Readings also at 0h. (Samarkand, Obi-garm, Dzhergetal, Stalinabad, and near Khorog), 2h. (Puebla, Oaxaca, Tacubaya, Vera Cruz, Merida, Palomar, China Lake, and Palisades), 4h. (near Dzhergetal), 5h. (Scoresby Sund, near Rybach'e, Frunse, Kurmenty, Almata, Ili, Fergana, Andijan, Almata II, Krasnogorka, Przhevalsk, and Naryn), 6h. (Khorog, Dzhergetal, Fergana, Andijan, Murgab, Samarkand, Obi-garm, and near Stalinabad), 7h. (Naryn, and Alicante (2)), 9h. (near Obi-garm), 10h. (Istanbul and Stuttgart), 11h. (near Przhevalsk, Chilisk, Kurmenty, Almata II, and near Apia), 12h. (Kimberley, Alicante, Timisoara, near Athens, near Istanbul, and Sofia), 13h. (near Malaga (2)), 16h. (near Ili, Krasnogorka, Naryn, Chilisk, Almata, and Almata II), 17h. (Prague), 18h. (Raciborzu and Apia), 20h. (Bermuda, Lick, Tinemaha, Mineral, Fresno, Mount Wilson, Palomar, China Lake, near Andijan, Fergana, Obi-garm, and Dzhergetal), 21h. (Riverside, China Lake, Mount Wilson, Tamanrasset, Istanbul, Huancayo, and near La Paz), 22h. (Apia, near Krasnogorka, Naryn, Chilisk, Almata II, near Przhevalsk, Malaga (2), and near Granada), 23h. (Apia and China Lake).

Aug. 22d. 5h. 41m. 30s. Epicentre 10°·0N. 83°·0W.

A = +·1200, B = −·9777, C = +·1725; δ = +5; h = +7;
D = −·993, E = −·122; G = +·021, H = −·171, K = −·985.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		3·5	107	1 1	+ 4	1 52	+12	—	—	—
Swan Island		7·4	353	e 3 28	+96	e 4 52	+94	—	—	—
Chinchina		8·8	124	i 2 14	+ 3	i 4 1	+ 8	i 4 55	S_g	—
Bogota		10·4	120	i 2 40	+ 6	i 4 56	SSS	i 2 49	PPP	i 5·6
Guantanamo Bay		12·5	37	e 3 20	PPP	—	—	—	—	—
Miami		16·0	9	e 4 54	+66	e 8 4	L	—	—	(e 8·1)
Puebla		17·2	303	e 3 58	− 5	e 7 12	− 2	—	—	9·3
Tacubaya		18·2	302	i 4 16	0	e 8 12	SSS	e 8 24	?	e 10·6
San Juan		18·3	60	4 23	+ 6	i 7 59	SS	—	—	—
Roosevelt Roads		18·7	61	i 3 34	−48	—	—	—	—	—
Fort de France		21·8	76	e 5 1	+ 5	i 9 17	SS	—	—	—
Huancayo		23·2	160	e 5 13	+ 4	—	—	e 5 41	PP	e 10·5
Washington		29·3	10	e 6 8	+ 2	—	—	—	—	e 17·2
La Paz		30·2	149	e 6 14	0	i 11 23	+10	i 12 59	SS	i 14·3
Pennsylvania	N.	31·0	6	e 7 37	PPP	e 11 58	+32	—	—	e 16·9
Cleveland		31·4	1	i 6 34a	+ 9	e 11 38	+ 6	—	—	—
Palisades		31·9	13	e 6 30	+ 1	e 11 27	−13	e 12 11	?	e 15·6
Weston		33·8	15	i 6 46	0	—	—	—	—	e 18·7
Tucson		33·9	315	e 6 39	− 8	—	—	e 8 2	PP	—
Ottawa		35·8	9	7 4	+ 1	12 48	+ 7	—	—	18·5
Shawinigan Falls	N.	37·5	12	e 7 15	− 2	—	—	—	—	—
Seven Falls	E.	38·4	13	e 9 4	PP	—	—	—	—	—
Boulder City		38·8	317	e 7 27	− 1	—	—	—	—	—
Palomar	Z.	38·8	313	e 7 20	− 8	—	—	—	—	—
Pasadena	Z.	40·2	313	e 7 35	− 5	—	—	—	—	—
China Lake	Z.	40·6	316	e 7 41	− 2	—	—	—	—	—
Tinemaha	Z.	41·6	316	e 7 46	− 5	—	—	—	—	—
Lick	Z.	44·2	315	e 8 8	− 4	—	—	e 8 43	?	—
Mineral	Z.	45·6	318	e 8 23k	− 1	—	—	e 8 59	?	—
Hungry Horse		46·2	332	e 8 21	− 7	—	—	—	—	—
Kew		77·7	39	—	—	e 28 30	?	—	—	—
Strasbourg		83·1	42	e 12 24	− 5	—	—	—	—	—
Stuttgart		84·0	42	e 12 34	+ 1	—	—	e 38 30	Q	42·5
Tamanrasset	Z.	84·8	68	e 12 37	0	12 42	PcP	e 15 53	PP	—
Kiruna	N.	85·8	22	—	—	e 27 18	?	e 37 30	Q	e 46·5

Tamanrasset also gives eZ = 13m.1s.
Long waves were also recorded at Vera Cruz, Bermuda, Berkeley, Harvard, Seattle, Resolute Bay, Scoresby Sund, Paris, Almeria, Potsdam, De Bilt, and Granada.

Aug. 22d. 14h. 14m. 49s. Epicentre 40°·0N. 20°·0E. (as on 1945, Sept. 12d.).

A = +·7219, B = +·2627, C = +·6402; δ = +1; h = −2;
D = +·342, E = −·940; G = +·602, H = +·219, K = −·768.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		2·2	283	0 38	0	1 6	0	—	—	—
Athens		3·5	125	e 0 57	0	i 1 51	S*	i 1 6	P*	—
Sofia		3·7	42	e 0 59	− 1	e 1 43	− 2	i 1 51	S*	—
Messina	Z.	4·0	244	i 1 5	+ 1	i 1 51	− 1	i 0 59	P	i 2·5
Belgrade		4·8	5	e 1 26k	P*	i 2 39	S*	e 1 33	P_g	—
Timisoara		5·8	9	e 1 51	P_g	e 3 11?	S_g	e 2 21	?	3·8
Rome		6·0	290	e 1 33	+ 1	e 3 0	S*	e 2 23	?	—
Bucharest		6·3	44	e 1 41	+ 5	e 2 59	+ 9	—	—	—
Istanbul		7·0	79	e 1 43	− 3	e 3 14	+ 6	—	—	—
Triest		7·3	323	e 1 50	0	i 3 6	− 9	i 3 55	S_g	i 4·2

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pavia	9·5	306	—	—	e 4 41	S*	—	—	e 6·4
Prague	10·8	341	e 4 16	?	e 4 45	+ 3	e 6 1	S_g	—
Zürich	11·1	315	e 2 43	0	e 4 49	0	—	—	—
Stuttgart	11·7	322	e 2 40	−11	—	—	—	—	e 6·7
Besançon	12·5	310	e 5 10	?	e 5 25	+ 2	e 5 55	SSS	—
Ksara	14·1	111	—	—	e 5 39	−23	—	—	e 9·3
Kew	18·2	317	e 5 11	?	—	—	—	—	—
Kiruna	27·9	0	e 6 18	+24	e 13 1	?	e 13 6	?	e 15·2

Additional readings :—
Belgrade eNW =2m.1s., eSNW =2m.32s., eS_gNW =3m.1s., eNE =3m.51s.
Timisoara eP_gE =2m.23s., eS?N =3m.6s.?, eS*?N =3m.31s., eS_gE =3m.50s.
Bucharest eN =2m.22s. and 3m.6s.
Prague e =5m.6s., eS* =5m.23s.
Long waves were also recorded at Budapest, Jena, Potsdam, Copenhagen, and Helsinki.

Aug. 22d. Readings also at 0h. (near Dzhergetal), 2h. (Tacubaya and Huancayo), 3h. (Apia and near Dzhergetal), 4h. (Mount Wilson, Palomar, China Lake, Tinemaha, Lick, Fresno, Mineral, and near Messina), 6h. (La Paz, Copiapo, near Dzhergetal, and near Obi-garm), 7h. (Ksara, Leninakan, Lenkoran, Zugdidi, Baku, near Goris, Erevan, Kirovobad, Tiflis, Gori, and Shemakla), 8h. (Riverside, Palomar, Pasadena China Lake, Tinemaha, Berkeley, Lick, Fresno, Mineral, Boulder City, Tucson, Shasta Dam, Butte, Hungry Horse, Victoria, and College), 9h. (Palisades), 10h. (Algiers Univ., Besançon, Paris, Helsinki, Strasbourg, Tamanrasest, Kimberley, Pietermaritzburg, Ksara, Apia, near Fort de France, near Alberni, Horseshoe Bay, and Victoria), 11h. (near Dzhergetal), 12h. (near Alicante, Fergana, near Khorog, Obi-garm, Stalinabad, and Dzhergetal), 13h. (Stuttgart, Alberni, Horseshoe Bay, Victoria, and Apia), 15h. (Apia (3), and near Ashkabad), 17h. (Copiapo and Santa Lucia), 18h. (near Alicante (2), Almata, near Przhevalsk, Chilisk, Almata II, and III), 19h. (Brisbane and near Apia), 20h. and 21h. (Apia), 22h. (Apia and near Dzhergetal), 23h. (Apia, Scoresby Sund, Huancayo, and near Dzhergetal).

Aug. 23d. 1h. 3m. 12s. Epicentre 53°·4N. 170°·0W. Depth of focus 0·015.

A = −·5897, B = −·1039, C = +·8009 ; δ = −2 ; h = −7 ;
D = −·174, E = +·985 ; G = −·789, H = −·139, K = −·599.

		△	Az.	P.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.
College		16·0	36	3 37	− 2	—	—
Shasta Dam		34·2	91	e 6 35	0	—	—
Hungry Horse		34·9	74	i 6 40	− 1	i 9 14	PcP
Mineral	z.	34·9	91	i 6 41a	0	—	—
Berkeley	z.	36·1	95	e 6 51a	0	e 8 0	?
Lick	z.	36·8	95	i 5 57a	−60	e 9 20	PcP
Tinemaha	z.	39·0	93	i 7 16a	+ 1	e 13 0	ScP
China Lake	z.	40·2	93	i 7 26a	+ 1	e 13 5	ScP
Pasadena		41·0	96	i 7 33a	+ 1	—	—
Riverside	z.	41·6	96	i 7 36a	− 1	i 7 43	?
Boulder City		41·8	91	i 7 39	+ 1	—	—
Palomar		42·4	96	i 7 43a	0	—	—
Tucson		46·7	91	i 8 18	0	—	—
Kiruna	z.	58·8	355	e 10 28	PcP	—	—
Palisades		61·6	58	i 10 4	− 2	i 10 40	pP
Harvard		61·7	56	i 10 6	− 1	—	—
Weston		61·9	56	i 10 7	− 1	i 10 42	pP
San Juan		83·4	68	i 12 16	+ 2	e 12 51	pP

Aug. 23d. 9h. 11m. 46s. Epicentre 13°·7S. 167°·2E. (as on 1947, April 27d.).

A = −·9478, B = +·2153, C = −·2354 ; δ = +9 ; h = +6 ;
D = +·222, E = +·975 ; G = +·230, H = −·052, K = −·972.

		Δ	Az.	P.	O−C.	Supp.		
		°	°	m. s.	s.	m.	s.	s.
Brisbane	z.	19·0	222	i 4 25k	− 1	—		—
Lick	z.	83·8	49	e 12 33a	+ 1	—		—
Mineral	z.	85·0	47	e 12 39k	+ 1	e 12	47	pP
Pasadena	z.	85·3	53	e 12 40	0	—		—
College		85·4	17	12 40	0	—		—
Riverside	z.	85·9	53	e 12 42	− 1	—		—
Palomar	z.	86·0	54	e 12 44	+ 1	—		—
Tinemaha	z.	86·2	50	e 12 46	+ 2	—		—
China Lake	z.	86·3	52	i 12 45	0	—		—
Boulder City		88·5	52	i 12 56	0	—		—
Tucson		90·6	57	e 13 6	+ 1	—		—
Kiruna	z.	121·8	347	i 18 54	[− 2]	—		—
Stuttgart	z.	140·6	338	e 19 30	[− 2]	—		—
Strasbourg		141·3	339	e 19 33	[0]	—		—
Besançon		143·0	340	e 19 34	[− 2]	—		—

Additional readings :—
Besançon e =19m.58s. and 20m.25s.

Aug. 23d. 13h. 42m. 28s. Epicentre 35°·5S. 179°·6E. Depth of focus 0·010. (as on 1951, May 19d.).

A = −·8160, B = +·0057, C = −·5781 ; δ = +9 ; h = 0 ;
D = +·007, E = +1·000 ; G = +·578, H = −·004, K = −·816.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tuai	N.	3·8	209	1 2	+ 4	1 43	+ 1
Wellington		6·9	211	1 37	− 3	i 2 48	−10
Cobb River	E.	7·8	222	e 2 1	+ 9	e 3 4	−16
Kaimata	N.E.	9·5	220	e 2 16	0	e 3 42	−19
Christchurch		9·6	211	e 2 16	− 1	e 3 51	−13
Brisbane	z.	24·0	283	i 5 0k	− 6	—	—
Pasadena	z.	90·4	49	i 12 52	0	—	—
Lick	z.	90·7	43	i 12 53a	0	—	—
Palomar	z.	90·7	50	i 12 54k	+ 1	—	—
Berkeley	z.	90·7	43	i 12 53a	0	—	—
Riverside	z.	90·8	49	i 12 53	− 1	—	—
China Lake	z.	91·9	47	i 12 59k	0	—	—
Tinemaha	z.	92·4	46	e 13 1	0	—	—
Mineral	z.	92·9	42	e 13 3a	0	—	—
Tacubaya		94·2	70	—	—	i 32 51	SSP
Kiruna	z.	145·5	348	i 19 20	[− 7]	—	—

Aug. 23d. Readings also at 0h. (Antofagasta and Apia (2)), 1h. (Fresno, Mineral, Lick Cobb River, and near Tsikhlis-Dzhvari (2)), 2h. (Apia and near Concepción), 3h. (Palomar, Berkeley, Riverside, China Lake, Tinemaha, Mineral, Lick, Mount Wilson, and Tacubaya), 4h. (Kiruna), 5h. (near Obi-garm), 7h. (Sofia, Stuttgart, near Horseshoe Bay, Victoria, and Alberni), 9h. (near Chilisk, Almata II, and Kurmenty), 10h. (near Samarkand, Fergana, Stalinabad, Andijan, Khorog, Dzhergetal, Obi-garm, Puebla, near Tacubaya, Oaxaca, Guadalajara, Fresno, Palomar (2), Riverside (2), China Lake, Tinemaha, Mineral, Mount Wilson (2), Boulder City, Tucson, Hungry Horse, College, Kiruna, and Strasbourg), 11h. (Mount Wilson, Tinemaha, China Lake, Palomar, Stuttgart, and Apia), 12h. (near Apia), 14h. (Victoria and Horseshoe Bay), 16h. (Pretoria, Apia, and Lwow), 17h. (Santa Lucia), 18h. (Mizusawa, Toledo, near Malaga, Granada, and near Victoria), 19h. (Apia, La Paz, and near Dzhergetal), 20h. (Santa Lucia, Puebla, Oaxaca, near Tacubaya, Vera Cruz, and near Neuchatel), 21h. (Manila, Apia, and Victoria), 22h. (Kew), 23h. (Istanbul and near Victoria.).

Aug. 24d. 10h. 27m. 26s. Epicentre 37°·3N. 21°·3E.

Felt in the S.W. of the Peleponnese, principally in the provinces of Pylia intensity VIII at Pylia; VII-VIII at Koryphasion, Sgrapa, and Iklaena, Triphylia; VII-VIII at Floka and Kalamae; IV-V at Arios. Epicentre as adopted.

A. Galanopoulos.
Seismological Institute Bulletin, 1951, Athens, 1952, p.23.

$A = +\cdot7429$, $B = +\cdot2897$, $C = +\cdot6034$; $\delta = -8$; $h = -1$;
$D = +\cdot363$, $E = -\cdot932$; $G = +\cdot562$, $H = +\cdot219$, $K = -\cdot797$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·0	71	i 0 36a	+ 1	i 1 1	− 1	i 1 7	S_g	—
Taranto		4·5	317	1 16	+ 5	2 6	+ 1	—	—	—
Messina	z.	4·6	283	e 1 16k	+ 4	i 2 8	+ 1	i 1 29	P_g	—
Sofia		5·6	16	e 1 30	+ 3	e 2 48	S*	e 2 44	P*	e 3·9
Istanbul		7·1	56	e 1 48	0	e 3 5	− 5	e 3 53	S_g	e 4·2
Belgrade		7·5	356	e 1 52k	− 1	e 3 39	S*	e 2 24	P_g	i 4·5
Bucharest		8·0	26	e 2 4	+ 4	e 3 32	− 1	e 2 46	P_g	3·9
Rome		8·3	307	e 3 4	+60	—	—	—	—	—
Timisoara		8·4	0	2 39?	+33	e 4 11	S*	—	—	—
Kalossa	E.	9·4	350	e 4 0	S	(e 4 0)	− 7	e 5 22	S_g	e 6·5
Kecskemet		9·7	354	—	—	e 5 28	S_g	—	—	—
Triest		10·1	328	e 2 34	+ 5	4 19	− 6	—	—	i 5·6
Budapest		10·3	352	i 3 59	?	i 4 24	− 6	—	—	e 6·7
Ogyalla		10·8	349	e 4 24	?	e 4 41	− 1	e 5 11	SSS	e 5·9
Helwan		11·2	129	e 2 39	− 5	4 41	−11	i 5 1	SS	—
Kishinev		11·2	28	e 2 50	+ 6	—	—	—	—	—
Uzhgorod		11·3	3	e 2 46	0	e 4 58	+ 4	—	—	—
Skalnate Pleso		11·9	357	e 3 7	PPP	—	—	—	—	e 5·8
Pavia		12·0	315	e 9 0	PcP	—	—	—	—	e 5·9
Yalta		12·1	50	e 2 56	− 1	—	—	—	—	—
Ksara		12·4	102	e 3 19	PPP	—	—	—	—	e 6·8
Raciborzu		13·0	351	e 3 7	− 2	e 5 50	SS	e 15 55	ScS	—
Theodosia		13·1	50	e 3 13?	+ 3	—	—	—	—	—
Prague		13·7	341	i 3 18	0	e 5 50	− 2	e 3 32	PP	e 7·8
Zürich		13·8	321	e 3 27	+ 8	e 6 12	SS	—	—	—
Cheb		14·3	336	e 3 29?	+ 3	—	—	—	—	e 8·6
Basle		14·4	320	e 3 27	0	e 6 2	− 7	—	—	—
Stuttgart		14·5	326	e 3 30	+ 2	e 6 3	− 8	e 3 39	PP	e 7·6
Karlsruhe	z.	15·0	325	e 3 38	+ 3	—	—	e 3 45	PP	—
Strasbourg		15·0	323	e 3 35	0	e 6 34	+11	e 3 44	PP	e 8·7
Besançon		15·1	316	e 3 38	+ 2	e 6 25	0	e 3 44	PP	—
Collmberg		15·2	340	e 3 38	0	e 7 4	SSS	i 3 45	PP	e 10·1
Jena		15·3	336	e 3 43	+ 4	—	—	e 4 0	PPP	e 8·9
Clermont-Ferraud		16·0	308	e 1 22	?	—	—	—	—	—
Potsdam		16·2	342	i 3 57	+ 7	e 7 8	SS	e 4 21	pP	e 8·6
Abastumanj		17·2	67	e 4 3	0	—	—	—	—	—
Alicante		17·3	282	5 16	?	8 53	PcP	(e 15 50)	ScS	e 15·8
Leninakan		17·9	71	e 4 15	+ 3	—	—	—	—	—
Paris		17·9	316	i 4 16	+ 4	i 7 47	+17	i 8 43	PcP	e 11·1
Gori		18·2	69	e 4 13	− 3	—	—	—	—	—
Erevan		18·3	73	e 4 17	0	7 53	+14	—	—	—
Tiflis		18·6	69	e 4 18?	− 3	e 7 56?	+10	—	—	—
Witteveen	z.	18·6	332	i 4 24	+ 3	—	—	—	—	—
De Bilt		18·7	329	e 4 16	− 6	e 8 4	+16	e 4 27	P	10·6
Almeria		19·0	277	i 4 31	+ 5	8 25	+30	4 55	PP	10·4
Copenhagen		19·3	345	i 4 30	+ 1	e 8 11	+ 9	4 52	PP	10·3
Goris		19·7	75	4 31	− 3	8 19	+ 9	—	—	—
Granada		19·8	278	i 4 40k	+ 5	8 30	SS	5 28	?	13·4
Kirovobad		19·8	71	4 30	− 5	8 19	+ 6	—	—	—
Tamanrasset	z.	19·9	229	i 4 34a	− 2	e 8 23	+ 8	e 4 54	PP	e 9·7
Toledo		20·0	285	i 4 39	+ 2	—	—	e 4 53	PP	—
Kew		20·9	321	—	—	e 8 46	+11	—	—	e 11·6
Moscow		21·5	25	4 51	− 1	8 54	+ 7	—	—	—
Baku		22·5	73	e 5 15	+13	—	—	—	—	—
Upsala		22·7	355	e 5 5k	+ 1	e 9 9	0	e 9 54	SS	e 12·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helsinki	N.	23·0	4	e 5 6	− 1	e 9 17	+ 3	—	—	—
Pulkovo		23·2	11	i 5 8	− 1	e 9 20	+ 2	—	—	—
Durham		24·3	326	7 54	?	—	—	—	—	i 13·9
Kiruna		30·6	359	i 6 17k	− 1	e 11 15	− 5	e 16 34	ScS	e 14·3
Sverdlovsk		32·5	40	i 6 32	− 2	—	—	—	—	—
Stalinabad		37·1	72	e 7 11	− 3	—	—	—	—	—
Dzhergetal		38·8	71	e 7 26	− 2	—	—	—	—	—
Fergana		39·0	69	e 7 30	0	—	—	—	—	—
Andijan		39·4	69	7 30	− 3	i 13 37	+ 2	—	—	—
Frunse		40·6	65	i 7 41	− 2	—	—	—	—	—
Murgab		41·1	71	e 7 45	− 2	—	—	—	—	—
Almata		42·5	63	e 7 56	− 3	—	—	—	—	—
Przhevalsk		43·4	64	e 8 3	− 3	—	—	—	—	—
Calcutta	E.	58·8	84	e 9 50	−12	i 12 41	PP	e 10 17	?	—
Pretoria	Z.	63·1	173	e 10 29	− 3	—	—	—	—	—
Weston		67·8	308	e 11 1	− 1	—	—	i 11 33	PcP	—
Harvard		67·9	308	e 11 3	+ 1	—	—	e 11 21	pP	—
Ottawa		68·9	312	i 11 9	0	—	—	—	—	—
Morgantown		74·7	308	i 11 45	+ 2	—	—	—	—	—
College		77·8	356	12 0	− 1	—	—	—	—	—
Hungry Horse		85·9	332	i 12 44	+ 1	—	—	—	—	—

Additional readings :
Athens i = 41s.
Messina iZ = 1m.56s.
Sofia eS_gEN = 3m.21s.
Belgrade eNW = 2m.42s., eZ = 2m.50s., eS_gZ = 4m.16s.
Rome e = 3m.20s., 3m.46s., and 4m.18s., eS? = 4m.58s.
Timisoara eE = 3m.33s., eSE = 4m.4s., eS*EN = 5m.3s., eS_gE = 5m.29s.
Triest $eP_gP_gP_g$? = 3m.18s., eS_gS_g = 5m.14s.
Budapest iN = 4m.16s., eE = 6m.4s., eL? = 6m.34s.?.
Helwan S*Z = 5m.27s., S_gZ = 5m.58s.
Raciborzu eP?N = 3m.11s., ePPZ = 3m.20s., ePPPE = 3m.50s., eZ = 6m.35s., ePcPE = 8m.30s., ePcPN = 8m.34s.
Prague e = 3m.53s. and 4m.2s., eN = 4m.22s. and 6m.5s., e = 6m.15s., 6m.42s., 6m.54s., and 7m.8s.
Stuttgart eZ = 3m.56s.
Strasbourg e = 4m.17s., 4m.33s., and 6m.13s., eSS = 6m.44s., i = 7m.2s.
Besançon e = 4m.8s.
Potsdam ePE = 4m.0s.
Paris e = 4m.23s., iPP = 4m.31s., iPPP = 4m.43s., i = 5m.9s., iSS? = 8m.13s., i = 8m.39s. and 10m.25s., eScP = 12m.13s., ePcS = 12m.23s., iScS = 16m.2s.
Upsala ePP?N = 5m.23s., eSN = 9m.14s.
Kiruna eN = 11m.29s.
Long waves were also recorded at Aberdeen and Scoresby Sund.

Aug. 24d. 14h. 21m. 35s. Epicentre 46°·5N. 150°·7E. Depth of focus 0·025.
(as on 1950, Nov. 9d.).

Intensity V at Oma ; IV at Attoko and Chanai ; II-III at Nemuro, Kusiro, Urakawa, Morioka, Kenebetu, and Sannohe. Epicentre 45°·5N. 150°·8E. Depth 200km.

Seismological Bulletin of the C.M.O., Japan, for Aug., 1951, Tokyo, 1951, pp.196-197, with macroseismic chart.

$A = -·6024$, $B = +·3381$, $C = +·7231$; $\delta = +7$; $h = -4$;
$D = +·489$, $E = +·872$; $G = -·631$, $H = +·354$, $K = -·691$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	4·8	231	1 11 a	− 1	2 2	− 7	—	—	—
Kusiro	5·7	234	1 25	+ 1	2 25	− 4	—	—	—
Wakkanai	6·4	263	1 37	+ 4	2 49	+ 3	—	—	—
Asahigawa	6·5	248	1 33	− 2	2 45	− 3	—	—	—
Urakawa	7·2	235	1 43 a	− 1	3 1	− 4	—	—	—
Sapporo	7·5	246	1 50	+ 2	3 9	− 3	—	—	—
Muroran	8·1	243	2 1	+ 6	—	—	—	—	—
Petropavlovsk	8·4	35	1 30?	−29	3 10?	−23	—	—	—
Mori	8·5	242	2 1	0	3 30	− 5	—	—	—
Hatinohe	8·9	232	2 4	− 2	3 35	− 9	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Aomori		9·1	235	2 8	0	3 43	− 6	—	—	—
Miyako		9·4	226	2 8	− 4	3 44	−12	—	—	—
Morioka		9·7	229	2 16k	0	3 57	− 6	—	—	—
Mizusawa		10·2	227	2 23	0	4 5	−10	—	—	—
Akita		10·3	232	2 25	+ 1	4 9	− 8	—	—	—
Sendai		11·0	225	2 31	− 2	4 24	− 9	—	—	—
Yamagata		11·2	226	2 34	− 2	4 32	− 6	—	—	—
Hukusima		11·6	225	2 40	− 1	4 40	− 7	—	—	—
Klyuchi		11·6	29	2 39	− 2	—	—	—	—	—
Inawasiro		11·9	225	2 45	0	4 49	− 5	—	—	—
Onahama		12·0	221	2 53	+ 7	4 49	− 7	—	—	—
Niigata		12·1	229	2 52	+ 5	5 6	+ 7	—	—	—
Shirakawa		12·2	224	2 47	− 1	4 56	− 5	—	—	—
Aikawa		12·5	232	2 49	− 3	5 2	− 6	—	—	—
Mito		12·7	221	2 56	+ 1	5 10	− 3	—	—	—
Utunomiya		12·8	223	2 56	0	5 11	− 4	—	—	—
Tukubasan		13·0	221	2 56	− 3	5 10	−10	—	—	—
Takada		13·2	229	3 10	+ 9	5 19	− 5	—	—	—
Maebasi		13·3	225	3 4k	+ 2	5 33	+ 7	—	—	—
Kumagaya		13·4	223	3 6	+ 2	5 24	− 5	—	—	—
Nagano		13·6	228	3 14	+ 8	5 28	− 5	—	—	—
Oiwake		13·6	226	3 9	+ 3	5 53	+20	—	—	—
Titibu		13·6	224	3 8	+ 2	5 31	− 2	—	—	—
Tokyo		13·6	221	3 9	+ 3	5 28	− 5	—	—	—
Wazima		13·7	233	3 20	+13	5 31	− 4	—	—	—
Vladivostok		13·8	262	3 21	+12	—	—	—	—	—
Yokohama		13·8	221	3 21	+12	5 41	+ 3	—	—	—
Matumoto		14·0	224	3 10	− 1	6 0	+18	—	—	—
Toyama		14·1	230	3 12	0	6 2	+18	—	—	—
Hunatu		14·2	224	3 15	+ 1	5 43	− 4	—	—	—
Kohu		14·2	224	3 20	+ 6	5 48	+ 1	—	—	—
Misima		14·4	222	3 17	+ 1	5 52	+ 1	—	—	—
Osima		14·5	220	3 21	+ 4	5 49	− 4	—	—	—
Iida		14·6	226	3 20	+ 1	6 13	+17	—	—	—
Shizuoka		14·8	223	3 19	− 2	6 4	+ 4	—	—	—
Hukui		15·0	231	3 24	0	—	—	—	—	—
Nagoya		15·3	227	3 30	+ 3	6 24	+13	—	—	—
Tsuruga		15·4	231	3 34	+ 5	6 18	+ 4	—	—	—
Hikone		15·6	229	3 29	− 2	6 24	+ 6	—	—	—
Kameyama		15·8	228	3 41	+ 8	6 35	+12	—	—	—
Kyoto		16·1	230	3 35	− 2	6 25	− 4	—	—	—
Osaka		16·5	229	3 46	+ 4	7 24	+46	—	—	—
Kobe		16·6	230	3 47	+ 4	6 51	+11	—	—	—
Sumoto		17·1	231	3 51a	+ 2	6 56	+ 5	—	—	—
Siomisaki		17·3	227	3 53	+ 2	7 4	+ 9	—	—	—
Takamatsu		17·5	231	3 57	+ 4	7 13	+13	—	—	—
Muroto		18·3	230	4 5	+ 3	7 5	−11	—	—	—
Koti		18·4	230	4 4	+ 1	7 24	+ 6	—	—	—
Ooita		19·7	236	4 25	+ 9	—	—	—	—	—
Hukuoka		20·1	236	4 28	+ 8	—	—	—	—	—
Miyazaki		20·8	233	4 36	+ 9	8 23	+20	—	—	—
Zi-ka-wei	z.	27·2	247	e 5 39	+11	10 19	+28	—	—	—
Nanking		28·4	252	e 5 46	+ 7	i 10 14	+ 4	e 6 18	pP	—
Kabansk		28·9	298	5 41	− 2	—	—	—	—	—
Irkutsk		30·3	299	5 54	− 1	e 11 53	sS	—	—	—
College		37·4	38	6 56	0	12 32	+ 3	—	—	—
Manila		40·4	227	e 7 22	+ 1	i 13 20	+ 6	i 8 0	pP	—
Ili		50·1	296	i 8 40	+ 3	i 15 35	+ 2	—	—	—
Przhevalsk		50·1	293	e 8 37	0	—	—	—	—	—
Almata II		50·3	295	e 8 39	0	—	—	—	—	—
Almata		50·6	295	i 8 41	0	i 15 39	0	—	—	—
Resolute Bay		51·6	18	8 48a	− 1	e 18 20	ScS	e 9 27	pP	e 20·9
Naryn		52·1	293	i 8 52	0	i 16 0	0	9 32	pP	—
Frunse		52·3	296	i 8 55?	+ 1	i 16 4?	+ 1	e 9 34?	pP	—
Sverdlovsk		52·9	317	i 8 57	− 1	i 16 8	− 3	e 9 37	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		54·8	294	i 9 13	+ 1	i 16 38	+ 2	9 54	pP	—
Victoria		55·0	54	e 9 13a	− 1	—	—	—	—	—
Calcutta	E.	55·1	267	e 10 26	PcP	—	—	i 11 47	?	—
Murgab		55·2	291	9 16	+ 1	16 43	+ 2	—	—	—
Fergana		55·4	294	e 9 29?	+13	e 16 57?	+13	e 10 11?	pP	—
Tchimkent		55·7	298	i 9 18	− 1	i 16 47	− 1	9 58	pP	—
Seattle		56·1	54	e 9 26a	+ 5	i 17 4	+11	e 10 6	pP	—
Dzhergetal		56·4	294	i 9 24	0	i 16 58	+ 1	—	—	—
Tashkent		56·4	297	i 9 22	− 2	i 16 57	0	i 9 59?	pP	—
Khorog		57·1	292	e 9 30	+ 1	i 17 10	+ 3	e 10 11	pP	—
Obi-garm		57·7	295	i 9 30	− 3	i 17 12	− 2	—	—	—
Stalinabad		58·3	295	i 9 38	+ 1	i 17 23	+ 1	e 10 21	pP	—
Samarkand		58·8	296	i 9 41	+ 1	17 27	− 2	e 10 23	pP	—
New Delhi		58·9	281	9 43	+ 2	i 17 30	0	i 19 13	ScS	—
Kiruna		60·0	339	i 9 46a	− 2	i 17 39	− 5	i 10 23	pP	e 27·4
Shasta Dam		60·1	61	i 9 25?	−24	—	—	—	—	—
Hungry Horse		60·2	49	i 9 51	+ 1	e 17 45	− 2	—	—	—
Mineral	Z.	60·8	61	i 9 55a	+ 1	—	—	i 10 45	pP	—
Berkeley	Z.	62·0	63	e 10 3a	+ 1	—	—	e 10 49	pP	—
Mary		63·2	298	i 10 10	0	i 18 26	+ 2	i 19 44	sS	—
Scoresby Sund		63·2	358	i 10 9a	− 1	i 18 26	+ 2	e 10 53	pP	28·4
Pulkovo		63·4	332	i 10 10	− 1	e 18 25	− 2	e 10 50	pP	—
Moscow		63·7	325	i 10 11	− 2	e 18 26	− 5	i 10 54	pP	—
Fresno	Z.	64·2	62	e 10 17a	+ 1	—	—	e 11 1	pP	—
Helsinki	E.	64·9	334	—	—	e 19 55	sS	—	—	—
Tinemaha	Z.	64·9	62	i 10 23	+ 2	—	—	—	—	—
Ashkabad		65·2	299	e 10 24	+ 1	—	—	—	—	—
China Lake		66·1	62	i 10 30	+ 1	i 19 5	− 5	i 20 8	ScS	—
Pasadena		66·9	64	i 10 34	0	i 19 15	+ 6	e 11 14	pP	—
Upsala		67·3	337	i 10 33a	− 3	e 20 1	ScS	e 11 7	pP	e 34·4
Riverside	Z.	67·5	64	e 10 38	+ 1	—	—	—	—	—
Boulder City		67·7	61	i 10 40	+ 1	i 19 25	+ 6	—	—	—
Poona		67·8	274	i 10 41	+ 2	i 19 21	+ 4	i 11 36	pP	—
Palomar	Z.	68·2	64	i 10 43	+ 1	—	—	—	—	—
Bombay		68·3	275	e 10 31	−11	i 19 30	+ 4	20 26	ScS	—
Baku		68·4	306	i 10 45	+ 2	e 19 32	+ 5	e 11 29	pP	—
Grozny		68·6	311	e 10 43	− 1	—	—	—	—	—
Shemakla		69·0	308	10 49	+ 3	i 20 28	ScS	—	—	—
Reykjavik	Z.	69·5	357	i 10 23	−27	—	—	—	—	—
Kirovobad		70·1	309	i 10 54	+ 1	19 48	+ 1	—	—	—
Lenkoran		70·1	306	i 10 55	+ 2	—	—	—	—	—
Tiflis		70·3	311	i 10 55	+ 1	e 19 50?	+ 1	e 11 33	pP	—
Goris		71·0	308	i 11 1	+ 2	i 20 1	+ 3	—	—	—
Tsikhlis-Dzhvari		71·0	312	i 10 59	0	—	—	—	—	—
Zugdidi		71·2	313	—	—	i 21 10	PS	—	—	—
Abastumanj		71·3	312	e 11 3	+ 3	—	—	—	—	—
Erevan		71·5	309	e 11 4	+ 2	20 9	+ 6	—	—	—
Nakhichevan		71·7	308	i 10 51?	−12	i 19 55?	−10	—	—	—
Copenhagen		72·3	337	i 11 5	− 1	i 20 9	− 3	11 51	pP	—
Theodosia		72·5	318	e 11 8	0	—	—	—	—	—
Tucson		72·7	61	i 11 11	+ 2	—	—	—	—	—
Lwow		73·5	328	i 11 12	− 1	e 20 24	− 2	—	—	—
Yalta		73·5	318	11 13	0	—	—	—	—	—
Brisbane	Z.	73·6	178	i 11 17k	+ 3	—	—	—	—	—
Kishinev		73·9	324	i 11 14	− 2	—	—	—	—	—
Potsdam		75·0	335	i 11 23a	+ 1	i 20 42	0	e 12 1	pP	—
Uzhgorod		75·1	328	11 23	0	—	—	—	—	—
Raciborzu		75·4	331	i 11 24	0	e 25 49	SS	e 14 2	PP	—
Skalnate Pleso		75·4	329	e 11 25	+ 1	e 20 52	+ 5	e 11 54	pP	—
Collmberg		76·0	334	i 11 27	− 1	—	—	e 12 14	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Witteveen	z.	76·4	339	e 11 30	0	—	—	e 11 41	?	—
Prague		76·6	333	i 11 30	− 1	e 21 1	+ 1	e 11 57	pP	e 34·4
Jena		76·7	335	e 11 31	0	e 21 19	ScS	e 14 15	PP	—
Bucharest		77·1	323	e 11 30?	− 4	e 21 6	+ 1	—	—	33·4
Budapest		77·3	329	e 11 35	0	e 21 5	− 2	—	—	—
Cheb		77·3	335	e 11 39	+ 4	e 12 52	sP	e 14 13	PP	—
Ogyalla		77·3	330	e 11 37	+ 2	e 21 13	+ 6	e 14 22	PP	—
De Bilt		77·4	340	i 11 45	+10	e 21 9	+ 1	i 12 17	pP	e 36·4
Timisoara		77·9	326	e 11 37?	− 1	e 21 16	+ 2	e 14 31	PP	e 38·4
Kalossa		78·1	329	e 11 42	+ 3	—	—	—	—	—
Istanbul		78·5	320	e 11 42	+ 1	e 21 22	+ 2	e 12 25	pP	e 37·4
Rathfarnham Castle		78·7	347	i 11 43a	+ 1	e 21 5	−17	e 12 54	sP	—
Belgrade		79·0	326	e 11 44k	0	e 21 26	+ 1	e 12 54	sP	e 40·2
Kew		79·3	342	i 11 46a	0	e 21 26	− 2	e 12 36	pP	e 43·4
Karlsruhe	z.	79·4	336	i 11 47	+ 1	—	—	e 12 35	pP	—
Stuttgart		79·4	336	i 11 46a	0	e 21 25	− 4	e 12 25	pP	e 37·4
Seven Falls	E.	79·7	27	11 52	+ 4	21 36	+ 3	26 42	SS	—
Ottawa		79·8	31	11 48	0	21 33	− 1	14 51	PP	—
Shawinigan Falls	N.	79·8	28	11 49	+ 1	21 25	− 9	14 38	PP	—
Strasbourg		79·9	337	e 11 49a	0	e 21 36	+ 1	e 12 31	pP	—
Triest		80·7	332	e 11 57	+ 4	e 21 41	− 2	e 12 48	pP	—
Cleveland		80·8	37	i 11 55a	+ 2	e 21 44	0	e 15 2	PP	—
Ksara		80·8	310	i 11 57a	+ 4	21 52	+ 8	—	—	—
Zürich		80·8	336	e 11 54a	+ 1	e 21 46	+ 2	e 12 38	pP	—
Basle		80·9	336	e 11 55	+ 1	—	—	—	—	—
Paris		81·1	340	i 11 57	+ 2	i 21 52	+ 5	i 12 42?	pP	e 38·4
Besançon		81·7	337	i 11 58	0	—	—	—	—	—
Bologna		82·5	332	e 12 5	+ 3	e 22 5	+ 4	—	—	—
Pavia		82·6	334	e 12 4a	+ 1	e 22 7	+ 5	i 23 36	sS	—
Pennsylvania	N.	82·9	35	—	—	i 22 6	+ 1	i 23 26	sS	—
Morgantown		83·0	38	i 12 7	+ 2	—	—	i 12 52	pP	—
Clermont-Ferrand		83·8	338	i 12 15	+ 6	e 22 13	− 1	i 13 35	?	—
Harvard		83·8	30	i 12 10	+ 1	i 22 15	+ 1	—	—	—
Weston		84·0	30	i 12 11	+ 1	e 22 17	+ 1	i 12 55	pP	—
Taranto		84·0	327	e 12 10	0	—	—	—	—	—
Palisades		84·2	32	i 12 11	0	i 22 16	− 2	—	—	—
Halifax		84·3	24	—	—	e 22 16	− 3	—	—	—
Rome		84·5	331	i 12 12a	− 1	i 22 19	− 2	e 12 51	pP	—
Helwan		86·3	311	i 12 22	+ 1	22 43	+ 5	e 13 4	pP	—
Messina	z.	86·6	327	i 12 22a	− 1	—	—	i 12 51	?	—
Tortosa		89·1	338	e 13 18	pP	—	—	—	—	—
Tacubaya		89·2	63	e 13 19	pP	—	—	—	—	—
Toledo		91·1	341	i 12 44	0	e 23 1	[+ 5]	e 21 19	?	—
Alicante		91·7	338	e 12 45	− 2	i 23 3	[+ 4]	16 16	PP	e 42·7
Algiers Univ.	z.	92·2	334	e 12 50	+ 1	—	—	—	—	—
Granada		93·5	340	i 13 1k	+ 6	i 23 13	[+ 4]	23 48	S	51·2
Almeria		93·6	339	i 12 56	+ 1	23 28	SKKS	16 44	PP	42·5
Malaga		94·2	340	i 12 57	− 1	—	—	13 54	pP	40·4
Bermuda		94·2	29	e 13 4	+ 6	e 23 21	[+ 8]	i 16 55	PP	—
Tamanrasset	z.	104·2	327	i 13 43	0	—	—	18 1	PP	—
San Juan		107·4	37	18 26	PP	—	—	—	—	—
Huancayo		128·2	64	—	—	e 21 50	SKP	—	—	—
Pretoria	z.	130·3	275	e 18 52	[+ 4]	i 21 58	SKP	—	—	—
La Paz		136·1	60	—	—	22 20	SKP	—	—	—

Additional readings :—
Manila eScS =12m.55s., esS =14m.10s.
Resolute Bay cZ =9m.43s. and 9m.53s., eE =10m.44s., eEN =11m.37s., eE =11m.52s.
Naryn iPcP =9m.57s., esS =17m.8s.
Frunse esS =17m.11s.
Fergana sS =18m.12s.?
Tchimkent sS =18m.3s.
Seattle e =10m.40s., i =17m.17s., epS? =17m.59s., iScS =18m.55s., e =19m.7s. and 19m.14s., ipScS? =19m.38s., i =23m.29s.
Tashkent iScS =18m.52s.
New Delhi iN =18m.43s. and 19m.28s.

Continued on next page.

Kiruna isPZ = 10m.32s., ipPPZ = 12m.38s., ePPP = 13m.29s., eScPEN = 14m.15s., eN = 18m.22s., eZ = 18m.26s., iScSE = 19m.18s., eEN = 20m.25s., eN = 21m.12s., eEN = 24m.12s., eZ = 25m.28s.
Mineral iZ = 10m.1s.
Pulkovo isS = 19m.43s.
Moscow esS = 19m.45s.
China Lake iZ = 10m.35s.
Pasadena iZ = 10m.40s., iEN = 20m.14s., eEN = 26m.49s.
Upsala ePPE = 12m.50s., eN = 20m.4s., i = 20m.13s.
Poona PPSE = 19m.55s., ScSE = 20m.17s.
Copenhagen i = 20m.57s.
Potsdam ePPZ = 14m.11s., isPPNZ = 14m.53s., e = 16m.55s., iSKSN = 21m.15s.
Raciborzu iPEN = 11m.27s., ePcPZ = 11m.36s., ePPPN = 15m.54s., eZ = 21m.7s., eN = 21m.19s., ePPSE = 21m.49s.
Skalnate Pleso ePcP = 11m.46s., csP? = 12m.15s., e = 12m.56s., ePP = 14m.16s., e = 21m.9s., eScS? = 21m.22s., e = 22m.36s. and 27m.37s.
Prague ePcP = 11m.48s., esP = 12m.7s., e = 13m.32s., ePPN = 14m.6s., eScS = 21m.25s., iScS = 21m.31s., esSN = 21m.44s., eSS = 26m.5s., eSSS = 29m.25s.
Jena eE = 11m.35s., eN = 14m.59s., eE = 15m.2s.
Bucharest eN = 11m.35s., eE = 12m.35s.
Ogyalla ePcP = 11m.54s., e = 12m.37s., 13m.6s., 15m.43s., and 17m.49s., eScS = 21m.32s., ePS = 22m.6s.
De Bilt ePP = 14m.28s., epPP = 15m.11s., eZ = 17m.32s.
Timisoara ePE = 11m.42s., eE = 13m.30s., eSN = 21m.19s., ePS?N = 21m.36s., ePS?E = 21m.39s.
Istanbul esPN = 12m.46s., ePPN = 14m.40s., epPPEN = 15m.22s., eSKSEN = 21m.41s., ePSEN = 22m.32s., eSSN = 26m.27s.
Rathfarnham Castle iZ = 11m.59s., eSSEN = 25m.25s., eEN = 29m.50s.
Belgrade eNW = 13m.26s.
Kew eEN = 22m.40s.
Stuttgart iZ = 11m.50s., e = 12m.41s., ePP = 14m.45s., e = 21m.39s. and 22m.55s., eSS = 27m.43s.
Seven Falls SSE = 30m.4s.
Ottawa i = 14m.40s., SS = 26m.55s., SSS = 30m.9s.
Shawinigan Falls eN = 21m.53s.
Strasbourg ePcP? = 12m.11s., e = 12m.18s., iPP = 14m.52s., e = 15m.27s., ePPP = 16m.35s., eSKS = 21m.48s., eSP = 22m.36s., ePS = 22m.55s., eSS = 27m.19s.
Triest ePS? = 22m.7s.
Cleveland iSEN = 21m.47s.
Zürich ePP = 15m.5s.
Paris i = 12m.8s., e = 12m.19s. and 12m.36s.?, isP? = 12m.56s.?, i = 13m.8s., 13m.46s., and 14m.34s., iPP = 15m.0s., isPP? = 15m.55s., ipS = 22m.44s., isS? = 23m.7s., ePPS = 23m.32s., i = 23m.56s.
Besançon e = 12m.13s., 12m.19s., 12m.29s., and 14m.48s.
Pennsylvania ipS?N = 22m.25s., epPPS?N = 23m.48s.
Rome ePP = 15m.29s., esS? = 23m.39s.
Helwan iZ = 16m.28s., iN = 22m.29s., PSNZ = 23m.46s., eZ = 24m.52s.
Tacubaya e = 17m.3s. and 17m.6s.
Alicante PPS = 25m.11s., Q = 37m.15s.
Granada iPP = 17m.27s., PPP = 19m.28s., PS = 25m.14s., SS = 30m.48s.
Almeria PPP = 18m.44s., SS = 30m.16s.
Malaga PP = 16m.23s., PPP? = 19m.57s.
Bermuda e = 25m.20s.
Tamanrasset eZ = 13m.49s., iZ = 18m.41s., eZ = 19m.36s., ePPPZ = 20m.13s.

Aug. 24d. 23h. 1m. 1s. Epicentre 37°·8N. 141°·4E. (as on 1951, July 14d.).

Intensity V at Kawatabi and Kawamae ; IV at Hukusima, Shirakawa, Onahama, Sendai, Mito, Iwadezama, Yunohara, Toyama, Watari, Hurukawa, Semmaya, etc. : II-III at Utunomiya, Tukubasan, Mizusawa, Tokyo, Miyako, Morioka, Matusima, Kawanchi, and Sibutami. Epicentre 37°·3N. 141°·6E. Depth 50km.

Seismological Bulletin of the C.M.O., Japan, for Aug., 1951, Tokyo, 1951, pp.197-199, with macroseismic chart.

$A = -·6191$, $B = +·4942$, $C = +·6103$; $\delta = -2$; $h = -1$;
$D = +·624$, $E = +·782$; $G = -·477$, $H = +·381$, $K = -·792$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Isinomaki	0·6	354	0 25	+10	0 37	+11	—	—	—
Sendai	0·6	320	0 24k	+ 9	0 37	+11	—	—	—
Hukusima	0·7	266	0 25k	+ 8	0 38	+10	—	—	—
Onahama	0·9	205	0 18k	− 2	0 27	− 7	—	—	—
Yamagata	0·9	299	0 29	+ 9	0 45	+11	—	—	—

Continued on next page.

		△	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Inawasiro	E.	1·1	257	0 27	+ 5	0 42	+ 3	—	—	—
Shirakawa		1·2	234	0 25	+ 1	0 36	− 5	—	—	—
Mizusawa		1·4	351	0 34	+ 7	0 55	+ 9	—	—	—
Mito		1·6	208	0 27	− 3	0 42	− 9	—	—	—
Sakata		1·6	311	0 44	+14	1 8	+17	—	—	—
Utunomiya		1·8	224	0 31k	− 1	0 51	− 5	—	—	—
Miyako		1·9	14	0 40	P_g	1 6	S_g	—	—	—
Morioka		1·9	355	0 44k	+10	1 10	+11	—	—	—
Niigata		1·9	274	0 46	+12	1 8	+ 9	—	—	—
Tukubasau		1·9	213	0 31	− 3	—	—	—	—	—
Tyosi		2·1	192	0 35	− 2	0 54	−10	—	—	—
Akita		2·2	332	0 50	P_g	1 18	S_g	—	—	—
Kumagaya		2·3	224	0 40k	0	—	—	—	—	—
Maebasi		2·3	233	0 41k	+ 1	1 7	− 2	—	—	—
Aikawa		2·5	275	0 47	+ 4	—	—	—	—	—
Tokyo		2·5	212	0 41	− 2	1 8	− 6	—	—	—
Titibu		2·6	226	0 44	0	1 10	− 7	—	—	—
Hatinohe		2·7	2	1 1	P_g	1 36	S_g	—	—	—
Oiwake		2·7	237	0 48	+ 3	—	—	—	—	—
Yokohama		2·7	211	0 44	− 1	1 14	− 5	—	—	—
Matusiro		2·8	244	0 51	+ 4	1 26	+ 4	—	—	—
Nagano		2·8	246	0 55k	P_g	1 33	S*	—	—	—
Aomori		3·0	355	1 1	P_g	—	—	—	—	—
Hunatu		3·1	223	0 53	+ 2	1 29	0	—	—	—
Mera		3·1	204	0 50	− 1	1 27	− 2	—	—	—
Kohu		3·2	226	0 52	0	1 33	+ 1	—	—	—
Matumoto		3·2	240	0 57	+ 5	—	—	—	—	—
Misima		3·3	216	0 53	0	1 29	− 6	—	—	—
Osima		3·4	208	0 54	− 1	1 30	− 7	—	—	—
Toyama		3·5	253	1 5	P*	—	—	—	—	—
Wazima		3·6	265	1 6	P*	—	—	—	—	—
Iida		3·7	232	1 6k	P*	—	—	—	—	—
Shizuoka		3·7	221	1 1	+ 1	1 42	− 3	—	—	—
Kanazawa		4·0	253	1 18	P_g	2 0	S*	—	—	—
Omaesaki		4·1	220	1 6	+ 1	1 56	+ 1	—	—	—
Hamamatu		4·3	225	1 12	+ 4	1 57	− 3	—	—	—
Mori		4·3	352	1 19	P*	2 17	S_g	—	—	—
Gihu		4·4	239	1 14	+ 4	2 4	+ 2	—	—	—
Nagoya		4·4	235	1 12	+ 2	2 3	+ 1	—	—	—
Hukui		4·5	248	1 13	+ 2	—	—	—	—	—
Muroran		4·5	356	1 22	P*	—	—	—	—	—
Urakawa		4·5	13	1 20	P*	2 16	S*	—	—	—
Tsuruga		4·8	245	1 11	− 4	—	—	—	—	—
Hikone		4·9	240	1 18	+ 1	2 14	− 1	—	—	—
Kameyama		5·0	235	1 21	+ 3	2 16	− 2	—	—	—
Tu		5·0	233	1 27	P*	2 35	S*	—	—	—
Kyoto		5·3	240	1 26	+ 4	2 53	S_g	—	—	—
Obihiro		5·3	14	1 43	P_g	2 47	S*	—	—	—
Sapporo		5·3	359	1 23	+ 1	2 38	S*	—	—	—
Owase		5·6	230	1 25	− 2	2 32	− 1	—	—	—
Kusiro		5·7	23	2 36	S	(2 36)	+ 1	—	—	—
Osaka		5·7	238	1 35	+ 7	2 49	S*	—	—	—
Kobe		5·9	240	1 35	+ 4	3 1	S*	—	—	—
Asahigawa		6·0	7	2 34	S	(2 34)	− 9	—	—	—
Siomisaki		6·3	228	2 17	P_g	—	—	—	—	—
Sumoto		6·3	238	1 40	+ 4	3 1	+11	—	—	—
Nemuro		6·4	29	1 37	− 1	2 49	− 4	—	—	—
Abashiri		6·6	18	3 46	S_g	—	—	—	—	—
Takamatsu		6·9	242	1 51	+ 6	3 54	S_g	—	—	—
Koti		7·7	239	2 40	P_g	—	—	—	—	—
Ooita		9·2	243	2 26	+10	4 37	S*	—	—	—
Hukuoka		9·9	248	2 31a	+ 6	—	—	—	—	—
College		48·5	33	i 8 46	0	—	—	—	—	—
Kiruna		65·8	338	i 10 49a	0	—	—	—	e	38·0
Shasta Dam		70·7	53	i 11 20	0	—	—	—	—	—

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		71·2	43	i 11 23	0	—	—	—	—	—
Mineral	z.	71·4	53	e 11 23k	− 1	—	—	—	—	—
Fresno	z.	74·6	55	e 11 52k	+ 9	—	—	—	—	—
China Lake	z.	76·5	55	e 11 53	− 1	—	—	i 12 4	PcP	—
Copenhagen		77·2	333	i 11 58	+ 1	—	—	—	—	—
Mount Wilson	z.	77·2	57	e 11 56	− 1	—	—	i 12 9	PcP	—
Riverside	z.	77·8	57	e 12 11	PcP	—	—	—	—	—
Boulder City		78·2	45	i 12 3	0	—	—	—	—	—
Collmberg	z.	80·4	330	e 12 14	− 1	—	—	—	—	—
Ksara		80·7	306	e 16 3	PP	e 24 14	PPS	—	—	—
Prague		80·8	329	i 12 21	+ 4	—	—	—	—	—
Jena		81·3	331	e 12 19	− 1	—	—	—	—	—
Tucson		83·1	55	e 12 29	0	—	—	—	—	—
Stuttgart	z.	83·9	331	e 12 33	0	—	—	e 12 46	PcP	—
Strasbourg		84·6	332	e 12 37	+ 1	—	—	e 12 51	PcP	—
Besançon		86·4	332	e 12 46	+ 1	—	—	e 13 0	PcP	—
Paris		86·4	335	i 12 45	0	—	—	e 15 47	PP	e 45·0
Ottawa		90·7	26	13 5	− 1	—	—	—	—	—
Tamanrasset	z.	106·8	318	e 18 37	PP	—	—	e 18 58	?	—
La Paz		146·5	59	e 20 0	[+18]	—	—	—	—	—

Additional readings :—
Prague e = 12m.31s., 12m.56s., and 13m.23s.
Jena eN = 12m.33s., eE = 13m.26s.
Paris e = 12m.55s., ipP? = 12m.58s.
Long waves were also recorded at Almeria, Alicante, and Granada.

Aug. 24d. Readings also at 0h. (Apia), 2h. (Ksara, Granada, near Manila, near Khorog, and near Apia), 3h. (near Dzhergetal), 4h. (Copiapo), 5h. (near Dzhergetal), 6h. (near Nakhichevan), 7h. (Kew), 11h. (Stuttgart, Pretoria, near Mizusawa, and near Alicante), 12h. (Pasadena, China Lake, Tinemaha, and Raciborzu), 13h. (near Dzhergetal (2)), 14h. (Tacubaya, and near Basle), 16h. (Alicante, Apia, near Granada and near Obi-garm), 18h. (Alicante), 19h. (Palisades), 20h. (near Fort de France), 21h. (Apia), 22h. (Copiapo), 23h. (near Alicante).

Aug. 25d. 4h. 41m. 36s. Epicentre 6°·0N. 60°·5E.

A = +·4898, B = +·8657, C = +·1038; δ = +11; h = +7;
D = +·870, E = −·492; G = +·051, H = +·090, K = −·995.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		
		°	°	m. s.	s.	m. s.	s.	m. s.		
Kodaikanal	E.	17·3	72	e 4 4	0	—	—	—	—	—
Bombay	E.	17·6	41	i 4 6	− 2	e 5 27	?	—	—	—
Poona		18·0	44	i 4 14	+ 1	—	—	i 5 2	PPP	—
Hyderabad	E.	20·9	54	—	—	e 8 49	+ 14	—	—	—
Goris		35·7	341	8 19	PP	—	—	—	—	—
Nakhichevan		35·8	340	e 8 47?	PPP	—	—	—	—	—
Ksara		35·9	322	e 8 11	PP	e 13 13	+31	—	—	—
Tashkent		36·0	10	e 7 8	+ 3	e 12 47	+ 3	—	—	—
Andijan		36·2	14	—	—	e 12 36	−11	—	—	—
Kirovobad		36·8	341	e 8 37	PP	e 15 21	SS	—	—	—
Tchimkent		37·0	11	e 7 21	+ 8	i 13 7	+ 8	—	—	—
Pretoria	z.	44·5	223	i 8 17	+ 2	—	—	—	—	—
Kimberley	z.	48·7	223	i 8 50	+ 2	—	—	—	—	—
Sverdlovsk		50·7	0	—	—	16 19	+ 1	—	—	—
Tamanrasset	z.	55·5	293	i 9 39a	0	—	—	e 10 40	PcP	—
Collmberg	z.	59·8	327	e 10 8	− 1	—	—	—	—	—
Strasbourg		61·5	323	e 10 20	− 1	e 12 5	PP	e 10 34	PcP	—
Besançon		62·0	321	e 10 25	+ 1	—	—	e 10 37	PcP	—
Paris		64·8	321	e 10 40	− 3	—	—	—	—	—
Kiruna	z.	66·9	344	e 11 0	+ 4	—	—	—	—	—

Additional readings :—
Bombay eE = 5m.55s.
Hyderabad eN = 8m.52s.
Tamanrasset eZ = 10m.11s.
Long waves were also recorded at Istanbul and Rathfaruham Castle.

Aug. 25d. Readings also at 0h. (China Lake, Collmberg, Copenhagen, Jena, Paris, Strasbourg, Stuttgart, near Santa Clara, and near Ashkabad), 1h. (Apia, Ksara, China Lake, Tinemaha, Puebla, Vera Cruz, and near Tacubaya), 2h. (Collmberg, Jena, Paris, Besançon, Stuttgart, Ksara, and China Lake), 3h. (Brisbane, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Mineral, College, Tucson, Boulder City, Puebla, Tacubaya, Besançon, Paris, Almata, Frunse, near Almata II, Chilisk, Ili, Krasnogorka, Naryn, and Przhevalsk), 4h. (China Lake, Collmberg, and near Dzhergetal), 7h. (Galerazamba), 10h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Mineral, Berkeley, Lick, Santa Clara, Fresno, Seattle, Hungry Horse, near Tucson, Dzhergetal, near Andijan, Fergana, Khorog, Murgab, Obi-garm (2) and Stalinabad), 11h. (Ili, Palomar, Pasadena, Riverside, China Lake (2), Palisades, Harvard, Weston (2), and La Paz), 12h. (Alicante, Pasadena, Riverside, China Lake, Tinemaha, Resolute Bay, Palisades, Huancayo, Bogota, near Guadalajara, Manzanillo, Puebla, Tacubaya, Vera Cruz, Stalinabad, near Andijan, Dzhergetal, Fergana, Khorog, Murgab, and Obi-garm), 13h. (Samarkand, Stalinabad, near Almata II, Chilisk, Dzhergetal (3), Fergana (2), Ili, Khorog (2), Obi-garm (2), near Istanbul, near Copiapo, and near Manila), 14h. (Alberni and Horseshoe Bay), 15h. (Palisades), 17h. (near Apia and near Dzhergetal), 18h. (Alicante (2)), 20h. (near Apia (2)), 23h. (near Almata II and near Dzhergetal).

Aug. 26d. 10h. Undetermined shock.

New Delhi ePEN =9m.43s., P*EN =9m.50s., P_gEN =10m.1s., iEN =10m.12s., iSEN =10m.33s., S*EN =10m.44s., eS_gEN =10m.55s.
Murgab eP =10m.38s., iS_g =11m.56s.
Khorog eP =10m.43s., eS =12m.10s.
Obi-garm eP =11m.1s.?, iS =12m.50s.?
Dzhergetal eP =11m.4s., eS_g =12m.45s.
Naryn eP =11m.12s., iS =12m.35s.
Andijan eP =11m.12s., eS =13m.4s.
Fergana iP =11m.15s., eS =13m.3s.
Przhevalsk iP =11m.26s.
Kurmenty P =11m.31s.
Almata eP =11m.32s.
Frunse eP =11m.32s.
Samarkand eP =11m.42s.?, S =13m.54s.?.
Ili eP =11m.47s.
Tchimkent eP =11m.47s.
Poona iPZ =12m.1s., PPE =12m.9s., eSE =14m.29s., SSEZ =14m.44s., SSSZ =14m.54s., P_gPE =17m.18s.
Bombay eSS?E =15m.47s.

Aug. 26d. 13h. 30m. 44s. Epicentre 39°·3N. 73°·3E. (as on 1951, March 25d.).

$A = +\cdot2230$, $B = +\cdot7432$, $C = +\cdot6308$; $\delta = -2$; $h = -1$;
$D = +\cdot958$, $E = -\cdot287$; $G = +\cdot181$, $H = +\cdot604$, $K = -\cdot776$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Murgab	1·0	152	i 0 21	0	0 35	− 1	—	—
Andijan	1·6	334	i 0 29	− 1	0 53	+ 2	—	—
Dzhergetal	1·6	267	i 0 30	0	i 0 56	+ 5	—	—
Fergana	1·6	313	i 0 31	+ 1	0 55	+ 4	—	—
Khorog	2·3	216	i 0 43	+ 3	—	—	—	—
Obi-garm	2·9	258	0 47	− 1	i 1 25	+ 1	—	—
Naryn	3·0	44	e 0 50	0	i 1 28	+ 1	—	—
Frunse	3·7	14	e 0 59	− 1	i 1 50	+ 5	—	—
Lunacharskoe	3·7	305	e 1 8	P*	i 1 56	S*	—	—
Tashkent	3·7	305	e 1 0?	0	1 55?	S*	—	—
Rybach'e	3·8	33	i 1 3	+ 2	i 1 58	S*	i 1 8	P*
Tchimkent	4·1	318	i 1 7	+ 2	2 20	S_g	—	—
Krasnogorka	4·2	19	e 1 6	− 1	i 2 10	S*	—	—
Almata	4·8	33	i 1 17	+ 2	i 2 45	S_g	i 2 32	S*
Samarkand	4·9	276	i 1 22	+ 5	2 20	+ 5	—	—
Almata II	5·0	36	e 1 19	+ 1	i 2 35	S*	i 1 31	P*
Kurmenty	5·3	43	i 1 21	− 1	—	—	i 1 34	P*
Ili	5·4	30	i 1 22	− 2	i 2 46	S*	—	—
Chilisk	5·7	40	i 1 30	+ 2	i 3 0	S_g	—	—

Aug. 26d. 18h. 23m. 58s. Epicentre 36°·9N. 70°·8E. (as on 19d.). Depth of focus 0·030.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Khorog		0·9	48	i 0 27	− 5	i 0 50	− 6	—	—	—
Obi-garm		2·2	335	i 0 33?	−10	i 1 4?	−12	—	—	—
Dzhergetal		2·3	8	i 0 44	0	i 1 18	+ 1	—	—	—
Stalinabad		2·3	316	i 0 42?	− 2	i 1 17?	0	—	—	—
Murgab		2·9	59	0 50	0	e 1 29	0	—	—	—
Fergana		3·6	12	i 1 4?	+ 6	i 1 50?	+ 6	—	—	—
Andijan		4·0	17	1 4	+ 1	1 55	+ 3	—	—	—
Samarkand		4·1	314	i 1 6	+ 2	1 57	+ 3	—	—	—
Lunacharskoe		4·6	346	e 1 10	− 1	i 2 6	+ 1	—	—	—
Tashkent		4·6	346	i 1 10	− 1	i 2 6	+ 1	—	—	—
Tchimkent		5·5	351	e 1 24	+ 2	i 2 27	+ 1	—	—	—
Naryn		6·1	40	e 1 28	− 2	e 2 38	− 1	—	—	—
Frunse		6·6	25	i 1 38	+ 2	i 2 54	+ 3	—	—	—
Mary		7·2	279	e 1 42	− 2	—	—	—	—	—
Almata		7·9	35	i 1 55	+ 2	i 3 25?	+ 4	i 2 49	?	—
Almata II		8·1	36	i 1 57	+ 2	—	—	—	—	—
Przhevalsk		8·1	44	i 1 57	+ 2	i 3 28	+ 2	—	—	—
Chilisk		8·8	39	e 2 1	− 3	—	—	—	—	—
New Delhi		9·9	145	e 2 7	−11	i 3 44	−23	2 15	PP	—
Poona		18·5	171	i 3 58	− 4	7 25	+ 9	7 43	SS	8·2
Grozny		20·2	296	e 4 25	+ 6	—	—	—	—	—
Tiflis		20·7	291	e 4 26	+ 2	—	—	—	—	—
Gori		21·2	292	e 4 38	+ 9	—	—	—	—	—
Tsikhlis-Dzhvari		21·7	290	e 4 36	+ 2	—	—	—	—	—
Collmberg	z.	42·8	309	e 8 20	+43	—	—	e 9 38	PP	—

Additional readings :—
New Delhi SSEN =3m.56s., SSSEN =4m.7s.
Poona QZ =7m.18s.
Long waves were also recorded at Paris, Santa Clara, and Scoresby Sund.

Aug. 26d. 18h. 38m. 24s. Epicentre 24°·5N. 109°·0W. (as on 1951, Feb. 13d.).

$A = -\cdot2966$, $B = -\cdot8614$, $C = +\cdot4124$; $\delta = +6$; $h = +3$;
$D = -\cdot946$, $E = +\cdot326$; $G = -\cdot133$, $H = -\cdot390$, $K = -\cdot911$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chihuahua		4·8	31	e 1 34	P_g	i 2 43	S_g	—	—	—
Guadalajara		6·4	124	e 1 37	− 1	—	—	—	—	e 3·0
Tucson		7·8	350	e 1 57	− 1	e 4 6	S*	—	—	—
Tacubaya		10·4	117	e 2 38	+ 4	e 4 44	+12	e 5 0	SS	e 5·3
Palomar	z.	11·2	324	e 2 44	0	—	—	—	—	—
Puebla		11·4	116	e 2 47	0	—	—	e 2 57	PP	e 5·9
Riverside	z.	11·9	325	e 2 58	+ 4	—	—	—	—	—
Boulder City		12·5	338	e 3 4	+ 2	—	—	—	—	i 7·2
Pasadena		12·5	324	e 3 2	0	—	—	—	—	e 5·4
China Lake		13·5	329	i 3 17k	+ 2	—	—	—	—	—
Tinemaha	z.	14·8	330	e 3 33	+ 1	—	—	—	—	—
Fresno	z.	15·3	325	e 3 38a	− 1	e 6 30	0	—	—	e 9·0
Lick	z.	16·7	323	i 3 59k	+ 2	—	—	—	—	—
Berkeley		17·5	323	i 4 7a	0	e 7 39	+18	—	—	e 8·5
Mineral	z.	19·0	330	e 4 25a	− 1	—	—	—	—	—
Shasta Dam		19·7	330	4 30	− 4	—	—	—	—	—
Hungry Horse		24·1	353	i 5 26	+ 8	—	—	—	—	—
Seattle		25·4	339	e 5 24?	− 7	—	—	e 5 42	?	e 14·1
Cleveland		28·4	47	i 6 0k	+ 2	e 11 20	+ 35	—	—	—
Pittsburgh		29·0	50	—	—	e 12 1	SS	—	—	i 16·0
Washington		30·5	53	e 6 17	0	—	—	—	—	—
Palisades		33·5	52	i 6 44	+ 1	—	—	—	—	e 17·9
Ottawa		34·0	44	i 6 48	0	—	—	—	—	17·9
Harvard		35·7	50	e 6 56	− 6	—	—	i 7 4	P	e 16·2
Weston		35·8	50	i 7 4	+ 1	—	—	—	—	—
College		47·5	339	8 34	− 4	—	—	e 10 8	PP	—
Paris		84·9	39	e 12 39	+ 1	—	—	—	—	—

For Notes see next page.

NOTES TO AUGUST 26d. 18h. 38m. 24s.

Additional readings :—
Palomar iZ = 2m.50s. and 2m.56s.
Riverside iZ = 3m.5s. and 3m.12s.
Pasadena iZ = 3m.12s., i = 3m.18s.
China Lake iZ = 3m.23s., i = 3m.31s.
Tinemaha e = 3m.39s., i = 3m.45s.
Lick iZ = 4m.5s. and 4m.15s.
Berkeley iZ = 4m.12s., eN = 4m.48s.
Mineral iZ = 4m.32s., 4m.39s., and 5m.14s.
Long waves were also recorded at Vera Cruz and Resolute Bay.

Aug. 26d. Readings also at 0h. (Nanking and Zi-ka-wei), 4h. (Prague), 5h. and 6h. (near Manila), 8h. (La Paz, near Dzhergetal, and near Ashkabad), 9h. (Alicante (2)), 10h. (near Alicante and near Obi-garm), 12h. (near Ashkabad), 13h. (Guadalajara, Manzanillo, Tacubaya, Puebla, Vera Cruz, Harvard, Tucson, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Boulder City, Butte, Hungry Horse, Seattle and Resolute Bay), 14h. (Messina and near Athens), 15h. (Tamanrasset, near Algiers Univ., and near Almata II), 16h. (Antofagasta, and near Almata II), 17h. (Collmberg and near Istanbul), 18h. (Bombay), 20h. (near Almata II), 21h. (near Mizusawa), 23h. (Fergana, Stalinabad, near Dzhergetal, Khorog, and Obi-garm).

Aug. 27d. 13h. South-West Pacific.

Apia iEN = 15m.7s., eEZ = 15m.22s.?.
Murgab eP = 17m.49s., iS = 25m.1s.
Khorog eP = 17m.52s.
Naryn iP = 17m.59s., S = 25m.24s.
Brisbane iPZ = 18m.5s. a.
Almata II eP = 18m.7s.
Andijan P = 18m.8s., S = 25m.37s.
Fergana eP = 18m.8s.
Frunse iP = 18m.12s., eS = 25m.49s.
Tashkent eP = 18m.20s.
Samarkand eP = 18m.21s.
Stalinabad eP = 18m.24s.?.
Mount Wilson iPZ = 24m.21s., eZ = 28m.3s.
China Lake iPZ = 24m.21s., eZ = 28m.3s. and 28m.12s., iZ = 31m.28s. and 31m.43s.
Palomar iPZ = 24m.24s.
Bombay eEN = 25m.
Sverdlovsk eS = 29m.30s.
Ksara e = 35m.48s.

Aug. 27d. 19h. 27m. 14s. Epicentre 41°·1N. 19°·3E. (as on 1947, Dec. 9d.).

$A = +\cdot7133$, $B = +\cdot2498$, $C = +\cdot6548$; $\delta = -4$; $h = -2$;
$D = +\cdot331$, $E = -\cdot944$; $G = +\cdot618$, $H = +\cdot216$, $K = -\cdot756$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		1·7	247	0 32	+ 1	0 54	0	—	—	—
Belgrade	z.	3·9	13	e 1 16	P_g	e 1 54	+ 4	e 1 26	?	—
Messina	z.	4·1	227	e 1 10	+ 5	i 2 3	+ 8	i 1 28	P_g	—
Athens		4·6	311	e 1 28	P_g	e 1 53	−14	—	—	—
Timisoara		4·9	16	i 2 11	?	i 2 18	+ 3	i 2 51	S_g	—
Rome		5·2	281	e 1 46?	P_g	e 2 46	S_g	—	—	e 3·8
Bucharest		5·8	55	e 2 7	P_g	e 2 57	S*	e 3 23	S_g	—
Triest		6·1	321	e 1 37	+ 3	e 2 44	− 1	e 2 2	$P_gP_gP_g$	e 3·4
Ogyalla		6·8	354	—	—	e 2 57	− 6	e 3 26	S*	e 4·9
Istanbul	z.	7·4	86	e 1 55	+ 3	e 3 46?	S*	—	—	—
Prague		9·6	341	—	—	e 3 56	−16	e 4 53	S*	e 5·6
Zürich		9·9	312	e 2 24	− 1	e 4 12	−8	e 4 52	S*	—
Stuttgart		10·5	321	e 2 35	0	e 5 5	SSS	—	—	—
Basle		10·6	312	e 3 57	?	—	—	—	—	—
Strasbourg		11·1	317	—	—	e 5 10	SSS	e 5 30	Q	e 6·1
Jena		11·2	334	e 3 42?	+58	e 5 4	SS	e 5 23	SSS	e 6·8
Besançon		11·4	307	—	—	e 4 52	− 4	e 5 9	SS	e 5·9
Paris		14·1	309	e 3 19	− 4	i 6 1	− 1	i 3 35	PP	—
Tamanrasset	z.	21·6	216	e 4 51	− 3	—	—	—	—	—

For Notes see next page.

NOTES TO AUGUST 27d. 19h. 27m. 14s.

Additional readings :—
Belgrade eNE =1m.39s., eP$_g$S$_g$NE =1m.47s.
Messina iZ =2m.25s.
Timisoara eS*EN =2m.25s., eS*N =2m.59s., eS$_g$N =3m.10s.
Triest e =3m.2s.
Ogyalla e =4m.1s.
Prague e =4m.27s., eE =5m.8s. and 5m.23s.
Jena eN =4m.22s. and 5m.7s., eE =5m.26s., eN =5m.53s., eE =6m.7s., eN =6m.29s.
Paris e =4m.57s.?.
Long waves were also recorded at Budapest.

Aug. 27d. Readings also at 0h. (near Lunacharskoe, Tchimkent, Dzhergetal, Khorog, Naryn, Andijan, Fergana, Frunse, Samarkand, Stalinabad, and Obi-garm), 1h. (Hungry Horse, Weston, Palisades, Harvard, Port au Prince, Bermuda, and near San Juan), 2h. (Istanbul, near Fergana, Frunse, Almata, Almata II, Chilisk, Kurmenty, Przhevalsk, and Naryn), 5h. (near Messina), 7h. (China Lake, Mount Wilson, Tinemaha, and near Sofia), 8h. (near Messina), 9h. (Brisbane), 10h. (Palomar, Pasadena, Riverside, China Lake, Tinemaha, and near Messina), 12h. (near Alicante and near Istanbul), 13h. (Djakarta, near Lwow, Kishinev, Istanbul (2), Bucharest, near Leninakan, Goris (2), Lenkoran, Tiflis, Tsikhlis-Dzhvari, Kirovobad, and Erevan), 14h. (Brisbane and near Messina), 15h. (near Messina), 17h. (Witteveen), 19h. (Manila and near Obi-garm), 20h. (near Taranto), 21h. (Harvard, Weston, Bermuda, and near Port au Prince), 23h. (Horseshoe Bay).

Aug. 28d. 2h. 59m. 31s. Epicentre 27°·0N, 99°·0E.

Approximate.

A = −·1396, B = +·8812, C = +·4516 ; δ = −6 ; h = +3 ;
D = +·988, E = +·156 ; G = −·071, H = +·446, K = −·892.

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Calcutta	E.	10·7	248	—	—	i 4 54	+15	e 5·9
Nanking		18·0	68	e 4 14	+ 1	7 48	+16	—
New Delhi		19·4	280	e 4 21	− 9	e 8 2	− 2	—
Zi-ka-wei	Z.	20·0	70	e 4 36	− 1	8 33	+16	—
Hyderabad	N.	21·3	248	—	—	8 23	−20	—
Naryn		23·8	313	i 5 17	+ 2	i 9 33	+ 5	—
Almata		24·2	319	—	—	i 9 58	+23	—
Poona		24·6	256	e 5 19	− 4	e 9 36	− 6	—
Khorog		25·3	301	e 5 30	0	—	—	—
Bombay		25·4	257	e 5 38	+ 7	e 9 45	−11	—
Frunse		25·4	315	e 5 57	+26	i 10 27	+31	—
Andijan		25·9	308	e 5 36	+ 1	—	—	—
Dzhergetal		26·2	306	e 5 37	− 1	—	—	—
Fergana		26·2	308	e 5 35	− 3	—	—	—
Stalinabad		27·8	363	e 6 6	+13	—	—	—
Tashkent		28·3	309	—	—	e 10 47	+ 4	—
Samarkand		29·4	304	6 11	+ 4	—	—	—
Mary		32·9	299	—	—	e 11 58	+ 2	—
Sverdlovsk		40·4	329	7 49	+ 8	14 6	+16	—
Gori		46·9	303	e 8 30	− 4	—	—	—
Lwow		60·4	314	e 10 11	− 2	—	—	—
Kiruna	N.	61·0	334	—	—	e 18 52	+17	e 30·5
Paris		74·2	317	—	—	e 20 36	−38	—

Paris gives also i =20m.41s.
Long waves were also recorded at Djakarta, Copenhagen, and Potsdam.

Aug. 28d. 16h.

A slight fore shock of the deep focus earthquake was also noticed. It appears to precede the major shock by about 12 seconds and, in consequence, cannot readily be distinguished. Phases which definitely appertain to this small shock are recorded at Apia, Cobb River, Christchurch, Wellington, Kaimata, New Plymouth, in New Zealand, and at Brisbane, Matumoto, and Yokohama.

Aug. 28d. 16h. 31m. 18s. Epicentre 26°·5S. 178°·5E. Depth of focus 0·090.
(as on 1937, May 10d.).

A = −·8958, B = +·0235, C = −·4438; δ = −3; h = +3;
D = +·026, E = +1·000; G = +·444, H = −·012, K = −·896.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	s.	m.
Auckland	N.	10·8	196	i 2 32	+ 5	i 4 37	+12	i 13 37	ScS	—
Karapiro	N.	11·7	192	e 2 42?	+ 6	—	—	—	—	—
New Plymouth	E.	13·1	195	i 2 56	+ 7	i 5 20	+14	—	—	—
Wellington		15·1	191	i 3 9	0	5 39	− 2	i 13 47	ScS	—
Cobb River	E.	15·3	197	e 3 14	+ 3	i 5 53	+ 9	—	—	—
Apia		15·6	38	i 3 12	− 2	e 5 49	− 1	—	—	6·7
Kaimata	N.E.	17·0	198	i 3 28	+ 1	—	—	—	—	—
Christchurch		17·7	194	i 3 34	0	6 31	+ 6	e 5 57	sP	i 8·6
Brisbane		22·7	261	i 4 18k	− 1	i 7 44	− 3	—	—	—
Riverview		24·7	245	4 40	+ 3	i 8 18	− 1	i 7 22	sP	—
Terre Adélie		46·3	200	i 7 44	+10	—	—	—	—	—
Manila		69·2	299	i 10 9	0	e 16 2	?	i 11 34	PP	i 20·0
Djakarta		70·9	273	e 10 20	+ 1	i 18 44	− 3	—	—	—
Tokyo		71·9	328	e 10 26	+ 1	18 50	− 8	e 22 34	SS	—
Hunatu		72·2	327	10 24	− 2	e 18 57	− 5	—	—	—
Kumagaya		72·4	328	10 23	− 5	e 18 59	− 5	13 22	PP	—
Utunomiya		72·5	329	e 10 20	− 8	—	—	e 12 42	PP	—
Maebasi		72·8	328	e 10 29	− 1	e 19 7	− 1	e 12 41	PP	—
Matusiro		73·3	328	e 10 28	− 5	i 19 8	− 6	12 27	pP	—
Nagano	N.	73·4	328	e 10 30	− 3	—	—	—	—	—
Sendai		73·4	331	e 10 24	− 9	19 9	− 6	13 17	PP	—
Zi-ka-wei	Z.	79·1	313	i 11 0a	− 4	20 10	− 5	i 13 6	pP	—
Petropavlovsk		81·2	348	e 11 9?	− 6	20 22?	−14	—	—	—
Nanking		81·4	312	11 14	− 2	i 20 32	− 6	i 24 20	sS	—
Vladivostok		81·5	328	i 11 13	− 3	i 20 31	− 8	i 13 19	pP	—
Klyuchi		83·9	351	e 11 17	−11	i 20 48	−14	i 13 33?	pP	—
Berkeley		84·8	43	i 11 32a	− 1	e 20 58	−13	i 13 42	pP	—
Lick	Z.	84·8	43	i 11 33a	0	—	—	i 13 43	pP	—
Pasadena		85·1	48	i 11 34a	0	e 21 18	+ 4	i 13 43	pP	—
Palomar		85·5	49	i 11 36a	0	i 21 5	[+ 2]	i 13 47	pP	—
Riverside	Z.	85·5	49	i 11 35a	− 1	—	—	i 13 47	pP	—
Fresno	Z.	85·6	45	e 11 36a	− 1	e 14 52	sP	e 13 46	pP	—
China Lake		86·5	47	i 11 36a	− 5	e 21 13	[+ 3]	i 13 50	pP	—
Shasta Dam		86·5	41	i 11 26	−15	—	—	i 13 50	pP	—
Mineral	Z.	86·7	41	i 11 41k	− 1	—	—	i 13 52	pP	—
Tinemaha	Z.	86·8	46	i 11 42a	0	—	—	—	—	—
Boulder City		88·4	48	i 11 50	0	e 21 23	[+ 2]	—	—	—
Tucson		89·1	53	i 11 54	+ 1	—	—	14 5	pP	—
Seattle		91·0	36	e 12 13a	+11	e 21 43	[+ 7]	e 14 16	pP	—
Tacubaya		91·9	70	e 14 31	pP	e 22 25	+10	—	—	—
Puebla		92·6	70	e 13 18	?	e 23 45?	SP	e 13 52	pP	—
College		94·8	13	i 12 16	− 3	—	—	i 14 25	pP	—
Butte		95·4	40	e 14 32	pP	—	—	e 18 11	PPP	—
Hungry Horse		95·8	38	i 12 24	0	—	—	e 14 17	pP	—
Calcutta	N.	99·9	290	e 16 17	PP	i 22 21	[− 2]	e 18 6	PPP	—
Kabansk		100·2	323	e 12 39	− 5	e 22 18	[− 6]	e 14 56?	pP	—
Irkutsk		101·5	323	e 16 59	PP	22 27	[− 3]	e 23 4	SKKS	—
La Paz		102·5	116	e 15 24	?	i 26 58	PS	e 31 32	SS	—
Poona	Z.	110·8	281	i 17 3	[−22]	23 6	[− 5]	e 31 31	SS	—
Bombay		111·8	281	e 17 42?	[+15]	e 24 15	SKKS	e 30 49	SS	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Cleveland	E.	114·2	54	—	—	e 23 25	[+ 1]	e 24 39 SKKS	—
Przhevalsk		114·5	307	e 17 32	[0]	—	—	— —	—
Grahamstown	z.	114·8	206	i 17 33	[0]	—	—	— —	—
Almata		115·7	308	e 18 41	PP	i 23 28	[− 1]	— —	—
Naryn		116·0	306	i 17 35	[0]	i 23 29	[− 1]	i 18 35 PP	—
Rybach'e		116·2	317	e 17 34	[− 1]	e 23 30	[− 1]	e 18 44 PP	—
Pietermaritzburg	z.	116·4	211	i 18 55	PP	—	—	— —	—
Murgab		116·8	302	e 17 36	[− 1]	e 23 32	[− 1]	— —	—
Frunse		117·3	307	e 17 37?	[− 1]	e 23 32?	[− 3]	i 18 57? PP	—
Andijan		118·5	304	17 31	[− 9]	23 30	[− 9]	18 56 PP	—
Fergana		118·9	304	e 17 39	[− 2]	e 23 39	[− 2]	e 19 5 PP	—
Dzhergetal		119·1	302	e 17 43	[+ 2]	i 23 40	[− 1]	— —	—
Ottawa		119·1	51	17 40	[− 1]	24 54	SKKS	17 27 sP	—
Kimberley	z.	119·5	207	i 17 43	[+ 1]	—	—	— —	—
City College, N.Y.		119·6	56	e 14 22	P	—	—	16 11 pP	—
Obi-garm		120·2	301	i 17 46	[+ 3]	—	—	— —	—
San Juan		120·3	83	i 17 43	[− 1]	—	—	— —	—
Pretoria	z.	120·6	212	i 17 45	[+ 1]	—	—	— —	—
Stalinabad		120·8	301	e 17 44	[− 1]	—	—	— —	—
Lunacharskoe		120·9	304	—	—	i 25 16	SKKS	— —	—
Tashkent		120·9	304	e 17 41	[− 4]	i 23 48	[0]	i 19 19 PP	—
Tchimkent		120·9	305	e 17 47	[+ 2]	i 25 33	SKKS	— —	—
Harvard		121·7	54	i 17 45	[− 1]	—	—	— —	—
Weston		121·8	54	e 17 45	[− 2]	—	—	— —	—
Samarkand		122·4	302	e 17 47	[− 1]	23 45	[− 7]	— —	—
Seven Falls	E.	122·7	49	—	—	23 56	[+ 3]	25 31 SKKS	—
Mary		126·1	299	17 56	[+ 2]	i 24 2	[− 1]	19 49 PP	—
Sverdlovsk		126·9	322	e 17 54	[− 2]	24 5	[− 1]	i 20 14 pPKP	—
Ashkabad		128·9	299	e 19 51	PP	—	—	— —	—
Scoresby Sund		134·4	10	e 18 6	[− 5]	i 20 44	PP	e 20 30 pPKP	—
Baku		135·5	302	e 20 49	PP	—	—	e 23 44 PPP	—
Lenkoran		136·4	300	18 19	[+ 5]	—	—	20 52 PP	—
Shemakla		136·5	302	e 18 5	[− 9]	—	—	20 43 PP	—
Kiruna	z.	136·6	348	i 18 1	[−13]	i 20 49	PP	i 20 28 pPKP	—
Kirovobad		138·2	302	i 20 56	PP	—	—	— —	—
Goris		138·3	301	e 20 36	pPKP	i 24 25	[− 5]	i 20 55 PP	—
Grozny		138·4	307	e 20 57	PP	—	—	— —	—
Tiflis		139·3	304	e 18 20	[0]	—	—	e 21 0 PP	—
Moscow		139·4	327	e 20 49	PP	—	—	— —	—
Borzhomi		140·3	305	e 18 7	[−15]	—	—	— —	—
Pulkovo		141·1	335	e 21 0	PP	—	—	e 24 13 PPP	—
Upsala		144·1	344	—	—	i 24 22	[−17]	i 27 33 SKKS	—
Yalta		146·2	311	e 18 35	[+ 4]	—	—	— —	—
Ksara		147·0	290	i 18 36	[+ 3]	—	—	i 20 53 PP	—
Copenhagen		149·1	345	i 18 27	[− 9]	—	—	i 20 55 pPKP	—
Lwow		149·5	328	18 29	[− 7]	e 22 2	PKS	20 59? pPKP	—
Istanbul		150·9	309	i 18 31	[− 8]	e 45 6	SS	e 20 55 pPKP	—
Uzhgorod		151·2	328	18 33	[− 6]	i 18 46	PKP_2	i 21 9? pPKP	—
Skalnate Pleso		151·8	330	e 18 54	[+14]	e 23 12	PP	e 21 7 pPKP	—
Potsdam	z.	151·9	343	e 18 43	[+ 3]	e 24 36	[−14]	i 21 5 pPKP	—
Raciborzu		152·0	334	e 18 30?	[−10]	e 21 57	PKS	e 18 44 PKP_2	—
Collmberg	z.	152·9	340	i 18 34	[− 8]	i 19 0	PKP_2	i 21 12 pPKP	—
Rathfarnham C.	z.	153·0	7	i 18 49	[+ 7]	i 19 4	PKP_2	e 21 7 pPKP	—
Witteveen	z.	153·0	349	i 18 51	[+ 9]	—	—	i 21 38 pPKP	—
Prague		153·5	338	e 18 52	[+ 9]	e 21 54	sPKP	e 21 12 pPKP	—
Jena		153·6	340	e 18 39?	[− 4]	e 19 18	PKP_2	e 21 13 pPKP	—
Timisoara		153·6	324	18 42	[− 1]	—	—	49 42 SSS	—
Ogyalla		153·7	330	e 19 1	[+18]	e 23 1	PP	e 25 6 pPP	—
De Bilt		153·9	350	e 18 54	[+11]	e 44 42	SS	e 21 6 pPKP	—
Belgrade	z.	154·6	322	e 18 43$_s$	[− 1]	e 22 43	PP	e 21 10 pPKP	—
Kew		155·1	358	—	—	e 23 42	?	— —	—
Stuttgart		156·2	343	e 18 44	[− 2]	e 32 22	PSKS	e 21 5 pPKP	—
Strasbourg		156·8	345	e 18 47	[0]	e 21 22	PKS	e 21 6 pPKP	—
Triest	z.	157·3	333	e 18 47	[0]	—	—	e 21 7 pPKP	—
Paris		157·5	354	i 18 47	[0]	e 25 3	[+ 7]	i 21 7 pPKP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zürich		157·7	343	e 19 20	PKP_2	—	—	e 21 53	pPKP	—
Basle		157·8	343	e 19 24	PKP_2	—	—	e 20 29	PKP_2	—
Besançon		158·4	347	e 18 48	[0]	e 21 36	PKS	e 21 9	pPKP	—
Taranto		159·1	318	e 22 21	PKS	29 16	SKKS	—	—	—
Pavia		159·5	339	—	—	e 33 15	PS	e 45 55	SSS	—
Rome		160·8	328	e 18 51	[0]	e 29 7	SKKS	e 21 11	pPKP	—
Tortosa		165·6	354	e 19 29	PKP_2	i 23 3	SKS	—	—	—
Toledo		166·5	9	i 22 20	pPKP	e 26 6	?	—	—	—
Alicante		168·2	356	e 19 7	[+10]	25 6	[+ 2]	38 10	PPS	—
Algiers Univ.	z.	169·1	340	i 18 58k	[0]	e 30 7	SKKS	i 21 19	pPKP	—
Malaga		169·5	13	i 18 59	[0]	i 26 18	[+73]	i 20 19	PKP_2	—
Almeria		169·6	4	i 18 55	[− 4]	30 49	SKKS	20 15	PKP_2	—
Tamanrasset	z.	172·6	—	i 19 1k	[+ 2]	e 30 3	SKKS	e 21 21	pPKP	—

Additional readings :—
Wellington i =3m.13s. and 3m.37s., eS? =4m.29s., iS? =5m.49s.
Cobb River, eE =3m.18s. and 3m.31s.
Kaimata eNE =4m.18s. and 5m.21s.
Christchurch eNZ =4m.6s., i =4m.19s.
Brisbane iN =4m.51s., iEN =7m.8s., iE =8m.48s.
Riverview iE =8m.24s., iPcS?N =11m.33s., iScSE =14m.23s.
Manila i =10m.48s., iPPP =12m.7s., iSS =18m.23s., iScS =20m.30s.
Tokyo e =11m.6s., i =19m.36s., e =20m.13s. and 26m.6s.
Kumagaya ScS?E =19m.40s.
Matusiro e =11m.22s., sP? =13m.27s., PP =13m.55s., pPP =14m.56s., sPP =16m.36s., ScS =19m.44s., SP =20m.6s.
Sendai ScS =19m.40s., SSN =23m.59s.
Vladivostok ePP =14m.28s.
Berkeley esP?Z =14m.45s., esSEN =24m.47s.
Lick iZ =11m.44s. and 12m.40s.
Pasadena iEN =25m.9s., eN =26m.12s.
Palomar iEN =21m.22s.
China Lake iEN =21m.34s., ePKP,PKPZ =37m.42s.
Mineral iZ =11m.47s.
Seattle i =14m.57s., 15m.9s., and 15m.31s., e =21m.53s., i =22m.18s., iSP =22m.49s., e =25m.2s. and 26m.12s.
Puebla e =32m.47s. and 33m.50s.
Calcutta iN =19m.50s., eN =23m.58s. and 25m.13s.
Poona iZ =22m.34s., 26m.36s., 28m.2s., and 30m.31s.
Cleveland eSN =25m.36s., ePS =27m.29s., esSKKSE =28m.27s., esSN =29m.34s., esSPE =31m.11s., eE =32m.14s. and 35m.2s.
Naryn iPPP =21m.10s., iSKKS =24m.46s.
Frunse eSKKS =24m.52s.?
Andijan SKKS =24m.52s.
Fergana eSKKS =25m.3s.
Ottawa PP =19m.19s., SKKS =26m.16s., PS =29m.8s., PPS =31m.0s., e =38m.0s.
Tashkent ePPP =21m.42s., SKKS =25m.16s., iSKSP =28m.8s.
Seven Falls eE =28m.11s.
Mary iSKKS =25m.51s.
Sverdlovsk iSKKS =25m.52s.
Goris iSKKS =26m.57s.
Copenhagen i =18m.33s. and 18m.40s., ipPKP$_2$ =21m.13s.
Lwow ePP =21m.56s.
Istanbul iZ =18m.44s., ePPZ =22m.24s., eN =28m.16s., eE =34m.36s. and 41m.24s.
Skalnate Pleso e =25m.52s. and 26m.59s.
Potsdam iPKP$_2$N =19m.1s., epPKPN =21m.8s., epPKP$_2$E =21m.18s.
Raciborzu iZ =21m.19s., ePPE =22m.24s., eN =24m.0s.
Collmberg iZ =18m.49s., 20m.13s., and 21m.6s.
Rathfarnham Castle iZ =21m.19s.
Prague epPKP$_2$ =21m.33s., esPKP$_2$ =22m.37s., ePP =23m.4s., epPP =25m.0s., esPP =25m.52s. and other unidentified readings.
Jena eEN =18m.51s., eZ =19m.7s., 20m.1s., 21m.23s., 21m.51s., and 21m.59s., ePP?E =22m.51s., ePP?Z =23m.17s.
Belgrade eZ =19m.10s.
Stuttgart ePKP$_2$Z =19m.16s., e =21m.20s., 21m.25s., and 25m.6s.
Strasbourg i =19m.20s., e =19m.46s., i =21m.37s., e =35m.24s. and 36m..51s.
Paris e =17m.46s., i =19m.7s. and 19m.23s., iSKP =21m.27s., i =21m.37s., e =22m.33s., ePP? =22m.42s., e =23m.27s., eSKS? =25m.11s., eSPP? =35m.15s., iSPP =35m.29s.
Besançon e =19m.14s., 19m.25s., and 21m.46s.
Taranto e =23m.21s. and 27m.11s.
Rome ePKP$_2$ =19m.25s., eSS =43m.42s., eSSS? =49m.42s.?.
Alicante SSS =28m.46s.
Algiers Univ. iPKP$_2$Z =20m.13s., epPKP$_2$Z =22m.24s., iPPZ =23m.46s., ipPPZ =26m.7s.
Almeria PP =24m.3s.
Tamanrasset iPKP$_2$Z =20m.32s., epPKP$_2$Z =22m.56s., ePPZ =24m.24s., epPPZ =26m.41s., esPPZ =27m.35s., ePPPZ =28m.44s.

Aug. 28d. Readings also at 0h. (2) and 4h. (near Messina), 9h. (Djakarta, near Angra do Heroismo, and near Mizusawa), 12h. (Frunse, Naryn, near Almata, Ili, Kransogorka, Chilisk, and Przhevalsk), 13h. (Khorog, Rybach'e, near Andijan, Dzhergetal (3), Fergana, Murgab, and Naryn), 14h. (near Manila), 15h. (Angra do Heroismo), 16h. (Prague, Ottawa, near Andijan, Dzhergetal, Khorog, Murgab, and Obi-garm), 18h. (near Alicante), 21h. (Apia and near Messina).

Aug. 29d. 12h. 6m. 36s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030.
(as on 1951, July 21d.).

$A = +\cdot2683$, $B = +\cdot7576$, $C = +\cdot5951$; $\delta = +9$; $h = 0$;
$D = +\cdot943$, $E = -\cdot334$: $G = +\cdot199$, $H = +\cdot561$, $K = -\cdot804$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Khorog		1·2	48	i 0 29	− 5	i 0 54	− 6	—	—
Obi-garm		2·1	342	i 0 38	− 4	e 1 8	− 6	—	—
Garm		2·3	356	e 0 42	− 2	1 14	− 3	—	—
Stalinabad		2·3	323	i 0 39?	− 5	i 1 0?	−17	—	—
Dzhergetal		2·6	12	i 0 45	− 2	i 1 20	− 3	—	—
Murgab		3·2	59	0 55	+ 1	1 38	+ 3	—	—
Fergana		3·8	15	i 1 2	+ 1	i 1 48	0	—	—
Samarkand		4·1	319	1 2	− 2	1 47	− 7	—	—
Andijan		4·3	20	i 1 8	+ 1	i 1 59	0	—	—
Tashkent		4·7	349	i 1 12	0	2 6?	− 2	—	—
Frunse		6·9	26	i 1 44	+ 4	i 3 9	+11	—	—
Mary		6·9	280	e 1 34	− 6	2 47	−11	—	—
Rybach'e		7·2	35	i 1 47	+ 3	—	—	—	—
Krasnogorka		7·5	27	e 1 50	+ 3	—	—	—	—
Almata		8·2	35	i 2 0	+ 3	—	—	—	—
Almata II		8·4	37	i 2 4	+ 5	—	—	—	—
Przhevalsk		8·4	44	i 2 2	+ 3	—	—	—	—
Ili		8·8	33	i 2 7	+ 3	—	—	—	—
New Delhi		9·8	143	e 2 11	− 6	i 3 48	−17	2 25	PP
Poona	z.	18·3	170	i 3 57	− 3	i 7 32	+20	—	—

Additional readings :—
Murgab i = 1m.29s.
Fergana i = 1m.56s.

Aug. 29d. Readings also at 0h. (near Obi-garm), 2h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, and near Kew), 3h. (Bermuda), 6h. (near Malaga), 7h. (near Dzhergetal), 8h. (near Rome and near Istanbul), 13h. (Alicante, Brisbane, Kimberley, Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, and near Alicante), 14h. (Stuttgart and Kimberley), 15h. (Prague and near Yalta (2)), 17h. (near Alicante and near Huancayo), 18h. (near Dzhergetal and near Messina), 20h. (near Concepción), 21h. (Tashkent, Tchimkent, near Andijan, Fergana, Dzhergetal, and Naryn).

Aug. 30d. 7h. 11m. 23s. Epicentre 22°·5N. 143°·5E. Depth of focus 0·040.
(as on 1950, Dec. 28d.).

$A = -\cdot7434$, $B = +\cdot5501$, $C = +\cdot3805$; $\delta = +3$; $h = +4$;
$D = +\cdot595$, $E = +\cdot804$; $G = -\cdot306$, $H = +\cdot226$, $K = -\cdot925$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Tokyo		13·5	347	e 3 11	+ 9	5 39	+13	—	—
Osaka		14·0	332	e 3 2	− 6	—	—	—	—
Matusiro		14·7	343	e 3 11	− 5	i 5 49	− 4	—	—
Sendai		15·9	352	e 3 36	+ 6	6 32	+14	—	—
Mizusawa	E.	16·7	354	—	—	6 54	+20	—	—
College		60·8	27	9 44	0	—	—	—	—
Shasta Dam		78·7	51	i 11 32	0	—	—	—	—
Mineral	z.	79·3	51	i 11 35a	0	—	—	e 12 45	pP
Berkeley	z.	79·7	54	i 11 38a	+ 1	—	—	—	—
Lick	z.	80·4	53	i 11 41a	0	—	—	i 11 46	?

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Hungry Horse		81·4	42	i 11 47	+ 1	—	—	—	—
Fresno	z.	82·0	54	e 11 49a	0	—	—	—	—
Tinemaha	z.	83·0	53	i 11 54a	0	—	—	—	—
Butte		83·2	43	i 11 54	− 1	—	—	—	—
China Lake	z.	84·0	54	i 11 58a	− 1	—	—	i 13 8	pP
Pasadena	z.	84·2	56	i 12 0	0	—	—	—	—
Riverside	z.	84·8	56	i 12 2	− 1	—	—	—	—
Palomar	z.	85·5	56	i 12 7	0	—	—	—	—
Boulder City		85·9	53	i 12 9	0	—	—	—	—

Aug. 30d. 20h. 48m. 17s. Epicentre 35°·8N. 140°·8E. Depth of focus 0·010.
(as on 1950, April 16d.).

Intensity II-III at Tukubasan, Mito, Tokyo, Ajiro, and Sengokubara.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for Aug., 1951, Tokyo, 1951, pp.199-200, with macroseismic chart on p.199. Epicentre 35°·7N. 140°·6E.

$A = -\cdot6300$, $B = +\cdot5138$, $C = +\cdot5823$; $\delta = -4$; $h = -1$;
$D = +\cdot632$, $E = +\cdot775$; $G = -\cdot451$, $H = +\cdot368$, $K = -\cdot813$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tyosi		0·1	141	0 15	+ 1	0 24	0
Tukubasan		0·7	306	0 17	− 1	0 29	− 2
Mito		0·7	335	0 18k	0	0 29	− 2
Tokyo		0·8	263	0 19	+ 1	0 32	0
Yokohama		1·0	249	0 20	0	—	—
Utunomiya		1·1	315	0 20a	− 2	0 37	− 1
Onahama		1·1	4	0 23	+ 1	0 39	+ 1
Mera		1·2	222	0 21	− 2	0 37	− 3
Kumagaya		1·2	287	0 22a	− 1	0 33	− 7
Titibu		1·4	278	0 26	+ 1	0 41	− 3
Maebasi		1·5	293	0 26a	− 1	0 45	− 2
Osima		1·5	228	0 27	0	0 43	− 4
Ajiro		1·6	242	0 25	− 3	0 44	− 5
Hunatu		1·7	260	0 27	− 2	0 45	− 6
Kohu		1·8	265	0 31	+ 1	0 49	− 4
Oiwake		1·9	286	0 34	+ 2	0 55	0
Inawasiro		1·9	343	0 32	0	0 55	0
Hukusima		2·0	352	0 33	0	0 58	+ 1
Matusiro		2·2	291	0 34	− 2	0 56	− 6
Matumoto		2·3	281	0 37	0	1 5	0
Nagano		2·3	292	0 37	0	1 3	− 2
Iida		2·4	263	0 37	− 1	1 4	− 3
Niigata		2·5	327	0 48	+ 8	1 14	+ 4
Sendai		2·5	2	0 39	− 1	1 8	− 2
Hamamatu		2·7	247	0 46	+ 3	—	—
Hatidyosima		2·7	196	0 46	+ 3	1 15	+ 1
Toyama		3·0	287	1 2	+15	—	—
Sakata		3·2	346	0 49	− 1	1 32	+ 5
Nagoya		3·2	259	0 54	+ 4	1 32	+ 5
Mizusawa	N.	3·3	5	e 1 9	+18	e 1 27	− 2
Wazima		3·5	298	0 53	− 1	—	—
Hukui		3·7	275	1 33	S	(1 33)	− 6
Kameyama		3·7	257	1 17	+21	—	—
Hikone		3·8	264	0 58	0	1 41	− 1
Morioka		3·9	4	1 0	+ 1	1 41	− 3
Akita		3·9	252	1 47	S	(1 47)	+ 3
Miyako		3·9	13	0 59	0	1 42	− 2
Owase		4·2	247	0 58	− 5	1 45	− 6
Kyoto		4·2	262	1 44	S	(1 44)	− 7
Osaka		4·5	257	1 52	S	(1 52)	− 7
Kobe		4·7	258	2 2	S	(2 2)	− 2
Urakawa		6·5	12	2 35	S	(2 35)	−13

Aug. 30d. Readings also at 0h. (near Manila), 1h. (Harvard, Bermuda, Besançon, near Zürich, Neuchatel, and Basle), 2h. (Paris, Besançon, and Strasbourg), 3h. (China Lake), 6h. (Puebla and Tacubaya), 9h. (Fresno, Tinemaha, China Lake, Palomar, Berkeley, Lick, Mineral, Mount Wilson, Shasta Dam, Hungry Horse, College, Mizusawa and near Dzhergetal), 10h. (Butte), 12h. (Taranto and Rome), 15h. (Kew), 16h. (Alicante (2)), 17h. (near Gori, Tiflis, Erevan, Abastumanj, Grozny, Nakhichevan, Kirovobad, Tsikhlis-Dzhvari, and near Dzhergetal), 19h. (Apia and near Garm), 22h. (near Garm), 23h. (near Dzhergetal).

Aug. 31d, 10h. 9m. 14s. Epicentre 19°·98, 179°·0W. Depth of focus 0·080.
(as on 1950, May 30d.).

A = −·9409, B = −·0164, C = −·3384 ; δ = +8 ; h = +5 ;
D = −·017, E = +1·000 ; G = +·338, H = +·006, K = −·941.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Apia		9·2	50	e 2 10	0	e 3 46?	− 8	—	—
Auckland	N.	17·7	197	e 3 31	− 5	i 6 34	+ 5	i 5 59	?
Karapiro	N.	18·6	195	e 3 46?	+ 2	—	—	—	—
Tuai	N.	19·1	189	e 3 46	− 3	6 45	− 8	—	—
Wellington		22·0	195	i 4 13	− 3	i 7 32	− 9	i 14 17	ScS
Cobb River	E.	22·3	197	e 4 16	− 2	e 7 37	− 9	—	—
Kaimata	N.E.	24·0	199	e 4 33	− 1	8 4	− 9	e 4 41	P
Christchurch		24·6	196	i 4 55	+16	e 8 16	− 7	—	—
Brisbane	Z.	26·7	248	i 5 4a	+ 6	—	—	i 5 15	?
Riverview		29·9	236	i 5 41	+16	9 49	+ 3	i 14 58	ScS
Terre Adélie		53·3	199	i 9 22	PP	—	—	i 2 5	?
Petropavlovsk		75·3	347	10 52	+ 3	e 19 41	− 3	—	—
Zi-ka-wei	Z.	76·5	311	i 11 0	+ 4	e 20 3	+ 6	—	—
Vladivostok		77·3	325	e 10 58	− 2	i 20 9	+ 3	i 13 8	pP
Klyuchi		77·8	350	e 11 4	+ 1	e 20 8	− 3	—	—
Berkeley		78·4	43	e 11 4k	− 2	e 20 13	− 4	e 14 23	PP
Lick	Z.	78·5	43	e 11 4k	− 2	—	—	—	—
Nanking		78·8	310	11 10k	+ 2	i 20 26	+ 5	—	—
Pasadena		79·0	47	i 11 6k	− 3	e 20 14	− 9	i 11 19	PcP
Mount Wilson	Z.	79·1	47	—	—	i 20 18	− 6	—	—
Fresno	Z.	79·3	44	e 11 12k	+ 2	e 20 21	− 5	—	—
Riverside	Z.	79·4	47	e 11 11	0	—	—	e 11 23	PcP
Palomar		79·5	49	i 11 9k	− 3	i 20 26	− 3	e 13 20	pP
Shasta Dam		80·0	40	i 11 12	− 2	—	—	—	—
China Lake		80·3	46	i 11 14k	− 2	i 20 33	− 4	e 13 18	pP
Mineral	Z.	80·3	41	i 11 13k	− 3	—	—	—	—
Tinemaha		80·5	45	i 11 14k	− 3	e 20 35	− 4	e 13 36	pP
Boulder City		82·3	47	i 11 24	− 2	e 20 52	− 5	—	—
Tucson		83·3	52	i 11 30	− 1	—	—	e 13 35	pP
Seattle		84·3	35	i 11 38k	+ 2	i 21 17	+ 1	i 14 27	sP
College		87·8	12	i 11 49	− 3	—	—	i 13 59	pP
Hungry Horse		89·2	37	i 11 56	− 3	—	—	—	—
Kabansk		96·3	323	16 36	PP	e 23 4	+ 2	22 12	SKS
Irkutsk		97·7	323	e 16 45	PP	e 22 18	[− 5]	26 7	PS
La Paz		103·1	113	i 26 56	PS	—	—	—	—
Cleveland	N.	108·4	52	—	—	e 24 48	S	—	—
Almata		113·5	310	i 18 40	PP	—	—	—	—
Naryn		114·0	308	i 18 45	PP	i 23 20	[−14]	—	—
Rybach'e		114·0	309	e 18 46	PP	i 23 32	[− 2]	—	—
Frunse		115·1	309	i 18 54	PP	i 23 35	[− 3]	e 19 53	pPKP
Murgab		115·2	304	e 18 52	PP	e 23 41	[+ 2]	—	—
Andijan		116·6	306	e 19 4	PP	i 23 41	[− 3]	—	—
Fergana		117·1	306	—	—	i 23 42	[− 4]	e 25 4	SKKS
Obi-garm		118·6	305	—	—	i 23 46	[− 5]	—	—
Tchimkent		118·8	308	—	—	i 23 46	[− 6]	—	—
Tashkent		119·0	307	e 19 20	PP	i 23 46	[− 6]	—	—
Stalinabad		119·3	304	e 19 19	PP	—	—	—	—
Sverdlovsk		123·0	326	e 17 54	[− 1]	e 24 1	[− 4]	e 19 43	PP
Mary		124·7	303	e 19 57	PP	e 24 7	[− 4]	e 25 59	SKKS
Ashkabad		127·5	303	—	—	21 28	PKS	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund		127·6	10	e 18 15	[+11]	—	—	e 20 16 PP	—
Kiruna		130·5	351	i 18 7	[− 2]	e 24 20	[− 6]	e 20 20 pPKP	—
Lenkoran		134·8	304	i 20 55	PP	—	—	— —	—
Pulkovo		135·0	339	e 20 53	PP	—	—	e 24 1 PPP	—
Kirovobad		136·2	309	i 20 59	PP	—	—	— —	—
Goris		136·6	306	21 0	PP	—	—	— —	—
Piatigorsk		137·6	314	e 21 5	PP	—	—	— —	—
Erevan		137·8	308	e 21 5	PP	—	—	— —	—
Leninakan		138·1	309	i 21 18	PP	—	—	— —	—
Yalta		143·1	319	18 31	[− 2]	—	—	— —	—
Copenhagen		143·2	350	i 18 30	[− 3]	—	—	i 18 43 PKP	—
Lwow		145·6	334	18 35	[− 1]	—	—	— —	—
Ksara		146·1	302	i 18 40	[+ 2]	—	—	i 20 57 pPKP	—
Potsdam		146·2	347	i 18 38k	[0]	i 28 2 SKKS		20 56 pPKP	—
Rathfarnham Castle		146·2	8	i 18 32	[− 6]	—	—	e 25 52 PPP	—
Uzhgorod		146·6	335	i 18 40	[+ 2]	—	—	20 56 pPKP	—
Raciborzu		146·9	340	e 18 35	[− 4]	e 27 57 SKKS		e 18 42 PKP_2	—
Witteveen	z.	146·9	354	i 18 42k	[+ 3]	—	—	— —	—
Collmberg	z.	147·3	346	i 18 42	[+ 3]	—	—	e 21 2 pPKP	—
De Bilt		147·7	355	e 18 44	[+ 4]	e 21 58 sPKP		e 21 2 pPKP	—
Jena		147·9	347	e 18 40?	[0]	—	—	e 20 57 pPKP	—
Prague		148·1	344	e 18 42	[+ 1]	e 24 48	[− 8]	e 20 59 pPKP	—
Istanbul	z.	148·1	318	e 18 46	[+ 5]	—	—	e 19 25 ?	—
Ogyalla		148·8	338	e 18 56	[+14]	—	—	e 21 7 pPKP	—
Timisoara	n.	149·3	332	e 18 51	[+ 9]	—	—	— —	—
Belgrade	z.	150·4	332	e 19 1a	[+17]	—	—	e 21 20 pPKP	—
Karlsruhe	z.	150·4	350	e 18 46	[+ 2]	—	—	— —	—
Helwan	z.	150·8	295	e 19 3	[+18]	—	—	e 21 9 pPKP	—
Strasbourg		150·9	350	i 18 51a	[+ 6]	e 28 28 SKKS		e 21 6 pPKP	—
Paris		151·1	358	e 18 40	[− 5]	i 21 14 SKP		e 20 54 pPKP	—
Triest	z.	152·2	342	e 18 47	[0]	i 19 7 PKP_2		e 21 19 pPKP	—
Besançon		152·4	353	e 18 54	[+ 7]	—	—	— —	—
Rome		156·0	339	19 24	PKP_2	e 23 6 PP		e 19 38 ?	—
Messina	z.	157·8	329	e 19 31	PKP_2	e 23 33 PP		e 19 44 ?	—
Toledo		159·6	12	e 19 38	PKP_2	—	—	i 19 52 PKP_2	—
Alicante		161·6	4	19 3	[+ 5]	36 10 sPP		23 34 PP	—
Malaga		162·6	14	i 19 51	PKP_2	—	—	e 23 35 PP	—
Algiers Univ.	z.	163·1	354	19 7	[+ 7]	e 23 43 PP		e 20 9 PKP_2	—
Tamanrasset	z.	174·9	—	i 19 8k	[+ 1]	e 25 18	[0]	e 21 30 pPKP	—

Additional readings :—
Riverview eN =12m.46s., iSSN =13m.0s., iEN =15m.13s.
Vladivostok ePcP =11m.4s., PP =14m.11s.
Berkeley iZ =11m.17s., eE =20m.30s., csS?Z =24m.4s.
Lick iZ =11m.18s. and 12m.35s.
Riverside eZ =13m.31s. and 13m.57s.
Palomar iPcPZ =11m.23s., eZ =13m.43s.
China Lake iPcPNZ =11m.28s.
Mineral iZ =11m.29s. and 11m.42s.
Tinemaha iPcPZ =11m.27s.
Seattle i =11m.51s., 12m.18s., and 12m.54s., e =21m.27s., i =21m.55s., e =22m.29s.
Frunse iSKKS =24m.51s.
Sverdlovsk eSKKS =25m.42s., eSS =35m.46s.
Mary ePKS =21m.20s., eSS =35m.58s.
Kiruna iSKPZ =20m.37s., eN =26m.26s., ePSN =30m.46s.?, eL? =33m.4s.
Potsdam esPKPZ =21m.56s.
Rathfarnham Castle iZ =18m.44s., eEN =44m.46s.?.
Raciborzu eZ =21m.1s.
Jena eN =18m.44s., ePKPEN =19m.0s., eE =19m.27s. and 19m.42s., ePPZ =21m.4s., ePPE =21m.8s.
Prague iPKP$_2$ =19m.1s., esPKP =21m.46s., esPKP$_2$Z =22m.8s. and other unidentified e readings.
Ogyalla ePKP$_2$E =19m.17s., e =21m.32s., eE =22m.53s.
Strasbourg i =19m.1s., e =19m.4s., i =19m.16s., ePP =22m.7s.
Paris iPKP =18m.52s., i =19m.0s., 19m.5s., 19m.17s., and 21m.1s., e =21m.42s., ePP =22m.12s., ePPP =26m.1s., ePS =32m.26s.
Besançon e =19m.7s., 19m.21s., and 20m.11s.
Alicante PKP$_2$ =20m.0s.
Algiers Univ. eZ =19m.55s.
Tamanrasset ePKP$_2$Z =20m.50s., eZ =21m.6s., epPKP$_2$Z =23m.6s., iPPZ =24m.44s., epPPZ =26m.47s., esPPZ =27m.52s., ePPPZ =28m.55s., iSKKSZ =30m.35s.

Aug. 31d. 12h. 29m. 37s. Epicentre 35°·5N. 22°·8E. (as on 1951, May 30d.).

Felt in the province of Triphylia, intensity III at Chora.

A. Galanopoulos.
Seismclogical Institute Bulletin, 1951, Athens, 1952, p.23.

$A = +\cdot7522$, $B = +\cdot3162$, $C = +\cdot5781$; $\delta = -1$; $h = 0$;
$D = +\cdot388$, $E = -\cdot922$; $G = +\cdot533$, $H = +\cdot224$, $K = -\cdot816$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·6	17	e 0 42k	− 2	i 1 15	− 2	i 0 50	P_g	—
Messina	z.	6·4	297	i 1 32k	− 6	i 2 36	−17	i 1 42	P	—
Taranto		6·6	321	1 32	− 9	2 44	−14	—	—	—
Sofia		7·2	3	1 48	− 1	3 46	S*	—	—	—
Istanbul		7·5	40	1 55	+ 2	3 25	+ 5	e 3 49	S*	—
Helwan		9·1	126	e 2 26	PP	4 3	+ 3	i 3 14	?	—
Bucharest		9·3	15	e 2 18	+ 1	(4 11)	+ 6	—	—	4·2
Belgrade		9·5	350	2 17k	− 3	4 13	+ 3	e 4 33	SSS	—
Rome		10·2	312	e 2 25	− 6	e 4 23	− 4	—	—	e 5·4
Timisoara		10·3	354	e 2 37	+ 5	e 5 28	+58	e 2 44	PP	5·7
Ksara		10·9	95	e 2 49	PP	i 5 51	L	—	—	(i 5·8)
Kecskemet		11·6	350	—	—	e 5 30	SSS	—	—	—
Triest		12·2	328	e 2 54	− 4	i 5 12	− 4	e 3 9	PP	i 6·9
Budapest		12·3	348	2 55	− 4	e 5 46	SS	e 6 8	SSS	6·6
Prato		12·3	316	e 2 56	− 3	e 6 42	S	—	—	(e 6·7)
Kishinev		12·4	20	3 1	0	5 19	− 2	—	—	—
Yalta		12·5	41	3 4	+ 2	5 28	+ 5	—	—	—
Bologna		12·6	319	e 3 10	+ 7	—	—	e 4 24	?	e 7·4
Ogyalla		12·8	346	e 3 12	+ 6	e 5 31	+ 1	e 5 49	SS	e 6·7
Uzhgorod		13·1	359	3 7	− 3	5 30	− 8	—	—	—
Theodosia		13·5	41	e 3 24	PP	—	—	—	—	—
Salo		13·7	321	e 1 53	?	e 5 55	+ 3	e 2 33	?	e 7·4
Skalnate Pleso		13·8	353	e 3 29	PP	e 5 51	− 3	e 6 12	SS	—
Pavia		14·1	317	e 3 52	PPP	6 41	SSS	e 5 46	?	e 8·3
Lwow		14·3	3	e 3 30	+ 4	i 6 7	+ 1	—	—	—
Raciborzu		15·0	348	e 3 38	+ 3	e 6 29	+ 6	e 3 45	PP	e 10·4
Prague		15·8	340	e 3 37k	− 8	6 47	+ 5	e 4 10	PPP	e 8·4
Zürich		15·9	323	e 3 43a	− 4	e 6 31	−13	—	—	—
Algiers Univ.	z.	16·0	280	e 3 48	0	e 6 26	−20	e 3 59	PP	—
Cheb		16·4	336	—	—	e 6 51	− 5	e 7 28	SSS	e 8·5
Basle		16·5	321	e 3 50	− 4	e 7 4	+ 6	—	—	—
Neuchatel		16·5	319	e 3 48	− 6	—	—	—	—	—
Karlsruhe		17·1	328	e 3 59	− 3	e 7 11	− 1	—	—	e 9·4
Strasbourg		17·1	325	e 3 58	− 4	e 7 9	− 3	e 7 39	SS	e 9·0
Besançon		17·2	319	e 4 1	− 2	e 7 6	− 8	e 3 56	P	—
Collmberg		17·3	340	e 3 57	− 7	e 7 21	+ 5	e 4 12	PP	e 10·2
Jena		17·4	337	e 4 0	− 6	e 7 23	+ 4	e 4 28	PP	9·4
Leninakan		17·4	65	e 3 58	− 8	—	—	—	—	—
Erevan		17·8	68	i 4 16	+ 5	i 7 44	+16	—	—	—
Gori		17·8	62	4 15	+ 4	—	—	—	—	—
Clermont-Ferrand		18·1	311	i 4 9	− 5	i 4 26	PP	i 4 37	PPP	e 12·1
Potsdam		18·2	342	e 4 12	− 4	i 7 40	+ 3	e 4 15	P	e 9·4
Tiflis		18·2	62	e 4 19	+ 3	—	—	—	—	—
Tortosa		18·3	294	(i 4 24)	+ 7	i 4 24	S	—	—	e 14·4
Alicante		18·9	287	e 4 23	− 1	e 7 53	0	4 39	PP	e 9·5
Goris		19·1	70	i 4 28	+ 1	i 8 6	+ 9	—	—	—
Kirovobad		19·2	66	i 4 30	+ 2	i 8 14	+15	—	—	—
Grozny		19·3	58	4 30	+ 1	—	—	—	—	—
Tamanrasset	z.	19·6	235	i 4 34	+ 2	e 8 9	+ 1	e 4 52	PP	i 9·5
Paris		20·0	318	e 4 33	− 4	i 8 14	− 3	i 4 51	PP	e 9·9
Almeria		20·4	282	i 4 35	− 6	i 8 37	+12	5 9	PP	16·2
Witteveen	z.	20·7	333	i 4 42k	− 2	—	—	—	—	—
De Bilt		20·8	330	e 4 39	− 6	i 8 36	+ 3	e 8 29	S	e 10·4
Shemakla		20·9	67	5 0?	+14	i 10 51?	L	—	—	(i 10·8)
Lenkoran		21·0	72	4 49	+ 2	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Granada		21·3	283	i 4 50a	0	i 8 57	+14	5 23	PP	14·9
Copenhagen		21·4	345	i 4 47	− 4	i 8 37	− 8	—	—	10·7
Toledo		21·6	290	i 4 52	− 2	i 8 56	+ 7	—	—	—
Baku		21·9	68	e 5 8	+11	e 9 16?	+22	—	—	—
Malaga		22·0	283	i 4 56	− 2	e 8 28	−28	—	—	—
Moscow		22·7	22	e 5 1	− 3	i 9 7	− 2	—	—	—
Kew		23·0	321	e 5 6	− 1	e 10 13	SSS	—	—	e 12·4
Upsala		24·6	354	i 5 23?	0	i 9 43	+ 1	i 5 53	PP	e 13·4
Helsinki		24·7	3	e 5 24?	0	e 9 40	− 4	e 9 31	S	e 11·9
Pulkovo		24·8	9	e 5 22	− 3	i 9 37	− 9	—	—	—
Durham	N.	25·6	328	—	—	i 10 1	+ 2	i 10 36	SS	—
Rathfarnham Castle		27·1	322	i 5 42	− 4	e 10 50?	+26	—	—	e 14·9
Aberdeen		27·4	331	i 6 13	+24	i 10 33	+ 5	i 11 33	SS	e 15·7
Ashkabad		28·5	74	6 1	+ 2	10 50	+ 4	—	—	—
Mary		31·3	73	e 6 26	+ 2	11 31	0	—	—	—
Kiruna		32·4	359	i 6 31	− 3	i 11 46	− 2	e 7 46	PP	e 17·8
Sverdlovsk		33·2	38	e 6 40	0	—	—	—	—	—
Samarkand		35·0	69	6 55	− 1	12 30	+ 2	—	—	—
Stalinabad		36·5	70	e 7 15	+ 6	e 12 55	+ 4	—	—	—
Tashkent		36·5	66	i 7 10	+ 1	i 12 53	+ 2	—	—	—
Tchimkent		36·7	64	i 7 13	+ 3	i 12 55	+ 1	—	—	—
Obi-garm		37·2	70	i 7 18	+ 3	—	—	—	—	—
Garm		37·6	69	e 7 21	+ 3	—	—	—	—	—
Dzhergetal		38·3	69	i 7 29	+ 5	i 13 20	+ 1	—	—	—
Fergana		38·5	67	e 7 29	+ 3	e 13 21	+ 2	—	—	—
Andijan		38·9	66	e 7 31	+ 2	i 13 33?	+ 5	—	—	—
Frunse		40·3	63	i 7 43	+ 3	i 13 51?	+ 5	—	—	—
Murgab		40·6	70	e 7 49	+ 6	e 14 1	+ 7	—	—	—
Rybach'e		41·4	64	i 7 55	+ 5	—	—	—	—	—
Naryn		41·5	65	i 7 54	+ 4	i 14 11	+ 4	—	—	—
Almata		41·9	62	e 7 57	+ 3	—	—	—	—	—
Ili		41·9	61	e 7 50	− 4	—	—	—	—	—
Scoresby Sund		42·3	340	i 7 55	− 2	e 14 15	− 4	—	—	—
Kurmenty		42·9	62	i 8 5	+ 3	—	—	—	—	—
Przhevalsk		43·1	63	e 7 58	− 6	—	—	—	—	—
Bombay	E.	47·0	97	e 9 3	+28	e 15 34	+ 8	—	—	—
Poona		48·0	97	i 8 47	+ 4	i 15 51	+10	10 8	PcP	—
Irkutsk		58·0	45	e 9 57	0	e 17 52	− 5	—	—	—
Kabansk		59·4	46	e 10 11?	+ 5	—	—	—	—	—
Kimberley	Z.	63·9	178	i 10 40	+ 3	—	—	—	—	—
Seven Falls	E.	67·2	313	10 57	− 1	—	—	—	—	—
Weston		69·8	308	e 11 13	− 1	—	—	—	—	—
Harvard		69·9	308	e 11 13	− 2	—	—	—	—	—
Ottawa		71·0	313	11 21	− 1	—	—	—	—	—
Vladivostok		78·6	45	—	—	e 21 58	− 4	—	—	—
San Juan		78·7	285	i 12 5	− 1	—	—	—	—	—
College		79·7	356	e 12 5	− 6	—	—	—	—	—
Hungry Horse		88·1	333	i 12 53	− 1	—	—	—	—	—
Mineral	Z.	97·7	333	e 13 37k	− 1	—	—	—	—	—
Boulder City		98·7	326	e 13 43	+ 1	—	—	—	—	—
China Lake	Z.	100·0	328	e 13 48	0	—	—	—	—	—
Fresno	Z.	100·2	330	e 13 50a	+ 1	—	—	—	—	—

Additional readings :—
Athens i =1m.26s.
Sofia eEN =2m.30s. and 2m.51s.
Istanbul eP*E =2m.17s., eP$_g$N =2m.39s., eN =3m.10s., eS*N =3m.55s., eS$_g$?N = 4m.27s.
Bucharest eE =2m.24s. and 3m.16s., eN =3m.28s.
Belgrade eZ =2m.25s. and 3m.15s., eNE =3m.23s., eNW =3m.31s., eZ =3m.45s.
Timisoara eEN =3m.15s.
Triest iPS =5m.59s.
Ogyalla e =3m.42s., 4m.38s., 4m.58s., and 6m.5s.
Skalnate Pleso eN =5m.45s.
Raciborzu ePPPN =3m.52s., eN =4m.54s., eSSSZ =6m.41s., eP$_c$PE =8m.54s., eN = 9m.4s.

Continued on next page.

Prague e =4m.24s. and 6m.12s., eS?Z =6m.31s.
Algiers Univ. ePPPZ =4m.8s., eZ =5m.42s.
Strasbourg ePP =4m.4s., i =4m.29s., e =4m.45s., i =5m.32s., e =6m.25s., eS =7m.3s., e =7m.53s.
Besançon ePP =4m.9s., ePPP =4m.19s., e =4m.57s. and 5m.25s., eS =7m.1s.
Jena eN =5m.8s., eSEN =7m.35s.
Clermont-Ferrand i =4m.51s.
Potsdam eSSZ =7m.44s.
Alicante PPP =4m.57s., SS =8m.18s., PcP =8m.53s., ScS =15m.57s.
Tamanrasset eZ =5m.23s.
Paris i =4m.38s. and 4m.43s., iPPP =5m.1s., i =5m.21s., iS =8m.7s., iSS =8m.31s., i =8m.44s., iSSS =8m.50s., i =9m.11s., iScP =12m.39s.
Almeria SS =9m.13s.
Granada SS =9m.32s.
Upsala iS =9m.36s., eSSE =10m.22s.?, i =11m.50s.
Rathfarnham Castle iZ =5m.47s., eZ =6m.27s.
Kiruna iNZ =6m.38s., eN =8m.8s., iS =11m.40s., eN =12m.32s., eSSSZ =13m.47s., e =15m.45s., iE =17m.19s.
Poona ScSE =18m.42s., SSE =19m.12s.

Aug. 31d. 20h. 18m. 34s. Epicentre 35°·5N. 22°·8E. (as at 12h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·6	17	i 0 50	+ 6	1 21	+ 4	i 1 26	S_g	—
Messina	z.	6·4	297	e 1 35	− 3	i 2 42	−11	i 1 42	P	—
Taranto		6·6	321	1 35	− 6	2 56	− 2	e 2 40	?	—
Sofia		7·2	3	e 1 50	+ 1	3 47	S*	—	—	e 4·2
Istanbul		7·5	40	e 1 56	+ 3	e 3 24	+ 4	e 2 24	P_g	4·4
Helwan		9·1	126	e 2 29	PPP	3 55	− 5	—	—	4·9
Belgrade		9·5	350	e 2 16a	− 4	e 4 51	SSS	e 5 0	S_g	5·6
Rome		10·2	312	e 3 2	+31	e 4 52	SSS	e 5 40	S_g	e 6·4
Timisoara		10·3	354	e 2 37	+ 5	i 5 2	SSS	e 2 40	PP	e 5·9
Ksara		10·9	95	e 3 0	PPP	—	—	—	—	i 6·5
Triest		12·2	328	e 2 52	− 6	i 5 11	− 5	i 6 2	SSS	i 6·9
Budapest		12·3	348	e 2 56	− 3	—	—	e 3 16	PPP	e 7·1
Prato		12·3	316	e 3 18	PPP	—	—	—	—	i 7·6
Kishinev		12·4	20	2 58	− 3	—	—	—	—	—
Yalta		12·5	41	3 4	+ 2	—	—	—	—	—
Ogyalla		12·8	346	e 3 4	− 2	—	—	—	—	e 7·6
Uzhgorod		13·1	359	e 3 14	+ 4	—	—	—	—	—
Skalnate Pleso		13·8	353	e 3 26	+ 7	5 45	− 9	—	—	—
Pavia		14·1	317	e 5 9	?	—	—	—	—	e 7·0
Raciborzu		15·0	348	3 28	− 7	e 6 12	−11	e 3 35	P	e 9·0
Prague		15·8	340	e 3 35	−10	e 7 2	SS	—	—	e 8·4
Zürich		15·9	323	e 3 45k	− 2	e 6 41	− 3	—	—	—
Algiers Univ.	z.	16·0	280	e 3 49	+ 1	e 6 44	− 2	e 4 1	PP	—
Cheb		16·4	336	—	—	e 6 56	0	e 5 14	?	9·2
Basle		16·5	321	e 3 53	− 1	e 7 3	+ 5	—	—	—
Abastumanj		16·8	62	e 4 2	+ 4	—	—	—	—	—
Karlsruhe		17·1	328	e 4 1	− 1	—	—	—	—	e 9·9
Strasbourg		17·1	325	e 4 0	− 2	e 7 14	+ 2	e 7 28	SS	e 10·3
Besançon		17·2	319	e 4 3	0	e 7 8	− 6	e 7 35	SS	—
Tsikhlis-Dzhvari		17·3	62	4 7	+ 3	—	—	—	—	—
Jena		17·4	337	e 4 6	0	e 7 35	SS	e 4 17	PP	e 9·4
Leninakan		17·4	65	e 3 55?	−11	—	—	—	—	—
Erevan		17·8	68	e 4 13	+ 2	7 40	SS	—	—	—
Gori		17·8	62	e 4 11	0	—	—	—	—	—
Potsdam		18·2	342	i 4 16	0	e 7 56	SS	e 2 13	?	e 9·4
Tiflis		18·2	62	i 4 13	− 3	e 7 44?	+ 7	—	—	—
Alicante		18·9	287	5 4	+40	8 36	SSS	16 22	ScS	e 10·2
Goris		19·1	70	4 26	− 1	8 3	+ 6	—	—	—
Kirovobad		19·2	66	i 4 28	0	—	—	—	—	—
Grozny		19·3	58	e 4 34	+ 5	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O – C.	S.	O – C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tamanrasset	Z.	19·6	235	i 4 31a	– 1	e 8 12	+ 4	e 4 48	PP	9·2
Paris		20·0	318	i 4 34	– 3	8 17	C	i 4 50	PP	e 10·1
Almeria		20·4	282	i 4 49	+ 8	8 49	88	5 17	PP	12·6
Witteveen	Z.	20·7	333	i 4 43	– 1	—	—	—	—	—
De Bilt		20·8	330	i 4 44	– 1	e 8 35	+ 2	—	—	e 10·9
Shemakha		20·9	67	4 55	+ 9	i 8 46	+11	—	—	—
Lenkoran		21·0	72	—	—	i 8 47	+10	—	—	—
Copenhagen		21·4	315	i 4 49	– 2	e 8 57	+12	—	—	11·9
Toledo		21·6	290	e 4 54	0	e 8 54	+ 5	—	—	—
Baku		21·9	68	e 4 53	– 4	—	—	—	—	—
Malaga		22·0	283	i 4 54	– 4	e 8 41	–15	—	—	—
Moscow		22·7	22	e 5 1	– 3	e 9 10	+ 1	—	—	—
Kew		23·0	321	i 5 5	– 2	e 9 14	0	e 9 29	?	e 11·4
Upsala		24·6	354	i 5 32	+ 9	i 9 39	– 3	i 6 2	PP	e 13·4
Helsinki	N.	24·7	3	e 4 55	–29	—	—	—	—	—
Pulkovo		24·8	9	e 5 25	0	e 9 50	+ 4	—	—	—
Durham	N.	25·6	328	—	—	i 10 18	+19	—	—	—
Rathfarnham Castle		27·1	322	i 5 42	– 4	e 9 51	–33	—	—	e 13·4
Aberdeen	E.	27·4	331	—	—	e 10 56	+28	—	—	e 15·0
Ashkabad		28·5	74	e 6 6	+ 7	—	—	—	—	—
Mary		31·3	73	—	—	e 11 47	+16	—	—	—
Kiruna		32·4	359	i 6 31a	– 3	e 11 44	– 4	e 13 36	SS	17·4
Sverdlovsk		33·2	38	i 6 37	– 3	11 57	– 3	—	—	—
Stalinabad		36·5	70	e 7 9	0	—	—	—	—	—
Tashkent		36·5	66	e 7 6	– 3	—	—	—	—	—
Tchimkent		36·7	64	i 7 13	+ 3	—	—	—	—	—
Obi-garm		37·2	70	i 7 13	– 2	—	—	—	—	—
Garm		37·6	69	e 7 19	+ 1	—	—	—	—	—
Dzhergetal		38·3	69	e 7 23?	+ 1	—	—	—	—	—
Andijan		38·9	66	i 7 29	0	13 25	– 3	—	—	—
Frunse		40·3	63	i 7 40	0	—	—	—	—	—
Murgab		40·6	70	e 7 43	0	e 13 54?	0	—	—	—
Naryn		41·5	65	i 7 51	+ 1	—	—	—	—	—
Scoresby Sund		42·3	340	i 7 56k	– 1	17 50	SSS	—	—	21·4
Bombay	E.	47·0	97	e 8 26?	– 9	e 18 43	SS	—	—	—
Weston		69·8	308	e 11 15	+ 1	—	—	—	—	—
Harvard		69·9	308	e 11 15	0	—	—	—	—	—
Ottawa		71·6	313	11 23	+ 1	—	—	—	—	—
College		79·7	356	e 12 8	– 3	—	—	—	—	—
Hungry Horse		88·1	333	i 12 53	– 1	—	—	—	—	—

Additional readings :—
Athens i =0m.55s. and 1m.31s.
Istanbul eP*E =2m.4s., eSEN =3m.12s., eS*E =3m.38s., eS$_g$N =3m.52s.
Helwan eZ =2m.43s.
Belgrade eZ =3m.6s., eNW =3m.24s., eNE =3m.41s.
Timisoara eN =3m.17s. and 3m.54s.
Ogyalla e =3m.36s., eE =4m.51s., e =6m.40s. and 6m.58s.
Raciborzu eN =3m.41s., ePPPE =3m.45s., eZ =4m.33s., eSZ =6m.8s., ePcPN =8m.53s.
Prague e =4m.26s., 4m.54s., and 6m.7s.
Algiers Univ. eZ =4m.25s.
Strasbourg e =4m.4s., i =4m.31s. and 5m.26s., e =6m.45s.
Besançon e =4m.58s.
Jena eE =4m.59s. and 5m.51s., eSN =7m.41s.
Potsdam eE =4m.20s., iN =7m.50s.
Tananrasset ePPPZ =4m.56s., eZ =6m.39s.
Paris ePPP =4m.58s., i =5m.42s., iS =8m.11s., eSSS =8m.58s.
Upsala iPN =5m.36s., iS =9m.45s.
Rathfarnham Castle iZ =5m.50s., eEN =11m.5s.
Kiruna iZ =7m.22s., ePPP?N =7m.47s., eN =15m.37s., eE =16m.51s.

Aug. 31d. Readings also at 2h. (near Ottawa), 3h. (near La Paz, near Garm, Obi-garm, and Dzhergetal), 4h. (Antofagasta and near Concepción), 5h. (Reykjavik and near Garm (2), 6h. (Copiapo and near Santa Lucia), 7h. (Athens and Stuttgart), 8h. (near Dzhergetal and near Bogota), 10h. (Palomar, China Lake, Tinemaha, and Brisbane), 11h. (Athens), 12h. (Messina), 13h. (Messina, near Athens, and near Lwow), 14h. (near Dzhergetal), 15h. (Tananarive and near Athens (2)), 17h. (Brisbane), 18h. (Scoresby Sund), 19h. (Ksara, Athens, Granada, Vera Cruz, near Tacubaya, Puebla, Oaxaca, near Galerazamba, Chinchina, near Bogota, near Istanbul, and near Garm), 20h. (near Garm), 21h. (near Athens), 23h. (Palisades and Bermuda).

Sept. 1d. 4h. 40m. 23s. Epicentre 36°·0S. 111°·2W.
(foreshock of larger earthquake at 8h.).

$A = -·2932$, $B = -·7560$, $C = -·5852$; $\delta = -4$; $h = 0$;
$D = -·932$, $E = +·362$; $G = +·212$, $H = +·546$, $K = -·811$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia	N.	33·2	97	—	—	e 14 20	SSS	—	—	e 17·2
Copiapo	N.	35·6	87	—	—	e 15 28	SSS	—	—	—
Huancayo		40·2	62	e 7 41	+ 1	i 13 54	+ 6	e 9 16	PP	e 16·8
La Paz		42·8	75	i 8 5	+ 1	i 14 37	+11	9 46	PP	i 20·4
Chinchina		52·6	46	e 9 26	+ 8	e 16 58	+14	—	—	e 25·6
Bogota		53·3	48	i 9 26	+ 3	i 17 4	+10	i 20 55	SS	i 23·7
Tacubaya		56·3	13	e 9 52	+ 7	—	—	—	—	—
Christchurch		57·2	237	—	—	e 18 7	+21	—	—	e 26·7
Tucson		67·9	1	e 10 58	− 4	—	—	e 11 2	P	—
Palomar	Z.	69·2	355	e 11 7	− 3	—	—	e 11 15	P	—
Riverside	Z.	69·9	354	e 11 12	− 3	—	—	—	—	—
Pasadena		70·1	354	e 11 17	+ 1	—	—	e 29 37	Q	e 32·9
Boulder City		71·7	357	e 11 27	+ 1	—	—	—	—	—
China Lake		71·7	355	e 11 22	− 4	—	—	—	—	—
Fresno	Z.	72·8	353	e 11 31	− 1	—	—	—	—	—
Tinemaha	Z.	73·0	354	e 11 33	0	—	—	—	—	—
Lick	Z.	73·6	351	i 11 37k	0	—	—	—	—	—
Berkeley		74·2	351	e 11 44	+ 4	e 21 17	+ 3	e 10 28k	?	e 34·9
Riverview	N.	76·4	238	—	—	e 22 14	PS	e 22 27	PPS	e 36·0
Mineral	Z.	76·6	352	e 11 50a	− 4	—	—	—	—	—
Shasta Dam		77·0	351	i 11 53	− 3	—	—	—	—	—
Brisbane		78·7	244	e 12 12	+ 6	—	—	—	—	e 40·6
Bermuda		80·8	38	—	—	e 22 36	+11	—	—	e 33·9
Cleveland		81·8	22	e 12 42k	+20	i 22 38	+ 3	—	—	—
Palisades		83·9	28	—	—	e 22 54	− 2	—	—	—
Granada		122·2	66	—	—	37 24	SS	—	—	60·2
Scoresby Sund		123·8	24	—	—	37 19	SS	—	—	49·6
Tamanrasset	Z.	124·2	86	19 26	[+25]	—	—	e 20 59	PP	—
Alicante		126·0	66	e 29 35	PKKP	—	—	—	—	e 61·2
Stuttgart	Z.	135·3	55	e 19 22?	[0]	—	—	—	—	—
Rome		136·5	65	e 21 31	?	e 40 3	SS	e 22 7	PP	e 66·4
Triest		138·0	60	e 19 47	[+20]	e 39 56	SS	e 22 28	PP	—
Helwan	Z.	148·1	92	e 19 55	[+11]	—	—	—	—	—
Ksara		153·0	87	e 20 15	PKP_2	27 20	[+22]	23 33	PKS	—

Additional readings :—
Lick iZ = 11m.42s., eZ = 12m.5s.
Berkeley eZ = 10m.46s., eSS?Z = 26m.6s.
Rome eE = 24m.25s., eSKS? = 27m.18s.
Helwan eZ = 20m.9s., 20m.19s., 21m.17s., and 21m.40s.
Long waves were also recorded at La Plata, Auckland, Wellington, Fort de France, Pennsylvania, Weston, Seattle, Resolute Bay, and at other European stations.

Sept. 1d. 6h. 56m. 4s. Epicentre 43°·1N. 13°·2E. (as on 1943, Oct. 3d.).

Intensity VII in the province of Macerata, at Macerata, Tolentino, Caldarola, Belognola, Visso, Gualdo, and Ussita; VI in many places in the provinces of Teramo, Ascoli Picena, Perugia, and Ancona. Some damage (press report). Energy ca. 10^{21} ergs.
Epicentre 43°14′·5N. 13°35′E. (Rome).

Monthly Seismic Bulletin of the I.N.G., Rome, Sept., 1951, p.3.

$A = +·7131$, $B = +·1673$, $C = +·6808$; $\delta = -1$; $h = -3$;
$D = +·228$, $E = -·974$; $G = +·663$, $H = +·155$, $K = -·732$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Rome	1·3	204	i 0 25a	0	i 0 44	0	i 0 28	P_g	i 1·0
Rocca di Papa	1·4	195	i 0 27a	0	i 0 46	0	i 0 30	P_g	—
Prato	1·7	297	i 0 34	+ 3	i 0 56	+ 2	—	—	—
Bologna	1·9	316	e 0 38	+ 4	i 1 3	+ 4	i 0 46	P_g	—
Triest	2·6	9	i 0 43a	− 1	i 1 16	− 1	i 0 52	P_g	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Salo		3·2	323	e 0 56k	+ 4	i 1 30	− 2	i 1 5	P_g	i 1·9
Pavia		3·6	307	e 1 0	+ 2	e 1 36	− 6	i 1 17	P_g	e 1·9
Taranto		4·0	129	1 2	− 2	e 2 35	?	e 1 18	P_g	—
Messina	z.	5·2	159	e 1 22	+ 1	i 2 23	+ 1	—	—	—
Kalossa		5·3	48	2 2	?	e 2 18	− 7	2 54	S_g	3·2
Ravensburg		5·3	333	e 1 21?	− 1	e 2 24	− 1	e 3 1	S_g	—
Zürich		5·4	323	e 1 23a	− 1	e 2 26	− 2	—	—	—
Belgrade	z.	5·5	70	e 1 40	P*	e 2 29	− 1	e 1 49	P_g	—
Vienna		5·6	22	e 1 26	− 1	e 2 27	− 6	e 1 51	P_g	—
Ogyalla		5·9	35	e 1 25	− 6	e 2 42	+ 2	e 3 10	S_g	—
Basle		6·0	321	e 1 49	P*	—	—	—	—	—
Budapest	E.	6·0	42	2 7	P_g	i 2 40	− 3	3 9	S*	3·4
Kecskemet		6·0	48	—	—	e 2 57	S*	e 3 20	S_g	i 3·8
Stuttgart	z.	6·3	336	e 1 35	− 1	e 3 8	S*	e 1 50	P*	—
Timisoara	N.	6·3	62	e 2 4	P_g	i 2 56	+ 6	i 3 16	S*	—
Strasbourg		6·7	327	i 1 40	− 2	i 2 58	− 2	i 2 13	P_g	—
Karlsruhe		6·8	332	e 1 41	− 3	i 3 25	S*	i 3 40	S_g	—
Cheb		7·0	356	2 15	P_g	e 3 10	+ 2	—	—	—
Prague		7·0	7	e 1 45	− 1	e 3 3	− 5	i 3 32	S*	—
Sofia		7·4	90	e 1 53	+ 1	3 15	− 3	2 26	P_g	e 4·7
Sonneberg	E.	7·4	349	—	—	e 3 14	− 4	i 4 7	S_g	i 4·4
Clermont-Ferrand		7·7	294	i 1 59	+ 3	i 3 14	−11	i 2 37	P_g	—
Raciborzu		7·8	25	e 2 10	P*	e 3 29	+ 1	e 2 36	P_g	e 4·9
Skalnate Pleso		7·8	36	e 3 4	?	e 3 28	0	e 4 4	S*	e 4·6
Jena		7·9	353	e 1 58	− 1	i 3 25	− 5	e 2 38	P_g	—
Collmberg		8·2	359	e 2 4	+ 1	e 3 35	− 3	e 4 6	S*	—
Barcelona		8·4	262	—	—	e 6 39	?	—	—	—
Potsdam		9·3	0	—	—	e 3 56	− 9	i 4 46	S*	e 4·9
Bucharest		9·4	78	e 2 20	+ 2	e 4 40	S*	e 3 16	?	5·1
Paris		9·4	311	e 2 19	+ 1	i 4 17	+10	i 5 16	S_g	—
Athens		9·5	119	e 2 19	− 1	e 3 59	−11	e 4 25	?	—
Tortosa		9·7	260	—	—	i 5 30	S_g	—	—	i 6·7
Algiers Univ.	z.	10·0	234	e 2 29	+ 2	—	—	e 2 38	PP	—
De Bilt		10·5	332	e 2 42	PP	e 4 50	SS	—	—	e 5·4
Alicante		11·5	250	3 3	PPP	5 20	SSS	—	—	e 6·2
Kishinev		11·7	65	—	—	e 5 8	+ 4	—	—	—
Kew		12·4	317	e 3 3	+ 2	e 5 29	+ 8	—	—	e 5·9
Copenhagen		12·6	358	—	—	e 5 38	SS	—	—	7·6
Toledo		13·3	261	i 3 13	0	—	—	—	—	i 9·8
Almeria		13·5	248	3 35	+20	6 21	+34	3 53	?	9·0
Granada		14·1	252	i 3 37k	PP	6 13	SS	4 1	?	6·9
Malaga		14·9	251	e 3 39	+ 5	—	—	e 3 57	PPP	—
Yalta		15·2	78	e 3 35	− 3	—	—	—	—	—
Rathfarnham Castle		16·5	315	i 4 0	+ 6	e 7 12	SS	e 4 15	PPP	e 9·1
Upsala		17·0	7	e 8 56?	PcP	—	—	—	—	e 10·6
Aberdeen		17·1	332	—	—	i 7 26	SS	e 8 46	Q	e 9·8
Helsinki	E.	18·5	18	—	—	e 8 10	SS	—	—	e 9·5
Helwan	z.	19·6	127	e 4 38	+ 6	e 5 4	PPP	e 5 17	?	—
Pulkovo		19·7	27	e 4 32	− 2	e 8 2	− 8	—	—	—
Ksara		20·0	112	e 4 35	− 2	e 8 18	+ 1	—	—	—
Moscow		20·1	43	e 4 36	− 2	—	—	—	—	—
Tamanrasset	z.	21·2	200	i 4 53a	+ 4	e 9 1	SS	e 5 19	PP	—
Abastumanj		21·9	83	e 4 56	− 1	—	—	—	—	—
Borzhomi		22·2	83	e 5 3	+ 3	—	—	—	—	—
Leninakan		22·9	85	e 4 58?	− 8	—	—	—	—	—
Gori		22·9	82	e 5 6	0	—	—	—	—	—
Tiflis		23·3	82	e 5 12	+ 2	—	—	—	—	—
Erevan		23·5	86	e 5 14	+ 2	9 24	+ 1	—	—	—
Kirovobad		24·7	83	5 36?	+12	9 52?	+ 8	—	—	—
Kiruna		25·1	7	e 5 26	− 2	e 9 56?	+ 5	e 11 1	SSS	e 13·9
Sverdlovsk		32·7	49	e 6 33	− 3	e 11 48	− 4	—	—	—
Mary		37·1	81	—	—	e 12 56	− 5	—	—	—
Fergana		43·0	73	e 8 13	+10	—	—	—	—	—
Andijan		43·3	73	e 8 8	+ 3	—	—	—	—	—

For Notes see next page.

NOTES TO SEPTEMBER 1d. 6h. 56m. 4s.

Additional readings :—
Rome iS_g? —52s.
Rocca di Papa iS_gE =55s.
Triest iP_gZ =48s., iS =1m.8s.
Salo iS? =1m.39s.
Pavia e =1m.21s.
Messina iZ =1m.26s. and 2m.13s.
Kalossa SN =3m.2s.
Ravensburg eP_gZ =1m.29s. and 1m.32s., e =1m.52s. and 2m.34s., eS =2m.43s.
Belgrade eP_gNE =2m.6s., eNW =2m.12s. and 2m.49s., eZ =3m.1s., eP_gS_gZ =3m.18s.
Vienna eP* =1m.40s., eS* =2m.48s., iS =2m.59s., iS_g =3m.3s.
Ogyalla eP_g =2m.7s., e =2m.28s., eS? =2m.35s., eS* =2m.57s.
Budapest ePN =2m.24s.
Stuttgart eZ =1m.40s. and 1m.46s., iZ =3m.16s., iS_g? =3m.35s.
Timisoara eN =2m.11s., iP*?N =2m.34s., iSEN =3m.46s.
Strasbourg iP* =1m.52s., e =2m.28s., 2m.40s., and 2m.53s., i =3m.4s. and 3m.16s., iS* =3m.27s., eS_g =3m.41s.
Karlsruhe eP*Z =1m.50s., e =2m.49s.
Cheb eP_g =2m.24s., e =2m.36s.
Prague eP* =2m.4s., eP_g =2m.28s., iS_g =4m.0s. and other unidentified readings.
Sofia eEN =2m.59s., S_gEN =3m.57s.
Sonneberg eE =3m.35s. and 3m.49s.
Clermont-Ferrand iP_g? =2m.19s., i =2m.43s., iS* =3m.53s.
Raciborzu eN =2m.27s., eS_gZ =4m.16s.
Skalnate Pleso eN =3m.7s.
Jena iP*?N =2m.17s., eP_gN =2m.33s., iS*?N =3m.56s., iS_gE =4m.28s. and numerous unidentified readings.
Collmberg eP*?EZ =2m.26s., eE =3m.15s., eEZ =3m.47s., and 4m.31s., eS*EZ = 4m.58s., eEZ =5m.20s. and 5m.46s., eS_gEZ =6m.14s.
Potsdam iN =4m.23s., iE =4m.27s.
Paris iPP =2m.34s., iP* =2m.49s., iP_g =3m.17s., iS =4m.44s., iS_g =5m.19s. and other unidentified readings.
Algiers Univ. eZ =2m.52s., eP_gZ =3m.47s.
Alicante PP =3m.14s., PPP =3m.24s., SS =5m.37s.
Rathfarnham Castle eZ =4m.6s., e =6m.40s.
Upsala eE =9m.30s., e =9m.55s.?.
Tamanrasset eZ =5m.8s., iZ =5m.38s., eZ =5m.49s.
Kiruna iPPPZ =6m.23s., eZ =10m.30s., eE =10m.45s. and 11m.8s., eQE =12·0m.
Long waves were also recorded at Witteveen and Scoresby Sund.

Sept. 1d. 8h. 49m. 2s. Epicentre 36°·0S. 111°·2W. (as at 4h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia	N.	33·2	97	8 42	PPP	—	—	10 20	?	e 14·2
Huancayo		40·2	62	i 7 39	− 1	e 13 52	+ 4	e 9 10	PP	e 16·8
La Paz		42·8	75	i 8 4a	+ 3	i 14 31	+ 5	i 17 48	SS	i 20·5
La Plata	E.	42·9	104	8 16	+14	14 34	+ 7	17 28	SS	22·2
Chinchina		52·6	46	i 9 27	+ 9	i 16 51	+ 7	i 11 26	PP	i 25·0
Bogota		53·3	48	i 9 21	− 2	i 16 56	+ 2	—	—	—
Tacubaya		56·3	13	e 9 42	− 3	e 20 7	?	e 26 54	Q	e 27·0
Wellington		56·4	240	—	—	17 52	+16	24 10	Q	26·0
Vera Cruz		56·7	17	—	—	e 18 46	?	—	—	e 24·8
Christchurch		57·2	237	—	—	18 9	+23	e 21 36	SS	26·6
Auckland	N.	58·1	245	—	—	e 17 24	−34	—	—	25·0
Swan Island		59·0	30	e 10 25	+21	e 19 7	+57	—	—	—
Terre Adélie		63·8	206	(e 10 51)	+15	(e 19 39)	PPS	—	—	—
Guantanamo Bay		65·3	37	e 11 28	PcP	e 20 40	ScS	—	—	—
Tucson		67·9	1	e 11 0	− 2	e 20 2	+ 1	—	—	—
San Juan		68·9	46	e 11 7	− 2	—	—	—	—	—
Fort de France		69·1	53	e 11 13	+ 3	e 20 9	− 6	—	—	—
Palomar	Z.	69·2	355	e 11 8	− 2	—	—	—	—	—
Riverside	Z.	69·9	354	e 11 13	− 2	—	—	—	—	—
Pasadena		70·1	354	e 11 14	− 2	e 20 22	− 5	e 24 46	SS	e 33·2
Boulder City		71·7	357	e 11 23	− 3	—	—	—	—	—
China Lake		71·7	355	e 11 24	− 2	—	—	—	—	—
Fresno	Z.	72·8	353	e 11 24a	− 8	e 21 2	+ 4	—	—	e 35·0
Tinemaha	Z.	73·0	354	e 11 32	− 1	—	—	—	—	—
Lick	Z.	73·6	351	i 11 37a	0	—	—	i 11 50	PcP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Clara		73·7	351	—	—	e 20 11	−57	—	—	e 35·2
Berkeley		74·2	351	e 11 40a	0	e 21 17	+ 3	e 26 6	SS	e 35·2
Riverview		76·4	238	i 12 6	+13	i 21 55	+17	e 22 36	PPS	e 35·1
Mineral	Z.	76·6	352	e 11 52a	− 2	—	--	—	—	—
Shasta Dam		77·0	351	i 11 55	− 1	—	—	—	—	—
Brisbane		78·7	244	i 12 12a	+ 6	—	—	—	—	e 36·0
Bermuda		80·8	38	e 12 44	+27	e 22 35	+10	e 31 4	Q	e 38·3
Washington		80·9	27	e 12 13	− 4	—	—	—	—	—
Cleveland		81·8	22	i 12 20k	− 2	e 22 32	− 3	—	—	—
Pennsylvania	N.	82·3	25	—	—	i 22 40	0	i 23 17	PS	—
Palisades		83·9	28	e 12 36	+ 3	e 22 53	− 3	—	—	e 39·8
Seattle		83·9	352	e 12 40	+ 7	i 23 4	+ 8	e 23 41	PS	e 41·0
Hungry Horse		84·0	358	i 12 32	− 1	—	—	—	—	—
Weston		86·1	28	e 12 45	+ 1	e 23 13	− 5	e 15 3	?	—
Harvard		86·2	28	i 12 49	+ 5	e 23 20	+ 1	—	—	e 42·0
Ottawa		87·1	24	—	—	e 23 24	− 4	29 14	SS	35·5
Resolute Bay		110·9	5	—	—	e 26 52	S	e 35 13	SSP	e 49·8
Malaga		122·5	66	e 20 23	PP	—	—	—	—	—
Granada		123·2	66	i 21 24a	PP	27 48	{+12}	37 21	SS	60·1
Scoresby Sund		123·8	24	28 47	PKKP	37 18	SS	—	—	52·0
Almeria		123·9	67	19 2	[+ 2]	26 2	[− 1]	20 42	PP	59·6
Tamanrasset	Z.	124·2	86	e 20 57	PP	e 23 36	PPP	e 21 30	?	—
Alicante		126·0	66	19 16	[+12]	25 58	[−11]	20 52	PP	e 58·6
Rathfarnham Castle		126·4	46	i 19 18	[+13]	e 29 27	?	e 20 58	PP	e 75·0
Jersey	E.	128·0	53	e 23 36	PPP	—	—	—	—	—
Aberdeen	E.	129·4	42	i 35 23	?	i 39 10	SSP	e 66 8	Q	e 73·6
Kew		129·6	50	e 19 24	[+13]	e 22 39	PKS	—	—	e 76·0
Paris		130·9	54	e 19 26	[+12]	i 26 6	[−16]	e 21 48	PP	e 62·0
De Bilt		133·1	50	e 19 37	[+19]	e 22 55	PKS	e 21 46	PP	e 66·0
Strasbourg		134·3	55	e 19 39	[+19]	e 23 0	PKS	e 22 13	PP	e 63·0
Pavia		134·7	59	—	—	e 23 5	PKS	—	—	—
Stuttgart		135·3	55	e 19 28	[+ 6]	e 22 58	PKS	e 34 10	PPS	68·0
Jena	Z.	137·0	52	e 19 31	[+ 6]	e 23 5	PKS	e 22 14	PP	—
Copenhagen		137·5	44	—	—	45 22	SSS	—	—	63·0
Potsdam		137·9	49	e 19 52	[+25]	e 23 22	PKS	e 22 10	PP	e 59·0
Triest		138·0	60	e 19 49	[+22]	e 29 9	{ 0}	i 22 22	PP	—
Kiruna		138·2	26	e 23 17	PKS	e 29 12	{+ 2}	i 40 26	SS	e 66·5
Helwan	Z.	148·1	92	19 58	[+14]	—	—	—	—	—
Istanbul	E.	148·7	69	e 20 0	[+15]	e 32 58	?	e 48 16	SSS	e 71·0
Ksara		153·0	87	e 20 1	[+ 9]	—	—	23 17	PP	—
Kodaikanal	E.	153·2	200	e 25 28	?	—	—	—	—	—
Bombay		162·6	194	e 20 58?	?	e 27 36	[+29]	—	—	—

Additional readings and note :—
Huancayo e =9m.40s.
La Paz iZ =8m.22s., iPcP =10m.24s., iSSS =18m.30s.
La Plata PPPN =10m.46s., PPPE =10m.52s., PSN =14m.40s., QN =17·8m.
Christchurch eQ =24m.18s.
Terre Adélie readings have been increased by 6 minutes.
Pasadena eSSSN =27m.34s., eQE =28·4m.
Berkeley eE =25m.9s. and 31m.25s.
Riverview iN =22m.17s., eQN =32·5m.
Bermuda e =25m.43s.
Cleveland iPZ =12m.32s., eSE =22m.37s.
Pennsylvania iSSN =27m.38s., iN =29m.15s.
Seattle e =12m.48s., 13m.1s., and 13m.28s., iPPS =24m.0s.
Resolute Bay eN =43m.40s.
Granada PPS =32m.33s., SSS =41m.36s.
Almeria SS =37m.2s.
Alicante PKS =22m.31s., PPP =23m.21s., PPS =31m.46s., SSP =37m.24s., Q =40m.28s.
Paris ePPP =24m.46s., iPS =31m.48s., iPPS =33m.20s.
De Bilt ePS =31m.58s., eSS =38m.58s.
Strasbourg e =20m.8s., 20m.39s., and 23m.48s., ePPP? =24m.23s., e =28m.28s. and 33m.14s., ePPS =34m.10s., e =34m.58s.?
Stuttgart eSSS =44m.52s., eQ =64·0m.
Triest iSS? =38m.38s., ePSS =40m.19s.
Kiruna ePKS?N =23m.23s., ePKS?Z =23m.27s., eSKKSZ =29m.15s., ePPSN =34m.48s., ePPSZ =34m.58s., iSSN =40m.32s., eQEN =59·0m., and other unidentified readings.
Helwan eZ =20m.14s., 20m.43s., 21m.19s., and 22m.21s.
Long waves were also recorded at Punta Arenas, Ivigtut, and Tortosa.

Sept. 1d. 23h. 52m. 50s. Epicentre 35°·1N. 23°·4E. (as on 1949, July 1d.).

$A = +·7525$, $B = +·3257$, $C = +·5724$; $\delta = -2$; $h = 0$;
$D = +·397$, $E = -·918$; $G = +·525$, $H = +·227$, $K = -·820$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Athens		2·9	5	i 0 32	?	i 1 31	S*	e 0 51	P	i 1·8
Messina		7·0	299	—	—	e 2 49	−19	—	—	e 4·1
Istanbul	N.	7·4	35	e 2 1	+ 9	e 4 13	S_g	—	—	—
Bucharest		9·5	12	e 3 4	?	—	—	—	—	e 5·3
Triest		12·8	328	—	—	e 5 44	SS	—	—	e 7·2
Algiers Univ.	z.	16·6	283	e 4 3	+ 7	—	—	—	—	—
Stuttgart		17·2	327	e 4 3	0	—	—	—	—	e 10·7
Collmberg		17·9	338	e 4 12	0	—	—	e 4 25	PP	—
Jena	z.	18·0	337	e 4 12	− 1	e 4 22	PP	e 4 32	PPP	—
Tamanrasset	z.	19·8	238	e 4 32	− 3	e 4 49	PP	e 8 58	PcP	—
Paris		20·6	318	i 4 40	− 3	e 9 29	SSS	i 4 54	PP	—
De Bilt		21·4	330	—	—	e 12 20	ScP	—	—	—
Copenhagen		21·9	344	e 4 52	− 5	—	—	—	—	—
Kiruna	z.	32·8	358	i 6 26a	− 1	—	—	—	—	—

Additional readings :—
Athens $iP_g = 0m.53s.$, $iS_g = 1m.37s.$, $i = 1m.43s.$
Paris $i = 4m.44s.$, $e = 5m.20s.$, 5m.38s., and 6m.41s.
Long waves were also recorded at Rome and Pavia.

Sept. 1d. Readings also at 0h. (near Apia), 1h. (Apia (2)), 2h. (Grozny, Kirovobad, near Tiflis, Gori, Borzhomi, Abastumanj, and Goris), 3h. (near Athens), 6h. (Ksara and near Alicante (2)), 7h. (China Lake, Tinemaha, Paris, Stuttgart, Jena, Triest, near Prato, Taranto, Rome, Murgab, Fergana (2), Andijan (2), Tchimkent, near Khorog, Dzhergetal (2), Garm (2), Obi-garm (2), Stalinabad, and near Alicante), 8h. (near Tananarive), 10h. (Rome), 11h. (Taranto, Rome, Triest, and near Garm), 12h. (Kodaikanal, near Manila (2), near Kurmenty (2), and near Dzhergetal), 13h. (Brisbane and near Dzhergetal), 17h. (near Dzhergetal and near Garm), 18h. (Alicante (3) and Brisbane), 21h. (Stalinabad, near Khorog, Obi-garm, Garm, and Dzhergetal), 22h. (Kimberley and Grahamstown).

Sept. 2d. 16h. 27m. 29s. Epicentre 30°·9N. 117°·3W.

$A = -·3942$, $B = -·7638$, $C = +·5110$; $\delta = -9$; $h = +1$;
$D = -·889$, $E = +·459$; $G = -·234$, $H = -·454$, $K = -·860$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palomar		2·5	5	i 0 40	− 3	i 0 59	−15	—	—	—
Riverside		3·1	359	i 0 50	− 1	i 1 21	− 8	—	—	—
Pasadena		3·3	349	e 0 53	0	i 1 38	+ 3	i 0 59	P*	—
China Lake	z.	4·9	357	i 1 16	− 1	—	—	—	—	—
Boulder City		5·5	22	e 1 22	− 3	—	—	—	—	—
Tucson		5·7	74	e 1 28	0	i 2 37	+ 2	—	—	—
Lick	z.	7·4	332	e 1 53a	+ 1	i 3 8	−10	—	—	i 4·2
Santa Clara	E.	7·5	331	(e 1 51)	− 2	(e 3 15)	− 5	(e 2 56)	?	—
Berkeley		8·1	331	e 2 5a	+ 3	e 3 35	0	—	—	e 4·5
Mineral	z.	10·0	342	i 2 41	PP	i 4 27	+ 5	—	—	i 5·4
Shasta Dam		10·6	339	e 2 46	PP	—	—	—	—	—
Seattle		17·2	350	e 4 14	PP	—	—	e 4 27	PPP	e 9·4
Hungry Horse		17·6	9	i 4 9	+ 1	—	—	—	—	e 9·1
Tacubaya		20·0	120	e 4 44	+ 7	e 7 34	−43	—	—	—
Ottawa		35·4	54	e 7 3	+ 3	—	—	—	—	e 17·6
College		38·9	341	e 7 33	+ 4	—	—	—	—	—
La Paz		66·7	128	e 10 59	+ 4	—	—	—	—	—

Additional readings and note :—
Santa Clara readings have been reduced by one minute.
Berkeley eN = 4m.14s.
Seattle e = 4m.37s. and 4m.47s.
Long waves were also recorded at Bermuda, Pennsylvania, Palisades, Weston, Resolute Bay, Seven Falls, and several European stations.

Sept. 2d. Readings also at 0h. (Kew and Paris), 1h. (Tacubaya (2), Alicante, Granada, Mary, Frunse, Andijan, Tchimkent, Naryn, near Fergana, Samarkand, Garm (2), Stalinabad (2), Tashkent, Obi-garm (2), Khorog (2), and Dzhergetal (2)), 2h. (Kimberley), 4h. (La Paz, Huancayo, near Chinchina, and Bogota), 6h. (Murgab, Samarkand, Obi-garm, Frunse, near Tchimkent, Tashkent, Garm, Stalinabad, Andijan, Fergana, Dzhergetal, and near Almata II), 8h. (near Alicante (2)), 9h. (Tacubaya, La Paz, near Huancayo, Samarkand, Tashkent, Andijan, Tchimkent, near Murgab, Dzhergetal, Stalinabad, Garm, Fergana, Obi-garm, and Khorog), 10h. (Alicante and near Garm), 12h. (Apia, Chinchina, La Paz, and near Huancayo), 13h. (Dzhergetal, near Fergana, Garm, Stalinabad, Obi-garm, Khorog, and near Kirovobad (2)), 14h. (Frunse, Fergana, near Stalinabad, Garm, Dzhergetal, Obi-garm, Khorog, Santa Lucia, and near Granada), 16h. (Kew, Brisbane, Mount Wilson, China Lake, Concepción, Antofagasta, Huancayo, and near La Paz), 17h. (Istanbul and near Athens (2)), 19h. (near Ashkabad), 20h. (Kimberley and near Dzhergetal), 21h. (Apia and Pietermartizburg), 22h. (near Almata II, Kurmenty, Ili, Krasnogorka, Chilisk, Rybach'e, and near Dzhergetal), 23h. (near Malaga and near Ashkabad).

Sept. 3d. 0h. Undetermined shock.

Brisbane iPZ = 5m.24s.k, iSEN = 9m.25s.
Riverview iZ = 6m.29s., eS?N = 11m.3s., eLZ = 14·3m.
Guam P = 9m.38s.
College iP = 12m.48s., i = 13m.4s.
Garm eP = 13m.24s.?, epP = 13m.43s.
Frunse eP = 13m.30s., eS = 23m.42s., sS = 24m.10s.
Andijan eP = 13m.35s., S = 23m.50s., isS = 24m.22s.
Fergana P = 13m.37s., S = 23m.55s., esS = 24m.27s.
China Lake iPZ = 13m.38s.
Mount Wilson iPZ = 13m.38s.
Tinemaha iPZ = 13m.38s.
Riverside iPZ = 13m.40s.
Palomar ePZ = 13m.43s.
Tashkent eP = 13m.44s., epP = 14m.5s.?, iS = 24m.13s., isS = 24m.45s.
Boulder City e = 13m.48s.
Hungry Horse eP = 13m.53s., e = 17m.53s.
Samarkand P = 13m.54s., S = 24m.25s., esS = 24m.59s.
Tamanrasset ePKPZ = 20m.6s., ePKP$_2$Z = 20m.25s., eZ = 20m.46s.
Bombay eEN = 23m.15s., iN = eE = 23m.45s.
Dzhergetal eS = 23m.57s., sS = 24m.31s.
Tchimkent S = 24m.12s., esS = 24m.44s.
Sverdlovsk eS = 25m.37s.

Sept. 3d. 2h. 59m. 21s. Epicentre 40°·6N. 142°·3E. Depth of focus 0·005.
(as on 1940, Feb. 9d.).

Intensity V at Iwaizumi; IV at Hatinohe, Miyako, Sakari, Hukuoka; II-III at Shibutami
Epicentre 40°·7N. 142°·3E. Depth 50km.

Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, p.218, with macroseismic chart

$A = -·6025$, $B = +·4657$, $C = +·6482$; $\delta = +5$; $h = -2$;
$D = +·612$, $E = +·791$; $G = -·513$, $H = +·396$, $K = -·761$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Hatinohe	0·6	263	0 16a	+ 2	0 24	− 1
Miyako	1·0	194	0 24	+ 5	0 37	+ 4
Aomori	1·2	281	0 19k	− 3	0 33	− 5
Morioka	1·2	224	0 23	+ 1	0 36	− 2
Urakawa	1·6	13	0 34	+ 7	1 7	+20
Mizusawa	1·7	211	0 29	+ 1	0 47	− 3
Akita	1·9	242	0 23	− 8	0 47	− 7
Mori	2·0	327	0 33	+ 1	0 55	− 2
Isinomaki	2·3	198	0 36	− 1	—	—
Obihiro	2·4	16	0 35	− 3	1 24	+17

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Sakata	2·5	228	0 44	+ 5	1 8	− 1
Sapporo	2·6	344	0 43	+ 2	1 13	+ 1
Sendai	2·6	205	0 41	0	—	—
Yamagata	2·8	213	0 43	− 1	1 13	− 4
Hukusima	3·2	206	0 49a	0	1 26	− 1
Inawasiro	3·5	210	1 4	+10	1 41	+ 7
Shirakawa	3·8	205	0 59	+ 1	1 38	− 4
Aikawa	4·1	231	0 57	− 5	1 35	−14
Mito	4·5	199	1 15	+ 8	2 7	+ 8
Utunomiya	4·5	205	1 7	0	1 56	− 3
Kakioka	4·7	201	1 10	0	2 3	− 1
Tukubasan	4·7	202	1 12	+ 2	1 58	− 6
Maebasi	4·9	211	1 12	− 1	2 9	0
Kumagaya	5·0	208	1 18	+ 4	—	—
Nagano	5·1	221	1 15	− 1	—	—
Matusiro	5·2	219	1 15	− 2	2 11	− 6
Oiwake	5·2	216	1 14	− 3	—	—
Titibu	5·2	209	1 29	+12	2 26	+ 9
Tokyo	5·3	203	1 15	− 4	2 18	−1
Toyama	5·6	227	1 21	− 2	—	—
Kohu	5·7	211	1 27	+ 3	—	—
Hunatu	5·8	209	1 27	+ 2	2 32	0
Misima	6·1	207	1 24	− 6	—	—
Shizuoka	6·4	210	1 36	+ 2	2 45	− 1

Sept. 3d. 6h. 25m. 13s. Epicentre 36°·8N. 140°·4E. Depth of focus 0·010.

Intensity V at Makabe Ueda ; IV at Mito, Kakioka, Tukubasan, Utunomiya, Minato, Manabe, Otsu, Koga, Nikko ; II-III at Shirakawa, Hukusima, Ashio, and Tomioka. Epicentre as adopted. Depth of focus 80km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1951, Tokyo, 1951, p.219, with macroseismic chart.

$A = -·6184$, $B = +·5116$, $C = +·5964$; $\delta = -15$; $h = -1$;
$D = +·637$, $E = +·771$; $G = -·460$, $H = +·380$, $K = -·803$.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Shirakawa	0·3	335	0 13	− 2	0 22	− 4
Mito	0·4	173	0 14k	− 1	0 24	− 3
Onahama	0·4	72	0 15	0	0 26	− 1
Utunomiya	0·5	240	0 13	− 3	0 23	− 5
Kakioka	0·6	197	0 13	− 4	0 24	− 5
Tukubasan	0·6	202	0 14	− 3	0 25	− 4
Inawasiro	0·8	344	0 17a	− 1	0 31	− 1
Hukusima	1·0	3	0 20a	0	0 34	− 2
Kumagaya	1·1	232	0 23	+ 1	0 36	− 2
Maebasi	1·1	250	0 21k	− 1	0 36	− 2
Tyosi	1·1	161	0 25a	+ 3	0 40	+ 2
Tokyo	1·2	205	0 21	− 2	0 37	− 3
Titibu	1·3	232	0 24	0	0 40	− 2
Sendai	1·5	15	0 28	+ 1	0 45	− 2
Yokohama	1·5	204	0 34	+ 7	—	—
Oiwake	1·6	253	0 29	+ 1	0 50	+ 1
Hunatu	1·8	225	0 31	+ 1	0 54	+ 1
Nagano	1·8	266	0 29	− 1	—	—
Kohu	1·9	232	0 33	+ 1	0 57	+ 2
Mera	1·9	194	0 35	+ 3	0 57	+ 2
Misima	2·1	215	0 35	+ 1	1 1	+ 1
Mizusawa	E. 2·4	14	e 0 47	+ 9	1 9	+ 2
Morioka	3·0	12	0 46	− 1	—	—
Miyako	3·1	24	0 43	− 5	—	—

Sept. 3d. 23h. 19m. 46s. Epicentre 36°·7N. 139°·7E. (as on 1951, March 31d.).

Intensity VI at Chuguji ; V at Ashio ; IV at Utunomiya, Nikko, Imaichi, Ujiie, Manabe, Tateno ; II-III at Mito, Tukubasan, Kakioka, and Tokyo. Epicentre 36°·6N. 139°·6E.

Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, p.220, with macroseismic chart.

A = −·6129, B = +·5198, C = +·5951 ; $\delta = -2$; $h = 0$;
D = +·647, E = +·763 ; G = −·454, H = +·385, K = −·804.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Utunomiya		0·2	138	0 7	− 3	0 10	− 6
Kakioka		0·6	140	0 15	0	0 23	− 3
Kumagaya		0·6	205	0 10a	− 5	0 16	−10
Maebasi		0·6	239	0 11a	− 4	0 18	− 8
Tukubasan		0·6	146	0 11	− 4	0 19	− 7
Mito		0·7	117	0 16k	− 1	0 27	− 1
Inawasiro		0·9	21	0 21	+ 1	—	—
Titibu		0·9	215	0 14	− 6	0 26	− 8
Oiwake		1·0	248	0 19	− 2	0 32	− 4
Onahama		1·0	76	0 23	+ 2	0 37	+ 1
Tokyo		1·0	177	0 20	− 1	0 32	− 4
Hukusima		1·2	30	0 25	+ 1	—	—
Matusiro		1·2	263	0 20	− 4	0 35	− 6
Nagano		1·2	268	0 22	− 2	0 39	− 2
Takada		1·2	289	0 55	?	1 38	?
Tyosi		1·3	136	0 28	+ 3	0 44	0
Yokohama		1·3	182	0 25	0	0 39	− 5
Hunatu		1·4	212	0 26	− 1	0 42	− 4
Kohu		1·4	221	0 26	− 1	0 52	+ 6
Matumoto		1·5	251	0 28	0	0 43	− 6
Aikawa		1·7	319	0 32	+ 1	0 57	+ 3
Misima		1·7	201	0 30	− 1	0 56	+ 2
Mera		1·8	177	0 36	+ 4	0 58	+ 2
Sendai		1·8	31	0 35	+ 3	1 2	+ 6
Iida		1·9	232	0 42	+ 8	1 5	+ 6
Osima		1·9	188	0 36	+ 2	—	—
Shizuoka		2·0	211	0 36	+ 1	1 3	+ 1
Toyama		2·0	270	0 40	+ 5	1 4	+ 2
Omaesaki		2·4	210	0 45	+ 4	1 18	+ 6
Wazima		2·4	287	0 40	− 1	—	—
Gihu		2·7	241	0 49	+ 4	1 20	+ 1
Mizusawa	E.	2·7	25	e 0 50	+ 5	1 28	+ 9
Miyako		3·4	31	0 57?	+ 2	1 37?	0

Sept. 3d. Readings also at 0h. (Andijan, near Dzhergetal, Garm, Krasnogorka, and Obigarm), 2h. (near Ashkabad), 3h. (near Santa Lucia), 5h. (Kimberley and Pietermaritzburg), 7h. (Mount Wilson, Palomar, Riverside, China Lake, Tinemaha, Tamanrasset, Tananarive, Algiers Univ., Stuttgart, Bombay, Hyderabad, Kodaikanal, Poona, near Istanbul, Ksara, and near Ashkabad, several shocks), 8h. (near La Paz), 9h. (Auckland, Christchurch, Kaimata, Wellington, and Brisbane), 10h. (Brisbane, Christchurch, Cobb River, Kaimata, Karapiro, New Plymouth, Tuai, and Wellington), 11h. (Apia and Stuttgart), 12h. (Alicante (2), Nanking, Furnse, near Almata II, Chilisk, Ili, Krasnogorka, Kurmenty, Naryn, and Przhevalsk), 13h. (near Alicante), 15h. (near Bucharest), 15h. (Ottawa), 16h. (Strasbourg), 17h. (near Dzhergetal), 18h. (Alicante, Huancayo, Ottawa, Mount Wilson, China Lake, Boulder City, Lick, Shasta Dam, Hungry Horse, College, Guam (2), Fergana, near Andijan, Dzhergetal, and Garm), 19h. (China Lake, Boulder City, Shasta Dam, Hungry Horse, College, and near Chilisk), 21h. (Granada, Seven Falls, Shawinigan Falls, near Ottawa, Palisades, and Fordham), 22h. (near Kurmenty), 23h. (Copiapo).

Sept. 4d. Readings at 2h. (Puebla, Tacubaya, and Vera Cruz), 3h. (Puebla, Tacubaya, Vera Cruz, and Scoresby Sund), 6h. (Santa Lucia), 8h. (Oaxaca, Tacubaya, Vera Cruz, Tananarive, near Almata II, Chilisk, and Ili), 9h. (near Ashkabad), 12h. (Stuttgart), 15h. (Brisbane, Bombay, and Antofagasta), 17h. (Palisades and near Kurmenty), 18h. (near Alicante and Palisades), 19h. (near Kurmenty), 20h. (near Ashkabad), 21h. (near Alicante), 22h. (Collmberg and Tortosa), 23h. (Huancayo, La Paz, near Auckland, Christchurch, Cobb River, Kaimata, Karapiro, Tuai, New Plymouth, and Wellington).

Sept. 5d. 7h. 36m. 55s. Epicentre 36°·0S. 111°·2W. (as on 1d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		40·2	62	e 7 38	− 2	e 13 40	− 8	—	—	e 16·8
La Paz		42·8	75	8 3	+ 2	i 17 49	SS	—	—	—
Pasadena	z.	70·1	354	e 11 15	− 1	—	—	—	—	—
China Lake	z.	71·7	355	i 11 25	− 1	—	—	—	—	—
Tinemaha	z.	73·0	354	e 11 33	0	—	—	—	—	—
Lick	z.	73·6	351	e 11 37a	0	—	—	e 11 42	?	—
Berkeley	z.	74·2	351	e 11 47a	+ 7	—	—	—	—	—
Mineral	z.	76·6	352	e 11 53k	− 1	—	—	—	—	—
Cleveland		81·8	22	i 12 20k	− 2	e 22 36	+ 1	—	—	—
Seattle		83·9	352	e 12 47	+14	—	—	—	—	—
Tamanrasset	z.	124·2	86	e 19 4	[+ 3]	—	—	e 21 2	PP	—
Stuttgart		135·3	55	e 19 25	[+ 3]	—	—	—	—	e 66·1
Kiruna	z.	138·2	26	i 19 34k	[+ 7]	—	—	—	—	—

Additional readings :—
Huancayo e =8m.8s.
China Lake iZ =11m.30s.
Cleveland iPZ =12m.27s.
Tamanrasset eZ =21m.7s.
Long waves were also recorded at Pennsylvania and other European stations.

Sept. 5d. 7h. 52m. 19s. Epicentre 18°·6N. 146°·9E. (as on 1951, June 24d.).

A = −·7945, B = +·5179, C = +·3170 ; δ = −6 ; h = +5 ;
D = +·546, E = +·838 ; G = −·266, H = +·173, K = −·948.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		5·5	202	e 1 33	+ 8	2 37	+ 7	—	—	—
Mera		17·4	340	e 3 58	− 8	e 7 27	+ 8	—	—	—
Omaesaki		17·7	336	e 4 20	+10	7 35	+ 9	—	—	—
Misima		17·9	338	e 4 1	−11	7 32	+ 2	—	—	8·7
Tokyo	E.	18·2	340	e 4 27	+11	7 54	+17	—	—	—
Hunatu		18·3	338	e 4 22	+ 5	7 45	+ 6	—	—	—
Kumagaya		18·7	341	4 21	− 1	e 7 51	+ 3	—	—	—
Nagoya		18·7	335	e 4 15	− 7	e 7 51	+ 3	—	—	—
Osaka		18·9	332	e 4 31	+ 7	e 8 16	+23	—	—	—
Maebasi		19·0	341	e 4 26	0	e 8 0	+ 5	e 4 54	PP	—
Koti		19·1	323	e 4 27	0	e 7 59	+ 2	—	—	9·8
Oiwake		19·2	340	e 4 29	+ 1	e 8 13	+14	—	—	—
Matumoto		19·3	338	e 4 27	− 2	e 8 13	+11	—	—	—
Matusiro		19·4	338	4 17	−13	8 2	− 2	—	—	e 9·3
Takamatu		19·4	326	e 4 30	0	e 8 4	0	—	—	—
Nagano	E.	19·6	339	e 4 34	+ 2	e 8 8	0	—	—	—
Matuyama		19·8	323	e 4 29	− 6	e 8 7	− 6	—	—	—
Ooita		20·0	319	e 4 43	+ 6	e 8 7	−10	—	—	—
Hukuoka		21·0	318	e 4 50	+ 3	e 8 29	− 8	e 5 11	PP	—
Manila		25·2	265	e 5 30	+ 1	e 5 48	?	—	—	—
Nanking		28·6	303	e 5 51	− 9	(e 10 46)	− 2	—	—	e 10·8
College		62·9	25	e 10 26	− 4	—	—	—	—	—
Seattle		77·0	44	e 12 5	+ 9	—	—	—	—	e 42·7
Shasta Dam		78·6	51	i 12 3	− 2	—	—	—	—	—
Mineral	z.	79·3	51	e 12 9k	0	—	—	—	—	—
Resolute Bay		79·3	14	—	—	e 22 5	− 4	—	—	e 37·7
Berkeley	z.	79·5	53	e 12 6a	− 4	—	—	—	—	—
Lick	z.	80·1	53	i 12 11a	− 2	—	—	—	—	—
Fresno	z.	81·7	54	e 12 21	− 1	—	—	—	—	—
Hungry Horse		82·2	41	i 12 22	− 2	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha	z.	82·8	53	e 12 32	+ 5	—	—	—	—	—
China Lake	z.	83·6	54	e 12 29	− 2	—	—	—	—	—
Pasadena		83·7	56	e 12 36	+ 4	—	—	—	—	e 41·7
Kiruna		85·4	342	e 12 41	+ 1	e 23 2	[− 1]	e 37 41	Q	e 41·2
Boulder City		85·7	53	i 12 47	+ 5	—	—	—	—	—
Tucson		90·1	56	e 13 2	− 1	—	—	e 16 46	PP	—
Stuttgart	z.	103·1	333	e 18 21	PP	—	—	—	—	—
Taranto		104·9	323	—	—	e 27 41?	PS	—	—	54·7
Rome		106·5	326	—	—	e 27 10	?	—	—	e 54·3
La Paz	z.	146·6	92	19 56	[+14]	—	—	—	—	—

Additional readings :—
Mineral iZ =12m.12s. and 12m.28s.
Lick iZ =12m.18s. and 12m.58s.
Kiruna eZ =14m.5s., eN =14m.9s., iSN =23m.6s., iSE =23m.9s., eE =24m.58s., eN = 25m.23s. and 28m.17s.
Long waves were also recorded at Messina, Palisades, and Granada.

Sept. 5d. Readings a so at 0h. (Kimberley, Bogota, and Alberni), 1h. (Collmberg and Nanking), 6h. (Horseshoe Bay, Puebla, Vera Cruz, and near Tacubaya), 7h. (Ksara and near Dzhergetal), 8h. (near Klyuchi), 11h. (Almata, Fergana, Frunse, Stalinabad, near Almata II, Andijan (2), Dzhergetal, Garm, Kurmenty, and Przhevalsk), 12h. (Alicante, Tortosa, Fergana, Murgab, Stalinabad, near Dzhergetal (2), Garm, Khorog, and Obi-garm), 13h. (near Dzhergetal), 15h. (near Dzhergetal (2)), 16h. (Brisbane, Fergana, Stalinabad, near Andijan, Dzhergetal (2), Garm, Khorog, Murgab, and Obi-garm), 17h. (Bombay and near Dzhergetal), 18h. (Alicante (2), Bermuda, and near Almata II), 19h. (Ashkabad and Seattle), 20h. (Resolute Bay and near Dzhergetal), 21h. (Fergana, Obi-garm, near Andijan, Dzhergetal (2), and Garm), 22h. (near Dzhergetal (2), Fergana, Garm, and near Athens.)

Sept. 6d. Readings at 0h. (Palomar, China Lake, Kiruna, Samarkand, Stalinabad, near Dzhergetal, Garm, Khorog, and Obi-garm), 1h. (Seattle), 3h. (near Dzhergetal), 4h. (near Dzhergetal, near Alberni, Horseshoe Bay, and Victoria), 6h. (Manila), 8h. (Calcutta, New Delhi, and Poona), 9h. (Bombay, Ashkabad, Mary, Kizyl-Arvat, Andijan, Fergana (2), Krasnogorka, Murgab, Samarkand, Tashkent, near Almata, Chilisk, Dzhergetal (2), Kurmenty, Naryn, Przhevalsk, and Rybach'e), 10h. (Stuttgart and near Garm), 11h. (Stuttgart), 12h. (Alicante), 13h. (Antofagasta, Ksara, and near Kurmenty), 14h. (Kiruna), 16h. (Apia, Krasnogorka, near Almata, Almata II, Chilisk, Ili, and Kurmenty), 17h. (near Alicante (8), and near Dzhergetal), 18h. (Alicante, Stalinabad, near Dzhergetal, Fergana, Garm, Khorog, Obi-garm, and near Palisades), 19h. (Kimberley), 20h. (Pasadena, Riverside, China Lake, Tinemaha, Naryn, Samarkand, Tashkent, near Andijan (2), Dzhergetal, Fergana (2), Garm (2), Khorog (2), Murgab (2), Obi-garm (2), and Stalinabad), 23h. (Kiruna and near Manila).

Sept. 7d. 4h. Undetermined shock in South America.

Bogota eP =27m.20s., eEN =29m.16s., eSZ =29m.55s.
Huancayo iP =27m.41s., eS =29m.30s., eL =30m.0s.
San Juan e =39m.27s.
La Paz P =32m.32s.
Tucson iP =33m.35s.
Fayetteville iP =33m.52s.
Boulder City i =34m.13s.
Riverside iPZ =34m.15s.k.
Pasadena iPZ =34m.21s.k.
China Lake iPZ =34m.25s.k.
Tinemaha iPZ =34m.33s.
Lick iPZ =34m.51s.k, iZ =35m.2s.
Mineral eZ =35m.2s.k.
Shasta Dam iP =35m.6s.
Hungry Horse iP =35m.12s.
College e =37m.36s.

Sept. 7d. 21h. 34m. 32s. Epicentre 39°·3N. 73°·3E. (as on 1951, Aug. 26d.).

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Murgab	1·0	152	i 0 27	+ 6	i 0 49	+13
Andijan	1·6	334	i 0 25	− 5	i 0 44	− 7
Dzhergetal	1·6	267	i 0 29	− 1	i 0 48	− 3
Fergana	1·6	313	i 0 24	− 6	e 0 41	−10
Garm	2·3	263	i 0 38	− 2	i 1 13	+ 4
Khorog	2·3	216	e 0 44	+ 4	i 1 19	+10
Obi-garm	2·9	258	i 0 50	+ 2	e 1 27	+ 3
Naryn	3·0	44	e 0 50	0	i 1 23	− 4
Stalinabad	3·6	261	e 1 2	+ 4	e 1 54	S*
Frunse	3·7	14	e 0 58?	− 2	i 1 41	− 4
Tashkent	3·7	305	e 1 3?	+ 3	i 1 48?	+ 3
Rybach'e	3·8	33	e 0 58	− 3	i 2 1	S*
Tchimkent	4·1	318	e 1 9	+ 4	2 4	S*
Almata	4·8	33	e 1 21	P*	i 2 30	S*
Samarkand	4·9	276	1 8	− 9	2 16	+ 1
Almata II	5·6	36	1 18	0	—	—
Przhevalsk	5·0	49	e 1 17	− 1	—	—
Ili	5·4	30	e 1 21	− 3	—	—

Sept. 7d. 23h. 6m. 58s. Epicentre 50°·3N. 7°·3E. (as on 1949, November 4d.).

A = +·6361, B = +·0815, C = +·7672 ; δ = −14 ; h = −6 ;
D = +·127, E = −·992 ; G = +·761, H = +·097, K = −·641.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Heerlen		1·0	305	i −0 3	?	i 0 1	?	—	—	—
Karlsruhe		1·5	151	e 0 38	P_g	1 2	S_g	—	—	—
Strasbourg		1·7	170	e 0 30	− 1	i 0 57	+ 3	i 0 39	P_g	—
Stuttgart	Z.	2·0	141	e 0 34	− 1	e 0 57	− 5	e 0 46	P_g	—
De Bilt		2·3	324	e 0 24	−16	e 0 46	−23	—	—	—
Witteveen	Z.	2·6	351	i 0 34	−10	i 1 5	−12	—	—	—
Basle		2·8	176	e 0 1	?	—	—	—	—	—
Jena		2·8	77	0 51?	+ 4	e 1 26	+ 4	e 0 56?	P_g	—
Ravensburg		2·9	149	e 0 47	− 1	e 1 30	+ 6	e 1 48	S_g	—
Zürich		3·1	164	e 0 46a	− 5	e 1 43	S_g	—	—	—
Cheb		3·3	94	—	—	e 2 1	S_g	—	—	—
Neuchatel		3·3	184	e 0 45	− 8	e 1 25	−10	—	—	—
Paris		3·5	246	e 0 39	−18	i 1 43	+ 3	—	—	—
Collmberg		3·7	73	e 0 59	− 1	e 2 0	S_g	e 1 15	P_g	—
Potsdam	N.	4·2	58	—	—	i 2 23	S_g	—	—	—
Prague		4·6	90	e 1 48	P_g	e 2 8	+ 1	i 2 30	S_g	—
Kew	Z.	5·0	286	e 1 5	−13	e 2 14	− 4	e 1 45	P_g	—
Clermont-Ferrand		5·3	213	i 1 31	P*	i 2 34	+ 9	i 2 38	S*	—
Jersey	E.	6·2	263	—	—	2 54	+ 6	—	—	—
Triest	Z.	6·4	135	—	—	e 2 40	−13	—	—	—
Raciborzu	Z.	7·0	88	—	—	e 3 23	+15	e 4 14	S_g	—
Rathfarnham C.	Z.	8·9	295	i 2 4	− 8	e 3 48	− 7	—	—	e 4·1

Additional readings :—
Strasbourg eP* −34s., iS* =1m.2s., iS_g =1m.7s.
Stuttgart eZ =52s., eS_gZ =1m.2s., eZ =1m.7s. and 1m.12s., eS_gZ =1m.23s., eZ =1m.37s.
Jena eS_gE =1m.38s., eE =1m.47s.
Paris i =42m., iP* =45s., iP_g? =51s., i =59s., iS =1m.16s., iS* =1m.23s., iS_g =1m.31s.
Collmberg eEZ =1m.5s., eP_gEZ =1m.32s., eS*EZ =2m.10s., eEZ =2m.15s. and 2m.32s., eS_gZ =2m.42s., eZ =2m.59s.
Potsdam eZ =2m.27s., iEN =2m.31s.
Prague e =2m.26s.
Kew iP?Z =1m.35s., iS?Z =1m.59s. and 2m.8s.
Raciborzu eZ =3m.46s., eE =4m.27s. and 5m.18s., eZ =5m.23s.

Sept. 7d. Readings also at 1h. (Fergana, Samarkand, near Dzhergetal, Garm, Obi-garm, and Stalinabad), 6h. (near Dzhergetal), 8h. (Stuttgart), 11h. (near Manila (2)), 12h. (Ksara and near Dzhergetal), 14h. (Paris), 16h. (near Dzhergetal (2) and near Istanbul), 17h. (Alicante and Malaga), 18h. (Alicante), 20h. (Malaga), 21h. (Wellington), 22h. (China Lake, Tinemaha, near Shemakla, near Almata, Almata II, Chilisk, Ili, and Przhevalsk), 23h. (China Lake (2) and Tinemaha (2)).

Sept. 8d. 6h. 40m. 24s. (I) } Epicentre 28°·7N. 43°·6W.
6h. 52m. 39s. (II) } (as on 1950, May 20d.).

$A = +·6362$, $B = -·6058$, $C = +·4777$; $\delta = -6$; $h = +2$;
$D = -·690$, $E = -·724$; $G = +·346$, $H = -·329$, $K = -·879$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Bermuda		18·5	286	e 4 19	0	e 7 57	+13	—	—	—
I San Juan		23·0	248	e 5 6	− 1	—	—	—	—	—
II		23·0	248	e 5 8	+ 1	—	—	—	—	—
I Seven Falls	E.	28·1	319	—	—	e 12 48	Q	—	—	—
I Cleveland		33·3	303	i 3 53	?	—	—	i 3 56	?	—
II Granada		34·4	64	i 6 52a	+ 1	13 4	−45	7 10	pP	14·8
II Almeria		35·3	65	7 11	+12	12 47	+14	8 27	PP	17·7
II Alicante		36·9	63	7 5	− 7	12 35	−23	8 19	PP	e 17·6
II Kew		39·4	42	e 6 49	?	e 11 21	?	—	—	17·4
I Fayetteville		43·0	293	i 7 57	− 6	—	—	—	—	—
II		43·0	293	i 8 1	− 2	e 15 34	+65	—	—	—
I Tamanrasset	Z.	44·4	85	i 8 15	+ 1	—	—	e 9 57	PP	—
II	Z.	44·4	85	i 8 15	+ 1	—	—	e 10 0	PP	e 20·8
I Stuttgart		44·8	48	e 8 16	− 1	—	—	—	—	e 23·0
II		44·8	48	e 8 16	− 1	e 14 6	−49	—	—	e 24·4
II Rome		46·9	57	e 8 34a	0	e 15 32	+ 7	e 10 21	PP	23·0
I Cheb	E.	47·0	46	e 9 41	+66	e 15 34	+ 8	e 17 52	SS	—
II		47·0	46	e 9 39	+64	e 15 32	+ 6	e 10 37	PP	—
II Messina		49·5	62	e 8 28	−26	e 16 11	PS	e 10 27	PP	e 21·8
II Taranto		50·6	59	e 11 39	PP	e 21 9	SSS	—	—	26·1
II Huancayo		50·8	222	—	—	e 21 2	SSS	—	—	e 27·6
I La Paz		50·8	211	e 9 5	+ 1	—	—	—	—	—
II Belgrade		52·5	53	e 8 40a	−37	e 15 59	−44	e 9 59	PcP	e 22·7
I Tucson		57·2	292	e 9 51	0	—	—	—	—	—
II		57·2	292	e 9 50	− 1	—	—	—	—	—
I Boulder City	Z.	59·4	297	e 10 6	0	—	—	—	—	—
II	Z.	59·4	297	e 10 6	0	—	—	—	—	—
I China Lake	Z.	61·6	298	e 10 26	+ 4	—	—	—	—	—
II	Z.	61·6	298	e 10 20	− 2	—	—	—	—	—
I Palomar	Z.	61·8	295	e 10 21	− 2	—	—	—	—	—
II	Z.	61·8	295	e 10 21	− 2	—	—	—	—	—
I Tinemaha	Z.	61·8	299	e 10 23	0	—	—	—	—	—
II	Z.	61·8	299	e 10 25	+ 2	—	—	—	—	—
I Riverside	Z.	62·0	296	e 10 23	− 1	—	—	—	—	—
II	Z.	62·0	296	e 10 15	− 9	—	—	—	—	—
II Mount Wilson	Z.	62·5	296	e 10 24	− 4	—	—	—	—	—
I Mineral	Z.	63·4	303	e 10 32a	− 2	—	—	—	—	—
II	Z.	63·4	303	i 10 31k	− 3	—	—	—	—	—
II Helwan	Z.	64·2	68	10 42	+ 3	—	—	e 13 0	PP	—
I Lick	Z.	64·3	301	e 10 44k	+ 5	—	—	—	—	—
II	Z.	64·3	301	e 10 38a	− 1	—	—	—	—	—
II Ksara		66·5	63	e 10 57	+ 3	e 16 47	?	—	—	—
I College		70·1	335	11 14	− 2	—	—	—	—	—
II		70·1	335	e 11 14	− 2	—	—	—	—	—

Additional readings :—
Granada II PP = 7m.42s.
Alicante II PcP = 9m.40s., SS = 14m.51s.
Tamanrasset I iZ = 8m.21s., II eZ = 14m.5s., 14m.35s., and 15m.22s.
Rome II ePS ?N = 16m.19s., eSS = 18m.43s.
Cheb II eE = 13m.21s.
Belgrade II eNE = 13m.29s., eNW = 19m.48s.
Boulder City I e = 10m.17s.
Helwan II iZ = 10m.57s., eZ = 11m.6s.
Long waves to one or other of these shocks were also recorded at a few other American and European stations.

Sept. 8d. 11h. 46m. 10s. Epicentre 33°·7N. 135°·8E. (as on 1950, April 26d.).

Intensity VI at Kojindake ; V at Dorogawa ; IV at Owasi, Sumoto, Wakayama, Siomisaki, Iruka, Isato, Utsumi ; II-III at Kashiwara, Osaka, Ogihara, Nagasima, and Matsusaka. Epicentre 33°·9N. 135°·6E. Depth slight.

Seismo. Bull. Cent. Met. Obs., Japan, Sept., 1951, Tokyo, 1951, p.221, with macroseismic chart.

$A = -\cdot5977$, $B = +\cdot5812$, $C = +\cdot5523$; $\delta = +7$; $h = +1$;
$D = +\cdot697$, $E = +\cdot717$; $G = -\cdot396$, $H = +\cdot385$, $K = -\cdot834$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Siomisaki		0·3	186	0 11	0	0 18	0
Owase		0·5	36	0 12a	− 2	0 18	− 5
Wakayama		0·7	310	0 12	− 5	0 17	−11
Kashiwara		0·8	0	0 14	− 4	0 22	− 9
Osaka		1·0	344	0 15a	− 6	0 26	−10
Sumoto		1·0	310	0 16a	− 5	0 26	−10
Kobe		1·1	328	0 18a	− 4	0 29	−10
Tu		1·2	30	0 24	0	0 37	− 4
Kameyama		1·3	26	0 22	− 3	0 38	− 6
Kyoto		1·3	357	0 22	− 3	0 35	− 9
Muroto		1·4	252	0 25	− 2	0 42	− 4
Takamatsu		1·6	293	0 25	− 5	0 41	−10
Nagoya		1·8	33	0 32	0	0 52	− 4
Gihu		1·9	24	0 33	− 1	0 57	− 2
Hikone		1·9	13	0 26	− 8	0 45	−14
Koti		1·9	268	0 36	+ 2	1 3	+ 4
Tsuruga		2·0	6	0 31	− 4	0 53	− 9
Omacsaki		2·2	66	1 3	S	(1 3)	− 3
Matuyama		2·5	273	0 51	+ 8	1 14	0
Shizuoka		2·5	57	0 56	+13	1 24	+10
Simidu		2·6	249	1 8	+24	—	—
Hirosima		2·9	283	0 55	+ 7	—	—
Hunatu		3·0	53	0 59	+ 9	1 38	+11
Kohu		3·0	49	1 1	+11	1 44	+17
Matumoto		3·1	35	1 6	+15	—	—
Toyama		3·2	21	1 7	+15	—	—
Oiwake		3·4	39	1 8	+13	—	—
Nagano		3·6	33	1 11	+13	—	—

Sept. 8d. 11h. 47m. 23s. Epicentre 28°·7N. 43°·6W. (as at 6h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		18·5	286	e 4 15	− 4	e 7 52	+ 8	—	—	—
San Juan		23·0	248	e 5 7	0	—	—	—	—	—
Palisades		27·6	304	—	—	e 10 39	+ 7	—	—	e 12·6
Seven Falls	E.	28·1	319	—	—	e 11 5	+25	—	—	—
Granada		34·4	64	i 6 56a	+ 5	—	—	—	—	16·2
Alicante		36·9	63	7 3	− 9	12 23	−35	8 7	PP	e 17·2
Kew		39·4	42	—	—	e 14 37?	+62	—	—	—
Algiers Univ.	Z.	39·7	65	e 7 26	−10	—	—	e 8 58	PP	—
Paris		40·4	46	e 7 42	+ 1	e 13 42	− 8	e 9 30	PPP	e 18·6
Fayetteville		43·0	293	e 8 2	− 1	—	—	e 9 40	PP	—
Strasbourg		43·8	48	e 8 17	+ 8	—	—	e 9 5	PP	—
Tamanrasset	Z.	44·4	85	e 8 14	0	—	—	e 9 58	PP	—
Stuttgart		44·8	48	e 8 15	− 2	—	—	e 10 22	PP	e 22·6
Rome		46·9	57	e 8 38	+ 4	e 15 34	+ 9	—	—	e 22·9
Cheb		47·0	46	—	—	e 15 3	−23	—	—	—
Triest	Z.	47·7	52	e 8 41	+ 1	—	—	—	—	—
Messina		49·5	62	e 9 24	+30	e 16 7	+ 5	—	—	e 23·7
La Paz		50·8	211	i 9 4	0	16 11	− 9	i 20 1	SS	—
Hungry Horse		56·5	311	e 9 40	− 6	—	—	—	—	—
Boulder City		59·4	297	i 10 6	0	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
China Lake	z.	61·6	298	e 10 21	− 1	—	—	—	—	—
Palomar	z.	61·8	295	e 10 22	− 1	—	—	—	—	—
Tinemaha	z.	61·8	299	e 10 21	− 2	—	—	—	—	—
Riverside	z.	62·0	296	e 10 21	− 3	—	—	—	—	—
Mount Wilson	z.	62·5	296	e 10 26	− 2	—	—	—	—	—
Mineral	z.	63·4	303	e 10 31a	− 3	—	—	—	—	—
Helwan	z.	64·2	68	e 10 39	0	—	—	e 13 43	PP	—
Lick	z.	64·3	301	i 10 39k	0	—	—	i 10 54	?	—
Ksara		66·5	63	e 10 58	+ 4	e 21 6	?	—	—	—
College		70·1	335	e 11 14	− 2	—	—	—	—	—

Additional readings :—
Alicante PPP = 8m.33s., SS = 14m.35s., ScS = 16m.44s.
Paris e = 8m.5s., i = 14m.6s., eSSS = 17m.10s., e = 17m.32s.
Tamanrasset eZ = 8m.38s.
Helwan eZ = 10m.52s.
Long waves were also recorded at Huancayo, Pennsylvania, Pasadena, De Bilt, Potsdam, and Pavia.

Sept. 8d. 12h. 4m. 14s. I
12h. 34m. 58. II } Epicentre 28°·7N. 43°·6W. (as at 11h.).

			Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	San Juan		23·0	248	e 5 8	+ 1	—	—	—	—	—
II			23·0	248	e 5 9	+ 2	—	—	—	—	—
I	Alicante		36·9	63	e 7 42	+30	e 12 58	0	—	—	e 17·6
I	Paris		40·4	46	e 7 41	0	—	—	—	—	—
I	Fayetteville		43·0	293	i 8 6	+ 3	—	—	—	—	—
II			43·0	293	i 9 2	+59	—	—	—	—	—
I	Strasbourg		43·8	48	e 8 9	0	—	—	—	—	—
I	Tamanrasset	z.	44·4	85	e 8 14	0	—	—	e 10 1	PP	—
II		z.	44·4	84	e 8 15	+ 1	—	—	—	—	—
I	Stuttgart	z.	44·8	48	e 8 11	− 6	—	—	—	—	—
II		z.	44·8	48	e 8 13	− 4	—	—	—	—	—
I	La Paz		50·8	211	e 9 4	0	—	—	—	—	—
II			50·8	211	i 9 9	+ 5	—	—	e 5 11	?	—
I	Tucson		57·2	292	e 9 51	0	—	—	—	—	—
II			57·2	292	e 9 50	− 1	—	—	—	—	—
I	Boulder City		59·4	297	e 10 5	− 1	—	—	i 10 12	P	—
II			59·4	297	e 10 7	+ 1	—	—	—	—	—
II	China Lake	z.	61·6	298	e 10 21	− 1	—	—	—	—	—
I	Palomar	z.	61·8	295	e 10 22	− 1	—	—	—	—	—
II		z.	61·8	295	e 10 24	+ 1	—	—	—	—	—
I	Tinemaha	z.	61·8	299	e 10 27	+ 4	—	—	—	—	—
I	Riverside	z.	62·0	296	e 10 27	+ 3	—	—	—	—	—
II	Mount Wilson	z.	62·5	296	e 10 26	− 2	—	—	—	—	—
I	Mineral	z.	63·4	303	e 10 32k	− 2	—	—	e 10 36	?	—
II		z.	63·4	303	e 10 32a	− 2	—	—	e 10 45	?	—
I	Lick	z.	64·3	301	e 10 38k	− 1	—	—	i 10 44	?	—
II		z.	64·3	301	i 10 41k	+ 2	—	—	i 11 1	PcP	—
I	College		70·1	335	e 11 15	− 1	—	—	—	—	—
II			70·1	335	e 11 16	0	—	—	—	—	—

Additional readings :—
Tamanrasset I eZ = 8m.20s., II eZ = 8m.21s.
Lick II iZ = 10m.54s.
Long waves to shock I were recorded at Granada, to shock II at Huancayo.

Sept. 8d. 16h. 15m. 25s. Epicentre 24°·9S. 179°·8W. Depth of focus 0·070.

A = −·9081, B = −·0032, C = −·4187 ; δ = −3 : h = +3 ;
D = −·003, E = +1·000 : G = +·417, H = +·001, K = −·908.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	12·8	200	i 2 49	+ 1	5 9	+ 5	—	—	e 7·9
Apia		13·4	36	2 51	− 4	5 0	−15	—	—	—
Karapiro	N.	13·6	196	2 35?	−22	5 0?	−19	—	—	—
Tuai	N.	14·1	190	e 3 2	0	e 5 30	+ 1	—	—	—
New Plymouth	E.	15·0	199	e 3 17	+ 6	i 5 57	+11	—	—	—
Cobb River	E.	17·3	201	e 3 34	0	e 5 30	−57	—	—	—
Wellington		17·8	195	i 3 31	− 8	e 6 15	−21	i 7 53	PcP	—
Kaimata	N.E.	19·0	200	i 3 50	− 1	e 6 54	− 3	—	—	—
Christchurch		19·6	196	i 3 55	− 2	7 4	− 3	i 14 25	ScS	—
Brisbane	Z.	24·5	258	i 4 43a	+ 1	—	—	—	—	—
Riverview		26·8	243	i 5 3a	+ 1	i 9 4	0	i 8 4	PcP	—
Guam		51·5	313	e 11 50	PPP	—	—	—	—	—
Nanking		81·5	310	14 38a	PP	20 56	− 3	—	—	—
Berkeley	Z.	82·5	42	i 11 33k	0	—	—	—	—	—
Lick		82·6	42	e 11 33a	0	—	—	i 13 13	pP	—
Pasadena		82·9	47	i 11 34	− 1	—	—	e 13 20	pP	—
Palomar		83·3	48	i 11 37	0	—	—	e 13 23	pP	—
Riverside	Z.	83·3	47	i 11 36	− 1	—	—	e 13 23	pP	—
China Lake	Z.	84·2	46	i 11 41a	0	—	—	e 13 28	pP	—
Shasta Dam		84·3	40	i 11 42	0	—	—	—	—	—
Mineral	Z.	84·5	40	e 11 41k	− 2	—	—	e 13 32	pP	—
Tinemaha	Z.	84·6	45	i 11 43	0	—	—	e 13 33	pP	—
Boulder City		86·2	47	i 11 50	− 1	—	—	e 13 19	pP	—
Tucson		86·9	52	i 11 55	+ 1	—	—	e 13 43	pP	—
College		92·8	12	e 12 20	− 2	—	—	e 14 11	pP	—
Hungry Horse		93·6	37	e 12 12	−13	—	—	—	—	—
Bombay	E.	113·1	281	—	—	e 25 44	S	—	—	—
Kiruna	Z.	135·3	349	i 21 8	PP	—	—	i 21 19	?	—
Ksara		147·8	294	e 18 51	[+ 4]	—	—	e 20 51	PP	—
Copenhagen		148·0	347	i 18 50	[+ 3]	—	—	—	—	—
Collmberg	Z.	151·9	343	e 18 59	[+ 6]	—	—	e 20 59	pPKP	—
Stuttgart	Z.	155·2	346	e 18 57	[0]	e 19 26	PKP_2	e 20 58	pPKP	—
Strasbourg		155·6	348	e 18 57	[− 1]	i 19 28	PKP_2	e 21 24	pPKP	—
Paris		156·1	358	e 19 30	[+32]	—	—	—	—	—
Triest	Z.	156·6	336	e 21 28	pPKP	—	—	—	—	—
Tamanrasset	Z.	174·7	—	e 19 15	[+ 2]	e 30 51	SKKS	e 21 15	pPKP	—

Additional readings :—
Wellington eZ = 3m.59s., iSZ = 6m.20s., iZ = 6m.51s., iScS = 14m.16s.
Riverview iN = 10m.49s. and 11m.35s., iScSN = 14m.56s.
Lick iZ = 11m.37s., eZ = 12m.29s.
Pasadena eZ = 13m.25s.
China Lake eZ = 13m.33s.
Mineral iZ = 11m.49s.
Collmberg eZ = 19m.11s.
Tamanrasset iPKP_2Z = 20m.54s., epPKP_2Z = 22m.46s., ePPZ = 24m.37s., iZ = 27m.59s.
Long waves recorded at La Plata and Santa Lucia may have been generated by this shock.

Sept. 8d. Readings also at 0h. (Tortosa), 1h. (Pennsylvania, Samarkand, near Dzhergetal (2), Fergana, Garm, Khorog, Obi-garm, and Stalinabad), 2h. (near Dzhergetal), 3h. (near Huancayo), 5h. (Mount Wilson, Riverside, Palomar, China Lake, and Tinemaha), 7h. (Palomar, Pasadena, Riverside, China Lake, and Tinemaha), 9h. (Palomar, Pasadena, and China Lake), 10h. (Huancayo, near Toledo, and Tortosa), 11h. (Almeria, near Ashkabad, and near Dzhergetal), 12h. (Andijan, Khorog, Naryn, near Dzhergetal, Fergana, Obi-garm, Samarkand, Stalinabad, Tashkent, and near Mary), 17hl (near Dzhergetal and near Ashkabad), 18h. (Frunse, Stalinabad, near Andijan, Dzhergetal (2), Fergana, Garm, Khorog, Samarkand, Tashkent, and Tchimkent), 19h. (Frunse, Naryn, Samarkand, Tashkent, Tchimkent, near Andijan, Dzhergetal, Fergana, Garm, Khorog, Stalinabad, near Ashkabad, and near Manila), 20h. (Port au Prince, and near Manila), 22h. (near Almata II), 23h. (Helwan and Ksara (2)).

Sept. 9d. 4h. 43m. 57s. Epicentre 16°·28. 173°·2W.

Intensity I-II at Apia. Quarterly Seismological Bulletin of Apia, third quarter, 1951, p.8.

A = −·9541, B = −·1137, C = −·2772 ; δ = +7 ; h = +5 ;
D = −·118, E = +·993 ; G = +·275, H = +·033, K = −·961.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		2·8	29	i 0 43a	− 4	i 1 2	−20	—	—	—
Auckland	N.	23·2	206	i 5 8	− 1	9 26	+ 8	—	—	11·0
Karapiro	N.	23·8	204	5 37	−12	—	—	—	—	—
New Plymouth	E.	25·4	204	5 34	+ 3	—	—	—	—	—
Wellington		27·1	201	i 5 46	0	e 10 49	+25	e 12 47	ScP	11·9
Cobb River	E.	27·6	205	e 5 52	− 1	—	—	—	—	—
Kaimata	N.E.	29·4	205	e 6 11	+ 4	—	—	—	—	—
Christchurch		29·8	202	i 6 8	− 3	e 11 28	+21	e 13 43	Q	e 15·6
Brisbane	E.	33·2	245	e 6 38	− 2	—	—	i 7 50	PP	—
Riverview		36·5	235	i 7 7k	− 2	i 13 5	+14	i 8 34	PP	e 17·4
Manila		71·8	292	i 11 25	− 1	—	—	e 12 14	?	—
Berkeley		72·0	41	i 11 27a	− 1	e 20 55	+ 6	i 11 46	PcP	e 33·0
Pasadena		72·4	46	i 11 30	0	e 20 57	+ 4	i 11 50	PcP	e 32·8
Riverside		72·9	46	i 11 31a	− 2	—	—	—	—	—
Palomar		72·9	47	i 11 33	0	—	—	—	—	—
China Lake		73·8	45	i 11 37a	− 1	—	—	i 11 46	PcP	—
Mineral	Z.	73·9	39	i 11 38a	− 1	—	—	i 12 27	?	—
Tinemaha		74·0	44	i 11 39a	0	—	—	—	—	—
Boulder City		75·7	46	i 11 29	−20	e 21 13	−17	—	—	—
Tucson		76·7	51	e 11 55	0	e 21 31	−10	—	—	—
Vladivostok		77·5	323	i 12 0	+ 1	i 21 53	+ 3	i 12 9	PcP	—
Victoria		78·1	32	12 3a	+ 1	22 3	+ 7	—	—	e 37·0
Seattle		78·1	33	i 12 4a	+ 2	—	—	i 12 10	PcP	—
Zi-ka-wei	Z.	78·4	308	e 12 5	+ 1	—	—	—	—	—
Nanking		80·8	308	e 12 15	− 2	22 24	− 1	—	—	—
Tacubaya		80·9	67	e 12 14	− 3	—	—	e 11 57	PcP	—
Hungry Horse		83·0	36	i 12 28	0	—	—	—	—	—
College		83·1	11	12 28	− 1	22 45	− 3	—	—	—
Huancayo		94·1	104	e 13 24	+ 2	e 24 46	+15	e 31 9	SS	e 38·5
Irkutsk		98·1	322	e 13 48?	+ 8	e 24 18	[0]	e 17 37	PP	—
Chinchina		98·6	87	—	—	e 24 33	[+13]	e 31 16	SS	e 46·0
La Paz		99·3	110	e 12 47	−58	i 24 30	[+ 6]	i 25 35	S	47·6
Bogota		100·0	88	—	—	e 24 36	SKP	—	—	56·9
La Plata		100·3	131	—	—	25 33	+10	31 45	SS	45·8
Cleveland	E.	101·8	50	—	—	e 24 33	[− 3]	—	—	—
Resolute Bay		102·4	15	—	—	e 25 45	+ 5	e 32 51	SS	e 45·4
Ottawa		106·6	47	18 39	PP	e 25 3	[+ 5]	e 28 3	PS	—
Palisades		107·4	52	e 28 9	PS	e 24 58	[− 3]	e 34 19	SSP	e 51·2
Seven Falls	E.	110·1	45	e 28 30	PS	e 25 13	[0]	—	—	—
Frunse		117·1	311	e 18 39	[− 8]	—	—	—	—	—
Andijau		118·8	308	18 53	[+ 2]	e 25 50	[+ 4]	—	—	—
Fergana		119·3	308	e 18 54	[+ 3]	e 25 50	[+ 2]	e 20 36	PP	—
Tashkent		121·1	309	e 20 24	PP	25 59	[+ 5]	e 30 20	PS	—
Stalinabad		121·7	306	e 19 10	[+14]	—	—	—	—	—
Sverdlovsk		122·9	329	18 57	[− 1]	26 4	[+ 4]	37 19	SS	—
Scoresby Sund		123·0	12	—	—	26 17	[+17]	29 33	PKKP	58·0
Mary		127·3	306	—	—	e 26 27	[+14]	—	—	—
Kiruna		127·7	353	e 19 11	[+ 3]	e 28 3	[− 2]	e 38 14	SS	e 61·6
Ashkabad		129·9	307	e 19 14	[+ 2]	—	—	—	—	—
Pulkovo		133·2	344	e 22 47	PKS	—	—	—	—	—
Kirovobad		138·0	314	e 19 28	[+ 1]	e 22 55	PKS	—	—	—
Goris		138·5	312	—	—	e 22 55	PKS	—	—	—
Aberdeen		138·6	7	e 15 43	P	—	—	e 24 23	?	—
Tiflis		138·6	316	e 25 29	PPP	e 23 7	PKS	—	—	—
Erevan		139·5	315	e 19 33	[+ 3]	e 23 11	PKS	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Leninakan		139·7	316	e 19 40?	[+10]	—	—	—	—	—
Copenhagen		140·4	355	e 23 24	PKS	—	—	—	—	67·0
Yalta		143·5	327	e 19 36	[− 1]	—	—	—	—	—
Witteveen	z.	143·5	358	e 19 47	[+10]	—	—	—	—	—
Potsdam	z.	143·6	354	e 19 46	[+ 9]	—	—	—	—	73·0
Lwow		143·7	342	e 19 36	[− 1]	—	—	—	—	
De Bilt		144·2	1	e 19 45	[+ 7]	e 41 51	SS	e 22 51	PP	e 72·0
Kew		144·4	7	e 19 45	[+ 7]	e 41 28	SS	e 20 7	PKP_2	e 66·0
Collmberg		144·6	353	e 19 39	[+ 1]	e 30 4	(+16)	—	—	—
Raciborzu		145·0	347	19 41	[+ 2]	e 23 6	PKS	—	—	—
Jena		145·1	354	e 19 40	[+ 1]	—	—	e 19 57	PKP_2	—
Uzhgorod		145·2	343	e 19 42	[+ 2]	—	—	—	—	—
Skalnate Pleso		145·3	344	e 19 44	[+ 4]	e 29 33	(−19)	e 19 53	PKP_2	—
Prague		145·7	351	e 19 41	[+ 1]	e 29 59	(+ 5)	e 41 33	SS	—
Cheb		145·9	354	e 19 45	[+ 4]	e 35 9	PPS	e 20 5	PKP_2	—
Jersey	E.	146·3	10	e 18 53	[−48]	—	—	e 20 3?	PKP_2	—
Ogyalla		147·1	346	e 19 49	[+ 6]	e 34 27	PS	e 20 23	PKP_2	—
Karlsruhe	z.	147·3	358	e 19 47	[+ 4]	—	—	e 20 47	PKP_2	—
Paris		147·3	5	e 19 48	[+ 5]	e 42 22	SS	i 23 12	PP	70·0
Stuttgart		147·5	357	e 19 45	[+ 2]	e 36 3	PS	e 33 25	PSKS	e 75·0
Strasbourg		147·7	358	i 19 49	[+ 5]	e 30 7	(+ 1)	i 20 1	PKP_2	e 70·0
Timisoara		148·2	340	e 19 53	[+ 8]	—	—	e 20 52	pPKP	—
Ksara		148·5	310	e 19 49	[+ 4]	—	—	i 23 34	PP	—
Istanbul		148·6	327	e 19 53	[+ 8]	—	—	i 20 50	pPKP	e 77·0
Basle		148·7	358	e 19 11	[−34]	—	—	—	—	—
Zürich		148·9	358	e 19 45	[− 1]	—	—	e 19 51	PKP_2	—
Belgrade		149·2	340	i 19 52k	[+ 6]	e 30 3	(−11)	e 26 7	PPP	—
Triest		150·1	350	i 19 51a	[+ 3]	e 23 35	PKS	e 20 53	pPKP	—
Clermont-Ferrand		150·4	5	i 20 13	PKP_2	—	—	—	—	—
Pavia		151·0	356	—	—	e 34 56	?	—	—	e 56·2
Helwan	z.	153·7	306	e 19 56	[+ 3]	—	—	e 20 12	PKP_2	—
Rome		153·9	352	e 19 59	[+ 6]	e 30 41	(+ 1)	e 20 11	PKP_2	73·4
Toledo		154·6	20	18 35	[−79]	e 24 7	PP	e 20 21	PKP_2	—
Messina		156·8	344	e 20 27	PKP_2	e 31 17	(+22)	e 43 4	SS	—
Alicante		157·0	15	(19 54)	[− 3]	(26 47)	[−15]	(43 5)	SS	(e 72·2)
Granada		157·2	22	i 20 37k	PKP_2	—	—	i 24 11	PP	—
Malaga		157·3	23	i 20 31	PKP_2	—	—	i 24 6	PP	81·4
Almeria		157·9	20	19 38	[−20]	—	—	23 24	PP	84·0
Algiers Univ.	z.	159·2	8	e 20 3	[+ 3]	—	—	e 20 45	PKP_2	—
Tamanrasset	z.	173·3	—	i 20 15k	[+ 4]	e 32 31	(+12)	e 21 41	PKP_2	—

Additional readings :—
Auckland ePKKP?N =31m.18s., eSKKS?N =38m.47s.
Wellington eQ =11m.13s., eSS =12m.33s., ScS? =16m.39s.
Riverview iPPPEZ =8m.58s., eSSN =15m.48s.
Berkeley eEN =21m.32s.
Pasadena iZ =11m.36s., eZ =21m.45s., eQN =32·0m.
Mineral iZ =11m.47s.
Vladivostok iSKS =22m.2s., ePS =22m.43s.
Huancayo e =13m.28s., 26m.4s., and 37m.32s.
Irkutsk eSKKS =24m.30s., eS =25m.7s., PS =26m.33s.
La Paz iSS =28m.29s.
La Plata SE =25m.15s.
Resolute Bay e =27m.21s.
Kiruna ePKSN =22m.39s., iN =38m.39s., eE =40m.35s., eN =40m.47s., eZ =57m.27s.
De Bilt iZ =20m.43s., ePS =33m.8s., eZ =35m.53s.
Kew ePPEN =23m.22s.
Raciborzu ePKPE =19m.44s., eZ =21m.14s., eE =21m.18s.
Jena eN =19m.48s.
Skalnate Pleso e =20m.17s., 21m.19s., 21m.39s., and 24m.27s.
Prague ePP =22m.50s., ePPSE =35m.16s. and many other unidentified e readings.
Cheb e =22m.3s., eE =39m.9s., e =43m.26s.
Ogyalla e =20m.42s., 21m.10s., 21m.41s., 22m.15s., 22m.39s., and 24m.15s.
Paris iPKP$_2$? =19m.56s., ePPS =36m.6s., eSSP? =43m.6s. and other unidentified readings.
Stuttgart e =19m.59s., 20m.45s., and 34m.11s., eSS =43m.9s.
Strasbourg ePP =23m.23s., eSS =43m.15s. and other unidentified e readings.
Timisoara eN =21m.58s., eE =22m.44s., eN =22m.51s.
Belgrade eZ =20m.17s. and 22m.11s.

Continued on next page.

Triest iPKP$_2$Z = 20m.5s., epPKP$_2$Z = 21m.10s., esPKPZ = 21m.15s., ePSKS = 33m.16s., eSS = 42m.19s.
Helwan eZ = 20m.3s. and 20m.24s., iZ = 21m.31s., eZ = 22m.39s.
Rome ePP = 23m.44s., e = 23m.59s., ePSKSN — 33m.59s., SS = 43m.21s.
Alicante SSS = (49m.9s.), readings have been increased by 1m.
Algiers Univ. eZ = 19m.20s. and 21m.5s., ePPZ = 24m.26s.
Tamanrasset iZ = 20m.50s. and 23m.15s., iPPZ = 25m.33s., eZ = 26m.31s., ePcP,PKPZ = 29m.2s., ePPPZ = 29m.25s., eZ = 30m.37s.
Long waves were also recorded at Pennsylvania, Weston, Harvard, Santa Clara, Bombay, and Tortosa.

Sept. 9d. Readings also at 0h. (near Almata II, Chilisk, and Kurmenty), 1h. (near Port au Prince, and near Manila), 3h. (Tinemaha and China Lake), 4h. (Punta Arenas), 5h. (Kurmenty, near Ili, Almata II, Przhevalsk, and Chilisk), 6h. (near Manila and near Dzhergetal), 8h. (Port au Prince and near Athens), 10h. (Oaxaca, near Vera Cruz, Puebla, and Tacubaya (2)), 11h. (near Manila), 12h. (near Kurmenty), 13h. (near Dzhergetal), 15h. (Prague), 16h. (near Dzhergetal), 17h. (Ksara), 18h. (Antofagasta and near Ashkabad), 19h. (near Almata II, Ili, Chilisk, and Kurmenty), 20h. (near Yalta), 21h. (Vera Cruz, Puebla, and near Tacubaya), 22h. (Strasbourg, Paris, Witteveen, Stuttgart, and Collmberg), 23h. (Collmberg).

Sept. 10d. Readings at 2h. (near Manila), 5h. (Fergana, Stalinabad, near Dzhergetal, Garm, Obi-garm, Khorog, and Andijan), 7h. (Manila and near Huancayo), 9h. (Stuttgart), 10h. (Manila), 11h. (Murgab, near Khorog, Garm, Stalinabad, Dzhergetal, Fergana, Samarkand, and near Huancayo), 12h. (Bogota, La Paz, Seattle, Reno, Mineral, Alberni, near Victoria, and near Ashkabad), 14h. (Brisbane), 17h. (Rome), 18h. (Alicante), 20h. (near Istanbul), 21h. (Shawinigan Falls), 22h. (near Dzhergetal), 23h. (Collmberg).

Sept. 11d. 17h. 28m. 35s. I
20h. 0m. 37s. II
Epicentre 38°·6N. 75°·3E. (as on 1950, Feb. 8d.).

A = +·1988, B = +·7579, C = +·6213; $\delta = -5$; $h = -1$;
D = +·967, E = −·254; G = +·158, H = +·601, K = −·784.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
I Murgab	1·1	258	i 0 27	+ 5	i 0 44	+ 5
II	1·1	258	i 0 26	+ 4	i 0 42	+ 3
I Naryn	2·9	12	e 0 46	− 2	1 18	− 6
II	2·9	12	e 0 45	− 3	1 19	− 5
I Andijan	3·1	315	e 0 51	0	e 1 28	− 1
II	3·1	315	0 50	− 1	1 34	S*
I Dzhergetal	3·2	282	e 1 0	P*	i 1 51	S_g
II	3·2	282	i 1 3	P_g	i 1 48	S_g
I Fergana	3·3	303	e 0 59	P*	e 1 44	S*
II	3·3	303	e 0 53	0	e 1 36	+ 1
I Garm	3·9	278	i 1 9?	P*	i 2 9?	S_g
II	3·9	278	i 1 19	P_g	i 2 8	S_g
I Rybach'e	3·9	9	e 1 7	P*	e 1 52	+ 2
II	3·9	9	e 1 5	+ 3	e 2 2	S*
I Frunse	4·3	353	—	—	i ? 10	S*
II	4·3	353	e 1 4	− 4	i 2 13	S*
I Obi-garm	4·4	273	e 1 17	P*	e 2 23	S_g
II	4·4	273	e 1 14	+ 4	—	—
I Krasnogorka	4·6	359	i 1 9	− 3	e 2 22	S*
II	4·6	359	i 1 9	− 3	i 2 1	− 6
I Przhevalsk	4·6	30	1 9	− 3	e 2 21	S*
II	4·6	30	1 9	− 3	2 26	S_g
I Almata	4·8	15	e 1 19	+ 4	—	—
II	4·8	15	e 1 22?	P*	i 2 18	+ 6
I Almata II	4·9	18	i 1 14	− 3	—	—
II	4·9	18	e 1 14	− 3	i 2 21	+ 6
I Stalinabad	5·1	271	e 1 38	P_g	—	—
II	5·1	271	e 1 36	P_g	—	—
I Tashkent	5·4	303	—	—	2 42	S*
II	5·4	303	e 1 40	P*	—	—
I Ili	5·5	14	e 1 33	P*	—	—
II	5·5	14	—	—	i 2 37	+ 7
II Tchimkent	5·7	312	e 1 27	− 1	—	—
II Samarkand	6·5	283	e 1 57	P*	e 3 43	S_g

Sept. 11d. 21h. 24m. 11s. Epicentre 37°·8N. 142°·2E. Focus at base of Superficial Layers. (as on 1951, June 6d.).

Intensity IV at Yamagawa, Moniwa, Watari, etc. II-III at Hukusima, Inawashiro, Hirano, and Hanahiki. Epicentre 37°·8N., 142°·0E. Depth 50km.
Seismological Bulletin of Cent. Met. Obs., Japan, for September, 1951, Tokyo, 1951, p. 222 with macroseismic chart.

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

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Isinomaki		0·9	314	0 15	− 1	0 29	+ 1
Sendai		1·1	294	0 20	+ 1	0 32	− 1
Hukusima		1·4	268	0 22k	− 1	0 36	− 5
Onahama		1·4	230	0 23	0	0 33	− 8
Yamagata		1·5	287	0 27	+ 3	0 41	− 3
Mizusawa	E.	1·6	328	0 30	+ 4	0 45	− 1
Inawasiro		1·7	262	0 25	− 3	0 43	− 6
Shirakawa		1·7	247	0 25	− 3	0 39	−10
Miyako		1·8	355	0 33	+ 4	0 55	+ 4
Mito		2·0	224	0 31	− 1	0 51	− 5
Morioka		2·1	337	0 37	+ 4	1 1	+ 2
Kakioka		2·2	226	0 35	0	—	—
Utunomiya		2·2	236	0 33	− 2	0 57	− 4
Tukubasan		2·3	227	0 34	− 2	0 57	− 7
Kumagaya		2·8	234	0 46	+ 3	1 11	− 5
Maebasi		2·9	241	0 44	− 1	1 15	− 4
Tokyo		2·9	223	0 47	− 2	1 15	− 4
Yokohama		3·1	221	1 2	+14	—	—

Mizusawa gives also eSN =0m.18s.

Sept. 11d. Readings also at 0h. (Santa Lucia), 1h. (near Dzhergetal), 5h. (Palomar, China Lake, Tinemaha, and near Kurmenty), 6h. (Tortosa, Brisbane, and near Kurmenty), 8h. (Ashkabad), 10h. (near Dzhergetal), 11h. (Reschute Bay, Seven Falls, Shawinigan Falls, and Ottawa), 14h. (Port au Prince and near Dzhergetal), 15h. (Istanbul and near Dzhergetal), 17h. (near Ashkabad), 18h. (Manila and near Dzhergetal), 19h. (near Palisades (2) and near Port au Prince), 20h. (Port au Prince), 21h. (Christchurch, near Tnai, Karapire, New Plymouth, Wellington, Cobb River, Kaimata, near Almata II, and near Palisades), 22h. (Grahamstown, Kimberley, Pretoria, Tamanrasset, Stuttgart, Jena, Collmberg, Prague, Kiruna, Rome, Ottawa, Harvard, Huancayo, Leninakan, Goris, near Tsikhlis-Dzhvari, Abastumani, Gori, Tiflis, Erevan, Kirovabad, and near Garm), 23h. (Naryn, Fergana, near Dzhergetal, Garm, Obi-garm, Przhevalsk, Almata II, and Ili).

Sept. 12d. 13h.-14h. Aleutians.

College iP =58m.50s.
Mineral iPZ =62m.4s. a.
Butte eP =62m.13s.
Reno ePZ =62m.14s. a, eZ =62m.20s.
Lick ePZ =62m.16s. a.
Fresno ePZ =62m.33s.
Tinemaha ePZ =62m.35s., iZ =62m.40s., iPcPZ =63m.50s.
China Lake ePZ =62m.43s., iZ =62m.48s., iPcPZ =63m.53s.
Mount Wilson ePZ =62m.49s., iZ =62m.55s.
Palomar ePZ =62m.59s.
Boulder City i =62m.59s. and 63m.2s.
Kiruna ePZ =63m.19s., iZ =63m.35s.
Tucson eP =63m.31s.
Fayetteville iP =64m.13s.
Ottawa iZ =64m.24s.
Weston eP =64m.42s.
Collmberg eZ =65m.13s.
Strasbourg e =65m.34s. and 66m.10s.
Paris i =65m.36s., e =65m.48s.
Kimberley iZ =73m.5s.
Grahamstown iPKPZ =73m.43s.

Sept. 12d. 15h. 10m. 19s. Epicentre 45°·8N. 150°·8E.

A = −·6107. B = +·3413. C = +·7146 ; δ = +9 ; h = −4 ;
D = +·488. E = +·873 ; G = −·624. H = +·349. K = −·700.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		4·5	238	1 16	+ 5	2 5	0	—	—	—
Kusiro		5·4	241	1 26	+ 2	2 24	− 4	—	—	—
Yuzno-Sakhlinsk		5·7	285	i 1 32?	+ 4	—	—	—	—	—
Obihiro		6·2	245	1 40	+ 5	2 55	+ 7	—	—	—
Asahigawa		6·3	254	1 44	+ 8	3 2	+12	—	—	—
Urakawa		6·8	241	1 46	− 2	3 0	− 3	—	—	—
Sapporo		7·3	251	1 57	− 7	3 13	− 2	—	—	—
Mori		8·3	247	2 5	+ 1	3 44	+ 4	—	—	—
Hatinohe		8·6	235	2 13	− 4	3 35	−13	—	—	—
Aomori		8·8	239	2 13	+ 2	3 45	− 8	—	—	—
Petropavlovsk		8·9	32	2 23?	+11	4 3?	+ 8	—	—	—
Morioka		9·3	233	2 16	− 1	3 55	−10	—	—	—
Mizusawa	N.	9·8	230	e 2 24	0	e 4 5	−12	—	—	—
Sendai		10·5	228	2 32	− 3	4 22	−13	—	—	—
Hukusima		11·2	227	2 40	− 4	4 40	−12	—	—	—
Inawasiro		11·4	228	2 46	− 1	4 43	−13	—	—	—
Onahama		11·6	223	2 47	− 3	4 45	−16	—	—	—
Klyuchi		12·2	27	e 3 5	+ 7	—	—	—	—	—
Utunomiya		12·4	225	2 57	− 4	5 6	−15	—	—	—
Kumagaya		12·9	226	3 8	+ 1	5 23	−10	—	—	—
Nagano		13·1	230	3 16	+ 6	5 27	−11	—	—	—
Tokyo		13·1	223	3 20	+10	5 35	− 3	—	—	—
Matusiro		13·2	230	3 9	− 2	5 42	+ 2	—	—	—
Hunatu		13·8	226	3 17	− 2	5 41	−13	—	—	—
Vladivostok		13·8	266	i 3 21	+ 2	i 6 6	+12	3 35	PPP	—
Tu		15·5	230	3 22	−20	6 44	+ 9	—	—	—
Osaka		16·1	231	3 41	− 8	6 57	+ 8	—	—	—
Sumoto		16·7	232	3 59	+ 2	—	—	—	—	—
Koti		18·0	234	4 15	− 2	7 42	+10	—	—	—
Matuyama		18·3	236	4 19	+ 2	7 48	+ 9	—	—	—
Simidu		18·9	234	4 24	0	7 57	+ 4	—	—	—
Ooita		19·3	236	4 33	+ 4	8 19	+17	—	—	—
Hukuoka		19·8	238	4 34	− 1	8 10	− 3	—	—	—
Zi-ka-wei	Z.	27·0	248	i 5 45a	0	10 32	+10	i 6 38	PP	—
Nanking		28·2	253	5 54a	− 2	i 10 39	− 2	—	—	12·0
Irkutsk		30·7	300	—	—	e 11 41	+20	—	—	—
Guam		32·6	192	—	—	13 45	88	—	—	—
College		37·9	37	7 21	+ 1	—	—	—	—	—
Manila		40·0	229	i 7 36	− 2	e 15 4	?	i 9 33	PP	—
Ili		50·5	297	i 9 1	− 1	—	—	—	—	—
Almata II		50·7	296	e 9 3	0	—	—	—	—	—
Almata		50·9	296	i 9 7	+ 2	—	—	—	—	—
Rybach'e		51·9	295	e 9 12	0	e 19 0	ScS	—	—	—
Resolute Bay		52·2	19	i 9 14	− 1	e 21 46	SSS	—	—	e 32·0
Naryn		52·5	294	e 9 16	− 1	16 46	+ 3	—	—	—
Frunse		52·6	296	e 9 17	− 1	e 16 45	+ 1	e 10 33	PcP	—
Sverdlovsk		53·4	317	e 9 24	0	e 17 21	PS	i 10 29	PcP	—
Andijan		55·2	295	i 9 35	− 2	i 17 21	+ 1	—	—	—
Calcutta		55·2	267	e 9 20	−17	i 17 23	+ 3	—	—	—
Victoria		55·4	54	e 9 36	− 2	—	—	e 9 48	?	—
Murgab		55·5	292	i 9 41?	+ 2	i 17 25?	+ 1	—	—	—
Fergana		55·7	295	e 9 40?	0	e 17 21?	− 5	—	—	—
Tchimkent		56·0	298	e 9 42	− 1	17 32	− 2	—	—	—
Seattle		56·5	54	e 9 58	+12	e 11 41	PP	e 10 48	PcP	—
Dzhergetal		56·8	294	e 9 49	+ 1	—	—	—	—	—
Tashkent		56·8	297	e 9 45	− 3	i 17 36	− 5	e 10 33?	PcP	—
Obi-garm		58·0	295	i 9 55?	− 2	i 17 54?	− 3	—	—	—
Stalinabad		58·7	295	i 10 1	− 1	i 18 1	− 5	—	—	—
New Delhi		59·1	281	i 10 3	− 1	e 18 7	− 4	18 27	PS	—
Samarkand		59·2	298	e 10 2	− 3	18 8	− 4	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shasta Dam		60·4	60	i 10 0	−13	—	—	—	—	—
Hungry Horse		60·6	49	i 10 18	+ 3	e 19 58	?	—	—	—
Kiruna		60·7	340	i 10 14a	− 1	e 18 27	− 5	i 10 58	PcP	e 28·7
Mineral	Z.	61·1	61	i 10 16	− 2	—	—	e 9 54a	?	—
Berkeley		62·2	64	e 10 24k	− 2	e 18 49	− 2	e 14 38	PPP	e 26·5
Reno		62·7	60	e 9 51a	−38	—	—	e 10 53	PcP	—
Lick	Z.	62·9	64	i 9 47a	−43	—	—	i 10 48	PcP	—
Moscow		64·3	326	e 10 40	+ 1	—	—	—	—	—
Fresno	Z.	64·4	63	e 10 38a	− 2	—	—	e 10 50	PcP	—
Tinemaha	Z.	65·2	62	e 10 44	− 1	—	—	e 10 55	pP	—
Ashkabad		65·5	300	e 10 48	+ 1	e 19 37?	+ 5	—	—	—
Kizyl-Arvat		66·1	303	e 10 50	− 1	—	—	—	—	—
China Lake	Z.	66·4	62	i 10 51	− 2	—	—	i 11 1	pP	—
Pasadena	Z.	67·1	64	e 10 56	− 1	—	—	i 11 6	pP	i 31·3
Riverside	Z.	67·7	64	i 10 58	− 3	—	—	i 11 8	pP	—
Poona		67·9	274	i 11 3	+ 1	e 20 1	0	11 24	PcP	—
Boulder City		68·0	61	i 11 2	− 1	—	—	—	—	—
Upsala	E.	68·0	337	—	—	e 27 58	SSS	—	—	e 34·7
Bombay	E.	68·4	276	i 11 8	+ 2	e 20 9	+ 2	11 32	PcP	29·2
Palomar	Z.	68·5	64	i 11 4	− 2	—	—	e 11 16	pP	—
Shemakha		69·4	308	11 8	− 4	—	—	—	—	—
Kirovobad		70·6	309	i 11 20	+ 1	—	—	—	—	—
Tiflis		70·8	311	i 11 20	0	e 20 36	+ 1	—	—	—
Gori		70·9	311	e 11 22	+ 1	—	—	—	—	—
Goris		71·5	308	i 11 26?	+ 2	20 50?	+ 7	—	—	—
Tsikhlis-Dzhvari		71·5	312	11 22	− 2	—	—	—	—	—
Erevan		72·0	310	e 11 29	+ 1	—	—	—	—	—
Nakichevan		72·2	308	e 11 35?	+ 6	—	—	—	—	—
Brisbane	N.	73·0	177	—	—	i 20 59	− 1	—	—	—
Copenhagen		73·0	338	i 11 31	− 2	e 20 51	− 9	—	—	33·7
Tucson		73·0	61	i 11 32	− 1	—	—	—	—	—
Lwow		74·1	328	i 11 40	0	—	—	—	—	—
Kishinev		74·5	324	11 42	0	21 15	− 2	—	—	—
Potsdam		75·7	336	e 11 49	0	—	—	e 11 53	P	e 41·7
Skalnate Pleso		76·1	330	e 11 52	+ 1	e 21 5	−30	—	—	—
Cellmberg		76·7	335	i 11 54	− 1	—	—	—	—	—
Witteveen	Z.	77·1	339	i 11 57	0	—	—	—	—	—
Prague		77·3	333	e 11 59	+ 1	e 21 37	−11	e 14 59	PP	e 33·7
Jena		77·4	335	e 11 59?	+ 1	—	—	—	—	—
Istanbul		79·1	319	e 12 10	+ 2	e 23 8	+61	—	—	e 41·7
Riverview		79·3	179	i 12 18a	+ 9	i 22 8	− 1	i 22 30	ScS	e 33·8
Rathfarnham Castle		79·4	347	i 12 7	− 2	e 22 14	+ 4	e 28 21	SS	e 39·2
Belgrade		79·7	327	e 12 11a	0	e 22 33	+20	e 35 54	Q	e 48·1
Fayetteville		79·7	48	i 12 9	− 2	—	—	—	—	—
Kew		80·0	343	—	—	e 22 18	+ 1	e 28 14	SS	e 39·7
Karlsruhe	Z.	80·0	337	e 12 13	0	—	—	e 13 23	?	—
Stuttgart		80·0	336	e 12 13a	0	e 22 14	− 3	e 40 41?	Q	e 44·7
Ottawa	Z.	80·3	31	i 12 12a	− 2	—	—	—	—	—
Shawinigan Falls	N.	80·4	29	e 12 6	− 9	—	—	—	—	—
Strasbourg		80·6	337	i 12 16a	0	e 33 47	Q	e 15 24	PP	e 38·7
Ksara		81·3	311	i 12 20	0	e 23 1	+31	—	—	—
Cleveland	Z.	81·4	38	i 12 19a	− 1	—	—	—	—	—
Triest		81·4	332	e 12 19	− 1	e 22 28	− 3	—	—	—
Zürich		81·5	336	i 12 20a	− 1	—	—	—	—	e 44·7
Basle		81·6	337	e 12 22a	+ 1	—	—	—	—	—
Paris		81·8	340	i 12 23	+ 1	e 22 35	0	i 12 34	pP	e 44·7
Harvard		84·3	30	i 12 35	0	—	—	—	—	—
Weston		84·5	30	i 12 36	0	—	—	—	—	—
Palisades		84·8	32	i 12 38a	+ 1	—	—	—	—	—
Rome		85·1	331	i 12 38	− 1	23 1	[0]	28 46	SS	41·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		86·8	311	—	—	e 23 25	0	e 24 41	PS	—
Messina		87·2	327	e 13 2	+13	e 23 25	− 3	—	—	e 47·4
Tacubaya		89·4	63	e 18 29	PPP	e 21 58	?	e 26 28	?	—
Christchurch		91·0	164	—	—	e 23 56	− 7	—	—	e 44·7
Alicante		92·3	338	13 11	− 2	e 25 4	PS	17 38	PP	e 48·4
Almeria		94·3	339	13 22	− 1	23 54	[− 3]	17 12	PP	50·7
Pretoria	z.	130·5	273	i 19 13	[0]	—	—	—	—	—
Kimberley	z.	134·7	273	i 19 21	[0]	—	—	—	—	—

Additional readings :—
Manila iPPP =10m.26s., eSS =15m.36s.
Resolute Bay eZ =9m.24s., eN =18m.44s.
Frunse ePP =11m.28s.
Sverdlovsk iSS =21m.9s.
Seattle e =10m.8s.
Tashkent iScS =19m.33s.
Kiruna ePcP?Z =11m.7s., ePPPN =13m.41s., iS?Z =18m.18s., eSN =18m.23s., eN = 19m.20s. and 20m.15s., eSSE =22m.28s., iSSN =22m.32s., iZ =25m.23s., eN = 26m.21s.
Mineral eZ =10m.25s.
Berkeley eZ =10m.34s.
Reno eZ =10m.28s., eEZ =10m.39s.
Lick iZ =10m.31s. and 10m.37s.
Fresno eZ =12m.16s.
China Lake iZ =11m.21s.
Pasadena iZ =11m.26s.
Poona PS =20m.23s., PPS =20m.39s., SS =21m.19s.
Bombay iPSE =20m.33s., iPPSE =20m.48s.
Skalnate Pleso eN =19m.27s., eE =20m.6s.
Prague e =13m.6s., ePPP =16m.56s., eSS? =26m.41s.
Jena ePE =12m.3s., eN =13m.9s.
Stuttgart eZ =12m.39s. and 22m.26s.
Strasbourg e =12m.26s., i =12m.41s. and 12m.53s., e =13m.21s. and 13m.35s.
Paris ePP =15m.23s., eSPP =23m.43s. and other unidentified readings.
Alicante PS =26m.58s., PPS =27m.45s., SS =32m.28s., SSP =32m.42s., SSS =36m.36s., Q =42m.16s.
Almeria SS =31m.0s.
Long waves were also recorded at Auckland, Wellington, Cheb, De Bilt, Pavia, Huancayo, and Bermuda.

Sept. 12d. 20h. 41m. 48s. Epicentre 33°·3N. 76°·5E. (as on 1950, Oct. 6d.).

Intensity VII at Amritsar, Srinagar, Jammu, and parts of Kashmir ; VI at Dalhousie ; less strong at Gulmerg. Epicentre as adopted (Poona).

Seismo. Bull., Gov. of India Met. Department, Sept., 1951, pp.3 and 12.

$A = +\cdot1955$, $B = +\cdot8144$, $C = +\cdot5464$; $\delta = +2$; $h = +1$;
$D = +\cdot972$, $E = -\cdot233$; $G = +\cdot128$, $H = +\cdot531$, $K = -\cdot838$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Dehra Dun	N.	3·2	156	e 0 29	−23	e 1 42	+10	—	—	—
New Delhi		4·7	173	i 1 6	− 8	i 2 7	− 3	1 28	P_g	—
Murgab		5·5	338	i 1 30	+ 5	—	—	—	—	—
Dzhergetal		7·3	326	i 1 51?	+ 1	i 3 20?	+ 5	—	—	—
Garm		7·6	320	e 1 54	− 1	3 20	− 3	—	—	—
Obi-garm		7·7	316	i 1 56	0	e 3 23	− 2	—	—	—
Fergana		8·0	333	e 2 2	+ 2	i 3 37	+ 4	—	—	—
Andijan		8·1	337	i 2 4	+ 2	i 3 39	+ 4	—	—	—
Naryn		8·1	357	i 2 8	+ 6	i 3 46	+11	—	—	—
Stalinabad		8·2	312	i 2 4	+ 1	3 39	+ 1	—	—	—
Rybach'e		9·1	358	e 2 22	+ 8	i 4 7	+ 7	—	—	—
Przhevalsk		9·3	9	2 25	+ 8	—	—	—	—	—
Frunse		9·7	352	i 2 28	+ 6	i 4 24	+ 9	—	—	—
Samarkand		9·9	312	2 24	− 1	—	—	—	—	—
Tashkent		9·9	326	e 2 24	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata		10·0	2	i 2 34	+ 7	—	—	—	—	—
Almata II		10·0	4	i 2 34	+ 7	—	—	—	—	—
Krasnogorka		10·0	354	e 2 31	+ 4	—	—	—	—	—
Chilisk		10·4	8	i 2 40	+ 6	—	—	—	—	—
Tchimkent		10·5	331	2 33	− 2	—	—	—	—	—
Mary		12·7	294	e 2 58	− 7	5 18	−10	—	—	—
Bombay	E.	14·7	194	e 3 51	+20	i 6 5	−11	6 30	SS	7·0
Poona		14·9	190	i 3 20	−14	i 6 2	−18	3 30	P	6·6
Calcutta		15·0	133	—	—	e 6 6	−17	—	—	i 8·0
Ashkabad		15·5	293	e 3 36	− 6	i 6 29	− 6	—	—	—
Hyderabad		15·9	173	e 3 46	− 1	e 6 49	+ 5	—	—	7·8
Kizyl-Arvat		17·3	295	4 3	− 1	7 19	+ 3	—	—	—
Kodaikanal	E.	23·0	177	—	—	e 9 2	−12	—	—	—
Nakichevan		25·7	293	e 5 39?	+ 6	10 19?	+18	—	—	—
Erevan		26·4	295	e 5 41	+ 1	e 10 17	+ 5	—	—	—
Tsikhlis-Dzhvari		27·4	299	5 41	− 8	—	—	—	—	—
Ksara		33·7	282	—	—	e 14 14	SS	—	—	e 17·6
Kiruna		46·9	334	i 8 34a	0	e 15 12	−13	e 19 35	SSS	e 22·2
Collmberg	z.	48·7	312	e 8 45	− 3	—	—	—	—	—
Triest	z.	48·8	305	e 9 11	+22	—	—	e 9 29	?	—
Jena		49·6	311	e 8 56	+ 1	—	—	e 11 40	PPP	—
Stuttgart	z.	51·4	309	e 9 6	− 3	—	—	—	—	—
Strasbourg		52·4	309	e 9 14	− 2	—	—	—	—	—
Paris		55·8	310	i 9 36	− 5	—	—	—	—	—
Tamanrasset	z.	62·5	280	i 10 21a	− 7	—	—	e 12 36	PP	—
Grahamstown	z.	81·2	220	i 12 45	+26	—	—	—	—	—

Additional readings :—
New Delhi P*EN = 1m.16s., PPPEN = 1m.20s., iEN = 1m.43s., SSEN = 2m.17s., S*EN = 2m.22s., S_gEN = 2m.34s.
Bombay QE = 5m.53s., SSSE = 6m.43s.
Poona QE = 5m.56s., SSE = 6m.20s., SSSE = 6m.32s.
Kiruna iZ = 8m.37s. and 8m.57s.
Jena eN = 10m.6s.
Strasbourg e = 9m.37s. and 10m.15s.
Paris i = 9m.42s. and 10m.4s.

Sept. 12d. Readings also at 0h. (China Lake, and Palomar), 2h. (near Huancayo and near Santa Lucia), 4h. (near Mizusawa), 5h. (Poona, Kiruna, Stuttgart, Collmberg, Tamanrasset, Harvard, Ottawa, Bermuda, and near Manila), 6h. (near Garm), 8h. (Manila), 10h. (near Huancayo), 13h. (Palomar, China Lake, Victoria, Mizusawa, Stuttgart, near Dzhergetal, Fergana, and Garm), 15h. (Antofagasta, Huancayo, La Paz, Palomar, Pasadena, Riverside, China Lake, Tinemaha, Harvard, and Ottawa), 16h. (Victoria and Strasbourg), 18h. (Nanking, Zi-ka-wei, Calcutta, and Stuttgart), 20h. (Murgab, near Andijan, Dzhergetal, Fergana, Frunse, Garm, Naryn, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 21h. (Almata II).

Sept. 13d. 16h. 26m. 22s. Epicentre 5°·0S. 124°·0E. (as on 1949, April 15d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		16·4	262	e 3 45	− 8	—	—	—	—	—
Djakarta		17·1	265	e 4 0	− 2	e 7 15	+ 3	i 4 10	PP	—
Manila		19·7	351	i 4 38	+ 4	—	—	i 4 59	pP	e 11·2
Brisbane	E.	35·5	132	i 7 5	+ 5	e 12 52	+16	—	—	—
Zi-ka-wei	z.	36·1	357	i 7 8a	+ 3	12 51	+ 6	i 8 39	PP	—
Nanking		37·2	353	i 7 10a	− 5	12 58	− 4	i 8 40	PP	—
Riverview		38·2	142	i 7 26a	+ 3	i 13 25	+ 8	e 16 9	SS	—
Vladivostok		48·4	9	i 8 48	+ 2	—	—	—	—	—
Poona		54·7	297	i 9 30	− 3	i 16 55	−18	14 19	ScP	—
Bombay		55·7	297	i 9 41	+ 1	e 17 20	− 6	11 42	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kabansk		58·7	348	10 5	+ 3	—	—	—	—	—
Irkutsk		59·5	346	10 8	+ 1	18 22	+ 6	—	—	—
Naryn		63·6	322	i 10 34	− 1	—	—	—	—	—
Petropvolsak		63·9	24	i 10 38	+ 1	—	—	—	—	—
Almata II		63·9	325	e 10 37	0	—	—	—	—	—
Almata		64·1	325	i 10 39	+ 1	—	—	—	—	—
Rybach'e		64·2	323	i 10 39	0	e 19 18	+ 2	—	—	—
Ili		64·4	325	i 10 41	+ 1	—	—	—	—	—
Frunse		65·3	322	i 10 46	0	i 19 29	0	—	—	—
Andijan		65·6	319	10 48	0	19 34	+ 1	—	—	—
Dzhergetal		65·6	318	i 10 49	+ 1	—	—	—	—	—
Fergana		65·8	319	e 10 49	0	e 19 35	0	—	—	—
Obi-garm		66·4	317	i 10 52	− 1	e 19 39	− 4	—	—	—
Tashkent		67·9	319	i 11 2	0	e 19 59	− 2	—	—	—
Tchimkent		68·2	320	11 4	0	—	—	—	—	—
Samarkand		68·7	316	11 6	− 1	—	—	—	—	—
Mary		71·5	313	i 11 21	− 3	20 43?	0	—	—	—
Kizyl-Arvat		76·1	313	11 46	− 5	—	—	—	—	—
Sverdlovsk		80·0	330	i 12 13	0	22 14	− 3	—	—	—
Shemakla		82·2	312	e 9 57?	?	e 20 6?	?	—	—	—
Kirovobad		83·9	312	i 12 34	+ 1	—	—	—	—	—
Nakhichevan		84·3	310	i 12 48?	+13	23 8?	+ 8	—	—	—
Erevan		85·2	311	e 12 41	+ 2	23 7	− 2	—	—	—
Tiflis		85·3	313	i 12 39	− 1	—	—	—	—	—
Ksara		91·2	304	e 13 11	+ 3	e 23 8	−57	—	—	—
College		93·7	25	13 21	+ 1	—	—	—	—	—
Kimberley	z.	95·7	241	i 13 28	− 1	—	—	—	—	—
Kiruna	z.	99·7	337	i 13 47k	0	—	—	—	—	—
Stuttgart	z.	110·0	320	e 19 6	PP	—	—	—	—	—
Hungry Horse		114·6	38	i 18 47	[+ 5]	—	—	—	—	—
Pasadena	z.	115·7	54	e 18 49	[+ 5]	—	—	—	—	—
China Lake	z.	115·8	52	i 18 49	[+ 4]	—	—	—	—	—
Boulder City		118·0	51	i 18 55	[+ 6]	—	—	—	—	—
Tamanrasset	z.	118·2	293	e 18 53?	[+ 4]	e 19 58	PP	e 29 19	PKKP	—
Ottawa	z.	136·2	20	19 27	[+ 3]	—	—	—	—	—
Weston		140·4	17	e 19 34	[+ 3]	—	—	—	—	—
Bermuda		151·6	15	e 19 55	[+ 5]	—	—	—	—	—
Huancayo		154·4	132	e 20 9	[+15]	—	—	—	—	—
La Paz		155·5	152	i 19 57	[+ 2]	37 22	PPS	i 20 38	PKP,	78·6

Additional readings :—
Manila iPP =5m.45s., iS =9m.45s., iScS =10m.56s., eScP =14m.54s.
Bombay iPSEN =17m.30s.
La Paz iPPZ =23m.50s.
Long waves were also recorded at Auckland, Christchurch, and Wellington.

Sept. 13d. Readings also at 0h. (Copenhagen, near Bandong, and Djakarta), 1h. (near Ili, Almata II, Naryn, and near Ashkabad), 3h. (Helwan, Ksara, Copenhagen, Kiruna, Tortosa, and Ashkabad (2)), 4h. (China Lake, Pasadena, Palomar, Tinemaha, Riverside, Lick, Fresno, Mineral, Alberni, near Victoria, near Garm, and near Dzhergetal), 6h. (Mount Wilson, China Lake, Riverside, Tinemaha, Palomar, Manila, Victoria (2), near Alberni, and near Mizusawa), 7h. (Brisbane, and near Garm), 8h. (Andijan, Frunse, Rybach'e, near Almata, Almata II, Chilisk, Ili, Naryn, and Przhevalsk), 9h. (Stuttgart and near Garm), 11h. (China Lake, Mount Wilson, Riverview, and Brisbane), 12h. (Pretoria, near Athens, and near Garm), 13h. (Strasbourg), 14h. (near Manila), 15h. (Palomar, China Lake, Tchimkent, near Samarkand, Obi-garm, Andijan, Dzhergetal, Stalinabad, Fergana, and Garm), 16h. (near Garm), 20h. (China Lake, Palomar, and near Palisades), 21h. (near Dzhergetal and near Tananarive), 22h. (Apia), 23h. (Kimberley, Pretoria, Tamanrasset, and Kiruna).

Sept. 14d. 7h. 7m. 20s. Epicentre 49°·0N. 129°·0W. (as on 1950, April 16d.).

A = −·4145, B = −·5118, C = +·7525; δ = +1; h = −5;
D = −·777, E = +·629; G = −·474, H = −·585, K = −·659.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Alberni		2·8	84	e 0 46	− 1	e 1 20	− 2	—	—	—
Victoria		3·7	97	0 58	− 2	1 47	+ 2	—	—	—
Horseshoe Bay		3·8	82	e 0 45	−16	—	—	—	—	—
Seattle		4·7	104	e 1 49	?	e 2 24	S*	e 2 30	S_g	e 3·5
Shasta Dam		9·5	148	e 2 22	+ 2	—	—	—	—	—
Hungry Horse		9·9	88	i 2 25	0	—	—	—	—	—
Mineral	z.	10·1	146	e 2 30k	+ 1	i 2 42	PPP	i 3 3	?	—
Berkeley		12·1	154	e 2 56a	− 1	e 5 26	SS	e 3 31	?	—
Lick	z.	12·8	153	e 3 5k	− 1	—	—	—	—	—
Fresno	z.	14·0	148	e 3 21k	− 1	—	—	—	—	—
Tinemaha	z.	14·2	143	e 3 29	+ 5	—	—	—	—	—
China Lake	z.	15·6	143	i 3 44	+ 1	—	—	—	—	—
Boulder City		16·7	136	e 3 59	+ 2	—	—	e 4 7	PP	—
Pasadena	z.	16·9	148	i 4 0	+ 1	—	—	i 4 7	PP	—
Riverside	z.	17·3	146	e 4 4	0	—	—	—	—	—
Palomar	z.	18·1	146	e 4 15	+ 1	—	—	—	—	—
College		18·8	336	e 4 22	− 1	—	—	—	—	—
Tucson		21·6	134	e 4 53	− 1	—	—	—	—	—
Fayetteville		28·5	103	i 7 2	PPP	—	—	—	—	—
Cleveland	z.	33·8	85	—	—	i 14 27	SS	—	—	—
Ottawa		35·8	75	7 2	− 1	—	—	—	—	—

Additional readings :—
Victoria e = 1m.1s. and 1m.27s.
Seattle e = 3m.21s.
Lick eZ = 3m.54s. and 4m.11s.
Long waves were also recorded at Palisades.

Sept. 14d. Readings also at 0h. (Manila, Kiruna, and near Garm), 1h. (Nanking, Naryn, Frunse, near Obi-garm, Stalinabad, Garm, Dzhergetal, Samarkand, Fergana, and Andijan), 4h. (Fergana, Samarkand, near Dzhergetal, Garm, and Obi-garm), 5h. (Kimberley, Santa Lucia, Fresno, Lick, and Mineral), 8h. (Victoria, Zi-ka-wei, Nanking, Manila, and near Istanbul), 12h. (Kimberley and Christchurch), 13h. (Aberdeen and near Manila), 15h. (Pasadena, Riverside, Palomar, China Lake, Tinemaha, Berkeley, Lick, Fresno, and near Naryn), 16h. (Port au Prince), 17h. (Manila), 18h. (Almata, Chilisk, near Fergana, Murgab, Naryn, Dzhergetal, Frunse, Andijan, Garm, Krasnogorka, Obi-garm, Tchimkent, Almata II, Stalinabad, Przhevalsk, and Ili), 19h. (Pasadena, Riverside, Palomar, China Lake, Tinemaha, and Ashkabad), 20h. (Zi-ka-wei, Nanking, Manila, Stuttgart, and Kew), 21h. (Paris and Antofagasta), 22h. (Chinchina, near Bogota, and near Rome), 23h. (Brisbane, College, Shasta Dam, Mineral, Fresno, Lick, Mount Wilson, and China Lake).

Sept. 15d. 0h. 56m. 15s. Epicentre 33°·3N. 76°·5E. (as on 12d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
New Delhi	E.	4·7	173	e 1 9	− 5	i 2 4	− 6	1 26	P_g
Murgab		5·5	338	e 1 28	+ 3	—	—	—	—
Dzhergetal		7·3	326	e 1 52	+ 2	i 3 19	+ 4	—	—
Garm		7·6	320	e 1 54	− 1	—	—	—	—
Obi-garm		7·7	316	i 1 59	+ 3	—	—	—	—
Fergana		8·0	333	e 2 0	0	e 3 32	− 1	—	—
Andijan		8·1	337	e 2 0	− 2	3 32	− 3	—	—
Naryn		8·1	357	e 2 4	+ 2	i 3 42	+ 7	—	—
Stalinabad		8·2	312	i 2 1	− 2	e 3 33	− 5	—	—
Przhevalsk		9·3	9	e 2 27	+10	—	—	—	—
Frunse		9·7	352	e 2 27	+ 5	e 4 23	+ 8	—	—
Samarkand		9·9	312	2 23	− 2	4 16	− 4	—	—
Almata II		10·0	4	2 30	+ 3	—	—	—	—
Tchimkent		10·5	331	2 34	− 1	4 32	− 3	—	—
Ili		10·7	2	e 2 37	− 1	—	—	—	—
Bombay		14·7	194	e 2 45?	−46	—	—	—	—
Poona		14·9	190	i 3 18	−16	e 5 49	−31	—	—

New Delhi gives also P*E = 1m.15s., PPPE = 1m.21s., SSE = 2m.15s., S*E = 2m.18s.?, iE = 2m.23s., SSSE = 2m.25s., S_gE = 2m.30s.

Sept. 15d. 8h. 11m. 24s. Epicentre 18°·5N. 66°·0W. Depth of focus 0·010.
(as on 1946, March 9d.).

A = +·3860, B = −·8669, C = +·3154 ; δ = −1 ; h = +5 ;
D = −·914, E = −·407 ; G = +·128, H = −·288, K = −·949.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
San Juan		0·2	224	i 0 14	0	i 0 24	− 1	—	—
Port au Prince		6·0	272	e 2 40	S	(e 2 40)	+ 4	—	—
Bermuda		13·9	5	i 3 8	− 6	e 5 23	−23	—	—
Bogota		15·9	211	e 3 41	+ 2	e 6 44	+12	—	—
Washington		22·5	338	e 4 56	+ 4	e 8 54	+ 6	—	—
City College, N.Y.		23·3	345	e 5 18	+18	i 9 23	+21	—	—
Fordham		23·3	345	i 5 22	+22	i 9 20	+18	—	—
Palisades		23·4	345	e 5 11	+10	i 9 26	+23	i 5 23	pP
Weston		24·2	351	e 5 9	+ 1	e 9 31	+14	i 5 34	pP
Harvard		24·4	351	i 5 12	+ 2	e 9 35	+15	i 5 34	pP
Ottawa		28·0	345	e 6 6	+22	11 17	+58	6 27	pP
Fayetteville		30·4	312	i 6 6	+ 1	—	—	—	—
Huancayo		31·7	197	i 6 17	+ 1	—	—	—	—
Tucson		42·5	298	e 7 49	+ 2	—	—	—	—
Boulder City		46·3	303	i 8 20	+ 2	—	—	—	—
Palomar	z.	47·6	298	i 8 31	+ 3	—	—	e 8 50	pP
Riverside	z.	47·9	299	i 8 34	+ 4	—	—	e 8 56	pP
Haiwee	z.	48·8	302	i 8 40	+ 3	—	—	—	—
Hungry Horse		48·8	319	i 8 38	+ 1	—	—	i 9 0	pP
Pasadena	z.	48·8	299	i 8 39	+ 2	—	—	i 9 1	pP
Tinemaha		49·2	303	e 8 38	− 2	—	—	—	—
Lick	z.	51·9	304	i 9 2k	+ 1	—	—	i 9 25	pP
Mineral	z.	52·2	307	i 9 2k	− 1	—	—	i 9 58	?
Shasta Dam		52·8	307	i 9 7	− 1	—	—	—	—
Victoria		54·9	317	e 9 20	− 3	—	—	—	—
Algiers Univ.	z.	62·6	57	e 10 12	− 4	—	—	—	—
Tamanrasset	z.	66·5	73	i 10 39k	− 2	—	—	i 11 0	pP
College		69·9	333	i 11 1	− 1	—	—	—	—

Additional readings :—
Port au Prince i = 2m.49s. and 3m.9s., iS = 3m.19s., i = 3m.35s.
Ottawa i = 11m.40s., sS = 11m.56s.

Sept. 15d. 12h. 54m. 25s. Epicentre 37°·1N. 71°·2E. Depth of focus 0·025.
(as on 1951, May 14d.).

A = +·2577, B = +·7569, C = +·6006 ; δ = +3 ; h = −1 ;
D = +·947, E = −·322 ; G = +·194, H = +·569, K = −·800.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Garm	2·0	340	i 0 38	0	1 8	0
Obi-garm	2·0	324	e 0 36?	− 2	e 1 7?	− 1
Dzhergetal	2·1	0	e 0 41	+ 2	i 1 12	+ 2
Stalinabad	2·4	307	i 0 42	− 1	i 1 15	− 1
Murgab	2·5	60	i 0 42	− 2	i 1 14	− 4
Fergana	3·3	7	e 0 53	0	e 1 35	0
Andijan	3·8	13	e 0 58	− 2	e 1 44	− 2
Samarkand	4·2	309	1 6	+ 1	e 1 57	+ 2
Lunacharskoe	4·5	341	—	—	e 2 5	+ 3
Tashkent	4·5	341	—	—	e 2 3	+ 1
Tchimkent	5·3	347	1 21	+ 2	e 2 24	+ 4
Naryn	5·7	39	—	—	i 2 35	+ 6
Frunse	6·3	22	—	—	i 2 47	+ 4
Almata II	7·8	35	e 1 53	+ 2	i 3 18	− 1
Ili	8·2	31	e 1 36	−21	—	—
Ashkabad	10·2	279	—	—	e 4 13	− 2
Kizyl-Arvat	11·9	284	—	—	i 4 57	+ 3

Sept. 15d. 22h. 24m. 20s. Epicentre 36°·4N. 140°·6E. Depth of focus 0·010.
(as on 1950, March 28d.).

Intensity IV at Mito, Kakioka, Manabe, Hokota, Kasama, Makabe, Ose, Miyamoto, etc.; II-III at Utunomiya, Onahama, Hukusima, Otu, Asio, Hirano, Katono, etc.
Epicentre 36°·5N. 140°·5E. Depth 80km.

Seismological Bulletin of the Cent. Met. Obs., Japan, for September, 1951, Tokyo, 1951, p. 223, with macroseismic chart.

$A = -·6235$, $B = +·5121$, $C = +·5908$; $\delta = +4$; $h = 0$;
$D = +·635$, $E = +·773$; $G = -·457$, $H = +·375$, $K = -·807$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Mito		0·1	261	0 11	− 3	0 21	− 3
Kakioka		0·4	244	0 13	− 2	0 23	− 4
Tukubasan		0·5	246	0 18	+ 2	0 29	+ 1
Onahama		0·6	24	0 16k	− 1	0 28	− 1
Utunomiya		0·6	284	0 15k	− 2	0 27	− 2
Tyosi		0·7	162	0 17	− 1	0 29	− 2
Tokyo		1·0	224	0 20k	0	0 37	+ 1
Inawasiro		1·2	342	0 22k	− 1	0 39	− 1
Maebasi		1·3	270	0 22	− 2	0 39	− 3
Titibu		1·3	251	0 24	0	0 40	− 2
Yokohama		1·3	219	0 23	− 1	0 40	− 2
Hukusima		1·4	356	0 24k	− 1	0 41	− 3
Mera		1·6	203	0 24	− 4	0 45	− 4
Oiwake		1·6	268	0 28	0	0 48	− 1
Ajiro		1·8	222	0 29	− 1	0 50	− 3
Hunatu		1·8	239	0 29	− 1	0 49	− 4
Kohu		1·8	245	0 32	+ 2	0 52	− 1
Misima		1·8	226	0 25	− 5	0 51	− 2
Matusiro		1·9	274	0 38	+ 6	1 5	+10
Osima		1·9	211	0 26	− 6	0 50	− 5
Sendai		1·9	7	0 30	− 2	0 50	− 5
Nagano		2·0	278	0 32	− 1	0 58	+ 1
Isinomaki		2·1	16	0 38	+ 4	—	—
Matumoto		2·1	266	0 37	+ 3	1 0	0
Iida		2·4	248	0 39	+ 1	1 6	− 1
Sakata		2·5	346	0 48	+ 8	1 11	+ 1
Mizusawa	E.	2·8	9	0 43	− 1	1 14	− 3
Toyama		2·8	276	0 47	+ 3	1 10	− 7
Nagoya		3·2	247	0 50	0	1 34	+ 7
Morioka		3·3	8	0 55	+ 4	1 31	+ 2
Miyako		3·4	18	0 49	− 3	1 27	− 5
Kameyama		3·7	247	1 6	+10	1 51	+12

Sept. 15d. 22h. 52m. 7s. Epicentre 40°·4N. 28°·0E. (as on 1942, June 16d.).

Felt at Bandirma.

Bulletin séismique annual pour l'année, 1951, Istanbul, 1956.

$A = +·6743$, $B = +·3585$, $C = +·6456$; $\delta = 0$; $h = -2$;
$D = +·469$, $E = -·883$; $G = +·570$, $H = +·303$, $K = -·764$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Istanbul		1·1	50	i 0 27	+ 5	i 0 43	+ 4	—	—	—
Athens		4·1	235	e 1 3	− 2	i 2 8	S*	i 2 18	S_g	—
Sofia		4·2	305	e 1 6	− 1	i 2 2	+ 5	1 25	P_g	—
Belgrade		7·1	311	i 1 37k	−11	i 3 49	S_g	e 2 17	P_g	i 4·1
Timisoara	N.	7·3	320	e 1 50	0	i 3 22	+ 7	i 2 27	P_g	—
Taranto		8·2	276	e 2 59	P_g	e 4 4	S*	—	—	—
Kalossa		9·0	316	e 2 46	P*	i 5 5	S_g	e 2 56	P_g	e 6·6
Ksara		9·1	134	e 2 53	P_g	4 48?	S_g	—	—	—
Budapest	E.	9·6	321	2 30	+ 9	i 5 26	S_g	—	—	6·5
Messina		9·9	261	e 2 35	+10	e 4 9	−11	—	—	5·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ogyalla		10·3	320	—	—	e 4 21	− 9	e 5 40	S_g	e 6·0
Skalnate Pleso		10·4	331	e 3 4	?	e 4 19	−13	e 5 40	S_g	e 6·3
Helwan	z.	10·9	164	e 2 35	− 5	—	—	i 2 59	PPP	—
Triest		11·7	302	e 2 41	−10	e 4 50	−16	—	—	i 6·5
Rome		11·8	282	e 3 7	PPP	e 5 15	+ 9	—	—	6·0
Raciborzu		11·9	328	e 2 38	?	e 5 17	+ 8	i 8 30	PcP	e 7·6
Prato		13·0	291	e 3 8	− 1	—	—	—	—	—
Prague		13·6	320	e 3 19	+ 2	e 5 49	− 1	e 3 33	PP	e 8·4
Cheb		14·6	317	e 5 14	?	—	—	—	—	—
Pavia		14·6	295	e 3 42	PP	—	—	e 7 9	Q	e 8·4
Collmberg		15·0	321	e 3 35	0	e 6 52	SSS	—	—	e 8·8
Jena		15·5	318	e 3 42	0	e 6 40	+ 5	e 4 58	?	e 8·7
Zürich		15·6	303	e 3 46	± 3	—	—	—	—	e 8·4
Stuttgart		15·8	308	e 3 48	+ 3	e 6 41	− 1	e 3 51	P	e 7·9
Basle		16·3	303	e 3 55	+ 3	—	—	—	—	e 8·7
Karlsruhe	z.	16·3	308	e 3 59	+ 7	—	—	—	—	—
Strasbourg		16·6	307	i 3 59a	+ 3	e 7 9	+ 9	i 4 26	PPP	e 8·9
Copenhagen		18·4	332	e 4 27	+ 9	—	—	—	—	9·8
Algiers Univ.	z.	19·8	266	e 4 32	− 3	e 8 37	SS	e 5 1	PPP	—
Paris		20·0	303	e 4 35	− 2	i 8 24	+ 7	i 8 50	PcP	e 9·9
Alicante		22·1	274	4 56	− 3	9 6	+ 8	12 36	PcS	e 11·1
Kew		22·4	310	e 5 6	+ 4	e 9 13	+ 9	—	—	e 11·9
Almeria		24·0	271	6 51	+94	10 55	+85	—	—	14·2
Toledo		24·4	279	i 5 23	+ 2	10 6	+27	i 5 32	?	—
Granada		24·8	273	i 5 38k	+13	i 9 53	+ 7	i 6 43	?	13·4
Aberdeen	E.	25·7	323	—	—	i 10 33	?	—	—	e 17·2
Tamanrasset	z.	25·9	234	e 5 34a	− 1	e 10 4	0	e 9 1	PcP	—
Rathfarnham Castle		26·5	311	e 5 43	+ 2	e 10 26	+12	—	—	e 12·9
Kiruna		27·8	354	i 5 52	− 1	—	—	—	—	e 14·6
Kimberley	z.	68·9	182	(i 11 9)	0	—	—	—	—	—
Weston		70·0	309	(i 11 14)	− 1	—	—	—	—	—
College		75·0	358	e 11 44	− 1	—	—	—	—	—
Hungry Horse		85·4	336	i 12 41	+ 1	—	—	—	—	—
Fayetteville		87·2	316	i 12 55	+ 6	—	—	—	—	—
Boulder City		96·7	330	e 13 44	+11	—	—	e 13 56	?	—

Additional readings and notes :—
Athens i = 1m.18s. and 1m.42s.
Sofia P*EN = 1m.15s., eEN = 1m.28s., S*EN = 2m.15s., iS_gEN = 2m.27s.
Belgrade eNW = 3m.23s., eP_gS_gNE = 3m.39s., iZ = 3m.55s.
Timisoara eP*E = 2m.11s., iS*EN = 3m.47s.
Kalossa eN = 5m.8s., iE = 5m.26s. and 6m.2s., eN = 6m.23s.
Budapest eN = 2m.53s.?, iE = 3m.25s., iN = 5m.8s.
Ogyalla eN = 4m.40s. and 5m.30s.
Skalnate Pleso eN = 6m.1s.
Triest eP_gP_g = 3m.43s.?, iS_gS_g = 6m.15s.
Raciborzu ePPZ = 3m.8s., ePPPE = 3m.15s., eN = 4m.32s., iE = 7m.24s.
Prague e = 4m.22s., 6m.35s., 7m.13s., and 7m.36s., i = 8m.1s.
Strasbourg e = 4m.49s.
Algiers Univ. iZ = 4m.37s., eZ = 5m.15s., iZ = 6m.3s.
Paris iPP = 4m.48s., iPPP = 5m.3s., i = 6m.10s., e = 8m.0s., eSS = 8m.39s.
Alicante Q = 9m.39s., SSS = 9m.58s.
Tamanrasset ePPZ = 6m.15s., ePPPZ = 6m.28s., eZ = 6m.54s.
Kiruna iZ = 5m.56s., eE = 13m.12s., eZ = 13m.16s.
Kimberley reading has been increased by 6m.
Weston reading has been increased by 15m.
Long waves were also recorded at Kecskemet, Potsdam, De Bilt, and Upsala.

Sept. 15d. Readings also at 4h. (near Garm), 7h. (near Istanbul), 10h. (near Dzhergetal), 11h. (Santa Lucia), 12h. (near Dzhergetal), 13h. (Lick), 15h. (near Garm (2)), 16h. (Huancayo, Mount Wilson, Riverside, Palomar, Tamanrasset, and Ksara), 17h. (Grahamstown, Mount Wilson, Riverside, Palomar, China Lake, and Tinemaha), 18h. (near Naryn), 20h. (Mount Wilson, Riverside, Palomar, China Lake, Tinemaha, near Klyuchi, near Chilisk, Przhevalsk, Almata II, and Ili), 21h. (near Bucharest), 22h. (Tamanrasset), 23h. (Antofagasta, Mount Wilson, Riverside, Palomar, and near Garm.).

Sept. 16d. 1h. 32m. 0s. Epicentre 15°·0S. 167°·4E. Depth of focus 0·010.

A = −·9431, B = +·2108, C = −·2572; δ = +3; h = +5;
D = +·218, E = +·976; G = +·251, H = −·056, K = −·966.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		18·2	225	i 4 11a	+ 3	i 7 32	+ 8	i 4 45	PPP	—
Apia		20·2	89	4 36	+ 7	e 8 51	SSS	—	—	—
Riverview		23·8	216	i 5 6a	+ 1	e 9 14	+ 4	i 5 39	PP	e 11·2
Tuai	N.	25·2	163	e 5 14	− 4	e 9 28	−6	5 0	?	—
Cobb River	E.	26·4	172	e 5 29	0	—	—	e 8 23	?	—
Wellington		27·0	169	i 5 32	− 3	e 10 6	+ 3	—	—	e 19·1
Kaimata	N.E.	27·6	174	i 5 40	0	—	—	—	—	—
Christchurch		28·8	172	e 5 51	0	—	—	—	—	—
Manila		54·5	301	i 9 20	0	i 15 14	?	e 10 34	PcP	—
Zi-ka-wei	Z.	63·7	317	e 10 23	0	i 16 49	?	—	—	—
Nanking		66·0	316	e 10 40	+ 2	19 18	+ 1	—	—	—
Berkeley	Z.	84·3	49	e 12 22	0	—	—	e 12 48	pP	—
Lick	Z.	84·5	49	e 12 24a	+ 1	—	—	i 13 2	sP	—
Shasta Dam		85·3	46	i 12 27	0	—	—	—	—	—
Fresno	Z.	85·6	50	e 12 28a	− 1	—	—	e 15 50	PP	—
Mineral	Z.	85·7	47	e 12 30k	+ 1	—	—	e 13 6	sP	—
Pasadena		85·9	54	i 12 30	0	—	—	i 13 5	sP	—
Riverside	Z.	86·5	54	i 12 32	− 1	—	—	i 13 8	sP	—
College		86·5	18	12 33	0	—	—	—	—	—
Palomar	Z.	86·6	55	i 12 34a	0	—	—	i 13 11	sP	—
Reno	Z.	86·7	48	e 12 36a	+ 2	—	—	e 13 30	?	—
China Lake		86·9	52	i 12 36	+ 1	—	—	i 13 13	sP	—
Tinemaha	Z.	86·9	51	i 12 34	− 1	—	—	i 13 12	sP	—
Boulder City		89·1	53	i 12 47	+ 1	—	—	i 13 23	sP	—
Tucson		91·1	57	i 12 55	0	—	—	i 13 31	sP	—
Hungry Horse		93·7	41	e 13 7	0	—	—	—	—	—
Tacubaya		98·0	72	—	—	e 25 28	PS	e 23 1	?	—
Ottawa		119·4	46	18 37	[− 2]	—	—	—	—	—
Kiruna	Z.	123·1	346	i 18 44a	[− 2]	—	—	—	—	—
Pretoria	Z.	123·3	226	i 21 16?	PP	—	—	—	—	—
Kimberley	Z.	123·4	139	i 18 47	[0]	—	—	—	—	—
Ksara		132·5	303	e 19 8	[+ 4]	—	—	e 21 30	PP	—
Collmberg	Z.	138·4	337	e 19 7	[− 8]	e 22 55	PKS	e 19 18	?	—
Jena		139·2	337	e 19 13	[− 3]	—	—	e 20 10	?	—
Stuttgart	Z.	141·9	338	e 19 18	[− 3]	—	—	e 20 17	?	—
Triest	Z.	142·3	330	e 19 18	[− 3]	—	—	e 22 32	PP	—
Strasbourg		142·5	338	e 19 20	[− 2]	—	—	e 19 40	pPKP	—
Zürich		143·2	337	e 19 22k	[− 1]	—	—	e 20 30	?	e 92·4
Basle		143·5	337	e 19 23	[0]	—	—	—	—	—
Paris		144·1	344	i 19 25	[+ 1]	—	—	i 19 45	pPKP	—
Prato		144·8	330	i 19 24	[− 2]	—	—	i 19 42	pPKP	—
Rome		145·5	326	i 19 27a	[0]	—	—	e 20 49	?	—
Messina		146·1	319	e 19 36	[+ 8]	—	—	e 21 20	?	—
Clermont-Ferrand		146·6	340	e 19 36	[+ 7]	—	—	e 20 24	?	—
Algiers Univ.	Z.	154·2	330	i 19 42?k	[+ 2]	—	—	i 20 4?	pPKP	—
Tamanrasset	Z.	161·2	299	i 19 51k	[+ 2]	—	—	e 20 17	pPKP	—

Additional readings :—
Riverview iPPPE = 5m.48s., iEZ = 9m.27s., iN = 9m.55s.
Manila ePPP = 10m.59s.
Berkeley eZ = 12m.58s.
Lick iZ = 12m.28s.
Jena eZ = 19m.17s.
Triest epPKP?Z = 20m.17s.
Strasbourg e = 20m.14s., 21m.10s., and 21m.44s.
Paris i = 20m.0s. and 20m.26s.
Algiers Univ. eZ = 19m.50s.?, ePKP$_2$Z = 20m.15s.?, epPKP$_2$Z = 20m.40s.?, ePPZ = 23m.46s.?.
Tamanrasset ePKP$_2$Z = 20m.36s., ePPZ = 24m.20s., epPPZ = 24m.38s.

Sept. 16d. 1h. 43m. 28s. Epicentre 16°·8N. 146°·4E. Depth of focus 0·020.

A = −·7978, B = +·5301, C = +·2873; δ = +3; h = +5;
D = +·553, E = +·833; G = −·248, H = +·159, K = −·958.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		3·7	205	e 1 8	+11	—	—	—	—	—
Misima		19·4	342	e 4 15	− 1	7 45	+ 3	—	—	8·8
Kameyama		20·0	335	e 4 25	+ 3	—	—	—	—	—
Osaka		20·3	334	e 4 38	+13	e 7 53	− 5	—	—	—
Sumoto		20·3	333	e 4 25	0	—	—	e 6 35	?	—
Koti		20·3	327	e 4 22	− 3	e 7 57	− 1	e 4 54	PP	—
Nagano	N.	21·1	342	e 4 37	+ 4	e 8 9	− 4	—	—	—
Inawasiro		21·4	346	e 4 33	− 3	e 8 16	− 2	—	—	—
Hukusima		21·5	347	e 4 36	− 1	e 8 33	+13	—	—	—
Sendai	E.	21·9	348	e 4 54	+13	e 8 27	0	—	—	—
Manila		24·6	270	i 5 0	− 7	i 9 0	−13	e 5 33	pP	e 10·9
Irkutsk		48·4	327	e 10 39	PP	—	—	—	—	—
Przhevalsk		62·7	310	i 10 7	− 3	—	—	—	—	—
Almata II		63·5	312	e 10 11	− 4	—	—	—	—	—
Ili		63·7	313	i 10 10	− 7	—	—	—	—	—
Naryn		64·5	309	i 10 17	− 5	—	—	—	—	—
College		64·7	25	10 21	− 2	—	—	—	—	—
Colombo		65·6	271	10 32?	+ 3	—	—	—	—	—
Murgab		66·1	306	e 10 27	− 5	—	—	—	—	—
Andijan		67·2	308	i 10 35?	− 4	e 19 18?	− 1	—	—	—
Fergana		67·7	308	i 10 35	− 7	—	—	—	—	—
Khorog		68·0	304	e 10 40	− 4	—	—	—	—	—
Dzhergetal		68·2	307	i 10 42	− 3	e 19 20	−11	—	—	—
Poona	Z.	68·7	285	i 10 43	− 5	—	—	—	—	—
Obi-garm		69·4	307	i 10 40	−12	—	—	—	—	—
Lunacharskoe		69·5	309	10 50	− 3	19 40	− 6	—	—	—
Tashkent		69·5	309	i 10 48	− 5	i 19 39	− 7	—	—	—
Bombay		69·6	285	e 12 32?	?	e 19 32	−15	—	—	—
Stalinabad		70·2	307	i 10 52	− 5	—	—	—	—	—
Sverdlovsk		73·8	326	i 12 13	?	—	—	—	—	—
Victoria		77·7	43	e 11 41k	+ 1	—	—	—	—	—
Seattle		78·6	44	i 11 49k	+ 4	—	—	e 11 55	PcP	—
Shasta Dam		80·1	51	i 11 56	+ 3	—	—	—	—	—
Mineral	Z.	80·8	51	i 11 59k	+ 2	—	—	i 12 4	PcP	—
Berkeley		80·9	54	i 12 1k	+ 3	e 21 57	+ 6	e 23 22	PPS	e 40·0
Lick	Z.	81·5	54	i 12 3k	+ 2	—	—	i 15 14	PP	—
Reno		82·4	51	e 12 8a	+ 3	e 22 10	+ 4	—	—	—
Fresno	Z.	83·1	54	e 12 11a	+ 2	—	—	e 12 48	pP	—
Hungry Horse		83·8	42	i 12 14	+ 2	e 22 16	− 4	—	—	—
Tinemaha		84·2	54	i 12 16k	+ 2	—	—	e 13 1	pP	—
China Lake		85·1	54	i 12 21k	+ 2	e 22 28	[+ 4]	i 22 37	S	—
Pasadena		85·1	56	i 12 21k	+ 2	—	—	i 13 4	pP	—
Butte		85·5	43	i 12 22	+ 1	—	—	i 13 5	pP	—
Riverside	Z.	85·8	56	i 12 24k	+ 2	—	—	—	—	—
Palomar		86·4	56	i 12 25k	0	i 22 16	[−17]	e 22 6	?	—
Kiruna	Z.	87·0	342	i 12 23a	− 5	—	—	i 13 5	pP	—
Boulder City		87·2	54	i 12 31	+ 2	i 22 58	+ 5	—	—	—
Tucson		91·5	56	i 12 52	+ 3	—	—	—	—	—
Tamanrasset	Z.	125·1	315	e 18 38	[− 3]	—	—	i 20 31	PP	—
Huancayo		139·4	89	(e 18 0)	[−69]	—	—	—	—	e 18·0
La Paz		146·9	94	i 19 28	[+ 6]	—	—	e 18 54	?	—

Additional readings :—
Manila iPP = 5m.24s.
Seattle i = 12m.20s., 12m.35s., 12m.55s., and 13m.13s.
Berkeley eZ = 12m.16s. and 13m.52s., eN = 35m.7s., eEN = 36m.52s.
Lick iZ = 12m.13s., 12m.48s., and 13m.11s.
Tinemaha iZ = 13m.5s.
La Paz i = 20m.38s.
Long waves were also recorded at Palisades.

Sept. 16d. 11h. 42m. 52s. Epicentre 19°·2N. 155°·5W. (as on 1951, August 21d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Honolulu		3·0	314	e 0 45	− 5	i 1 19	− 8	—	—	—
Berkeley		34·4	51	e 6 52	+ 1	e 14 8	SS	e 6 28	?	e 15·7
Lick	Z.	34·6	51	e 6 52a	− 1	—	—	i 7 6	?	—
Mineral	Z.	35·9	46	e 7 2a	− 2	—	—	i 7 16	?	—
Pasadena	Z.	36·3	58	e 7 8	+ 1	—	—	—	—	—
Reno	Z.	36·8	48	e 7 17	+ 6	—	—	—	—	—
Tinemaha	Z.	37·1	54	e 7 15	+ 1	—	—	—	—	—
Palomar	Z.	37·2	59	e 7 13	− 2	—	—	—	—	—
China Lake	E.	37·2	54	e 7 13	− 2	—	—	—	—	—
Boulder City		39·4	55	e 7 32	− 1	—	—	—	—	—
Tucson		42·0	62	e 7 53	− 1	—	—	—	—	—
Butte		44·2	43	e 8 10	− 2	—	—	—	—	—
Hungry Horse		44·3	38	e 8 11	− 2	—	—	—	—	—
College		45·9	4	e 8 22	− 4	—	—	—	—	—
Fayetteville		56·0	58	i 9 45	+ 2	—	—	—	—	—
Pennsylvania	N.	68·5	52	—	—	20 33	PS	—	—	—
Palisades		71·4	52	—	—	e 25 52	SS	—	—	e 33·1
Weston		73·1	50	e 11 38	+ 4	—	—	—	—	—

Additional readings :—
Lick iZ = 7m.16s.
Mineral iZ = 7m.5s.
Long waves were also recorded at Santa Clara and Seattle.

Sept. 16d. 16h. 38m. 4s. Epicentre 22°·3S. 176°·8W. Depth of focus 0·025.
(as on 1951, March 31d.).

A = −·9246, B = −·0517, C = −·3773 ; δ = −9 ; h = +4 ;
D = −·056, E = +·998 ; G = +·377, H = +·021, K = −·926.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		9·7	30	—	—	e 3 51	−12	—	—
Karapiro	N.	16·9	201	3 56	+ 9	6 56	+ 9	—	—
Tuai	N.	17·3	196	e 3 39	−12	e 6 33	−22	—	—
New Plymouth	E.	18·5	202	e 4 1	− 3	e 7 18	− 2	—	—
Wellington		20·2	199	e 4 12	− 9	7 40	−12	—	—
Cobb River	E.	20·7	204	e 4 23	− 3	e 7 52	− 9	—	—
Kaimata	N.E.	22·4	203	4 41	− 2	e 8 29	− 2	—	—
Christchurch		22·9	200	e 4 36	−12	e 8 37	− 3	—	—
Brisbane		27·8	253	i 5 34k	+ 1	i 10 0	0	—	—
Riverview	N.	30·4	240	i 6 1	+ 5	—	—	—	—
Lick	Z.	78·8	42	e 11 45a	+ 2	—	—	i 12 29	pP
Pasadena	Z.	79·2	46	e 11 45	0	—	—	e 12 33	pP
Palomar	Z.	79·5	47	e 11 48	+ 1	—	—	e 12 32	pP
Riverside	Z.	79·5	46	e 11 48	+ 1	—	—	e 12 35	pP
Fresno	Z.	79·6	43	e 11 48a	+ 1	—	—	e 12 34	pP
China Lake		80·5	45	e 11 52	0	e 21 49	+ 8	e 12 38	pP
Mineral	Z.	80·8	40	e 11 54k	+ 1	—	—	i 12 41	pP
Tinemaha	Z.	80·8	44	e 11 54	+ 1	—	—	e 12 39	pP
Reno	Z.	81·3	41	e 11 59a	+ 3	—	—	e 12 43	pP
Boulder City		82·4	46	i 12 3	+ 1	—	—	—	—
Tucson		83·1	51	e 12 7	+ 1	—	—	i 12 51	pP
Victoria		85·1	32	e 12 17	+ 2	—	—	—	—
College		89·7	11	12 37	0	—	—	i 13 27	pP
Hungry Horse		89·9	36	i 12 38	6	—	—	—	—
Fayetteville		97·2	53	i 12 57	−15	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Tananarive		120·4	230	30 6	PS	25 11	[+ 4]	e 36 55	PSS
Kiruna	Z.	133·2	351	i 18 53	[0]	i 22 6	PKS	i 19 30	pPKP
Rathfarnham C.	Z.	148·2	11	i 19 25	[+ 6]	e 26 40	PP	i 20 0	pPKP
Ksara		149·1	299	i 19 28	[+ 7]	e 30 52	SKKKS	e 23 2	PP
Witteveen	Z.	149·4	355	i 19 29	[+ 8]	—	—	—	—
Raciborzu	Z.	149·9	342	e 19 30	[+ 8]	—	—	e 20 16	pPKP
Collmberg		150·1	349	i 19 29	[+ 7]	—	—	e 19 37	PKP_2
Jena	N.	150·7	349	e 19 30	[+ 7]	—	—	e 19 41	PKP_2
Kew	Z.	150·7	4	i 19 32a	[+ 9]	—	—	i 19 41	PKP_2
Prague		150·9	345	i 19 32	[+ 8]	—	—	e 20 19	pPKP
Ogyalla	N.	151·8	339	e 19 47	PKP_2	—	—	e 20 43	$pPKP_2$
Stuttgart	Z.	152·7	352	e 19 28	[+ 2]	—	—	e 20 26	pPKP
Belgrade	Z.	153·4	332	e 19 38	[+11]	e 22 49	PKS	i 19 50	PKP_2
Paris		153·5	1	e 19 21	[− 7]	—	—	i 19 52	PKP_2
Strasbourg		153·5	353	i 19 38k	[+10]	—	—	e 20 14	pPKP
Helwan	Z.	153·7	293	e 19 34	[+ 6]	—	—	e 19 53	PKP_2
Triest	Z.	155·2	344	e 19 30	[+ 1]	—	—	e 20 29	pPKP
Tamanrasset	Z.	177·8	—	i 19 49k	[+ 2]	—	—	e 20 37	pPKP

Additional readings :—
Lick iZ = 11m.54s.
Rathfarnham Castle iZ = 21m.31s.
Collmberg iZ = 20m.17s.
Prague ePKP_2? = 19m.44s., e = 20m.12s., eZ = 20m.28s., esPKP = 20m.45s., esPKP_2Z = 21m.13s., eZ = 21m.28s.
Ogyalla esPKP_2?N = 21m.8s., eN = 21m.32s.
Stuttgart eZ = 19m.37s. and 19m.49s.
Paris e = 19m.29s., i = 19m.38s.
Strasbourg i = 19m.52s., e = 20m.4s.
Triest iPKP_2Z = 19m.57s.
Tamanrasset isPKPZ = 20m.56s., iPKP_2Z = 21m.40s.?., ePPZ = 25m.31s., eZ = 28m.36s.

Sept. 16d. Readings also at 3h. (Huancayo), 4h. (Weston, Fayetteville, Hungry Horse, Tucson, Boulder City, Tinemaha, Mineral, China Lake, Lick, College, near Mitchell Field, Adak, near Dzhergetal, Fergana, Garm, and near Shemakla), 7h. (Alicante), 10h. (near Alicante), 11h. (near Tsikhlis-Dzhvari), 12h. (Ottawa, Frunse, Naryn, Samarkand, Mary, Rybach'e, near Garm, Fergana, Dzhergetal, Stalinabad, Tashkent, Obi-garm, Andijan, Khorog, Tchimkent, Lunacharskoe, and near Alicante), 13h. (near Dzhergetal), 14h. (near Dzhergetal), 15h. (Tamanrasset (2), College, Hungry Horse, Fayetteville, Weston, Harvard, Tucson, Mineral, Palomar (2), Tinemaha (2), China Lake, Vera Cruz, Oaxaca, near Puebla, and Tacubaya), 16h. (Riverview, Brisbane, Grahamstown, Kimberley, Pretoria, Pietermaritzburg, Murgab, Andijan, Stalinabad, near Obi-garm, Khorog, and Dzhergetal), 17h. (Tashkent, Andijan, Fergana, near Khorog, Dzhergetal, Obi-garm, Stalinabad, and Garm (2)), 19h. (near Frunse, Naryn, Fergana, Andijan, and near Dzhergetal), 20h. (Khorog, Tchimkent, Almata, Przhevalsk, near Garm, Ili, and Almata II), 22h. (La Paz), 23h. (Ili, near Naryn, Prezhevalsk, and Almata II).

Sept. 17d. 11h. 57m. 51s. Epicentre 17°·5S. 172°·2W. Focus at base of Superficial Layers.

$A = -·9455$, $B = -·1295$, $C = -·2989$; $\delta = +8$; $h = +5$;
$D = -·136$, $E = +·991$; $G = +·296$, $H = +·041$, $K = -·954$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Apia		3·7	6	e 0 55	− 1	i 1 33	− 6	—	—	—
Auckland	N.	22·4	208	i 4 57	0	i 8 59	+ 3	e 8 52	S	—
Karapiro	N.	23·0	207	e 5 9?	+ 6	—	—	—	—	—
Tuai	N.	23·2	201	e 5 1	− 4	e 9 3	− 7	—	—	—
New Plymouth	E.	24·6	205	e 5 29	pP	e 9 47	sS	e 10 22	SS	—
Wellington		26·2	203	e 5 30	− 3	10 9	+ 8	—	—	14·4
Cobb River	E.	26·8	206	e 5 45	+ 6	e 10 20	+10	—	—	—
Kaimata	N.E.	28·6	206	e 6 11?	+16	e 10 55	+15	—	—	—
Christchurch		29·0	203	e 6 9	pP	e 11 9	sS	e 13 19	Q	e 15·2
Brisbane		33·5	246	i 6 36a	− 2	e 11 53	− 4	i 6 48	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverview		36·6	236	i 7 2a	− 3	i 12 46	+ 1	i 7 12	pP	e 17·0
Santa Clara		72·2	40	e 11 26	+ 3	—	—	i 11 35	pP	—
Berkeley		72·3	40	i 11 26a	+ 2	e 20 52	+ 8	i 11 34	pP	—
Lick	z.	72·4	40	i 11 25a	0	e 14 1	PP	i 11 34	pP	—
Pasadena		72·7	45	i 11 27a	+ 1	e 21 9	SP	i 11 34	pP	e 32·8
Palomar		73·1	46	e 11 29	0	i 11 47	PcP	i 11 36	pP	—
Riverside	z.	73·1	45	i 11 29a	0	i 11 45	PcP	i 11 37	pP	—
Fresno	z.	73·2	41	e 11 29a	0	e 14 18	PP	e 11 39	pP	—
Manila		73·2	292	i 11 29	0	—	—	—	—	—
China Lake		74·0	43	i 11 34a	0	—	—	i 11 41	pP	—
Mineral	z.	74·3	38	i 11 35a	− 1	e 14 28	PP	i 11 44	pP	—
Tinemaha		74·3	42	i 11 37	+ 1	i 11 55	PcP	i 11 45	pP	—
Reno	z.	74·9	39	e 11 41a	+ 2	—	—	e 11 49	pP	—
Boulder City		76·0	45	i 11 46	0	—	—	i 11 54	pP	—
Tucson		76·8	49	i 11 51	+ 1	e 21 18	−16	—	—	—
Bandoeng		78·6	267	e 11 54	− 6	e 21 51	− 2	—	—	—
Seattle		78·7	32	i 12 10a	+10	—	—	—	—	e 41·2
Victoria		78·8	31	e 12 1	0	—	—	—	—	—
Vladivostok		79·2	322	i 12 3	0	i 22 5	+ 6	—	—	—
Djakarta		79·6	267	—	—	e 21 52	−12	—	—	—
Zi-ka-wei	z.	80·0	308	i 12 7a	− 1	e 22 16	+ 8	—	—	—
Tacubaya		80·5	66	e 12 25	sP	—	—	—	—	—
Nanking		82·4	307	i 12 21a	+ 1	i 22 39	+ 6	—	—	—
Butte		83·0	37	i 12 24	+ 1	—	—	i 12 33	pP	—
Hungry Horse		83·5	35	i 12 25	− 1	—	—	—	—	—
College		84·2	10	i 12 28	− 1	—	—	i 12 37	pP	—
Fayetteville		90·8	52	i 13 2	+ 1	—	—	i 15 31	?	—
Huancayo		92·8	103	e 13 13	+ 3	e 23 49	[+10]	e 30 44	PSS	e 39·8
La Paz		97·9	110	e 13 29	− 5	i 24 17	[+10]	e 17 33	PP	46·6
Kabansk		98·3	322	e 13 45	pP	e 24 26	sSKS	e 17 51	pPP	—
Bogota		99·1	88	—	—	e 24 22	[+ 9]	—	—	47·2
Irkutsk		99·7	322	e 13 43	+ 1	e 24 9	[− 7]	—	—	—
Resolute Bay		102·8	15	—	—	e 25 40	+ 5	e 25 55	sS	e 46·0
Palisades		107·4	51	—	—	e 24 54	[+ 2]	e 38 9	SS	e 51·7
Harvard		109·4	50	i 18 58	PP	—	—	—	—	e 40·4
Poona		117·5	282	18 44	[+ 1]	25 49	sSKS	—	—	—
Naryn		117·6	308	—	—	e 25 45	[+13]	i 27 11	SKKS	—
Bombay	E.	118·5	282	e 19 9?	[+25]	—	—	e 30 2	?	—
Frunse		118·6	310	e 20 0	PP	—	—	—	—	—
Murgab		119·2	305	e 18 50	[+ 5]	e 25 46	[+ 8]	e 20 8	PP	—
Andijan		120·4	308	e 18 49	[+ 1]	—	—	—	—	—
Dzhergetal		121·3	306	e 18 51	[+ 2]	—	—	—	—	—
Tchimkent		122·3	310	e 18 51	[0]	—	—	e 20 24	PP	—
Obi-garm		122·5	306	e 18 53	[+ 1]	—	—	—	—	—
Tashkent		122·7	308	e 18 54	[+ 2]	e 26 2	[+13]	e 20 29	PP	—
Stalinabad		123·3	306	e 18 54	[0]	—	—	—	—	—
Scoresby Sund		124·1	12	e 18 56	[+ 1]	—	—	—	—	65·2
Sverdlovsk		124·5	328	e 18 54	[− 2]	e 26 18?	[+23]	i 20 42	PP	—
Mary		128·8	305	19 6	[+ 1]	22 30	SKP	i 21 11	PP	—
Kiruna	z.	129·0	354	i 19 13	[+ 8]	—	—	—	—	—
Baku		137·2	312	e 19 25?	[+ 5]	e 23 6?	PKS	—	—	—
Shemakha		138·0	313	i 19 26?	[+ 4]	i 23 10?	PKS	—	—	—
Lenkoran		138·5	309	19 21	[− 1]	23 0	PKS	—	—	—
Kirovobad		139·6	313	e 19 26?	[+ 2]	i 23 5?	PKS	i 22 17	PP	—
Goris		140·1	311	19 28	[+ 3]	—	—	e 22 23	PP	—
Tiflis		140·2	316	e 19 18?	[− 7]	e 23 5?	PKS	e 22 18	PP	—
Erevan		141·1	313	e 19 24	[− 3]	22 57	PKS	e 22 24	PP	—
Rathfarnham C.	z.	142·6	14	i 19 32	[+ 2]	—	—	—	—	e 71·2
Witteveen	z.	144·8	0	i 19 34	[0]	—	—	—	—	—
Potsdam		145·0	355	i 19 34a	[0]	—	—	i 19 39	PKP_2	e 75·2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lwow		145·2	342	i 19 35	[+ 1]	—	—	—	—	—
Yalta		145·2	326	e 19 32	[− 2]	—	—	—	—	—
De Bilt		145·4	3	i 19 37	[+ 2]	—	—	e 22 57	PP	e 82·2
Kew		145·5	9	i 19 36a	[+ 1]	—	—	—	—	e 72·2
Kishinev		145·8	335	e 19 37	[+ 2]	—	—	—	—	—
Collmberg	z.	146·0	354	i 19 36	[0]	—	—	e 23 23	PKS	—
Raciborzu	z.	146·4	348	i 19 39	[+ 2]	—	—	—	—	—
Jena		146·5	355	e 19 39	[+ 2]	—	—	e 19 46	PKP_2	—
Skalnate Pleso		146·8	346	e 19 46	[+ 9]	—	—	—	—	—
Prague		147·1	352	i 19 41a	[+ 3]	—	—	e 19 54	pPKP	—
Paris		148·5	7	e 19 42	[+ 2]	e 23 2	SKP	e 19 30	?	e 70·2
Ogyalla		148·5	347	i 19 47	[+ 7]	—	—	e 20 0	pPKP	—
Stuttgart		148·8	358	e 19 41a	[+ 1]	e 36 21	PPS	e 19 46	PKP_2	e 70·2
Strasbourg		149·0	359	i 19 43k	[+ 2]	—	—	i 19 55	PKP_2	e 78·2
Timisoara	N.	149·7	341	e 19 49	[+ 7]	—	—	—	—	—
Basle		150·0	359	e 19 44	[+ 2]	—	—	—	—	—
Ksara		150·1	308	i 19 43	[+ 1]	—	—	23 27	PP	—
Istanbul		150·2	327	e 19 52	[+10]	e 33 9	?	e 23 23	PP	e 76·2
Zürich		150·2	359	e 19 42a	[0]	—	—	e 19 48	?	—
Belgrade		150·8	341	(e 19 44a)	[+ 1]	—	—	(e 19 58)	PKP_2	(e 83·1)
Triest		151·5	352	i 19 43a	[− 1]	e 29 34	?	i 20 5	PKP_2	—
Prato		153·6	354	e 19 56	[+ 8]	—	—	—	—	—
Helwan		155·2	304	i 19 50a	[0]	e 30 54	SKKS	23 53	PP	—
Rome		155·4	353	i 19 49	[− 1]	e 34 8	SKSP	e 44 28	PSS	—
Toledo		155·5	23	e 19 52	[+ 2]	23 58	PP	i 20 29	?	—
Taranto		155·7	343	—	—	e 39 9?	?	—	—	—
Alicante		158·0	18	19 44	[−10]	—	—	e 24 45	?	e 78·2
Granada		158·0	25	i 20 0k	[+ 6]	26 51	[− 3]	20 27	pPKP	77·2
Malaga		158·0	27	i 19 52	[− 2]	—	—	i 24 0	PP	—
Messina		158·3	344	e 20 6	[+12]	e 24 34	PP	e 20 58	PKP_2	—
Almeria		158·7	23	19 53	[− 2]	37 55	PPS	24 19	PP	79·6
Algiers Univ.	z.	160·3	12	i 19 59k	[+ 3]	e 24 23	PP	i 20 39	PKP_2	—
Tamanrasset	z.	174·4	—	i 20 8k	[+ 2]	i 25 32	PP	e 21 38	PKP_2	—

Additional readings :—
Auckalnd iPcP?N =8m.35s.
Brisbane eSE =11m.50s., eE =16m.32s.
Riverview ePPZ =8m.25s., iE =8m.35s., iSE =12m.39s., eQE =15·4m.
Berkeley eN =29m.39s., e =32m.52s.
Lick iZ =12m.33s. and 12m.47s.
Pasadena iZ =11m.44s., eZ =11m.55s., iZ =12m.9s.
Mineral iZ =11m.53s. and 12m.52s.
Seattle i =12m.28s., 12m.46s., and 13m.17s.
Huancayo eS =24m.28s., ePS? =25m.46s., eSSS =34m.25s.
La Paz iPS =26m.33s., SS =31m.9s.
Palisades eSS =33m.30s.
Poona eE =19m.46s. and 20m.26s.
Tashkent ePKS =22m.18s., iSKKS =27m.40s.
Sverdlovsk eSKKS =27m.50s.?, eSS =37m.33s.
Mary iPS =31m.23s.
Erevan SKKS =29m.42s.?.
Kew iZ =19m.45s. and 19m.53s., eZ =20m.5s.
Collmberg iEZ =19m.45s. and 19m.55s., eZ =20m.49s.
Raciborzu eE =19m.50s., eZ =21m.51s.
Jena eN =20m.15s. and 21m.19s.
Skalnate Pleso e =20m.4s., 20m.20s., 20m.37s., and 21m.31s.
Prague e =20m.4s., eN =20m.34s. and 20m.47s., e =21m.18s.
Paris iPP =23m.14s., eSKKS$_2$ =34m.52s., eSSS =48m.34s. and other unidentified readings.
Ogyalla e =20m.18s., 20m.24s., 20m.50s., and 21m.38s., ePP? =22m.37s.
Stuttgart e =19m.54s., eZ =20m.13s., e =24m.33s., eSKKS =29m.45s.
Strasbourg i =19m.47s., 20m.31s., and 20m.43s.
Belgrade eZ =(19m.51s.), readings have been decreased by 1m.
Triest iZ =20m.20s., and 21m.11s.
Helwan PKKPZ =20m.17s.
Rome ePKP$_2$ =20m.33s., ePPZ =24m.13s.
Granada PKP$_2$ =20m.51s., iPP =24m.15s., pPP =24m.33s., PPP =28m.27s., SS =44m.14s., SSS =49m.56s.
Algiers Univ. eZ =20m.6s., iZ =20m.47s., eZ =21m.16s.
Tamanrasset iZ =20m.17s., eZ =20m.41s. and 22m.30s., iPcP,PKPZ =28m.56s.
Long waves were also recorded at Pennsylvania, Ottawa, and Tortosa.

Sept. 17d. 20h. 48m. 2s. Epicentre 3°·8S. 102°·2E. Depth of focus 0·005.
(as on 1949, April 28d.).

A = −·2109, B = +·9753, C = −·0658 ; δ = +2 ; h = +7 :
D = +·977, E = +·211 ; G = +·014, H = −·064, K = −·998.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Djakarta		5·2	117	i 1 14	− 3	i 2 13	− 4	—	—	—
Bandong		6·2	120	e 1 31	0	i 2 43	+ 2	—	—	—
Colombo	E.	24·7	295	5 18	+ 2	—	—	—	—	—
Manila		26·1	43	e 5 29	− 1	—	—	—	—	—
Calcutta		29·5	333	e 7 13	PPP	i 10 50	+ 1	—	—	—
Hyderabad	N.	31·5	312	e 6 18	0	11 21	+ 1	7 11	PP	14·7
Poona		35·7	310	i 6 56	+ 2	12 29	+ 4	8 7	PP	16·1
Bombay		36·7	309	i 8 23	PP	i 12 47	+ 6	13 8	Q	14·4
Nanking		39·0	21	7 24a	+ 2	i 13 21	+ 5	—	—	—
Zi-ka-wei	Z.	39·3	25	i 7 25a	+ 1	—	—	—	—	—
New Delhi		40·2	325	e 7 32	0	i 13 33	− 1	9 5	PP	17·4
Murgab		49·4	331	e 8 47	+ 2	i 15 49	+ 3	—	—	—
Khorog		49·9	328	i 8 50	+ 1	i 15 56	+ 3	—	—	—
Przhevalsk		50·9	338	i 8 58	+ 1	i 16 12	+ 5	—	—	—
Naryn		51·0	335	i 8 58	+ 1	i 16 11	+ 3	i 16 48	sS	—
Dzhergetal		51·5	329	i 9 0	− 1	—	—	—	—	—
Rybach'e		51·8	336	e 9 3?	0	i 16 23?	+ 4	—	—	—
Obi-garm		51·9	328	e 9 4	0	i 16 18	− 3	—	—	—
Almata		52·1	337	i 9 2	− 4	—	—	—	—	—
Andijau		52·1	331	e 9 4	− 2	i 16 25	+ 2	e 9 28	pP	—
Fergana		52·1	331	e 9 7	+ 1	e 16 23	0	—	—	—
Stalinabad		52·3	327	e 9 5	− 2	i 16 23	− 3	—	—	—
Ili		52·6	338	e 9 9	0	i 16 25	− 5	—	—	—
Frunse		52·8	334	i 9 10	− 1	i 16 36	+ 3	e 9 34	pP	—
Brisbane		53·8	122	i 9 18a	0	i 16 47	+ 1	—	—	—
Vladivostok		53·9	27	i 9 20	+ 1	i 16 53	+ 5	—	—	—
Lunacharskoe		54·0	330	e 9 18	− 2	i 16 48	− 1	—	—	—
Tashkent		54·0	330	e 9 19	− 1	i 16 50	+ 1	e 9 41	pP	—
Riverview		54·4	130	i 9 44a	pP	i 16 58	+ 4	—	—	e 27·6
Tchimkent		54·6	331	i 9 23	− 1	i 16 58	+ 1	—	—	—
Kabansk		55·8	3	9 34	+ 1	—	—	—	—	—
Mary		55·8	322	9 36	+ 3	17 11	− 2	9 59	pP	—
Irkutsk		55·9	1	9 34	0	17 20	+ 6	—	—	—
Ashkabad		58·1	320	e 9 49	0	e 17 47	+ 4	—	—	—
Kizyl-Arvat		60·1	320	e 10 10?	+ 7	i 18 8	− 1	—	—	—
Baku		64·9	318	—	—	e 19 11	+ 1	—	—	—
Shemakha		65·9	317	e 10 27?	−14	i 19 6?	−16	—	—	—
Goris		66·9	315	e 10 49	+ 2	i 19 37	+ 3	—	—	—
Kirovobad		67·5	317	e 10 50	− 1	i 19 42	+ 1	—	—	—
Nakhichevan		67·5	314	e 10 55?	+ 4	i 19 41?	0	—	—	—
Erevan		68·5	316	e 11 4	+ 6	19 54	+ 1	—	—	—
Tiflis		69·0	317	e 11 1	0	—	—	—	—	—
Sverdlovsk		69·2	337	i 10 59	− 3	i 20 0	− 1	i 11 24	pP	—
Ksara		72·7	306	e 11 28?	+ 5	i 20 56	+14	—	—	—
Wellington		74·4	132	i 11 31	− 2	—	—	—	—	—
Helwan		75·4	302	e 12 8	+30	e 21 13	+ 1	e 21 55	SP	—
Kimberley	Z.	77·2	241	i 11 17	−32	—	—	—	—	—
Yalta		77·2	317	e 11 48	− 1	—	—	—	—	—
Moscow		79·2	328	e 12 0	0	i 21 52	− 1	—	—	—
Istanbul		79·9	313	e 11 55	− 8	e 22 0	0	e 12 19	pP	—
Kishinev		81·5	318	e 12 12	0	—	—	—	—	—
Athens		83·3	308	e 12 20	− 1	—	—	—	—	—
Pulkovo		84·2	331	e 12 28	+ 2	i 22 47	+ 3	—	—	—
Lwow		85·3	321	12 31	0	22 57	+ 2	i 12 54	pP	—
Taranto		88·6	310	—	—	e 24 9	sS	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Messina		89·7	308	—	—	e 23 14	[− 1]	i 23 43	S	—
Kiruna	Z.	90·4	337	i 12 55a	0	—	—	i 13 13	pP	—
Triest		91·6	315	e 13 6	+ 5	i 23 27	[+ 1]	i 23 56	S	—
Rome		92·3	312	—	—	i 23 32	[+ 2]	i 24 2	S	—
Collmberg	Z.	92·4	320	e 13 6	+ 1	—	—	—	—	—
Copenhagen		93·0	325	—	—	24 13	+ 8	—	—	—
Jena	N.	93·4	320	e 13 30	pP	—	—	e 13 34	?	—
Stuttgart		94·8	318	e 13 17?	+ 1	e 23 45	[+ 1]	e 24 18	SKKS	e 53·0
Strasbourg		95·8	318	—	—	e 23 46	[− 3]	e 31 4	SS	e 50·0
De Bilt		97·3	322	e 26 46	SPP	e 24 46	+ 4	e 24 3	SKS	e 49·0
Tamanrasset	Z.	97·6	293	e 13 27	− 1	—	—	e 13 46	pP	—
Paris		99·2	318	14 22	?	i 26 43	PS	e 27 24	PPS	e 54·0
Kew		100·8	321	—	—	e 24 42	SKKS	—	—	e 52·0
Alicante		102·3	308	13 56	+ 6	24 24	[+ 2]	18 14	PP	e 46·7
Rathfarnham Castle		104·0	324	—	—	—	—	e 41 48	PKP,PKS	—
Granada		104·9	307	e 13 51	−10	24 40	[+ 6]	28 43	PPS	54·3
Victoria		120·9	33	e 18 47	[+ 2]	—	—	—	—	—
Tinemaha	Z.	130·3	43	e 19 6	[+ 3]	e 22 25	SKP	e 22 50	sSKP	—
China Lake		131·4	43	e 19 8	[+ 3]	e 22 30	SKP	—	—	—
Pasadena		131·9	45	e 19 9	[+ 3]	e 22 30	SKP	i 22 54.	sSKP	—
Riverside	Z.	132·5	45	e 19 9	[+ 2]	e 22 32	SKP	e 22 56	sSKP	—
Palomar	Z.	133·2	46	e 19 12	[+ 4]	e 22 30	SKP	e 23 1	sSKP	—
Harvard		141·1	352	e 19 18	[− 5]	—	—	e 22 17	PP	—
Bermuda		149·0	338	i 19 42	[+ 5]	—	—	—	—	—
Bogota		176·2	—	—	—	e 32 54	SKKS	—	—	—

Additional readings :—
Poona PPPE =8m.30s., ScPE =13m.4s., SSEN =14m.28s., SSSEN =14m.54s., ScSEN = 16m.58s.
New Delhi PcSN =14m.1s., SSN =15m.48s., SSSN =16m.18s.
Naryn iPP =9m.22s.
Andijan sS =17m.1s.
Frunse isS =17m.18s.
Helwan eZ =13m.29s., 14m.33s., and 23m.21s.
Istanbul eZ =12m.3s.
Messina e =29m.43s.
Triest ePS =25m.12s., ePPS =25m.53s., eSS =29m.55s.
Rome eSS? =30m.17s.
Stuttgart eZ =13m.32s.
Tamanrasset ePPZ =17m.44s., ePPPZ =19m.58s.
Paris e =26m.31s., eSS =32m.46s.
Kew eSS?Z =40m.56s., ePSS?Z =41m.3s.
Alicante PP =16m.2s., eS =23m.16s.
Long waves were also recorded at Potsdam, Palisades, and Huancayo.

Sept. 17d. Readings also at 0h. (Ksara, Helwan, and Tamanrasset (2)), 2h. (near Dzhergetal), 4h. (Murgab, Fergana, near Khorog, Obi-garm, Garm, and Dzhergetal), 6h. (Andijan, Stalinabad, near Dzhergetal, Garm, and Obi-garm), 7h. (Manila), 9h. (La Paz and Huancayo), 10h. (Fergana, Almata II, Ili, Krasnogorka, near Murgab, Khorog, Dzhergetal, Obi-garm, Andijan, Stalinabad, and Naryn), 11h. (Triest), 14h. (Pretoria, Pietermaritzburg, Kimberley, Grahamstown, and near Palisades), 16h. (Weston, Apia, and near Manila), 18h. (near Palisades), 20h. (near Istanbul), 22h. (Nanking, Zi-ka-wei, and Kiruna).

Sept. 18d. 7h. North Atlantic.
Bermuda iP? =6m.59s.
Weston eP =9m.31s.
Fordham iP =9m.35s., iS =11m.31s.
Palisades iP =9m.35s., eS? =11m.28s.
Harvard iP =9m.36s., eS =11m.29s.
Ottawa PZ =10m.34s., e =10m.56s., S =13m.14s., e =13m.33s. and 13m.43s.
Shawinigan Falls eN =10m.42s.
Fayetteville iP =11m.16s., eS =15m.51s.
Washington eP =11m.50s.
Seven Falls eE =13m.19s.
Tucson e =14m.21s. and 16m.31s.
Hungry Horse iP =14m.31s., i =16m.34s.
Mineral eZ =15m.17s.k.
Lick iPZ =15m,24s.k, iZ =15m,36s.

Sept. 18d. Readings also at 0h. (Algiers Univ. and near Malaga), 2h. (Apia, Kiruna, Stalinabad, near Dzhergetal, Obi-garm, Fergana, Khorog, near Bandong, and Djakarta), 3h. (Pasadena, Palomar (2), China Lake, Tinemaha, and Mount Wilson), 4h. (near Manila), 5h. (Messina and near Obi-garm), 6h. (Huancayo and near Dzhergetal), 8h. (Ksara, Nakhichevan, near Tsikhlis-Dzhvari, Leninakan, Erevan, Tiflis, Goris, Kirovobad, near Almata, Almata II, and Ili), 9h. (Ottawa), 10h. (Manila, near Khorog (2), Garm (2), Dzhergetal (2), Murgab, Obi-garm, and Fergana (2)), 11h. (Tacubaya, Naryn, Tashkent, Tchimkent, near Dzhergetal, Garm, Obi-garm, Fergana, Khorog, Stalinabad, Andijan, and Murgab), 12h. (Ksara, Strasbourg, Karlsruhe, and Kew), 14h. (Karlsruhe and Stuttgart), 15h. (Kiruna, Bombay, Calcutta, near Alicante, and near Istanbul), 17h. (Poona and near Alicante), 18h. (Bandong, Djakarta, Poona, Brisbane, and Kiruna), 19h. (near Garm and near Palisades), 21h. (Przhevalsk, near Krasnogorka, Almata II, Ili, and Chilisk), 22h. (near Garm), 23h. (Messina and near Garm).

Sept. 19d. 4h. 13m. 50s. Epicentre 20°·5S. 69°·8W. Depth of focus 0·010.

Intensity IV in Chile between 20° and 21° south latitudes.
Epicentre 20°·5S. 69°·75W. (Strasbourg). Depth 100km. ca.

F. Greve.
Boletín del año 1951, Instituto Sismológico, Universidad de Chile, Santiago, p. 35.

$A = +·3237$, $B = -·8798$, $C = -·3481$; $\delta = 0$; $h = +5$;
$D = -·938$, $E = -·345$; $G = -·120$, $H = +·327$, $K = -·937$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Antofagasta	E.	3·1	190	e 1 6	+18	e 1 33	+ 9	e 1 54	?	—
La Paz		4·3	22	i 1 3a	− 2	i 1 38	−16	i 1 14	pP	1·8
Copiapo	N.	6·8	184	1 45	+ 6	2 58	+ 3	i 2 4	?	—
Huancayo		9·9	327	e 2 23	+ 2	e 4 32	+21	—	—	—
Santa Lucia	N.	12·9	183	—	—	e 5 55	SSS	6 21	?	6·9
Bogota		25·3	350	e 5 18	− 1	e 9 39	+ 4	—	—	—
Bermuda		52·8	6	e 9 4	− 4	—	—	i 9 28	pP	—
Fayetteville		60·8	338	i 9 4	−60	—	—	—	—	—
Cleveland		62·6	350	i 10 15k	− 1	e 18 30	− 5	i 10 40	pP	—
Weston		62·6	359	i 10 13	− 3	—	—	—	—	—
Harvard		62·7	359	i 10 15	− 2	—	—	—	—	—
Tucson		65·5	323	e 10 37	+ 2	—	—	—	—	—
Ottawa	Z.	65·8	356	10 36	− 1	—	—	i 11 1	pP	—
Kirkland Lake		68·9	353	e 11 22	pP	—	—	—	—	—
Palomar	Z.	69·9	319	i 11 5	+ 3	—	—	e 11 32	pP	—
Boulder City		70·5	323	i 11 9	+ 3	—	—	i 11 34	pP	—
Pasadena	Z.	71·2	319	i 11 13k	+ 3	i 11 49	sP	i 11 38	pP	—
China Lake		72·0	322	i 11 17	+ 2	—	—	e 11 48	pP	—
Tinemaha	Z.	73·2	322	i 11 24	+ 2	—	—	e 11 50	pP	—
Fresno	Z.	73·9	321	e 11 27k	+ 1	—	—	—	—	—
Lick	Z.	75·4	320	i 11 38k	+ 3	i 12 15	sP	i 12 4	pP	—
Reno	Z.	75·8	323	e 11 40k	+ 3	—	—	—	—	—
Mineral	Z.	77·4	322	e 11 48a	+ 2	—	—	—	—	—
Hungry Horse		79·1	332	i 11 57	+ 2	—	—	—	—	—
Kimberley	Z.	84·2	118	i 12 21	− 1	—	—	—	—	—
Tamanrasset	Z.	85·1	64	i 12 26k	0	—	—	e 12 54	pP	—
College		103·4	335	e 25 56	S	(e 25 56)	+30	—	—	—

Additional readings :—
Cleveland isPZ = 10m.51s.
Tamanrasset eZ = 13m.58s.
Long waves were also recorded at Palisades and Almeria.

Sept. 19d. 4h. Undetermined shock.

Apia P?NZ =33m.57s.?, S?NZ =34m.46s., LNZ =35m.12s.
Auckland eSN =41m.54s., LN =45m.
Pasadena eZ =44m.25s.
Palomar eZ =44m.28s.
Tinemaha eZ =44m.33s.
Haiwee eZ =44m.34s.
Paris iPKP =51m.23s., i =51m.43s., ePKP$_2$ =52m.39s., e =52m.43s. and 53m.32s., eL =113m.
Rathfarnham Castle eZ =51m.30s.?
Kew eZ =51m.31s., eL =105·0m.
Collmberg eZ =52m.32s.
Jena ePKP?EN =52m.37s., eN =52m.52s.
Stuttgart ePKP?Z =52m.41s., eZ =53m.10s. and 60m.6s.
Karlsruhe eZ =52m.43s. and 53m.12s.
Strasbourg ePKP? =52m.43s., i =52m.52s. and 53m.5s., e =53m.25s.
Long waves were also recorded at Palisades and Lisbon.

Sept. 19d. 19h. Undetermined shock.

Kaimata eNE =54m.
Karapiro eN =55m.
Auckland S?N =58m.32s.
Fresno ePZ =61m.10s.
Mount Wilson iPZ =61m.10s.
Lick iPZ =61m.11s.a, iZ =61m.38s., eZ =62m.8s.
Palomar ePZ =61m.12s.
Riverside eZ =61m.14s.
China Lake ePEN =61m.20s.
Shasta Dam i =61m.20s.
Tinemaha iPZ =61m.21s.
Reno ePZ =61m.22s.a.
Boulder City e =61m.28s.
Tucson eP =61m.35s.
Hungry Horse iP =61m.38s.
Butte e =62m.6s.
College iP =62m.10s.
Mineral iPZ =62m.21s.a.
Kew eZ =68m.0s.
Clermont-Ferrand 69m.
Collmberg eZ =69m.18s.
Jena ePKP?N =69m.21s., ePKP?E =69m.25s., eN =69m.34s. and 71m.7s.
Stuttgart ePKPZ =69m.22s., eZ =69m.44s., ePPP =77m.0s., eSKKS? =80m.36s., ePSKS =83m.30s., e =88m.
Paris ePKP =69m.26s., i =69m.30s., 69m.38s., and 69m.42s., e =70m.36s. and 70m.48s. eL =130m.
Strasbourg ePKP =69m.27s., e =69m.45s.
Karlsruhe eZ =69m.28s.
Prague ePKP =69m.28s., e =70m.55s.
Ksara ePKP? =69m.34s., pPKP =69m.54s., PP =72m.55s.
Long waves were also recorded at Palisades, Weston, Alicante, Almeria, and Granada.

Sept. 19d. Readings also at 0h. (Palisades), 1h. (Vera Cruz, Tacubaya, Riverview, Copiapo, Krasnogorka, near Przhevalsk, Almata II, Chilisk, and Ili), 2h. (Ashkabad, Mary, Andijan, Naryn, near Khorog, Obi-garm, Stalinabad, Dzhergetal (2), and Fergana), 3h. (Fergana, Frunse, near Przhevalsk, Chilisk, Almata II, Ili, and Almata), 5h. (Victoria and near Athens), 6h. (Mineral, Fresno, Reno, Weston, Kiruna, and near Dzhergetal), 7h. (Palomar, Bermuda, Kiruna, Frunse, Dzhergetal, Almata, Tashkent, Tchimkent, Stalinabad, near Naryn, Andijan, Fergana, Krasnogorka, Przhevalsk, Almata II, Ili, Obi-garm, near Djakarta, and Bandong), 8h. (Brisbane, Tacubaya, Puebla, Weston, Palisades, Ottawa, Kirkland Lake, near Seven Falls, Shawinigan Falls, and near Huancayo), 9h. (Strasbourg), 10h. (Oaxaca, Puebla, and near Tacubaya), 11h. (near Santa Clara), 13h. (Lick, Fresno, Reno, Mineral, Pasadena, China Lake, Riverside, Palomar, and Tinemaha), 14h. (Strasbourg, Fergana, near Khorog, Obi-garm, Garm, Dzhergetal, and Stalinabad), 16h. (Pretoria), 18h. (Palisades, Andijan, near Khorog, Stalinabad, Obi-garm, Garm, Dzhergetal, and Fergana), 19h. (Weston, Dzhergetal, Fergana, Frunse, Ili, Obi-garm, near Andijan, Naryn, Garm, Krasnogorka, and Almata II), 20h. (near Almata II, Ili, and Krasnogorka), 21h. (Weston)

Sept. 20d. 1h. 10m. 59s. Epicentre 30°·1S. 177°·8W. Base of Superficial Layers.
(as on 1949, September 28d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	9·2	221	—	—	(4 13)	SS	—	—	4·2
Karapiro	N.	9·5	213	e 3 1?	?	—	—	—	—	—
Tuai	N.	9·6	204	e 2 13	− 6	e 4 15	+ 8	—	—	—
Wellington		12·7	207	—	—	e 5 23	+ 1	—	—	e 6·0
Cobb River	E.	13·4	212	—	—	e 6 1?	SS	—	—	—
Kaimata	N.E.	15·1	212	e 3 45	+13	e 6 26	+ 7	—	—	—
Berkeley		85·2	41	i 12 34k	0	—	—	i 12 41	pP	e 38·9
Lick	Z.	85·2	41	i 12 34a	0	—	—	i 12 44	pP	—
Mount Wilson	Z.	85·3	46	e 12 35	0	—	—	—	—	—
Palomar	Z.	85·4	47	e 12 35	0	—	—	—	—	—
Riverside	Z.	85·5	46	e 12 36	0	—	—	—	—	—
Fresno	Z.	85·9	43	e 12 37a	− 1	—	—	e 12 44	pP	—
Tinemaha	Z.	87·0	44	e 12 43	0	—	—	—	—	—
Shasta Dam		87·1	39	i 12 43	− 1	—	—	—	—	—
Mineral	Z.	87·3	39	e 12 44a	− 1	—	—	e 12 50	pP	—
Boulder City		88·4	47	e 12 50	0	—	—	i 13 13	?	—
Tucson		88·7	51	i 12 52	+ 1	e 22 10	−84	—	—	—
Huancayo		94·6	107	—	—	e 23 59	[+ 9]	e 31 9	SS	e 43·9
Butte		96·0	39	e 13 27	+ 2	—	—	—	—	—
College		97·5	12	e 13 30	− 2	—	—	—	—	—
Palisades		118·9	57	e 29 45	PS	e 36 37	SSP	e 47 27	?	e 57·6
Kiruna		140·7	348	i 19 23k	[− 3]	—	—	i 19 43	pPKP	e 71·0
Rathfarnham Castle		156·0	12	e 20 5?	[+14]	—	—	—	—	e 84·0
Collmberg	Z.	157·3	342	e 19 53	[0]	—	—	—	—	—
Jena		158·0	343	e 20 4?	[+10]	—	—	e 20 41	?	—
Kew		158·6	3	e 20 6	[+11]	e 43 58	SS	—	—	e 86·0
Stuttgart		160·6	345	e 19 51?	[− 6]	—	—	e 24 19	PP	e 105·0
Strasbourg		161·0	348	e 20 18	[+21]	e 44 49	SS	i 20 43	PKP_2	e 75·0
Paris		161·3	359	e 20 8	[+11]	e 24 23	PP	e 28 17	PPP	e 82·0
Triest		162·0	333	e 20 5	[+ 7]	e 45 53	PSS	e 20 44	PKP_2	—
Rome		165·6	328	e 21 24	PKP_2	e 46 21	PSS	e 24 51	PP	—
Alicante		171·5	14	e 38 50	P'P'	—	—	—	—	e 87·2
Granada		171·5	32	21 2k	[+57]	32 12	SKKS	25 27	PP	84·1
Tamanrasset	Z.	172·1	203	e 20 10	[+ 5]	—	—	e 21 45	PKP_2	—
Almeria		172·2	28	21 4	[+59]	33 0	SKKS	26 16	PP	85·5

Additional readings :—
Berkeley eZ = 13m.36s. and 16m.6s.
Fresno eZ = 13m.46s.
Huancayo eS = 24m.40s., ePS = 25m.38s., eSSS = 35m.4s.
Kiruna iZ = 19m.27s.
Jena eZ = 20m.29s., eE = 20m.46s.
Stuttgart ePKP$_2$Z = 20m.36s., ePSKS = 35m.49s.
Strasbourg e = 20m.49s., 21m.19s., 35m.45s., and 48m.1s.
Triest eZ = 23m.5s.
Rome ePP? = 26m.7s., e = 39m.31s., eSSS = 51m.51s.
Granada SKSP = 36m.27s., SS = 46m.23s.
Tamanrasset iZ = 20m.25s., eZ = 20m.58s. and 22m.26s., ePPZ = 25m.51s.
Long waves were also recorded at Christchurch, Brisbane, Apia, Weston, Scoresby Sund, De Bilt, Taranto, and Potsdam.

Sept. 20d. 5h. 48m. 13s. Epicentre 4°·2S. 81°·2W.

Intensity V-VI at Lobitos and El Alto. Epicentre 5°·5S. 81°·0W. (U.S.C.G.S.).

E. Silgado.
Datos Sismológicos del Perú, 1951, Boletin No. 8, Lima, Peru. 1953, p.17.

$A = +·1526$, $B = -·9856$, $C = -·0728$; $\delta = -1$; $h = +7$;
$D = -·988$, $E = -·153$; $G = -·011$, $H = +·072$, $K = -·997$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		9·7	144	i 2 26	+ 4	i 4 11	− 4	i 4 25	SS	i 4·6
Chinchina		10·7	32	e 2 53	+15	e 4 59	+20	—	—	—
Bogota		11·3	39	e 2 49	+ 3	e 5 0	+ 6	—	—	5·8
La Paz		17·7	133	i 4 10a	0	i 7 36	+10	i 4 32	PPP	9·3
San Juan		26·9	32	e 5 39	− 6	e 10 17	− 3	—	—	—
La Plata		37·4	147	—	—	17 29	ScS	19 11	Q	20·9
Fayetteville		41·9	344	i 6 54	−60	—	—	—	—	—
Morgantown		43·6	2	i 8 5	− 3	—	—	—	—	—
Cleveland		45·5	0	i 8 19	− 4	e 18 9	SS	—	—	—
Tucson		45·9	325	i 8 27	+ 1	—	—	i 8 36	pP	—
Weston		47·2	11	i 8 34	− 2	—	—	—	—	—
Harvard		47·3	11	i 8 34	− 3	—	—	—	—	—
Ottawa		49·6	6	8 51	− 4	15 55	− 8	16 15	eS	—
Palomar	z.	50·3	321	i 9 1a	+ 1	—	—	i 9 9	pP	—
Boulder City		50·9	325	e 9 4	− 1	—	—	i 9 18	?	—
Riverside	z.	51·1	321	e 9 6	0	—	—	i 9 15	pP	—
Shawinigan Falls	N.	51·1	9	e 9 13	+ 7	—	—	—	—	—
Mount Wilson	z.	51·7	321	i 9 11a	0	—	—	i 9 20	pP	—
Kirkland Lake		52·1	2	e 9 18	+ 4	—	—	—	—	—
Tinemaha	z.	53·6	323	e 9 24	− 1	—	—	i 9 33	pP	—
Fresno	z.	54·3	322	e 9 30k	0	—	—	—	—	—
Lick	z.	55·9	322	i 9 42a	0	—	—	—	—	—
Reno	z.	56·2	325	e 9 44k	0	—	—	e 12 1	PP	—
Berkeley	z.	56·6	322	i 9 56a	+ 9	—	—	—	—	—
Butte		57·2	335	i 9 50	− 1	—	—	i 10 13	?	—
Mineral	z.	57·8	325	e 9 54a	− 1	—	—	—	—	—
Shasta Dam		58·4	325	i 10 6	+ 6	—	—	—	—	—
Hungry Horse		59·7	336	i 10 7	− 2	—	—	—	—	—
Seattle		63·0	331	e 10 34	+ 3	—	—	—	—	—
Malaga		82·1	52	i 12 21	− 3	e 22 10	−28	—	—	—
Toledo		82·9	49	e 12 37	+ 9	—	—	—	—	—
Almeria		83·5	53	12 27	− 4	22 55	+ 3	15 47	PP	47·9
College		84·1	337	12 32	− 2	—	—	—	—	—
Alicante		85·3	51	12 25	−15	23 12	+ 2	24 32	PPS	e 42·1
Tamanrasset	z.	88·6	67	i 12 54k	− 2	—	—	e 16 27	PP	—
Paris		89·0	41	i 12 57	− 1	—	—	i 13 8	?	e 46·8
Strasbourg		92·4	42	e 13 22	+ 8	—	—	—	—	—
Stuttgart	z.	93·4	42	e 13 16	− 2	—	—	—	—	—
Jena	z.	95·0	39	13 23	− 3	—	—	—	—	—
Rome		95·5	48	e 26 47	PPS	—	—	—	—	e 51·8
Collmberg	z.	95·9	39	e 13 28	− 2	—	—	—	—	—
Poona	z.	151·8	58	i 19 56	[+ 6]	—	—	—	—	—

Additional readings :—
La Paz SS =8m.10s.
Fresno eZ =9m.38s., ePP?Z =12m.15s.
Lick iZ =9m.50s., 10m.0s., and 10m.41s.
Reno eZ =9m.52s.
Mineral iZ =10m.2s., 10m.12s., and 10m.29s.
Seattle e =10m.43s. and 10m.52s.
Alicante Q =35m.20s.
Tamanrasset iZ =13m.2s., eZ =14m.20s.
Long waves were also recorded at Pennsylvania, De Bilt, and Bombay.

Sept. 20d. 12h. 38m. 53s. Epicentre 65°·0N. 150°·0W. (as on 1950, May 25d.).

A = −·3681, B = −·2125, C = +·9052; δ = +4; h = −8;
D = −·500, E = +·866; G = −·784, H = −·453, K = −·425.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		0·9	98	i 0 27	+ 7	—	—	—	—	—
Resolute Bay		20·4	37	e 4 51	+10	e 8 41	+16	e 5 31	PPP	e 11·3
Victoria		21·8	126	4 52	− 4	10 52	L	—	—	(10·9)
Seattle		22·9	125	e 5 7	+ 1	—	—	e 5 15	pP	e 11·6
Hungry Horse		25·3	113	i 5 27	− 3	e 12 42	ScP	—	—	—
Butte		27·8	113	e 5 52	− 1	—	—	—	—	e 13·5
Mineral	z.	29·6	132	e 6 5a	− 4	—	—	i 7 23	PPP	—
Reno	z.	30·9	130	e 6 19	− 1	—	—	—	—	—
Lick	z.	32·4	135	i 6 30a	− 4	—	—	—	—	—
Fresno	z.	33·5	132	e 6 39	− 4	—	—	e 7 31	PP	—
Tinemaha	z.	33·6	130	e 6 43	− 1	—	—	—	—	—
Haiwee	z.	34·6	130	e 6 52	− 1	—	—	—	—	—
Boulder City		35·8	126	i 7 0	− 3	—	—	i 6 44	?	—
Pasadena	z.	36·4	131	e 6 54	−14	—	—	—	—	—
Riverside	z.	36·8	131	e 7 8	− 3	—	—	—	—	—
Palomar	z.	37·5	130	e 7 15	− 2	—	—	—	—	—
Kirkland Lake		39·7	80	e 7 39	+ 3	—	—	—	—	—
Tucson		40·5	124	e 7 41	− 1	—	—	—	—	—
Fayetteville		43·7	103	i 7 4	−64	e 21 20	L	—	—	(e 21·3)
Ottawa		43·7	79	e 8 9	+ 1	—	—	e 19 37	Q	e 22·6
Shawinigan Falls	N.	44·0	75	e 8 11	0	—	—	—	—	—
Cleveland	z.	44·4	87	i 8 13a	− 1	—	—	—	—	—
Morgantown		46·6	88	i 8 32	0	—	—	—	—	e 24·2
Kiruna	z.	47·3	5	e 8 51	+14	—	—	—	—	—
Harvard		47·7	78	i 8 44	+ 4	—	—	—	—	e 24·5
Weston		48·0	78	e 8 42	− 1	—	—	—	—	e 24·9
Poona	z.	90·3	319	—	—	i 29 34	SS	—	—	—
Kimberley	z.	143·6	7	i 19 45	[+ 8]	—	—	—	—	—

Additional readings :—
Mineral iZ = 6m.10s.
Lick iZ = 6m.33s. and 6m.39s.
Long waves were also recorded at Palisades, Seven Falls, Halifax, and Scoresby Sund.

Sept. 20d. 17h. 0m. 42s. Epicentre 52°·8N. 168°·2W. Depth of focus 0·010.
(as on 1949, March 14d.).

A = −·5943, B = −·1242, C = +·7945; δ = −15; h = −6;
D = −·204, E = +·979; G = −·778, H = −·162, K = −·607.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mitchell Field		5·2	264	i 1 28	+11	—	—	—	—	—
College		15·9	33	3 38	− 1	—	—	—	—	—
Shasta Dam		33·1	93	e 6 28	− 1	—	—	—	—	—
Mineral	z.	33·8	93	e 6 34a	− 1	—	—	i 6 52	pP	—
Hungry Horse		34·0	75	i 6 36	0	—	—	—	—	—
Berkeley	z.	34·9	97	e 6 41	− 3	—	—	—	—	—
Reno	z.	35·4	93	e 6 50a	+ 2	—	—	—	—	—
Lick	z.	35·6	97	e 6 49k	− 1	—	—	e 7 3	pP	—
Fresno	z.	37·2	96	e 7 0	− 3	—	—	e 7 8	pP	—
Tinemaha	z.	37·9	94	e 7 26	pP	—	—	e 7 37	?	—
Haiwee	z.	38·6	94	e 7 33	pP	—	—	—	—	—
Pasadena	z.	39·9	97	e 7 30	+ 4	—	—	e 7 38	pP	—
Riverside	z.	40·5	97	e 7 32	+ 1	—	—	e 7 44	pP	—
Boulder City		40·7	93	e 7 36	+ 4	—	—	i 7 48	pP	—
Palomar	z.	41·2	97	e 7 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.
Tucson		45·6	93	e 8 12	0	—	—	—	—	—
Kiruna	z.	59·5	356	i 9 54k	− 1	—	—	—	—	—
Harvard		61·1	57	e 10 17	+11	—	—	—	—	—
Weston		61·3	57	e 10 7	− 1	—	—	—	—	—
Collmberg	z.	76·3	0	e 11 39	− 1	—	—	—	—	—
Paris		78·5	7	e 11 54	+ 2	—	—	—	—	e 52·3
Stuttgart	z.	78·8	2	e 11 53	− 1	—	—	—	—	—
Strasbourg		78·9	3	e 11 56	+ 2	—	—	e 12 10	pP	—
Ksara		91·2	341	10 18?	?	e 21 28	?	—	—	—

Additional readings :—
Lick eZ = 6m.54s. and 7m.28s.
Fresno eZ = 7m.24s.
Long waves were also recorded at Scoresby Sund, Palisades, Seattle, and Kew.

Sept. 20d. 17h. 48m. 13s. Epicentre 52°·8N. 168°·2W. Depth of focus 0·010.
(as at 17h. 0m.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mitchell Field		5·2	264	i 1 3	−14	i 2 4	−12	—	—
College		15·9	33	e 3 38	− 1	e 9 40	?	—	—
Shasta Dam		33·1	93	e 6 27	− 2	—	—	—	—
Mineral	z.	33·8	93	e 6 33a	− 2	—	—	i 6 45	pP
Hungry Horse		34·0	75	i 6 36	0	—	—	i 9 10	?
Reno	z.	35·4	93	e 6 51k	+ 3	—	—	e 7 15	pP
Lick	z.	35·6	97	i 6 46a	− 4	—	—	e 8 7	PP
Fresno	z.	37·2	96	e 7 8	+ 5	—	—	—	—
Tinemaha	z.	37·9	94	e 7 12	+ 3	—	—	—	—
China Lake	z.	39·1	94	e 7 22	+ 3	—	—	e 7 36	pP
Mount Wilson	z.	39·9	97	e 7 32	+ 6	—	—	—	—
Riverside	z.	40·5	97	e 7 34	+ 3	—	—	e 7 44	pP
Boulder City		40·7	93	e 7 33	+ 1	—	—	i 7 44	pP
Palomar	z.	41·2	97	e 7 43	+ 7	—	—	—	—
Tucson		45·6	93	e 8 12	0	—	—	e 8 24	pP
Fayetteville		53·0	76	i 8 6	−63	—	—	—	—
Ottawa		57·0	57	9 36	− 2	—	—	—	—
Morgantown		58·7	64	e 9 48	− 2	—	—	—	—
Kiruna	z.	59·5	356	i 9 54k	− 1	—	—	—	—
Harvard		61·1	57	e 9 57	− 9	—	—	—	—
Weston		61·3	57	e 10 5	− 3	—	—	—	—
Collmberg	z.	76·3	0	e 11 39	− 1	—	—	—	—
Jena		76·6	0	e 11 42	0	—	—	e 11 52	pP
Prague		77·5	358	e 11 59	+12	—	—	e 12 17	pP
Paris		78·5	7	e 11 47	− 5	—	—	—	—
Stuttgart	z.	78·8	2	e 11 53	− 1	—	—	—	—
Strasbourg		78·9	3	e 11 56a	+ 2	—	—	e 12 19	pP
Clermont-Ferrand		81·5	7	i 12 10	+ 2	—	—	—	—
Kimberley	z.	154·1	335	i 19 9	[−31]	—	—	—	—

Additional readings :—
Reno eZ = 7m.37s.
Lick iZ = 6m.55s.
Prague e = 13m.14s.
Long waves were recorded at Seattle and Scoresby Sund.

Sept. 20d. 23h. 19m. 33s. Epicentre 32°·6N. 75°·9E. (as on 1950, September 25d.).

$A = +·2056$, $B = +·8187$, $C = +·5362$; $\delta = +5$; $h = +1$;
$D = +·970$, $E = -·244$; $G = +·131$, $H = +·520$, $K = -·844$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
New Delhi		4·1	164	e 1 10	+ 5	e 1 57	+ 2	1 17	P*	—
Murgab		6·0	345	e 1 31	− 1	i 3 2	S*	—	—	—
Dzhergetal		7·6	332	e 1 52	− 3	i 3 18	− 5	—	—	—
Obi-garm		7·9	322	e 1 55?	− 4	e 3 27?	− 3	—	—	—
Garm		7·9	326	e 1 58	− 1	—	—	—	—	—
Fergana		8·4	338	e 2 7	+ 1	3 37	− 6	—	—	—
Andijan		8·6	342	e 2 14	+ 5	—	—	—	—	—
Naryn		8·8	1	e 2 7	− 4	i 3 45	− 8	—	—	—
Bombay	E.	13·9	192	—	—	e 5 27	?	—	—	—
Poona		14·1	188	e 3 20	− 3	i 5 56	− 6	3 31	PP	6·5

Additional readings :—
New Delhi $P_gE = 1m.27s.$, $S^*E = 2m.7s.$, $S_gE = 2m.15s.$
Poona $PPPE = 3m.39s.$, $QE = 5m.50s.$, $SSE = 6m.8s.$, $SSSE = 6m.13s.$, $S^*E = 6m.55s.$

Sept. 20d. Readings also at 1h. (near La Paz), 2h. (Palomar, Guadalajara, Oaxaca, Vera Cruz (2), near Puebla (2), and Tacubaya (2), 3h. (Apia, La Paz, and Rathfarnham Castle), 4h. (near Dzhergetal), 6h. (near Obi-garm), 7h. (Huancayo), 8h. (near Athens (2)), 9h. (Poona and Santa Lucia), 10h. (near Almata II), 11h. (Palisades and near Apia), 12h. (near Dzhergetal), 13h. (Manila), 14h. (Strasbourg), 15h. (Frunse, Almata II, near Almata, Naryn, Krasnogorka, and Chilisk), 17h. (Riverside and China Lake), 20h. (Alberni and near Mizusawa), 21h. (near Shemakla and near Manila), 23h. (near Manila near Shemakla, and near Garm).

Sept. 21d. 3h. 21m. 5s. Epicentre 18°·8S. 175°·0E. Depth of focus 0·060 (as on 1950, September 27d.).

$A = -·9437$, $B = +·0826$, $C = -·3203$; $\delta = -2$; $h = +5$;
$D = +·087$, $E = +·996$; $G = +·319$, $H = -·028$, $K = -·947$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		13·6	71	(e 2 55?)	− 4	—	—	—	—	—
Karapiro	N.	19·0	180	e 3 55?	+ 1	—	—	—	—	—
Tuai	N.	20·0	177	—	—	e 7 0	−21	—	—	—
Brisbane	Z.	22·0	234	i 4 25a	+ 2	—	—	—	—	—
Cobb River	E.	22·3	185	e 4 29	+ 3	e 8 5	+ 5	—	—	—
Wellington		22·4	182	e 4 24	− 2	e 7 58	− 3	—	—	—
Kaimata	N.E.	23·9	187	e 4 46	+ 6	e 8 38	+12	—	—	—
Manila		62·7	298	e 10 42	pP	—	—	—	—	—
Berkeley	Z.	81·5	46	i 11 34a	0	—	—	—	—	—
Lick	Z.	81·7	46	i 11 34k	− 1	—	—	i 13 19	pP	—
Pasadena	Z.	82·5	50	i 11 35k	− 4	—	—	e 13 5	pP	—
Fresno	Z.	82·6	48	e 11 38k	− 1	—	—	—	—	—
Shasta Dam		82·9	43	i 12 42	pP	—	—	—	—	—
Palomar		83·1	52	i 11 38k	− 4	—	—	e 13 11	pP	—
Mineral	Z.	83·3	44	i 11 43k	0	—	—	e 12 55	pP	—
China Lake	Z.	83·7	48	i 11 43k	− 2	—	—	e 13 15	pP	—
Tinemaha	Z.	83·9	48	i 11 45k	− 1	—	—	—	—	—
Reno	Z.	84·0	45	e 11 47k	+ 1	—	—	e 13 15	pP	—
Boulder City		85·8	50	i 11 53	− 2	e 21 40	[+ 1]	—	—	—
Victoria		86·5	37	e 12 3	+ 5	—	—	—	—	—
Tucson		87·2	55	e 11 58	− 4	—	—	—	—	—
College		88·1	15	i 12 22	+16	—	—	—	—	—
Hungry Horse		91·9	39	i 12 27	+ 3	—	—	—	—	—
Kiruna	Z.	128·4	349	i 18 38	[+20]	—	—	—	—	—
Ksara		140·7	310	i 19 11	[+30]	—	—	e 21 35	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copenhagen		140·9	347	i 19 4a	[+22]	—	—	—	—	—
Collmberg	z.	144·6	342	e 19 10	[+22]	—	—	e 19 14	PKP$_2$	—
Witteveen	z.	144·8	350	i 19 14	[+25]	—	—	i 19 21	PKP$_2$	—
Jena	z.	145·3	341	e 19 14?	[+24]	—	—	—	—	—
Stuttgart	z.	148·0	343	e 19 14	[+20]	—	—	e 21 2	PKP$_2$	—
Strasbourg		148·5	344	e 19 10	[+16]	—	—	—	—	—
Paris		149·5	352	e 19 15	[+19]	—	—	—	—	e 91·9
Tamanrasset	z.	169·4	294	i 19 37k	[+19]	e 25 16	PP	e 21 23	PKP$_2$	—

Additional readings :—
Apia reading has been increased by 2 minutes.
Lick iZ = 11m.41s.
Fresno eZ = 11m.51s. and 12m.7s.
Mineral iZ = 11m.48s.
Reno eZ = 12m.1s.
Jena eZ = 19m.17s., eE = 20m.2s.
Stuttgart eZ = 19m.22s. and 19m.33s.
Strasbourg i = 19m.22s., e = 19m.36s.
Paris i = 19m.24s. and 19m.37s.
Tamanrasset eZ = 19m.44s., ePcP,PKPZ = 28m.26s.

Sept. 21d. 4h. 22m. 7s. Epicentre 19°·4N. 70°·4W. (as on 1950, Aug. 13d.).

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

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Port au Prince	2·0	245	i 0 41	+ 6	i 1 12	+10	—	—	i 1·4
San Juan	4·2	103	i 0 59	− 8	i 1 48	− 9	—	—	—
Guantanamo Bay	4·4	277	i 1 13	+ 3	1 25	P*	—	—	—
Roosevelt Roads	4·7	104	e 0 44	−30	2 26	+16	—	—	—
Swan Island	13·0	263	e 3 12	+ 3	—	—	—	—	—
Bermuda	13·9	21	—	—	(e 5 44)	−13	—	—	e 5·7
Bogota	15·1	194	e 3 42	+ 6	e 6 35	+10	—	—	6·9
Chinchina	15·2	200	i 3 39	+ 1	i 6 48	+20	—	—	—
Washington	20·3	347	e 4 39	− 1	—	—	i 4 45	P	—
City College, N.Y.	21·6	353	e 4 51	− 3	e 8 37	−12	—	—	—
Palisades	21·7	353	e 4 48	− 7	e 8 48	− 3	e 8 36	?	—
Morgantown	21·8	340	i 4 52	− 4	e 8 45	− 7	—	—	—
Weston	22·9	359	e 5 7	+ 1	e 9 4	− 9	—	—	—
Harvard	23·1	359	i 5 7	− 1	e 9 11	− 5	—	—	e 11·6
Cleveland	24·0	339	i 5 20a	+ 3	i 9 38	+ 6	—	—	—
Ottawa	26·3	352	5 37	− 2	10 11	0	—	—	—
Fayetteville	26·7	315	i 4 40	−63	—	—	—	—	—
Huancayo	31·6	189	e 6 26	0	e 11 30	− 5	—	—	e 13·3
La Paz	35·8	175	e 6 53	−10	i 13 25	PcS	e 8 21	PP	—
Tucson	38·4	298	e 7 24	− 1	—	—	—	—	—
Boulder City	42·3	303	i 7 57	0	—	—	—	—	—
Palomar	z. 43·5	299	e 8 7	0	—	—	—	—	—
China Lake	z. 44·5	302	e 8 14	− 1	—	—	—	—	—
Pasadena	z. 44·7	300	e 8 18	+ 2	—	—	—	—	—
Tinemaha	z. 45·2	303	e 8 20	0	—	—	—	—	—
Hungry Horse	45·4	320	i 8 20	− 2	—	—	—	—	—
Lick	z. 47·9	304	i 8 42a	0	—	—	i 8 47	?	—
Mineral	z. 48·3	308	i 8 43a	− 2	—	—	i 8 46	?	—
Shasta Dam	49·0	308	i 8 47	− 3	—	—	—	—	—
Victoria	51·4	317	e 9 4	− 5	—	—	—	—	—
Almeria	61·2	58	10 35	+16	19 19	+41	12 49	P'	36·0
Alicante	62·7	56	—	—	e 20 14	?	—	—	e 29·9
Kew	62·7	41	e 17 53	?	—	—	—	—	—
College	67·3	334	10 53	− 6	—	—	—	—	—
Kiruna	z. 72·5	23	e 11 28	− 2	—	—	—	—	—

Additional readings :—
Port au Prince i = 54s. and 1m.17s.
Almeria SS = 22m.53s.
Long waves were also recorded at Resolute Bay, Scoresby Sund, Granada, and Rome.

Sept. 21d. 8h. 48m. 11s. Epicentre 52°·8N. 168°·2W. Depth of focus 0·010. (as on 20d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mitchell Field		5·2	264	i 1 1	−16	i 2 2	−14	—	—
College		15·9	33	3 40	+ 1	—	—	—	—
Mineral	z.	33·8	93	e 6 37k	+ 2	—	—	e 6 57	pP
Hungry Horse		34·0	75	i 6 36	0	—	—	—	—
Fresno	z.	37·2	96	e 7 28	pP	—	—	—	—
China Lake	z.	39·1	94	e 7 18	− 1	—	—	—	—
Mount Wilson	z.	39·9	97	e 8 1	sP	—	—	—	—
Boulder City		40·7	93	e 7 44	+12	—	—	—	—
Palomar	z.	41·2	97	e 7 52	pP	—	—	e 8 11	sP
Tucson		45·6	93	e 8 11	− 1	—	—	—	—
Kiruna	z.	59·5	356	i 9 53k	− 2	—	—	i 10 16	pP
Weston		61·3	57	i 10 6	− 2	—	—	—	—

Sept. 21d. 9h. 10m. 17s. Epicentre 0°·2N. 125°·2E. (as on 1951, April 23d.).

$A = -\cdot5764$, $B = +\cdot8171$, $C = +\cdot0035$; $\delta = -10$; $h = +7$;
$D = +\cdot817$, $E = +\cdot576$; $G = -\cdot002$, $H = +\cdot003$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manila		14·9	344	i 3 41	+ 7	i 3 49	?	—	—	—
Bandong		18·9	249	e 4 19	− 5	e 7 49	− 4	—	—	—
Djakarta		19·4	251	e 4 23	− 7	e 7 58	− 6	—	—	—
Zi-ka-wei	z.	31·0	354	6 25	+ 4	e 11 32	+ 6	—	—	—
Nanking		32·3	349	e 6 26	− 7	e 11 41	− 5	—	—	—
Saga		33·2	7	6 42	+ 2	—	—	—	—	—
Ooita		33·4	9	e 6 29	−13	—	—	—	—	—
Koti		34·1	12	e 6 50	+ 2	e 12 11	− 3	—	—	—
Osaka		35·6	15	e 6 59	− 2	—	—	e 9 9	PcP	—
Nagoya		36·5	16	e 7 11	+ 2	—	—	—	—	—
Hunatu		37·3	19	7 18	+ 2	—	—	—	—	—
Matusiro		38·1	16	e 7 28	+ 6	13 19	+ 3	—	—	16·3
Nagano	N.	38·2	17	e 7 9	−14	e 13 3	−14	—	—	—
Maebasi		38·4	18	e 7 26	+ 1	—	—	e 8 13	?	—
Brisbane		38·4	138	e 7 25	0	i 13 8	−12	i 9 13	PP	e 19·2
Riverview		41·7	147	i 8 0k	+ 8	i 14 5	− 5	i 8 11	pP	e 19·1
Vladivostok		43·2	7	i 8 7	+ 3	e 14 31	− 1	—	—	—
Kodaikanal	E.	48·5	284	e 7 48	−58	—	—	—	—	—
Poona	E.	53·6	293	9 22	− 3	16 57	− 1	10 8	PcP	26·1
New Delhi		53·8	306	e 9 22	− 4	i 16 53	− 8	—	—	—
Kabansk		54·0	347	e 9 29	+ 1	—	—	—	—	—
Bombay	E.	54·6	293	i 9 30	− 2	e 17 8	− 3	11 34	PP	25·7
Irkutsk		54·8	345	i 9 35	+ 1	e 17 12	− 2	—	—	—
Przhevalsk		59·4	322	i 10 14	+ 8	e 18 23	+ 8	—	—	—
Murgab		60·4	315	i 10 17	+ 4	i 18 28	0	—	—	—
Naryn		60·4	318	i 10 14?	+ 1	18 30?	+ 2	—	—	—
Almata II		60·5	322	i 10 16	+ 2	—	—	—	—	—
Almata		60·7	322	i 9 44?	−31	e 17 56?	−36	—	—	—
Rybach'e		60·9	320	i 10 18	+ 1	e 18 35	+ 1	—	—	—
Ili		61·0	323	i 10 19	+ 1	—	—	—	—	—
Khorog		61·7	313	i 10 24	+ 2	—	—	—	—	—
Frunse		62·0	320	i 10 24?	0	i 18 51?	+ 3	—	—	—
Andijan		62·5	317	10 27	− 1	i 18 50	− 4	—	—	—
Fergana		62·8	317	e 10 27	− 3	e 18 54	− 4	—	—	—
Garm		63·2	315	—	—	e 18 56	− 7	—	—	—
Obi-garm		63·6	314	i 10 30?	− 5	e 19 4?	− 4	—	—	—
Stalinabad		64·2	314	i 10 38	− 1	—	—	—	—	—
Lunacharskoe		64·9	317	i 10 41	− 2	i 19 16	− 8	—	—	—
Tashkent		64·9	317	i 10 42	− 1	e 19 23	− 1	—	—	—
Tchimkent		65·1	317	i 10 45	0	i 19 21	− 6	—	—	—

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.
Samarkand		65·9	314	i 10 50	0	19 33	− 4	—	—	—
Mary		69·0	311	i 11 11	+ 2	—	—	—	—	—
Ashkabad		71·8	310	i 11 31	+ 5	20 48	+ 2	—	—	—
Kizyl-Arvat		73·6	312	—	—	e 21 16?	+ 9	—	—	—
Sverdlovsk		76·3	330	i 11 52	0	e 21 27	−10	—	—	—
Baku		78·7	312	i 12 7	+ 1	—	—	—	—	—
Lenkoran		79·3	309	12 10	+ 1	—	—	—	—	—
Shemakha		79·7	312	12 11	0	—	—	—	—	—
Goris		81·3	310	i 12 19	− 1	—	—	—	—	—
Kirovobad		81·4	311	e 12 20	0	—	—	—	—	—
Tiflis		82·7	312	i 12 28	+ 1	e 22 45	+ 1	—	—	—
Erevan		82·8	310	e 12 28	+ 1	—	—	—	—	—
Gori		83·2	312	e 12 32	+ 3	—	—	—	—	—
College		88·5	26	e 12 55	− 1	—	—	—	—	—
Moscow		88·5	326	i 12 55	− 1	e 23 25	− 6	—	—	—
Ksara		89·3	304	i 13 1a	+ 2	e 25 27	PPS	—	—	—
Pulkovo		92·3	330	—	—	e 23 53	[+ 7]	—	—	—
Helwan	z.	93·3	300	e 13 18	0	—	—	e 16 32	PP	—
Istanbul		94·5	312	—	—	e 24 31	− 3	—	—	50·7
Kiruna		95·4	338	e 13 25	− 3	e 24 2	[− 1]	i 17 15	PP	e 48·2
Pretoria	z.	96·4	244	e 17 15	PP	—	—	—	—	—
Lwow		97·1	320	i 13 35	0	—	—	e 17 33	PP	—
Grahamstown	z.	97·3	237	i 13 36	0	—	—	—	—	—
Uzhgorod		98·4	320	13 41	0	e 25 7	0	—	—	—
Resolute Bay		101·5	10	—	—	e 32 49	SS	—	—	e 54·3
Copenhagen		102·5	328	e 18 15	PP	—	—	—	—	48·7
Potsdam		103·2	342	—	—	e 27 31?	PS	—	—	e 50·7
Collmberg	z.	103·6	323	e 14 4	0	—	—	e 18 28	PP	—
Jena		104·5	323	e 14 5?	− 3	—	—	—	—	—
Scoresby Sund		106·2	350	22 1	PKS	26 19	+ 7	28 2	PS	52·7
Stuttgart		106·7	322	e 14 18	P	e 27 6	− 9	e 18 28?	PKP	58·7
Strasbourg		107·7	323	e 18 49	PP	e 28 1	PS	e 34 39	SS	—
De Bilt		107·8	326	e 18 55	PP	e 25 2	[− 1]	e 28 19	PS	e 55·7
Hungry Horse		109·8	37	e 18 30	[− 3]	—	—	—	—	—
Paris		110·8	324	e 19 10	PP	e 25 58	{−13}	e 21 40	PPP	e 56·7
Kew		111·1	327	e 19 50	PP	e 28 42	PS	e 44 39	Q	e 62·7
China Lake	z.	111·7	50	e 18 40	[+ 3]	e 29 39	PPS	e 19 30	PP	—
Rathfarnham Castle		113·3	331	e 19 18	PP	—	—	—	—	—
Tamanrasset	z.	117·1	296	i 18 49a	[+ 2]	—	—	e 20 29	PP	—
Tucson		118·1	52	e 18 49	[0]	—	—	—	—	—
Granada		119·9	314	—	—	27 34	{+21}	31 7	PPS	66·1
Fayetteville		128·6	41	i 18 11	[−58]	—	—	—	—	—
Shawinigan Falls	N.	130·8	15	e 22 39	PKS	—	—	—	—	—
Ottawa		131·0	19	19 14	[0]	—	—	i 22 36	PKS	—
Morgantown		134·2	27	i 22 47	PKS	—	—	—	—	—
Harvard		134·9	17	e 19 23	[+ 2]	—	—	e 22 50	PKS	—
Weston		135·1	17	e 19 22	[0]	—	—	e 22 51	PKS	—
Palisades		135·5	20	i 22 52	PKS	—	—	—	—	—
City College, N.Y.		135·6	21	e 19 21	[− 1]	—	—	e 21 59	PP	—
Swan Island		146·4	56	e 18 50	[−52]	—	—	i 19 32	PKP	—
Bermuda		146·9	15	e 19 45	[+ 3]	—	—	e 23 7	PKS	—
Huancayo		156·4	120	e 20 2	[+ 6]	e 36 52	PPS	e 44 19	SS	e 70·4
San Juan		158·4	29	e 20 36	PKP_2	—	—	—	—	—
La Paz		159·1	139	i 20 3	[+ 3]	31 19	{+11}	24 26	PP	—

Additional readings :—

Osaka eN =7m.22s.

Brisbane eSE =13m.11s., iSSE =15m.56s., iE =16m.1s.

Riverview iE =17m.14s., iN =17m.20s., iE =17m.24s.

Poona PPE =11m.20s., PPPE =12m.55s., PSE =17m.22s., PPSE =17m.37s., SSSE =23m.27s., QE =23m.46s.

Bombay iPPSE =17m.28s., SSE =20m.42s.

Kiruna iZ =13m.33s., ePPZ =17m.22s., eN =18m.27s., eS?N =25m.0s., eE =25m.18s., ePPSE =26m.23s., eN =30m.20s., eSS?E =31m.43s.?, eSSSE =35m.6s., eN =38m.43s.?.

Stuttgart ePPZ =18m.47s., ePPPZ =21m.3s., ePS =27m.54s., ePPS =29m.1s., eSSS =38m.13s., eQ =55·7m.

Continued on next page.

Strasbourg e =18m.52s. and 18m.55s., eSSS =37m.43s.?.
De Bilt eSS =34m.43s.?.
Paris e =19m.20s. and 19m.27s., eS =26m.51s., ePS =28m.36s., ePPS? =29m.20s., e =30m.19s. and 34m.2s., eSS =34m.32s.
China Lake eZ =27m.37s. and 27m.50s.
Granada SS =36m.43s., SSS =40m.52s.
Huancayo eSSS? =50m.16s.
La Paz SS =44m.31s.
Long waves were also recorded at Colombo and Aberdeen.

Sept. 21d. 9h. 41m. 20s. Epicentre 39°·2N. 71°·5E. (as on 1951, Aug. 3d.).

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Dzhergetal	0·2	274	i 0 8	P_g	i 0 11	S_g	—	—
Garm	1·0	258	i 0 20	P_g	i 0 33	S_g	—	—
Fergana	1·2	11	e 0 26	P_g	i 0 43	S_g	—	—
Obi-garm	1·5	250	i 0 27	P_g	i 0 47	S_g	—	—
Andijan	1·7	23	0 37	P_g	1 1	S_g	—	—
Khorog	1·7	177	0 35	+ 4	0 57	S*	—	—
Stalinabad	2·2	253	i 0 43	P_g	i 1 11	S_g	—	—
Lunacharskoe	2·7	323	0 53	P_g	1 28	S_g	—	—
Tashkent	2·7	322	e 0 53	P_g	i 1 29	S_g	—	—
Tchimkent	3·4	335	e 1 8	P_g	e 1 41	S*	e 1 55	S_g
Samarkand	3·5	289	1 6	P*	1 51	S*	—	—
Frunse	4·4	31	—	—	i 2 26	S_g	—	—

Readings are given as indicated.

Sept. 21d. 16h. 16m. 16s. Epicentre 52°·8N. 168°·2W. Depth of focus 0·010. (as at 8h.).

		△	Az.	P.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	
Mitchell Field		5·2	264	i 1 2	−15	—	—
College		15·9	33	e 3 38	− 1	—	—
Shasta Dam		33·1	93	e 6 34	+ 5	—	—
Mineral	z.	33·8	93	e 6 39k	+ 4	—	—
Hungry Horse		34·0	75	i 6 36	0	—	—
Fresno	z.	37·2	96	e 7 17k	pP	e 7 29	sP
China Lake	z.	39·1	94	e 7 20	+ 1	e 7 33	sP
Mount Wilson	z.	39·9	97	e 7 32	+ 6	—	—
Riverside	z.	40·5	97	e 7 44	pP	—	—
Boulder City		40·7	93	e 7 33	+ 1	e 7 57	sP
Palomar	z.	41·2	97	i 7 51	pP	—	—
Tucson		45·6	92	e 8 11	− 1	—	—
Reykjavik	z.	60·5	17	i 26 5	SS	—	—
Harvard		61·1	57	e 10 4	− 2	—	—
Weston		61·3	57	e 10 7	− 1	—	—
Cellmberg	z.	76·3	0	e 11 40	0	—	—
Stuttgart	z.	78·8	2	e 11 54	0	—	—
Strasbourg		78·9	3	e 11 55	+ 1	—	—

Reykjavik gives also eE =26m.8s., iEZ =26m.11s.
Long waves were recorded at Scoresby Sund.

Sept. 21d. 18h. 44m. 51s. Epicentre 29°·2S. 178°·2W. (as on 1950, July 21d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	9·6	216	2 41	+20	4 3	− 9	—	—	4·4
Karapiro	N.	10·0	210	e 3 9?	?	—	—	—	—	—
Tuai	N.	10·2	200	e 2 37	+ 6	e 4 1	−26	—	—	—
Wellington		13·3	203	e 3 13	0	e 5 10	−32	—	—	i 7·6
Cobb River	E.	13·9	210	e 3 39?	+18	i 5 27	−30	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kaimata	N.E.	15·6	210	3 37	− 6	e 6 12	−27	—	—	—
Christchurch		16·0	207	e 3 38	−10	e 6 14	−32	e 7 29	Q	e 9·2
Apia		16·5	23	—	—	(6 9?	−49	—	—	—
Brisbane		25·4	267	i 5 34a	+ 3	i 11 8	SS	i 9 11	PcP	i 13·8
Riverview		26·4	251	i 5 42a	+ 2	e 9 29	PcP	i 5 54	pP	e 10·4
Manila		73·1	298	e 11 33	− 1	—	—	—	—	—
Pasadena		84·8	47	i 12 38	+ 1	—	—	i 12 45	pP	e 46·2
Berkeley		84·9	42	i 12 39k	+ 1	e 23 13	+ 7	i 12 46	pP	e 46·2
Lick	Z.	84·9	42	i 12 39k	+ 1	—	—	i 12 46	pP	—
Palomar		85·2	48	i 12 39	0	—	—	—	—	—
Riverside	Z.	85·3	47	i 12 39	− 1	—	—	i 12 46	pP	—
Fresno	Z.	85·6	43	e 12 41a	0	—	—	e 16 13	PP	—
China Lake	Z.	86·3	45	i 12 46k	+ 1	—	—	i 12 53	pP	—
Shasta Dam		86·7	39	i 12 47	0	—	—	—	—	—
Tinemaha	Z.	86·7	44	i 12 47k	0	—	—	—	—	—
Mineral	Z.	86·9	40	i 12 48k	0	—	—	e 12 55	pP	—
Boulder City		88·1	46	i 12 54	0	—	—	i 13 1	pP	—
Tucson		88·5	51	i 12 56a	0	—	—	i 13 8	pP	—
Victoria		91·7	34	e 13 10	0	—	—	—	—	—
Huancayo		95·1	107	—	—	e 23 59	[− 3]	e 24 41	S	e 44·6
Hungry Horse		96·3	37	e 13 30	− 2	—	—	—	—	—
College		96·8	13	13 34	0	—	—	—	—	—
Kiruna		139·9	348	e 19 26	[− 4]	—	—	—	—	e 70·2
Ksara		150·7	287	e 19 51	[+ 3]	—	—	23 31	PP	—
Copenhagen		152·6	347	e 20 6	[+15]	—	—	—	—	76·2
Helwan	Z.	154·3	278	e 19 53	[− 1]	—	—	e 20 17	PKP_2	—
Rathfarnham C.	Z.	155·3	12	e 19 46	[− 9]	e 30 15	(−33)	—	—	—
Potsdam		155·5	345	e 19 57	[+ 2]	—	—	e 24 15	PP	79·2
Witteveen	Z.	156·2	353	e 20 27	PKP_2	—	—	—	—	—
Collmberg	Z.	156·5	342	e 19 53	[− 3]	—	—	e 20 26	PKP_2	—
De Bilt		157·1	354	e 20 0	[+ 3]	e 24 9	PP	e 20 30	PKP_2	e 83·2
Jena		157·2	342	e 20 15?	PKP_2	e 22 36?	PKS	—	—	—
Prague		157·2	338	e 20 3	[+ 6]	e 24 45	PP	e 20 43	PKP_2	—
Kew		157·8	3	e 20 5	[+ 7]	e 30 11	(−50)	e 24 23	PP	e 80·2
Stuttgart		159·7	346	e 19 58	[− 2]	e 31 11	(+ 1)	e 20 41	PKP_2	86·2
Strasbourg		160·2	348	e 19 57	[− 4]	e 34 57	PS	e 20 44	PKP_2	e 84·2
Paris		160·5	359	e 20 1	[0]	i 30 42	(−33)	e 24 26	PP	e 76·2
Triest		161·2	334	—	—	e 29 0	PKKP	e 34 19	PSKS	—
Pavia		163·1	343	—	—	e 28 53	PKKP	—	—	e 84·5
Rome		164·7	328	e 20 3	[− 2]	e 32 5	(+29)	e 25 15	PP	e 85·2
Messina		165·5	313	—	—	e 26 1	?	e 32 14	SKKS	e 53·3
Alicante		170·8	11	e 20 40	PKP_2	27 57	[+45]	25 59	PP	e 78·1
Granada		170·9	29	e 21 46k	PKP_2	32 16	(+ 8)	i 25 25	PP	79·4
Malaga		170·9	34	i 20 24	[+14]	i 25 20	PP	i 21 30	PKP_2	e 80·2
Almeria		171·7	24	20 12	[+ 2]	46 24	SS	27 26	PP	80·7
Tamanrasset		172·7	208	i 20 10a	[− 1]	e 25 19	PP	i 21 48	PKP_2	—

Additional readings :—
Christchurch eS?EN =6m.19s.
Brisbane eEN =10m.28s.
Pasadena iZ =12m.51s.
Lick iZ =13m.11s.
Huancayo eSS =31m.12s.
Collmberg eZ =20m.5s.
Jena eZ =20m.31s.
Prague e =20m.31s., 21m.1s., and 21m.26s.
Stuttgart ePPZ =24m.22s. and 24m.39s., eZ =29m.27s., ePSKS =34m.33s., eQ = 85·2m.
Strasbourg e =20m.57s. and 22m.21s., i =22m.54s., ePP =24m.20s., e =25m.48s.
Paris e =20m.16s., 20m.44s., 20m.48s., 20m.56s., 24m.52s., and 31m.58s., ePP (△ >180°) =32m.54s., ePPS =37m.58s., e =38m.12s.
Triest ePS? =35m.44s., eSS =44m.43s.
Rome eSS =45m.39s., eSSS =53m.29s.
Alicante PKP_2 =22m.4s., PPP =29m.53s., Q =69m.44s.
Granada PPP =29m.28s., SKSP =35m.55s., iSS =46m.49s., SSS =53m.10s.
Tamanrasset eZ =20m.18s.
Long waves were also recorded at Kodaikanal, Istanbul, Clermont-Ferrand, Scoresby Sund and other American stations.

Sept. 21d. 20h. 53m. 54s. Epicentre 34°·2N. 136°·8E. Depth of focus 0·050.
(as on 1945, October 9d.).

Intensity IV at Utunomiya ; II-III at Tukubasan, Mito, Shimodate, and Makabe. Epicentre 34°·0N. 137°·2E. Depth of focus 350km.
Seismo. Bull. Cent. Met. Obs., Japan, for Sept., 1951, Tokyo, 1951, p. 224, with macroseismic chart.

$A = -·6042$, $B = +·5674$, $C = +·5595$; $\delta = +4$; $h = 0$;
$D = +·685$, $E = +·729$; $G = -·408$, $H = +·383$, $K = -·829$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Owase		0·5	255	0 44	0	1 18	− 1	—	—	—
Tu		0·6	336	0 45	0	1 21	+ 1	—	—	—
Kameyama		0·7	337	0 46	+ 1	1 21	+ 1	—	—	—
Nagoya		1·0	8	0 46	0	1 24	+ 2	—	—	—
Hikone		1·1	337	0 49	+ 3	1 25	+ 2	—	—	—
Osaka		1·1	292	0 50a	+ 4	1 27	+ 4	—	—	—
Gihu		1·2	359	0 48	+ 1	1 24	0	—	—	—
Omaesaki		1·2	71	0 48	+ 1	1 24	0	—	—	—
Kobe		1·6	290	0 50a	+ 1	1 28	+ 1	—	—	—
Sumoto		1·6	275	0 50	+ 1	1 29	+ 2	—	—	—
Kohu		2·0	45	0 52	0	1 31	− 1	—	—	—
Ajiro		2·1	66	0 53	+ 1	—	—	—	—	—
Hunatu		2·1	51	0 51k	− 1	1 32	− 1	—	—	—
Osima		2·2	75	0 50	− 3	—	—	—	—	—
Muroto		2·4	246	0 54a	− 1	1 38	+ 1	—	—	—
Toyama		2·5	7	0 56	+ 1	1 36	− 3	—	—	—
Matusiro		2·6	28	0 55	− 1	1 38	− 2	—	—	—
Mera		2·6	74	0 52k	− 4	1 34	− 6	—	—	—
Titibu		2·6	46	0 54	− 2	1 37	− 3	—	—	—
Yokohama		2·6	62	0 55	− 1	1 35	− 5	—	—	—
Hatidyozima		2·7	114	0 54	− 3	1 36	− 6	—	—	—
Kumagaya		2·9	47	0 56	− 3	1 38	− 7	—	—	—
Maebasi		2·9	40	1 0k	+ 1	1 40	− 5	—	—	—
Tokyo		2·9	59	0 57	− 2	1 47	+ 2	—	—	—
Matuyama		3·4	263	1 7a	+ 4	1 57	+ 4	—	—	—
Tukubasan		3·4	52	1 2	− 1	1 45	− 8	—	—	—
Utunomiya		3·4	47	1 1	− 2	1 46	− 7	—	—	—
Kakioka		3·5	52	0 59	− 5	1 45	−10	—	—	—
Simidu		3·5	247	1 3	− 1	1 56	+ 1	—	—	—
Mito		3·7	53	1 4	− 2	1 51	− 7	—	—	—
Inawasiro		4·3	38	1 12	− 1	2 6	− 4	—	—	—
Onahama		4·3	51	1 13	0	2 4	− 6	—	—	—
Ooita		4·4	259	1 19	+ 5	2 19	+ 8	—	—	—
Hukusima		4·6	39	1 20	+ 4	2 22	+ 7	—	—	—
Miyazaki		5·0	244	1 37	+17	2 34	+11	—	—	—
Sendai		5·2	40	1 20	− 2	2 20	− 7	—	—	—
Hukuoka		5·3	265	1 27	+ 3	2 34	+ 5	—	—	—
Saga		5·5	262	1 46	+20	2 42	+ 9	—	—	—
Mizusawa		6·0	33	e 1 28	− 3	2 37	− 6	2 40	S	—
Zi-ka-wei	z.	13·3	261	e 3 1	+ 3	e 5 25	+ 5	—	—	—
Nanking		15·2	267	i 3 19	0	e 6 13	+14	—	—	—
Manila		24·2	220	e 4 6	−42	i 14 6	L	—	—	(i 14·1)
Calcutta	E.	43·8	268	e 11 59	?	i 14 1	+23	i 15 37	SS	—
Victoria		71·1	44	e 10 43	+ 1	—	—	—	—	—
Mineral	z.	76·5	50	i 11 14k	0	—	—	—	—	—
Berkeley	z.	77·4	53	i 11 20k	+ 2	—	—	—	—	—
Branner	z.	77·7	53	e 11 21a	+ 1	—	—	—	—	—
Reno	z.	78·1	50	e 11 22a	0	—	—	—	—	—
Fresno	z.	79·7	53	e 11 30a	− 1	—	—	—	—	—
Tinemaha	z.	80·5	52	i 11 36	+ 1	—	—	—	—	—
China Lake	z.	81·7	52	i 11 41	0	—	—	—	—	—
Pasadena		82·3	54	i 11 45	+ 1	—	—	—	—	—
Riverside	z.	82·9	54	i 11 46	− 1	—	—	—	—	—
Palomar		83·6	54	i 11 41	−10	—	—	—	—	—

Sept. 21d. Readings also at 0h. (Apia and Kimberley), 1h. (Almata, near Almata II, Chilisk Ili, Krasnogorka, Naryn, and near Manila), 2h. (Santa Lucia), 3h. (Dzhergetal and Naryn), 4h. (Puebla and near Tacubaya), 5h. (Copiapo), 7h. (La Paz), 8h. (Khorog, Tashkent, near Dzhergetal, Garm, Obi-garm, and near Ashkabad), 10h. (China Lake, Palomar, Pasadena, Tinemaha, Tucson, Fresno, Lick, Mineral, Hungry Horse, College, Victoria, Butte, Harvard, Auckland, near Apia, and near Manila), 11h. (Helwan, Ksara, Collmberg, Paris, Strasbourg, Stuttgart, Copenhagen, Horseshoe Bay, near Seattle, and Victoria), 12h. (Brisbane, Manila, Mount Wilson, Palomar, China Lake, Tinemaha, Mineral, Victoria, and Collmberg), 13h. (Kiruna, Strasbourg, near Manila, and near Garm), 14h. (Brisbane, Manila, Algiers Univ., Kew, Paris, and near Garm), 17h. (Kiruna, Manila, and near Athens), 18h. (Brisbane, Manila, Harvard, Kiruna, and near Alicante), 19h. (Manila and Victoria), 20h. (Mount Wilson, Riverside, China Lake, Copiapo, La Paz, and Weston), 21h. (Brisbane, Pasadena, Riverside, China Lake, Tinemaha, Victoria, Kiruna, Collmberg, Paris, Strasbourg, Stuttgart, and Clermont-Ferrand), 22h. (Brisbane, near Garm, and near La Paz), 23h. (Granada, Dzhergetal, Lunacharskoe, Samarkand, Tchimkent, near Andijan, Fergana, and Khorog).

Sept. 22d. 10h. 16m. 57s. Epicentre 48°·0N. 127°·0W.
Berkeley and Pasadena suggest epicentre as adopted.

$A = -·4042$, $B = -·5364$, $C = +·7409$; $\delta = +4$; $h = -5$;
$D = -·799$, $E = +·602$; $G = -·446$, $H = -·592$, $K = -·672$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Alberni		1·9	48	0 34	0	1 7	+ 8	—	—	—
Victoria		2·5	78	e 0 40	− 3	—	—	—	—	—
Horseshoe Bay		2·8	60	e 0 33	−14	e 1 29	+ 7	—	—	—
Seattle		3·1	95	e 0 57	+ 6	e 1 44	S_g	—	—	e 2·6
Shasta Dam		8·0	154	e 1 59	− 1	—	—	—	—	—
Mineral	z.	8·6	151	e 2 5k	− 4	—	—	i 2 8	P	—
Hungry Horse		8·7	83	e 2 10	0	—	—	—	—	—
Reno	z.	9·9	146	e 1 27a	−58	—	—	—	—	—
Berkeley	z.	10·7	159	i 2 35k	− 3	—	—	e 3 36	?	—
Lick	z.	11·4	158	i 2 44k	− 3	i 2 55	PP	i 3 11	PPP	—
Fresno	z.	12·4	152	e 3 0a	− 1	—	—	—	—	—
China Lake	z.	14·0	147	i 3 22	0	—	—	—	—	—
Boulder City		15·0	139	e 3 40	+ 5	—	—	—	—	—
Pasadena	z.	15·3	151	i 3 42	+ 3	—	—	—	—	—
Riverside	z.	15·7	149	e 3 44	0	—	—	—	—	—
Palomar	z.	16·5	149	i 3 53	− 1	—	—	—	—	—
Tucson		19·9	137	e 4 35	− 1	—	—	—	—	—
College		20·3	334	4 30	−10	—	—	—	—	—
Ottawa	z.	34·7	75	6 53	− 1	—	—	—	—	—
Weston		38·9	77	e 7 32	+ 3	—	—	—	—	—
La Paz		82·9	124	e 11 26	−62	—	—	—	—	—

Additional readings :—
Seattle e = 1m.12s., i = 1m.55s., e = 2m.2s., 2m.12s., and 2m.19s.
Mineral iZ = 2m.49s. and 3m.25s.
Long waves were also recorded at Resolute Bay, Palisades, and Scoresby Sund.

Sept. 22d. 23h. 40m. 35s. Epicentre 16°·5N. 46°·8W.

$A = +·6567$, $B = -·6993$, $C = +·2823$; $\delta = -3$; $h = +6$;
$D = -·729$, $E = -·685$; $G = +·193$, $H = -·206$, $K = -·959$.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Fort de France	13·9	265	e 3 25	+ 4	—	—	—	—	—
San Juan	18·5	279	i 4 18	− 1	e 6 32	−72	—	—	—
Bermuda	22·7	318	e 5 5	+ 1	e 9 11	+ 2	—	—	e 9·5
Bogota	29·2	249	e 6 6	+ 1	11 11	+13	e 12 15	SS	13·9
Chinchina	30·5	251	e 9 2?	PcP	—	—	—	—	—
Harvard	33·5	326	e 6 34	− 9	—	—	—	—	—
Palisades	33·8	322	e 6 46	0	e 12 14	+ 4	—	—	e 15·6
Morgantown	36·9	314	e 7 13	+ 1	—	—	—	—	—
Shawinigan Falls N.	36·9	331	e 7 13	+ 1	—	—	—	—	—
Ottawa	37·6	326	7 19	+ 1	e 17 35	ScS	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Cleveland		38·9	317	e 8 55	PP	e 13 30	+ 2	e 16 30	SSS	—
Huancayo		40·0	226	e 7 37	− 1	e 13 44	0	—	—	e 20·4
Malaga		42·5	52	i 8 1	+ 2	e 14 12	−10	—	—	—
Granada		43·3	52	i 8 5a	0	i 14 38	+ 5	i 17 47	SS	i 21·4
Almeria		44·0	53	i 8 12	+ 1	i 14 50	+ 7	9 42	PP	25·4
Alicante		45·9	51	8 25	− 1	15 22	+11	19 17	Q	e 24·0
Fayetteville		46·2	305	i 7 28	−60	—	—	—	—	—
Rathfarnham Castle		48·4	31	e 8 48	+ 2	e 15 44	− 2	e 11 57	PPP	e 22·9
Tamanrasset	z.	49·5	73	i 8 55a	+ 1	e 10 52	PP	e 11 32	PPP	—
Paris		51·3	40	i 9 8	0	i 16 36	+10	i 9 20	pP	e 23·4
De Bilt		54·1	36	e 9 30	+ 1	e 17 13	+ 8	e 12 36	PPP	e 25·4
Strasbourg		54·5	41	e 9 31	− 1	e 17 19	+ 9	e 11 33	PP	—
Pavia		54·6	45	e 10 8	?	e 17 46	SPP	e 10 47	PcP	e 25·2
Karlsruhe	z.	55·1	40	e 9 33	− 3	—	—	—	—	—
Witteveen	z.	55·2	35	e 9 37	0	—	—	—	—	—
Stuttgart		55·5	41	e 9 36	− 3	e 17 25	+ 1	e 12 37	PPP	e 25·4
Rome		56·4	50	9 45k	0	17 43	+ 7	e 11 49	PP	e 26·4
Jena		57·5	40	e 9 52	− 1	—	—	e 10 36	PcP	—
Cheb		57·8	41	e 9 53	− 2	e 18 6	+12	—	—	—
Triest		57·9	45	i 9 56	0	i 18 3	+ 8	e 12 5	PP	e 27·2
Messina		58·4	54	e 9 59	− 1	e 18 47	PPS	—	—	e 28·2
Collmberg	z.	58·5	40	e 10 0	0	—	—	—	—	—
Potsdam		58·8	47	e 10 1	− 1	e 18 13	+ 6	e 22 19	SS	e 28·4
Prague		59·1	41	e 17 25	?	—	—	—	—	—
Copenhagen		59·3	34	i 10 5	− 1	i 18 21	+ 7	24 43	SSS	—
Tucson		59·6	298	e 10 8	0	—	—	—	—	—
Taranto		59·8	51	e 10 12	+ 3	—	—	—	—	—
Hungry Horse		62·7	316	e 10 26	− 3	—	—	—	—	—
Boulder City		62·9	302	e 10 30	0	—	—	—	—	—
Uzhgorod		64·0	42	e 10 35	− 3	e 19 21	+ 8	—	—	—
Riverside	z.	65·0	300	e 10 44	0	—	—	—	—	—
China Lake	z.	65·1	302	e 10 45	0	—	—	—	—	—
Pasadena	z.	65·7	300	e 10 47	− 1	—	—	—	—	—
Kiruna		66·3	23	i 10 51a	− 1	e 19 45	+ 3	i 11 36	PcP	e 31·4
Reno	z.	66·7	306	e 10 55	0	—	—	e 11 27	PcP	—
Mineral	z.	68·0	307	i 11 3k	0	—	—	i 11 23	PcP	—
Lick	z.	68·3	304	i 11 6a	+ 1	—	—	—	—	—
Kishinev		68·4	44	e 11 2	− 4	e 20 12	+ 5	—	—	—
Shasta Dam		68·6	308	e 11 6	− 1	—	—	—	—	—
Helwan	z.	71·9	63	e 11 25	− 2	—	—	e 12 22	?	—
Moscow		73·4	35	e 11 35	− 1	e 21 11	+ 6	—	—	—
Ksara		75·0	58	e 11 48	+ 3	—	—	22 52	?	—
Goris		82·1	50	12 24	0	e 22 48	ScS	—	—	—
Sverdlovsk		85·5	32	12 42	+ 1	e 23 22	+10	—	—	—

Additional readings :—
Granada iPP = 8m.56s.
Rathfarnham Castle eZ = 14m.44s., eEN = 15m.13s., eZ = 16m.38s.
Tamanrasset eZ = 9m.4s., ePcPZ = 9m.57s.
Paris isP = 9m.27s., ePcP = 10m.14s., ePP = 11m.6s., e = 11m.57s., eSP = 16m.47s., e = 16m.58s., eScS = 18m.59s., iQ = 21m.21s.
De Bilt eSSS = 22m.25s.?
Strasbourg e = 9m.57s.
Rome ePS = 18m.23s., eSS = 21m.33s.
Cheb e = 15m.52s. and 23m.1s.
Kiruna eE = 20m.10s., eN = 20m.49s., eE = 20m.52s., eSSSN = 26m.51s.
Lick iZ = 11m.11s. and 11m.16s.
Long waves were also recorded at Weston.

Sept. 22d. Readings also at 0h. (near Dzhergetal), 1h. (near Dzhergetal, near Almata II, Ili, and Chilisk), 2h. (near Dzhergetal), 4h. (Rome, Tsikhlis-Dzhvari, Fergana, Andijan, near Khorog, Dzhergetal, and Samarkand), 5h. (near Yalta), 6h. (Ashkabad, near Dzhergetal, and near Manila), 8h. (Big Bear, Dalton, near Riverside, and Pasadena), 9h. (near Yalta), 10h. (Ashkabad and Apia), 11h. (Huancayo, Murgab, near Naryn, Andijan, Fergana, Khorog, and near Ashkabad (2)), 12h. (Ksara), 13h. (Paris, Strasbourg, Stuttgart, and Bogota), 15h. (Copiapo), 17h. (Santa Lucia and near Apia), 18h. (Ksara, Fergana, near Dzhergetal, Garm, and Khorog), 19h. (Copiapo, Buenos Aires, Huancayo, La Paz, La Plata, Kimberley, Stalinabad, Tashkent, near Khorog, Obi-garm, Dzhergetal, Murgab, and Fergana), 21h. (Kew), 23h. (near Athens).

Sept. 23d. 10h. 19m. 43s. Epicentre 34°·3N. 136°·2E.

Focus at Base of the Superficial Layers.

Intensity V at Owase and Hamajima; IV at Kashiwara, Nabari, Ueno, Nagajima, Iruka, Utumi, Otu, etc.; II-III at Osaka, Hikone, Nagoya, Tsuruga, Yokusuga, etc. Epicentre as adopted. Depth 40km.

Seismological Bulletin of the C.M.O., Japan, for Sept., 1951, Tokyo, 1951, p.225, with macroseismic chart.

$A = -\cdot5978$, $B = +\cdot5732$, $C = +\cdot5604$; $\delta = -3$; $h = 0$;
$D = +\cdot692$, $E = +\cdot722$; $G = -\cdot404$, $H = +\cdot388$, $K = +\cdot828$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Owase	0·2	180	0 6k	− 1	0 12	− 1
Kashiwara	0·4	303	0 8a	− 1	0 14	− 2
Tu	0·5	32	0 5a	− 5	0 12	− 6
Kameyama	0·6	21	0 9k	− 3	0 18	− 3
Osaka	0·7	302	0 10a	− 3	0 19	− 4
Kobe	0·9	295	0 15a	− 1	0 28	0
Siomisaki	0·9	203	0 15	− 1	0 27	− 1
Hikone	1·0	2	0 15	− 3	0 25	− 6
Nagoya	1·1	36	0 16	− 3	0 30	− 3
Sumoto	1·1	273	0 16	− 3	0 30	− 3
Gihu	1·2	23	0 19	− 1	0 35	− 1
Hamamatu	1·3	72	0 18	− 4	0 36	− 2
Tsuruga	1·4	355	0 20	− 3	0 37	− 4
Himeji	1·5	278	0 20	− 4	0 38	− 6
Omaesaki	1·7	80	0 32	+ 4	0 56	+ 7
Toyooka	1·7	317	0 23	− 5	0 45	− 4
Hukui	1·8	2	0 27	− 2	0 49	− 2
Iida	1·8	48	0 29	0	0 53	+ 2
Takamatsu	1·8	271	0 25	− 4	0 47	− 4
Shizuoka	1·9	70	0 27	− 4	0 59	+ 5
Muroto	2·0	238	0 28	− 4	0 53	− 3
Kanazawa	2·3	9	0 37	+ 1	1 5	+ 1
Koti	2·3	251	0 36	0	1 2	− 2
Hunatu	2·4	60	0 37	− 1	—	—
Kohu	2·4	55	0 46	+ 8	—	—
Toyama	2·5	19	0 41	+ 2	1 19	+10
Osima	2·7	80	0 34	− 8	—	—
Matusiro	2·8	36	0 50	+ 7	1 25	+ 9
Oiwake	2·8	43	0 41	− 2	—	—
Nagano	2·9	34	0 49	+ 4	1 21	+ 2
Titibu	2·9	54	0 53	+ 8	—	—
Simidu	3·1	243	0 57	+ 9	—	—
Kumagaya	3·2	53	0 48	− 1	1 25	− 2
Maebasi	3·2	46	0 56	+ 7	1 33	+ 6
Tokyo	3·2	63	0 59	+10	1 37	+10
Wazima	3·2	10	0 52	+ 3	1 35	+ 8
Takada	3·3	30	1 5	+14	1 44	+15
Utunomiya	3·8	51	1 13	+15	—	—
Ooita	4·0	256	1 5	+ 5	—	—

Sept. 23d. Readings also at 1h. (near Tortosa (2) and near Alicante (2)), 4h. (La Paz and near Manila), 6h. (near Yalta), 7h. (Apia, near Yalta, and near Garm), 8h (near Yalta (2)), 9h. (Andijan, near Khorog, Obi-garm, Garm, and Fergana), 10h. (Apia, New Plymouth, Wellington, Karapiro, Cobb River, Kaimata, Christchurch, and China Lake), 12h. (Manila, La Paz, and near Yalta), 14h. (Apia), 15h. (near Bogota), 17h. (near Tananarive and near Garm), 18h. (near Mizusawa), 19h. (Apia (2)), 20h. (Bucharest, near Sofia, Istanbul, Belgrade, and Timisoara), 21h. (Tacubaya), 22h. (Huancayo), 23h. (Stuttgart and Strasbourg).

Sept. 24d. 3h. 29m. 38s. Epicentre 42°·2N. 21°·4E.

Intensity V at Skoplje ; IV at Creshevo, and Zdunje.

M. D. Uzelac.
Annuaire macroséismique pour l'année 1951, de l'Institut séismologique de Béograd, Nouvelle, série No. 11, Belgrade, 1953, p.57.

$A = +·6918$, $B = +·2711$, $C = +·6693$; $\delta = +4$; $h = -3$;
$D = +·365$, $E = -·931$; $G = +·623$, $H = +·244$, $K = -·743$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia		1·5	71	(0 38)	P_g	(0 58)	S_g	—	—	—
Belgrade		2·7	345	e 0 39k	− 6	i 1 28	S_g	i 0 54	P_g	—
Timisoara		3·5	2	e 1 7	+10	i 2 0	S_g	—	—	—
Taranto		3·6	242	0 58	0	e 1 58	S_g	e 2 8	?	—
Bucharest		4·1	55	e 1 4	− 1	e 2 19	S_g	e 1 30	P_g	3·1
Athens		4·6	156	e 1 13	+ 1	—	—	e 1 30	P_g	e 3·2
Istanbul	N.	5·9	99	—	—	e 2 30	−10	e 3 11	S_g	e 3·4
Messina		6·0	230	—	—	e 2 32	−11	—	—	e 3·9
Triest		6·5	304	e 1 39	0	e 3 0	+ 5	i 2 14	P_g	—
Rome		6·6	270	—	—	e 3 31	S_g	—	—	i 4·3
Prague		9·2	331	—	—	e 4 30	S*	e 5 12	S_g	e 5·7
Zürich		10·5	304	e 2 24	−11	—	—	—	—	—
Stuttgart	z.	10·8	312	e 2 32?	− 7	—	—	—	—	e 5·4
Collmberg	z.	10·8	330	e 2 44	+ 5	e 4 46	+ 4	—	—	—

Additional readings :—
Sofia eEN =(1m.19s.) and (1m.51s.), readings have been increased by 1m.
Belgrade eP^*Z =44s., eP_gNE =47s., iS_gZ =1m.34s., iNW =1m.44s.
Timisoara iP^*E =1m.19s., eP^*N =1m.22s., iP_gE =1m.26s., iS^*E =2m.13s., eS_gE = 2m.24s.?.
Athens e =2m.42s.
Triest esP_gS_g =3m.27s., iS_gS_g =3m.43s.
Long waves were also recorded at Pavia.

Sept. 24d. 13h. 10m. 44s. Epicentre 49°·5N. 156°·2E. Depth of focus 0·010.
(as on 1950, Sept. 16d.).

$A = -·5966$, $B = +·2631$, $C = +·7582$; $\delta = +2$; $h = -5$;
$D = +·404$, $E = +·915$; $G = -·694$, $H = +·306$, $K = -·652$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		7·4	21	e 1 46	− 1	—	—	—	—	—
Abashiro		9·8	240	e 1 55	−25	—	—	—	—	—
Wakkanai		10·6	253	e 1 28	−62	—	—	—	—	—
Urakawa		11·9	237	e 2 44	− 4	e 4 24	?	e 5 26	Q	e 7·2
Sapporo		12·1	243	e 2 53	+ 3	e 5 26	+22	—	—	e 6·9
Mizusawa		14·9	231	3 55	+28	6 48	sS	e 4 1	?	—
Akita		15·0	236	e 3 24	− 4	e 5 56	−16	—	—	e 8·8
Sendai		15·7	230	e 3 35	− 2	e 7 5	sS	—	—	e 8·9
Hukusima	N.	16·3	230	3 36	− 8	—	—	—	—	—
Onahama		16·7	227	e 4 2	+13	e 7 33	+43	—	—	e 10·1
Niigata		16·9	233	e 3 20	−32	i 7 31	sS	i 4 29	?	—
Vladivostok		17·9	258	e 3 56	− 8	i 7 57	SSS	—	—	—
Kumagaya		18·1	229	e 4 8	+ 2	e 7 44	+22	—	—	—
Nagano	E.	18·3	233	e 4 13	+ 4	e 7 59	sS	—	—	e 10·2
Tokyo		18·3	228	e 4 18	+ 9	e 7 42	+16	4 41	pP	e 9·8
Matusiro		18·4	233	3 58	−12	7 48	+20	i 4 23	pP	9·6
Oiwake		18·4	232	e 3 54	−16	—	—	—	—	—
Toyama		18·8	236	e 4 18	+ 4	e 8 7	sS	—	—	e 10·7
Mera		18·9	227	e 4 19	+ 4	e 8 16	sS	—	—	—
Gihu		20·0	232	e 4 34	+ 7	e 8 34	sS	—	—	—
Osaka		21·2	234	e 4 36	− 3	e 8 48	sS	—	—	—
Kobe		21·4	234	e 4 57	+16	e 9 14	+46	e 6 24	?	e 12·5
Hukuoka		24·8	240	e 5 5	− 9	e 9 31	+ 4	10 7	SS	12·9
Zi-ka-wei	z.	31·8	249	6 33a	+16	—	—	—	—	—
Irkutsk		32·3	297	e 6 26?	+ 4	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		32·7	40	i 6 25	0	—	—	i 7 5	?	—
Nanking	z.	32·8	253	e 6 40	+14	—	—	—	—	—
Sitka		40·0	53	e 8 41	+74	e 13 39	+14	—	—	—
Manila		45·1	232	e 8 1	− 7	—	—	—	—	—
Resolute Bay		47·6	20	e 8 29	+ 1	e 15 39	PPS	e 8 51	pP	e 25·4
Ili		52·2	297	i 9 0	− 3	—	—	—	—	—
Przhevalsk		52·3	294	e 8 57	− 7	—	—	—	—	—
Almata II		52·4	296	e 9 4	0	—	—	—	—	—
Almata		52·7	296	e 9 11	+ 4	—	—	—	—	—
Sverdlovsk		53·2	318	e 9 10	0	e 17 16	sS	—	—	—
Krasnogorka		53·7	298	e 9 11	− 3	—	—	—	—	—
Frunse		54·3	297	i 9 39?	+21	i 17 40?	PcS	—	—	—
Naryn		54·3	294	e 9 23	+ 5	e 17 33	sS	—	—	—
Hungry Horse		55·5	54	i 9 26	− 1	—	—	—	—	—
Shasta Dam		55·5	66	i 9 26	− 1	—	—	—	—	—
Mineral	z.	56·2	66	e 9 30 a	− 2	—	—	i 9 46	pP	—
Andijan		56·9	296	9 36	− 1	—	—	—	—	—
Berkeley		57·4	68	i 10 16k	pP	e 17 59	sS	e 10 49	PcP	e 24·6
Murgab		57·5	293	e 10 3?	+22	e 18 31?	+62	—	—	—
Tchimkent		57·5	299	e 9 39	− 2	—	—	—	—	—
Fergana		57·5	296	e 9 37	− 4	—	—	—	—	—
Lick	z.	58·1	68	e 9 57k	+11	—	—	e 10 25	?	—
Tashkent		58·3	298	e 9 47?	0	—	—	—	—	—
Lunacharskoe		58·3	298	e 9 46	− 1	—	—	—	—	—
Kiruna		58·4	342	e 9 46	− 2	e 18 16	sS	e 10 7	pP	e 31·3
Calcutta	E.	58·9	269	e 10 25	sP	i 19 55	ScS	—	—	—
Garm		59·2	296	e 9 54	+ 1	e 18 27	sS	—	—	—
Khorog		59·5	294	e 10 14	pP	—	—	—	—	—
Fresno	z.	59·6	67	e 10 10	pP	—	—	—	—	—
Obi-garm		59·8	296	e 9 59	+ 2	—	—	—	—	—
Scoresby Sund		60·2	359	i 10 2	+ 2	20 23	ScS	10 22	pP	31·3
Stalinabad		60·4	296	e 10 1	0	e 18 44	sS	—	—	—
New Delhi		61·9	282	e 10 10	− 2	e 18 43	+17	10 48	PcP	26·2
Pasadena		62·3	70	e 10 25	+11	e 18 52	+21	e 10 50	pP	—
Mount Wilson	z.	62·3	70	e 10 12	− 2	—	—	i 10 50	PcP	—
Pulkovo		62·6	333	—	—	e 19 12	sS	—	—	—
Riverside	z.	62·9	70	e 10 32	+14	—	—	e 10 52	pP	—
Boulder City		63·1	66	i 10 32	pP	—	—	—	—	—
Moscow		63·4	326	e 10 41?	+19	—	—	—	—	—
Mary		65·1	300	e 10 33	+ 1	e 19 42	sS	—	—	—
Upsala		65·9	339	—	—	e 20 16	+60	e 24 28	SS	e 35·3
Ashkabad		66·8	302	e 10 51	+ 8	—	—	—	—	—
Kizyl-Arvat		67·2	305	—	—	e 20 9	sS	—	—	—
Ivigtut		67·9	13	—	—	24 22	SS	—	—	37·3
Tucson		68·0	67	e 10 49	− 2	—	—	e 11 3	pP	—
Baku		68·9	309	e 11 5	+ 9	—	—	—	—	—
Hyderabad		69·0	273	11 15	pP	20 26	sS	—	—	—
Shemakla		70·0	310	11 22?	pP	—	—	—	—	—
Copenhagen		70·9	340	i 11 30	+22	e 20 42	+27	25 23	SS	35·3
Tiflis		71·1	313	i 11 11	+ 1	—	—	—	—	—
Kirovobad		71·1	311	11 11	+ 1	20 54	sS	—	—	—
Poona		71·2	277	10 59	−11	20 28	+10	21 20	PS	31·8
Lenkoran		71·3	308	i 11 32?	pP	—	—	—	—	—
Bombay		71·6	278	e 11 15	+ 2	e 20 43	+20	21 6	sS	—
Goris		72·0	310	e 11 15	0	e 21 3	sS	—	—	—
Erevan		72·1	312	e 11 4?	−12	—	—	—	—	—
Lwow		72·9	330	i 11 20	0	e 21 14	sS	—	—	—
Yalta		73·6	321	e 11 25	+ 1	e 21 25	sS	—	—	—
Potsdam		73·8	338	e 11 28	+ 2	—	—	e 30 4	Q	e 37·3
Uzhgorod		74·5	331	e 11 29	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Raciborzu		74·5	334	e 11 34	+ 4	—	—	e 11 38	PcP	—
Skalnate Pleso		74·7	332	e 11 45	+14	e 21 29	+31	e 12 2	pP	—
Collmberg	z.	74·8	337	i 11 32	+ 1	—	—	i 11 52	pP	—
Kodaikanal		75·0	270	e 9 6	?	21 26	+25	—	—	—
Ottawa		75·2	35	11 33	− 1	21 36	sS	26 42	SS	39·6
Shawinigan Falls	N.	75·3	32	e 11 55	pP	—	—	—	—	—
Prague		75·5	336	e 11 51	+16	e 21 40	sS	e 12 18	pP	e 34·3
Seven Falls	E.	75·5	31	—	—	21 10	+ 4	27 10	SSS	—
Jena		75·5	338	e 11 36	+ 1	—	—	e 11 57	pP	—
De Bilt		75·8	343	e 12 4	pP	e 21 52	sS	e 22 52	?	39·3
Cheb		76·1	338	e 12 14	sP	—	—	—	—	—
Cleveland		76·2	41	—	—	e 21 21	+ 7	e 21 48	SP	—
Rathfarnham Castle		76·5	350	e 12 3	pP	e 22 4	sS	—	—	e 36·3
Ogyalla		76·5	332	e 12 0	pP	e 20 46	−31	e 12 34	?	—
Kew		77·4	345	e 11 57	+11	e 21 56	+29	—	—	e 39·3
Timisoara	N.	77·4	330	e 12 9	pP	—	—	—	—	49·3
Karlsruhe	z.	78·0	340	e 11 54	+ 5	—	—	—	—	—
Stuttgart		78·1	339	e 11 50	0	e 22 16	sS	e 12 12	pP	45·3
Morgantown		78·4	41	11 51	− 1	—	—	—	—	—
Belgrade		78·4	300	e 11 53a	+ 1	e 26 24	SS	e 12 28	sP	e 43·9
Strasbourg	z.	78·6	340	e 11 54	+ 1	e 22 16	+36	i 12 15	pP	e 37·3
Istanbul		78·6	322	e 11 53	0	e 22 7	+27	e 18 13	?	e 43·3
Harvard		79·3	34	—	—	e 22 23	sS	e 26 29	SS	e 47·1
Paris		79·5	343	i 11 59	+ 1	e 22 5	+15	i 12 27	pP	e 39·3
Zürich		79·5	339	e 11 58a	0	e 22 34	sS	e 12 17	pP	—
Palisades		79·7	36	e 12 16	pP	—	—	—	—	—
Triest		79·8	335	e 11 58	− 1	e 21 42	−11	e 12 24	pP	e 43·7
Pavia		81·4	337	—	—	e 22 54	sS	—	—	—
Ksara		81·6	313	e 12 8	− 1	e 22 55	sS	e 12 32	pP	—
Clermont-Ferrand		82·3	342	e 12 40	pP	—	—	—	—	e 48·0
Rome		83·6	334	e 12 24	+ 5	e 22 58	+27	i 23 38	PS	—
Messina		86·0	331	e 13 2	pP	e 23 23	sS	—	—	—
Alicante		90·2	343	12 34	−17	23 23	−11	24 49	PS	e 43·6
Tamanrasset	z.	103·5	332	e 14 6	+15	—	—	e 14 15	pP	—
Pretoria	z.	133·6	281	(19 5)	[− 1]	—	—	—	—	—

Additional readings :—
Mizusawa SE =7m.3s.
Tokyo iN =6m.15s. and 7m.16s., esS?N =8m.19s.
Resolute Bay eN =18m.33s., 19m.39s., and 21m.23s.
Mineral iZ =10m.7s., eZ =10m.20s.
Kiruna ePPP?Z =13m.44s., ePPP?N =13m.47s., ePPP?E =13m.51s., esSN =18m.42s., esSZ =18m.45s., eN =19m.46s., esSSN =22m.48s., eE =23m.23s., eQEN =27·8m.
New Delhi SSN =22m.40s.
Mount Wilson eZ =10m.24s., iZ =10m.29s.
Upsala eE =22m.3s.
Copenhagen 16m.6s.
Poona PcPEZ =11m.9s., ScSEZ =20m.36s., PPSEZ =21m.38s.
Bombay PN =10m.16s.?, iE =21m.32s.
Skalnate Pleso eN =19m.5s.
Ottawa i =15m.20s., SSS =30m.28s.
Prague e =12m.40s.
Jena eE =11m.48s.
Rathfarnham Castle eZ =12m.46s., 15m.22s., and 23m.35s.
Ogyalla e =23m.4s.
Stuttgart ePcP?Z =12m.2s., e =25m.40s., eSS =26m.46s., e =31m.28s., eQ =41·3m.
Belgrade eZ =13m.11s., eNE =18m.16s. and 29m.46s.
Strasbourg ePcPZ =12m.6s., eZ =12m.11s., isPZ =12m.29s., ePP?Z =14m.44s., eSPZ = 22m.29s., eSSZ =27m.41s., eZ =31m.29s. and 31m.57s.
Paris iPcP =12m.11s., i =12m.20s., isP =12m.34s., ePP =15m.12s., eSP =22m.25s., iPPS =23m.9s., eSS? =26m.26s.
Triest eP? =11m.49s., eSS =26m.59s.
Rome e =24m.10s., eSSS =31m.58s.
Alicante PP =16m.1s., PPP =18m.5s., Q =36m.41s.
Pretoria reading has been increased by 16m.
Long waves were also recorded at Bergen, Aberdeen, Malaga, Fort de France, Huancayo, Wellington, and Christchurch.

Sept. 24d. 19h. 30m. 21s. Epicentre 25°·9N. 96°·8E. (as on 1950, Oct. 30d.).

A = −·1066, B = +·8944, C = +·4344; δ = +2; h = +3;
D = +·993, E = +·118; G = −·051, K = +·431, K = −·901.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta		8·4	248	e 2 59	+53	e 4 18	S*	—	—	i 5·1
New Delhi		17·6	283	e 4 8	0	e 7 13	−10	—	—	—
Zi-ka-wei	z.	22·3	70	e 4 59	− 2	e 9 12	+10	—	—	—
Poona		22·4	225	5 1	− 1	8 56	− 8	—	—	—
Przhevalsk		22·4	322	4 59	− 3	—	—	—	—	—
Murgab		22·9	308	i 5 6	0	i 9 13	0	—	—	—
Naryn		23·1	317	i 5 8	0	e 9 19	+ 3	—	—	—
Bombay		23·2	256	i 5 21	+12	i 9 42	+24	—	—	10·6
Almata II		23·5	322	e 5 12?	0	—	—	—	—	—
Rybach'e		23·7	318	e 5 16	+ 2	e 9 27	0	—	—	—
Almata		23·7	322	e 4 38?	−36	e 8 49?	−38	—	—	—
Ili		24·1	323	i 5 17	− 1	—	—	—	—	—
Khorog		24·3	303	i 5 22	+ 2	e 9 44	+ 7	—	—	—
Andijan		25·1	310	e 5 29	+ 1	e 9 56	+ 5	—	—	—
Fergana		25·3	310	e 5 30	0	—	—	—	—	—
Garm		25·8	307	i 5 35	+ 1	—	—	—	—	—
Stalinabad		26·8	306	e 5 44	0	—	—	—	—	—
Tchimkent		27·7	313	e 5 52	0	—	—	—	—	—
Samarkand		28·4	304	e 5 51	− 7	—	—	—	—	—
Kizyl-Arvat		36·3	302	e 7 8	+ 1	—	—	—	—	—
Sverdlovsk		40·3	330	e 7 39	− 1	—	—	—	—	—
Moscow		51·8	321	e 9 11	− 1	—	—	—	—	—
Stuttgart	z.	69·5	315	e 11 13	+ 1	—	—	—	—	—
Tamanrasset	z.	81·4	291	e 12 23	+ 3	—	—	e 15 25	PP	—

Sept. 24d. Readings also at 0h. (Paris, Clermont-Ferrand, Strasbourg, near Malaga, Granada, and Almeria), 1h. (Taranto, near Messina, near Istanbul, and near Apia (4)), 2h. (Huancayo), 7h. (near Obi-garm, Stalinabad, Fergana, Khorog (2), Dzhergetal (2), and Garm (2)), 8h. (La Paz (2) and near Huancayo), 11h. (Apia, Ili, near Naryn, Frunse, and Almata II), 12h. (Tamanrasset), 13h. (Seattle and Christchurch), 14h. (Santa Clara, La Paz (2), and near Istanbul), 17h. (near Alicante (2)), 19h. (near Apia), 20h. (Santa Lucia), 21h. (Bogota and near Tacubaya), 23h. (Mineral, Mount Wilson, Tinemaha, China Lake, Palomar, Lick, Riverside, Shasta Dam, Boulder City, Tucson, College, Pretoria, and near Garm).

Sept. 25d. 3h. 48m. 46s. Epicentre 36°·7N. 141°·2E. (Focus at Base of Superficial Layers). (as on 1951, Jan. 28d.).

Intensity IV at Kakioka, Tukubasan, Minato, Hunahiki, Koriyama, Nakahata, etc.
II-III at Mito, Utunomiya, Hukusima, Shirakawa, Hirano, etc.
Epicentre 36°·6N. 141°·3E. Depth 40km.

Seismological Bulletin of the Central Meteorological Observatory, Japan, for Sept., 1951, Tokyo, 1951, p.226, with macroseismic chart.

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

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Onahama	0·3	314	0 8?a	0	0 15?	0
Mito	0·7	242	0 13k	0	0 23	0
Kakioka	0·9	240	0 15	− 1	0 27	− 1
Shirakawa	0·9	298	0 16	0	0 28	0
Tukubasan	1·0	241	0 19	+ 1	0 31	0
Utunomiya	1·1	262	0 17	− 2	0 32	− 1
Hukusima	1·2	331	0 21a	+ 1	0 37	+ 1
Inawasiro	1·2	315	0 21	+ 1	0 37	+ 1
Kunagaya	1·6	247	0 24	− 2	0 44	− 2
Sendai	1·6	351	0 26	0	0 44	− 2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Tokyo		1·6	229	0 25k	− 1	0 44	− 2
Maebasi		1·8	260	0 28a	− 1	0 49	− 2
Titibu		1·8	247	0 25	− 4	—	—
Oiwake		2·2	260	0 36	+ 1	—	—
Hunatu		2·3	239	0 36	0	1 7	+ 3
Ajiro		2·4	226	0 40	+ 2	—	—
Matusiro		2·4	266	0 38	0	1 10	+ 4
Mizusawa	E.	2·4	359	—	—	1 16	+10
Nagano		2·4	269	0 41	+ 3	—	—
Sakata		2·4	334	—	—	1 15	+ 9

Sept. 25d. Readings also at 0h. (Collmberg and near Apia), 1h. (Khorog, Tashkent, Naryn, Ashkabad, near Obi-garm, Garm, Dzhergetal, Murgab, Stalinabad, Fergana, Andijan, Lunacharskoe, Samarkand, Frunse, and Tchimkent), 2h. (Andijan, Tchimkent, Tashkent, Frunse, Naryn, Almata II, Ili, Samarkand, Rybach'e, near Khorog, Obi-garm, Garm, Dzhergetal, Murgab, Stalinabad, and Fergana), 3h. (near Garm), 4h. (near Manzanillo, Guadalajara, Tacubaya, Bogota, Stuttgart, near Neuchatel, Basle, Zürich, Garm, near Khorog, Stalinabad, Dzhergetal, and Fergana), 5h. (Rome), 6h. (Ksara and near Khorog), 8h. (near Malaga, Lisbon, Alicante, Granada, Toledo, and Almeria), 10h. (Ksara, Dzhergetal, near Obi-garm, Khorog, and Stalinabad), 11h. (Murgab, Przhevalsk, Naryn, Rybach'e, Almata II, Fergana, Krasnogorka, Almata, Frunse, Obi-garm, Stalinabad, Tashkent, Tchimkent, Khorog, Poona, and Bombay), 12h. (near Shemakla), 13h. (Pretoria, Christchurch, near Almata II, and Naryn), 14h. (Fergana, near Obi-garm, Khorog, and Dzhergetal), 15h. (near Shemakla, near Ottawa, Shawinigan Falls, and Seven Falls), 16h. (Alicante (2)), 17h. (near Manila), 18h. (Apia, Weston, and near Ashkabad), 19h. (near Garm), 20h. (Rybach'e, Fergana, Dzhergetal, Murgab, Stalinabad, Tashkent, near Naryn, Przhevalsk, Almata II, Almata, Frunse, Krasnogorka, Chilisk, Andijan, Ili, Obi-garm, and near Rome), 21h. (Apia), 22h. (Rome, Messina, Tamanrasset, and near Tunis), 23h. (near Khorog, Obi-garm, and Garm).

Sept. 26d. Readings at 1h. (Lick, Fresno, Mineral, Reno, Pasadena, Riverside, Palomar, China Lake, Tinemaha, and near Apia (2)), 2h. (Collmberg, Stuttgart (2), Vera Cruz, Oaxaca, Puebla, and near Tacubaya), 4h. (Rome, Triest, Tunis, and near Messina), 6h. (La Paz), 11h. (near Alicante), 12h. (near Athens), 13h. (near Dzhergetal and near Garm), 15h. (Alberni, Horseshoe Bay, and Kimberley), 16h. (Dzhergetal, near Tsikhlis-Dzhvari, and near Ashkabad), 17h. (Ashkabad, La Paz, Bermuda and Huancayo), 18h. (Kimberley and La Paz).

Sept. 27d. 9h. 8m. 29s. Epicentre 19°·0S. 69°·0W. Depth of focus 0·015.
(as on 1939, May 19d.).

Doubtful identification.

$A = +·3391$, $B = -·8834$, $C = -·3236$; $\delta = +10$; $h = +5$;
$D = -·934$, $E = -·358$; $G = -·116$, $H = +·302$, $K = -·946$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		2·6	18	i 0 59k	+17	i 1 43	+29	i 1 56	?	—
Antofagasta	E.	4·8	195	0 29	?	0 56	?	1 4	P	—
Copiapo	N.	8·4	188	e 1 13	−47	e 2 19	−75	—	—	—
Huancayo		9·2	319	e 2 32	PPP	e 4 33	SSS	e 4 45	?	—
Bogota		24·0	347	e 5 13	+ 9	e 10 23	SS	6 27	?	12·3
San Juan		37·3	5	i 7 1	0	—	—	—	—	—
Bermuda		51·2	5	i 8 53	+ 1	—	—	—	—	—
Morgantown		59·2	350	i 9 52	+ 2	—	—	—	—	—
Harvard		61·2	359	i 10 3	0	—	—	—	—	—
Tucson		64·8	322	i 10 27	0	—	—	—	—	—
Palomar	Z.	69·3	319	i 10 54k	− 1	—	—	e 11 26	pP	—
Boulder City		69·8	322	i 10 58	0	—	—	i 11 30	pP	—
Riverside	Z.	70·0	318	i 10 58k	− 2	—	—	i 11 28	pP	—
Pasadena		70·6	319	i 11 2k	− 1	e 11 46	sP	i 11 33	pP	—
China Lake		71·3	320	i 11 6	− 1	—	—	—	—	—
Haiwee	Z.	71·8	320	i 11 10	0	—	—	e 11 41	pP	—
Tinemaha	Z.	72·6	320	i 11 15k	0	—	—	e 11 45	pP	—
Fresno	Z.	73·3	320	e 11 17k	− 2	—	—	—	—	—
Lick	Z.	74·8	319	11 27k	− 1	i 11 41	?	e 11 58	pP	—
Reno	Z.	75·1	322	e 11 29k	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Berkeley	z.	75·5	319	i 11 30k	− 2	e 11 37	P	e 12 1	pP	—
Butte		75·8	331	11 33	0	—	—	e 12 4	pP	—
Mineral	z.	76·7	321	i 11 36k	− 3	i 12 14	sP	i 11 45	P	—
Shasta Dam		77·4	321	i 11 39	− 3	—	—	—	—	—
Hungry Horse		78·2	331	i 11 45	− 2	—	—	i 12 17	pP	—
Tamanrasset	z.	83·8	63	e 12 5	−11	—	—	—	—	—

Tamanrasset gives also eZ = 12m.31s. and 12m.53s.

Sept. 27d. 13h. 52m. 11s. Epicentre 18°·5N. 63°·0W. (as on 1951, June 13d.).

A = + ·4308, B = − ·8456, C = + ·3154; δ = +11; h = +5;
D = − ·891, E = − ·454; G = + ·143, H = − ·281, K = − ·949.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
San Juan		2·9	268	i 0 56	P_g	i 1 34	S_g	—	—
Fort de France		4·1	154	i 1 3	− 2	1 53	− 2	1 19	P_g
Bermuda		13·8	355	i 3 35	+16	i 6 57	+63	—	—
Galerazamba		14·1	239	i 3 27	+ 4	—	—	—	—
Bogota		17·5	220	e 3 33	−34	e 6 29	−52	—	—
Palisades		24·3	342	i 5 56a	PP	i 10 19	SS	—	—
Weston		24·8	347	i 5 31	+ 6	e 10 19	+33	i 6 2	PP
Harvard		25·0	347	i 5 33	+ 6	e 10 24	+35	e 6 5	PP
Morgantown		25·7	328	i 4 45	−48	e 10 52	SS	—	—
Huancayo		32·7	204	e 6 27	− 9	—	—	—	—
Tucson		45·0	299	i 8 19	0	—	—	—	—
Boulder City		48·7	303	i 8 49	+ 1	—	—	i 9 15	?
Butte		49·1	316	i 8 53	+ 2	—	—	—	—
Palomar	z.	50·1	298	i 8 59k	0	—	—	—	—
Riverside	z.	50·6	300	i 9 2	0	—	—	—	—
Hungry Horse		50·7	318	i 9 5	+ 2	—	—	e 9 44	?
China Lake		50·9	302	i 9 6	+ 1	—	—	—	—
Pasadena	z.	51·3	300	i 9 7k	− 1	—	—	—	—
Tinemaha	z.	51·5	304	i 9 11k	+ 2	—	—	—	—
Fresno	z.	52·7	303	e 9 18k	0	—	—	e 10 1	?
Reno	z.	53·0	306	e 9 21a	0	—	—	—	—
Lick	z.	54·3	304	i 9 30k	0	—	—	—	—
Mineral	z.	54·4	307	i 9 30k	− 1	—	—	—	—
Victoria		56·8	316	9 48	0	—	—	—	—
Tamanrasset	z.	63·8	73	10 36k	0	e 11 18	PcP	e 11 0	?
Kiruna	z.	70·6	24	i 11 20	+ 1	—	—	—	—
College		71·2	334	11 22	− 1	—	—	—	—

Additional readings :—
Fort de France P* = 1m.11s., iS = 1m.44s., S_g = 2m.4s.
Lick iZ = 9m.47s. and 9m.57s.
Mineral iZ = 9m.39s. and 9m.45s.

Sept. 27d. 19h. 24m. 12s. Epicentre 49°·0N. 129°·0W. (as on 14d.).

U.S.C.G.S. suggests epicentre as adopted.

A = − ·4145, B = − ·5118, C = + ·7525; δ = +1; h = −5;
D = − ·777, E = + ·629; G = − ·474, H = − ·585, K = − ·659.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Alberni		2·8	84	0 45	− 2	1 26	+ 4	1 15	S	—
Victoria		3·7	97	0 57	− 3	1 42	− 3	2 7	S_g	—
Horseshoe Bay		3·8	82	e 0 59	− 2	e 1 42	− 5	e 1 35	?	—
Seattle		4·7	104	e 1 24k	+10	i 2 11	+ 1	i 1 28	P*	i 2·6
Sitka		9·4	339	e 2 0	−18	e 3 59	− 8	—	—	—
Shasta Dam		9·5	148	i 2 27	+ 7	e 4 31	SSS	—	—	—
Hungry Horse		9·9	88	i 2 24	− 1	—	—	—	—	—
Mineral	z.	10·1	146	2 34k	+ 5	—	—	i 3 10	?	e 5·2
Reno		11·6	142	e 2 53	+ 3	e 4 57	− 4	e 3 28	?	e 6·1
Berkeley	z.	12·1	154	e 3 1k	+ 4	i 5 34	SS	—	—	e 6·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bozeman		12·6	98	e 3 0	− 3	e 5 8	−18	—	—	—
Santa Clara		12·7	154	i 3 9	+ 4	—	—	i 3 45	?	—
Lick	z.	12·8	153	i 3 10k	+ 4	—	—	i 3 43	?	e 6·4
Fresno	z.	14·0	148	e 3 26	+ 4	—	—	—	—	—
Tinemaha		14·2	143	i 3 31k	+ 7	—	—	—	—	—
China Lake	z.	15·6	143	i 3 48k	+ 5	—	—	i 4 20	?	—
Boulder City		16·7	136	e 4 0	+ 3	—	—	e 4 18	PPP	—
Pasadena		16·9	148	e 4 2	+ 3	(i 7 10)	+ 3	—	—	i 7·2
Riverside	z.	17·3	146	i 4 8	+ 4	—	—	i 4 43	PPP	—
Palomar	z.	18·1	146	i 4 18	+ 4	—	—	—	—	—
Rapid City		18·4	96	i 3 46	−32	e 7 32	− 9	—	—	—
College		18·8	336	4 16	− 7	7 54	+ 4	—	—	—
Tucson		21·6	134	i 4 56	+ 2	e 9 3	+14	—	—	—
Resolute Bay		29·5	16	e 6 15	+ 7	11 1	− 1	—	—	i 16·0
Chicago		30·2	89	—	—	e 10 41	−32	—	—	—
Kirkland Lake		32·0	72	e 6 26a	− 4	—	—	—	—	e 16·6
Cleveland		33·8	85	i 6 43k	− 3	e 12 7	− 3	i 6 46	P	e 15·5
Morgantown		35·8	86	i 6 56	− 7	e 15 28	SSS	—	—	—
Ottawa		35·8	75	6 58	− 5	12 36	− 5	8 21	PP	18·3
Pennsylvania		36·5	82	i 7 5	− 4	e 13 5	+14	i 8 26	PP	—
Shawinigan Falls	N.	37·1	72	e 7 15	+ 1	e 13 4	+ 3	e 17 30	ScS	18·9
Tacubaya		38·0	129	7 29	+ 8	—	—	e 8 35	PP	e 21·4
Washington		38·0	84	i 7 20	− 1	—	—	i 9 4	PPP	—
Seven Falls	E.	38·1	70	7 18	− 4	13 11	− 5	8 48	PP	19·4
Palisades		39·0	80	i 7 37k	+ 7	—	—	i 8 54	PP	e 20·0
City College, N.Y.		39·1	80	i 7 26	− 5	—	—	i 8 59	PP	—
Fordham		39·1	80	e 7 26	− 5	13 49	+18	—	—	—
Harvard		39·8	77	e 7 34	− 2	e 13 53	+11	—	—	e 18·5
Weston		40·0	77	i 7 31	− 7	—	—	—	—	e 23·5
Ivigtut		44·8	43	—	—	18 12	SS	—	—	21·8
Scoresby Sund		49·9	25	—	—	16 0	− 7	—	—	22·8
Bermuda		50·0	84	i 8 54	− 4	e 16 11	+ 2	e 20 20	?	e 24·4
Galerazamba		58·5	111	e 13 39	PPP	e 19 10	?	—	—	36·8
San Juan		58·6	97	i 9 58	− 3	—	—	—	—	—
Kiruna		61·2	13	i 10 11k	− 8	i 18 34	− 4	i 10 20	P	e 28·1
Bogota		64·1	114	e 10 46	+ 8	e 19 23	+ 9	e 15 14	PcS	30·8
Vladivostok		64·1	306	e 11 9	PcP	i 19 50	PPS	—	—	—
Fort de France		64·5	96	e 10 52	+11	e 20 2	PPS	—	—	—
Aberdeen		65·4	28	i 19 8	?	e 19 38	+ 8	i 26 42	SSS	e 30·3
Rathfarnham Castle		67·2	33	e 10 24?	−34	e 20 39	PPS	e 13 23	PP	e 27·8
Durham	N.	67·6	30	e 16 12	?	i 20 29	PPS	—	—	—
Upsala		68·2	18	e 13 20	PP	e 19 51?	−13	e 20 34	PS	e 30·8
Irkutsk		69·4	329	—	—	e 20 20	+ 2	—	—	—
Pulkovo		70·3	11	e 11 19	+ 2	e 20 16	−13	—	—	—
Copenhagen		70·8	22	e 11 17	− 3	e 20 24	−11	—	—	29·8
Kew		70·8	32	i 8 31	?	e 21 11	PPS	—	—	e 30·8
De Bilt		72·0	27	—	—	e 20 55	+ 6	e 25 18	SS	e 32·3
Paris		74·0	32	e 11 41	+ 2	e 21 13	+ 2	i 21 44	ScS	e 33·8
Potsdam		74·0	23	e 11 39	0	e 22 5	PPS	—	—	e 35·8
Sverdlovsk		74·2	354	11 34	− 6	e 21 2	−12	—	—	—
Collmberg	Z.	74·9	25	e 11 37	− 7	e 15 22	?	e 11 48	P	—
Jena	N.	74·9	25	e 11 44	0	—	—	—	—	—
Moscow		75·0	8	e 11 41	− 4	—	—	—	—	—
Cheb		75·9	26	e 20 42	?	e 21 36	+ 4	e 22 5	PS	e 34·9
Strasbourg		75·9	29	e 11 50	0	e 21 31	− 1	e 22 4	PS	e 28·8
Stuttgart		76·1	27	e 11 54	+ 3	e 21 38	+ 3	e 22 13	PS	e 30·8
Prague		76·4	23	e 11 53	0	e 21 34	− 4	e 22 10	PS	—
Huancayo		77·0	125	e 11 56	0	e 21 48	+ 3	e 22 27	PS	e 32·3
Zi-ka-wei	z.	78·5	304	e 12 41	+37	—	—	e 12 53	?	—
Skalnate Pleso		78·7	20	e 12 12?	+ 6	e 22 12	+ 9	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lwow		78·9	18	e 12 16	+ 9	e 22 0	− 5	—	—	—
Toledo		79·0	40	e 12 10	+ 3	e 22 11	+ 5	e 12 47	?	—
Nanking		79·3	307	e 12 5	− 4	e 22 9	0	—	—	—
Pavia		79·3	28	—	—	e 22 6	− 3	—	—	e 33·8
Uzhgorod		79·6	19	e 12 11?	+ 1	—	—	—	—	—
Triest		80·3	26	e 12 11	− 3	e 22 7	−13	e 27 21	SS	e 34·8
Granada		81·5	42	i 12 35k	+14	22 27	− 5	13 20	pP	36·8
Alicante		81·6	39	12 31	+10	22 49	+16	—	—	e 36·7
Almeria		82·3	40	12 27	+ 2	22 33	− 7	15 33	PP	41·8
Kishinev		82·4	15	e 12 26	+ 1	—	—	—	—	—
Belgrade		82·8	21	e 12 29a	+ 2	e 22 48	+ 3	e 12 42	?	e 48·7
Rome		83·3	28	e 12 26	− 4	e 22 56	+ 6	28 14	SS	e 36·8
La Paz		84·5	122	e 12 42	+ 6	i 23 6	+ 4	28 38	SS	—
Krasnogorka		85·7	343	e 12 32	−10	—	—	—	—	—
Frunse		86·2	343	e 12 40	− 4	e 25 50	?	—	—	—
Rybach'e		86·3	342	e 12 39	− 6	—	—	—	—	—
Naryn		87·3	341	e 12 49	− 1	e 23 12	[− 4]	—	—	—
Tchimkent		87·6	346	e 12 50	− 1	e 23 24	[+ 6]	—	—	—
Messina		87·7	27	e 17 12	PPP	e 22 30	−63	e 29 17	SS	38·7
Istanbul		88·3	17	e 12 50	− 5	e 23 21	[− 1]	e 23 33	ScS	e 38·3
Tashkent		88·6	347	13 2?	+ 6	e 23 33?	{+ 2}	—	—	—
Andijan		88·7	344	e 12 53	− 4	—	—	—	—	—
Fergana		89·1	344	e 12 54	− 4	e 23 35	{ 0}	e 23 45	ScS	—
Tiflis		89·5	5	e 13 5?	+ 5	e 23 44?	{+ 6}	—	—	—
Kirovobad		90·6	4	—	—	e 25 3	PS	—	—	—
Samarkand		90·6	349	e 13 2	− 3	—	—	—	—	—
Baku		91·0	1	—	—	e 24 44	PS	—	—	—
Stalinabad		91·4	346	e 13 5?	− 4	e 23 47?	{− 5}	—	—	—
Goris		91·8	4	e 13 14	+ 3	e 23 48	[+ 5]	—	—	—
Ksara		96·5	14	e 14 5	+33	e 27 19	PPS	—	—	—
Pretoria	z.	150·8	46	i 19 55	[+ 6]	—	—	—	—	—
Kimberley	z.	151·5	55	i 19 56	[+ 6]	—	—	—	—	—

Additional readings :—
Victoria P =1m.6s.
Seattle i =1m.39s., 1m.51s., 1m.59s., and 2m.2s., iS =2m.16s.
Berkeley iZ =3m.21s. and 3m.30s., iPPZ =3m.36s., iN =5m.52s.
Tinemaha iZ =4m.6s. and 4m.59s.
Pasadena iZ =4m.37s. and 4m.54s.
Palomar iZ =4m.22s. and 4m.52s.
Resolute Bay eZ =6m.37s., 13m.28s., and 15m.4s.
Ottawa iZ =7m.34s., SS =14m.56s., SSS =15m.38s., ScS =17m.24s.
Pennsylvania iZ =9m.5s.
Shawinigan Falls eSSN =15m.46s.
Seven Falls SSSE =16m.23s.
Kiruna ePPN =12m.20s., eE =14m.19s. and 19m.11s., eZ =19m.17s., iZ =22m.22s., eSSN =22m.41s., eSSSE =25m.10s.
Aberdeen eSE =21m.20s., iPSN =21m.57s.
Upsala eQN =27·8m.
Kew iZ =9m.27s., eEN =23m.10s.
Paris i =11m.52s. and 12m.13s., e =12m.42s., i =15m.42s. and 22m.42s., e =23m.40s., 27m.17s., 28m.1s., 29m.37s., and 30m.10s., eQ =30m.39s.
Potsdam eZ =12m.13s., eE =22m.47s.
Jena eN =12m.20s., eE =12m.55s.
Strasbourg e =12m.17s. and 13m.14s., ePP =14m.26s., e =15m.14s., ePPP =16m.43s., e =21m.23s., 23m.2s., and 24m.3s., eSS =26m.11s.
Stuttgart eZ =12m.37s., e =16m.8s., ePPP =16m.51s.
Prague e =12m.14s., 12m.25s., 14m.28s., 14m.59s., and 21m.48s.
Huancayo e =12m.24s., eSS? =26m.49s.
Skalnate Pleso e =13m.15s. and 23m.54s.
Triest ePS =22m.51s.
Granada PP =15m.39s., pPP =16m.34s., PPS =24m.32s.
Almeria SS =27m.51s.
Rome PS? =23m.26s., SSS =31m.26s.
La Paz iPS? =23m.42s.
Messina e =24m.26s.
Long waves were also recorded at Guadalajara, Oaxaca, Puebla, Pittsburgh, Bergen, Edinburgh, Clermont-Ferrand, Tortosa, and Bombay.

Suggested after-shocks to 19h. quake.

I	Alberni	e = 31m.35s. and 32m.6s.
II		e = 44m.8s. and 44m.39s.
I	Pasadena	iPZ = 31m.55s.
II		ePZ = 47m.27s.
I	Palomar	iPZ = 31m.55s.
II		iPZ = 47m.40s.
III		eZ = 57m.6s.
I	China Lake	iPZ = 32m.1s.
II		iPZ = 47m.11s.
III		iZ = 56m.35s.
II	Seattle	e = 45m.40s.?
III		eP = 55m.26s., e = 55m.37s.
II	Hungry Horse	e = 45m.47s.
II	Shasta Dam	iP = 45m.50s.
II	Mineral	iPZ = 45m.58s. a.
II	Reno	ePZ = 46m.16s. a.
II	Lick	iPZ = 46m.33s. a.
II	Fresno	ePZ = 46m.48s. a.
II	Tinemaha	iPZ = 47m.1s.
III		eZ = 56m.20s.
II	Boulder City	e = 47m.27s.
II	Riverside	ePZ = 47m.31s.
III		eZ = 56m.53s.
II	College	e = 47m.41s.
II	Tucson	eP = 48m.24s.
III	Victoria	P = 53m.45s.

Sept. 27d. Readings also at 1h. (Lunacharskoe, Tashkent, Frunse, near Dzhergetal, Fergana, Garm, Andijan, Stalinabad, Khorog, Samarkand, and near Obi-garm), 2h. (Santa Lucia, Copiapo, La Plata, La Paz, and near Ili), 3h. (near Malaga), 4h. (Puebla, Vera Cruz, Tacubaya, Fergana, near Garm, Obi-garm, Khorog, and Dzhergetal), 5h. (Stuttgart, Apia, and near Manila), 6h. (Brisbane, Palomar, Riverside, China Lake, Tinemaha, Lick, Mineral, Shasta Dam, College, Tamanrasset, Paris (2), Strasbourg (2), Stuttgart, and near Dzhergetal), 7h. (Victoria, Pasadena, Riverside, Palomar, China Lake, Tinemaha, Lick, Fresno, Mineral, Reno, Harvard, Shasta Dam, Tucson, Boulder City, Hungry Horse, Butte, and College), 8h. (Brisbane, Pasadena, Riverside, Palomar, China Lake, Tinemaha, Berkeley, Lick, Fresno, Mineral, Reno, Shasta Dam, Tucson, Boulder City, College, Tamanrasset, Paris, Strasbourg, Stuttgart, Collmberg, and Ksara), 10h. (Strasbourg, Tchimkent, Frunse, Krasnogorka, Andijan, Przhevalsk, Ili, near Khorog, Obi-garm, Dzhergetal, Stalinabad, Murgab, Fergana, Samarkand, and Tashkent), 12h. (Stuttgart, Collmberg, Pasadena, Palomar, Tinemaha, and near Apia (3)), 13h. (Apia, Prague, and near La Paz), 14h. (near Dzhergetal), 15h. (Pretoria, Samarkand, Naryn, Rybach'e, Frunse, near Khorog (2), Dzhergetal (2), Obi-garm (2), Murgab, Fergana, Andijan, Stalinabad, Tchimkent, and near Garm), 17h. (Apia, Antofagasta, Tacubaya, and Huancayo), 18h. (Hunacayo, Manila, and near Dzhergetal), 19h. (Christchurch, Cobb River, Kaimata, Karapiro, Tuai, and Wellington), 20h. (near Ottawa and near Ashkabad), 21h. (Mizusawa, Victoria, Tinemaha, China Lake, and Riverside), 22h. (near Athens (3)), 23h. (Brisbane, Paris, Collmberg, Stuttgart, Strasbourg, and Kiruna).

Sept. 28d. 1h. 25m. 8s. Epicentre 29°·18. 177°·7W. (as on 1941, Sept. 16d.).

$A = -·8745$, $B = -·0351$, $C = -·4838$; $\delta = +4$; $h = +2$;
$D = -·040$, $E = +·999$; $G = +·483$, $H = +·019$, $K = -·875$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Wellington		13·6	205	e 3 15	− 2	5 24	−26	6 41	Q	7·9
Cobb River	E.	14·3	211	—	—	e 5 45	−21	—	—	—
Kaimata	N.E.	16·0	210	e 3 47	− 1	e 6 27	−19	—	—	—
Christchurch		16·4	206	—	—	e 6 52	− 4	e 7 57	Q	e 9·7
Brisbane		25·8	266	e 5 42	+ 8	—	—	—	—	e 12·2
Riverview		26·9	251	e 5 53	+ 8	i 11 15	SS	i 6 24	PP	e 13·2
Terre Adélie		45·1	203	e 8 12	− 8	—	—	—	—	—
Berkeley		84·4	41	e 10 49	?	e 23 2	+ 1	e 40 34	Q	e 42·3
Lick	z.	84·4	41	e 12 36k	0	—	—	i 12 47	PcP	—
Palomar	z.	84·7	47	e 12 35	− 2	—	—	—	—	—
Riverside	z.	84·8	46	e 12 49	PcP	—	—	—	—	—
Fresno	z.	85·1	43	e 12 42	+ 3	—	—	e 12 52	PcP	—
China Lake	z.	85·8	45	e 12 41	− 1	—	—	—	—	—
Shasta Dam		86·3	39	e 12 41	− 4	—	—	—	—	—
Mineral	z.	86·5	39	e 12 43k	− 3	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Reno	z.	87·0	42	e 12 50	+ 2	—	—	—	—	—
Tucson		88·0	51	e 12 54	+ 1	—	—	—	—	—
Huancayo		94·8	106	—	—	e 24 0	[0]	e 24 43	S	e 44·1
College		96·5	12	e 13 22	−10	—	—	—	—	—
Kiruna		139·7	348	e 39 46	P′P′	e 40 52	SS	i 55 3	Q	e 69·9
Ksara		151·0	287	e 19 55?	[+ 6]	—	—	23 37,	PP	—
Copenhagen		152·5	348	e 19 58	[+ 7]	—	—	—	—	—
Collmberg	z.	156·4	342	e 20 22	PKP_2	—	—	—	—	—
Triest		161·2	335	e 20 15	[+13]	e 42 19	?	e 21 10	PKP_2	—
Rome		164·8	328	e 24 44	PP	e 51 52?	SSS	e 35 58	?	—
Tamanrasset	z.	173·1	203	i 20 13k	[+ 2]	e 25 27	PP	e 21 49	PKP_2	—

Additional readings :—
Brisbane eE =6m.2s. and 9m.17s.
Berkeley eZ =11m.12s.
Huancayo eSS =30m.55s.
Long waves were also recorded at Auckland, Karapiro, Apia, Bermuda, Cleveland, Palisades, Weston, Bogota, Istanbul, De Bilt, Kew, Paris, Pavia, and Granada.

Sept. 28d. 3h. 31m. 42s. Epicentre 10°·0S. 119°·0E. (as on 1951, April 13d.).

A = −·4775, B = +·8615, C = −·1725 ; δ = −6 ; h = +7 ;
D = +·875, E = +·485 ; G = +·084, H = −·151, K = −·985.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bandong		11·7	285	e 3 8	+17	e 5 44	+40	—	—	—
Djakarta		12·6	286	e 3 6	+ 3	e 5 45	+19	—	—	—
Apia		22·0	187	i 5 2	+ 4	i 9 2	+ 6	—	—	13·0
Manila		24·5	5	i 5 24	+ 2	i 9 46	+ 6	e 8 47	PcP	—
Brisbane		36·6	123	i 7 9	0	—	—	i 7 49	?	e 21·3
Riverview		37·8	134	e 7 30	+10	i 13 11	0	e 15 56	SS	e 19·9
Zi-ka-wei	z.	41·0	4	7 45	− 1	—	—	e 10 25	?	—
Nanking		41·8	0	i 7 52	− 1	—	—	9 36	PP	—
Poona		52·8	303	i 9 16	− 3	e 16 38	− 9	—	—	—
Bombay	N.	53·8	303	—	—	i 16 54	− 7	—	—	—
Vladivostok		54·2	13	i 9 27?	− 2	—	—	—	—	—
Terre Adélie		58·7	169	e 10 2	0	—	—	—	—	—
Kabansk		62·7	353	10 28	− 1	—	—	—	—	—
Irkutsk		63·3	351	10 31	− 3	e 19 2	− 2	—	—	—
Naryn		64·7	326	i 10 39	− 3	i 19 16	− 6	—	—	—
Almata II		65·2	328	i 10 44	− 1	—	—	—	—	—
Rybach'e		65·3	327	i 10 44	− 2	—	—	—	—	—
Almata		65·4	328	i 10 42	− 5	i 19 28	− 2	—	—	—
Ili		65·8	329	i 10 46	− 3	—	—	—	—	—
Andijan		66·3	324	10 51	− 1	19 38	− 4	—	—	—
Fergana		66·4	324	e 10 50	− 3	e 19 37	− 6	—	—	—
Frunse		66·4	327	i 10 51	− 2	i 19 38	− 5	—	—	—
Krasnogorka		66·4	327	i 10 42	−11	—	—	—	—	—
Stalinabad		67·2	320	i 10 55	− 3	e 19 43	− 9	—	—	—
Tashkent		68·5	322	i 11 4	− 2	i 20 2	− 6	—	—	—
Tchimkent		68·9	323	i 11 7	− 2	i 20 7	− 6	—	—	—
Samarkand		69·0	320	11 7	− 2	—	—	—	—	—
Ashkabad		74·0	315	i 11 39	0	i 21 10	− 1	—	—	—
Kizyl-Arvat		75·9	315	e 11 58	+ 8	—	—	—	—	—
Lenkoran		81·2	312	i 12 18	− 1	—	—	—	—	—
Sverdlvosk		82·0	332	i 12 22	− 1	22 30	− 7	—	—	—
Goris		83·2	312	12 29	0	—	—	—	—	—
Kirovobad		83·6	313	i 12 31	0	i 22 50	− 3	—	—	—
Tiflis		85·0	314	i 12 42	+ 4	e 23 4?	− 3	—	—	—
Gori		85·6	314	e 12 44	+ 3	—	—	—	—	—
Tsikhlis-Dzhvari		86·0	314	i 12 47	+ 4	i 23 12	{ 0}	—	—	—
Pretoria	z.	86·4	245	i 12 49	+ 4	—	—	—	—	—
Grahamstown	z.	86·6	237	i 12 49	+ 3	—	—	—	—	—
Kimberley	z.	88·9	241	i 13 8	+10	—	—	—	—	—
Ksara		89·8	306	e 13 5	+ 3	e 14 4	ScS	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Moscow		93·4	326	e 13 25	+ 7	i 23 50	[− 2]	—	—	—
Kiruna		102·4	337	i 13 57a	− 2	i 24 35	[− 4]	e 25 36	S	e 52·1
Collmberg	z.	107·7	321	e 18 27	[− 1]	—	—	—	—	—
Stuttgart	z.	110·5	319	e 18 33?	[− 1]	—	—	e 19 6	PP	—
Tamanrasset	z.	115·4	290	e 18 52	[+ 8]	—	—	e 19 57	PP	—
Rathfarnham C.	z.	118·6	326	e 21 40	?	—	—	—	—	—
Mineral	z.	118·7	50	e 19 3a	[+13]	—	—	—	—	—
Lick	z.	119·3	52	e 19 4	[+13]	—	—	i 19 21	?	—
Reno	z.	120·3	50	e 18 55	[+ 2]	—	—	—	—	—
Fresno	z.	120·9	53	e 19 6a	[+12]	—	—	—	—	—
Tinemaha	z.	122·0	53	e 19 10	[+13]	—	—	e 19 17	?	—
Pasadena	z.	122·6	56	i 19 10	[+12]	—	—	—	—	—
China Lake	z.	122·8	54	e 19 0	[+ 2]	—	—	e 19 11	?	—
Riverside	z.	123·3	56	e 19 0	[+ 1]	—	—	e 19 11	?	—
Palomar	z.	123·9	56	e 19 14	[+14]	—	—	—	—	—
Harvard		146·3	13	i 19 44	[+ 3]	—	—	—	—	—
Weston		146·5	13	i 19 44	[+ 2]	—	—	—	—	—
Palisades		147·1	17	i 19 46	[+ 3]	—	—	—	—	—
Huancayo		153·9	148	e 20 12	PKP_2	—	—	e 70 38	Q	e 76·4
Bermuda		157·5	8	i 20 10	[+12]	—	—	—	—	—

Additional readings :—
Manila i = 5m.47s. and 7m.35s.
Riverview iE = 13m.14s.
Kiruna iZ = 17m.13s., iPKSE = 21m.48s., ePSE = 27m.12s., eN = 35m.18s.? and 45m.18s.?
Tamanrasset eZ = 18m.59s. and 19m.39s.
Long waves were also recorded at Copenhagen, De Bilt, Kew, Paris, Pavia, and La Plata.

Sept. 28d. 12h. 7m. 7s. Epicentre 11°·5N. 86°·3W. (as on 1949, Jan. 25d.).

U.S.C.G.S. suggests a depth of 200km.

A = +·0633, B = −·9782, C = +·1981 ; δ = +13 ; h = +6 ;
D = −·998, E = −·065 ; G = +·013, H = −·198, K = −·980.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		7·0	109	i 1 55	+ 9	—	—	—	—	—
Galerazamba		10·9	93	i 2 55	+15	i 5 30	L	i 3 46	pP	(i 5·5)
Oaxaca		11·5	299	e 3 38	?	—	—	e 5 44	?	e 5·8
Chinchina		12·4	121	i 3 4	+ 3	e 5 12	− 9	—	—	6·0
Puebla		13·7	304	e 3 31	PP	—	—	—	—	—
Bogota		13·9	119	i 3 27	+ 6	e 6 11	SS	—	—	—
Tacubaya		14·7	304	i 3 42a	PP	—	—	—	—	—
Miami		15·4	21	i 3 35	− 5	e 7 9	+37	—	—	—
San Juan		20·6	68	i 4 45	+ 2	—	—	—	—	—
Fort de France		24·7	81	e 5 27	+ 3	i 10 11	+27	—	—	e 13·1
Fayetteville		25·5	346	i 5 30	− 2	—	—	—	—	—
Huancayo		25·8	155	e 5 36	+ 2	e 10 7	+ 5	e 6 15	pP	e 12·1
Bermuda		28·6	41	i 6 4	+ 4	—	—	—	—	e 13·8
Morgantown		28·6	10	e 6 2	+ 2	—	—	e 9 17	PcP	—
Pennsylvania	N.	30·1	14	e 6 12	− 1	e 11 34	+22	e 7 24	PPP	—
Tucson		30·6	317	e 6 18	0	e 10 37	−43	—	—	—
Palisades		31·3	19	i 6 26	+ 2	—	—	e 7 33	PP	e 15·8
La Paz		33·1	147	i 6 41	+ 1	i 12 15	+16	14 4	SS	16·9
Harvard		33·4	20	i 6 45	+ 3	e 12 40	+37	—	—	e 16·5
Weston		33·4	20	—	—	(e 12 3)	0	—	—	e 12·0
Ottawa		35·0	13	6 56	0	e 12 29	+ 1	—	—	14·9
Palomar	z.	35·4	314	i 7 0	0	è 9 28	PcP	e 7 28	?	—
Boulder City		35·5	319	e 6 58	− 2	—	—	i 7 2	P	—
Riverside	z.	36·1	315	i 7 6	+ 1	—	—	e 9 30	PcP	—
Pasadena		36·8	315	i 7 12	+ 1	e 13 20	PcS	i 9 32	PcP	e 17·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shawinigan Falls	N.	36·8	16	e 7 12	+ 1	—	—	—	—	—
China Lake		37·2	317	i 7 14	− 1	i 13 22	PcS	i 9 34	PcP	—
Tinemaha		38·4	318	e 7 24	− 1	e 17 34	ScS	i 9 38	PcP	—
Fresno	Z.	39·2	316	e 7 21	−10	e 17 45	ScS	e 8 3	pP	—
Reno	Z.	40·7	320	e 7 45	+ 1	e 13 35	PcS	e 9 37	PcP	—
Lick	Z.	40·8	316	e 7 45a	0	i 9 47	PcP	i 7 55	?	—
Santa Clara	E.	41·0	316	e 7 48	+ 2	—	—	—	—	e 23·1
Berkeley		41·5	316	i 7 51k	0	e 14 9	+ 2	i 9 48	PcP	e 20·3
Mineral	Z.	42·3	320	e 7 57k	0	i 9 47	PcP	i 8 7	?	—
Shasta Dam		43·0	319	e 8 0	− 3	—	—	i 9 51	PcP	—
Hungry Horse		43·4	333	i 8 5	− 1	—	—	i 9 54	PcP	—
Victoria		48·1	329	8 41	− 2	—	—	10 11	PcP	—
Resolute Bay		63·3	358	e 10 29	− 4	e 19 41	?	e 11 6	PcP	e 30·1
College		67·7	336	10 58	− 3	—	—	e 13 16	PP	—
Rathfarnham Castle		74·9	37	e 12 27	+43	—	—	—	—	e 40·9
Toledo		76·8	52	12 16	PcP	—	—	—	—	—
Granada		77·4	55	i 12 35a	+37	—	—	—	—	—
Jersey	E.	77·6	42	e 11 53	− 7	—	—	(18 53)	?	18·9
Almeria		78·3	55	12 23	+20	22 19	PS	15 23	PP	33·7
Alicante		79·7	53	12 29	+18	—	—	—	—	e 37·4
Paris		80·7	42	e 12 15	− 1	—	—	—	—	e 37·9
Strasbourg		84·1	42	e 12 28	− 6	e 24 7	PPS	e 13 3	pP	—
Stuttgart		85·0	42	e 12 36	− 2	e 24 17	PPS	e 17 53	PPP	e 38·9
Kiruna		85·5	22	e 12 38	− 3	e 29 18	SS	i 13 10	pP	e 42·9
Jena		86·1	39	e 12 41	− 3	—	—	—	—	—
Cheb		86·8	40	e 25 12	PPS	e 23 27	+ 2	e 22 58	SKS	—
Collmberg	Z.	86·9	39	e 13 7	?	e 16 15	PP	e 13 23	?	—
Tamanrasset	Z.	87·3	67	e 12 51	+ 1	e 15 53	PP	e 13 13	pP	—
Prague		88·1	39	—	—	e 26 24	?	e 31 55	?	e 44·9
Rome		88·8	48	—	—	e 25 15	PPS	—	—	—
Triest		88·8	44	e 12 47	−10	i 23 17	[− 8]	e 13 29	pP	—
Messina		92·1	51	—	—	e 25 38	PS	—	—	e 45·4
Ksara		109·0	48	(e 18 35)	[+ 4]	(e 24 51)	[−17]	—	—	—

Additional readings :—
Galerazamba iPcP =9m.15s., eScP? =12m.12s.
Huancayo ePP =6m.45s.
Palisades i =6m.35s., e =12m.9s.
La Paz PP =7m.59s., ScS =17m.25s.
Ottawa iZ =7m.5s. and 7m.26s., eNZ =12m.56s.
China Lake eScSEN =17m.31s., eN =17m.49s.
Victoria e =8m.52s. and 10m.17s.
Strasbourg eP =12m.48s., e =29m.5s.
Stuttgart ePZ =12m.58s., eZ =13m.8s.
Kiruna iN =20m.21s., eEN =23m.27s., eN =29m.30s. and 33m.53s.?.
Jena eZ =13m.2s. and 13m.22s.
Triest esPZ =13m.38s., ePPZ =16m.31s., eSKS =22m.58s., esSKS? =24m.23s., isS = 24m.33s.
Ksara readings have been increased by 8m.
Long waves were also recorded at La Plata, Seattle, Scoresby Sund, and at other European stations.

Sept. 28d. 14h. 37m. 25s. Epicentre 29°·1S. 177°·7W. (as at 1h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Karapiro	N.	10·4	211	e 2 35?	+ 1	—	—	—	—	—
New Plymouth	E.	12·0	212	—	—	e 5 53	SSS	—	—	e 8·1
Wellington		13·6	205	e 3 10	− 7	e 5 22	−28	e 5 3	?	6·3
Cobb River	E.	14·3	211	e 3 27	+ 1	e 5 43	−23	e 3 31	P	—
Kaimata	N.E.	16·0	210	e 3 44	− 4	e 6 26	−20	—	—	—
Christchurch		16·4	206	e 3 52	− 1	e 6 53	− 3	e 7 45	Q	9·8
Brisbane		25·8	266	i 5 40k	+ 6	—	—	i 6 25	PP	e 15·8
Riverview		26·9	251	i 5 50k	+ 5	(e 10 29)	+ 9	e 6 26	PP	e 10·5
Terre Adélie		45·1	203	e 8 25	+ 5	e 14 53	− 6	—	—	21·9
Lick	Z.	84·4	41	i 12 39	+ 3	—	—	e 12 24	?	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palomar	Z.	84·7	47	e 12 35	− 2	—	—	—	—	—
Riverside	Z.	84·8	46	e 12 36	− 1	—	—	—	—	—
Fresno	Z.	85·1	43	e 12 37	− 2	—	—	e 12 59	?	—
China Lake	Z.	85·8	45	e 12 40	− 2	—	—	—	—	—
Shasta Dam		86·3	39	e 12 41	− 4	—	—	e 12 49	P	—
Tinemaha	Z.	86·3	44	e 12 44	− 1	—	—	—	—	—
Reno	Z.	87·0	42	e 13 1 a	+13	—	—	—	—	—
Tucson		88·0	51	e 12 51	− 2	—	—	e 16 50	PP	—
College		96·5	12	e 13 26	− 6	—	—	—	—	—
Kiruna		139·7	348	e 19 33	[+ 3]	e 29 18	{− 1}	e 22 29	PP	e 70·6
Ksara		151·0	287	e 19 45	[− 4]	—	—	23 27	PP	—
Copenhagen		152·5	48	i 20 16	PKP_2	—	—	—	—	—
Collmberg	Z.	156·4	342	e 20 0?	[+ 4]	—	—	e 20 15	PKP_2	—
De Bilt		156·9	355	e 20 5	[+ 8]	—	—	—	—	e 53·6
Prague		157·1	340	e 19 55	[− 2]	—	—	e 20 40	PKP_2	—
Cheb		157·7	343	e 20 6	[+ 8]	e 27 30	[+28]	e 50 11	SSS	—
Stuttgart		159·7	346	e 20 5	[+ 5]	e 30 40	{−30}	e 20 43	PKP_2	e 52·6
Strasbourg		160·1	348	e 20 20	[+19]	e 37 35	PPS	—	—	—
Triest		161·2	335	e 20 6	[+ 4]	i 26 52	[−14]	e 20 45	PKP_2	—
Tamanrasset	Z.	173·1	203	e 20 11	[0]	e 25 16	PP	e 21 43	PKP_2	—

Additional readings :—
Christchurch eS? =6m.31s.
Lick iZ =12m.51s.
Kiruna eE =23m.0s., iPKSN =23m.6s., ePPPN =25m.30s., eZ =28m.25s., eSKSPZ = 32m.35s.?, eZ =39m.46s., eSSE =40m.48s., eE =42m.57s., eZ =43m.6s.
Prague e =21m.6s., 21m.46s., and 23m.50s.
Cheb e =37m.23s., eSS =43m.59s.
Stuttgart eZ =20m.20s,, ePPZ =24m.19s., eZ =25m.53s.
Strasbourg e =21m.2s., 34m.35s., and 42m.35s.
Triest eSKPZ =23m.37s., ePPZ =24m.25s., i =32m.7s., ePSKS =35m.17s., iPPS = 38m.6s., eSS =45m.2s.
Tamanrasset eZ =20m.23s.
Long waves were also recorded at Apia, Istanbul, and Pavia.

Sept. 28d. 14h. 51m. 17s. Epicentre 11°·5N. 86°·3W. Depth of focus 0·020. (as at 12h.).

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Swan Island	6·3	21	i 1 32	0	e 3 38	− 5	—	—	—
Balboa Heights	7·0	109	i 1 39	− 2	—	—	—	—	—
Oaxaca	11·5	299	e 2 45	+ 5	5 7	SS	—	—	—
Chinchina	12·4	121	i 2 45	− 7	e 5 17	+10	—	—	—
Puebla	13·7	304	e 3 28	+20	e 6 1	+24	e 6 16	SSS	—
Bogota	13·9	119	i 3 9	− 2	i 6 56	L	—	—	(i 6·9)
Tacubaya	14·7	304	e 3 18	− 3	—	—	—	—	—
San Juan	20·6	68	i 4 31	+ 3	e 8 37	sS	—	—	—
Fort de France	24·7	81	e 5 9	+ 1	i 10 11	+56	—	—	—
Fayetteville	25·5	346	i 4 14	−61	i 8 44	−44	—	—	—
Huancayo	25·8	155	i 5 16	− 2	e 9 47	+14	e 5 56	pP	e 11·8
Washington	28·5	17	i 5 44	+ 2	—	—	e 7 1	?	—
Bermuda	28·6	41	e 5 45	+ 2	—	—	—	—	e 13·6
Morgantown	28·6	10	e 5 45	+ 2	—	—	—	—	—
Pennsylvania	30·1	14	e 5 55	− 2	e 11 21	?	e 7 3	PP	—
Tucson	30·6	317	e 5 59	− 2	e 9 49	−61	—	—	—
Palisades	31·3	19	e 6 8	+ 1	e 11 42	?	e 7 24	PP	e 16·8
La Paz	33·1	147	e 7 15	PP	—	—	—	—	—
Harvard	33·4	20	—	—	e 12 19	ScP	—	—	e 16·3
Ottawa	35·0	13	6 39	0	e 12 28	ScP	8 3	PP	—
Palomar Z.	35·4	314	i 6 44	+ 2	i 9 12	PcP	i 7 17	pP	—
Boulder City	35·5	319	e 6 42	− 1	—	—	—	—	—
Riverside Z.	36·1	315	i 6 48	0	—	—	i 9 13	PcP	—
Pasadena	36·8	315	i 6 55	+ 1	—	—	i 9 17	PcP	—
Shawinigan Falls N.	36·8	16	e 6 55	+ 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
China Lake		37·2	317	e 6 58	+ 1	e 17 15	ScS	i 9 17	PcP	—
Tinemaha	z.	38·4	318	e 7 8	+ 1	—	—	e 9 20	PcP	—
Lick	z.	40·8	316	i 7 28a	+ 1	—	—	i 9 30	PcP	—
Santa Clara		41·0	316	e 7 30	+ 1	—	—	e 23 41	Q	e 27·4
Berkeley		41·5	316	e 7 41a	+ 8	e 13 55	+19	e 17 31	ScS	e 23·1
Mineral	z.	42·3	320	e 7 40k	+ 1	—	—	e 9 33	PcP	—
Hungry Horse		43·4	333	i 7 48	0	—	—	i 7 59	?	—
Resolute Bay		63·3	358	e 12 55	PP	—	—	e 15 40	?	e 33·6
College		67·7	336	10 41	− 1	—	—	—	—	—
Granada		77·4	55	11 48k	PcP	—	—	12 37	?	—
Kew		78·6	39	e 18 43	?	—	—	—	—	e 38·7
Copenhagen		85·5	34	—	—	32 31	88S	—	—	45·7
Kiruna		85·5	22	—	—	e 22 37	0	23 43?	sS	e 42·7
Triest		88·8	44	e 12 36	− 1	e 22 45	[− 3]	—	—	—
Messina		92·1	51	e 11 24?	?	—	—	—	—	—

Additional readings :—
Ottawa e =16m.19s. and 17m.51s.
Lick iZ =7m.50s. and 8m.10s.
Berkeley eN =21m.31s.
Long waves were also recorded at La Plata, Weston, Seattle, Scoresby Sund, and at other European stations.

Sept. 28d. 17h. Kermadec Islands region.

Karapiro eN =27m.0s.
Wellington ePZ =27m.37s., eZ =27m.48s., SZ =29m.50s., eL =32m.15s.
Cobb River eP?E =27m.58s., eS?E =30m.11s.
Kaimata ePNE =28m.12s., eSNE =30m.51s.
Christchurch eP? =28m.36s.?, eS? =30m.54s.?, i =31m.15s.
Brisbane iPZ =30m.9s.k, eSE =34m.22s., eLE =37m.25s.
Terre Adélie eP =32m.43s.
Riverview eSN =34m.43s., eLZ =37·6m.
Palomar ePZ =37m.5s.
Fresno ePZ =37m.6s.k.
Lick iPZ =37m.7s.k.
China Lake ePZ =37m.10s.
Shasta Dam e =37m.12s.
Riverside ePZ =37m.17s.
Reno eZ =37m.18s.
Tinemaha ePZ =37m.19s.
Tucson e =37m.23s.
Boulder City e =37m.27s.
College e =38m.1s.
Kiruna ePKPZ =43m.58s.
Collmberg eZ =44m.43s.

Sept. 28d. 19h. 18m. 13s. Epicentre 38°·2N. 142°·0E. (as on 1951, May 9d.).
Focus at Base of the Superficial Layers.

Intensity V at Kinkazan ; IV at Onagawa and Watari ; II-III at Sendai, Hukusima, Shirakawa and Miyako. Epicentre 39°·0N. 141°·9E. Depth 45km.

Seismological Bulletin of the C.M.O., Japan, for Sept., 1951, Tokyo, 1951, pp.226-227, with macroseismic chart.

$A = -\cdot6208$, $B = +\cdot4850$, $C = +\cdot6159$; $\delta = -5$; $h = -1$;
$D = +\cdot616$, $E = +\cdot788$; $G = -\cdot485$, $H = +\cdot379$, $K = -\cdot788$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Isinomaki		0·6	294	0 10	− 2	0 19	− 2
Sendai		0·9	274	0 14k	− 2	0 25	− 3
Hukusima		1·3	250	0 19	− 3	0 33	− 5
Mizusawa	E.	1·3	324	0 21	− 1	0 37	− 1
Yamagata		1·3	272	0 19	− 3	0 36	− 2
Miyako		1·4	0	0 26	+ 3	0 45	+ 4
Onahama		1·5	215	0 22	− 2	0 37	− 7
Inawasiro		1·6	247	0 25	− 1	0 43	− 3
Morioka		1·6	337	0 29	+ 3	0 54	+ 8
Shirakawa		1·8	249	0 24	− 5	0 43	− 8

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Akita	2·1	315	0 37	+ 4	1 7	+ 8
Mito	2·2	214	0 28	− 7	0 51	−10
Hatinohe	2·3	351	0 34	− 2	1 8	+ 4
Niigata	2·3	263	0 51	+15	1 21	+17
Kakioka	2·4	216	0 30	− 8	—	—
Utunomiya	2·4	226	0 34	− 4	1 2	− 4
Tukubasan	2·5	217	0 33	− 6	0 58	−11
Kumagaya	2·9	225	0 49	+ 4	—	—
Aikawa	3·0	266	0 49	+ 3	—	—
Maebasi	3·0	232	0 41	− 5	1 15	− 7
Matusiro	3·4	242	0 57	+ 5	—	—
Nagano	3·4	245	0 51	− 1	—	—
Oiwake	3·4	236	0 52	0	—	—
Hunatu	3·8	224	0 55	− 3	1 39	− 3
Kohu	3·8	228	0 59	+ 1	—	—
Misima	3·9	220	0 58	− 1	—	—
Osima	4·0	212	0 56	− 4	1 39	− 8
Urakawa	4·0	9	1 15	+15	2 5	+18
Mori	4·1	344	1 14	+12	2 5	+16
Shizuoka	4·4	223	1 10	+ 4	—	—
Nagoya	5·0	235	1 17	+ 2	2 15	+ 3

Mizusawa gives also eSN = 40s.

Sept. 28d. 23h. 28m. 38s. Epicentre 29°·8S. 177°·6W. (as on 1944, September 23d.).

A = −·8684, B = −·0364, C = −·4945; δ = −3; h = +2;
D = −·042, E = +·999; G = +·494, H = +·021, K = −·869.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	9·5	220	1 22?	−58	—	—	—	—	—
Karapiro	N.	9·9	213	e 2 22?	− 3	—	—	—	—	—
New Plymouth	E.	11·5	214	e 3 8	PPP	e 5 11	SS	e 3 41	?	e 5·6
Wellington		13·0	206	e 3 7	− 2	i 5 38	+ 3	i 3 22	PP	7·1
Cobb River	E.	13·7	212	e 3 30	PP	e 5 44	− 8	—	—	—
Kaimata	N.E.	15·5	212	e 3 45	+ 3	e 6 38	+ 3	e 4 0	PP	—
Christchurch		15·8	207	i 3 50	+ 5	e 6 30	−12	i 4 9	PPP	e 8·2
Apia		16·8	20	i 3 59	+ 1	i 6 43	−22	e 9 4	PcP	—
Brisbane		25·9	268	i 5 39a	+ 4	i 10 23	+19	i 6 32	PPP	i 12·4
Riverview		26·8	253	i 5 48a	+ 4	i 6 49	PPP	i 6 8	?	e 12·0
Terre Adélie		44·5	203	i 8 15	0	i 14 49	− 2	i 10 9	PP	21·0
Honolulu		54·2	23	e 9 27	− 2	e 17 4	− 2	—	—	—
Perth		56·3	250	i 8 6	?	—	—	—	—	—
Bandong		73·4	272	e 11 36	0	e 21 6	+ 1	—	—	—
Manila		73·8	298	e 11 11	−27	—	—	—	—	—
Zi-ka-wei	Z.	83·9	311	e 12 32	− 1	23 8	+12	—	—	—
Santa Clara		84·7	46	e 12 37	0	e 23 9	+ 5	—	—	e 42·8
Pasadena		84·8	46	i 12 35a	− 2	i 22 59	[0]	i 12 48	pP	e 38·0
Berkeley		84·9	42	e 12 37a	− 1	e 23 6	0	—	—	e 42·6
Lick	Z.	84·9	46	e 12 37k	− 1	—	—	—	—	—
Palomar		85·1	47	i 12 37	− 2	—	—	—	—	—
Riverside	Z.	85·2	46	i 12 38	− 1	—	—	i 12 52	pP	—
Fresno		85·6	43	e 12 40a	− 1	e 22 56	[− 9]	e 19 26	?	e 43·6
Vladivostok		86·1	326	i 12 44	0	e 23 19	+ 1	e 23 7	SKS	—
Nanking		86·2	310	12 45	+ 1	i 23 23	+ 4	—	—	—
China Lake		86·3	45	i 12 43	− 2	e 23 11	[+ 2]	i 12 55	pP	—
Tinemaha	Z.	86·7	44	i 12 46	− 1	—	—	—	—	—
Shasta Dam		86·8	39	i 12 47	0	—	—	—	—	—
Reno		87·4	41	e 12 48	− 2	e 23 19	[+ 2]	—	—	—
Klyuchi		87·7	348	e 12 48	− 4	—	—	—	—	—
Boulder City		88·1	47	i 12 53	− 1	i 23 24	[+ 3]	—	—	—
Tucson		88·4	51	i 12 55	0	e 23 26	[+ 3]	—	—	—
Tacubaya		89·9	68	e 13 33	+31	e 24 10	+16	—	—	—
Puebla		90·5	68	e 13 49	+44	—	—	—	—	—
Seattle		91·1	34	e 13 32?	+24	e 23 57	(+ 7)	e 25 6	PS	e 51·4

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vera Cruz		92·3	70	—	—	e 23 49	[+ 3]	—	—	—
La Plata		94·1	134	(13 22)	0	(24 40)	+ 9	(30 22)	SS	(62·4)
Huancayo		94·5	106	e 13 21	− 2	e 24 1	[+ 3]	e 24 37	S	e 43·6
Hungry Horse		96·3	37	e 13 29	− 3	—	—	i 17 30	PP	—
College		97·1	12	i 13 31	− 4	—	—	e 17 36	PP	—
La Paz		98·0	114	e 13 45	+ 6	i 24 16	[− 1]	i 24 54	S	46·7
Fayetteville		102·1	56	i 13 56	− 2	—	—	i 12 50	?	—
Bogota		104·0	93	i 18 56	PP	e 24 41	[− 5]	—	—	49·2
Calcutta	E.	104·2	288	e 18 23	PP	i 25 1	[+14]	27 53	PS	—
Colombo	E.	104·3	270	—	—	33 38	SSP	—	—	e 53·7
Kabansk		104·9	321	—	—	e 24 50	[0]	—	—	—
Irkutsk		106·3	321	e 14 21?	P	e 24 56	[0]	—	—	—
Kodaikanal	E.	107·9	273	e 29 57	PKKP	—	—	—	—	—
Hyderabad	N.	110·3	279	e 28 45	PS	—	—	—	—	—
Grahamstown	Z.	113·2	202	i 18 43	[+ 3]	—	—	—	—	—
Poona	N.	114·7	278	e 18 29	[−13]	22 5	PKS	29 4	PS	—
Bombay	N.	115·8	277	e 19 58	PP	e 29 35	PS	—	—	—
New Delhi	N.	115·8	290	—	—	e 29 22	PS	—	—	e 60·7
Resolute Bay		116·6	17	e 18 44	[− 2]	e 25 29	[− 9]	e 19 53	PP	e 60·4
Kimberley	Z.	118·0	202	i 18 50	[+ 1]	—	—	—	—	—
Ottawa		118·5	52	18 46	[− 4]	25 38	[− 7]	27 2	SKKS	—
Palisades		118·6	57	e 19 36	PP	e 29 48	PS	—	—	e 57·3
Pretoria	Z.	119·5	207	e 19 2	[+10]	—	—	—	—	—
Fort de France		120·0	90	—	—	e 30 10	PS	—	—	—
Almata		120·5	306	i 18 14?	[−40]	—	—	—	—	—
Ili		120·5	307	e 19 1	[+ 7]	—	—	—	—	—
Naryn		120·7	304	i 18 54	[0]	i 25 54	[+ 2]	i 30 14?	PS	—
Murgab		121·5	300	e 18 58	[+ 2]	—	—	e 20 1	PP	—
Frunse		122·1	305	e 18 57	[0]	—	—	e 20 39	PP	—
Seven Falls	E.	122·2	50	e 20 59	PP	e 25 58	[+ 1]	e 27 27	SKKS	—
Andijan		123·2	302	e 18 58	[− 1]	i 26 2	[+ 2]	i 20 38	PP	—
Bermuda		123·4	68	—	—	e 26 2	[+ 1]	e 37 51	SSP	e 59·3
Fergana		123·6	302	e 18 58	[− 2]	e 20 37?	PP	e 15 20	P	—
Obi-garm		124·8	300	e 20 46	PP	—	—	—	—	—
Stalinabad		125·4	300	i 19 4	[+ 1]	—	—	—	—	—
Lunacharskoe		125·6	302	e 19 6?	[+ 2]	i 26 12	[+ 4]	i 20 52	PP	—
Tashkent		125·6	302	e 19 3	[− 1]	i 26 10	[+ 2]	i 20 50	PP	—
Tchimkent		125·6	303	i 19 2	[− 2]	—	—	e 20 58	PP	—
Samarkand		127·0	300	19 6	[0]	—	—	i 21 5	PP	—
Mary		130·6	297	i 19 14	[+ 1]	i 22 40	PKS	e 21 12	PP	—
Sverdlovsk		131·7	322	i 19 16	[+ 1]	i 22 41	PKS	—	—	—
Kizyl-Arvat		135·2	298	i 19 20	[− 2]	i 22 52	PKS	i 21 58	PP	—
Scoresby Sund		137·0	12	21 52	PP	40 18	SS	42 20	?	67·4
Baku		140·1	299	e 19 32	[+ 1]	—	—	—	—	—
Kiruna		140·5	348	i 19 27k	[− 4]	i 26 41	[+ 1]	i 22 27	PP	e 66·4
Lenkoran		141·0	297	e 19 28?	[− 4]	—	—	—	—	—
Shemakha		141·1	300	e 19 33?	[+ 1]	i 22 53?	PKS	—	—	—
Kirovobad		142·8	300	i 19 33?	[− 2]	—	—	—	—	—
Goris		142·9	297	i 19 32	[− 4]	—	—	—	—	—
Tiflis		143·9	302	i 19 35?	[− 2]	e 29 9?	(−35)	e 22 15	PP	—
Moscow		144·0	327	e 19 30?	[− 7]	e 29 40	(− 4)	i 22 46	PP	—
Erevan		144·3	299	19 35	[− 3]	—	—	22 36	PP	—
Gori		144·4	302	e 19 40	[+ 2]	—	—	—	—	—
Pulkovo		144·6	336	e 19 35	[− 3]	32 36	SKSP	e 25 54	PPP	—
Leninakan		144·7	301	e 19 40	[+ 1]	—	—	—	—	—
Helsinki		146·1	341	e 19 41	[0]	—	—	—	—	—
Sotchi		147·4	306	e 19 45	[+ 2]	—	—	—	—	—
Upsala		148·2	346	e 19 47	[+ 2]	e 26 56	[+ 5]	e 23 0	PP	e 70·4
Bergen		149·3	357	19 39	[− 7]	—	—	i 19 52	PKP_2	e 80·4
Yalta		151·0	310	19 55	[+ 6]	e 33 46	SKSP	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		151·3	286	e 19 48	[− 1]	23 22	PKS	—	—	—
Aberdeen		152·5	5	i 20 8	PKP_2	i 43 18	SS	—	—	e 85·6
Copenhagen		153·2	349	i 19 53	[+ 1]	43 22	SS	i 20 16	PKP_2	71·4
Kishinev		153·3	318	20 0	[+ 8]	e 30 36	{0}	—	—	—
Lwow		154·2	327	e 19 53	[0]	e 27 23?	PPP	e 21 3	?	—
Helwan	z.	154·9	276	i 19 53a	[− 1]	23 24	PKS	e 20 26	PKP_2	—
Istanbul		155·6	306	e 19 36	[−19]	e 23 40	PKS	e 24 21	PP	e 71·4
Rathfarnham Castle		155·7	12	e 19 54	[− 1]	—	—	e 20 25	PKP_2	e 72·4
Uzhgorod		155·8	327	e 19 56	[0]	—	—	—	—	—
Potsdam		156·1	345	i 19 55	[− 1]	e 23 57	PP	i 20 23	PKP_2	e 69·4
Skalnate Pleso		156·4	331	e 19 56	[0]	e 37 45	PPS	e 43 10	SS	—
Witteveen	z.	156·8	353	e 20 17k	[+20]	—	—	—	—	—
Collmberg		157·1	343	e 19 56	[− 1]	e 24 4	?	e 20 28	?	—
De Bilt		157·6	354	e 19 57	[− 1]	e 44 2	SS	e 24 7	PP	e 76·4
Jena		157·8	344	e 20 3?	[+ 5]	e 24 7	PP	e 20 41	PKP_2	—
Prague		157·8	340	e 20 11	[+13]	e 43 58	SS	e 20 31	PKP_2	e 67·4
Ogyalla		158·2	331	e 20 10	[+11]	e 44 22	SS	e 20 36	PKP_2	—
Kew		158·3	3	i 19 58	[− 1]	e 24 12	PP	i 20 30	PKP_2	e 76·4
Timisoara		158·3	323	e 20 13	[+14]	e 25 37	?	e 20 37?	PKP_2	—
Cheb		158·4	343	e 20 2	[+ 3]	e 34 26	SKSP	e 20 29	PKP_2	—
Belgrade		159·3	321	e 20 9a	[+ 9]	e 27 12	[+ 8]	e 23 40	PKS	e 90·6
Jersey	E.	160·3	8	e 19 52	[− 9]	e 33 43	$SKKS_2$	e 21 42	?	76·4
Karlsruhe	z.	160·3	349	e 20 0	[− 1]	—	—	e 20 41	PKP_2	—
Stuttgart		160·4	347	e 20 0	[− 1]	e 27 20	[+15]	e 20 41	PKP_2	e 79·4
Strasbourg		160·8	349	e 20 1	[− 1]	e 26 57	[− 8]	i 20 45	PKP_2	e 74·4
Paris		161·0	0	i 20 2	[0]	e 26 55	[−11]	i 20 47	PKP_2	e 76·4
Triest		161·8	335	e 20 0	[− 3]	e 27 0	[− 6]	i 20 49	PKP_2	e 78·0
Zürich		161·8	348	e 20 3	[0]	e 31 24	[+ 2]	e 20 41	PKP_2	—
Basle		162·0	348	e 20 11	[+ 8]	—	—	—	—	—
Pavia		163·7	343	e 20 57k	PKP_2	e 45 23	SS	e 25 10	PP	—
Taranto		163·9	315	e 21 4	PKP_2	—	—	—	—	—
Rome		165·4	329	20 4a	[− 2]	31 46	{+ 6}	24 46	PP	—
Messina		166·3	311	e 21 11	PKP_2	31 55	{+11}	24 55	PP	—
Toledo		168·6	26	e 20 15	[+ 7]	—	—	e 25 6	PP	—
Malaga		171·0	38	i 20 9	[− 1]	i 25 20	PP	i 21 23	PKP_2	93·1
Alicante		171·1	15	20 7	[− 3]	e 27 15	[+ 3]	25 29	PP	e 81·1
Granada		171·1	33	i 20 13a	[+ 3]	i 32 16	{+ 8}	20 37	pPKP	i 84·8
Almeria		171·9	29	i 20 11	[+ 1]	46 21	SS	25 23	PP	86·2
Tamanrasset	z.	172·5	—	i 20 10k	[− 1]	e 25 28	PP	e 21 45	PKP_2	—
Algiers Univ.	z.	173·0	—	i 20 12	[+ 1]	e 25 25	PP	i 21 38	PKP_2	—

Additional readings and notes :—
Wellington eZ =3m.12s., e =3m.45s., eSZ =5m.26s., QZ =6m.2s.
Kaimata eNE =4m.20s., eS?NE =6m.27s.
Christchurch eQEN =6m.37s.
Apia i =4m.11s.
Brisbane iSSE =11m.24s.
Perth i =12m.6s., S =16m.7s., SS =19m.54s., i =20m.30s.
Pasadena iZ =12m.59s., eS?N =22m.50s.
Berkeley eZ =13m.5s., iZ =14m.21s., cZ =15m.8s.
Lick iZ =12m.44s. and 13m.31s.
Palomar iZ =12m.52s. and 13m.1s.
Vladivostok iP_cP =12m.52s., ePP =16m.4s., ePPP =18m.6s., iS_cS =23m.34s., iPS = 24m.29s., eSS =28m.50s.
China Lake iZ =13m.4s.
Tacubaya i =24m.23s., e =24m.33s.
Seattle e =13m.42s., 13m.53s., and 14m.0s., eS =24m.25s., e =30m.36s.
La Plata PKPN =(13m.28s.), SKSN =(20m.46s.), SKKSE =(24m.46s.), SKSPE = (27m.4s.), PPSE =(30m.10s.), PSSN =(38m.40s.), SSSE =(40m.46s.), SSSN = (41m.22s.), E.(44m.10s.), N =(47m.11s.), E =(51m.10s.) and (54m.16s.), readings wrongly identified and have been increased by 17 minutes.
Huancayo e =13m.48s., ePS =25m.53s., eSS? =31m.4s., eSSS =35m.1s., e =39m.41s.
La Paz iPZ =14m.2s., PPZ =17m.40s., SKKS =24m.40s., iPS =26m.22s., PPS =27m.13s.
Calcutta eE =28m.55s.
Poona eN =29m.16s., PPSN =30m.42s., eN =31m.27s., SSN =35m.59s., SSPN = 36m.16s., SSSN =39m.42s.
Resolute Bay eZ =18m.53s., eSKKSN =26m.46s., eN =27m.44s., ePSEN =29m.32s., ePPSEN =30m.53s., eSSEN =35m.53s., eN =39m.38s., eE =40m.4s.
Ottawa PS =30m.2s.

Continued on next page.

Naryn iPPP =22m.53s.
Seven Falls eE =30m.19s.
Andijan iPS =30m.36s.
Lunacharskoe PKS =22m.20s.
Tashkent iPKS =22m.18s.?, ePS =30m.34s.
Kiruna ePKSN =22m.57s., iPKSE =23m.4s., ePKKPE =28m.44s., ePPSZ =34m.50s., iSSEZ =40m.53s., eQZ =62·4m., and other unidentified readings.
Moscow iPKP =19m.34s., ePPP =25m.58s., PS =32m.56s.
Upsala eE =20m.17s., ePKSN =23m.49s., eN =27m.40s., eSKKSE =29m.52s., eSKSP?N =33m.22s., eSSE =42m.14s., eSSS?N =48m.40s., eQN =65·4m.
Aberdeen iN =21m.50s., iE =21m.55s. and 32m.39s., iN =33m.6s.
Copenhagen 23m.30s.
Helwan PPZ =22m.52s., eZ =30m.1s.
Istanbul ePPPNZ =27m.3s., ePKKPZ =28m.3s., eE =30m.48s., eZ =34m.17s., ePPSE =36m.47s., eSSE =43m.17s., eSSSE =49m.2s.
Rathfarnham Castle eZ =23m.5s., eEN =64m.42s.
Skalnate Pleso e =20m.3s., 21m.2s., 24m.58s., 25m.50s., 32m.34s., and 40m.0s., eSSS =48m.46s., e =50m.22s.
Witteveen iZ =20m.28s. and 20m.37s.
De Bilt ePPP =27m.50s.
Jena eEN =20m.31s., ePKP$_2$N =20m.46s., eE =20m.56s. and 21m.40s., eZ =26m.36s.
Prague eSKP? =23m.11s., ePPP =27m.54s., eSKSP =34m.1s., eSSS =49m.40s. and other unidentified e readings.
Ogyalla e =21m.6s., 22m.6s., and 22m.57s., ePP? =24m.5s., eSKSP? =33m.52s.
Timisoara E =30m.22s., N =33m.22s.
Cheb e =20m.16s., 22m.18s., and 24m.33s., ePPP? =28m.10s., e =31m.32s. and 41m.28s., eSS =43m.27s., e =48m.16s.
Belgrade eZ =20m.38s., ePPNW =24m.45s., eNE =28m.32s., eSKSPNE =34m.43s.
Stuttgart ePKP$_2$Z =20m.50s., ePP =24m.22s. and 24m.52s., ePPP =28m.43s., eSKKS =31m.27s., ePSKS =35m.48s., eSS =44m.30s., eSSS =52m.22s., and other unidentified e readings.
Strasbourg ePP =24m.22s., ePPP? =28m.30s., eSKKS =31m.15s., ePSKS =34m.53s., ePPS =37m.52s., eSS =44m.34s., eSSS =50m.44s. and other unidentified e readings.
Paris iSKP =23m.29s., iPP =24m.25s., ePcP,PKP =28m.27s., iSKKS =31m.23s., iPKKS =31m.36s., iPPP($\Delta > 180°$) =32m.54s., ePPS =38m.3s., eSS =43m.45s., iSSP =45m.11s. and numerous unidentified readings.
Triest ePKS =23m.33s., ePP =24m.32s., ePPP =28m.25s., eSKKS =30m.48s., ePSKS =34m.40s., ePPS =38m.54s., eSS =44m.49s.
Zürich ePP =24m.24s.
Pavia e =21m.51s., 27m.57s., 31m.11s., 39m.50s., and 41m.53s., eSSS? =51m.33s.
Rome PPP =28m.42s., PSKS =35m.14s., SS =45m.24s., SSS =51m.34s.
Messina PPP =28m.49s., e =35m.51s., 45m.26s., and 51m.59s.
Toledo e =25m.30s. and 27m.40s.
Alicante PPP =29m.41s., PPS =39m.29s., SS =46m.27s.
Granada PKP$_2$ =21m.47s., iPP =25m.18s., pPP =25m.40s., SKS =27m.55s., PPP =29m.31s., SKSP =36m.25s., PPS =40m.25s., iSS =46m.39s., SSS =53m.16s.
Almeria PPP =29m.29s.
Tamanrasset eZ =20m.34s., 24m.47s., and 28m.37s., ePPPZ =29m.37s., eZ =32m.31s.
Algiers Univ. eZ =20m.21s. and 22m.8s., ePPPZ =29m.21s.
Long waves were also recorded at Djakarta, Harvard, Weston, Tananarive, Ivigtut, and Tortosa.

Sept. 28d. Readings also at 0h. (Bombay, Frunse, Tchimkent, Krasnogorka, Przhevalsk, Almata II, Ili, near Dzhergetal, Fergana, Andijan, Obi-garm, Khorog, Stalinabad, Naryn, Samarkand, and near Copiapo), 1h. (Paris, New Delhi, Krasnogorka, Almata, Przhevalsk, Almata II, Ili, Chilisk, near Tashkent, Garm, Obi-garm, Dzhergetal, Stalinabad, Fergana, Andijan, Tchimkent, and Naryn), 2h. (Terre Adélie), 5h. (near Alicante), 7h. (College, Fayetteville, Tucson, Boulder City, Riverside, Palomar, China Lake, Tinemaha, Lick, Mineral, near Oaxaca, Puebla, and Tacubaya (2)), 9h. (Brisbane, Strasbourg, Kizyl-Arvat, Obi-garm, Lunacharskoe, Tashkent, Tchimkent, Garm, Dzhergetal, Khorog, Fergana Andijan, Frunse, Krasnogorka, Naryn, Almata II, near Samarkand, and Stalinabad), 10h. (Cobb River, Kaimata, Wellington, Palomar, China Lake , Kimberley, and Stuttgart) 11h. (Brisbane and Istanbul), 12h. (Ksara and near Triest), 14h. (Paris and Strasbourg), 15h. (Collmberg, Jena, Stuttgart, Bombay, Poona, Alberni, Victoria, Seattle, Hungry Horse, Fresno, Lick, Mineral, Reno, Shasta Dam, Mount Wilson, Riverside, Palomar, China Lake, Tinemaha, Boulder City, Tucson, Palisades, and near Lwow), 18h. (Kimberley, Samarkand, Tchimkent, Murgab, near Khorog, Obi-garm (2), Stalinabad, Garm, Dzhergetal (2), Fergana, and Andijan), 19h. (Kiruna (2) and Collmberg), 21h. (Tchimkent, Frunse, Krasnogorka, Almata, Almata II, Ili, Samarkand, Naryn, Rybach'e, near Khorog, Garm, Stalinabad, Obi-garm, Murgab, Dzhergetal, Fergana, Andijan, Lunacharskoe, and near Reykjavik), 22h. (La Plata, Christchurch, Cobb River, Karapiro, Kaimata, Wellington, Brisbane, Riverview, Mount Wilson, Riverside, Palomar, China Lake, Collmberg, and Tamanrasset).

Sept. 29d. 0h. 21m. 27s. Epicentre 29°·8S. 177°·6W. (as on 28d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Karapiro	N.	9·9	213	e 2 33?	+ 8	—	—	—	—	—
New Plymouth	E.	11·5	214	e 3 56	+68	e 5 56	+57	—	—	—
Wellington		13·0	206	e 3 10	+ 1	5 24	−11	e 3 14	P	8·9
Cobb River	E.	13·7	212	—	—	e 5 43	− 9	—	—	—
Kaimata	N.E.	15·5	212	e 3 45	+ 3	e 6 29	− 6	—	—	—
Christchurch		15·8	207	e 4 0	+15	e 6 36	− 6	i 6 51	SS	—
Mount Wilson	Z.	84·9	46	e 12 36	− 2	—	—	—	—	—
Lick	Z.	84·9	46	e 12 37k	− 1	—	—	e 13 19	?	—
Palomar	Z.	85·1	47	e 12 40	+ 1	—	—	—	—	—
Riverside	Z.	85·2	46	e 12 39	0	—	—	—	—	—
Fresno	Z.	85·6	43	e 12 39a	− 2	—	—	e 13 24	?	—
China Lake	Z.	86·3	45	e 12 41	− 4	—	—	—	—	—
Tinemaha	Z.	86·7	44	e 12 48	+ 1	—	—	—	—	—
Shasta Dam		86·8	39	i 12 45	− 2	—	—	—	—	—
Boulder City		88·1	47	e 12 52	− 2	—	—	—	—	—
Tucson		88·4	51	e 12 54	− 1	—	—	—	—	—
College		97·1	12	e 13 31	− 4	—	—	—	—	—
Kiruna	Z.	140·5	348	e 19 28	[− 3]	—	—	—	—	—
Collmberg	Z.	157·1	343	e 19 57	[0]	—	—	—	—	—
Stuttgart	Z.	160·4	347	e 20 1?	[0]	—	—	e 20 54	PKP_1	—
Triest	Z.	161·8	335	e 20 50	PKP_2	—	—	—	—	—
Tamanrasset	Z.	172·5	—	e 20 12	[+ 1]	—	—	—	—	—

Long waves were also recorded at Alicante.

Sept. 29d. 9h. 10m. 21s. Epicentre 29°·8S. 177°·6W. (as at 0h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	9·5	220	e 1 9	−71	—	—	—	—	e 5·0
Wellington		13·0	206	e 3 16	+ 7	5 26	− 9	e 3 22	PP	—
Cobb River	E.	13·7	212	—	—	e 5 51	− 1	—	—	—
Kaimata	N.E.	15·5	212	e 2 39	−63	e 6 33	− 2	—	—	—
Christchurch		15·8	207	—	—	e 6 33	− 9	—	—	—
Brisbane	Z.	25·9	268	i 5 43k	+ 8	—	—	—	—	—
Lick	Z.	84·9	46	e 12 37a	− 1	—	—	—	—	—
Berkeley	Z.	84·9	42	e 12 37	− 1	—	—	e 12 50	?	—
China Lake		86·3	45	12 44	− 1	—	—	—	—	—
Shasta Dam		86·8	39	i 12 47	0	—	—	—	—	—
Reno	Z.	87·4	41	e 12 50k	0	—	—	—	—	—
Tucson		88·4	51	e 12 55	0	—	—	—	—	—
College		97·1	12	e 13 32	− 3	—	—	—	—	—
La Paz		98·0	114	e 13 49	+10	—	—	—	—	—

Long waves were recorded at New Plymouth.

Sept. 29d. 12h. 18m. 55s. Epicentre 8°·78. 124°·1E. (as on 1951, May 20d.).

$A = -·5543$, $B = +·8186$, $C = -·1503$; $\delta = -6$; $h = +7$:
$D = +·828$, $E = +·561$; $G = +·084$, $H = -·124$, $K = -·989$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Djakarta		17·3	278	i 4 7a	+ 3	e 7 17	+ 1	—	—
Manila		23·3	353	i 5 16	+ 6	i 9 41	+21	e 5 38	PP
Brisbane		33·1	128	i 6 40k	0	i 13 41	SS	—	—
Riverview		35·7	139	i 7 0k	− 2	e 12 35	− 4	i 17 16	ScS
Kaimata	N.E.	53·4	137	e 9 23	− 1	—	—	—	—
Cobb River	E.	53·7	135	e 9 25	− 1	—	—	e 9 38	?
Karapiro	N.	54·6	131	e 9 5	−27	—	—	—	—
Wellington		55·2	135	i 9 35	− 2	—	—	—	—
Terre Adélie		59·2	171	i 10 3	− 2	—	—	—	—
Murgab		66·1	319	i 10 51	0	i 19 32	− 7	i 20 8	sS
Almata II		66·9	326	e 10 58	+ 2	—	—	—	—
Almata		67·1	326	i 10 59	+ 2	e 19 49	− 2	—	—
Rybach'e		67·2	324	i 10 57?	− 1	i 19 46?	− 6	—	—
Khorog		67·2	317	i 10 59	+ 1	i 19 46	− 6	i 11 20	pP
Krasnogorka		67·2	317	11 5	+ 7	e 19 58	+ 6	—	—
Ili		67·5	326	i 10 59	− 1	e 19 47	− 9	—	—
Frunse		68·3	323	i 11 5	0	i 20 0	− 6	i 11 31	pP
Andijau		68·4	320	i 11 20?	+14	—	—	i 11 43?	pP
Fergana		68·6	320	e 11 7	0	20 1	− 8	—	—
Stalinabad		69·7	317	i 11 13	− 1	i 20 12	−10	—	—
Tashkent		70·7	319	e 11 20	0	e 20 24	−10	i 20 57	sS
Lunacharskoe		70·7	319	i 11 22	+ 2	i 20 26	− 8	i 11 47	pP
Tchimkent		71·0	320	i 11 23	+ 1	e 20 28	− 9	11 44	pP
Samarkand		71·4	317	i 11 24	0	e 20 35	− 7	i 11 46	pP
Mary		74·1	313	e 11 41	+ 1	21 5	− 7	—	—
Ashkabad		76·8	312	i 11 56	+ 1	—	—	—	—
Kizyl-Arvat		78·7	313	12 5	− 1	—	—	—	—
Sverdlovsk		83·3	330	i 12 30	0	e 22 40	−10	—	—
Goris		86·1	311	12 45	+ 1	—	—	—	—
Leninakan		88·3	312	e 12 56	+ 1	—	—	—	—
Gori		88·4	313	e 12 56	+ 1	—	—	—	—
Ksara		93·3	303	e 18 15	PP	e 21 18	?	—	—
Moscow		95·1	326	e 13 25	1	—	—	—	—
College		97·0	26	e 13 32	− 3	—	—	—	—
Kiruna	z.	103·2	337	i 14 1a	− 2	—	—	e 18 19	PP
Uzhgorod		104·3	318	e 18 29	PP	—	—	—	—
Prague		109·2	321	e 18 45	[+13]	—	—	e 18 56	PP
Collmberg	z.	109·9	321	e 18 52	[+19]	—	—	—	—
Triest	z.	110·4	316	i 19 39a	?	—	—	—	—
Jena		110·9	322	e 19 11?	PP	—	—	e 19 15	PP
Stuttgart	z.	112·8	319	e 19 25	PP	—	—	—	—
Strasbourg		113·8	320	e 19 39	PP	—	—	—	—
Santa Clara		114·2	53	i 14 21	P	—	—	—	—
Paris		117·1	321	e 20 1	PP	—	—	—	—
Tinemaha	z.	117·2	53	e 18 52	[+ 5]	—	—	—	—
Hungry Horse		117·4	40	i 18 48	[0]	—	—	—	—
Mount Wilson	z.	117·8	56	i 18 51	[+ 3]	e 22 19	PKS	—	—
China Lake	z.	117·9	54	i 18 51	[+ 2]	e 22 20	PKS	—	—
Palomar	z.	118·9	57	i 18 53	[+ 2]	—	—	—	—
Tamanrasset	z.	119·6	292	i 18 53k	[+ 1]	—	—	e 20 22	PP
Boulder City		120·1	53	e 22 24	PKS	—	—	—	—
Huancayo		151·7	137	e 19 59	[+ 9]	—	—	—	—

Manila i = 6m.1s., e = 6m.32s., i = 7m.33s.
Riverview eN = 14m.18s.
Khorog isS = 20m.20s.
Prague e = 19m.33s. and 21m.27s.
Tamanrasset eZ = 19m.26s., 19m.48s., and 22m.23s.

Sept. 29d. 16h. 36m. 8s. Epicentre 29°·8S. 177°·6W. (as at 9h.).

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Auckland	N.	9·5	220	e 3 25	?	(e 4 16)	+ 6	—	—	e 4·3
Karapiro	N.	9·9	213	e 2 52?	+27	—	—	—	—	—
Wellington		13·0	206	e 3 17	+ 8	e 5 23	−12	—	—	e 8·9
Cobb River	E.	13·7	212	—	—	e 5 43	− 9	—	—	—
Kaimata	N.E.	15·5	212	3 47	+ 5	e 6 26	− 9	—	—	—
Christchurch		15·8	207	e 3 46	+ 1	e 6 33	− 9	—	—	—
Brisbane		25·9	268	i 5 38k	+ 3	—	—	—	—	e 12·8
Lick	Z.	84·9	46	e 12 35a	− 3	—	—	i 12 41	PcP	—
Palomar	Z.	85·1	47	e 12 48	+ 9	—	—	—	—	—
China Lake	Z.	86·3	45	e 12 42	− 3	—	—	e 12 54	PcP	—
Tinemaha	Z.	86·7	44	e 12 44	− 3	—	—	—	—	—
Mineral	Z.	87·0	39	e 12 45k	− 3	—	—	—	—	—
Tucson		88·4	51	e 12 53	− 2	—	—	—	—	—
College		97·1	12	e 13 29	− 6	—	—	—	—	—
Tamanrasset	Z.	172·5	—	e 20 11	[0]	—	—	—	—	—

Lick gives also iZ = 13m.14s.
Long waves were also recorded at Ksara and Palisades.

Sept. 29d. 18h. 15m. 0s. Epicentre 26°·6S. 122°·0W.

A = −·4744, B = −·7593, C = −·4454; δ = −3; h = +2;
D = −·848, E = +·530; G = +·236, H = +·378, K = −·895.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Huancayo		46·1	81	e 8 27	− 1	e 15 18	+ 4	e 10 38	PP	e 20·3
La Paz	Z.	50·8	90	i 9 4	0	—	—	—	—	—
Tacubaya		50·8	29	e 10 18	PcP	—	—	—	—	—
Tucson		59·5	12	i 10 7	0	e 18 51	ScS	—	—	—
Palomar	Z.	59·8	7	i 10 10	+ 1	—	—	e 10 56	PcP	—
Riverside	Z.	60·4	4	i 10 13	0	—	—	e 10 57	PcP	—
Pasadena		60·5	4	i 10 14a	0	e 12 30	PP	i 10 58	PcP	—
China Lake	Z.	62·2	5	i 10 25a	− 1	e 12 44	PP	i 11 5	PcP	—
Boulder City		62·6	8	i 10 29	+ 1	—	—	—	—	—
Tinemaha	Z.	63·4	5	i 10 34a	0	—	—	—	—	—
Lick	Z.	63·6	0	i 10 36k	+ 1	—	—	—	—	—
Berkeley	Z.	64·1	0	e 10 38k	0	—	—	i 11 13	PcP	—
Reno	Z.	65·8	3	e 10 50a	+ 1	—	—	e 13 38	PP	—
Mineral	Z.	66·6	1	e 10 54k	0	—	—	—	—	—
Shasta Dam		67·0	0	i 10 56	− 1	—	—	—	—	—
Terre Adélie		68·4	206	i 17 55	?	—	—	—	—	—
San Juan		70·3	57	e 11 14	− 3	—	—	—	—	—
Butte		72·8	7	i 11 32	0	—	—	—	—	—
Seattle		73·9	0	e 11 49	+10	—	—	e 12 38	?	—
Brisbane		74·1	247	i 11 40k	0	—	—	—	—	e 34·0
Hungry Horse		75·0	7	i 11 44	− 1	—	—	—	—	—
Bermuda		80·1	47	i 12 12	− 1	—	—	—	—	—
College		93·4	349	13 17	− 1	—	—	—	—	—
Kimberley	Z.	116·4	148	—	—	i 25 32	[− 5]	e 23 53	?	—
Paris		132·0	47	e 19 17	[+ 1]	—	—	—	—	—
Tamanrasset	Z.	132·4	82	i 19 17a	[0]	e 22 47	SKP	e 21 5	?	—
Kiruna	Z.	133·0	19	i 19 16k	[− 2]	—	—	—	—	—
Strasbourg		135·5	46	e 19 23	[+ 1]	—	—	—	—	—
Stuttgart	Z.	136·4	46	e 19 24	[0]	—	—	—	—	—
Collmberg	Z.	138·1	42	e 19 28	[+ 1]	—	—	—	—	—
Triest		140·1	49	e 19 27	[− 4]	e 28 41	{−41}	—	—	—
Timisoara		145·1	47	e 19 42	[+ 3]	—	—	—	—	—

Additional readings :—
Lick iZ = 10m.55s. and 11m.32s.
Reno eN = 12m.42s.
Mineral iZ = 11m.4s. and 11m.17s.
Long waves were also recorded at Christchurch.

Sept. 29d. 22h. 8m. 59s. Epicentre 34°·1N. 134°·0E. (as on 1951, February 23d.).

Intensity V at Nabesima and Ogijima; IV at Takamatsu, Okayama, Sakaide, Tsuda, Kasada, and Hasioka; II-III at Sumoto, Koti, and Hirosima. Epicentre 34°·3N. 134°·1E.

Seismological Bulletin of the Cent. Met. Obs., Japan, for September, 1951, Tokyo, 1951, pp. 227-229, with macroseismic chart on page 227.

A = −·5764, B = +·5969, C = +·5580; δ = −11; h = 0;
D = +·719, E = +·695; G = −·388, H = +·401, K = −·830.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Takamatsu	0·2	11	0 3a	− 7	0 5	−11
Himeji	0·5	40	0 15	+ 1	0 25	+ 2
Okayama	0·6	354	0 9	− 6	0 16	−10
Koti	0·7	216	0 19	+ 2	0 29	+ 1
Sumoto	0·8	71	0 15	− 3	0 25	− 6
Muroto	0·9	170	0 22	+ 2	0 37	+ 3
Matuyama	1·1	256	0 22a	0	0 37	− 2
Kobe	1·2	59	0 22	− 2	0 35	− 6
Osaka	1·3	66	0 31	+ 6	0 49	+ 5
Hirosima	1·3	282	0 22	− 3	0 38	− 6
Yonago	1·4	338	0 23	− 4	0 36	−10
Uwazima	1·5	234	0 33	+ 5	0 50	+ 1
Siomisaki	1·6	114	0 27	− 3	—	—
Simidu	1·6	213	0 35	+ 5	0 58	+ 7
Matsue	1·6	331	0 23	− 7	0 37	−14
Owase	1·8	91	0 35	+ 3	0 58	+ 2
Hamada	1·8	297	0 35	+ 3	1 1	+ 5
Ooita	2·2	247	0 45	+ 7	1 15	+ 9
Kameyama	2·2	70	0 39	+ 1	1 2	− 4
Hikone	2·2	58	0 40	+ 2	1 6	0
Nagoya	2·7	66	0 44	− 1	1 14	− 5
Hukuoka	3·0	260	0 56	+ 6	1 40	+13
Miyazaki	3·1	225	1 6	+15	1 51	+22

Sept. 29d. Readings also at 0h. (Riverside, China Lake, and Wellington (2)), 2h. (China Lake, Antofagasta, Copiapo, Kaimata, Cobb River, and Wellington), 3h. (Auckland, Christchurch, Kaimata, Cobb River, Wellington, Brisbane, and near Mizusawa), 4h. (Collmberg, China Lake, and near Dzhergetal), 5h. (Christchurch, Kaimata, Cobb River, Wellington, China Lake, Murgab, Fergana, Samarkand, near Obi-garm, Garm, Andijan, Stalinabad, Tashkent, Lunacharskoe, Tchimkent, Khorog, and Dzhergetal), 6h. (Brisbane, Kaimata, Wellington, China Lake, and Dzhergetal), 7h. (Kimberley), 8h. (Wellington), 9h. (near Dzhergetal), 10h. (near Tsikhlis-Dzhvari, and near Manila (2)), 11h. (Wellington, China Lake, and near Dzhergetal), 12h. (Wellington and China Lake), 13h. (Triest, Rome, and Messina), 15h. (Kiruna, Huancayo, and Antofagasta), 16h. (Huancayo and near Athens), 20h. (near Manila), 22h. (China Lake (2), Palomar (2), Cobb River, Wellington, Brisbane, Tamanrasset, Huancayo, and near La Paz), 23h. (Cleveland, Antofagasta, and Budapest).

Sept. 30d. 0h. 3m. 50s. Epicentre 39°·5S. 175°·1E. Depth of focus 0·020. (as on 1946, February 12d.).

A = −·7709, B = +·0661, C = −·6335; δ = −2; h = −1;
D = +·085, E = +·996; G = +·631, H = −·054, K = −·774.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
New Plymouth	E.	0·9	298	i 0 26	+ 1	i 0 50	+ 5
Karapiro	N.	1·6	12	e 0 30?	− 2	e 0 56?	0
Tuai	N.	1·7	66	e 0 35	+ 2	i 1 1	+ 3
Wellington		1·8	188	i 0 37	+ 3	1 8	+ 8
Cobb River	E.	2·4	229	i 0 41	0	1 14	+ 2
Kaimata	N.E.	4·1	222	e 0 59	− 4	1 48	− 3

Sept. 30d. 4h. 21m. 28s. (I)
8h. 47m. 43s. (II)
9h. 28m. 15s. (III)
10h. 14m. 26s. (IV)
11h. 11m. 57s. (V)
— Epicentre 30°·1S. 177°·8W. (as on Sept. 20d.).

			Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Auckland	N.	9·2	221	(e 2 57)	+41	e 2 57	P	—	—	e 4·4
II		N.	9·2	221	(e 2 17)	+ 1	e 2 17	P	e 3 21	?	e 4·1
III		N.	9·2	221	e 1 20?	?	e 1 45?	?	—	—	e 4·4
V		N.	9·2	221	—	—	e 3 10	?	—	—	e 4·6
I	Karapiro	N.	9·5	213	e 2 32?	+12	—	—	—	—	—
II		N.	9·5	213	e 2 17?	− 3	—	—	—	—	—
III		N.	9·5	213	e 2 45?	+25	—	—	—	—	—
I	Tuai	N.	9·6	204	—	—	e 3 55	−17	—	—	—
II		N.	9·6	204	—	—	e 4 17	+ 5	—	—	—
III		N.	9·6	204	e 2 40	+19	e 3 58	−14	—	—	—
IV		N.	9·6	204	—	—	e 4 20	+ 8	—	—	—
V		N.	9·6	204	—	—	e 4 11	− 1	—	—	—
I	New Plymouth	E.	11·2	215	—	—	e 5 47?	+55	—	—	—
II		E.	11·2	215	—	—	e 5 17	SSS	—	—	—
III		E.	11·2	215	—	—	e 4 58	+ 6	—	—	—
IV		E.	11·2	215	—	—	e 5 34?	+42	—	—	—
I	Wellington		12·7	207	e 3 4	− 1	e 5 19	− 9	—	—	e 6·2
II			12·7	207	e 3 4	− 1	e 5 21	− 7	—	—	e 6·5
III			12·7	207	e 3 4	− 1	5 16	−12	—	—	e 6·5
IV			12·7	207	e 3 4	− 1	e 5 12	−16	e 5 25	S	—
V			12·7	207	—	—	e 5 16	−12	—	—	e 8·7
I	Cobb River	E.	13·4	212	e 3 33	+19	e 5 38	− 7	—	—	—
III		E.	13·4	212	—	—	e 5 34	−11	—	—	—
IV		E.	13·4	212	—	—	e 5 34?	−11	—	—	—
V		E.	13·4	212	—	—	e 6 3?	+18	—	—	—
I	Kaimata	N.E.	15·1	212	e 3 38	+ 2	e 6 23	− 2	—	—	—
II		N.E.	15·1	212	e 3 41	+ 5	e 6 21	− 4	—	—	—
III		N.E.	15·1	212	e 3 37	+ 1	e 6 15	−10	e 6 46	S	—
IV		N.E.	15·1	212	e 3 43	+ 7	e 6 24	− 1	—	—	—
V		N.E.	15·1	212	e 3 35	− 1	e 6 26	+ 1	—	—	—
II	Apia		17·1	22	e 6 31?	S	(e 6 31?)	−41	—	—	—
I	Brisbane		25·7	268	i 5 34k	+ 1	i 9 3	−58	i 6 20	PP	e 12·6
II		E.	25·7	268	i 5 33a	0	—	—	i 6 0	PP	e 12·7
III		Z.	25·7	268	i 5 29k	− 4	—	—	—	—	—
IV		Z.	25·7	268	e 5 38	+ 5	—	—	—	—	—
V		Z.	25·7	268	e 5 38	+ 5	—	—	—	—	—
I	Riverview		26·5	254	e 5 44	+ 3	—	—	e 6 19	PP	e 11·9
II			26·5	254	e 5 48	+ 7	—	—	—	—	e 11·9
I	Lick	Z.	85·2	41	i 12 28k	−11	—	—	—	—	—
II		Z.	85·2	41	e 12 27k	−12	—	—	—	—	—
I	Fresno	Z.	85·9	43	e 12 41k	− 2	—	—	—	—	—
II		Z.	85·9	43	e 12 31	−12	—	—	—	—	—
I	China Lake	Z.	86·6	45	12 34	−12	—	—	—	—	—
II		Z.	86·6	45	12 34	−12	—	—	—	—	—
III		Z.	86·6	45	12 30	−16	—	—	—	—	—
IV		Z.	86·6	45	12 39	− 7	—	—	—	—	—
V		Z.	86·6	45	12 29	−17	—	—	—	—	—
I	Shasta Dam		87·1	39	e 12 38	−11	—	—	—	—	—
II			87·1	39	e 12 37	−12	—	—	—	—	—
I	Mineral	Z.	87·3	39	e 12 37k	−13	—	—	—	—	—
II		Z.	87·3	39	e 12 37k	−13	—	—	—	—	—
I	Reno	Z.	87·8	42	e 12 48k	− 4	—	—	—	—	—
II		Z.	87·8	42	e 12 39	−13	—	—	—	—	—
II	Boulder City		88·4	47	e 12 53	− 2	—	—	e 13 0	PcP	—
I	Tucson		88·7	51	e 12 46	−11	—	—	—	—	—
II			88·7	51	e 12 43	−14	—	—	—	—	—
I	College		97·5	12	e 13 23	−14	—	—	—	—	—
II			97·5	12	e 13 23	−14	—	—	—	—	—

Continued on next page.

			△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
III	Palisades		118·9	57	e 22 11	PKS	—	—	—	—	—
I	Kiruna	z.	140·7	348	e 19 22	[−10]	—	—	—	—	—
I	Ksara		151·3	285	e 23 36	PP	—	—	—	—	—
II			151·3	285	e 23 17	PKS	e 27 5	[+10]	—	—	—
I	Collmberg	z.	157·3	342	e 20 0	[+ 2]	—	—	—	—	—
I	Jena		158·0	343	e 20 23	[+24]	—	—	e 20 43	PKP_3	—
I	Stuttgart	z.	160·6	345	e 20 32	PKP_2	—	—	—	—	—
I	Tamanrasset	z.	172·1	203	i 20 3k	[− 7]	—	—	e 20 30	PKP_2	—

Additional readings :—
Wellington I eZ = 3m.14s., 5m.1s., and 5m.22s. ; IV eP? = 3m.16s.
Brisbane I iE = 5m.41s. ; II iEZ = 5m.43s. ; III iZ = 5m.40s.
Lick I iZ = 13m.1s. and 13m.6s. ; II iZ = 12m.43s.
Fresno II eZ = 12m.42s.
Mineral I iZ = 12m.53s. ; II eZ = 12m.49s.
Long waves to shock I were also recorded at Huancayo, Berkeley, Palisades, and other European stations, and to shock II at Palisades.

Sept. 30d. 17h. 8m. 22s. Epicentre 36°·2N. 139°·9E. Depth of focus 0·005.
(as on 1951, March 16d.).

Intensity VI at Shimodate ; V at Kakioka, Utunomiya, Tukubasan, Kumagaya, Mito, Onahama, Kasama, Koga, Manabe, Oyama ; IV at Tokyo, Maebasi, Ajiro, Osima, Hukusima, Sendai, Yokohama, and Shirakawa. Epicentre as adopted. Depth 30km.

Seismo. Bull. Cent. Met. Obs., Japan, 1951, Tokyo, 1951, p.243-244, with macroseismic chart.

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

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Kakioka	0·2	82	0 8	− 3	0 17	− 2	—	—
Tukubasan	0·2	84	0 9	− 2	0 16	− 3	—	—
Utunomiya	0·3	356	0 10a	− 2	—	—	—	—
Kumagaya	0·4	263	0 10	− 2	0 17	− 5	—	—
Mito	0·5	68	0 12	− 1	0 21	− 2	—	—
Tokyo	0·5	192	0 11a	− 2	0 21	− 2	—	—
Maebasi	0·7	287	0 13k	− 2	0 23	− 4	—	—
Titibu	0·7	252	0 13	− 2	0 21	− 6	—	—
Yokohama	0·8	195	0 18k	+ 1	0 33	+ 4	—	—
Shirakawa	0·9	15	0 17a	− 1	0 30	− 1	—	—
Tyosi	0·9	121	0 16a	− 2	0 28	− 3	—	—
Oiwake	1·1	277	0 21a	+ 1	0 34	− 2	—	—
Onahama	1·1	48	0 22a	+ 2	0 36	0	—	—
Hunatu	1·2	233	0 20a	− 2	0 36	− 2	—	—
Kohu	1·2	242	0 17	− 5	0 35	− 3	—	—
Mera	1·3	182	0 20	− 3	0 37	− 3	—	—
Misima	1·3	215	0 22	− 1	0 39	− 1	—	—
Inawasiro	1·4	7	0 24	0	0 42	− 1	—	—
Nagano	1·4	289	0 23k	− 1	0 42	− 1	—	—
Osima	1·5	196	0 24	− 2	0 40	− 5	—	—
Hukusima	1·6	16	0 26k	− 1	0 47	0	—	—
Matumoto	1·6	271	0 26	− 1	0 44	− 3	—	—
Shizuoka	1·7	225	0 28	0	0 50	0	—	—
Iida	1·8	248	0 31	+ 1	0 53	+ 1	—	—
Niigata	1·9	339	0 28	− 3	0 54	0	—	—
Omaesaki	2·1	221	0 37	+ 3	1 10	+11	—	—
Yamagata	2·1	10	0 34	0	1 0	+ 1	—	—
Aikawa	2·2	324	0 33	− 2	—	—	—	—
Toyama	2·2	283	0 35	0	—	—	—	—
Isinomaki	2·5	27	0 40	+ 1	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Kanazawa		2·6	277	0 42	+ 1	—	—	—	—
Nagoya		2·6	247	0 39	− 2	1 16	+ 4	—	—
Sakata		2·7	359	0 46	+ 4	1 24	+10	—	—
Wazima		2·7	296	0 42	0	1 12	− 2	—	—
Hatidyozima		3·1	181	0 45	− 3	1 20	− 4	—	—
Hikone		3·1	253	0 48	0	1 30	+ 6	—	—
Kameyama		3·1	244	0 55	+ 7	1 34	+10	—	—
Mizusawa		3·1	18	0 50	+ 2	1 23	− 1	—	—
Akita		3·5	3	1 2	+ 8	1 40	+ 6	—	—
Kyoto		3·6	251	1 0	+ 5	1 44	+ 7	—	—
Morioka		3·6	16	0 56	+ 1	1 39	+ 2	—	—
Owase		3·7	237	1 2	+ 6	1 50	+11	—	—
Miyako		3·8	24	0 56	− 2	1 39	− 3	—	—
Osaka		3·9	248	1 11	+12	1 57	+13	—	—
Kobe		4·2	248	1 10	+ 7	2 6	+14	—	—
Toyooka		4·2	261	1 4	+ 1	1 59	+ 7	—	—
Siomisaki		4·4	233	1 35	+29	2 17	+20	—	—
Hatinohe		4·5	16	1 7	0	2 10	+11	—	—
Sumoto		4·5	247	1 11	+ 4	2 8	+ 9	—	—
Aomori		4·7	9	1 10	0	2 18	+14	—	—
Takamatu		5·2	250	1 17	0	—	—	—	—
Mori		5·9	5	1 31	+ 4	2 40	+ 6	—	—
Urakawa		6·3	20	2 2	+30	—	—	—	—
Matuyama		6·4	249	1 44	+10	—	—	—	—
Sapporo		6·9	8	1 48	+ 7	—	—	—	—
Hukuoka		8·3	254	3 58	S	(3 58)	+25	—	—
Nemuro		8·4	30	2 26	+24	—	—	—	—
Manila		27·4	223	(e 5 18)	−23	—	—	—	—
College		50·4	32	i 8 51	− 2	—	—	i 9 5	pP
Kiruna	z.	66·9	339	i 10 43	− 4	—	—	—	—
Victoria		67·9	45	10 52	− 2	—	—	—	—
Shasta Dam		72·6	52	e 11 21	− 1	—	—	i 11 39	pP
Hungry Horse		73·2	42	i 11 26	0	—	—	—	—
Lick	z.	74·9	54	e 11 35a	− 1	—	—	i 11 51	pP
Reno	z.	74·9	52	e 11 34a	− 2	—	—	e 11 50	pP
Tinemaha	z.	77·3	53	e 11 49	0	—	—	—	—
China Lake	z.	78·5	54	e 11 55	− 1	—	—	—	—
Pasadena	z.	79·1	55	e 11 59	0	—	—	—	—
Riverside	z.	79·7	55	e 12 1	− 1	—	—	—	—
Boulder City		80·2	53	i 12 5	0	—	—	—	—
Palomar	z.	80·4	55	e 12 5	− 1	—	—	—	—
Stuttgart	z.	84·7	330	e 12 26	− 2	—	—	—	—
Tucson		85·1	53	e 12 30	0	—	—	—	—
Fayetteville		92·3	41	13 4	0	—	—	—	—
Tamanrasset	z.	107·2	316	e 18 34	[+15]	—	—	—	—
La Paz		148·3	58	i 19 50	[+15]	e 27 4	[+29]	i 31 2	SKKS

Additional readings and note :—
Manila e =(6m.8s.), i =(6m.34s.), all readings being given for 16h.
La Paz i =29m.28s., PPS =36m.50s.
Long waves were also recorded at Almeria.

Sept. 30d. 18h. 56m. 18s. Epicentre 16°·4N. 99°·6W. (as on 1941, Aug. 25d.).
A = −·1601, B = −·9464, C = +·2806 ; δ = +4 ; h = +5 ;
D = −·986, E = +·167 ; G = −·047, H = −·277, K = −·960.

	△	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Oaxaca	2·8	77	0 43	− 4	—	—	1·2
Puebla	3·0	27	0 51	+ 1	—	—	1·5
Tacubaya	3·0	7	0 52	+ 2	—	—	1·6
Vera Cruz	4·3	49	1 6	− 2	—	—	2·0
Tucson	18·8	330	i 4 23	0	i 10 41	L	(i 10·2)

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	L. m.
Fayetteville		20·2	13	i 4 31	− 8	—	—	—
Palomar	z.	23·0	322	e 5 7	0	—	—	—
Boulder City		23·7	329	e 5 14	0	—	—	—
Riverside	z.	23·7	322	e 5 19	+ 5	—	—	—
Mount Wilson	z.	24·3	322	e 5 21	+ 1	—	—	—
China Lake	z.	25·1	325	e 5 27	− 1	—	—	—
Tinemaha	z.	26·4	325	e 5 38	− 2	—	—	—
Fresno	z.	27·0	324	e 5 46a	+ 1	—	—	—
Lick	z.	28·5	322	e 5 58a	− 1	—	—	—
Morgantown		28·8	33	e 5 48	−14	—	—	—
Reno	z.	29·0	327	e 6 2a	− 2	—	—	—
Palisades		33·1	37	e 6 29	−11	—	—	—
Hungry Horse		34·0	343	e 6 46	− 2	—	—	—
Harvard		35·4	37	i 6 48	−12	—	—	—
College		58·2	339	i 9 53	− 5	—	—	—

College gives also i = 10m.43s.
Guadalajara also records long waves.

Sept. 30d. Readings also at 1h. (Grahamstown, Kimberley, Pretoria, Pietermaritzburg, and near Dzhergetal), 2h. (near Apia), 4h. (Kiruna and Ksara), 5h. (near Shemakla), 8h. (near Victoria), 9h. (Kaimata, Tuai, Wellington, China Lake, Ksara, and near Taranto), 10h. (Tacubaya), 11h. (Manila and near Shemakla (2)), 12h. (Apia, near Bogota and near Copiapo), 13h. (Alberni, Horseshoe Bay, Seattle, Victoria, Auckland, Cobb River, Kaimata, New Plymouth, near Karapiro, Tuai, Wellington, near Apia, and near Allmata II), 14h. (Alberni, Horseshoe Bay, Victoria, and near Dzhergetal), 15h. (Copiapo, Tacubaya, and near Dzhergetal), 16h. (Reykjavik), 17h. (near Andijan), 18h. (near Garm), 19h. (near Huancayo and near Manila), 20h. (near Dzhergetal), 22h. (Huancayo, Apia, Cobb River, Karapiro, Wellington, Fergana, near Garm, Khorog, and Murgab), 23h. (near Copiapo).

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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