The International Seismological Summary.

1949 April, May, June.

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 second quarter for 1949 contains 123 epicentres, 86 of which are repetitions from previously adopted epicentres.

Cases of abnormal focal depth are noted below :—

April	1d.	7h.	21·5S.	180°	0·090
	2d.	19h.	Undetermined shock		Suggested Deep.
	5d.	6h.	36·7N.	70·5E.	0·030
	5d.	9h.	41·5N.	130·5E.	0·080
	10d.	4h.	53·6N.	166·6W.	Suggested Deep.
	17d.	0h.	31·5S.	68·6W.	0·005
	18d.	21h.	15·8S.	172·8W.	Suggested Deep
	20d.	3h.	38·0S.	72·7W.	Base of Superficial Layers.
	23d.	11h.	7·6S.	120·7E.	Base of Superficial Layers.
	24d.	4h.	27·2N.	56·2E.	Suggested Deep.
	25d.	13h.	19·5S.	69·4W.	0·005
	28d.	20h.	42·4N.	147·0E.	0·030
	30d.	1h.	6·2N.	125·6E.	0·010
	30d.	16h.	38·2N.	142·0E.	0·010

May	2d.	5h.	4·0°S.	110·5°E.	0·070
	3d.	5h.	48·6N.	153·5E.	0·010
	4d.	2h.	42·5N.	144·4E.	0·010
	6d.	8h.	37·7N.	141·8E.	0·005
	8d.	7h.	41·0N.	143·3E.	0·020
	8d.	21h.	20·8S.	69·0W.	0·015
	9d.	13h.	4·5N.	95·5E.	Suggested Deep.
	10d.	9h.	36·7N.	70·5E.	0·020
	12d.	1h.	36·4N.	140·6E.	0·005
	17d.	2h.	48·3N.	154·7E.	Base of Superficial Layers.
	20d.	8h.	19·0S.	175·5W.	0·020
	21d.	21h.	37·3N.	142·0E.	Suggested Deep.
	23d.	4h.	31·0S.	178·5W.	0·020
	27d.	10h.	15·8S.	172·8W.	Base of Superficial Layers.
	30d.	1h.	20·8S.	69·0W.	0·010
	30d.	21h.	16·0N.	145·7E.	0·090
	31d.	2h.	6·5S.	130·0E.	0·020
June	9d.	21h.	17·2S.	174·4W.	0·020
	12d.	17h.	28·0S.	63·5W.	0·090
	12d.	17h.	28·0S.	63·5W.	0·090
	13d.	1h.	28·0S.	63·5W.	0·090
	19d.	22h.	61·8N.	150·9W.	0·005
	23d.	22h.	16·1S.	168·3E.	0·015
	24d.	22h.	6·2S.	105·7E.	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.

January, 1957,

KEW OBSERVATORY,
Richmond,
SURREY.

1949 APRIL, MAY, JUNE.

April 1d. 7h. 2m. 6s. Epicentre 21°·5S. 180°. Depth of focus 0·090. (as on 1943, March 4d.).

A = −·9313, B = ·0000, C = −·3644; δ = +11; h = +4;
D = ·000, E = +1·000; G = +·364 H = ·000, K = −·931.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Apia		10·9	47	e 2 25	− 3	e 4 15	−11	—	—
Brisbane	z.	25·2	251	i 4 43	+ 2	—	—	—	—
Pasadena		80·7	48	i 11 11a	− 1	—	—	—	—
Fresno	z.	81·1	45	i 11 13a	− 1	—	—	e 13 19	pP
Palomar		81·2	50	i 11 14a	− 1	—	—	e 13 7	pP
Riverside	z.	81·2	48	i 11 13	− 2	—	—	e 13 22	pP
Shasta Dam		81·8	41	i 11 15	− 3	—	—	—	—
Tinemaha		82·3	45	i 11 19a	− 1	—	—	i 13 29	pP
Reno	z.	82·7	44	i 11 22a	0	—	—	—	—
Boulder City		84·0	48	i 11 27	− 2	—	—	e 13 36	pP
Pierce Ferry		84·7	49	i 11 31	− 1	—	—	i 13 41	pP
Tucson		85·0	53	i 11 33	− 1	—	—	i 13 38	pP
College		89·6	13	i 14 4	pP	—	—	—	—
Hungry Horse		91·1	38	i 11 58	− 4	—	—	i 14 12	pP
Collmberg		148·6	344	e 18 40	[+ 5]	—	—	—	—
Stuttgart	z.	151·8	347	e 18 39	[− 1]	—	—	—	—

Additional readings :—
Brisbane iZ = 4m.59s.
Pierce Ferry isP = 14m.56s.
Tucson ePP? = 14m.54s.
Hungry Horse e = 15m.31s., iPP = 15m.45s.
Collmberg eZ = 18m.46s.

April 1d. 8h. Gulf of California. Only recorded locally.
Tucson eP = 41m.44s., i = 41m.52s., eS = 42m.28s., i = 42m.37s., eL = 42m.48s.
Palomar ePNZ = 42m.16s., iNZ = 42m.27s., iSN = 43m.34s.
Riverside ePZ = 42m.21s., iSEN = 44m.3s.
Pasadena ePZ = 42m.29s., iZ = 42m.49s., eSN = 44m.13s.
Boulder City iP = 42m.33s., iL = 44m.23s.
Pierce Ferry iP = 42m.33s., eL = 44m.54s.
Tinemaha ePZ = 43m.2s.
Reno ePZ = 43m.42s., iPN = 43m.47s., ePE = 43m.51s., eSEZ = 47m.14s., eSN = 47m.23s.
Hungry Horse eP = 45m.15s.
Long waves also recorded at Rapid City and Salt Lake City.

April 1d. 8h. 46m. 35s. Epicentre 2°·2N. 126°·0E. (as on 1947, September 20d.).

A = −·5874, B = +·8084, C = +·0382; δ = +1; h = +7;
D = +·809, E = +·588; G = −·022, H = +·031, K = −·999.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		20·9	248	i 5 32	+46	i 8 41	+ 6	—	—	—
Brisbane	z.	39·3	140	i 7 30	− 2	—	—	i 9 36	PP	—
Riverview		43·0	150	e 8 14	+11	e 15 8	+39	—	—	e 20·0
Hyderabad	N.	49·1	291	—	—	16 1	+ 5	—	—	23·1
Irkutsk		53·1	344	e 9 20	− 1	16 47	− 4	e 11 25	PP	—
Poona	E.	53·6	292	e 9 23	− 2	e 16 57	− 1	—	—	—
Bombay		54·6	292	—	—	e 17 11	0	—	—	—
Andijan		61·6	316	e 10 21	− 1	—	—	—	—	—
Stalinabad		63·4	313	i 10 33	− 1	e 19 3	− 3	—	—	—
Sverdlovsk		74·9	329	11 40	− 4	i 21 15	− 7	—	—	—
Grozny		81·4	314	e 12 30?	+10	—	—	—	—	—
Moscow		87·3	325	e 12 52	+ 2	e 23 25?	− 4	—	—	—
Ksara		88·9	303	e 13 9	+11	23 58	+14	—	—	—
Stuttgart		105·6	322	—	—	e 28 55	PPS	e 34 27	SSP	e 56·4
De Bilt		106·6	326	—	—	e 38 25?	SSS	—	—	e 53·4

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Strasbourg	106·6	322	—	—	e 29 5	PPS	—	—	e 50·4
Paris	109·6	324	e 28 25?	PS	—	—	—	—	e 57·4
Kew	109·9	327	e 28 31	PS	—	—	—	—	e 58·4
Clermont-Ferrand	110·7	321	e 28 39	PS	e 30 52	?	—	—	50·4
Tamanrasset z.	116·9	297	e 30 49	PPS	—	—	—	—	—

Additional readings :—
Strasbourg e =31m.25s.
Long waves were also recorded at Huancayo, La Paz, Aberdeen, Copenhagen, Potsdam, Alicante, Malaga, and the New Zealand stations.

April 1d. Readings also at 5h. (Tchimkent, near Andijan, Murgab, Samarkand, and Stalinabad), 6h. (near Murgab), 8h. (near Ashkabad), 9h. (Hungry Horse), 11h. (Mizusawa and Wellington), 12h. (Strasbourg), 13h. (College), 14h. (Ashkabad). 15h. (Clermont-Ferrand and near Messina), 16h. (Boulder City, Pierce Ferry, Hungry Horse, Tucson, Ukiah, Shasta Dam, and near Murgab), 17h. (Helwan, Ksara, Istanbul, and Santa Lucia), 18h. (Overton (2), Pierce Ferry, Hungry Horse, and Kew), 21h. (Pierce Ferry and Shasta Dam), 22h. (Overton, Samarkand, Tchimkent, near Andijan (2), Obi-garm, Murgab, Stalinabad, and near Tacuabya).

April 2d. 7h. Undetermined shock.

Batavia ePEN =6m.16s., iSE =9m.48s.
Brisbane iPZ =8m.36s.
Andijan eP =11m.25s.
Stalinabad eP =11m.33s., S =20m.53s.
Sverdlovsk P =12m.45s., S =22m.20s.
Grozny ePcP =13m.35s.?, eS =23m.31s.
Hungry Horse e =15m.2s.
Overton eZ =19m.44s. and 19m.50s.
Long waves were also recorded at Christchurch, Wellington, Huancayo, Stuttgart, Strasbourg, Paris, and Kew.

April 2d. 19h. Undetermined shock.

Intensity II at Apia. Suggested depth 150km. (Strasbourg).

Apia eP =4m.5s., S =4m.50s.
Brisbane iPZ =9m.15s.
Pasadena iPZ =14m.25s., iZ =15m.1s.
Riverside ePZ =14m.28s.
Tinemaha iPZ =14m.35s.k.
Boulder City eP =14m.42s., epP =15m.19s.
Overton iPZ =14m.48s.
Pierce Ferry iP =14m.48s., ipP =15m.24s.
Tucson iP =14m.49s.
College eP =15m.20s., epP =15m.58s.
Hungry Horse iP =15m.20s., ipP =15m.59s.
Shasta Dam iP =15m.32s.
Collmberg eP?Z =22m.31s.
Paris ePKP =22m.34s. and 22m.37s., e =23m.15s.?
Stuttgart ePKPZ =22m.36s.
Nanking e =27m.11s. and 27m.33s.

April 2d. Readings also at 0h. (Wellington and near College), 1h. (Batavia, Sverdlovsk, Auckland, Christchurch, and Wellington), 2h. (College, Hungry Horse, Overton, Pierce Ferry, Ashkabad, Ksara, Rome, Strasbourg, and De Bilt), 3h. (La Plata), 4h. (near Ashkabad and near Murgab), 5h. (Hungry Horse, Shasta Dam, Auckland, Christchurch, and Wellington), 6h. (Poona, Tchimkent, and near Murgab), 7h. (Copiapo and Ashkabad), 9h. (Boulder City, College, Hungry Horse, Overton, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Riverside, Palomar, Tinemaha, Mineral, Victoria, Saskatoon, Ottawa, Seven Falls, Shawinigan Falls, and Scoresby Sund), 10h. (Poona and near Ashkabad (2)), 12h. (Christchurch, Kaimata, New Plymouth, near Tuai, and Wellington), 14h. (Ashkabad and near Andijan), 15h. (Shasta Dam, Pasadena, Riverside, Tinemaha, Paris, Stuttgart, and Collmberg), 16h. (Brisbane, Riverview, Perth, Auckland, Christchurch, Wellington, College, and Hungry Horse), 17h. (Bermuda, Seven Falls, Copenhagen, Aberdeen, De Bilt, Kew, Paris, Clermont-Ferrand, Strasbourg, Stuttgart, Potsdam, and near Ottawa), 18h. (near Alicante), 20h. (near Obi-garm, Stalinabad, Andijan, and Samarkand), 21h. (Tacubaya (2)), 22h. (Copiapo, La Paz, near Obi-garm, Stalinabad, and Andijan), 23h. (Ashkabad, Andijan, Frunse, Almata, near Murgab, Tashkent, Samarkand, Tchimkent, Obi-garm, Boulder City, Hungry Horse, Overton, Pierce Ferry, Tucson, Riverside, Tinemaha, Bogota, Tacubaya, and near La Paz (2)).

April 3d. 6h. East Indies.

Batavia eP =40m.27s., eSEN =43m.39s.
Brisbane eZ =42m.51s., iZ =42m.59s. and 44m.24s., eE =44m.44s.
Riverview ePZ? =43m.36s., eSN? =49m.53s., eE =49m.57s., eLE =55·9m.
Poona ePE =44m.40s., epPE =45m.15s., eSE? =52m.22s., esSE? =53m.30s.
Bombay ePE? =45m.2s., eSEN? =52m.35s.
Hyderabad ePN =45m.12s., eSN =51m.28s.
Calcutta eE =45m.22s. and 49m.36s.
Andijan eP =45m.43s.?
Obi-garm iP =45m.49s.
Stalinabad iP =45m.53s.
Tashkent eP =46m.9s.?, eS =54m.31s.?
Sverdlovsk iP =47m.3s., iS =56m.35s.
Baku eP =47m.35s.?, eS =57m.27s.?
College eP =47m.56s., ePP =51m.17s., ePKKP =66m.8s.
Moscow eP =48m.16s., eS =58m.48s.
Ksara eP =48m.30s., S? =59m.28s.
Yalta P =48m.32s.?, eS =59m.6s. ?
Istanbul e =48m.48s. and 52m.39s.
Helwan ePZ =48m.56s., eZ =51m.10s., eE =59m.45s.
Hungry Horse eP =49m.36s., e =49m.46s.
Pierce Ferry ePKP? =53m.20s.
Tucson ePKP =53m.50s., eL =89m.2s.
Rome eP?Z =54m.12s., eS? =63m.46s., eSS? =69m.6s.?, eL? =81m.22s.?
Stuttgart eZ =54m.12s., eQ =92m.
Huancayo ePKP =55m.21s., e =80m.48s., eL =111m.38s.
La Paz ePKPZ =55m.35s.
San Juan ePKP =55m.49s., e =57m.7s., eSS =79m.36s., eL =118m.4s.
Bogota iPKPZ =55m.52s., iSKPZ =59m.28s.
Collmberg eE =66m.39s., eN =66m.44s. and 73m.3s.
Long waves were also recorded at other New Zealand, European, and American stations.

April 3d. 12h. 27m. 40s. Epicentre 50°·4N. 4°·0E. (anticipation of 12h.33m.).

$A = +\cdot6384$, $B = +\cdot0446$, $C = +\cdot7684$; $\delta = -2$; $h = -6$;
$D = +\cdot070$, $E = -\cdot998$; $G = +\cdot766$, $H = +\cdot054$, $K = -\cdot640$.

	E.	Δ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.	
Heerlen		1·4	69	e 0 25	− 2	i 0 41	− 5	—	—
Paris		1·9	212	0 33	− 1	e 0 59	0	i 0 39	P_g
Kew		2·9	291	i 0 54	+ 6	e 1 33	+ 9	—	—
Strasbourg		3·0	127	e 0 55	+ 5	e 1 24	− 3	0 59	P_g
Basle		3·7	139	e 1 10	P_g	e 1 52	S*	—	—
Stuttgart		3·7	113	e 1 5	P*	e 1 40	− 5	e 1 10	P_g
Neuchatel		3·9	149	e 1 16	P_g	e 1 59	S*	—	—
Zürich		4·3	133	e 1 2	− 6	—	—	e 1 10	P*
Clermont-Ferrand		4·7	188	i 1 10	− 4	i 2 3	− 7	i 1 31	P_g
Jena	E.	4·9	81	e 1 30	P*	e 2 14	− 1	e 2 31	S*
Chur		5·1	132	e 1 16	− 4	e 2 13	− 7	—	—
Salo		6·5	135	—	—	e 2 35	−20	e 3 45	S_g

Additional readings :—
Paris iS_g =1m.1s., iS_g =1m.6s.
Strasbourg eS =1m.31s., iS_g =1m.40s.
Stuttgart e =1m.52s. and 1m.57s., iS_g? =2m.2s.
Zürich e =1m.5s.
Clermont-Ferrand iP =1m.20s., iS =2m.20s., iS_g =2m.31s.
Jena eN =2m.10s.
Salo e =3m.13s.

April 3d. 12h. 33m. 41s. Epicentre 50°·4N. 4°·0E. (as at 12h. 27m.).

Intensity VII at Boussoit, Harré Maurage; VI at Bray, St. Vaast, Thieu, Villers, St. Ghislain; V at Gottignies, La Louvière, Morlanwelz; IV at Jemappes, Nimy, Cuesmes; III at Casteau, Feluy, Le Roeulx, Binche, Epinois, Gi, Jurbise, Soignies; II at Braine le Comte, Buzet, Horrie, Ittre, and Manage.

P. Fourmarier and Ch. Charlier.
Les séismes dans la Province du Hainaut, 1900, et 1949. Bull. Acad. Roy. Belgique. Classe des Sciences, 5e Série, t. XXXVI, 1950, pp. 207-219, 2 figs.

Ch. Charlier.
Etude systematique des tremblements de terre belges recents, 1900-1950. IVe partie. Pub. du Serv. Seism. et Grav., Série S, No. 10, 1951, pp. 10-19 with 2 figs.

Ch. Charlier.
Les Séismes de la Vallée de la Haine. Resumé of the Conference held by the National Committee of Geology and Geophisics of Belgium on 16th June, 1949.

R. Marliere.
Les tremblements de terre d'avril-mai, 1949, dans la région de Mons. Bull. de la Soc. Belge de Géologie, Paléontologie et Hydrologie (1951) No. 1, pp. 17-27, with figs. Epicentre 50°·27′N. ±1′, 4°00′E ± 1′. Depth 2·8km. ± 0·8km.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Heerlen		1·4	69	i 0 25	− 2	i 0 42	− 4	—	—	—
De Bilt		1·8	24	e 0 34	+ 2	e 0 59	+ 3	—	—	—
Paris		1·9	212	i 0 34	0	i 0 59	0	i 0 40	P_g	—
Kew		2·9	291	i 0 55	+ 7	1 32	+ 8	—	—	—
Strasbourg		3·0	127	e 0 49	− 1	i 1 27	0	i 1 0	P_g	—
Basle		3·7	139	e 0 58	− 2	e 1 53	+ 8	e 1 12	P_g	—
Stuttgart		3·7	113	e 0 57	− 3	i 1 45	0	e 1 11	P_g	—
Ebingen		3·9	122	e 1 4	+ 2	e 1 51	+ 1	e 2 9	S_g	—
Neuchatel		3·9	149	e 1 1	− 1	e 2 2	S*	—	—	—
Jersey	E.	4·1	256	e 1 6	+ 1	2 8	S*	e 1 13	P*	—
Zürich		4·3	133	e 1 6	− 2	e 2 2	+ 2	e 1 23	P_g	—
Ravensburg	Z.	4·5	123	e 1 9	− 2	e 2 5	0	e 1 28	P_g	—
Clermont-Ferrand		4·7	188	e 1 9	− 5	i 2 5	− 5	i 1 30	P_g	—
Jena		4·9	81	e 1 29	P*	e 2 10	− 5	e 1 35	P_g	—
Chur		5·1	132	e 1 18	− 2	e 2 15	− 5	—	—	—
Collmberg		5·8	77	e 1 26	− 3	e 2 38	0	e 1 54	P_g	—
Potsdam	Z.	6·0	67	—	—	e 3 29	S_g	—	—	—
Salo		6·5	135	e 1 48	+ 9	e 2 57	+ 2	e 3 8	P_g	—
Prague		6·7	89	e 1 34	− 8	e 2 48	−12	—	—	—
Triest		8·1	122	—	—	e 4 4	S*	e 4 35	S_g	4·8
Raciborzu	N.	9·1	86	—	—	i 4 1	+ 1	e 4 48	S*	—
Tortosa		9·9	196	4 42	PS	5 42	. S_g	—	—	6·4

Additional readings :—
Paris iS_g = 1m.7s.
Strasbourg iP = 56s., i? = 1m.12s., i = 1m.16s. and 1m.32s., iS? = 1m.38s., iS_g = 1m.41s.
Basle e = 1m.41s.
Stuttgart eP? = 1m.1s., e = 1m.32s. and 1m.41s., i = 1m.48s. and 1m.58s., iS_g = 2m.1s., i = 2m.4s. and 2m.7s.
Ebingen e = 2m.3s.
Neuchatel e = 1m.40s.
Zürich eS_g = 2m.14s.
Ravensburg eS_gZ = 2m.32s.
Clermont-Ferrand iP = 1m.21s., iS = 2m.19s., iS_g = 2m.35s.
Jena eP_g?E = 1m.55s., eN = 2m.7s., eS?E = 2m.27s.
Collmberg eEZ = 1m.32s., and 1m.45s., eE = 2m.2s. and 2m.10s., eN = 2m.30s., eSN = 2m.50s., eS_gN = 2m.58s., eE = 3m.3s.
Salo e = 2m.5s., 3m.17s., and 3m.30s.
Raciborzu eE = 5m.12s., eN = 6m.7s.
Tortosa $P_g S_g$N = 5m.10s.

April 3d. Readings also at 0h. (Collmberg, Jena, and Hungry Horse), 1h. (Tacubaya and near Ashkabad), 3h. (near Mizusawa), 8h. (Granada and near Andijan), 11h. (Ashkabad, Murgab, Samarkand, Tchimkent, near Andijan, Obi-garm, Stalinabad, and near Batavia), 12h. (Stuttgart, near Paris, near Andijan, and near Obi-garm), 13h. (Clermont-Ferrand, Kew, Stuttgart, Upsala, College, Hungry Horse, Boulder City, Overton, Pierce Ferry, and near Tucson), 14h. (near Andijan and near Bogota), 15h. (near Hungry Horse), 16h. (Boulder City, Overton, Pierce Ferry, Brisbane, near Murgab, Andijan, Obi-garm, Samarkand, Stalinabad, and Tchimkent), 17h. (Arapuni, Christchurch, Wellington, La Paz, Overton, Pierce Ferry, College, Pasadena, Riverside, and near Messina), 19h. (Hungry Horse, Ksara, Helwan, Poona, Andijan, near Murgab, Obi-garm, and Stalinabad), 20h. (Samarkand, Tchimkent, and Istanbul), 21h. (Pierce Ferry, Shasta Dam, and Hungry Horse), 22h. (Pierce Ferry), 23h. (Boulder City, Overton, and Pierce Ferry).

April 4d. Readings at 0h. (La Paz, Huancayo, Bogota, Overton, Lick, Tinemaha, Shasta Dam, Hungry Horse, and Ashkabad), 1h. (Tacubaya (2), San Juan, Bermuda, Bogota, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Mineral, Hungry Horse, College, Philadelphia, and Ashkabad), 2h. (Cleveland, Tucson, Boulder City, Pierce Ferry, Overton, Shasta Dam, and Hungry Horse), 3h. (Kodaikanal), 5h. (Copiapo), 6h. (La Paz and Stuttgart), 7h. (New Delhi, Poona, Grozny, Almata, Frunse, Obi-garm, Samarkand, Tchimkent, near Andijan, Murgab, Stalinabad, and Tashkent), 9h. (Shasta Dam), 10h. (Salo, Stuttgart, Triest, near Ashkabad (2), and near La Paz), 11h. (Grahamstown), 12h. (Salo, Sofia, Stuttgart, and near Triest), 13h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Pierce Ferry, Hungry Horse, Huancayo, and near Balboa Heights (2)), 15h. (La Paz, Logan, and Hungry Horse), 16h. (Santa Lucia, near Copiapo, and near Ashkabad (3)), 17h. (Calcutta and Overton), 18h. (Kulyab, Samarkand, near Obi-garm and Stalinabad), 19h. (Overton), 21h. (Pierce Ferry, Mineral, near Lick and Reno), 22h. (Kew and near Reno), 23h. (Overton, Shasta Dam, and College).

April 5d. 6h. 21m. 9s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·030.
(as on 1949, March 11d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Kulyab		1·3	335	i 0 33	− 2	i 0 59	− 2	—	—
Obi-garm		2·1	342	i 0 44?	+ 2	i 1 15?	+ 1	—	—
Stalinabad		2·3	323	i 0 41	− 3	i 1 13	− 4	—	—
Murgab		3·2	59	0 56	+ 2	1 38	+ 3	—	—
Samarkand		4·1	319	1 3	− 1	i 1 51	− 3	—	—
Andijan		4·3	20	1 7	0	i 1 59	0	—	—
Tashkent		4·7	349	e 1 13	+ 1	i 2 8	0	—	—
Tchimkent		5·6	354	e 1 24	+ 1	i 2 29	+ 1	—	—
Frunse		6·9	26	—	—	e 2 58	0	—	—
Almata		8·2	35	e 2 1	+ 4	—	—	—	—
Ashkabad		9·8	281	e 2 12	− 5	4 1	− 4	—	—
New Delhi	E.	9·8	143	e 2 13	− 4	i 3 55	−10	—	—
Grozny		20·0	297	4 22	+ 5	—	—	—	—
College		74·4	17	e 11 14	− 1	—	—	e 12 7	pP

New Delhi gives also iE = 2m.27s., iN = 2m.33s., iE = 3m.58s., iN = 4m.6s.

April 5d. 9h. 27m. 5s. Epicentre 41°·5N. 130°·5E. Depth of focus 0·080
(as on 1945, Aug. 21d.).

Seismo. Bull. Cent. Met. Obs., Japan, for 1949. Tokyo, 1950, p. 10. Epicentre 42°N. 131°E. Depth 600km. Macroseismic radius >300km.

A = −·4879, B = +·5712, C = +·6601 ; δ = +5 ; h = −2 ;
D = +·760, E = +·649 ; G = −·429, H = +·502, K = −·751.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Wazima	6·4	128	1 43	0	3 5	+ 1	—	—	—
Toyooka	6·8	149	1 48	+ 2	3 13	+ 2	—	—	—
Aikawa	6·9	118	1 50	+ 3	3 8	− 5	—	—	—
Toyama	7·1	131	1 48k	− 1	3 17	+ 1	—	—	—
Hirosima	7·3	167	1 53a	+ 2	3 24	+ 4	—	—	—
Akita	7·5	101	1 46	− 7	3 13	−11	—	—	—
Hikone	7·7	142	1 41k	−14	3 11	−16	—	—	—
Kobe	7·7	150	1 55k	0	3 29	+ 2	—	—	—
Nagano	7·7	127	1 56	+ 1	3 29	+ 2	—	—	—
Aomori	7·8	92	1 54k	− 2	3 34	+ 5	—	—	—
Gihu	7·8	139	1 57	+ 1	3 27	− 2	—	—	—
Hukuoka	7·9	180	2 2a	+ 5	3 40	+ 9	—	—	—
Osaka	7·9	148	1 59	+ 2	3 32	+ 1	—	—	—
Sumoto	7·9	153	1 59a	+ 2	3 34	+ 3	—	—	—
Kameyama	8·1	143	2 1	+ 2	3 34	0	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nagoya		8·1	139	2 1	+ 2	3 25	− 9	—	—	—
Sapporo		8·2	75	1 56	− 4	3 29	− 7	—	—	—
Kôti		8·3	162	2 3	+ 2	3 40	+ 2	—	—	—
Morioka		8·3	99	1 56k	− 5	3 27	−11	—	—	—
Hatinohe		8·4	93	1 58	− 4	3 27	−13	—	—	—
Maebasi		8·4	125	1 59	− 3	3 33	− 7	—	—	—
Mizusawa		8·4	102	1 58	− 4	3 21	−19	—	—	—
Hukusima		8·5	113	2 0k	− 3	3 34	− 8	—	—	—
Muroto		8·7	159	2 7	+ 2	3 41	− 4	—	—	—
Owase		8·7	147	2 5a	0	3 41	− 4	—	—	—
Hunatu		8·8	130	2 5	− 1	3 42	− 5	—	—	—
Kumagaya		8·8	125	2 0	− 6	3 39	− 8	—	—	—
Utunomiya		8·8	121	2 20	+14	3 40	− 7	—	—	—
Miyako		8·9	98	2 1k	− 6	3 36	−13	—	—	—
Shizuoka		9·0	134	2 7	− 1	3 46	− 5	—	—	—
Kakioka		9·2	122	2 5	− 5	3 38	−16	—	—	—
Omaebasi		9·2	136	2 16	+ 6	3 50	− 4	—	—	—
Tukubasan		9·2	122	2 6	− 4	3 42	−12	—	—	—
Mito		9·3	120	2 7	− 4	3 45	−11	—	—	—
Onahama		9·3	116	2 7	− 4	3 43	−13	—	—	—
Tokyo		9·3	126	2 4	− 7	3 50	− 6	—	—	—
Yokohama		9·4	127	2 11a	− 1	3 51	− 7	—	—	—
Miyazaki		9·6	175	2 17a	+ 2	4 7	+ 5	—	—	—
Osima		9·7	131	2 16	0	3 58	− 6	—	—	—
Mera		9·8	129	2 13	− 4	3 57	− 9	—	—	—
Kagosima		9·9	180	2 21a	+ 3	4 17	+ 9	—	—	—
Nemuro		11·3	76	2 26	− 6	4 20	−14	—	—	—
Zi-ka-wei		12·6	218	i 2 53	+ 8	i 5 15	+17	—	—	—
Irkutsk		20·8	310	i 4 8	+ 3	i 7 28	+ 6	—	—	—
Almata		39·0	292	i 6 45	+ 4	i 12 9	+ 6	—	—	—
Calcutta	E.	40·0	255	e 6 51	+ 2	i 12 23	+ 6	e 8 41	PP	—
Frunse		40·8	291	i 7 0?	+ 4	—	—	—	—	—
Murgab		42·8	286	i 7 17	+ 6	i 13 7	+10	—	—	—
Andijan		43·1	289	7 17	+ 3	13 7	+ 6	—	—	—
Tchimkent		44·5	293	i 7 27	+ 2	e 13 24	+ 3	—	—	—
New Delhi		44·8	271	i 7 33	+ 6	i 13 31	+ 6	i 9 18	pP	—
Tashkent		45·0	291	e 7 33?	+ 4	i 13 30?	+ 2	—	—	—
Obi-garm		45·8	288	i 7 35?	0	i 13 41?	+ 2	e 9 20	pP	—
Kulyab		46·0	287	i 7 42	+ 6	i 13 48	+ 6	—	—	—
Sverdlovsk		46·1	315	7 39	+ 2	i 13 44	+ 1	i 9 22	pP	—
Stalinabad		46·5	288	7 42	+ 2	i 13 52	+ 3	17 2	sS	—
Samarkand		47·3	290	i 7 48	+ 2	i 14 4	+ 4	—	—	—
College		50·0	34	i 8 2	− 4	e 14 30	− 7	i 9 47	pP	—
Hyderabad	N.	50·4	258	8 15	+ 6	14 47	+ 5	10 5	pP	—
Batavia		52·2	211	i 8 23	+ 1	i 15 9	+ 3	—	—	—
Poona		53·1	262	i 8 29	0	i 15 17	− 1	e 10 21	pP	—
Bombay		53·7	264	8 36	+ 3	i 15 29	+ 3	i 10 21	pP	—
Kodaikanal	E.	55·9	253	e 8 25	−23	—	—	—	—	—
Moscow		58·5	319	i 9 5	− 1	i 16 26	− 2	i 10 55	pP	—
Baku		58·7	299	e 9 3?	− 5	i 16 32	+ 1	—	—	—
Grozny		59·9	303	i 9 19	+ 3	i 16 47	+ 1	—	—	—
Piatigorsk		61·2	305	9 26	+ 2	17 4	+ 2	—	—	—
Erevan		62·3	301	e 9 35	+ 4	17 19	+ 4	—	—	—
Leninakan		62·4	302	9 30?	− 2	17 8?	− 9	—	—	—
Honolulu		62·7	85	e 9 31	− 3	—	—	i 11 53	PP	—
Sotchi		63·5	306	i 9 46	+ 7	17 36	+ 6	—	—	—
Upsala		65·0	329	i 9 47a	− 1	i 17 44	− 4	e 21 55	SS	e 25·9
Theodosia		65·3	309	9 52	+ 2	17 50	− 2	—	—	—
Simferopol		66·1	310	9 57	+ 2	18 1	0	—	—	—
Yalta		66·3	309	9 56	0	18 3	0	—	—	—
Scoresby Sund		66·6	351	—	—	i 18 5	− 2	21 31	sS	—
Victoria		69·2	44	—	—	e 18 38	+ 1	e 21 56	sS	—
Copenhagen		69·9	328	i 10 19	+ 1	18 44	− 1	—	—	—
Skalnate Pleso		70·9	319	e 10 24	0	e 18 56	0	—	—	—
Raciborzu		71·3	321	e 10 21	− 5	e 19 13	+12	e 12 24	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		71·4	309	i 10 26	− 1	i 19 1	− 1	—	—	—
Ksara		71·6	298	i 10 30k	+ 2	—	—	12 30	pP	—
Brisbane		71·7	159	i 10 28	− 1	—	—	i 12 28	pP	—
Potsdam		72·0	326	i 10 30a	0	i 19 35	+26	i 12 29a	pP	—
Collmberg		72·8	325	e 10 34	− 1	e 19 14	− 3	e 12 31	pP	—
Ogyalla		72·8	319	e 11 1	+26	e 19 16	− 1	—	—	—
Prague		73·0	323	e 10 34	− 2	e 19 15	− 5	—	—	—
Belgrade		73·7	316	i 10 41a	+ 1	e 19 29	+ 2	—	—	—
Jena		73·7	324	i 10 28	−12	e 19 17	−10	i 12 36	pP	—
Hungry Horse		74·0	39	i 10 39	− 3	e 19 24	− 6	i 12 30	pP	—
Saskatoon		74·4	33	—	—	e 19 31	− 4	e 23 2	sS	31·9
Shasta Dam		74·9	49	i 10 43	− 4	e 19 32	− 8	i 12 38	pP	—
De Bilt		75·4	329	—	—	i 19 45	− 1	—	—	e 38·9
Mineral	Z.	75·6	49	i 10 47a	− 4	i 19 41	− 7	i 13 43	PP	—
Butte	N.	76·3	40	e 10 53	− 1	e 19 49	− 6	e 13 40	PP	—
Stuttgart		76·3	324	i 10 54k	0	i 19 52	− 3	i 12 53	pP	—
Triest		76·5	320	e 10 54	− 2	i 19 54	− 3	i 14 1	PP	—
Berkeley	Z.	76·9	51	i 10 55a	− 3	—	—	i 12 54k	pP	—
Helwan		77·1	298	i 11 0	+ 1	20 2	− 2	13 0	pP	—
Strasbourg		77·1	325	i 10 59	0	i 20 3	− 1	i 12 59	pP	e 37·9
Reno		77·1	49	i 10 57	− 2	e 19 57	− 7	e 14 5	PP	—
Branner	Z.	77·2	51	i 10 57	− 2	—	—	—	—	—
Bozeman		77·3	40	e 10 57	− 3	e 19 59	− 7	e 23 30	sS	e 30·2
Riverview		77·3	163	i 11 1a	+ 1	i 20 11	+ 5	e 13 58	sP	—
Santa Clara	N.	77·4	51	i 11 11	+11	—	—	—	—	—
Chur		77·6	322	e 11 0a	− 2	e 20 4	− 5	e 12 59	pP	—
Lick	Z.	77·6	51	e 10 58k	− 4	—	—	i 12 58	pP	—
Zürich		77·6	324	e 11 0	− 2	e 20 7	− 2	e 12 59	pP	—
Ivigtut		77·7	359	i 11 0	− 2	i 20 3	− 7	12 42	pP	—
Kew		78·0	331	i 11 3	− 1	e 20 10	− 3	i 13 2	pP	e 31·9
Salo		78·1	322	e 11 3k	− 1	i 20 11	− 3	e 13 2	pP	—
Padova		78·3	320	11 3k	− 2	20 19	+ 3	13 2	pP	—
Taranto		78·4	314	—	—	20 5	−12	e 24 17	SS	—
Bologna		78·5	320	i 11 8k	+ 2	e 20 21	+ 3	e 13 8	pP	—
Florence		79·1	320	e 11 9k	0	e 20 23	− 1	e 13 10	pP	—
Fresno		79·1	50	i 11 7	− 2	e 20 20	− 4	i 13 7a	pP	—
Paris		79·1	328	i 11 9	0	i 20 14	−10	i 13 9	pP	e 38·9
Prato		79·1	320	e 11 11	+ 2	i 20 21	− 3	—	—	—
Tinemaha		79·7	49	i 11 10a	− 3	e 20 36	+ 5	i 13 10	pP	—
Logan		79·8	42	e 11 9	− 4	e 20 25	− 7	i 13 8	pP	—
Rome		79·9	318	i 11 14k	0	i 20 30	− 3	i 13 13	pP	—
Jersey	E.	80·5	331	—	—	e 20 35	− 4	—	—	—
Salt Lake City		80·5	43	—	—	e 20 27	−12	e 23 59	sS	—
Clermont-Ferrand		81·3	326	i 11 21	0	i 20 51	+ 4	i 13 23	pP	39·9
Pasadena		81·8	51	i 11 21a	− 2	i 20 46	− 6	i 13 21	pP	—
Rapid City	E.	82·1	36	e 11 25	0	i 20 49	− 6	e 16 12	pPP	e 37·3
Overton	Z.	82·2	47	i 11 25	0	—	—	i 13 10	pP	—
Boulder City		82·4	48	i 11 25	− 1	—	—	i 13 25	pP	—
Riverside		82·4	51	i 11 23a	− 3	e 20 51	− 7	i 13 20	pP	—
Pierce Ferry		82·8	47	i 11 26	− 2	—	—	i 13 29	pP	—
Palomar	N.	83·1	51	i 11 29	− 1	i 21 0	− 4	—	—	—
Tortosa		86·4	324	e 11 51	+ 5	i 21 15	[− 5]	i 14 24	pP	—
Tucson		87·4	48	i 11 49	− 2	e 21 29	[+ 3]	i 13 51	pP	—
Lincoln	E.	87·6	34	e 11 49	− 3	i 21 42	− 5	e 21 20	SKS	e 37·6
Auckland	N.	87·9	146	—	—	e 23 55?	sS	—	—	—
Algiers		88·5	320	—	—	e 21 28	[− 5]	—	—	—
Alicante		88·8	324	e 13 21	pP	i 21 29	[− 5]	e 24 21	sS	e 38·2
Toledo	Z.	89·1	327	i 12 1	+ 2	e 22 45	?	i 14 3	pP	—
Seven Falls	E.	89·8	14	e 12 0	− 2	e 21 58	− 8	e 25 37	sS	—
Shawinigan Falls	N.	89·9	15	e 12 1	− 1	—	—	—	—	—
Chicago		90·2	28	—	—	e 22 2	− 8	e 25 31	sS	i 33·3
Ottawa		90·4	19	i 12 2a	− 2	e 22 6	− 6	i 14 5	pP	—
Almeria		90·9	324	12 59	+52	23 41	?	25 19	PPS	—
Lubbock		91·0	41	12 12	+ 5	—	—	—	—	—
Granada		91·2	325	e 13 16a	+68	24 13	?	30 19	SS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Wellington		91·6	149	—	—	i 22 23	+ 1	25 25	PS	—
Malaga	z.	91·9	325	i 12 9k	− 2	e 22 49	+24	i 15 49a	PP	43·4
St. Louis		92·0	31	i 12 10	− 2	i 22 20	− 6	i 14 13	pP	—
Cleveland		92·5	24	i 12 14	0	i 22 28	− 2	i 14 16	pP	e 35·2
Weston		94·2	16	i 12 21	− 1	e 26 31	PS	i 14 24	pP	—
Fordham		95·1	18	i 12 23	− 3	e 25 59	PS	e 14 26	pP	—
Philadelphia		95·6	19	—	—	e 22 26	[+14]	e 22 48	S	e 41·0
Pretoria	z.	115·5	258	i 17 47	[+ 7]	—	—	—	—	—
San Juan		118·5	18	—	—	e 34 40	SS	e 37 55	sSS	—
Bogota	z.	128·9	32	i 18 7	[+ 1]	i 21 37	SKP	i 20 37	PP	—
Huancayo		143·0	45	i 18 30	[− 3]	—	—	e 21 18	PP	e 43·1
La Paz		150·4	37	i 18 48	[+ 4]	i 41 23	SS	i 20 59	pPKP	—

Additional readings :—
New Delhi iE =7m.58s., iN =8m.10s., iE =8m.20s., isPEN =10m.15s., iSSN =16m.19s., eSSE =16m.23s.
Sverdlovsk isS =16m.27s. and 16m.48s.
College iPP? =10m.23s., eS$_c$S =16m.38s., isS =17m.33s., eSS? =18m.3s.
Hyderabad SSN =18m.0s.
Poona iE =9m.33s., ipPE =10m.24s., isPEN =11m.25s., iE =17m.10s., isSEN =18m.25s.
Bombay isPEN =11m.23s., isSEN =18m.40s.
Moscow sS =19m.42s.
Honolulu i =9m.38s., e =11m.34s.
Upsala eN =18m.33s.
Copenhagen 19m.16s.
Raciborzu ePZ =10m.27s., eN =14m.27s., eZ =19m.21s.
Brisbane iZ =12m.57s.
Potsdam iPPZ =13m.8s., iZ =45m.14s.
Collmberg eE =10m.39s., ePcPZ =10m.46s., ePPZ =13m.29s., eE =14m.20s. and 14m.29s., eN =19m.45s., ePSE =19m.48s., eSS?E =24m.3s.
Belgrade e =13m.35s., 23m.17s., and 31m.13s.
Jena iPEN =10m.40s., e?EN =13m.18s., eS?N =19m.24s., eE =19m.52s.
Hungry Horse i =12m.36s., iPP =13m.33s.
Shasta Dam iPP =13m.40s., ePKKP =40m.26s., e =40m.41s.
Butte eS$_c$S?N =20m.16s., isSN =23m.24s., eSSSN =28m.55s.
Stuttgart eZ =11m.57s., esPZ =13m.39s., ePPZ =13m.58s., i =20m.27s., eZ =35m.43s.
Triest iSS =25m.15s.
Berkeley iZ =11m.41s.k.
Helwan sPEZ =14m.4s., PPZ =14m.20s.?, iEN =20m.18s., SPZ =20m.49s., iZ =22m.5s., SSN =25m.21s.
Strasbourg isP =14m.4s., iPP =14m.13s., epPP? =15m.25s., epPP =15m.50s., esS =23m.43s., eSS =24m.58s., eSSS =28m.25s., and other e readings without phase.
Reno iN =11m.1s., ePPN =14m.9s.
Riverview iPPZ =14m.7s., iS$_c$SE? =20m.29s., eN =21m.9s., isSE =23m.43s.
Santa Clara iN =11m.30s. and 12m.11s.
Lick eE =11m.1s., iP$_c$PZ =11m.9s., iZ =11m.23s., ePPZ =14m.1s.
Zürich ePP =14m.9s.
Ivigtut 20m.24s.
Kew isPZ =14m.2s., ePPP?EN =16m.12s., eSKSEN =20m.32s., eSSEN =24m.51s.
Fresno ePPZ =14m.18s.
Paris iP$_c$P =11m.21s., ipP$_c$P =13m.29s., esP =14m.4s., iPP =14m.19s., iS$_c$S =20m.26s., iSP =21m.6s., esSP? =24m.36s.
Tinemaha isPZ =14m.26s., eSKP,PKPZ =40m.28s.
Logan esP? =14m.1s., ePP =14m.9s., isS =24m.0s., eSKP,PKP =40m.28s.
Rome iPP =14m.26s., ePPP =16m.27s., isS? =24m.42s.
Clermont-Ferrand isP =14m.22s., iPP =14m.40s., eSS =25m.51s.
Pasadena iZ =11m.40s. and 13m.52s., esPZ =14m.20s., eZ =14m.31s., iPPZ =14m.42s., isSE =24m.19s., eSKP,PKPZ =40m.25s.
Rapid City eE =14m.19s., esSE =24m.22s.
Riverside iZ =11m.42s.
Pierce Ferry esP =14m.17s., esPP =17m.28s.
Tortosa S$_c$S?EN =21m.36s.
Tucson iPP =15m.17s., esPP? =18m.9s.
Lincoln esSE =25m.15s.
Toledo ePP =15m.34s., e =23m.39s.
Ottawa e =15m.51s.
St. Louis iPP =16m.0s., iSKS? =21m.45s., isS =26m.0s.
Cleveland iSKS =21m.49s., iSE =22m.22s., isSKSE =25m.43s., isSE =26m.4s., esSE =26m.7s., iSSE =28m.53s., iE =31m.32s., eSSE =32m.3s.
Fordham ePP =16m.18s.
Philadelphia esS =26m.28s., eSS =29m.28s.
La Paz iPPZ =22m.35s., iPPS? =34m.47s.

April 5d. Readings also at 2h. (near La Paz), 3h. (Riverside, Tinemaha, Tucson, Boulder City, Overton, Fresno, Lick, Pierce Ferry, Shasta Dam, Mineral, and Hungry Horse), 6h. (near Andijan), 9h. (Bozeman, La Paz, Copiapo, and Yalta), 10h. (Overton), 13h. (Copiapo and Ashkabad), 14h. (Baku, Sotchi, near Erevan, Grozny. Leninakan, Piatigorsk, and near Algiers), 20h. (Andijan, Samarkand, Tchimkent, near Kulyab, Murgab, Obi-garm (2), Stalinabad, Boulder City, Pierce Ferry (2), and near Tucson), 21h. (Murgab, Samarkand, near Kulyab, Obi-garm, and Stalinabad), 22h. (Andijan, Samarkand (2), near Kulyab (2), Obi-garm (2), and Stalinabad (2)).

April 6d. 3h. Undetermined shock.

Tucson eP = 38m.10s., e = 38m.19s., eS = 39m.27s., eL = 39m.33s.
Manzanillo e = 38m.33s., 38m.54s., and 41m.18s.
Pierce Ferry iP = 39m.15s., eL = 43m.36s.
Boulder City eP = 39m.16s.
Riverside eZ = 39m.24s.
Mount Wilson eZ = 39m.31s.
Tinemaha ePZ = 39m.34s.
Tacubaya e = 40m.44s., i = 41m.44s.
Hungry Horse iP = 41m.32s.
Berkeley eE = 45m.6s.
Strasbourg e = 46m.56s. and 47m.10s.
Long waves were also recorded at Butte, Chicago, Lincoln, Philadelphia, Rapid City, Salt Lake City, Saskatoon, Victoria, and Granada.

April 6d. 15h. 23m. 27s. Epicentre 5°·5N. 128°·0E. (as on 1947, May 25d.).

A = −·6129, B = +·7844, C = +·0952 ; δ = −1 ; h = +7 ;
D = +·788, E = +·616 ; G = −·059, H = +·075, K = −·995.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	Z.	40·7	145	i 7 43	− 1	—	—	i 9 52	PPP	—
Riverview		44·8	153	e 8 22	+ 5	e 14 50	− 5	i 18 14	S_cS	—
Hyderabad	N.	49·8	288	—	—	15 51	−16	—	—	22·5
Irkutsk		50·6	342	e 9 5	+ 3	16 17	0	—	—	—
Poona	E.	54·3	288	e 9 27	− 3	e 17 3	− 4	e 11 49	PP	—
Bombay		55·3	288	e 9 32	− 6	e 17 6	−15	—	—	—
Obi-garm		62·1	311	i 10 23	− 2	i 18 43	− 6	—	—	—
Stalinabad		62·7	311	i 10 26	− 3	i 18 47	−10	—	—	—
Tchimkent		63·2	315	i 10 32	0	—	—	—	—	—
Sverdlovsk		73·1	329	i 11 34	0	i 20 55	− 6	i 21 30	PS	—
Baku		77·4	310	e 11 54	− 4	21 40	− 9	—	—	—
Grozny		80·6	313	e 12 20	+ 4	—	—	—	—	—
Erevan		81·5	309	e 12 22	+ 1	—	—	—	—	—
Leninakan		82·0	310	12 26	+ 3	22 36	− 1	—	—	—
College		82·6	25	e 11 28	−58	—	—	—	—	—
Piatigorsk		82·6	314	i 12 26	0	22 36	− 7	—	—	—
Sotchi		85·0	313	—	—	23 4	− 3	—	—	—
Moscow		85·7	325	12 41	− 1	23 6	− 8	—	—	—
Ksara		88·7	303	e 12 46?	−11	e 23 40	− 3	i 12 56	P	—
Helwan		93·0	300	i 13 15	− 2	24 17	− 4	e 24 9	SKKS	—
Shasta Dam		101·1	46	e 30 23	PKKP	—	—	—	—	—
Hungry Horse		103·9	37	e 13 17	−49	—	—	i 18 27	PP	—
Haiwee	Z.	105·8	49	e 30 8	PKKP	—	—	—	—	—
Pasadena	Z.	106·3	52	e 30 2	PKKP	—	—	—	—	—
Riverside	Z.	107·0	52	e 29 59	PKKP	—	—	—	—	—
Boulder City		108·2	48	e 29 42	PKKP	—	—	e 29 53	?	—
Overton	Z.	108·3	48	e 19 7	PP	—	—	1 29 53	PPS	—
Pierce Ferry		108·8	48	e 17 57	?	—	—	e 29 38	PKKP	—
Tucson		112·7	51	e 18 41	[+ 3]	—	—	e 29 36	PKKP	—

Additional readings :—
Brisbane iZ = 8m.29s.
Riverview iN = 18m.53s.
Poona eE = 9m.54s., 12m.17s., and 19m.6s.
Helwan S?N = 24m.39s.
Hungry Horse e = 16m.25s., 17m.34s., and 29m.54s.
Long waves were also recorded at De Bilt.

April 6d. 23h. Undetermined shock.

Auckland PN =47m.5s., SN =47m.55s.
Tuai PN =47m.12s., eN =47m.38s., iN =48m.1s., eN =48m.12s.
New Plymouth PE =47m.36s., eE =48m.6s.
Wellington e =47m.58s., P? =48m.1s.
Kaimata eNE =48m.25s.
Riverview iPZ =51m.16s.k, ipPZ =51m.25s., eSN =55m.24s., esSE =55m.39s., eQN = 55·8m, SSN =56m.11s., eRZ =57·2m.
Lick ePZ =58m.43s., iPZ =58m.50s.
Riverside eZ =58m.48s., iZ =58m.52s.
Pasadena iZ =58m.52s.
Fresno ePZ =58m.55s. a
Shasta Dam eP =58m.57s.
Palomar eN =58m.58s.
Boulder City eP =59m.1s.
Tucson eP =59m.3s., iP =59m.9s.
Overton ePZ =59m.7s., iZ =59m.11s.
Pierce Ferry eP =59m.7s.
Ksara ePKP =67m.28s.
Kew eEN =70m.
Long waves were also recorded at Huancayo.

April 6d. Readings also at 0h. (near Ashkabad), 3h. (Auckland, Christchurch, and Wellington), 4h. (near Kulyab, Murgab, Andijan, and Tchimkent), 5h. (Tucson), 6h. (Boulder City (2), Hungry Horse, Overton (2), Pierce Ferry (2), Shasta Dam, Tucson, Mount Wilson, Riverside, Tinemaha, and La Paz), 7h. (Santa Lucia), 8h. (Copiapo, Frunse, Almata, near Murgab, Kulyab, Obi-garm, Stalinabad, Andijan, Samarkand, Tashkent, and Tchimkent), 9h. (Auckland, Christchurch, Tuai, Wellington, College, Hungry Horse, Overton, Pierce Ferry, Saskatoon, Victoria, Paris, and near Scoresby Sund), 10h. (Hungry Horse, Auckland, near Batavia, near Obi-garm and Kulyab), 11h. (near Ashkabad), 13h. (near Pavia), 14h. (Samarkand, Andijan, Tchimkent, near Kulyab, and Stalinabad), 15h. (Pierce Ferry, Paris, and Batavia), 16h. (College and Pierce Ferry), 18h. (Hungry Horse, Pierce Ferry, Shasta Dam, San Juan, and Ashkabad), 19h. (near College), 20h. (Boulder City, Hungry Horse, Overton, Pierce Ferry (2), Shasta Dam, near Apia, Ashkabad, Obi-garm, Stalinabad, Samarkand, near Frunse, Almata, Andijan, Murgab, and Tchimkent), 22h. (Ashkabad), 23h. (Overton).

April 7d. 7h. East Indies.

Perth P =19m.10s., S =22m.55s., L =24m.15s.
Batavia iPZ =21m.51s., iSNZ =23m.23s.
Riverview iPZ =22m.17s. a, iSE =28m.52s., iSSE =32m.8s., iN =32m.19s., eQE = 33m.6s., eLZ =35·2m.
Pretoria iZ =23m.56s.
Murgab P =26m.42s., S =37m.23s.
Tashkent eP =27m.15s.?, iS =38m.1s.?
Ksara iP =27m.40s., PP? =31m.32s.
Bombay eEN =33m.
Shasta Dam ePKP =33m.57s., e =34m.4s., ePP? =37m.45s.
Pasadena eZ =33m.57s., iZ =34m.6s., 34m.21s., and 34m.56s.
Mineral ePZ =34m.0s., iPZ =34m.7s., ipPZ =34m.16s.
Riverside eZ =34m.0s., iZ =34m.7s., and 34m.18s., eZ =34m.53s.
Fresno eZ =34m.0s. a, iZ =34m.7s., eZ =36m.55s.
Tinemaha ePZ =34m.2s., iZ =34m.10s., eZ =34m.22s.
Lick iPZ =34m.4s. a, iZ =34m.12s.
Tucson ePKP =34m.4s., i =34m.29s., e =35m.30s., ePP? =37m.56s.
Boulder City ePKP =34m.5s., e =34m.20s., ePP? =38m.0s.
Pierce Ferry ePKP =34m.5s., ePP? =38m.16s.
Overton iPKPZ =34m.6s., ePP?Z =38m.13s.
Hungry Horse iPKP =34m.8s., e =34m.46s., ePP? =38m.26s., e =38m.39s.
Reno eZ =34m.9s., eE =35m.5s., eN =35m.7s.
Palomar iN =34m.13s.
La Paz eZ =34m.15s., L =78m.30s.

April 7d. Readings also at 1h. (Paris and Rome), 2h. (Ivigtut and Stuttgart), 3h. (Andijan, near Kulyab, Murgab, and Obi-garm), 4h. (College, Hungry Horse, Rome, Istanbul, near Ksara, Helwan, and Leninakan), 5h. (Ashkabad, Boulder City, Pierce Ferry, and Hungry Horse), 6h. (Tucson, Boulder City, Overton, Pierce Ferry, Huancayo, La Paz, Balboa Heights, and near Bogota), 7h. (Obi-garm, near Kulyab and Stalinabad), 8h. (Askhabad, Bombay, Poona, and College), 10h. (Samarkand, Tashkent, near Andijan, Kulyab, Murgab, Obi-garm, and Stalinabad), 11h. (Clermont-Ferrand and near Zagreb), 12h. (College, Mizusawa, Almata, near Andijan, Kulyab (2), Murgab, Obi-garm, Samarkand, Stalinabad, Tashkent, Tchimkent, and near Triest), 13h. (near Ashkabad), 14h. (La Paz, Mount Wilson, Riverside, Tinemaha, Overton, and College), 15h. (near Zagreb), 16h. (Basle and Kew), 18h. (Durham and near Ashkabad), 19h. (Ashkabad, Hungry Horse, College, and near Ottawa), 21h. (La Plata, Santa Lucia, Overton, Tinemaha, Hungry Horse, near Tacubaya, and Puebla, Ashkabad, Stalinabad, near Kulyab, and Obi-garm), 22h. (Istanbul, Obi-garm, Samarkand, near Kulyab, Stalinabad, near Apia, Tinemaha, and near Shasta Dam (2)), 23h. (La Paz, Pierce Ferry, Shasta Dam, Ashkabad (2), Kulyab, and near Obi-garm).

April 8d. 1h. 4m. 28s. Epicentre 3°·1N. 127°·1E.

A = −·6023, B = +·7964, C = +·0537 ; δ = −10 ; h = +7 ;
D = +·798, E = +·603 ; G = −·032, H = +·043, K = −·999.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Batavia		22·3	246	e 6 11	+70	i 9 1	− 1	—	—
Brisbane	z.	39·4	142	i 8 22	PP	—	—	—	—
Irkutsk		52·6	343	9 18	0	16 45	+ 1	19 2	SeS
Murgab		59·8	314	e 9 59	−10	17 58	−22	—	—
Andijan		61·8	316	e 10 22	− 1	e 18 43	− 3	—	—
Kulyab		62·7	312	e 10 40	+11	—	—	—	—
Obi-garm		63·0	313	i 10 29	− 2	i 10 56	?	—	—
Stalinabad		63·6	313	i 10 33	− 2	i 19 6	− 2	—	—
Tchimkent		64·3	317	i 10 42?	+ 3	i 19 13?	− 4	—	—
Samarkand		65·3	313	e 10 47	+ 1	e 19 23	− 6	—	—
Sverdlovsk		74·7	329	11 41	− 2	21 13	− 6	—	—
College		85·1	26	e 12 39	0	—	—	—	—
Sotchi		86·0	313	e 12 49	+ 6	—	—	—	—
Moscow		87·2	326	e 12 50	+ 1	e 23 21	− 7	24 24	PS
Ksara		89·3	304	e 12 59	0	e 23 42	− 6	—	—
Shasta Dam		103·4	47	e 13 54	−10	—	—	—	—
Hungry Horse		106·4	37	e 14 33	P	—	—	—	—
Overton	z.	110·6	49	e 29 42	PPS	—	—	—	—

Additional readings :—
Brisbane iZ = 8m.43s.
Irkutsk eSS = 20m.32s.
College e = 15m.37s.
Long waves were recorded at Rome.

April 8d. 8h. 18m. 36s. Epicentre 8°·9N. 39°·8W. (as on 1949, Feb. 21d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Bogota		34·3	266	i 6 53	+ 3	e 12 19	+ 2	—	—
La Paz		37·7	228	i 7 16	− 3	i 13 3	− 7	—	—
Stuttgart	z.	57·0	37	e 9 46	− 4	—	—	—	—
Tucson		69·3	302	e 11 10	− 1	—	—	—	—
Logan		70·7	312	e 11 17	− 3	—	—	—	—
Pierce Ferry		72·1	305	i 11 28	0	—	—	—	—
Overton	z.	72·4	306	e 11 31	+ 1	—	—	—	—
Boulder City		72·7	305	i 11 37	+ 5	—	—	—	—
Hungry Horse		72·9	318	e 11 31	− 2	—	—	—	—
Ksara		73·2	57	e 11 34	− 1	—	—	e 14 17	PP
Palomar		74·4	302	i 11 47	+ 5	—	—	—	—
Riverside	z.	74·8	303	e 11 44	0	—	—	—	—
Mount Wilson	z.	75·5	303	e 11 49	+ 1	—	—	—	—
Tinemaha	z.	75·5	306	e 11 49	+ 1	—	—	—	—
Fresno	z.	76·7	306	e 11 55k	0	—	—	—	—
Mineral	z.	78·1	310	i 12 3k	+ 1	—	—	—	—
Shasta Dam		78·7	310	i 13 2	+56	—	—	—	—

April 8d. Readings also at 0h. (Hungry Horse), 1h. (near Tacubaya and near Kulyab), 3h. (Pierce Ferry, Shasta Dam, Hungry Horse, and College), 4h. (Istanbul, Hungry Horse, Shasta Dam, near College, and near Batavia), 5h. (New Delhi, Tashkent, Tchimkent, near Andijan, Murgab, Obi-garm, and near Santa Clara), 6h. (Boulder City, Shasta Dam (2), Hungry Horse (2), College (2), and near Apia), 7h. (Ashkabad), 8h. (2) and 10h. (near Andijan), 12h. (Ashkabad), 13h. (Overton (3), Pierce Ferry, Shasta Dam, Hungry Horse, La Paz, and Brisbane), 14h. (Pierce Ferry, Tucson, Hungry Horse, and near Tacubaya), 15h. (Raciborzu), 16h. (Pretoria, near Pavia, and near Ashkabad), 17h. (near Istanbul (3)), 21h. (Tucson), 22h. (near La Paz), 23h. (Ksara).

April 9d. 4h. 20m. 10s. Epicentre 5°·8N. 82°·7W. (as on 1946, July 12d.).

$A = +\cdot1264$, $B = -\cdot9869$, $C = +\cdot1004$; $\delta = +3$; $h = +7$;
$D = -\cdot992$, $E = -\cdot127$; $G = +\cdot013$, $H = -\cdot100$, $K = -\cdot995$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		4·4	45	i 1 10?	0	e 1 56	− 6	—	—	—
Bogota	z.	8·7	96	i 2 12	+ 2	—	—	—	—	—
Huancayo		19·2	158	i 4 28	0	i 8 7	+ 8	i 4 46	PP	e 8·3
San Juan		20·5	50	i 4 41	− 1	e 8 28	+ 1	e 5 20	PPP	e 10·0
Tacubaya		21·0	311	4 50	+ 3	e 9 5	SS	—	—	e 10·0
La Paz		26·5	147	i 5 37	− 4	i 10 46	+32	i 6 44	PPP	14·8
St. Louis		33·4	349	i 6 39	− 3	e 12 7	+ 4	—	—	—
Tucson		37·1	319	i 7 15	+ 1	—	—	e 8 43	PP	e 18·8
Weston		37·8	14	i 7 23	+ 3	—	—	—	—	—
Ottawa	z.	39·9	8	(7 35)	− 2	—	—	—	—	7·6
Pierce Ferry		41·6	321	i 7 52	+ 1	—	—	—	—	—
Palomar		41·9	316	i 7 55	+ 1	—	—	—	—	—
Boulder City		42·1	320	i 7 56	+ 1	—	—	—	—	—
Overton	z.	42·2	321	i 7 57	+ 1	—	—	—	—	—
Riverside	z.	42·6	316	e 8 1	+ 2	—	—	—	—	—
Pasadena	z.	43·3	316	i 8 6a	+ 1	—	—	—	—	—
Logan		44·2	329	e 8 9	− 3	—	—	e 9 57	PP	—
Tinemaha	z.	44·9	319	e 8 20	+ 2	—	—	—	—	—
Fresno	z.	45·8	318	e 8 25k	0	—	—	—	—	—
Lick	z.	47·4	317	i 8 38	0	—	—	—	—	—
Reno		47·4	321	e 8 36	− 2	—	—	—	—	—
Shasta Dam		49·6	320	e 9 6	+11	—	—	e 10 17	PcP	—
Hungry Horse		50·1	334	i 8 58	− 1	—	—	e 10 24	PcP	—
Granada		77·8	53	e 12 59a	+58	—	—	—	—	31·0
Stuttgart	z.	86·9	41	e 12 53	+ 5	—	—	—	—	—
Upsala		90·2	29	e 12 50?	−14	—	—	—	—	—

Additional readings :—
San Juan e = 6m.21s.
La Paz SS = 12m.50s.
Pasadena iZ = 8m.35s.
Long waves were also recorded at Bermuda, Chicago, Columbia, Philadelphia, Cleveland, and Seven Falls.

April 9d. 21h. New Zealand.

Christchurch eEN = 36m.40s., LZ = 40m.0s.
Tuai PN = 37m.1s., SN = 37m.52s.
Auckland eN = 38m.10s., SN = 39m.0s.
Wellington e = 38m.12s., S = 39m.2s., L? = 39m.59s.
Riverview iPEZ = 41m.15s.k, iPPZ = 41m.52s., ePPPZ = 42m.5s., iSE = 45m.36s., iE = 46m.23s., R = 47·6m.
Brisbane iPZ = 41m.17s., ePN = 41m.22s., iZ = 42m.8s., eE = 42m.44s., eSE = 45m.43s., iSSN = 46m.25s., eLN = 48m.20s.
Riverside ePZ = 48m.59s.
Ksara ePKP? = 55m.43s., ePP? = 59m.23s.
Helwan eZ = 55m.45s., 58m.6s., and 61m.42s.
Istanbul e = 55m.52s.
Long waves were also recorded at Tucson, Huancayo, Seven Falls, Rome, Alicante, and Granada.

April 9d. 23h. 55m. 28s. Epicentre 24°·9N. 63°·5E. (as on 1949, January 2d.).

Approximate.

A = +·4052, B = +·8127, C = +·4187; δ = −2; h = +3;
D = +·895, E = −·446; G = +·187, H = +·375, K = −·908.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
New Delhi		12·8	70	i 3 29	+23	i 5 48	+18
Obi-garm		14·7	19	i 3 45	+14	—	—
Samarkand		15·0	10	e 3 26	− 9	—	—
Murgab		16·1	31	e 3 57	+ 8	—	—
Tashkent		17·1	15	e 3 55	− 7	—	—
Andijan		17·4	23	e 3 51	−15	e 7 5	−14
Tchimkent		18·1	15	i 4 6?	− 8	i 7 16?	−19
Almata		21·4	27	e 5 0	+ 9	—	—
Helwan		28·9	288	e 6 23	+20	e 10 56	+ 3
Collmberg	E.	46·5	319	i 8 28	− 3	—	—
Copenhagen		48·1	324	8 40	− 3	—	—
Stuttgart	z.	48·4	315	i 8 42a	− 4	—	—
Zürich	z.	48·6	313	e 8 43a	− 4	—	—
Strasbourg		49·3	315	i 8 48	− 5	—	—
Paris		52·8	314	i 9 16	− 3	—	—
Hungry Horse		106·3	358	i 18 42	PP	—	—

Additional readings :—
New Delhi ePN = 3m.32s.
Collmberg eE = 8m.47s.
Paris i = 9m.37s.
Long waves were also recorded at Poona.

April 9d. Readings also at 1h. (Pretoria and Ashkabad), 6h. (Shasta Dam, Hungry Horse, and near Andijan), 7h. (Tucson, near Kulyab (2), Obi-garm, and Stalinabad), 8h. (Arapuni Auckland, Christchurch, Tuai, Wellington, Tucson, Mount Wilson, Riverside, Bombay, and Istanbul), 9h. (Obi-garm), 13h. (near Ashkabad), 14h. (Istanbul, Triest, Zagreb, Bucharest, Hungry Horse, and near Kulyab), 16h. (Bogota), 17h. (Overton and near Ashkabad), 19h. (near Samarkand, Stalinabad, Obi-garm, Kulyab, and near Ashkabad), 21h. (Tucson, Sofia, and near Ashkabad), 22h. (near Ashkabad), 23h. (Overton).

April 10d. 4h. 51m. 37s. Epicentre 53°·6N. 166°·6W. (as on 1942, December 9d.).

U.S.C.G.S. suggests depth 80km.

A = −·5798, B = −·1381, C = +·8030; δ = +5; h = −7;
D = −·232, E = +·973; G = −·781, H = −·186, K = −·596.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		14·7	33	e 3 28	− 3	i 6 9	− 7	—	—	e 6·6
Shasta Dam		32·2	96	i 6 31	− 1	—	—	i 6 49	pP	—
Hungry Horse		32·9	77	i 6 36	− 2	—	—	i 6 53	pP	—
Mineral	z.	32·9	95	i 6 38a	0	—	—	i 9 25	PcP	—
Reno		34·4	95	e 6 52	+ 1	—	—	—	—	—
Lick	z.	34·8	98	i 6 51a	− 3	i 9 31	PcP	i 7 15	pP	—
Fresno	z.	36·3	98	e 7 7a	0	—	—	—	—	—
Tinemaha		37·0	96	i 7 15	+ 2	i 9 38	PcP	i 7 31	pP	—
Pasadena	z.	39·0	100	i 7 32	+ 2	—	—	i 7 49	pP	—
Overton	z.	39·6	94	i 7 36	+ 1	i 13 27	−11	i 7 52	pP	—
Riverside	z.	39·6	100	e 7 36	+ 1	i 9 45	PP	i 7 53	pP	—
Boulder City		39·8	95	i 7 37	+ 1	e 13 27	−15	i 7 53	pP	—
Pierce Ferry		40·1	94	i 7 39	0	e 13 25	−21	i 7 56	pP	—
Palomar	z.	40·4	100	e 7 42	+ 1	—	—	e 8 1	pP	—
Tucson		44·7	95	i 8 17	+ 1	—	—	i 8 33	pP	—
Ottawa	z.	55·7	59	e 9 38	− 2	—	—	—	—	—
Weston		60·1	58	i 10 10	− 1	—	—	10 28	pP	—
Paris		77·5	9	e 12 3?	+ 4	—	—	—	—	—
Stuttgart		77·9	3	e 12 4	+ 3	—	—	—	—	—
Strasbourg		78·1	5	e 12 6	+ 4	—	—	—	—	—

For Notes see next page,

NOTES TO APRIL 10d. 4h. 51m. 37s.

Additional readings :—
College i = 3m.34s.
Shasta Dam, isP = 6m.59s., i = 9m.23s. and 12m.59s.
Hungry Horse iPP = 7m.27s., ipPP? = 7m.51s., i = 9m.20s.
Mineral iZ = 6m.55s. and 13m.1s.
Lick iZ = 9m.36s., 13m.8s., and 13m.13s.
Tinemaha iZ = 7m.53s. and 14m.16s.
Boulder City ipPP = 9m.12s., e = 9m.46s.
Long waves were also recorded at Philadelphia.

April 10d. 23h. 48m. 17s. Epicentre 25°·3S. 175°·4W.

A = −·9022, B = −·0726, C = −·4250 ; δ = −14 ; h = +3 ;
D = −·080, E = +·997 ; G = +·424, H = +·034, K = −·905.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		11·9	17	e 2 52	− 2	e 4 52	−17	—	—	e 5·0
Auckland	N.	14·2	214	3 21	− 3	7 4	L	—	—	(7·1)
Tuai	N.	14·9	203	3 38	+ 4	5 59	−21	—	—	—
Wellington		17·9	205	4 2	−10	i 7 34	+ 4	—	—	—
Kaimata	N.E.	20·3	209	4 45	+ 5	8 6	−17	—	—	—
Brisbane	Z.	28·3	259	i 5 57	0	—	—	—	—	—
Riverview		30·2	246	i 6 17a	+ 3	i 11 17	+ 4	i 7 18	PP	14·5
Batavia		76·3	270	i 11 52	0	i 21 38	+ 1	—	—	—
Punta Arenas	N.	78·3	144	—	—	—	—	e 34 5	Q	e 34·6
Berkeley		80·2	41	i 12 14k	0	—	—	i 14 47	PP	i 33·7
Lick	Z.	80·2	41	i 12 14k	0	—	—	i 14 47	PP	—
Pasadena		80·3	46	i 12 13k	− 1	e 23 1	PS	i 12 26	pP	e 37·0
Palomar	Z.	80·6	47	i 12 17k	+ 1	—	—	i 12 28	pP	—
Riverside	Z.	80·7	46	i 12 16k	0	—	—	i 12 27	pP	—
Fresno	√Z.	80·9	42	i 12 18k	+ 1	—	—	i 12 30k	pP	—
Shasta Dam		82·1	38	i 12 23	− 1	—	—	i 12 58	pP	—
Tinemaha		82·1	43	i 12 24k	0	—	—	i 12 36	pP	—
Boulder City		83·6	46	i 12 33	+ 2	—	—	—	—	—
Tucson		84·0	50	i 12 33	0	e 23 2	+ 5	e 24 3	PS	e 38·7
Pierce Ferry		84·2	46	i 12 35	+ 1	—	—	i 17 55	PPP	—
Tacubaya		86·4	68	i 13 5	+20	e 23 58	PS	—	—	—
Salt Lake City		88·3	43	e 13 2	+ 7	e 23 30	− 9	e 29 45	SS	e 44·3
Logan		88·9	43	e 12 53	− 5	e 23 17	[− 9]	—	—	e 43·0
Sitka		89·1	21	—	—	e 23 46	0	e 30 5	SS	e 37·5
Hungry Horse		91·6	36	i 13 9	− 1	—	—	e 30 29	PKKP	—
College		92·4	11	—	—	e 23 50	[+ 3]	—	—	e 41·0
Huancayo		93·8	105	e 21 25	?	e 24 36	+ 8	e 25 43	PS	e 38·4
St. Louis		101·8	53	—	—	e 24 28	[− 8]	e 32 22	SS	—
Bogota		102·2	90	e 27 19	PS	e 34 1	?	—	—	47·7
Cleveland		109·1	53	—	—	e 32 25	?	—	—	e 54·0
Philadelphia		113·3	56	—	—	e 35 27	SS	—	—	e 51·2
San Juan		114·6	80	e 19 35	PP	e 25 19	[−11]	e 28 49	PS	e 59·5
Seven Falls	E.	117·8	48	—	—	e 36 37	SS	—	—	61·7
Bermuda		119·8	66	e 30 18	PS	e 36 55	SS	—	—	e 61·3
Obi-garm		124·3	301	e 19 1	[0]	—	—	e 20 46	PP	—
Tashkent		124·8	304	i 20 52	PP	i 27 50	{+ 4}	e 30 52	PS	—
Stalinabad		125·0	301	e 19 3	[+ 1]	—	—	e 20 53	PP	—
Samarkand		126·4	301	e 19 11	[+ 6]	—	—	—	—	—
Sverdlovsk		129·3	324	e 19 9	[− 2]	e 22 32?	PKS	e 21 18	PP	—
Moscow		141·2	331	e 19 30	[− 3]	—	—	e 22 34	PP	—
Sotchi		146·1	312	20 3	[+22]	—	—	—	—	—
Theodosia		148·3	316	19 54	[+ 9]	—	—	—	—	—
Copenhagen		149·1	352	e 19 49	[+ 3]	—	—	—	—	89·7
Simferopol		149·2	317	19 54	[+ 8]	—	—	—	—	—
Yalta		149·4	316	19 49	[+ 3]	—	—	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		151·6	295	i 19 52	[+ 2]	—	—	23 37	PP	—
Potsdam	z.	152·2	350	i 19 53	[+ 2]	e 22 56	PKS	i 24 21	PP	e 35·8
Collmberg	z.	153·2	348	e 20 1	[+ 9]	—	—	e 20 13	PKP_2	—
De Bilt		153·2	359	i 19 53	[+ 1]	e 44 13	SSP	e 23 39	PP	e 81·7
Kew		153·6	7	e 19 48	[− 5]	e 34 6	PS	e 42 57	SS	e 79·7
Prague		154·1	346	e 20 4	[+11]	e 27 13	[+14]	e 24 13	PP	—
Istanbul		154·3	314	i 19 55	[+ 1]	e 27 29	[+30]	—	—	—
Cheb		154·5	349	e 23 47	PP	e 44 19	SSP	—	—	—
Helwan	z.	155·9	287	e 19 58	[+ 2]	26 55	[− 6]	24 1	PP	—
Stuttgart		156·3	353	e 19 57	[+ 1]	e 37 13	PPS	e 24 31	PP	e 86·7
Paris		156·5	4	e 19 52	[− 4]	e 26 46	[−15]	i 24 5	PP	e 84·7
Strasbourg		156·6	354	e 19 57	[0]	e 38 43	PPS	e 20 24	PKP_2	e 82·7
Belgrade		156·7	330	e 19 53 a	[− 4]	e 27 31	[+30]	e 34 29	PS	—
Zürich		157·7	353	e 20 3	[+ 5]	—	—	—	—	—
Triest		158·4	342	e 20 2	[+ 3]	—	—	—	—	e 87·7
Salo		159·2	347	e 20 6	[+ 6]	—	—	—	—	—
Clermont-Ferrand		159·5	4	i 20 5	[+ 5]	—	—	i 20 45	PKP_2	83·7
Padova		159·9	346	e 20 42	PKP_2	e 35 13	PS	e 24 41	PP	—
Bologna		160·1	346	e 20 13	[+12]	e 25 13	PP	e 36 43?	PPS	—
Rome		162·2	341	20 3k	[0]	e 35 1	PS	20 50	PKP_2	—
Toledo		163·7	25	e 21 8	PKP_2	—	—	—	—	—
Tortosa	E.	164·1	11	—	—	(e 30 43?)	{−50}	—	—	e 30·7
Granada		166·2	29	—	—	31 54	{+10}	45 23	SS	86·1
Malaga	z.	166·2	32	i 20 19k	[+12]	31 55	{+11}	21 19	PKP_2	90·0
Alicante		166·3	18	20 22	[+15]	—	—	—	—	e 79·1

Additional readings :—
Apia eEN =3m.26s.
Auckland iN =6m.43s.
Tuai SN =8m.33s.
Wellington e =4m.9s., i =5m.37s., P?Z =6m.43s., S =7m.7s., i =7m.11s., 8m.4s., and 8m.26s., e =8m.48s., S =9m.40s. Probably two shocks.
Kaimata eNE =5m.6s.
Riverview iZ =11m.35s.
Berkeley iZ =12m.19s.k and 12m.26s.k.
Lick iZ =12m.26s.k and 14m.52s.a.
Huancayo e =24m.46s., eSS =30m.51s.
San Juan eS? =27m.11s., eSS =35m.37s., eSSS =39m.59s.
Bermuda ePS =30m.41s., e =37m.23s.
Sverdlovsk eSS =38m.44s.
Copenhagen 19m.52s.
Kew eQEN =73·7m.
Cheb e =32m.13s., 32m.43s.?, 34m.13s., 41m.1s., and 48m.49s.
Helwan eZ =20m.11s., ePKP$_2$ =20m.27s., iZ =20m.52s., PSKSE =34m.28s., eZ =35m.43s.
Stuttgart ePKPZ =20m.0s., ePKP$_2$Z =20m.24s., ePPP =27m.33s., eSS =43m.7s.
Paris e =20m.4s., i =20m.15s., iPKP$_2$ =20m.26s., ePPP =27m.48s., ePPS? =37m.46s., eSS =43m.49s.
Strasbourg ePKP$_2$ =20m.28s., e =20m.33s., 20m.48s., 21m.14s., and 23m.13s., ePP =24m.5s. and 24m.20s., ePPP =27m.47s., ePPP(△ >180°) =33m.23s., eSKKS (△ >180°) =34m.49s., eSS =44m.29s., e =47m.13s., eSSS =50m.7s.
Belgrade e =20m.46s. and 22m.35s.
Salo e =21m.16s. and 21m.41s.
Clermont-Ferrand iPP =24m.26s., iPPP =28m.16s.
Rome ePP =24m.37s., eSS =45m.6s.
Malaga PPZ =25m.9s., PPPZ =28m.57s., P$_c$P,PKP$_2$Z =30m.33s.
Long waves were also recorded at Honolulu, La Paz, Tananarive, Almeria, Aberdeen, and other American stations.

April 10d. Readings also at 2h. (Riverside, Tinemaha, Tucson, Boulder City, Overton, and Pierce Ferry), 6h. (Mount Wilson, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, and Shasta Dam), 8h. (near Batavia), 9h. (near Pavia), 10h. (Stuttgart and near Zürich), 11h. (near Boulder City, Overton, Pierce Ferry, and Hungry Horse), 12h. (Overton, De Bilt, Paris, Strasbourg, Stuttgart, Rome, Alicante, Almeria, Malaga, near Andijan, and near Irkutsk), 13h. (Rome, near Andijan, Stalinabad, Kulyab, Murgab, and Obi-garm), 14h. (New Delhi and near Leninakan), 15h. (Bermuda, Boulder City, Overton, and Pierce Ferry), 16h. (Hungry Horse, near Andijan, Murgab, Obi-garm, and Stalinabad), 17h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry (2), Fresno, Berkeley, Lick, Reno, Shasta Dam, Hungry Horse (2), Logan, New Delhi, Obi-garm (2), Samarkand, near Andijan, Kulyab, Murgab, Tashkent, and near Mizusawa), 18h. (Pierce Ferry, Hungry Horse, Huancayo, New Delhi, and Klyuchi), 21h. (near Kulyab), 23h. (Hungry Horse and near Apia).

April 11d. Readings also at 0h. (Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Logan, and near Zagreb), 1h. (Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Lick, Shasta Dam, Hungry Horse, and Rome), 4h. (Klyuchi (2)), 5h. (Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 6h. (Boulder City, Overton, Pierce Ferry, and Hungry Horse), 7h. (Overton and near Ashkabad), 8h. (Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Pretoria, and near Apia), 9h. (Tucson and near Copiapo), 10h. (Overton (2), Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Murgab, near Obi-garm, Stalinabad, Jena, near Collmberg and Stuttgart), 11h. (Mizusawa and Zürich), 12h. (near Ashkabad (3)), 13h. (Chur), 14h. (Overton and Pavia), 15h. (Ksara and Helwan), 16h. (Boulder City, Overton, Pierce Ferry, and Hungry Horse), 17h. (Boulder City, Pierce Ferry, Obi-garm, Tchimkent, near Andijan, and near Ashkabad), 18h. (Auckland, Wellington, Stuttgart, Pasadena, Palomar, Riverside, Tinemaha, Tucson (2), Boulder City, Overton (3), Pierce Ferry (2), Lick, Hungry Horse (2), Logan, and near Fresno), 19h. (Ashkabad, Boulder City, Overton, Pierce Ferry, and Hungry Horse), 21h. (Boulder City, Overton, Pierce Ferry, Shasta Dam, Samarkand, near Obi-garm, Stalinabad, and Kulyab), 22h. (Overton).

April 12d. Readings at 2h. (Boulder City, Hungry Horse, Overton, Pierce Ferry, Shasta Dam, Tucson (2), Pasadena, Mount Wilson, Riverside (2), Palomar, Tinemaha (2), Lick, and near Klyuchi), 3h. (Tucson, Mount Wilson, Riverside, and Palomar), 5h. (Boulder City, Bozeman, College, Hungry Horse, Overton, Pierce Ferry, Tucson, Pasadena, Palomar, Riverside, Tinemaha, Lick, Weston, Ottawa, Seven Falls, Shawinigan Falls, and near Ashkabad), 6h. (Boulder City, Hungry Horse, Overton, Pierce Ferry (2), Shasta Dam, Tucson, Upsala, and near Istanbul), 7h. (Boulder City (2), Hungry Horse (3), Overton, Pierce Ferry (3), Tucson (2), Mount Wilson, Palomar, Riverside (2), and Tinemaha (2), 9h. (Apia, Samarkand, near Obi-garm and Stalinabad), 10h. (Apia, Auckland, Wellington, Boulder City (2), College (2), Hungry Horse, Overton (2), Philadelphia, Pierce Ferry (2), Shasta Dam, Tucson, Pasadena, Palomar, Riverside, Tinemaha, Berkeley, Lick, Ksara, Stuttgart, Strasbourg, Huancayo, near Bogota, and near Andijan), 11h. (Istanbul and Malaga), 15h. (Boulder City, Pierce Ferry, Tucson, Palomar, and Klyuchi), 17h. (Pasadena, Boulder City, Hungry Horse, Philadelphia, Pierce Ferry, Rapid City, Salt Lake City, Seattle, Tucson, Ukiah, San Juan, Huancayo, Tacubaya, Merida, Manzanillo, Puebla, Bogota, and Victoria), 18h. (La Paz and Cleveland), 21h. (near Obi-garm, Stalinabad, Murgab, and Samarkand), 22h. (Fresno), 23h. (New Delhi, College, Logan, Tucson, San Juan, Ashkabad, Tchimkent, near Obi-garm, Stalinabad, Murgab, Andijan, Samarkand, and Tashkent).

April 13d. 7h. 58m. 25s. Epicentre 37°·5N, 118°·5W. (as on 1948, Aug. 6d.).

$A = -\cdot3795$, $B = -\cdot6989$, $C = +\cdot6062$; $\delta = -4$; $h = -1$;
$D = -\cdot879$, $E = +\cdot477$; $G = -\cdot289$, $H = -\cdot533$, $K = -\cdot795$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fresno		1·3	233	i 0 21 a	− 4	i 0 42	− 2	—	—	—
Reno		2·3	334	i 0 40	0	i 1 10	+ 1	i 0 43	P*	—
Lick		2·5	266	i 0 41 a	− 2	i 1 11	− 3	i 0 47	P*	—
Branner	E.	2·9	268	i 0 46	− 2	e 1 20	− 4	—	—	—
Berkeley		3·0	277	i 0 47 a	− 3	i 1 29	+ 2	e 0 51	P*	—
San Francisco		3·2	275	i 0 58	P*	i 1 27	− 5	i 1 31	S*	—
Boulder City		3·3	117	i 0 47	− 6	—	—	—	—	i 1·7
Mineral		3·7	320	i 1 8	P*	i 1 55	S*	—	—	—
Shasta Dam		4·4	318	i 1 8	− 2	—	—	e 1 19	P*	i 2·3
Salt Lake City		6·1	55	e 1 40	+ 6	e 2 56	S*	—	—	e 3·4
Logan		6·7	48	e 1 43	+ 1	e 2 51	− 9	—	—	e 3·5
Tucson		8·2	128	e 2 6	+ 3	e 3 43	+ 5	i 2 36	P_g	e 4·0
Hungry Horse		11·3	15	i 2 42	− 4	—	—	i 2 54	PP	e 5·9

Additional readings :—
Fresno iN = 0m.34s., iSN = 0m.36s.
Reno iE = 1m.28s.
Berkeley iE = 1m.24s.
Tucson eS = 3m.21s.
Long waves were also recorded at Bozeman and Ukiah.

April 13d. 15h. 12m. 54s. Epicentre 10°·5N. 41°·0W.
(not intended as an approximate determination).

A = +·7423, B = −·6452, C = +·1811; δ = +9; h = +6;
D = −·656, E = −·755; G = +·137, H = −·119, K = −·984.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		20·1	283	e 4 36	− 2	e 8 24	+ 5	—	—	—
San Juan		25·5	291	e 5 36	+ 4	e 9 55	− 2	—	—	i 10·3
Bogota		33·3	263	e 6 46	+ 5	i 12 4	+ 2	e 8 16	PPP	—
La Paz		38·0	225	7 24	+ 3	i 13 20	+ 6	—	—	19·1
Huancayo		40·8	237	e 7 43	− 2	e 13 53	− 3	e 9 24	PP	e 20·1
Weston		41·4	327	e 7 47	− 3	e 14 2	− 3	—	—	—
Harvard		41·6	327	i 7 51	0	—	—	—	—	e 18·6
Malaga	N.	42·1	46	8 0	+ 5	14 16	0	—	—	—
Philadelphia		42·2	320	—	—	e 14 15	− 2	—	—	e 17·5
Granada		42·9	46	i 8 16k	+14	i 14 34	+ 7	18 4	SS	20·3
Almeria		43·5	47	i 8 7	0	i 14 41	+ 5	9 55	PP	24·4
Toledo	z.	43·9	43	i 8 15	+ 5	e 14 42	0	—	—	21·9
Alicante		45·6	46	8 18	− 6	15 2	− 4	10 12	PP	e 21·9
Cleveland		47·1	319	i 8 41	+ 6	e 15 23	− 5	e 18 53	SS	—
Tortosa		47·4	44	8 37	− 1	15 36	+ 4	10 24	PP	e 23·1
Chicago		51·3	317	e 9 35	+27	e 16 19	− 7	—	—	e 22·3
Clermont-Ferrand		51·4	39	i 9 7	− 2	i 16 35	+ 7	i 11 3	PP	23·8
St. Louis		52·0	312	e 9 10	− 3	e 16 38	+ 2	—	—	—
Kew		52·6	31	e 9 8	−10	e 16 47	+ 3	—	—	e 23·1
Paris		52·6	36	i 9 17	− 1	e 16 49	+ 5	—	—	e 24·1
Strasbourg		55·5	38	e 9 38	− 1	e 17 28	+ 4	e 10 42	PcP	26·1
De Bilt		55·8	33	—	—	e 17 30	+ 2	i 17 37	PS	e 26·1
Florence		55·9	44	e 9 42	0	e 17 7	−22	—	—	—
Salo		56·0	43	e 10 10	+27	e 18 24	+54	—	—	—
Rome		56·1	47	e 9 42a	− 1	e 17 35	+ 3	e 10 55	PcP	e 27·8
Bologna		56·2	43	e 9 49	+ 5	e 17 52	PPS	—	—	—
Stuttgart		56·5	38	e 9 44	− 2	e 17 41	+ 4	e 26 6?	Q	28·1
Triest		58·2	42	e 9 57?	− 1	e 17 43	−16	—	—	—
Copenhagen		61·3	31	10 26	+ 6	18 48	+ 9	—	—	29·1
Tucson		67·5	301	i 10 57	− 3	—	—	—	—	—
Istanbul		68·3	50	e 11 8	+ 3	—	—	—	—	—
Logan		68·8	312	e 11 4	− 4	—	—	—	—	—
Helwan	z.	69·5	63	e 11 14	+ 2	—	—	e 13 50	PP	—
Hungry Horse		70·9	318	i 11 19	− 2	—	—	i 11 51	PcP	—
Yalta		72·1	47	e 11 26	− 2	—	—	—	—	—
Palomar		72·5	302	i 11 32	+ 2	—	—	—	—	—
Riverside	z.	72·9	303	i 11 32	− 1	—	—	—	—	—
Ksara		73·4	58	e 10 40	−56	e 20 41	−24	—	—	—
Pasadena	z.	73·6	303	i 11 35	− 2	—	—	—	—	—
Moscow		75·0	35	e 11 46	+ 1	e 21 23	0	—	—	—
Lick	z.	76·3	307	i 11 53a	+ 1	—	—	—	—	—
Shasta Dam		76·7	310	i 11 52	− 3	—	—	—	—	—
College		87·6	337	e 12 52	+ 1	—	—	—	—	—
Sverdlovsk		87·6	33	e 12 59	+ 8	23 25	{+ 1}	e 24 33	PS	—

Additional readings :—
Bogota iS_cP = 13m.41s., eSS = 15m.51s., eS_cSEN = 18m.4s.
Almeria PPP = 10m.31s., P_cS = 13m.43s., S_cS = 18m.3s.
Alicante PS = 15m.10s., PPS = 15m.21s., SS = 18m.14s.
Cleveland eE = 15m.40s.
Tortosa SSS?E = 20m.46s.
Paris i = 9m.28s. and 9m.55s.
Strasbourg e = 10m.13s., ePP? = 12m.12s., eS = 17m.19s.
Rome e = 25m.57s.
Helwan iZ = 11m.22s., eZ = 18m.8s.
Long waves were also recorded at Victoria, Sitka, Scoresby Sund, and Potsdam,

April 13d. 19h. 55m. 36s. Epicentre 47°·3N. 122°·9W. (as on 1946, Feb. 15d.).

Epicentre 47°·1N. 122°·7W. (U.S.C.G.S.). Magnitude 7·1. Depth slightly greater than normal. Macroseismic area 150,000 sq. miles.

Intensity VIII within a radius of 65km. of the epicentre. 8 killed and hurt, considerable damage (more than 25,000,000 dollars); gas, water, electricity, and telephones cut off; railways out of service, bridges displaced; displacement of a block of rock 100m. thick, for a distance of nearly 1km.

L. M. Murphy and F. P. Ulrich.
United States Earthquakes, 1949, Serial No. 748, Washington, 1951, pp. 20-28, with macroseismic chart, p. 20.

O. W. Nuttli.
The Western Washington Earthquake of April 13th, 1949. Bulletin of the Seismological Society of America, Vol. 42, No. 1, January, 1952, pp. 21-28, 3 figs and 2 tables. Epicentre given as 47°10′N. 122°37′W.

$A = -\cdot3697$, $B = -\cdot5715$, $C = +\cdot7326$; $\delta = -1$; $h = +4$;
$D = -\cdot840$, $E = +\cdot543$; $G = -\cdot398$, $H = -\cdot615$, $K = -\cdot681$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seattle		0·5	49	i 0 30	S	(i 0 30)	+ 7	—	—	—
Victoria		1·3	344	i 0 32a	P_g	0 51	+ 7	—	—	—
Hungry Horse		6·1	76	i 1 29	− 5	—	—	i 1 33	P	—
Arcata		6·5	189	i 1 39	0	—	—	i 2 9	P_g	—
Shasta Dam		6·6	177	i 1 40	− 1	—	—	—	—	—
Ferndale		6·8	189	i 1 50	+ 6	i 3 9	+ 6	—	—	—
Mineral		7·0	172	i 1 47	+ 1	i 3 31	+23	i 2 0	P*	—
Butte	N.	7·2	96	i 1 50	+ 1	—	—	i 2 5	P*	i 3·6
Reno		8·0	163	i 2 3a	+ 3	—	—	—	—	—
Ukiah		8·2	182	e 2 1	− 2	i 3 27	−11	i 2 36	P_g	i 3·7
Bozeman		8·3	97	i 2 5	+ 1	i 3 30	−10	—	—	i 4·0
Berkeley		9·4	177	i 2 21a	+ 3	—	—	i 2 29	PP	i 4·6
San Francisco		9·5	178	i 2 22	+ 2	i 4 33	SSS	i 2 25	P	—
Logan		9·7	121	e 2 21	− 1	i 4 18	+ 3	—	—	i 5·0
Branner		9·9	177	i 2 27	+ 2	e 4 36	SS	e 2 30	P	—
Lick	Z.	10·0	174	i 2 28	+ 1	—	—	—	—	—
Santa Clara		10·0	176	i 2 28	+ 1	e 4 13	− 9	e 3 3	?	e 5·0
Salt Lake City		10·3	125	i 2 14	−18	i 4 2	−28	—	—	—
Fresno		10·8	167	e 2 38	− 1	—	—	i 2 56	PPP	—
Tinemaha		10·8	160	i 2 40a	+ 1	i 5 56	L	—	—	(i 5·9)
Overton	Z.	12·5	147	e 3 1	− 1	—	—	—	—	—
Sitka		12·7	328	i 3 8	+ 3	i 5 37	+ 9	—	—	i 6·0
Boulder City		12·8	149	i 3 5	− 1	—	—	—	—	e 5·7
Pasadena		13·6	163	i 3 16a	− 1	i 5 54	+ 4	—	—	—
Riverside		13·9	161	i 3 21a	0	i 6 12	SS	i 7 40	?	—
Rapid City	E.	14·1	96	i 3 24	+ 1	i 6 19	SS	i 3 42	PPP	i 6·9
Palomar		14·7	160	i 3 32	+ 1	i 8 22	?	—	—	—
Tucson		17·6	145	i 4 8	0	i 7 23	0	i 4 20	PP	i 7·7
Lincoln	E.	19·9	99	i 4 32	− 4	e 8 12	− 3	—	—	i 10·0
Lubbock		21·0	122	4 48	+ 1	—	—	—	—	—
College		22·3	331	i 5 3	+ 2	i 9 9	+ 7	i 5 21	PP	i 9·7
Chihuahua		22·8	139	e 4 54	−11	e 9 2	− 9	e 9 52	SS	—
St. Louis		25·3	98	i 5 24	− 6	i 9 53	− 1	i 6 1	PP	i 12·5
Chicago		25·6	89	i 5 27	− 5	e 9 50	− 9	e 6 27	PPP	e 11·0
Little Rock		26·0	108	i 5 29	− 7	i 9 57	− 9	—	—	—
Cincinnati		28·9	91	i 5 57	− 6	e 10 42	−11	i 6 49	PP	—
Temiskaming		29·6	74	6 4	− 5	10 42	−22	6 42	PP	15·1
Cleveland		29·9	86	i 6 7	− 5	i 10 56	−13	i 7 2	PP	e 13·6
Hamilton		30·3	81	—	—	11 12	− 3	—	—	15·4
Rolphton		30·7	76	5 56	−23	—	—	6 44	PP	13·9
Guadalajara		30·9	142	e 6 17	− 3	e 11 24	0	—	—	e 15·0
Buffalo		31·1	81	i 6 19	− 3	i 11 18	−10	—	—	—
Mobile		31·4	109	i 6 22	− 3	i 11 27	− 5	—	—	—
New Kensington	E.	31·5	85	e 6 23	− 3	e 11 23	−11	—	—	e 13·6
Manzanillo		32·0	145	e 7 27	PP	e 11 39	− 3	—	—	e 14·4

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pennsylvania	E.	32·6	84	i 6 31	− 4	—	—	i 7 21	PP	—
Shawinigan Falls	N.	33·8	71	6 41	− 5	12 1	− 9	7 44	PP	15·7
Tacubaya		33·9	136	i 6 45	− 2	e 12 9	− 2	i 14 13	SS	—
Columbia		34·0	97	e 6 43	− 5	e 11 54	−19	e 8 4	PP	e 13·7
Puebla		34·7	135	e 6 48	− 6	e 12 10	−14	e 14 42	SS	—
Seven Falls	E.	34·8	69	6 50	− 4	12 16	− 9	8 0	PP	17·3
Philadelphia		34·9	84	i 6 50	− 5	i 12 14	−13	i 7 53	PP	e 14·7
Fordham		35·3	81	i 6 54	− 5	i 12 32	− 1	i 8 3	PP	i 17·1
City College	N.Y.	35·3	81	i 6 53	− 6	e 12 48	+15	i 8 6	PP	e 15·2
Harvard		36·1	78	i 7 2	− 3	e 12 32	−13	e 8 20	PP	e 17·4
Weston		36·4	78	i 7 3	− 5	12 40	−10	i 9 32	P_cP	—
Oaxaca		37·1	134	e 7 7	− 7	e 12 55	− 6	—	—	e 17·0
Honolulu		38·3	239	e 7 28	+ 4	e 13 26	+ 7	e 8 46	PP	e 15·9
Halifax		40·4	71	7 38	− 3	13 43	− 7	9 12	PP	19·6
Ivigtut		43·3	43	i 8 2	− 3	i 14 29	− 4	e 9 46	PP	20·4
Klyuchi		45·7	312	8 5	−19	—	—	10 35	PP	—
Bermuda		46·1	87	i 8 34	+ 6	i 15 16	+ 2	i 10 32	PP	e 19·6
Scoresby Sund		49·7	26	8 56	0	16 5	+ 1	10 14	P_cP	22·4
Balboa Heights		53·0	121	e 9 43	+22	—	—	—	—	—
Reykjavik		53·0	32	e 9 20	− 1	—	—	—	—	e 25·3
San Juan		54·3	101	e 9 26	− 4	e 16 56	−11	e 10 26	P_cP	e 22·1
Bogota		59·7	119	i 10 7	− 2	i 18 13	− 6	i 12 35	PP	27·9
Fort de France		60·2	100	i 10 7	− 5	e 18 15	−10	e 13 23	?	—
Mori		64·4	305	9 45	−55	—	—	—	—	—
Bergen		64·7	25	i 10 48	+ 6	19 24?	+ 2	11 10	pP	26·9
Aberdeen	E.	64·9	31	i 10 46	+ 3	i 19 19	− 5	e 24 5	SS	e 26·8
Edinburgh		65·4	32	e 10 46	− 1	i 19 27	− 3	20 30	S_cS	—
Mizusawa		66·1	302	10 54	+ 3	e 11 49	?	—	—	—
Rathfarnham Castle		66·2	36	e 10 46	− 6	i 18 13	−87	—	—	—
Durham		66·9	33	i 11 5	+ 9	i 19 50	+ 1	i 11 31	P_cP	—
Upsala		68·4	20	i 11 4k	− 2	20 4	− 3	13 39	PP	e 30·4
Tokyo		69·2	300	e 11 11	+ 1	20 15	− 1	—	—	—
Helsinki		69·7	17	i 11 14	0	i 20 21	− 1	—	—	e 31·4
Kew		70·0	34	i 11 15	0	i 20 23	− 3	e 14 3	PP	e 30·4
Osima		70·1	300	11 15	− 1	—	—	—	—	—
Copenhagen		70·8	25	11 20k	0	i 20 35	0	e 11 38	P_cP	30·4
Jersey	E.	71·1	37	e 11 27	+ 5	e 20 36	− 2	e 21 25	S_cS	—
De Bilt		71·5	330	e 11 25k	+ 1	i 20 44	+ 1	i 11 56	pP	e 31·4
Huancayo		72·7	130	i 11 31	− 1	i 20 53	− 4	e 14 4	PP	e 28·8
Irkutsk		72·9	332	11 34	+ 1	21 0	+ 1	—	—	—
Paris		73·2	34	i 11 35	0	i 21 1	− 1	i 14 23	PP	e 35·4
Potsdam		73·8	26	i 11 38k	0	i 21 8	− 1	e 14 27	PP	e 29·5
Koti		74·4	302	11 46	+ 4	—	—	—	—	—
Jena		74·6	27	e 11 43	0	e 21 16	− 2	e 15 10	?	—
Collmberg		74·7	27	e 11 43	0	e 21 16	− 3	i 12 2	P_cP	—
Apia		74·9	228	e 11 44	0	e 21 37	+15	—	—	e 33·4
Strasbourg		75·3	31	i 11 47	0	i 21 24	− 2	i 14 33	PP	33·7
Cheb		75·6	28	e 11 51	+ 3	e 21 31	+ 3	—	—	—
Stuttgart		75·7	30	e 11 49a	0	i 21 29	− 1	i 11 58	P_cP	36·4
Clermont-Ferrand		75·9	35	i 11 50	0	i 21 31	− 1	i 12 2	P_cP	36·4
Lisbon		76·0	47	i 11 49a	− 2	i 21 29	− 5	i 12 19a	pP	35·7
Moscow		76·0	12	i 11 51	0	i 21 32	− 2	—	—	—
Hukuoka		76·1	304	e 11 52	+ 1	21 31	− 4	—	—	—
Basle		76·1	32	e 11 51a	0	e 21 34	− 1	—	—	—
Prague		76·2	26	11 51	− 1	e 21 32	− 4	e 14 39	PP	e 31·4
Sverdlovsk		76·2	358	i 11 52	0	i 21 32	− 4	—	—	—
Neuchatel		76·4	32	e 11 53	0	—	—	—	—	—
Zürich		76·7	31	e 11 54a	− 1	e 21 37	− 4	e 14 36	PP	—
Raciborzu		77·3	24	e 11 58	0	e 21 49	+ 1	—	—	—
Chur		77·4	31	e 11 59a	+ 1	e 21 48	− 1	—	—	e 35·2
Toledo	z.	77·6	43	i 11 59	− 1	e 21 51	0	i 12 7	P_cP	37·3
Skalnate Pleso		78·7	23	e 12 9	+ 3	e 22 4	+ 1	—	—	—
Pavia		78·7	32	e 12 8	+ 2	—	—	e 13 8	?	—
Salo		78·9	31	12 6a	− 1	22 2	− 3	22 36	PS	—
Tortosa		78·9	40	i 12 8	+ 1	i 21 57	− 8	15 10	PP	42·2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Barcelona		79·1	38	e 12 7	− 1	22 5	− 2	22 48	PS	32·8
Ogyalla		79·3	25	e 12 14	+ 5	e 22 4	− 5	—	—	—
Granada		79·9	45	12 15k	+ 3	i 22 15	− 1	15 24	PP	38·8
Triest		79·9	29	i 12 13k	+ 1	i 22 12	− 4	i 12 40k	pP	33·1
Malaga	z.	79·9	46	i 12 14k	+ 2	i 22 16	0	12 32	pP	38·2
Budapest		79·9	25	12 14	+ 2	e 22 16	0	15 43	PP	e 32·4
Bologna		80·1	32	e 12 16	+ 3	e 22 20	+ 2	e 22 44	PS	e 37·4
La Paz		80·2	126	i 12 13	− 1	i 22 10	− 9	i 12 17	pP	—
Padova		80·3	31	12 14	0	22 17	− 3	e 12 42	pP	—
Alicante		80·4	42	i 12 19	+ 4	i 22 20	− 1	12 30	pP	e 37·6
Zagreb		80·5	27	e 12 16	+ 1	e 23 23	+61	e 12 23	P_cP	e 35·4
Semipalatinsk		80·6	345	e 12 15	− 1	—	—	—	—	—
Almeria		80·7	44	i 12 18	+ 2	i 22 18	− 6	12 30	pP	34·1
Florence		80·7	31	e 12 16a	0	i 22 22	− 2	e 15 27	PP	e 39·1
Kalossa		80·8	25	e 12 20	+ 3	e 22 24	− 1	e 23 54	PPS	—
Prato		81·6	31	i 12 17	− 4	i 22 20	−13	—	—	—
Rome		82·8	32	e 12 27a	0	i 22 47	+ 2	15 38	PP	i 36·9
Belgrade		82·8	25	i 12 28a	+ 1	i 22 44	− 1	e 15 40	PP	e 33·5
Algiers		83·3	41	i 12 33	+ 3	i 22 50	0	i 15 42	PP	39·4
Bucharest		84·7	22	e 12 40	+ 3	e 22 55	− 9	e 15 40	PP	39·4
Sofia		85·5	24	e 12 32	− 9	e 22 41	−31	—	—	—
Taranto		85·7	29	12 39?	− 3	23 1	[− 4]	—	—	e 39·7
Simferopol		85·9	17	12 46	+ 3	23 5	[− 2]	—	—	—
Theodosia		86·1	16	e 12 34	−10	23 16	− 2	—	—	—
Yalta		86·4	17	12 45?	0	23 7?	[− 3]	—	—	—
Copiapo	N.	88·1	134	—	—	23 24?	[+ 3]	—	—	—
Almata		88·1	346	12 54	0	—	—	—	—	—
Sotchi		88·2	13	i 12 55?	+ 1	i 23 20?	[− 2]	—	—	—
Piatigorsk		88·2	11	12 54	0	—	—	—	—	—
Istanbul		88·6	21	i 12 57	+ 1	—	—	i 16 27	PP	—
Frunse		88·9	347	i 13 6?	+ 8	—	—	—	—	—
Grozny		89·2	8	13 2	+ 3	—	—	—	—	—
Tchimkent		90·1	351	i 13 5	+ 2	i 23 53	− 2	—	—	—
Tashkent		91·1	351	i 13 9	+ 1	i 24 1	− 3	—	—	—
Leninakan		91·5	10	13 16?	+ 6	23 44?	[+ 2]	—	—	—
Erevan		92·2	9	e 13 13	0	23 45	[− 1]	—	—	—
Santa Lucia	N.	93·0	138	e 12 48	−29	24 34	+13	—	—	40·4
Samarkand		93·0	352	i 13 15	− 2	—	—	—	—	—
Murgab		93·4	346	13 20	+ 2	24 21	− 3	—	—	—
Obi-garm		93·6	349	i 13 20	+ 1	—	—	—	—	—
Ashkabad		95·1	358	e 13 28	+ 2	—	—	—	—	—
Ksara		97·0	18	i 13 36	+ 1	26 16	PS	—	—	—
Helwan		99·8	22	13 48	+ 1	i 24 22	[− 4]	e 19 33	PP	—
La Plata		100·4	130	15 36	?	24 17	[−12]	26 48	PS	48·7
Auckland	N.	100·6	226	—	—	25 2	{+ 4}	27 14	PS	47·4
New Delhi	N.	102·3	342	e 13 58	− 1	i 24 40	[+ 2]	18 10	PP	—
Wellington		104·1	224	—	—	e 24 44	[− 2]	27 52	PS	47·4
Calcutta	E.	105·0	330	e 19 3	PP	e 24 58	[+ 7]	—	—	—
Brisbane	Z.	105·9	247	i 14 17	+ 2	i 24 50	[− 5]	i 18 34	PP	—
Christchurch		106·8	223	14 26	P	25 30	{−13}	18 26	PP	—
Riverview		111·5	243	e 14 35	P	e 25 8	[−10]	e 19 20	PP	e 47·0
Bombay		112·6	343	e 19 17	PP	e 27 4	{−19}	28 58	PS	47·3
Poona	E.	112·8	342	e 19 20	PP	e 27 3	{−22}	e 21 13	PPP	54·4
Kodaikanal	E.	119·9	337	e 14 54	P	—	—	—	—	—
Colombo	E.	122·4	333	e 21 30	?	(37 7)	SS	—	—	37·1
Tananarive		150·6	19	19 53	[+ 5]	30 21	{− 1}	42 49	SS	79·4

Additional readings :—
Arcata i = 1m.46s., iZ = 1m.58s., iE = 2m.2s., iNZ = 2m.6s.
Ferndale iPE = 1m.54s., iN = 2m.26s., iE = 2m.30s.
Mineral iE = 1m.53s.
Ukiah e = 2m.13s.
Berkeley iE = 2m.34s., 2m.39s., 2m.50s., 2m.56s., 3m.16s., and 3m.31s.
Logan i = 2m.49s. and 2m.56s.
Sitka i = 3m.35s., e = 4m.4s. and i = 4m.59s.
Tucson i = 4m.59s. and 5m.33s.
College iPP = 5m.43s., $iP_cP?$ = 8m.18s.
Chihuahua eS = 8m.58s.

Continued on next page.

St. Louis i = 5m.42s., 7m.14s., 9m.3s., and 9m.56s.
Chicago eP_cP = 8m.45s.
Little Rock iS = 9m.54s.
Cincinnati i = 6m.22s., iPP = 6m.39s., iSS = 11m.46s.
Cleveland ePP = 6m.49s., iN = 11m.22s.
Fordham i = 12m.22s.
Tacubaya iP = 6m.50s., e = 12m.44s., iSS = 14m.23s., i = 14m.37s.
Columbia e = 11m.39s.
Seven Falls SSE = 15m.18s.
City College, N.Y., i = 7m.45s., eS = 13m.18s.
Honolulu e = 7m.47s., eP_cP = 9m.16s.
Halifax e = 8m.12s., SSS = 16m.48s.
Ivigtut e = 10m.14s., SS = 17m.24s., S_cS = 17m.58s.
Bermuda ePPP? = 11m.32s., eSS = 18m.29s.
Scoresby Sund 10m.42s., 11m.54s., 18m.44s., and 20m.12s.
San Juan e = 9m.54s., ePP = 11m.19s., ePPP = 12m.36s., iS = 17m.0s., eSS? = 20m.52s.
Bogota iP_cP = 11m.6s., iPPPEN = 13m.29s., iPPPS = 18m.39s., iS_cSEN = 19m.22s., eSKKSEN = 24m.34s.
Bergen S_cSN = 20m.35s., SSN = 23m.34s.
Edinburgh PS = 20m.3s.
Upsala iP_cS?N = 15m.49s., iP_cS?E = 15m.53s., eE = 19m.52s., PS?N = 20m.34s., PPSE = 20m.39s., eSS?E = 24m.8s., eSSN = 24m.24s., eSSS? = 27m.24s.?
Kew eP_cPZ = 11m.26s., ePPP = 15m.11s., ePSEN = 21m.13s., eN = 23m.3s., eSS = 25m.23s., eSSS = 27m.59s.
Copenhagen 25m.2s., PKP,PKP = 39m.10s.
De Bilt esS? = 22m.1s., eSS = 24m.54s., eSSS = 28m.24s.?
Huancayo e = 14m.31s., eS = 20m.37s., i = 24m.42s.
Paris iP = 11m.38s., iPPP = 16m.15s., iPS = 21m.21s., iSKS? = 21m.26s. and 21m.31s., iPPS = 21m.49s., iSS = 26m.11s., eSSS = 29m.0s., eQ = 31·4m., ePKP,PKP = 39m.10s., and other unidentified readings.
Potsdam eE = 11m.41s. and 12m.41s., iZ = 21m.36s.
Collmberg iE = 11m.47s., eE = 12m.30s., eZ = 21m.39s., eE = 21m.49s.
Strasbourg iP_cP = 12m.7s., ePPP = 16m.26s. and 16m.31s., ePS = 21m.43s., ePPS? = 22m.0s., ePPS = 22m.4s., iPPS = 22m.10s., iSS = 26m.19s., eSS = 26m.33s., eSSS = 29m.48s., ePKP,PKP = 39m.12s., and many other unidentified readings.
Stuttgart iP = 11m.52s., i = 12m.9s., e = 17m.35s., ePS = 21m.58s., e = 22m.39s., eSS = 26m.6s., eQ = 31m.24s., ePKP,PKP = 39m.4s.
Clermont-Ferrand i = 12m.19s., iPP = 14m.36s., iPS = 22m.11s., iPPS = 22m.18s., eSS = 26m.10s., i = 26m.31s.
Lisbon Z = 13m.14s., SEN = 21m.26s., SSS?E = 29m.36s., Q?EN = 30m.59s.
Prague epP? = 12m.10s., e = 15m.36s., ePS = 22m.4s., eSS = 26m.24s., eSSS = 29m.54s.
Raciborzu ePEN = 12m.1s., eP_cP?E = 12m.31s., eE = 12m.45s., eN = 13m.9s., eE = 13m.50s., eN = 13m.56s. and 16m.8s.
Toledo ePN = 12m.2s., iPPN = 14m.34s., iSE = 21m.46s., iSKSE = 22m.1s., ePS?E = 22m.25s., eSS?E = 26m.34s., QE = 32m.21s.
Salo eZ = 12m.35s., iNZ = 12m.46s., iN = 22m.18s.
Tortosa P_cPEN = 12m.21s., iN = 15m.44s., PPPN = 16m.51s., S_cSEN = 22m.16s., PSEN = 22m.35s., PPSEN = 22m.58s., SSN = 27m.10s., SSS?N = 30m.41s., Q?N = 32m.28s.
Granada PS = 22m.51s., iSS = 27m.36s., Q = 33m.6s.
Triest iP_cP = 12m.54s.a, iPP = 15m.17s., i = 22m.26s., iS_cS = 22m.45s., isS? = 23m.13s., eSS = 27m.13s., eSSS = 30m.13s.
Malaga PPZ = 15m.14s., PPPZ = 17m.6s., PSZ = 23m.8s., SSZ = 27m.20s.
Budapest SKSN = 22m.27s., SKKSE = 22m.39s., SKKSN = 22m.47s., PSN = 23m.47s.
Bologna iZ = 12m.34s., ePP?E = 16m.15s.
La Paz iP_cPZ = 12m.40s., iZ = 14m.32s., iPPZ = 15m.28s., isSNZ = 22m.35s., SSN = 27m.54s.
Alicante P_cP = 12m.26s., PP = 15m.24s., PPP = 17m.20s., S_cS = 22m.35s., PS = 23m.12s., PPS = 23m.36s., sS = 24m.52s., SS = 27m.46s., SSS = 31m.8s., Q = 32m.46s.
Almeria PP = 15m.18s., PPP = 17m.10s., S_cS = 22m.38s., PS = 23m.10s., SS = 27m.26s., SSS = 30m.54s.
Florence eSN = 22m.39s., eSSE = 28m.35s.
Kalossa eN = 15m.49s., eE = 22m.56s.
Rome e = 19m.6s., eSKS? = 22m.27s., eSS = 28m.20s., eSSS = 31m.28s., e = 33m.56s.
Algiers PS? = 23m.24s.
Bucharest ePE = 12m.43s., iPSE = 23m.43s.
Santa Lucia SKSN = 22m.41s., iSN = 23m.13s., N = 29m.46s.
Helwan eZ = 15m.36s., PPPZ = 19m.39s., SN = 24m.54s.
La Plata SKSN = 23m.19s., PSN = 25m.43s., PPSE = 28m.24s., PKKPE = 30m.12s. PKKP?N = 30m.38s., SS?E = 31m.30s., SSN = 32m.17s., E = 35m.6s., SSS?E = 36m.25s., SSSN = 36m.54s., SSSE = 37m.35s., N = 42m.6s., E = 42m.28s., QE = 44·8m.
Auckland SSN = 33m.24s., SSSN = 36m.46s., eN = 43m.31s.
New Delhi iN = 18m.15s., 18m.31s., and 20m.7s., iSKSN = 24m.36s., iSSKSN = 25m.3s., eSKKSN = 25m.10s., pSN = 27m.15s., iN = 27m.41s., iPPSN = 27m.44s., SSN = 32m.55s., SSPN = 33m.23s., iN = 41m.54s.
Wellington SS = 33m.24s., SSS = 36m.53s.
Brisbane eN = 19m.6s.

Continued on next page.

Christchurch PS =28m.13s., SS =33m.44s., SSSE =38m.6s.
Riverview iPPZ =19m.15s., eSEN =26m.45s., ePSEZ =28m.41s., iPPSE =29m.52s., eSSE =34m.42s., iSSE =35m.3s., eSSSE =38m.29s., and other unidentified readings.
Bombay SSE =35m.2s.
Tananarive ePP (Δ >180°) =28m.17s., ePKKS =30m.45s., Q =67·4m.
Long waves were also recorded at Arapuni.

April 13d. Readings also at 1h. (Perth, Riverview, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Mount Wilson, and Riverside), 2h. (Brisbane, Granada, and La Paz), 3h. (Basle), 4h. (Helwan and Ksara (3)), 5h. (Tucson), 7h. (Fresno), 8h. (Santa Clara and near Ashkabad), 9h. (Helwan and Ksara), 10h. (College, Hungry Horse, and near Apia), 11h. (near Andijan), 12h. (Rome and near Ashkabad), 13h. (Tucson and Klyuchi), 14h. (Ksara, Copiapo, Santa Lucia, Huancayo, La Paz, Mount Wilson, Riverside, Palomar, New Delhi, Andijan, Samarkand, Tashkent, near Obi-garm, Murgab, Stalinabad, near Kulyab, near Grozny, and Leninakan), 15h. (Pavia), 18h. (near College, near Obi-garm, and near Ashkabad), 19h. (Brisbane, Riverview, New Delhi, Stuttgart, La Paz, College, Hungry Horse (2), Overton (2), and Shasta Dam), 20h. (Helwan, Boulder City, Shasta Dam, Tucson, Mount Wilson, Riverside, Tinemaha, and near College), 21h. (La Paz, near Andijan, Tchimkent, Tashkent, Frunse, Murgab, Samarkand, and Almata), 22h. (Overton), 23h. (Klyuchi and near Triest).

April 14d. 5h. 12m. 21s. Epicentre 50°·4N. 4°·0E. (as on April 3d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Paris		1·9	212	i 0 34	0	1 1	+ 2	0 40	P_g
Strasbourg		3·0	127	e 0 48	− 2	e 1 26	− 1	e 1 2	P_g
Basle		3·7	139	e 1 16	P_g	e 2 3	S_g	—	—
Stuttgart		3·7	113	e 1 2?	+ 2	e 1 46	+ 1	e 1 11	P_g
Neuchatel		3·9	149	e 1 16	P_g	e 1 43	− 7	—	—
Zürich		4·3	133	e 1 7	− 1	e 2 13	S*	e 1 23	P_g
Ravensburg		4·5	123	e 1 11	0	e 2 24	S_g	—	—
Clermont-Ferrand		4·7	188	—	—	e 2 29	S_g	—	—
Jena	E.	4·9	81	—	—	e 2 24	S*	—	—
Collmberg	Z.	5·8	77	—	—	e 2 57	S*	e 3 3	S_g
Salo		6·5	135	—	—	e 2 46	− 9	e 3 31	S_g

Additional readings :—
Paris iP =38s., S_g? =1m.5s., e =1m.9s.
Strasbourg eP =58s., e =1m.21s., eS =1m.32s., iS_g =1m.41s., i =1m.51s. and 1m.54s.
Stuttgart eZ =1m.51s., e =1m.59s., eS_g =2m.7s.
Ravensburg e =1m.14s.
Jena eEN =2m.33s.

April 14d. 15h. Undetermined shock.

Apia iPNZ =48m.
Basle e =54m.27s. and 57m.57s.
Riverview ePPZ? =55m.1s., eSE? =59m.19s., iSSN? =62m.8s., eRZ =64·3m.
Auckland S?N =55m.56s., eN =57m.55s., LN =59m.35s.
Arapuni eE =57m.36s.
Pasadena ePZ =57m.41s., eZ =57m.53s.
Palomar ePZ =57m.43s.
Riverside ePZ =57m.43s., eZ =57m.55s.
Haiwee ePZ =57m.47s.
Shasta Dam iP =57m.48s., i =57m.58s.
Boulder City e =57m.59s.
Pierce Ferry eP =58m.1s., i =58m.23s., e =59m.45s.
Overton eZ =58m.4s.
Tucson eP =58m.5s., eL =81m.13s.
College eP =58m.36s., i =58m.46s.
Hungry Horse eP =58m.37s., i =60m.0s.
Strasbourg ePKP =66m.1s., i =66m.10s., e =67m.8s.
Stuttgart ePKPZ? =66m.1s., eL =132m.
Paris iPKP =66m.2s., i =66m.16s., e =67m.6s., eL =128m.
Istanbul e =66m.6s.
Rome ePKP$_2$Z =66m.17s.
Helwan eZ =66m.20s., 66m.52s., and 67m.26s.
Ksara ePKP =66m.6s.k, PSKS? =79m.46s.
Padova e =66m.21s.
Bologna e =66m.28s.
Berkeley iN =66m.58s., eN =75m.46s. and 77m.42s., eE =79m.6s.
La Paz iE =87m.18s., L =96m.36s.
Granada P =95m.4s.a, L =126·5m.
Long waves were also recorded at Christchurch, Wellington, Brisbane, Honolulu, Huancayo, Ukiah, Philadelphia, Seven Falls, and other European stations.

April 14d. 17h. Undetermined shock.

Apia iPNZ = 4m.
Riverview ePZ? = 10m.4s., ePPEZ? = 11m.33s., iZ = 11m.36s., eSE? = 15m.52s., iSSN? = 18m.42s., cRE = 20·9m.
Auckland S?N = 12m.29s., LN = 16m.?
Shasta Dam e = 14m.9s., i = 14m.21s.
Pasadena iPZ = 14m.15s., iZ = 14m.32s.
Riverside ePZ = 14m.17s.
Palomar eP?Z = 14m.18s., eE = 14m.25s.
Haiwee eP?Z = 14m.32s.
Boulder City eP = 14m.34s., e = 14m.47s.
Pierce Ferry eP = 14m.37s., i = 15m.5s.
Tucson e = 14m.40s., eL = 37m.32s.
Logan e = 14m.53s.
College eP = 15m.11s., i = 15m.31s.
Hungry Horse eP = 15m.13s., i = 15m.34s., e = 16m.21s.
Paris ePKP = 22m.33s., eL = 85m.
Stuttgart ePKP?Z = 22m.34s., iZ = 22m.40s.k, eZ = 23m.28s., eZ = 44m.57s., eL = 85m.
Strasbourg ePKP = 22m.35s., i = 22m.42s., e = 22m.47s., 24m.6s., and 24m.16s., ePP? = 25m.43s., epPP? = 26m.9s., eL = 82m.
Istanbul iP = 22m.39s.
Ksara iPKP = 22m.39s.k, PP = 26m.4s.
Rome ePKP$_2$Z = 22m.44s., eZ = 23m.50s. and 40m.11s.?, e = 43m.31s.?
Helwan ePZ = 22m.51s., eZ = 23m.31s., iPPZ = 26m.36s., eSKSE = 33m.27s.
Bologna e = 22m.55s.
Huancayo eSKS = 26m.56s., eS = 27m.43s., eSS = 34m.18s., eL = 43m.2s.
La Paz P?NZ = 27m.16s.
Bogota ePKPEN? = 27m.17s.
Salo eEZ = 44m.0s., e = 45m.2s.
Granada eS = 61m.9s., SS = 67m.33s., L = 83·3m.
Long waves were also recorded at Arapuni, Christchurch, Honolulu, Brisbane, Philadelphia, De Bilt, Kew, Clermont-Ferrand, Almeria, Alicante, and Malaga.

April 14d. 23h. 28m. 40s. Epicentre 72°·2N. 0°·5E. (as on 1944, Feb. 4d.).

$A = +·3075$, $B = +·0027$, $C = +·9515$; $\delta = -8$; $h = -12$;
$D = +·009$, $E = -1·000$; $G = +·951$, $H = +·008$, $K = -·308$.

		△	Az.	P.	O−C.	S.	O−C.		Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		7·4	268	2 2	+10	—	—	—	—	—
Copenhagen		17·3	157	4 4	0	—	—	4 35	PP	8·3
De Bilt		20·3	172	—	—	e 8 20	− 3	—	—	e 10·3
Potsdam	z.	20·7	159	e 4 46	+ 2	—	—	—	—	e 10·4
Collmberg		21·7	157	e 4 51	− 4	—	—	—	—	—
Paris		23·5	178	e 5 10	− 2	—	—	e 5 57	PPP	—
Strasbourg		23·9	168	e 5 18	+ 2	—	—	e 5 43	PP	e 12·3
Stuttgart		23·9	166	e 5 14	− 2	e 10 5	+35	e 5 43	PP	e 12·8
Zürich	z.	25·2	168	e 5 17	−12	—	—	—	—	—
Salo	z.	27·1	163	e 6 36	+50	—	—	—	—	—
Rome		31·0	161	—	—	e 11 26	0	—	—	e 21·0
College		41·5	341	e 7 51	+ 1	—	—	—	—	—
Ksara		42·6	135	(e 7 51)	− 8	—	—	—	—	—
Hungry Horse		51·4	309	e 9 6	− 3	—	—	—	—	—
Shasta Dam		60·6	313	e 10 13	− 2	—	—	—	—	—
Overton	z.	62·6	305	e 10 29	+ 1	—	—	—	—	—
Pierce Ferry		62·9	304	i 10 28	− 2	—	—	—	—	—
Boulder City		63·3	305	e 10 37	+ 4	—	—	—	—	—
Tucson		65·8	300	e 10 46	− 3	—	—	e 11 15	P$_c$P	—
Palomar	z.	66·3	306	e 10 51	− 1	—	—	e 11 14	P$_c$P	—

Additional readings :—
Potsdam eEN = 4m.50s.
Paris e = 5m.27s.
Strasbourg e = 5m.35s.
Ksara reading has been increased by 3 mins.
College i = 8m.18s.
Hungry Horse i = 9m.32s.
Shasta Dam i = 10m.38s.
Pierce Ferry i = 10m.55s.
Boulder City i = 10m.57s.
Long waves were also recorded at Aberdeen, Upsala, Kew, and Almeria.

April 14d. Readings also at 0h. (Tacubaya and near Murgab), 1h. (Overton, Jena, Strasbourg, Stuttgart, Zürich, and near Paris), 2h. (Perth and near Tacubaya), 3h. (College, Murgab, and near Obi-garm), 4h. (near Ashkabad (2)), 5h. (Ashkabad and Overton), 6h. (Overton and Pavia), 7h. (Apia, Auckland, Wellington, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton (2), Shasta Dam, Hungry Horse, College, Ksara, Helwan, Stuttgart, and near Ashkabad), 8h. (near Ashkabad), 9h. (Apia, Boulder City, Overton (2), Hungry Horse, College (2), Jena, Stuttgart, near Collmberg, and near Mizusawa), 11h. (near College), 12h. (Apia, Overton, near Tacubaya, Ksara, Andijan, Stalinabad, near Murgab and Obi-garm), 13h. (College, Overton, and near Ashkabad), 14h. (College and near Copiapo), 15h. (College, Strasbourg, and Stuttgart), 18h. (near Obi-garm), 19h. (Apia (2), Auckland, Wellington, Brisbane, Ksara, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 20h. (College and near Alicante), 22h. (Ksara, Overton, and near Alicante).

April 15d. 10h-11h. Explosion near Nordhausen 51°·5N. 10°·8E.

$A = +6140$, $B = +\cdot1170$, $C = +\cdot7806$; $\delta = +2$.

Jena ($\triangle = 0°\cdot8$) $iP_gN = 59m.1s.$, $iS_gN = 59m.12s.$
Collmberg ($\triangle = 1°\cdot4$) $eP_gEZ = 59m.11s.$, $iE = 59m.20s.$, $iS_g = 59m.31s.$, $iZ = 59m.35s.$
Stuttgart ($\triangle = 2°\cdot9$) $eP?Z = 59m.37s.$, $eP^* = 59m.41s.$, $eP_g = 59m.44s.$, $eS? = 60m.4s.$, $eS^* = 60m.20s.$, $iS_g = 60m.26s.$
Strasbourg ($\triangle = 3°\cdot5$) $iP_g = 59m.53s.$, $i = 59m.57s.$, $eS = 60m.22s.$, $e = 60m.29s.$, $eS_g = 60m.42s.$, $iS_g? = 60m.46s.$, $i = 60m.49s.$
Ravensburg ($\triangle = 3°\cdot8$) $e = 59m.50s.?$, $eP_g = 60m.0s.$, $eS_g = 60m.54s.$
Copenhagen ($\triangle = 4°\cdot3$) $P = 59m.51s.$, $60m.8s.$
Zürich ($\triangle = 4°\cdot4$) $eP = 60m.1s.$, $eS_g? = 60m.6s.$, $e = 60m.10s.$
Basle ($\triangle = 4°\cdot5$) $eP? = 60m.9s.$, $eS = 61m.10s.$
Chur ($\triangle = 4°\cdot7$) $eP? = 60m.2s.$, $eS_g = 61m.17s.$
Paris ($\triangle = 6°\cdot0$) $eP_g = 60m.45s.$, $eS? = 61m.14s.$, $eS_g = 62m.2s.$, $eL = 62m.17s.$
Clermont-Ferrand ($\triangle = 7°\cdot7$) $eS_g = 63m.1s.$, $iL = 63m.18s.$

April 15d. 14h. 7m. 21s. Epicentre 5°·0S. 124°·0E.

Felt at Buton in Celebes. Bulletin séismique trimestriel de Batavia, 1949.
Epicentre suggested(U.S.C.G.S.) 5°·0S. 124°·0E.
(Strasbourg) 6°·0S. 122°·5E.

$A = -\cdot5571$, $B = +\cdot8259$, $C = -\cdot0866$; $\delta = -3$; $h = +7$;
$D = +\cdot829$. $E = +\cdot559$; $G = +\cdot048$, $H = -\cdot072$, $K = -\cdot996$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Batavia		17·1	265	i 3 59k	− 3	i 6 49	−23	—	9·7
Perth		27·9	195	i 4 44	−70	i 10 41	+ 4	—	i 12·2
Brisbane		35·5	132	i 7 5	+ 5	e 18 56	L	—	(e 18·9)
Riverview		38·2	142	e 7 24	+ 1	i 13 22	+ 5	9 0 PP	e 20·4
Hyderabad	N.	50·2	298	e 8 59	− 1	16 7	− 4	10 38 PP	—
Poona	E.	54·7	297	i 9 36	+ 3	i 17 9	− 4	—	—
Bombay		55·7	297	e 9 36	− 4	e 17 21	− 5	—	—
Irkutsk		59·5	346	e 10 9	+ 2	e 18 21	+ 5	—	—
Tashkent		67·9	319	e 11 3	+ 1	e 19 53	− 8	—	—
Sverdlovsk		80·0	330	e 12 10	− 3	e 22 14	− 3	e 23 9 PS	—
Ksara		91·2	304	e 12 49	−19	e 26 1	PPS	—	—
College		93·7	25	e 13 21	+ 1	—	—	—	—
Istanbul		97·0	311	e 17 4	PP	—	—	—	—
Stuttgart		110·0	320	e 19 6	PP	e 28 45	PS	—	e 62·6
Strasbourg		110·9	320	19 14	PP	—	—	—	—
Shasta Dam		111·1	48	e 19 20	PP	—	—	—	—
De Bilt		111·4	325	e 30 3	PPS	—	—	—	e 62·6
Paris		114·2	322	e 19 41	PP	—	—	—	—
Hungry Horse		114·6	28	e 18 41	[− 1]	—	—	e 19 44 PP	—
Pasadena	Z.	115·7	54	i 18 48	[+ 4]	—	—	e 20 28 PP	—
Riverside	Z.	116·4	54	e 18 48	[+ 2]	—	—	—	—
Boulder City		118·0	51	e 18 51	[+ 2]	—	—	—	—
Overton	Z.	118·1	51	e 18 52	[+ 3]	—	—	—	—
Pierce Ferry		118·6	51	i 18 53	[+ 3]	—	—	e 20 1 PP	—

Additional readings :—
Riverview $eE = 15m.5s.$, $eSSZ = 16m.5s.$
Hyderabad $SSN = 19m.44s.$
Poona $eE = 6m.23s.$, $eN = 8m.0s.$, $iE = 11m.9s.$, $eN = 16m.54s.$
Stuttgart $eZ = 20m.51s.$, $e = 31m.27s.$
De Bilt $e = 31m.56s.$
Long waves were also recorded at Collmberg, Christchurch, and Wellington.

April 15d. Readings also at 0h. (Palomar, Pasadena, Riverside, Tinemaha. Tucson, Boulder City, Overton, Pierce Ferry (2), Shasta Dam, College (2), Hungry Horse, Stuttgart, Samarkand, near Andijan, Obi-garm, Stalinabad, and near Ashkabad), 2h. (Mount Wilson, Pasadena, Tinemaha, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 4h. (near College), 5h. (College, Almata, near Andijan, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 6h. (Tucson), 7h. (Pavia and near Ashkabad (2)), 8h. (Arapuni, Wellington, and near Ashkabad),9h. (College), 11h. (Copiapo, Riverside, Palomar, Tucson, and Overton), 12h. (Copiapo), 13h. (near Andijan and near College), 14h. (New Delhi, Poona, Sverdlovsk, Ashkabad (2), Almata, Frunse, near Andijan (2), Obi-garm, Samarkand (2), Stalinabad, Tashkent, and Tchimkent), 15h. (Stuttgart, near Andijan, Stalinabad, College, and near Victoria), 16h. (near Mizusawa), 17h. (Overton), 18h. (Klyuchi (2) and Pavia), 19h. (Pavia), 20h. (Logan, Overton (2), and Pierce Ferry (2)), 21h. (near Obi-garm), 22h. (Overton (2), Collmberg, Salo, Strasbourg, Stuttgart, near Triest and Zagreb), 23h. (Pavia).

April 16d. Readings at 0h. (Grahamstown, Shasta Dam, Hungry Horse, College, La Plata, near Ashkabad, and near Bogota), 1h. (Ashkabad, Seattle, and La Paz), 2h. (Boulder City), 3h. (College, and near Ashkabad (2)), 4h. (College and Hungry Horse), 6h. (Apia, Pasadena, Riverside, Tinemaha, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Collmberg, Pavia, and Stuttgart), 7h. (Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 8h. (Ashkabad), 9h. (Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, near Tacubaya, near Almata, near Andijan (2), near Kulyab, and near Obi-garm), 10h. (Pavia, Bermuda, Tucson, Overton, Pierce Ferry (2), Shasta Dam (2), Hungry Horse (2), Lick, near Oaxaca, Tacubaya, and near Ashkabad), 11h. (Tacubaya and Zagreb), 12h. (Istanbul), 13h. (New Delhi and Poona), 14h. (Copiapo and Puebla), 16h. (Ashkabad), 17h. (Obi-garm, Andijan, and near Murgab), 18h. (Apia, Palomar, Pasadena, Riverside, Boulder City, Overton (3), Pierce Ferry, Shasta Dam, Lick, Hungry Horse, Collmberg, Paris, Pavia (3), Strasbourg, and Stuttgart), 19h. (Pavia), 20h. (Ashkabad and Kew), 23h. (Auckland, Christchurch, Wellington, and Riverview).

April 17d. 0h. 41m. 54s. Epicentre 31°·5S. 68°·6W. Depth of focus 0·005.
(as on 1947, May 6d.).
Intensity V between 31° and 32° S. Lat. Strong at San Juan and Mendoza. Macroseismic radius 300km.; suggested depth of focus 150km.

F. Greve.
Boletin del año 1949, primer semestre, Instituto Sismologico, Santiago, p. 15.

$A = +\cdot3117$, $B = -\cdot7953$, $C = -\cdot5199$; $\delta = -5$; $h = +1$;
$D = -\cdot931$, $E = -\cdot365$; $G = -\cdot190$, $H = +\cdot484$, $K = -\cdot854$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia	N.	2·2	223	i −0 17	?	—	—	—	—	—
Copiapo	N.	4·4	339	i 1 8	+ 2	—	—	i 1 38	pP	—
La Paz		15·0	4	i 3 34 a	+ 4	i 6 25	+11	i 3 45	pP	7·5
Huancayo		20·3	341	e 4 35	+ 2	i 8 16	+ 4	i 5 3	pP	e 10·3
Punta Arenas	N.	21·7	184	—	—	i 8 47	+ 9	—	—	—
Bogota		36·3	351	e 7 2	+ 3	e 12 37	+ 2	e 7 32	pP	e 15·4
San Juan		49·7	4	e 9 21	+34	e 15 46	− 4	—	—	e 19·9
Tacubaya		58·5	326	i 10 22	+30	—	—	i 10 58	sP	—
Bermuda		63·6	5	—	—	e 19 6	+1?	—	—	—
St. Louis		72·6	342	e 11 21	− 1	i 20 36	− 5	i 12 0	pP	—
Tucson		74·9	324	e 11 35	− 1	—	—	i 12 5	pP	—
Palomar		79·0	321	i 11 59	0	—	—	i 12 28	pP	—
Pierce Ferry		79·6	323	i 12 2	0	—	—	i 12 31	pP	—
Riverside	Z.	79·7	320	i 12 5	+ 3	—	—	i 12 31	pP	—
Boulder City		79·9	323	e 12 3	0	—	—	e 12 32	pP	—
Overton	Z.	80·1	323	e 12 4	0	—	—	i 12 35	pP	—
Pasadena		80·3	320	i 12 6	+ 1	i 21 59	− 5	i 12 35	pP	—
Tinemaha	Z.	82·5	322	i 12 17	0	—	—	i 12 48	pP	—
Fresno		83·1	321	i 12 49k	pP	—	—	e 13 17	sP	—
Logan		83·1	330	e 12 15	− 5	—	—	i 12 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.
Lick	z.	84·5	320	i 12 27k	0	—	—	i 12 53k pP	—
Reno		85·2	322	e 12 31	0	—	—	e 13 2 pP	—
Berkeley	z.	85·3	320	e 12 28k	− 3	—	—	i 13 2k pP	—
Shasta Dam		87·4	321	i 12 38	− 3	—	—	i 13 10 pP	—
Arcata	z.	88·4	321	e 12 43	− 3	—	—	e 13 17 pP	—
Hungry Horse		89·3	331	e 12 49	− 1	—	—	e 13 16 pP	—
Rome		104·3	48	e 10 45	?	—	—	— —	—
Ksara		117·8	65	e 19 29	PP	—	—	i 20 29 ?	—

Additional readings :—
Santa Lucia N = −13s. and 10s.
La Paz iPPZ = 3m.50s., PPPN = 3m.59s.
Bogota iPP = 8m.11s., eS_cP = 13m.16s.
San Juan e = 12m.10s.
Tacubaya isPP = 13m.16s.
St. Louis e = 11m.33s., iP_cP? = 11m.50s., i = 12m.40s. and 21m.12s., isS = 21m.26s.
Palomar i = 12m.43s.
Pierce Ferry esP = 12m.42s., epPP = 15m.42s.
Riverside i = 12m.45s.
Pasadena eE = 12m.50s.
Tinemaha iZ = 13m.2s.
Fresno eZ = 12m.58s., eN = 13m.37s.
Logan ePP? = 15m.46s.
Reno eE = 13m.7s.
Arcata eZ = 13m.28s.
Hungry Horse epPP = 16m.59s.
Long waves were also recorded at Scoresby Sund, Alicante, De Bilt, and Paris.

April 17d. Readings also at 0h. (Brisbane, Copiapo, Hungry Horse, and near Harvard), 2h. (Batavia, Pasadena, Riverside, Tinemaha, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Hungry Horse, Bogota, Huancayo, and near La Paz), 3h. (Tucson, Pierce Ferry, Hungry Horse, and near Murgab), 4h. (near Ashkabad), 5h. (Stuttgart, Tucson, and near Ashkabad), 6h. (Bogota, near La Paz, College, Tucson, Shasta Dam, Hungry Horse, New Delhi, Almata, Frunse, near Andijan, Kulyab, Murgab, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 7h. (College), 9h. (near Alicante), 10h. (Tacubaya, Tucson, near Andijan, Murgab, Obi-garm, Samarkand, Stalinabad, near Erevan, and Leninakan), 11h. (Grozny and Tacubaya), 12h. (La Paz), 13h. (La Paz and near Ashkabad), 14h. (Tucson, Overton, and Pierce Ferry), 15h. (Tucson (2), Boulder City (3), Overton (3), Pierce Ferry (3), Shasta Dam (2), Hungry Horse (2), and College (2)), 16h. (College), 17h. (Apia, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Fresno, Shasta Dam, Lick, Hungry Horse, and College), 20h. (Tucson and near Ashkabad), 21h. (Stuttgart), 23h. (Ottawa, Seven Falls, and Shawinigan Falls).

April 18d. 0h. South Atlantic.

La Plata N = 39m.54s., E = 40m.0s. and 40m.25s., N = 40m.57s., E = 44m.18s., ?N = 44m.21s., E = 43m.18s., LN = 45m.31s.
La Paz iPZ = 42m.28s., ipP = 42m.52s., PPZ = 44m.11s., iSE = 49m.28s., iPSE = 50m.14s., LE = 58m.24s.
Grahamstown iZ = 43m.6s., 43m.35s., and 44m.53s.
Huancayo eP = 43m.22s., epP? = 43m.49s., eS = 51m.7s., eL = 57m.36s.
Bogota eP = 45m.56s., iSKSEN? = 57m.0s., eEN = 62m.25s., LEN = 74m.
Ksara eP? = 46m., e = 57m.
San Juan e = 46m.52s. and 47m.28s., ePP? = 48m.50s., eS = 55m.36s., ePS = 56m.38s., eSS = 60m.41s., eL = 65m.14s.
Riverview iZ = 50m.10s., eE = 66m.36s., eQ?E = 71m.12s.
Helwan ePZ = 51m.12s., iZ = 51m.20s., eN = 58m.36s., S?N = 58m.48s.
Tucson iPKP = 52m.7s., e = 52m.38s. and 55m.28s.
Boulder City eP = 52m.15s., e = 55m.37s.
Pierce Ferry ePKP = 52m.15s., ePPP = 55m.36s.
Riverside $iPKP_2$ = 52m.16s., eZ = 55m.36s.
Overton ePKPZ = 52m.17s.
Pasadena $iPKP_2Z$ = 52m.17s., eZ = 55m.40s.
Tinemaha $iPKP_2Z$ = 52m.21s.
Fresno ePZ = 52m.22s., eN = 52m.28s.
Shasta Dam ePKP = 52m.25s., iPKP = 52m.29s., iPPP? = 55m.51s.
Lick iPZ = 52m.26s.k, iZ = 52m.56s. and 55m.47s.
Berkeley iPZ = 52m.27s.k, iZ = 53m.0s.a and 53m.6s.k.
Hungry Horse iPKP = 52m.30s., i = 55m.34s.
College ePKP = 53m.12s., iPKP = 53m.18s., e = 55m.39s.
De Bilt e = 62m.
Kew e = 63m.
Rome e = 66m.29s. and 76m.49s.
Long waves were also recorded at Christchurch, Wellington, and Granada.

April 18d. 21h. 34m. 42s. Epicentre 15°·8S. 172°·8W. (as on 1949, Feb. 10d.).

Intensity IV at Apia. Suggested depth 100km.
15°·25S. 173°·25W. (Strasbourg).
15°·5S. 173°·5W. (U.S.C.G.S.).

Preliminary Seismological Bulletin, Apia Observatory, Western Samoa, April-June, 1949, p. 2.

$A = -·9551$, $B = -·1207$, $C = -·2706$; $\delta = +1$; $h = +6$;
$D = -·125$, $E = +·992$; $G = +·268$, $H = +·034$, $K = -·963$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		2·2	26	i 0 38	0	—	—	—	—	—
Auckland	N.	23·7	205	5 14	0	9 20	− 7	5 33	PP	i 11·3
Arapuni	E.	24·4	203	—	—	e 8 18?	?	—	—	—
Tuai	N.	24·6	199	5 23	0	9 43	+ 1	—	—	—
New Plymouth	E.	25·9	203	5 38	+ 3	—	—	—	—	—
Wellington		27·6	201	5 51	0	10 40	+ 8	6 49	PP	14·8
Kaimata	N.E.	29·9	204	6 11	− 1	—	—	—	—	—
Brisbane		33·7	244	i 6 42	− 3	—	—	e 8 3	PP	i 16·5
Riverview		37·1	234	i 7 11a	− 3	e 12 47	−14	i 8 41	PP	17·8
Honolulu		39·7	23	i 7 37	+ 1	e 13 53	+13	i 7 48	pP	e 16·5
Branner	Z.	71·2	41	i 11 23	0	—	—	—	—	—
Santa Clara	Z.	71·3	41	i 11 24	+ 1	—	—	—	—	—
Berkeley		71·4	41	i 11 24k	0	—	—	—	—	e 32·5
Lick	Z.	71·5	41	i 11 24k	0	—	—	i 11 28	pP	—
Pasadena		71·9	46	i 11 25k	− 2	—	—	i 11 39	pP	e 32·5
Mount Wilson		72·0	46	i 11 27k	− 1	—	—	i 11 43	pP	—
Arcata		72·2	38	i 11 29	0	—	—	—	—	—
Fresno	Z.	72·3	43	i 11 29k	0	—	—	i 11 34	pP	—
Palomar		72·3	47	i 11 30k	+ 1	—	—	i 11 45	pP	—
Riverside	Z.	72·3	46	i 11 27k	− 2	—	—	i 11 44	pP	—
Shasta Dam		73·1	38	i 11 33	− 1	—	—	—	—	—
Tinemaha		73·5	43	i 11 36	0	—	—	i 11 43	pP	—
Reno	Z.	73·9	41	i 11 39k	0	—	—	—	—	—
Boulder City		75·2	46	i 11 46	0	—	—	e 11 56	PcP	—
Pierce Ferry		75·8	46	i 11 49	− 1	—	—	e 15 14	PP	—
Tucson		76·1	51	i 11 51	0	e 21 21	−14	e 12 4	pP	e 34·0
Salt Lake City		79·7	43	i 11 40	−31	e 21 8	−65	e 15 0	PP	e 36·4
Logan		80·2	42	i 12 11	− 3	e 22 35	+16	i 12 29	pP	e 37·4
Tacubaya		80·4	67	i 12 19	+ 4	e 22 29	+ 8	—	—	—
Hungry Horse		82·5	35	i 12 24	− 2	—	—	e 38 51	P′P′	—
Florissant		94·0	51	i 13 16	− 5	i 24 21	− 9	i 13 38	pP	—
St. Louis		94·1	51	i 13 19	− 3	i 24 23	− 8	i 13 39	pP	—
La Paz		99·1	110	i 13 45	+ 1	24 26	[+ 3]	18 6	PP	—
Bogota		99·6	88	e 17 51	PKP	e 24 54	{+ 3}	—	—	—
Philadelphia		105·7	52	—	—	e 24 54	[0]	e 27 54	PS	e 45·9
City College, N.Y.		106·8	50	—	—	e 24 54	[− 5]	—	—	—
Weston		108·9	50	e 29 8	PKKP	—	—	—	—	e 52·3
Bermuda		113·4	61	—	—	(e 28 58)	PS	—	—	29·0
Grahamstown	Z.	127·8	200	i 19 9	[+ 1]	—	—	—	—	—
Copenhagen		140·0	355	18 23	[−67]	—	—	—	—	—
Kew		143·9	7	19 34	[− 3]	—	—	—	—	e 63·3
Collmberg	Z.	144·3	352	e 19 35	[− 3]	—	—	—	—	—
Raciborzu		144·7	348	i 19 39	[0]	—	—	—	—	—
Jena	N.	144·8	354	e 19 37	[− 2]	—	—	e 23 20	PP	—
Jersey	E.	145·8	11	e 19 48	[+ 7]	—	—	—	—	—
Paris		146·9	5	e 19 42	[0]	—	—	i 20 10	pPKP	e 75·3
Stuttgart	Z.	147·1	357	e 19 43k	[0]	e 30 58	{+55}	e 20 20	pPKP	—
Strasbourg		147·3	358	e 19 44	[+ 1]	e 29 18	{−45}	i 20 5	pPKP	—
Basle		148·4	359	e 19 45	[0]	—	—	e 23 14	PP	—
Zürich		148·5	358	e 19 43a	[− 2]	e 30 0	{−10}	—	—	—
Istanbul		148·5	327	e 19 38	[− 7]	—	—	e 23 14	PP	—
Ksara		148·5	309	e 19 39?	[− 6]	—	—	e 23 25	PP	—
Belgrade		149·0	341	e 19 50a	[+ 4]	—	—	i 20 9	PKP_2	—
Chur		149·0	357	e 19 46k	[0]	—	—	e 19 50	PKP	—
Zagreb		149·2	347	e 19 48	[+ 2]	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Triest		149·7	351	e 19 52	[+ 5]	e 25 49	[−64]	i 20 33	PKP_2	—
Clermont-Ferrand		149·9	5	i 19 53	[+ 6]	e 23 18	PKS	i 20 12	PKP_2	—
Salo		150·2	353	e 19 52k	[+ 4]	—	—	e 20 11	PKP_2	—
Pavia	z.	150·7	356	i 19 53k	[+ 5]	—	—	—	—	—
Padova		151·1	352	19 54	[+ 5]	—	—	e 20 52	PKP_2	—
Prato		151·1	353	e 19 41	[− 8]	—	—	—	—	—
Bologna	z.	151·2	353	e 19 56	[+ 7]	—	—	—	—	—
Rome		153·6	350	e 19 52	[− 1]	e 23 32	PKS	43 56	SS	—
Helwan		153·8	306	19 54	[+ 1]	e 30 38	{− 1}	20 12	PKP_2	—
Toledo	z.	154·1	20	e 19 55	[+ 2]	—	—	e 23 55	PP	—
Tortosa		154·4	11	i 20 21	[+27]	27 12	[+13]	20 39	PKP_2	—
Alicante		156·5	15	20 14	[+17]	26 46	[−15]	23 4	PKS	e 74·9
Granada		156·6	22	20 30k	PKP_2	49 6	SSS	24 8	PP	74·0
Malaga	z.	156·7	23	e 20 1	[+ 4]	i 24 9	PP	i 20 33k	PKP_2	80·2
Almeria		157·4	20	e 19 58	[0]	27 28	[+26]	20 26	PKP_2	—

Additional readings :—
Apia i =3m.14s.
Auckland iN =5m.46s.
Tuai iN =5m.26s.
Wellington i =7m.36s., iZ =7m.55s., Q =14·1m.
Brisbane iZ =8m.29s., iQN? =14m.38s.
Riverview iPPPZ =9m.1s., iZ =9m.26s. and 9m.47s., iE =13m.16s., eN =16m.22s., iE =17m.41s.
Honolulu iPP =9m.11s., epPP =9m.54s.
Santa Clara ePN =11m.31s.
Berkeley iZ =12m.2s.a, eN =31m.42s.
Lick iZ =11m.43s.a.
Pasadena iZ =11m.36s. and 11m.52s., iPPZ =13m.57s.
Fresno iZ =12m.9s.
Tucson esP? =12m.12s., i =13m.45s., ePP =14m.39s., esPP =15m.31s.
Salt Lake City ePS? =21m.58s.
Logan e =14m.22s.
Tacubaya e =19m.13s., i =20m.11s.
Hungry Horse i =39m.4s.
Florissant iSKSE =23m.52s., esSE =24m.52s.
St. Louis eSKSE =23m.54s., eE =26m.1s.
Kew eNZ =19m.48s.
Collmberg eE =19m.51s., eZ =19m.59s.
Raciborzu eEZ =19m.57s. and 21m.32s.
Paris iPKP$_2$? =20m.1s. or 20m.5s., isPKP? =20m.31s., iPP =23m.3s., ipPP? =23m.27s.
Stuttgart iPKP =19m.46s.k, i =19m.58s., iZ =20m.4s. and 20m.13s., eZ =20m.38s. and 22m.11s., ePPZ =23m.24s.
Strasbourg ipPKP =20m.12s., isPKP =20m.22s., i =21m.28s., iPP =23m.1s., e =25m.58s.
Zürich e =30m.42s.
Belgrade e =20m.41s. and 21m.41s.
Zagreb e =19m.52s., 20m.1s., and 20m.9s.
Triest iPP =23m.21s., ePPS =36m.16s.
Clermont-Ferrand ePP? =23m.48s.
Salo eZ =20m.40s.
Rome e =24m.8s.
Helwan pPKPZ =20m.42s., sPKPZ =21m.18s., PPZ =23m.41s., pPPZ =24m.2s., iZ =24m.16s.
Toledo iZ =20m.3s., 20m.16s., and 20m.36s., eZ =26m.17s.
Tortosa PPE =24m.4s., SKKS?E =30m.46s., PPSE =36m.54s., SSE =43m.38s.
Alicante SSP =44m.28s.
Almeria PP =23m.56s.
Long waves were also recorded at De Bilt and Seven Falls.

April 18d. Readings also at 0h. (near Murgab), 1h. (Tinemaha, Tucson, Boulder City, Overton, Shasta Dam, Hungry Horse, near Berkeley, Branner, and Lick), 3h. (College and Copiapo), 5h. (College and near Murgab), 6h. (near Tacubaya and near Murgab), 7h. (Almeria and near Algiers), 8h. (near Istanbul), 10h. (La Paz, Bogota, Overton, and Istanbul), 12h. (Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, La Paz, and Ksara), 13h. and 14h. (Ashkabad), 15h. (College), 16h. (Ottawa, Ashkabad, and near Messina), 17h. (Overton), 19h. (Taranto and near Messina), 20h. (near Ashkabad), 21h. (Mount Wilson, Riverside, Tinemaha, Tucson, Pierce Ferry, Shasta Dam, La Paz, and near Apia (2)), 22h. (Overton, near Apia (3), Samarkand, near Andijan (2), Obi-garm, and Stalinabad),

April 19d. 0h. 36m. 46s. Epicentre 42°·4N. 18°·9E.

Intensity V at Kotor (42°26′N. 18°46′E.) and Risan; IV at Dobrota, Hercegnovi, Dubrovnik, and Bilcca.

Macroseismic radius 86km. Epicentre as given by Strasbourg.

M. D. Uzelac.
Annuaire microséismique et macroséismique de l'Institut seismologique de Beograd, 1949. New Series, No. 9, Belgrade, 1950, p. 58.

A = +·7008, B = +·2399, C = +·6718; δ = −1; h = −3;
D = +·324, E = −·946; G = +·636, H = +·218, K = −·741.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		2·3	213	0 57	P_g	1 17	S_g	—	—	e 1·6
Belgrade		2·7	25	i 0 45a	0	e 1 18	− 1	i 0 52	P_g	i 1·5
Zagreb		4·0	329	e 1 5	+ 1	—	—	—	—	e 2·1
Rome		4·8	266	e 2 6	S	(e 2 6)	− 6	e 2 40	S_g	—
Triest		4·9	313	e 1 35	P_g	e 2 9	− 6	—	—	2·7
Salo		6·9	301	—	—	e 2 51	−14	e 3 41	S_g	—
Stuttgart		9·3	316	e 2 15	− 2	e 4 4	− 1	e 5 2	S_g	—
Collmberg	E.	9·8	338	—	—	e 4 23	+ 6	—	—	—
Strasbourg		9·9	312	e 3 48	?	e 4 28	+ 8	—	—	e 4·8
Paris		13·1	305	—	—	e 6 2	+24	—	—	—

Additional readings:—
Salo e = 3m.18s.
Collmberg eE = 4m.36s., eZ = 4m.41s.

April 19d. 15h. 19m. 10s. Epicentre 48°·2N. 154°·4E.

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		9·0	23	e 2 16	+ 3	4 17	+19	—	—	—
Mizusawa		13·2	232	3 11	0	5 30	−10	—	—	—
Irkutsk		31·8	297	6 28	0	—	—	6 47	pP	—
College		34·5	39	i 6 52	0	i 12 17	− 3	i 8 33	PP	e 15·0
Sitka		41·6	50	i 7 56	+ 5	i 14 15	+ 7	i 9 38	PP	e 17·5
Sverdlovsk		53·4	317	9 22	− 2	e 16 46	− 9	—	—	—
Arcata	Z.	56·0	65	e 9 46	+ 3	e 18 28	+58	i 9 58	pP	—
Andijan		56·4	295	e 9 45	0	—	—	—	—	—
Shasta Dam		57·1	64	i 9 51	+ 1	—	—	i 10 4	pP	—
Hungry Horse		57·2	52	i 9 51	0	—	—	—	—	—
Tashkent		57·9	298	e 9 55	− 1	—	—	—	—	—
Berkeley	Z.	59·0	67	i 10 4a	0	—	—	i 10 16a	pP	—
Branner	Z.	59·3	67	i 10 6	0	—	—	—	—	—
Reno		59·4	64	e 10 7a	+ 1	e 18 16	+ 1	e 10 20	pP	—
Lick	Z.	59·7	67	i 10 9a	0	—	—	i 10 21k	pP	—
Stalinabad		59·9	296	10 9	− 1	i 18 18	− 3	10 31	pP	—
New Delhi	N.	61·0	282	—	—	e 18 26	− 9	—	—	e 33·2
Fresno	Z.	61·2	66	i 10 19a	0	—	—	i 10 31a	pP	—
Tinemaha		61·9	65	i 10 25a	+ 1	—	—	i 10 37	pP	—
Logan		62·6	57	i 10 22	− 6	—	—	i 10 39	pP	—
Pasadena		63·9	67	i 10 37a	0	i 19 9	− 3	i 10 50	pP	e 26·3
Riverside	Z.	64·5	67	i 10 40a	− 1	—	—	i 10 53	pP	—
Overton	Z.	64·6	63	i 10 42	+ 1	—	—	i 10 55	pP	—
Boulder City		64·7	64	i 10 42	+ 1	—	—	i 10 56	pP	—
Pierce Ferry		65·1	63	i 10 45	0	e 19 25	− 2	e 10 58	pP	—
Palomar		65·2	67	i 10 46a	+ 1	—	—	i 10 59	pP	—
Rapid City	E.	65·7	50	i 10 8?	−40	e 18 54?	−40	e 12 45?	PP	e 26·6
Upsala		66·7	338	—	—	—	—	e 27 50?	Q	e 33·8
Batavia	Z.	68·3	232	i 11 5a	0	e 20 2	− 4	—	—	—
Baku		69·4	308	e 11 18	+ 6	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grozny		69·4	312	e 11 15	+ 3	—	—	—	—	—
Tucson		69·7	64	i 11 14	0	e 20 22	0	i 11 26	pP	e 31·9
Poona	E.	70·2	275	i 11 16	− 1	i 20 36	+ 8	i 11 34	pP	—
Bombay		70·6	277	e 11 23	+ 4	e 20 26	− 7	—	—	—
Copenhagen		71·7	339	e 11 24	− 2	—	—	—	—	34·8
Leninakan		72·2	312	11 48?	+19	—	—	—	—	—
Erevan		72·4	311	11 44	+14	—	—	—	—	—
Theodosia		72·9	320	e 11 37?	+ 4	—	—	—	—	—
Yalta		73·9	320	11 11?	−28	—	—	—	—	—
Potsdam	Z.	74·5	337	11 40	− 2	—	—	—	—	e 44·9
Chicago		75·0	44	—	—	e 21 38	+15	—	—	e 30·2
Raciborzu		75·1	333	e 11 49	+ 3	—	—	—	—	—
Brisbane	Z.	75·3	181	i 11 47	0	—	—	i 12 0	pP	—
Collmberg		75·5	336	e 11 46	− 2	—	—	—	—	e 38·8
Prague		76·2	335	e 12 3	+11	—	—	e 9 32	?	e 36·8
St. Louis		76·2	47	i 11 52	0	i 21 33	− 3	i 12 4	pP	—
Ottawa		77·0	34	e 11 54	− 2	—	—	e 12 8	pP	37·8
Shawinigan Falls	N.	77·1	31	11 56	− 1	—	—	12 8	pP	—
Cleveland		77·9	40	e 12 2	+ 1	e 21 50	− 4	i 12 15	pP	—
Stuttgart		78·8	338	i 12 6a	0	—	—	i 12 18	pP	e 39·8
Belgrade		79·0	328	e 12 6a	− 1	e 22 20	+14	e 17 36	PP	e 49·8
Strasbourg		79·4	338	i 12 9	0	—	—	i 12 26	pP	40·8
Zagreb		79·6	332	e 12 8	− 2	—	—	—	—	—
Zürich		80·3	338	e 12 13a	− 1	—	—	—	—	—
Basle		80·4	338	e 12 14a	− 1	—	—	—	—	—
Paris		80·4	342	i 12 15	0	—	—	i 12 32	pP	—
Triest		80·4	333	e 12 22	+ 7	e 22 25	+ 4	i 12 55	pP	—
Chur		80·5	336	e 12 15a	0	—	—	—	—	—
Harvard		81·0	32	i 12 30	+12	—	—	—	—	—
Salo		81·4	336	e 12 20a	0	e 22 47	+16	e 15 39	PP	—
Ksara		81·6	312	i 12 22a	+ 1	e 23 7	PS	—	—	—
Riverview		81·7	183	i 12 24a	+ 2	i 22 37	+ 3	i 12 36	pP	39·0
Philadelphia		81·8	36	—	—	e 22 33	− 2	—	—	e 39·5
Padova		82·0	334	12 34	+11	e 22 54	+17	—	—	—
Pavia	Z.	82·1	336	e 12 33	+ 9	—	—	—	—	—
Bologna		82·2	334	e 12 32	+ 8	e 23 17	+38	—	—	—
Prato		82·8	334	e 12 27	0	—	—	—	—	—
Clermont-Ferrand		83·1	340	i 12 31	+ 2	—	—	—	—	42·8
Rome		84·2	332	i 12 34a	0	e 22 56	− 3	—	—	e 41·3
Tacubaya		86·2	65	i 13 3	+19	—	—	i 15 56	PP	—
Helwan		87·1	313	12 48	− 1	23 22	− 6	i 13 4	pP	—
Toledo	Z.	90·2	344	i 13 3	− 1	e 24 5	+ 9	i 13 20	pP	—
Wellington		90·9	166	i 21 51	PKS	23 30	[− 8]	36 50?	Q	42·8
Alicante		91·0	341	13 26	+19	24 35	+32	25 56	PS	45·4
Kaimata	N.E.	91·6	168	13 26	+16	—	—	—	—	—
Christchurch		92·7	167	—	—	30 50?	SS	—	—	—
Almeria		92·8	342	13 4	−12	24 6	−13	16 46	PP	48·8
Granada		92·8	343	e 12 50a	−26	i 24 10	− 9	30 39	SS	48·1
Pretoria	Z.	132·7	278	e 20 25	?	—	—	—	—	—
La Paz		133·1	62	19 18	[0]	26 32	[+ 5]	i 21 58	PP	—
Grahamstown	Z.	138·6	272	e 20 56	PKP_2	—	—	e 21 5	?	—

Additional readings :—
College i = 7m.4s., and 12m.39s., iS_cS? = 17m.32s.
Sitka i = 8m.5s. and 14m.35s.
Stalinabad es$S$ = 18m.51s.
Fresno iZ = 10m.50s.
Logan i = 10m.58s.
Pasadena iZ = 11m.33s., eZ = 39m.30s.
Boulder City i = 10m.5s.
Pierce Ferry ePP? = 13m.47s., e = 14m.29s., ePPP? = 15m.6s.
Rapid City iE = 10m.20s.? and 19m.15s.?
Tucson e = 13m.20s.
Poona eE = 21m.24s.
Collmberg eE = 11m.49s., eEZ = 11m.55s., eE = 11m.58s. and 12m.19s., eZ = 12m.24s.
Prague e = 14m.19s.
St. Louis iPP = 14m.42s., eSS = 26m.41s.

Continued on next page.

Ottawa e =12m.8s.
Cleveland esSN =22m.11s.
Stuttgart eZ =12m.46s. and 12m.56s., ePP =15m.22s., ePPP? =18m.16s.
Strasbourg i =13m.39s. and e =13m.47s.
Basle e =19m.49s.
Paris i =12m.43s., 12m.53s., and 13m.42s., e =16m.7s.
Riverview iP$_c$PZ =12m.31s., iS$_c$SN =22m.47s., iS$_c$SE =22m.50s., eSSE =27m.55s., eQE =34m.56s.
Helwan eZ =14m.8s., eN =23m.12s., SN =24m.44s., true S is given as SKSEN.
Alicante PPS =26m.28s.
Almeria SS =30m.12s., SSS =33m.46s.
Granada SSS =34m.54s.
Pretoria iZ =20m.36s.
Long waves were also recorded at Honolulu, Victoria, Saskatoon, Weston, and Tortosa.

April 19d. 17h. 2m. 4s. Epicentre 42°·5N. 142°·0E.

Intensity V at Sapporo; II-III at Muroran and Nemuro. Macroseismic radius 200-300km. Shallow. Epicentre as adopted.

Seismo. Bull. Cent. Met Obs., Japan, for 1949. Tokyo, 1950, p. 11, with macroseismic chart.

A = −·5827, B = +·4553, C = +·6731; δ = −10; h = −3;
D = +·616, E = +·788; G = −·530, H = +·414, K = −·740.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Sapporo		0·8	320	0 1	−17	0 9	−22	—
Mori		1·1	249	0 19	− 3	0 32	− 7	—
Hatinohe		2·0	190	0 37	+ 2	1 3	+ 1	—
Nemuro		2·8	72	0 24	−23	—	—	—
Morioka		2·9	193	0 48	0	—	—	—
Akita		3·1	207	0 50	− 1	1 34	+ 5	—
Mizusawa		3·4	191	1 1	+ 6	1 44	+ 7	—
Sendai		4·3	192	1 10	+ 2	2 17	+17	—
Hukusima		4·9	194	1 18	+ 1	2 34	S*	—
Utunomiya		6·2	196	1 37	+ 2	—	—	—
Tukubasan		6·4	194	1 52	P*	—	—	—
Maebasi		6·5	202	1 45	+ 6	3 10	+15	—
Tokyo		7·0	195	1 59	P*	3 56	S$_e$	—
Hunatu		7·4	201	1 59	+ 7	—	—	—
College		44·3	35	8 8	− 5	—	—	—
Hungry Horse		67·5	44	i 10 55	− 5	—	—	—
Shasta Dam		67·5	55	i 10 55	− 5	—	—	—
Overton	z.	75·0	54	i 11 42	− 3	—	—	—
Boulder City		75·1	55	i 11 42	− 4	—	—	—
Pierce Ferry		75·5	54	e 11 43	− 5	—	—	—
Collmberg		76·6	330	e 11 47	− 7	—	—	—
Stuttgart	z.	80·1	331	e 12 6	− 7	—	—	—
Tucson		80·1	55	e 12 10	− 3	—	—	e 43·0

April 19d. Readings also at 0h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Tacubaya, College, and near Belgrade), 1h. (Pierce Ferry, Shasta Dam, Hungry Horse, and Tacubaya), 2h. (near Obi-garm), 3h. (near Tacubaya), 4h. (near College and near Taranto), 7h. (Klyuchi and near Bogota), 9h. (Apia and Pavia), 10h. (Apia, Christchurch, Overton, Pavia, and Sofia), 11h. (near Obi-garm), 12h. (near Tunis), 13h. (College and near Ashkabad), 14h. (Ashkabad, Mount Wilson, Riverside, Boulder City, Overton, Shasta Dam, Hungry Horse, La Paz, and near Bogota), 15h. (Overton), 17h. (Hungry Horse), 18h. (Arapuni, Auckland, Christchurch, Wellington, Brisbane, Riverview, La Paz, Palomar, Pasadena, Riverside, Tinemaha, Boulder City, Overton, Pierce Ferry, Shasta Dam (2), Hungry Horse (2), College, Rapid City, Strasbourg, and Stuttgart), 19h. (Granada and Weston), 21h. (Overton and Hungry Horse), 22h. (near Andijan), 23h. (Ashkabad, Stuttgart, Tucson, Pierce Ferry, Shasta Dam, Hungry Horse, and College).

April 20d. 3h. 29m. 3s. Epicentre 38°·0S. 72°·7W. Focus at Base of Superficial Layers.

Destructive earthquake intensity X at Villarica ; IX at Traiguen, Angol, and Nacimiento ; VIII at Los Angeles, Temugo, and Concepción ; VII at Chillan, Valdivia, Talca, and Osorno ; IV at Valparaiso and Santiago de Chili. Macroseismic radius 800km.

Suggested epicentres : 37°50′S. 72°40′W. (La Paz).
38°·1S. 72°·8W. (B.C.I.S.).

The epicentre is situated among the system of seismic faulting that runs parallel to the Cordillera Andes from the volcano Llaima to Villarica (El Salto, Chili).

F. Greve.
Descripción de los principales efectos producidos por los sismos destructores de Chili y ubicación de sus epicentros, Santiago de Chili, 1953, p. 25, with Isoseismic map in appendix.

See Seismo. Notes, Bulletin of Seismological Society of America, July, 1949, Vol. 39, No. 3, pp. 224, 225.

A = +·2349, B = −·7543, C = −·6131 ; δ = +4 ; h = −1 ;
D = −·955, E = −·297 ; G = −·182, H = +·585, K = −·790.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia	N.	4·8	20	i 1 10	− 2	2 4	− 3	—	—	—
Copiapo		10·8	11	2 30	− 5	4 38	+ 2	—	—	—
La Plata		12·3	80	i 2 56a	0	5 15	+ 3	i 3 17	pP	i 6·0
Punta Arenas	N.	15·2	176	i 3 41	+ 7	6 36	+14	—	—	8·8
La Paz		21·8	13	i 4 52a	+ 1	i 8 25	−20	i 5 1	pP	11·2
Huancayo		26·0	354	e 5 33	+ 1	i 10 12	+14	i 5 51	pP	i 14·3
Rio de Janeiro		29·4	67	i 5 58	− 4	i 10 50	− 3	6 20	pP	—
Bogota		42·4	358	i 7 52	− 1	i 14 12	0	i 8 7	pP	19·0
Balboa Heights		47·1	351	e 8 33	+ 2	e 15 45	+25	—	—	—
Galerazamba		48·6	357	i 9 0	+18	e 15 45	+ 4	e 9 22	pP	—
Fort de France		53·6	14	i 9 17	− 3	i 16 43	− 7	i 9 33	pP	e 25·3
San Juan		56·4	8	e 9 40	0	i 17 16	−11	i 9 52	pP	e 25·0
Puebla		61·6	333	i 10 18	+ 2	e 18 28	− 7	i 10 46	pP	—
Tacubaya		62·3	332	i 10 25	+ 4	i 18 49	+ 5	i 10 43	pP	e 30·0
Manzanillo		64·1	327	e 11 30	+57	19 8	+ 2	e 19 33	sS	—
Mobile		69·8	346	i 11 6	− 3	i 20 8	− 7	27 39	SSS	i 33·4
Bermuda		70·4	8	e 11 23	+10	i 20 31	+ 9	i 11 39	pP	e 34·4
Columbia		72·1	353	e 11 22	− 1	e 20 31	−10	e 14 7	PP	e 29·7
Georgetown		76·6	357	i 11 48	− 1	—	—	i 12 2	pP	—
Grahamstown	Z.	76·8	121	i 13 42	?	—	—	e 13 57	PP	—
Woodstock		77·1	357	e 12 5	+13	e 21 47	+10	i 12 23	pP	—
Philadelphia		77·6	358	i 11 54	0	i 21 38	− 4	e 12 9	pP	e 33·0
St. Louis		78·0	346	i 11 53	− 4	i 21 40	− 7	12 12	pP	—
Tucson		78·4	328	i 11 58	− 1	e 21 50	− 1	i 12 16	pP	e 33·2
City College, N.Y.		78·5	359	i 11 59	0	e 21 49	− 3	i 12 14	pP	—
Fordham		78·5	359	i 11 59	0	e 21 50	− 2	i 12 16	pP	—
Pennsylvania		78·6	356	i 12 2	+ 2	i 21 49	− 4	i 12 34	pP	—
Cleveland		79·5	353	e 12 3	− 2	i 21 59	− 4	i 12 18	pP	38·4
Wellington		79·9	225	12 8	+ 1	22 12	+ 5	15 9	PP	37·0
Weston		80·0	2	i 12 6	− 2	i 22 7	− 1	i 12 28	pP	—
Harvard		80·1	2	i 12 7	− 1	i 22 7	− 2	i 12 23	pP	—
Tuai	N.	80·2	228	12 13	+ 4	22 20?	+10	e 12 0	P	—
Chicago		80·6	349	e 12 5	− 6	i 22 5	− 9	i 12 24	pP	e 33·4
Kaimata	N.E.	80·9	222	12 18	+ 6	22 48	+31	—	—	—
Lincoln	E.	81·5	342	e 12 4	−12	i 22 9	−14	i 12 33	pP	e 34·4
Arapuni	E.	81·6	228	i 13 3	+47	—	—	e 35 15	?	38·5
New Plymouth	E.	81·8	226	12 15	− 2	22 47	+21	15 42	PP	—
Palomar		82·0	324	e 12 19	+ 1	i 22 32	+ 3	—	—	—
Pretoria	Z.	82·5	116	i 13 27	+66	—	—	—	—	—
Halifax		82·7	6	12 20	− 2	22 35	− 1	e 12 39	pP	45·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside		82·8	324	i 12 22k	0	—	—	i 12 39	pP	—
Auckland	N.	82·9	228	12 23	0	22 47	+ 9	12 51	pP	36·8
Ottawa		83·1	358	12 23k	− 1	22 35	− 5	12 41	pP	36·0
Pierce Ferry		83·1	327	i 12 24	0	e 22 39	− 1	i 23 7	sS	—
Boulder City		83·3	327	i 12 25	0	e 22 43	+ 1	e 12 41	pP	—
Pasadena		83·3	324	i 12 25k	0	i 22 42	0	i 12 41	pP	i 35·8
Overton	Z.	83·6	327	i 12 27	+ 1	—	—	e 38 50	P′P′	—
Shawinigan Falls	N.	84·2	0	12 28	− 1	22 40	−11	12 45	pP	—
Seven Falls	E.	84·8	1	12 35	+ 3	22 51	− 6	12 51	pP	46·6
Tinemaha	Z.	85·7	325	i 12 38k	+ 1	—	—	i 12 56	pP	—
Fresno		86·2	324	e 12 39k	0	e 23 41	+31	i 12 56	pP	e 42·4
Rapid City	E.	86·2	338	e 12 20?	−19	i 22 54?	[− 6]	i 12 32?	pP	—
Salt Lake City		86·2	331	e 12 37	− 2	i 23 7	− 3	e 15 49	PP	e 35·7
Lick	Z.	87·5	322	i 12 46	0	e 24 0	PS	—		—
Santa Clara		87·7	322	i 12 47	0	i 23 30	+ 5	i 13 5	pP	e 40·4
Branner	Z.	87·8	322	e 12 40	− 7	—	—	—	—	—
Berkeley		88·2	322	i 12 49k	0	i 23 33	+ 4	i 23 15	SKS	e 33·4
San Francisco		88·2	322	e 14 7	?	e 23 37	+ 8	—	—	—
Reno		88·4	325	e 12 51k	+ 1	e 23 34	+ 3	i 13 8	pP	e 43·0
Apia		88·6	254	e 12 55	+ 4	e 23 43	+10	e 13 24	pP	e 40·4
Ukiah		89·7	323	e 12 57	+ 1	e 23 45	+ 2	e 16 38	PP	e 37·0
Mineral		89·9	324	e 12 59	+ 2	e 23 53	+ 8	—	—	e 48·0
Bozeman		90·0	334	e 12 58	+ 1	i 23 47	+ 1	e 13 35	pP	e 39·5
Shasta Dam		90·6	324	e 12 56	− 4	—	—	i 13 16	pP	—
Butte	N.	91·0	333	e 13 4	+ 2	e 23 28	[− 2]	e 17 0	PP	e 33·2
Arcata		91·5	323	i 13 8k	+ 4	e 24 0	+ 1	i 15 44	?	e 47·0
Hungry Horse		93·5	334	i 13 12	− 2	—	—	e 13 33	pP	—
Saskatoon		94·5	339	13 12	− 6	24 25	0	e 13 31	pP	45·0
Tamanrasset	Z.	95·0	65	i 13 22a	+ 2	i 30 49	SS	i 13 41a	pP	45·0
Lisbon		96·1	45	13 31k	+ 6	24 22	[+24]	13 42a	pP	45·2
Seattle		96·1	329	e 13 40	+15	e 24 52	+13	e 17 49	PP	e 34·6
Victoria		97·2	329	13 30	0	24 8	[+ 4]	e 13 52	pP	39·8
Malaga	Z.	97·5	49	i 13 36k	+ 4	i 24 54	+ 4	13 50	pP	46·6
Riverview		97·7	216	i 13 35k	+ 2	i 24 53	+ 1	i 13 55	pP	44·6
Granada		98·3	49	i 13 47k	+12	i 24 21	[+12]	14 10	pP	i 45·2
Almeria		98·8	50	i 13 43	+ 5	i 25 2	+ 1	13 54	pP	44·6
Honolulu		99·1	290	e 18 6	PP	e 24 13	[0]	e 19 40	PPP	e 45·4
Toledo		99·8	47	i 13 46	+ 4	i 24 17	[0]	i 14 0	pP	42·2
Tananarive		100·3	124	e 18 0	PP	25 17	+ 3	e 18 18	PKP	e 47·0
Alicante		100·9	50	13 57	+10	25 11	− 8	14 11	pP	e 37·4
Brisbane		102·0	221	e 17 11	?	i 24 27	[− 1]	e 18 8	PP	—
Algiers		102·1	53	e 14 12	+20	e 25 40	+11	e 18 9	PP	46·0
Tortosa		103·1	49	14 16	+19	25 41	+ 4	14 47	pP	e 46·0
Barcelona		104·4	48	e 18 28	PP	i 24 39	[+ 1]	—	—	e 45·4
Tunis		106·6	56	e 14 44	P	i 24 52	[+ 4]	e 18 21	PKP	e 47·6
Jersey	E.	106·9	40	—	—	e 24 54	[+ 5]	e 28 7	PS	49·4
Clermont-Ferrand		107·6	45	i 14 37	P	i 24 59	[+ 6]	i 18 13	PKP	50·0
Sitka		108·7	330	e 14 24	P	26 22	− 2	e 19 4	PP	e 45·4
Paris		109·1	43	e 14 28	P	24 55	[− 4]	i 14 41	pP	e 54·0
Kew		109·2	40	e 14 39	P	e 24 59	[− 1]	e 14 49	pP	e 50·0
Catania		110·3	58	e 19 29	PP	e 28 27	PS	—	—	e 55·
Neuchatel		110·5	46	e 18 3	[−26]	e 25 35	[+30]	—	—	—
Durham	E.	110·6	36	—	—	i 25 7	[+ 2]	—	—	—
Edinburgh	E.	110·6	34	18 34	[+ 5]	25 35	[+30]	19 20	PP	—
Pavia		110·8	48	e 19 15	PP	—	—	—	—	—
Messina		111·0	57	e 19 44	PP	e 28 38	PS	—	—	—
Rome		111·0	53	e 14 9	P	i 25 7	[0]	19 11	PP	e 52·0
Basle		111·1	46	e 18 30	[0]	e 25 9	[+ 2]	e 20 12	PP	—
Prato		111·2	51	i 19 44	PP	i 29 46	PPS	—	—	—
Zürich		111·6	46	e 18 35	[+ 4]	e 25 7	[− 2]	e 19 32	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bologna		111·7	50	e 18 34	[+ 3]	e 26 21	S	e 34 13	SS	—
Salo		111·8	48	e 15 59	P	e 25 9	[− 1]	e 19 26	PP	—
Aberdeen	E.	111·8	33	i 19 1	PP	i 25 9	[− 1]	i 28 37	PS	54·4
Strasbourg		111·8	45	e 14 48	P	i 25 12	[+ 2]	i 18 16	PKP	48·0
Chur		111·9	47	e 17 43	?	—	—	—	—	e 50·0
Padova		112·0	50	18 33	[+ 1]	e 25 14	[+ 3]	e 19 25	PP	—
De Bilt		112·3	41	e 14 57	P	i 25 13	[+ 1]	i 19 29	PP	e 52·0
Stuttgart		112·7	45	e 14 43?	P	i 25 17	[+ 4]	15 0	pP	54·0
Taranto		113·3	56	e 19 5	PP	e 30 25	PPS	—	—	e 52·1
Triest		113·7	50	e 19 12	PP	e 25 4	[−14]	i 19 44	pPP	48·0
Scoresby Sund		114·2	16	19 51	PP	25 27	[+ 7]	28 51	PS	—
Jena	N.	115·1	45	e 15 9	P	e 25 29	[+ 6]	e 18 9	PKP	—
Zagreb		115·2	51	e 18 58	[+20]	—	—	e 19 26	PP	e 49·0
Collmberg		116·1	44	e 19 7	[+27]	e 25 27	[0]	e 19 39	PP	e 52·4
Prague		116·3	46	e 19 1	[+21]	e 25 27	[0]	—	—	—
Potsdam		116·7	43	e 18 22	[−19]	e 25 26	[− 2]	e 19 43	PP	e 55·0
Bergen		116·8	33		—	25 33	[+ 4]	29 29	PS	51·0
Kalossa	E.	117·4	51	e 20 15	?	e 25 30	[− 1]	e 30 19	PPS	e 61·0
Belgrade		117·5	54	e 18 41a	[− 2]	i 25 34	[+ 2]	e 22 28	PPP	e 57·6
Ogyalla		117·5	49	e 19 42	[+59]	e 25 30	[− 2]	—	—	—
Budapest	E.	117·8	50	e 20 0	PP	25 34	[+ 1]	30 54	PPS	e 54·0
	N.	117·8	50	e 20 9	PP	e 30 29	PPS	—	—	e 50·0
Copenhagen		117·9	40	e 19 1	[+18]	25 34	[+ 1]	20 7	PP	53·0
College		117·9	332	e 15 2	P	e 25 25	[− 8]	e 18 43	PKP	e 47·3
Helwan		118·1	73	15 24	P	i 25 37	[+ 3]	19 45	PP	—
Sofia		118·4	56	e 19 33	PP	i 25 39	[+ 4]	i 28 53	PS	i 58·9
Raciborzu		118·5	47	e 19 2?	[+17]	e 26 2?	[+26]	e 20 2?	PP	e 63·0
Skalnate Pleso		119·3	49	e 19 24	PP	e 24 38	[−61]	—	—	—
Bucharest	E.	120·9	56	e 20 10	PP	(e 25 43)	[− 1]	e 23 1	PPP	—
Istanbul		121·5	60	e 15 32	P	i 25 52	[+ 6]	—	—	—
Upsala		122·1	37	i 20 27a	PP	e 25 38	[−10]	e 35 57?	SS	e 51·0
Ksara		123·3	71	18 59	[+ 5]	—	—	28 29	PKKP	—
Helsinki		125·7	37	e 21 18	PP	e 26 17	[+18]	e 22 24	PKS	e 52·0
Yalta		126·3	58	i 19 2	[+ 3]	—	—	—	—	—
Simferopol		126·4	57	e 19 6	[+ 6]	e 27 49	SKKS	—	—	—
Theodosia		127·3	58	e 19 11	[+10]	—	—	—	—	—
Sotchi		129·8	61	e 19 9	[+ 3]	—	—	—	—	—
Moscow		131·4	45	19 12	[+ 3]	26 17	[+ 3]	e 19 25?	pPKP	—
Leninakan		131·8	65	e 19 19	[+ 9]	—	—	—	—	—
Erevan		132·1	67	19 18	[+ 7]	—	—	—	—	—
Grozny		133·9	63	e 19 19	[+ 5]	—	—	22 4	PP	—
Batavia		136·0	179	i 19 21a	[+ 3]	—	—	i 22 53	PP	68·0
Baku		136·1	68	e 19 18	[0]	—	—	—	—	—
Colombo	E.	140·3	134	19 18	[− 8]	—	—	—	—	65·3
Kodaikanal	E.	141·5	127	19 28	[0]	—	—	23 10	PP	—
Sverdlovsk		144·1	43	i 19 31	[− 1]	i 29 35	SKKS	i 22 57	PP	—
Bombay		144·4	113	i 19 39	[+ 6]	i 29 41	SKKS	i 23 5	PP	68·4
Poona		145·0	115	i 19 38	[+ 4]	i 32 48	PSKS	22 57	PP	67·0
Hyderabad	N.	147·5	121	23 39	PP	29 48	SKKS	42 21	SS	—
Samarkand		148·7	75	e 19 43	[+ 3]	e 30 5	SKKS	—	—	—
Stalinabad		149·9	76	i 19 43	[+ 1]	i 30 8	SKKS	i 23 2	PP	—
Obi-garm		150·6	76	i 19 47	[+ 4]	—	—	i 23 50	PP	—
Tashkent		150·7	71	i 19 46	[+ 3]	i 30 3	SKKS	i 23 25	PP	—
Tchimkent		151·0	69	i 19 52	[+ 8]	—	—	—	—	—
Andijan		153·0	73	e 19 49	[+ 3]	e 30 25	SKKS	e 23 50	PP	—
New Delhi	N.	153·2	101	e 19 50	[+ 3]	e 26 50	[+ 1]	e 20 8	PKP_2	—
Mizusawa	E.	153·6	283	19 56	[+ 9]	24 23	PP	—	—	—
Sendai		153·6	281	20 2	[+15]	—	—	—	—	—
Tokyo		154·0	275	20 1	[+13]	—	—	—	—	—
Dehra Dun	N.	154·7	99	e 19 57?	[+ 8]	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Frunse		154·8	68	e 19 54	[+ 5]	—	—	e 24 9 PP	—
Almata		156·4	66	e 20 1	[+10]	—	—	— —	—
Osaka		157·0	271	e 19 56	[+ 4]	—	—	— —	—
Calcutta	E.	157·6	128	e 20 2	[+ 9]	(i 26 58)	[+ 5]	e 20 38 PKP_3	—
Miyazaki		159·3	259	19 24	[−31]	—	—	— —	—
Hamada		159·9	268	19 54	[− 1]	34 41	PS	— —	—
Hukuoka		160·8	264	e 20 0	[+ 4]	—	—	— —	—
Irkutsk		165·6	7	e 20 3	[+ 2]	31 30	SKKS	21 19 PKP_3	—

Additional readings :—
Santa Lucia E = 1m.13s., N = 1m.34s., E = 1m.46s., N = 1m.52s., E = 2m.27s.
Copiapo E = 4m.27s. and 4m.50s.
La Plata iN = 3m.35s., iE = 4m.12s., iEN = 4m.52s., lSE = 5m.18s., E = 5m.34s.
Punta Arenas N = 4m.28s., 5m.1s., 6m.21s., 6m.40s., 7m.13s. and 7m.37s.
La Paz PPN = 5m.29s.
Bogota iZ = 7m.55s., iPP = 9m.11s., iP_cP = 10m.2s., i = 14m.34s.
San Juan iPP = 12m.1s., eS_cP? = 13m.59s., eSS? = 20m.59s., iSS? = 21m.2s.
Pueblo eSS = 22m.52s.
Tacubaya isS = 19m.13s., eS_cS = 20m.15s., eSS = 23m.12s.
Bermuda iPP = 14m.7s., ePPP? = 16m.6s., eSS? = 24m.57s., eSSS = 28m.27s.
Columbia e = 12m.21s., ePPP = 16m.3s., ePS? = 21m.25s., eSS? = 25m.14s.
Woodstock e = 15m.20s.
Philadelphia e = 14m.30s.
Tucson i = 13m.28s., iPP = 14m.45s., ePPP? = 16m.33s., e = 20m.49s., iS = 21m.53s., isS = 22m.14s., iPS = 22m.46s., eSS = 27m.2s., csSS = 27m.37s., eSSS = 30m.37s., ePKKP = 31m.0s., eSKP,PKP? = 39m.7s.
City College, N.Y., ePP = 14m.46s.
Fordham i = 12m.27s., iPP = 14m.57s.
Pennsylvania iPPN = 15m.0s., ipPPE = 15m.30s., iSSE = 26m.41s.
Cleveland ipPZ = 12m.21s., isPZ = 12m.28s., iPPN = 15m.3s., ipPPN = 15m.20s., eSN = 21m.54s., eN = 22m.11s., eE = 22m.17s., isSN = 22m.24s.
Wellington P_cPZ = 12m.31s., iZ = 15m.20s., PPPZ = 16m.51s., i = 17m.53s. and 18m.38s., PS?Z = 22m.47s., iZ = 25m.33s., Q = 33·2m.
Weston iPP = 15m.13s., SS = 27m.27s.
Harvard ePP = 15m.27s., csS = 22m.35s.
Chicago iP = 12m.10s., isS = 22m.33s., e = 25m.45s., eSS = 27m.24s., eSKP,PKP = 42m.18s.
Lincoln ePPE = 15m.30s., isSE = 22m.37s., eSSE = 27m.17s.
Arapuni eE = 14m.9s.
Palomar eS?N = 22m.22s., iE = 22m.58s.
Pretoria eZ = 13m.37s.
Halifax PP = 15m.43s., PS = 23m.23s., SS = 27m.53s.
Riverside iPPZ = 15m.52s., eZ = 58m.50s.
Auckland PPN = 16m.1s., pPP?N = 16m.25s., PPP?N = 18m.59s., SN = 23m.2s., PSN = 24m.8s., PPSN = 24m.37s., iN = 26m.5s., SSN = 28m.46s., PKKPN = 30m.5s.
Ottawa PP = 15m.35s., sS = 22m.59s., PS = 23m.33s., SS = 27m.15s.
Boulder City ePKKP = 30m.48s.
Pasadena iPPZ = 15m.55s., iSPEN = 23m.11s., ePKP,PKP,PKPZ = 59m.11s., iZ = 59m.27s.
Shawinigan Falls PPN = 15m.54s.
Seven Falls sSE = 23m.16s., PSE = 24m.8s., SSE = 34m.33s.
Fresno iN = 15m.27s., eSKSN = 23m.16s., eN = 26m.10s.
Rapid City ePP?E = 15m.40s.?, ePPP?E = 18m.10s.?, iSKSE = 22m.34s.?, eSS?E = 28m.34s.?, eSSSE = 32m.8s.?
Salt Lake City ipP? = 13m.17s., ePPP? = 17m.52s., eSKS = 22m.59s., isS = 23m.35s., eSS? = 28m.39s., eSSS? = 32m.44s.
Lick iEN = 12m.52s., iZ = 13m.7s.
Santa Clara iPPE = 16m.20s., isSEN = 23m.53s., eSSSE = 32m.57s.
Berkeley iE = 12m.53s., iZ = 13m.7s., iE = 13m.37s., iN = 13m.45s., iSN = 22m.39s., iSKSE = 22m.47s., eZ = 23m.21s. and 23m.53s., iE = 23m.59s., iN = 24m.2s., iE = 25m.23s., iN = 29m.49s.
Reno iPNZ = 12m.54s., eSN = 23m.37s.
Apia e = 13m.4s. and 13m.16s., eE = 25m.7s. and 25m.28s.
Ukiah iS = 24m.10s., epS = 24m.30s., isS = 24m.40s., eSS? = 29m.31s., eSSS? = 33m.25s.
Mineral ePE = 13m.3s.
Bozeman eSKS = 23m.18s., isS? = 24m.16s., eSS = 29m.17s.
Shasta Dam iP = 12m.59s.
Butte eN = 14m.6s., and 24m.19s., eSS?N = 29m.23s.
Arcata ePN = 13m.13s., ePE = 13m.17s.
Hungry Horse ePKKP = 31m.0s.
Saskatoon e = 13m.43s., PP = 17m.1s., PPP = 18m.58s., SKS = 23m.43s., SKKS = 24m.6s., PPS = 26m.33s., SS = 31m.8s., SSS = 34m.51s.
Tamanrasset z. iP = 13m.25s., i = 13m.28s., iPP = 17m.14s., i = 17m.22s., ipPP? = 17m.29s., eSP = 25m.47s., esSP = 26m.17s., isSS = 31m.43s., iSSS = 34m.15s., iPKP,PKP = 38m.29s., e = 40m.19s.

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Lisbon PP =17m.11s. and 17m.42s., iSKSEN =23m.59s., E =25m.6s., PSEN =25m.42s., iQE =38m.42s.
Seattle e =18m.6s., eSKS? =24m.34s., eSP? =25m.59s., ePS? =26m.34s.
Victoria PP =17m.30s., PPP =20m.40s., S =25m.18s., PS =26m.12s., SS =31m.10s.
Malaga PPZ =17m.30s., PPPZ =19m.34s., SKSZ =24m.2s., PSZ =26m.6s.
Riverview iEN =13m.39s., eZ =16m.52s., iZ =17m.18s. and 17m.35s., iEZ =17m.50s., iN =17m.57s., iZ =19m.2s., iSKSEN =24m.9s., iSKKSEN =24m.32s., iEN = 24m.39s., iN =25m.14s. and 26m.8s., iPSN =26m.25s., iE =26m.54s. and 32m.21s., iN =32m.24s., eQEN =41m.21s.
Granada iPP =17m.31s., pPP =17m.46s., sPP =18m.4s., PPP =20m.1s., S =25m.31s., PPS =26m.43s., iSS =31m.43s., SSS =35m.19s.
Almeria PP =17m.38s., PPP =19m.46s., iSKS =24m.14s., iSKKS =24m.38s., PS = 26m.30s., PPS =27m.14s., SS =31m.42s., SSS =35m.30s.
Honolulu eSKS =23m.50s., eS? =24m.43s., esS? =25m.23s., e =27m.1s., eSS =32m.12s., eSSS =35m.12s.
Toledo iPPE =17m.50s., iE =24m.46s., 25m.26s., and 26m.37s., eSSE =32m.7s., eE = 35m.59s., QE =42m.14s.
Tananarive eSKS =24m.21s., SKKS =24m.55s., PPS =27m.17s., SS =32m.18s., SSS = 35m.39s., Q =42m.18s.
Alicante PP =17m.58s., PPP =20m.3s., SKS =24m.21s., SKKS =24m.45s., PS = 26m.19s., PPS =26m.55s.
Brisbane iSKSE =24m.30s., iSKKSN? =24m.58s., eSN =25m.49s., eN =33m.11s.
Algiers ipPP =18m.24s., iSKS =24m.29s., iSKKS =24m.55s., eSKKS =24m.59s., pS? =26m.1s., iPS =27m.19s., eSS =32m.1s.
Tortosa PPN =18m.28s., pPP?N =19m.7s., sPP?N =19m.32s., iSKSEN =24m.31s., SKKSEN =24m.58s., PSEN =27m.30s., PPSEN =28m.29s., SSEN =32m.50s., SSSEN =36m.33s., eQN =43·0m.
Tunis ePP =18m.42s., e =19m.24s., ePPP =20m.55s., iSKKS =25m.18s., eS? =26m.21s., ePS? =27m.28s., eSS =33m.46s., eSSS =37m.28s.
Jersey eSS? =34m.7s., e =43m.57s.
Clermont-Ferrand iPP =18m.44s., i =19m.9s. and 19m.15s., iPPP =21m.2s., eSKKS? = 25m.54s., iPS =28m.0s., eSPP =29m.18s., ePKKS =33m.17s., eSS =33m.59s., eSSS =37m.59s., Q =46·0m.
Sitka eSKS =25m.1s., iSP =28m.19s., iPS =28m.32s., eSS? =34m.1s., eSSS =38m.20s.
Paris ePKP =18m.18s., iPP =19m.5s., ePPP =21m.15s., PKS =22m.0s., SKKS = 25m.48s., S =26m.15s., ePS =28m.9s., i =28m.23s., PPS =29m.7s., i =30m.15s., eSS =34m.31s., SSS =38m.34s., eQ =46·0m.
Kew ePPNZ =17m.30s., e =18m.27s., ePKS =22m.43s., ePS =28m.12s., e =31m.19s. and 33m.15s., eSS =34m.11s., eSSSEN =37m.11s., eQEN =45·0m.
Edinburgh SKKSE =26m.6s., PSE =29m.7s.
Rome iPS =28m.30s., SS? =34m.44s.
Basle e =21m.35s.
Zürich eZ =17m.48s.
Bologna e =30m.27s. and 32m.21s., eSSS =37m.46s.
Salo ePS =28m.47s.
Aberdeen iPPSE =29m.37s., iE =31m.53s., eE =35m.22s., iSSSE =38m.27s., eE = 47m.32s.
Strasbourg e =15m.34s., 15m.56s., 18m.23s., 18m.52s., and 19m.2s., ePP =19m.13s., i =19m.20s. and 19m.29s., e =20m.31s. and 12m.36s., i =22m.4s., e =22m.38s., eSKS =25m.40s., iSKKS =26m.14s., iPS =28m.35s., e =30m.3s. and 30m.33s., iPKKS =33m.15s., i =34m.52s., eSS? =36m.4s., iSSS? =39m.14s., e =44m.8s.
Padova e =26m.18s. and 33m.13s.
De Bilt eZ =18m.57s., iPPP =21m.40s., ePS =28m.48s., eSS =34m.27s., eSSS =38m.57s.
Stuttgart ePKPZ =18m.26s., ePP =19m.2s. and 19m.32s., iPPP =22m.12s., eSKKS = 26m.18s., ePS =28m.36s. and 28m.57s., iPPS =30m.7s., eZ =32m.57s., eSS = 34m.57s., eSSS =39m.27s., e =45m.57s., eQ =51·0m.
Taranto e =37m.56s.
Triest iPPP =22m.6s., iSKKS =25m.45s., isSKS =26m.27s., iPS =29m.9s., ipPS = 30m.12s., iSS =35m.10s., iSSS =39m.8s.
Scoresby Sund 22m.39s., 29m.21s., and 33m.39s.
Jena ePP?N =20m.5s., ePPP?N =22m.29s., eN =29m.19s.
Zagreb e =19m.46s., eE =19m.59s. and 20m.15s.
Collmberg eE =19m.46s., eZ =20m.7s., eN =20m.24s., eE =20m.41s., ePPE =22m.41s., eE =25m.30s., eN =25m.33s., ePSE =29m.19s., ePSN =29m.30s., eSSE =36m.9s.
Potsdam iPPZ =19m.49s., ePPN =19m.53s., iPPPZ =22m.38s., iPSZ =29m.30s.
Bergen SKKSE =26m.47s., SSN =36m.5s., eE =36m.29s. and 36m.49s.?
Kalossa eN =20m.19s. and 20m.55s., eE =22m.57s., eN =30m.27s.
Belgrade iPPS =29m.43s., eSS =35m.46s.
Budapest eE =24m.24s., 30m.16s., 32m.10s., 32m.35s., and 36m.27s.
Copenhagen 20m.22s., SKKS =26m.57s. and 27m.26s., PS =29m.41s., 31m.9s., and 31m.21s., SS =36m.3s., SSS =40m.51s.
College ipPKP =19m.2s., esPKP =19m.27s., ePP =20m.2s., ipPP =20m.21s., eS? = 27m.34s., eSP =29m.35s., eSS =36m.1s., esSS =36m.38s.
Helwan eZ =18m.51s., iZ =19m.0s., PPPZ =22m.12s., SKSEN =26m.3s., SKKSE = 26m.53s., iN =28m.21s. and 29m.43s., PPSN =30m.0s.
Sofia i =20m.15s. and 26m.5s.
Raciborzu ePPP?N =21m.38s., eN =26m.12s., ePS?E =28m.40s.
Bucharest eE =20m.39s., iE =27m.19s., iS?E =30m.25s., true SKS is given as PP?.

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Upsala iPP?E =20m.42s., eE =23m.28s., eSKSE =25m.44s., eSKKSE =26m.57s.?, eSKKKSN =27m.16s., ePS?E =29m.42s., eSS?N =36m.57s.?, eSSSN =40m.57s?, eN =43m.57s?.
Helsinki e =21m.49s., 27m.16s., 27m.38s., 30m.44s., 34m.14s., and 36m.23s., eSS = 37m.50s., e =39m.20s., 40m.42s., and 46m.30s.
Moscow PP =21m.26s., pPP =21m.39s.?, PS =31m.34s.
Sverdlovsk iPKS =23m.17s., PPP =26m.11s., iSS =42m.15s., SSS =46m.21s.
Bombay iPPPEN =26m.8s., iPPSEN =35m.7s., iSSEN =41m.54s., iSSPEN =42m.24s., iSSSEN =48m.9s., QEN =58·0m.
Poona iPKP$_2$EN =19m.57s., PKSEN =23m.10s. and 23m.33s., iEN =24m.5s., 24m.24s., and 32m.19s., PSEN =32m.55s., SSEN =41m.5s., SSPEN =41m.44s., QEN =60·0m.
Hyderabad SKSPN =33m.28s.
Stalinabad eSKSP =33m.44s.
New Delhi iPKSN =23m.30s., iPPN =23m.39s., iSKKSN =30m.13s., iSKKKSN = 31m.5s., ePSKSN =34m.14s., iPPSN =37m.5s., iN =40m.31s., iSSN =43m.15s.
Mizusawa S?N =24m.19s.
Calcutta iSKPE =23m.35s., iSKSE =25m.54s., iPSKSE =33m.44s., iPPSE =37m.7s., true SKS is given as PPP.
Irkutsk PP =24m.49s.

April 20d. Readings also at 2h. (near Rome, near Puebla and Tacubaya), 3h. (Stuttgart), 4h. (Ashkabad, Overton, Pierce Ferry, Almeria, near Granada, Malaga, Puebla, near Oaxaca and Tacubaya), 5h. (College), 6h. (Pavia, Hungry Horse, and near Victoria), 9h. (Ashkabad), 12h. (near Puebla and Tacubaya), 14h. (Overton, Hungry Horse, College, Stuttgart, and near Obi-garm), 15h. (Mizusawa), 17h. (College), 20h. (Andijan, Obi-garm, Samarkand, Stalinabad, Tchimkent, and New Delhi), 21h. (Pierce Ferry, Shasta Dam, Ashkabad, near Apia, and near Granada), 22h. (near Tacubaya), 23h. (Batavia, Andijan, Obi-garm, Samarkand, and Stalinabad).

April 21d. Readings at 1h. (Santa Lucia (2)), 2h. (Pierce Ferry, Shasta Dam, and Hungry Horse), 5h. (near Andijan), 6h. (Ashkabad and near Pavia), 8h. (College, near Apia, near Obi-garm and near Fort de France), 9h. (Tucson, Boulder City, Pierce Ferry, Hungry Horse, Shasta Dam, and College (2)), 11h. (College, Stuttgart, and near Ashkabad (4)), 12h. (Boulder City, Pierce Ferry, Shasta Dam, College, and near Andijan (2)), 14h. (Collmberg, Stuttgart, College, and Santa Lucia), 15h. (College and Toledo), 16h. (near Taranto), 17h. (near Rome), 18h. and 19h. (near Andijan), 20h. (Victoria, Boulder City, Pierce Ferry, and near Tucson), 22h. (Tucson), 23h. (near Andijan and near Mizusawa).

April 22d. 1h. 2m. 32s. Epicentre 36°·5S. 113°·0W. (foreshock of 17h. 17m.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		41·7	64	e 7 50	− 2	e 14 7	− 3	e 10 32	PPP	e 18·9
La Paz		44·4	75	8 14	0	14 49	0	9 56	PP	20·6
Bogota		54·7	50	e 9 30	− 3	e 16 55	−18	—	—	25·5
Tacubaya		57·1	16	(i 9 27)	−23	(17 45)	0	(18 10)	PPS	—
Tucson		68·4	2	e 11 3	− 3	—	—	—	—	e 32·6
Palomar	N.	69·6	357	e 11 15	+ 2	—	—	—	—	—
Riverside	Z.	70·2	356	i 11 20	+ 3	—	—	—	—	—
San Juan		70·3	47	—	—	e 20 7	−22	—	—	e 33·7
Pasadena		70·4	356	i 11 19	+ 1	—	—	—	—	e 33·1
Boulder City		72·1	359	i 11 26	− 2	—	—	—	—	—
Pierce Ferry		72·3	0	i 11 26	− 3	—	—	—	—	—
Overton	Z.	72·7	359	e 11 31	− 1	—	—	—	—	—
Fresno	Z.	73·1	355	e 11 35	+ 1	—	—	—	—	—
Tinemaha	Z.	73·3	356	i 11 38	+ 3	—	—	—	—	—
Lick	Z.	73·9	353	i 11 41k	+ 2	—	—	—	—	—
Berkeley		74·5	353	i 11 40a	− 2	—	—	e 34 52	Q	e 36·9
Shasta Dam		77·3	353	i 11 42	−16	—	—	—	—	—
Logan		77·9	2	e 11 59	− 2	—	—	—	—	—
Hungry Horse		84·5	359	i 12 34	− 2	—	—	—	—	—
College		104·6	345	e 14 18	+ 9	—	—	—	—	—
Helwan	Z.	149·6	92	e 19 58	[+11]	—	—	—	—	—
Istanbul		150·2	69	e 20 2	[+14]	—	—	e 20 30	PKP$_3$	—
Ksara		154·5	87	e 20 49	[+55]	e 27 5	[+ 6]	—	—	—

Additional readings :—
La Paz SS =18m.6s.
Tacubaya readings have been increased by 3m.
Tucson e =19m.11s. and 22m.39s.
Berkeley eZ =11m.43s.
Long waves were also recorded at Honolulu, Auckland, and Wellington.

April 22d. 17h. 17m. 2s. Epicentre 36°·5S. 113°·0W. (as at 1h.).

A = −·3149, B = −·7417, C = −·5922 ; δ = −2 ; h = 0 ;
D = −·920, E = +·391 ; G = +·231, H = +·545, K = −·806.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Punta Arenas	N.	33·6	133	—	—	13 17	PcS	—	—	15·5
Santa Lucia	N.	34·6	98	—	—	12 27	+15	14 44	SS	—
Copiapo	N.	37·1	88	—	—	12 58	− 3	—	—	e 15·7
Huancayo		41·7	64	i 7 52	0	i 14 10	0	i 9 46	PP	e 16·6
La Plata		44·2	105	9 34	PP	14 55	+ 9	18 21	SS	20·4
La Paz		44·4	75	i 8 16a	+ 2	i 14 54	+ 5	i 8 37	pP	21·0
Bogota		54·7	50	i 9 31	− 2	i 17 7	− 6	i 20 49	SS	e 25·0
Wellington		54·9	241	17 48	S	(17 48)	+32	22 45	SSS	27·5
Arapuni	E.	55·5	245	—	—	e 18 28	+64	—	—	27·0
Christchurch		55·7	237	18 5	S	(18 5)	+39	21 24	SS	26·3
Tacubaya		57·1	16	i 9 34	−16	—	—	i 26 58	Q	e 28·8
Tucson		68·4	2	i 11 2	− 4	e 19 55	−12	i 14 7	PP	e 29·3
Palomar		69·6	357	e 11 14	+ 1	—	—	e 11 24	?	—
Riverside	Z.	70·2	356	e 11 15	− 2	—	—	i 11 19	?	—
San Juan		70·3	47	e 11 29	+12	e 20 21	− 8	—	—	e 32·6
Pasadena		70·4	356	e 11 16	− 2	e 20 28	− 2	i 11 21	?	i 29·7
Fort de France		70·6	54	e 10 57?	−22	—	—	—	—	—
Boulder City		72·1	359	i 11 26	− 2	—	—	—	—	—
Pierce Ferry		72·3	0	i 11 27	− 2	—	—	—	—	—
Overton	Z.	72·7	359	i 11 30	− 2	—	—	—	—	—
Fresno	Z.	73·1	355	e 11 36	+ 2	—	—	—	—	e 37·1
Tinemaha	Z.	73·3	356	i 11 38	+ 3	—	—	—	—	—
Lick	Z.	73·9	353	i 11 39a	0	—	—	i 11 42a	pP	—
Berkeley		74·5	353	i 11 46	+ 4	e 26 4	SS	e 34 34	Q	e 35·7
Riverview		74·9	239	i 11 45a	+ 1	i 21 58	PS	—	—	35·2
Reno		75·9	355	e 11 50	0	—	—	i 11 55	?	—
Salt Lake City		76·9	2	e 11 56	0	e 22 11	+28	—	—	e 33·6
Shasta Dam		77·3	353	i 11 56	− 2	—	—	i 12 24	pP	—
St. Louis		77·7	18	e 12 1	+ 1	i 21 45	− 7	e 26 5	SS	—
Logan		77·9	2	e 12 0	− 1	—	—	e 14 31	PP	e 38·1
Bermuda		82·1	40	e 12 38	PcP	e 22 38	0	e 28 13	SS	e 34·1
Cleveland		82·8	23	e 12 27	0	e 22 35	−10	e 24 7	PPS	35·7
Pennsylvania	N.	83·4	26	i 12 39	PcP	e 22 46	− 5	e 24 36	PPS	—
Philadelphia		83·7	29	—	—	e 22 45	− 9	e 27 22	?	e 37·0
Hungry Horse		84·5	359	i 12 36	0	—	—	i 12 42	?	—
Victoria		85·1	353	12 38	− 1	—	—	—	—	41·0
Weston		87·2	29	e 12 28	−21	23 27	− 1	—	—	—
Ottawa		88·2	25	12 59	+ 5	23 36	− 2	29 22	SS	43·0
Sitka		95·6	348	—	—	e 30 15	?	—	—	e 45·5
College		104·6	345	e 14 11	+ 2	—	—	i 14 16	?	e 48·7
Granada		124·8	66	29 31k	PKKP	—	—	—	—	—
Tamanrasset	Z.	125·7	85	e 19 15	[+11]	—	—	e 20 57	PP	—
Kew		131·0	50	e 23 58?	PPP	e 38 27	SS	—	—	e 62·0
Clermont-Ferrand		132·2	58	e 19 29	[+13]	e 23 0	PKS	—	—	e 63·0
Paris		132·4	54	i 19 29	[+12]	—	—	e 22 1	PP	e 67·0
Strasbourg		135·8	55	—	—	e 44 58	SSS	e 57 58	Q	e 64·0
Stuttgart		136·7	55	e 19 36	[+12]	—	—	e 22 17	PP	e 70·0
Rome		138·0	65	—	—	e 42 0	SSP	e 46 2	SSS	—
Irkutsk		149·4	313	e 18 3?	?	—	—	e 20 20	?	—
Helwan	Z.	149·6	92	19 58	[+11]	—	—	e 23 40	PP	—
Istanbul		150·2	69	e 20 2	[+14]	—	—	e 21 16	?	—
Ksara		154·5	87	e 20 13	[+19]	35 55	PS	—	—	—
Sverdlovsk		159·2	10	e 20 44	PKP_2	e 44 12	SS	—	—	—
Bombay		161·7	198	e 21 4	PKP_2	—	—	e 21 25	?	—
Tashkent		174·9	340	e 20 24?	[+13]	e 29 2	?	e 22 2?	PKP_2	—

Additional readings :—
Huancayo e = 8m.40s.
La Plata N = 14m.6s. and 15m.7s., E = 20m.16s.
La Paz isP? = 9m.26s., iPPE = 10m.8s., iEN = 12m.54s., SS = 18m.16s., SSS = 19m.10s.

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Wellington iZ = 20m.24s., S = 21m.58s.
Christchurch eE = 21m.52s., SN = 23m.8s., QE = 24m.23s.
Tucson epP? = 11m.33s., ePPP = 15m.6s., e = 20m.48s.
Shasta Dam i = 12m.1s.
Hungry Horse i = 13m.27s.
Helwan PKP_2Z = 20m.44s., $pPKP_2$?Z = 21m.23s., eZ = 22m.14s., PP?Z = 24m.8s., eZ = 25m.23s.
Tashkent ePPP = 24m.47s.
Long waves were also recorded at Apia, Auckland, Honolulu, and at other North American and European stations.

April 22d. Readings also at 0h. (Copiapo), 1h. (Boulder City, Hungry Horse, Pierce Ferry, and Tucson), 2h. (College, Overton, and Apia), 3h. (Shasta Dam), 4h. (College, near Kulyab, and Stalinabad), 6h. (Boulder City, Hungry Horse, Pierce Ferry, Tucson, Pasadena, Riverside, and near Victoria), 7h. (College, Overton, and Bogota), 8h. (near Ashkabad), 9h. (College and near Andijan (2)), 10h. (College and Pierce Ferry), 12h. (Copiapo), 14h. (Overton), 18h. (College (2), Stuttgart, Murgab, Stalinabad, Obi-garm, Tashkent, and near Almata), 19h. (Brisbane), 20h. (Hungry Horse), 21h. (Helwan, Ksara, College, Boulder City, and Pierce Ferry), 23h. (near Murgab).

April 23d. 11h. 15m. 35s. Epicentre 7°·6S. 120°·7E. Focus at base of superficial layer.

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.
Batavia		13·8	275	i 3 16k	0	i 6 2	+14	—	—	9·5
Perth		24·6	190	5 17	− 1	9 27	− 7	9 50	SS	—
Brisbane		36·4	127	i 7 4	+ 1	i 12 40	− 2	i 7 28	PP	i 20·4
Melbourne	E.	37·3	148	i 7 15	+ 4	i 12 51	− 5	—	—	—
Riverview		38·4	138	i 7 18a	− 2	i 13 12	0	i 7 30	pP	e 19·7
Hukuoka		42·0	13	7 51	+ 1	13 5	−61	—	—	17·5
Koti		42·7	16	7 52	− 3	14 19	+ 3	9 47	PP	17·7
Colombo	E.	43·2	289	8 4	+ 4	14 54	+30	—	—	20·8
Calcutta	E.	43·6	314	e 8 10	+ 7	i 14 38	+ 8	i 9 46	PP	—
Osaka		44·3	18	e 8 10	+ 2	14 56	+16	—	—	17·9
Kodaikanal	E.	46·6	292	i 8 5	−22	e 15 25	+12	10 0	PP	23·9
Hyderabad	N.	48·6	301	8 41	− 1	15 35	− 6	10 32	PP	23·5
Sendai		49·4	22	8 48	0	15 46	− 6	18 11	ScS	—
Poona		53·0	300	i 9 13	− 3	i 16 33	− 9	9 29	pP	—
Bombay		54·0	300	9 21	− 2	16 57	+ 2	—	—	25·5
New Delhi		55·3	313	9 28	− 4	i 17 5	− 7	i 9 43	pP	i 25·1
Auckland	N.	57·0	129	—	—	18 44	+69	i 24 16	SSS	31·4
Arapuni	E.	58·0	131	—	—	17 55	+ 7	—	—	28·0
Wellington		58·4	135	9 53	− 2	17 45	− 9	18 32	PPS	32·9
Tuai	N.	59·3	31	10 0	− 1	18 0	− 5	—	—	—
Irkutsk		61·3	348	10 15	+ 1	18 33	+ 2	10 34	pP	—
Almata		64·3	326	e 10 37	+ 3	—	—	—	—	—
Frunse		65·4	324	e 10 42	0	e 19 27	+ 5	—	—	—
Kulyab		65·6	317	i 10 40	− 3	i 19 22	− 2	—	—	—
Apia		66·5	102	e 10 58	+10	—	—	—	—	e 39·4
Stalinabad		66·6	318	i 10 47	− 2	—	—	—	—	—
Semipalatinsk		67·6	334	e 10 55	0	—	—	—	—	—
Tashkent		67·7	320	i 10 56	0	i 19 54	+ 4	11 19	pP	—
Samarkand		68·3	318	i 10 59	− 1	i 19 59	+ 2	—	—	—
Tananarive		71·7	253	i 11 20	0	e 20 37	0	i 11 32	PcP	e 34·8
Ashkabad		73·5	313	e 11 33	+ 2	—	—	—	—	—
Sverdlovsk		80·7	331	i 12 11	0	i 22 15	0	i 12 33	pP	—
Grozny		84·4	315	12 32	+ 2	22 58	+ 5	—	—	—
Erevan		84·5	312	e 12 33	+ 2	—	—	—	—	—
Leniankan		85·1	312	12 32?	− 2	—	—	—	—	—
Piatigorsk		86·4	315	12 41	+ 1	—	—	—	—	—
Sotchi		88·7	314	e 12 51	0	23 45	+11	—	—	—
Pretoria	z.	89·0	245	i 12 53	0	—	—	i 13 5	pP	—
Grahamstown	z.	89·3	124	i 12 25	−29	—	—	—	—	—
Ksara		89·9	303	i 12 57	0	24 12	+27	i 13 25	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Moscow		92·3	326	e 13 5	− 3	e 24 3	− 3	—	—	—
Yalta		92·8	314	i 13 8	− 2	—	—	—	—	—
Helwan		93·2	299	13 7	− 5	24 45	+31	i 16 37	PP	—
Istanbul		96·2	310	i 13 24	− 2	—	—	i 17 17	PP	—
College		97·5	25	e 13 29	− 3	e 25 2	+12	e 17 25	PP	e 50·2
Helsinki		99·4	330	—	—	e 26 43	PS	e 29 27	PKKP	e 53·4
Belgrade		102·6	314	e 17 51k	PP	e 27 36	PS	e 32 45	SS	e 64·1
Upsala		103·1	329	—	—	e 24 25?	[− 7]	e 25 25?	S	e 42·4
Sitka		103·9	33	e 18 17	PP	e 26 0	+16	e 27 33	PS	e 43·4
Zagreb		105·6	315	e 18 31?	PP	—	—	—	—	—
Prague		106·2	320	e 18 32	P	—	—	e 36 54	SSS	—
Copenhagen		106·5	326	e 14 28	P	27 55	PS	i 18 44	PP	51·4
Messina		106·6	308	e 18 35	PP	e 28 3	PS	—	—	—
Potsdam	z.	106·7	322	i 18 38a	PP	i 28 48	PPS	—	—	e 55·5
Collmberg		106·9	321	e 17 38?	PKP	e 26 49	+40	e 18 44	PP	e 55·9
Rome		108·6	311	e 14 31	P	e 28 8	PS	e 18 50	PP	—
Padova		108·7	314	e 18 50	PP	—	—	—	—	—
Bergen		109·0	332	—	—	e 29 15?	PPS	e 38 45	SSS	e 47·4
Bologna		109·1	313	e 19 14	PP	—	—	—	—	—
Prato		109·3	313	e 18 51	PP	—	—	—	—	—
Salo		109·5	315	19 25?	PP	—	—	—	—	—
Stuttgart		109·8	319	e 18 27	[0]	e 25 25	[+23]	e 19 5	PP	e 62·4
Strasbourg		110·8	319	e 18 33	[+ 4]	e 24 42	[−24]	e 19 3	PP	e 40·1
Basle		111·1	317	e 18 50	[+20]	—	—	—	—	—
De Bilt		111·5	323	i 19 15	PP	e 28 41	PS	e 40 25	SSS	e 56·4
Victoria		112·7	40	e 18 30	[− 3]	e 29 0	PS	—	—	53·4
Aberdeen	E.	113·8	329	e 20 3	PP	i 30 1	PS	—	—	e 67·8
Paris		114·1	320	i 18 37	[+ 1]	e 29 3	PS	i 19 34	PP	66·4
Clermont-Ferrand		114·5	317	e 19 14	PP	e 22 18	PKS	i 19 34	PP	59·4
Ukiah		114·9	50	—	—	e 29 12	PS	—	—	e 58·3
Kew		115·0	323	e 19 37	PP	e 29 7	PS	e 34 51	SS	e 57·4
Shasta Dam		115·2	48	e 18 37	[− 1]	—	—	e 15 0	P	—
Berkeley		115·9	51	i 18 40k	[+ 1]	e 29 33	PS	19 59	PP	e 57·8
Tamanrasset	z.	116·1	292	e 19 41	PP	e 29 17	PS	e 36 25?	SS	55·4
Santa Clara		116·3	51	e 19 56	PP	i 29 20	PS	e 20 11	pPP	e 62·9
Lick	z.	116·5	51	e 18 41	[0]	—	—	i 19 42	PP	—
Reno	z.	117·4	49	e 18 42	[0]	—	—	e 19 55	PP	—
Fresno		118·1	51	e 18 57	[+13]	—	—	e 19 58	PP	—
Hungry Horse		118·6	38	i 18 43	[− 2]	e 19 54	PP	e 18 59	pPKP	—
Alicante		119·0	310	19 28	?	30 54	PPS	21 5	?	e 67·4
Tinemaha		119·2	51	i 18 45	[− 1]	—	—	i 20 6	PP	—
Pasadena		119·9	54	i 18 48	[+ 1]	i 30 4	PS	i 20 10	PP	—
Riverside		120·6	54	i 18 49	[0]	e 32 41	PKKS	i 20 11	PP	—
Almeria		120·9	308	20 14	PP	27 22	SKKS	38 14	SS	67·4
Palomar		121·1	55	e 18 53	[+ 4]	—	—	—	—	—
Saskatoon		121·2	32	e 19 54	PP	e 29 2	PS	—	—	52·2
Toledo		121·2	312	e 18 7	?	e 23 28	PPP	e 20 14	PP	—
Boulder City		122·1	51	i 18 52	[+ 1]	—	—	—	—	—
Overton	z.	122·3	51	e 18 52	[0]	—	—	—	—	—
Malaga	z.	122·4	309	e 18 51	[− 1]	30 17	PS	i 20 25	PP	67·2
Logan		122·6	44	i 18 51	[− 1]	e 31 43	PPS	e 20 30	PP	—
Pierce Ferry		122·8	51	i 18 53	[0]	e 28 13	SKKS	—	—	—
Tucson		126·3	55	e 18 59	[0]	e 30 20	PS	i 20 54	PP	e 59·5
Chicago		137·7	32	e 22 9	PP	e 26 44	[+18]	e 40 26	SS	e 57·6
St. Louis		138·4	37	e 19 14	[− 8]	—	—	i 22 11	PP	—
Tacubaya		139·6	68	e 19 30	[+ 6]	—	—	—	—	—
Ottawa		139·8	17	19 25	[0]	22 59	PKS	22 21	PP	75·4
Cleveland		140·9	27	i 19 22	[− 5]	e 23 1	PKS	e 22 25	PP	—
Pennsylvania	E.	143·0	24	i 19 30	[0]	e 41 34	SKP,P'	e 22 42	PP	—
Harvard		143·6	14	i 19 29	[− 2]	—	—	i 19 43	pPKP	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
	°	°	m. s.	s.	m. s.	s.	m. s.			m.
Weston	143·8	14	i 19 29	[− 3]	e 33 1	SKSP	i 22 47	PP		—
Fordham	144·4	17	i 19 31	[− 2]	—	—	i 19 46	pPKP		—
Mobile	144·6	45	i 19 35	[+ 2]	—	—	i 22 49	PP		—
Philadelphia	144·8	20	e 19 33	[− 1]	—	—	e 23 1	PP		e 64·0
Georgetown	145·0	23	i 19 34	[0]	—	—	i 19 49	pPKP		—
Washington	145·0	23	i 19 36	[+ 2]	e 26 49	[+11]	e 22 55	PP		e 72·8
La Paz	154·5	161	i 19 51 a	[+ 3]	i 26 53	[+ 3]	i 20 13	pPKP		73·4
Bermuda	154·8	10	e 20 15	[+26]	e 30 20	SKKS	i 24 0	PP		—
Huancayo	154·8	141	e 19 51	[+ 2]	e 30 42	SKKS	i 23 56	PP		e 64·7
San Juan	167·4	31	e 20 4	[+ 2]	e 44 14	SS	e 24 48	PP		e 86·8
Fort de France	172·7	14	e 20 4	[− 1]	e 25 24	PP	e 21 32	PKP_2		—

Additional readings :—
Brisbane iSE =12m.44s., iSSNZ =15m.13s.
Riverview iZ =7m.41s., iE =13m.0s., iN =13m.8s., iN =13m.25s., iE =13m.31s. and 13m.39s., iSSZ =15m.56s., iS_cSE? =17m.18s., iN =17m.50s., iE =18m.6s.
Calcutta iP_cPE =10m.6s., iSSE =17m.33s., iS_cSE =18m.10s.
Hyderabad SSN =19m.6s.
Poona sPN =9m.41s., P_cPEN? =10m.41s., PPEN =11m.22s., S_cSEN =19m.6s.
New Delhi iSE =17m.10s., iN =21m.48s. and 22m.6s.
Auckland iN =19m.4s. and 26m.46s., e =27m.25s. and 28m.25s.
Wellington i =18m.56s., e =24m.16s., i =27m.9s., Q =31·2m.
Irkutsk ePP =12m.36s., sS =19m.8s.
Tashkent eSS =24m.31s.?
Tananarive e =11m.6s., eS =20m.43s., e =21m.43s., SS =25m.13s.
Sverdlovsk iPP =15m.23s., PS =23m.6s., iSS =27m.41s.
Grahamstown iZ =12m.37s.
Helwan iZ =13m.37s., PPZ =16m.56s., eE =24m.25s., PSZ =26m.40s., PPSZ =27m.10s.
College i =13m.43s., e =16m.51s., ePKKP? =29m.37s., ePSPS =32m.10s., cPKP,PKP = 38m.22s.
Helsinki e =35m.1s., 35m.52s., and 39m.45s.
Upsala eE =27m.16s. and 31m.25s.?, eSSN =32m.25s.?, eSSS?E =35m.56s. and 36m.54s.
Sitka eSS =33m.17s., e =33m.57s., eSSS =37m.38s.
Copenhagen 26m.19s., PPS =28m.49s., SS =33m.55s.
Potsdam cE =18m.46s.
Collmberg eEZ =18m.57s.
Rome SS =34m.3s.
Padova e =19m.49s.
Stuttgart ePKPZ =17m.48s.?, epPKP?Z =18m.55s., eZ =19m.17s., ePPP =21m.26s., eS =26m.37s., ePS =28m.27s., ePPS =29m.28s., eSS =34m.17s. and 34m.36s.
Strasbourg ePP =19m.8s. and 19m.13s., e =19m.30s. and 19m.51s., cPPP =21m.43s., ePS =28m.52s., ePPS =29m.46s., e =30m.55s., eSS =34m.47s., eSSS =38m.49s.
Victoria e =19m.20s.
Aberdeen iPPSE =30m.43s., iE =57m.22s., eE =64m.24s.
Paris e =18m.23s., i =18m.42s. and 18m.49s., ipPP =19m.47s., e =20m.5s.? and 31m.3s., eQ =57·4m.
Clermont-Ferrand ePS =29m.24s., ePPS =30m.24s., eSS =35m.22s.
Kew ePPZ =20m.4s., ePPSZ =29m.27s.
Berkeley iZ =18m.52s.a, eZ =19m.38s., eN =29m.35s., iN =35m.51s.
Lick eZ =18m.55s., iZ =20m.0s., eZ =22m.21s.
Reno eNZ =18m.56s., eN =20m.16s., eE =20m.21s.
Fresno eZ =20m.22s.
Alicante PPP =23m.40s., PPS =32m.24s., SS =37m.38s., SSS =42m.4s., Q =50m.28s.
Tinemaha iZ =19m.1s., ePKKPZ =29m.0s.
Pasadena iZ =19m.2s. and 20m.3s., iPKKPZ =28m.58s., epPKKPZ =29m.11s., eSKKPZ =32m.44s.
Riverside iZ =19m.4s. and 20m.52s., ePKKPZ =28m.55s.
Almeria PP =21m.50s., PKS =23m.48s.
Boulder City e =19m.22s.
Malaga PPPZ =23m.15s.
Pierce Ferry eP? =15m.39s., e =19m.28s.
Tucson iPKP =19m.14s., ePPS =32m.24s., e =39m.14s.
Chicago e =22m.50s. and 31m.54s., ePPS =34m.56s., e =42m.34s.
Ottawa PS =32m.37s., PPS =34m.45s., SS =39m.55s.
Cleveland ePPSN =35m.29s.
Harvard iPP =22m.46s.
Weston i =19m.37s., eSS =41m.27s.
Fordham ePP =23m.8s.
Philadelphia i =20m.8s.
Washington e =34m.6s.
La Paz iE =20m.47s., iPPEZ =23m.52s., ipPPEN =24m.27s., PPPZ =27m.17s., SKKP =28m.35s., SKKS =30m.41s., eSSE =43m.31s.
Bermuda e =34m.45s. and 38m.55s., eSS =42m.43s.
Huancayo iPKP =19m.59s., i =20m.57s., iSKSP =34m.7s., ePPS =37m.37s., eSS = 43m.33s., e =45m.6s., eSSS =49m.41s.
San Juan ePPP =28m.51s., e =33m.1s. and 48m.48s.
Long waves were also recorded at Honolulu and Seven Falls.

April 23d. Readings also at 0h. (Huancayo, La Paz, Bogota, near Santa Lucia, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, and Victoria), 1h. (College), 2h. and 5h. (near Ashkabad), 8h. (near Ashkabad, near Stalinabad, and near Bogota), 9h. (Boulder City, Overton, Pierce Ferry, Shasta Dam, Berkeley, Branner, Reno, Santa Clara, near Fresno, and Lick), 11h. (Shasta Dam, Hungry Horse, Stuttgart, and near Ashkabad), 13h. (Ashkabad (2) and near La Paz), 15h. (Boulder City, Pierce Ferry, La Paz, Grahamstown, and Pretoria), 16h. (near Obi-garm), 18h. (Overton, near Kulyab, and near Obi-garm), 20h. (near Grozny), 21h. (Collmberg, Strasbourg, Stuttgart, Clermont-Ferrand, Paris, Istanbul, and near Helwan).

April 24d. 4h. 22m. 8s. Epicentre 27°·2N. 56°·2E.

Damage and casualties at Bandu Abbas, according to a press report quoted by Triest. Epicentre as adopted ; depth probably greater than normal (Strasbourg).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Samarkand		15·2	33	i 3 35	− 3	—	—	—	—	—
Stalinabad		15·5	40	i 3 39	− 3	i 6 33	− 2	—	—	—
Kulyab		15·7	44	i 3 46?	+ 2	—	—	—	—	—
Obi-garm		16·1	41	i 4 0?	PP	—	—	—	—	—
Erevan		16·2	326	e 3 54	+ 4	—	—	—	—	—
Leninakan		17·0	326	3 53	− 8	—	—	—	—	—
Bombay		17·4	115	i 4 5	− 1	7 20	+ 1	—	—	8·9
Tashkent		17·7	34	i 4 7	− 3	i 7 24	− 2	i 4 28	PP	—
Grozny		18·2	335	e 4 18	+ 2	7 38	+ 1	—	—	—
Poona		18·4	113	i 4 17	− 1	e 7 43	+ 2	4 39	PP	8·8
New Delhi		18·6	81	i 4 17	− 4	i 7 46	0	i 4 29	PP	8·9
Ksara		18·7	294	i 4 23a	+ 1	8 1?	+13	—	—	—
Andijan		19·0	41	4 24	− 2	—	—	—	—	—
Dehra Dun	N.	19·4	75	e 3 42?	−48	e 7 25	−39	—	—	e 10·3
Sotchi		21·1	326	i 4 50	+ 2	i 8 46	+ 7	—	—	—
Frunse		21·7	40	e 4 54?	− 1	—	—	—	—	—
Helwan		22·0	282	i 4 59	+ 1	i 9 10	+14	5 31	PPP	—
Hyderabad	N.	22·7	111	5 2	− 2	9 14	+ 5	10 16	SSS	—
Almata		23·2	41	i 5 12	+ 3	—	—	—	—	—
Theodosia		24·4	322	i 5 32	+11	9 42	+ 3	—	—	—
Yalta		24·7	320	i 5 25?	+ 1	9 45?	+ 1	—	—	—
Simferopol		25·0	321	5 30	+ 3	9 53	+ 4	—	—	—
Kodaikanal	E.	26·2	126	i 5 37	− 1	i 10 17	+ 8	—	—	13·4
Istanbul		26·3	309	i 5 43	+ 4	i 10 30	+19	—	—	—
Calcutta	E.	29·5	92	e 6 10	+ 2	i 11 11	+ 9	i 7 4	PP	—
Bucharest		29·6	314	e 6 14	+ 5	e 10 57	− 7	i 12 47	SS	—
Semipalatinsk		29·6	32	e 6 10?	+ 1	—	—	—	—	—
Sverdlovsk		29·8	5	i 6 8	− 3	i 11 2	− 5	i 7 7	PP	—
Colombo	E.	30·2	128	6 15	+ 1	12 17	+64	—	—	15·7
Sofia		30·8	308	e 6 22	+ 2	11 30	+ 7	12 48	SS	—
Moscow		31·5	340	i 6 26	0	i 11 34	0	—	—	—
Belgrade		33·5	311	e 6 42k	− 1	i 12 16	+11	—	—	e 19·4
Taranto		34·7	302	6 48	− 6	12 29	+ 5	e 8 4	PP	e 19·2
Kalossa		35·1	314	e 6 58	+ 1	e 12 31	+ 1	e 8 25	PP	e 17·9
Budapest		35·3	315	6 52	− 7	12 34	+ 1	8 20	PP	18·9
Messina		35·7	300	7 4	+ 2	12 44	+ 5	—	—	—
Catania		36·0	297	e 7 5	0	e 12 51	+ 7	—	—	—
Ogyalla		36·0	315	e 6 58	− 7	e 12 37	− 7	—	—	—
Zagreb		36·8	311	7 10	− 1	e 13 0	+ 4	e 8 42	PP	e 20·9
Raciborzu		36·9	319	e 7 13	+ 1	e 13 28	+30	i 8 49	PP	e 19·9
Triest		38·3	310	i 7 24a	0	i 13 16	− 3	i 7 40	pP	e 19·9
Rome		38·5	304	i 7 27	+ 1	e 13 13	− 9	8 0	pP	—
Prague		39·1	317	7 30	− 1	e 13 35	+ 4	—	—	—
Helsinki		39·2	336	i 7 31a	0	e 13 30	− 2	e 9 2	PP	e 20·9
Padova		39·3	308	7 37	+ 5	13 44	+10	16 59	SSS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bologna		39·7	307	i 7 38 a	+ 2	e 13 50	+10	e 8 7	pP	e 23·5
Prato		39·8	307	e 7 38	+ 2	i 13 42	0	—	—	—
Tunis		39·9	295	i 7 39	+ 2	i 13 47	+ 4	i 9 19	PP	e 25·1
Collmberg		40·4	318	e 7 42	+ 1	e 14 2	+12	e 9 20	PP	e 20·9
Salo		40·5	310	i 7 42	0	13 50	− 2	i 9 16	PP	—
Potsdam		40·7	320	i 7 46 a	+ 2	i 13 46	− 9	i 9 46	PcP	e 20·0
Jena		41·1	317	e 7 48	+ 1	e 14 0	− 1	e 17 39	SSS	e 19·2
Pavia		41·3	309	i 7 51 a	+ 2	e 16 25?	SS	e 9 42	PP	—
Chur		41·4	311	i 7 50 a	0	e 14 1	− 4	—	—	—
Ravensburg		41·5	311	e 7 52	+ 2	e 14 2	− 5	—	—	—
Upsala		41·9	332	8 1?	+ 7	i 14 8	− 5	9 38 k	PP	e 20·9
Stuttgart		42·0	314	i 7 54 a	0	e 14 7	− 7	e 9 39	PP	e 20·9
Zürich		42·1	312	i 7 56 a	+ 1	i 14 10	− 6	—	—	—
Copenhagen		42·3	325	i 7 59 a	+ 2	14 15	− 4	17 22	SS	17·9
Basle		42·8	312	e 8 2 a	+ 1	e 14 21	− 5	—	—	—
Strasbourg		42·9	313	i 8 1	− 1	i 14 22	− 5	e 9 45	PP	23·4
Neuchatel		43·2	312	e 8 4	0	e 14 26	− 6	—	—	—
Irkutsk		43·6	41	i 8 8	0	14 30	− 8	10 3	PP	—
De Bilt		45·3	318	i 8 22 a	+ 1	i 15 5	+ 3	i 10 14	PP	e 21·9
Algiers		45·6	295	i 8 26	+ 2	15 10	+ 4	e 9 58	PP	23·9
Clermont-Ferrand		45·6	308	i 8 25	+ 1	i 15 26	+20	i 10 16	PP	23·9
Tamanrasset	Z.	45·9	277	i 8 29 k	+ 3	i 15 24	+13	i 10 20	PP	21·9
Barcelona		46·2	302	e 10 17	PP	e 13 59	PcS	—	—	e 24·4
Paris		46·4	312	i 8 30	0	i 15 15	− 3	e 10 20	PP	26·9
Tananarive		46·6	191	e 8 32	0	i 15 25	+ 4	10 27	PP	e 22·9
Tortosa		47·4	301	i 8 40	+ 2	i 15 34	+ 2	9 18	pP	e 24·1
Bergen		47·7	329	8 44?	+ 4	15 44?	+ 8	e 10 44	PP	—
Alicante		48·3	298	8 45	0	i 15 50	+ 5	9 4	pP	e 23·1
Kew		48·5	316	i 8 46 a	0	e 15 46	− 2	i 10 44	PP	e 24·9
Jersey	E.	49·4	313	e 8 53	0	e 16 2	+ 2	e 19 52?	?	27·9
Almeria		50·0	296	i 9 4	+ 6	i 16 16	+ 7	10 22	PcP	29·5
Granada		50·8	297	i 9 2 k	− 2	i 16 19	− 1	9 17	pP	i 27·0
Edinburgh	E.	50·9	321	8 35	−30	—	—	10 29	PP	—
Toledo		50·9	300	i 9 6	+ 1	i 16 22	+ 1	e 11 7	PP	23·9
Malaga	Z.	51·5	297	i 9 13 k	+ 4	i 16 15	−14	11 23	PP	25·2
Lisbon		55·0	299	9 37 a	+ 2	17 20	+ 3	17 27	PS	23·4
Batavia		59·1	116	i 10 0 a	− 4	i 18 8	− 3	—	—	—
Pretoria	Z.	59·2	209	i 10 27	+22	—	—	—	—	—
Scoresby Sund		60·7	338	i 10 16 a	+ 1	18 35	+ 3	19 45	ScS	—
Grahamstown	Z.	66·4	206	i 9 59	−54	—	—	—	—	—
Mizusawa	E.	69·7	55	11 14	0	e 20 21	− 1	—	—	—
College		86·4	10	i 12 45	0	e 23 14	[+ 2]	e 15 48	PP	e 47·5
Seven Falls	E.	92·0	326	13 7	− 5	23 47	[+ 3]	28 52	?	45·9
Ottawa		95·5	328	13 29 k	+ 1	24 8	[+ 4]	17 17	PP	45·9
Sitka		95·5	6	e 13 30	+ 2	e 23 59	[− 5]	e 17 17	PP	e 47·0
Weston		95·5	323	e 13 25	− 3	e 24 7	[+ 3]	e 17 12	PP	—
Fordham		98·0	324	e 17 38	PP	e 24 20	[+ 3]	—	—	—
Philadelphia		99·3	324	e 17 48	PP	e 24 17	[− 7]	e 32 33	PSPS	e 47·1
Pennsylvania		100·0	326	e 17 48	PP	e 24 31	[+ 4]	e 31 52	SS	40·7
Columbia		107·0	324	—	—	e 28 13	PS	e 36 15	?	e 48·5
Georgetown		101·1	324	e 13 54	+ 1	—	—	e 18 5	PP	—
New Kensington	E.	101·1	327	—	—	e 24 39	[+ 7]	—	—	e 56·5
Cleveland		101·3	329	e 17 3	?	e 26 56	PS	—	—	—
Chicago		103·6	333	—	—	e 24 46	[+ 2]	—	—	e 51·3
Hungry Horse		104·3	353	e 14 10	+ 2	—	—	—	—	—
Victoria		104·6	359	e 18 34	PP	e 24 59	[+10]	e 21 40	PPP	51·9
Butte	N.	106·4	351	e 18 42	PP	e 27 58	PS	e 28 50	PPS	e 44·6
Bozeman		106·5	349	e 18 37	PP	e 33 7	SS	—	—	e 47·9
St. Louis		107·4	333	e 18 54	PP	i 25 7	[+ 6]	i 28 16	PS	—
San Juan		108·0	302	e 18 35	PP	e 25 11	[+ 7]	e 28 23	PS	e 46·7
Lincoln	E.	108·4	338	—	—	e 25 7	[+ 2]	e 28 25	PS	e 44·2
Riverview		108·4	119	—	—	e 25 10	[+ 5]	e 28 18	PS	51·0
Logan		110·5	349	e 18 33	[− 1]	e 25 55	{−13}	e 28 24	PS	e 49·3
Shasta Dam		112·4	358	e 18 33	[− 5]	—	—	i 19 26	PP	—
Berkeley		115·7	357	e 19 33	PP	i 29 32	PS	e 55 16	Q	e 58·5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick	z.	115·8	357	i 18 48	[+ 3]	—	—	—	—	—
Tinemaha	z.	115·9	354	e 19 47	PP	—	—	—		—
Overton	z.	116·0	350	e 18 58	[+13]	—	—	i 29 26	PKKP	—
Fresno	z.	116·3	355	e 19 34	PP	—	—	—	—	—
Pierce Ferry		116·4	350	e 18 48	[+ 2]	—	—	e 19 38	PP	—
Boulder City		116·6	351	i 19 16	[+30]	—	—	e 29 12	PKKP	—
Pasadena		118·8	353	e 18 47	[− 3]	e 29 55	PS	i 20 10	PP	e 55·3
Riverside	z.	118·8	353	e 18 53	[+ 3]	—	—	e 20 6	PP	—
Tucson		119·6	346	e 18 55	[+ 3]	e 30 11	PS	e 20 11	PP	e 45·9
Bogota		122·5	296	e 20 47	PP	—	—	—	—	58·9
La Paz		127·6	269	i 19 11k	[+ 4]	i 38 24	SS	i 21 10	PP	58·9
Huancayo		132·2	278	e 19 22	[+ 6]	e 22 49	PKS	e 31 57	PS	e 53·1

Additional readings :—
Poona PPPE = 4m.45s., SSE = 8m.6s., SSSE = 8m.21s.
Calcutta iP_cPE = 9m.6s., iSSE = 12m.46s., iS_cSE = 16m.46s.
Bucharest eP_cPEN = 8m.59s., eSEN = 11m.23s., iSSN = 12m.58s., iS_cSN = 16m.33s., iS_cSE = 16m.41s.
Sverdlovsk iP_cP = 9m.11s., SS = 12m.35s.
Sofia S_cS = 18m.10s.
Belgrade iS = 15m.25s., eS_cS = 16m.38s.
Taranto e = 14m.49s.
Kalossa eN = 8m.57s., eE = 10m.46s., eN = 12m.41s., eN = 16m.54s.
Budapest iPE = 7m.0s., PPPN = 8m.35s., eN = 14m.2s., eSSE = 15m.9s., SSSN = 15m.19s., eSSSE = 15m.52s.?, iEN = 17m.52s.?
Zagreb eSSZ = 15m.45s., eS_cS = 17m.3s.
Raciborzu eN = 8m.3s.?, eP_cPNZ = 9m.42s., eN = 12m.31s. and 15m.20s., eSS?E = 15m.24s.
Triest iPP = 8m.55s., ipPP = 9m.20s., iP_cP = 9m.25s., isS = 13m.38s., iSS = 16m.27s.
Rome PP = 8m.46s., e = 13m.26s.
Padova PP? = 8m.43s.
Bologna iZ = 9m.19s., eZ = 10m.31s., eSS = 17m.3s.
Tunis i = 7m.59s. and 8m.23s., iPPP = 9m.39s., i = 10m.20s., 14m.24s., and 14m.50s., eSSS = 17m.8s.
Collmberg eE = 8m.7s. and 8m.16s., eP_cPZ = 9m.33s., eN = 14m.31s., eSSE = 16m.46s., eN = 16m.58s.
Potsdam iN = 8m.5s., iZ = 16m.33s.
Jena eS?E = 14m.3s., eN = 17m.58s.
Upsala iE = 10m.45s., i = 14m.34s., eSSE = 17m.8s., SSN = 17m.18s.
Stuttgart epP?Z = 8m.10s., eP_cPZ = 9m.1s., ePPP = 10m.57s., eSS = 17m.13s.
Copenhagen 9m.46s., 10m.55s., 14m.37s., and 15m.1s.
Strasbourg ePP = 9m.39s., iP_cP = 9m.52s., iPPP? = 10m.4s., eP_cS = 13m.44s., eS? = 14m.16s., iSS = 17m.32s., iS_cS = 17m.58s., iSSS = 18m.22s., and many other readings without phase.
Irkutsk SS = 17m.49s.
De Bilt iSS = 18m.22s.
Algiers ipP? = 8m.42s., i = 9m.5s., 15m.38s., and 15m.45s., e = 16m.38s., eSS = 18m.31s.
Clermont-Ferrand ipP? = 8m.58s., iSS? = 18m.59s.
Tamanrasset eSSZ = 18m.50s.
Paris i = 9m.2s., iP_cP = 10m.2s., ePPP = 11m.10s., i = 15m.24s., iPS = 15m.30s., eS_cS = 18m.20s., iSS = 18m.30s., iSSS = 19m.9s., eQ = 24·9m.
Tananarive eSS = 18m.40s., SSS = 19m.56s.
Tortosa P_cPN = 10m.2s., PPEN = 10m.35s., pPP?E = 11m.17s., PPPEN = 11m.39s., PSE = 15m.43s., PPSE = 15m.58s., SS?EN = 19m.21s., SSS?EN = 20m.52s.
Bergen SSEN = 19m.16s.
Alicante P_cP = 9m.58s., PP = 10m.42s., PPP = 11m.34s., P_cS = 14m.0s., PS = 16m.0s., PPS = 16m.6s., S_cS = 18m.20s., SS = 19m.18s., Q = 20m.12s.
Kew e = 16m.0s., eSS = 19m.41s., eE = 22m.57s.
Almeria PP = 11m.8s., PPP = 12m.6s., P_cS = 14m.22s., S_cS = 18m.54s., SSS = 21m.18s.
Granada sP = 9m.29s., P_cP = 10m.20s., iPP = 11m.8s., sS = 16m.32s., iSS = 20m.17s., SSS = 23m.56s.
Toledo i = 13m.3s., eSS? = 20m.23s., i = 20m.37s.
Malaga P_cPZ = 10m.35s.
Lisbon P = 9m.42s., pP?Z = 10m.15s., sS?EN = 18m.31s., SS?EZ = 21m.16s.
Mizusawa ePN = 11m.21s., SN = 20m.15s.
College ePPP? = 17m.45s., e = 23m.56s., eSS = 28m.44s., eSSS = 32m.54s.
Ottawa PS = 26m.8s., SS = 30m.40s.
Sitka ePPP? = 19m.35s., eS = 24m.57s., eSS = 31m.18s., ePSPS? = 31m.42s., e = 34m.7s., eSSS = 35m.30s.
Weston PS = 26m.7s., SSS = 38m.50s.
Pennsylvania eEN = 27m.18s.
Cleveland eE = 23m.30s., eN = 23m.33s., iE = 23m.36s., eN = 27m.7s.
Butte eSS?N = 32m.56s.
St. Louis eE = 26m.49s., eN = 29m.16s.
San Juan e = 19m.0s., eS? = 26m.59s., eSS = 33m.37s., ePSPS = 34m.41s., e = 39m.39s,

Continued on next page.

Lincoln ePPSE =29m.10s.
Riverview ePPSEN =29m.22s., eSSE =34m.7s., eSSSE =38m.7s., eQE =45·1m.
Shasta Dam i =19m.51s., eP(=PKKP) =29m.28s.
Berkeley iE =29m.52s.
Overton e =15m.35s.
Pierce Ferry eP(=PKKP) =29m.16s.
Pasadena eZ =19m.37s., iZ =21m.14s.
Tucson ePPP? =22m.36s., e =24m.46s., eS? =28m.35s., eP(=PKKP) =29m.5s., e = 32m.39s.
La Paz iEN =22m.32s.
Huancayo e =19m.54s., i =22m.52s., ePPS =34m.2s., eSS =39m.36s., e =45m.30s.
Long waves were also recorded at Ivigtut, Santa Clara, Salt Lake City, Seattle, Ukiah, and Tacubaya.

April 24d. Readings also at 1h. (Ashkabad (2), near Balboa Heights, and near Tacubaya), 2h. (Ashkabad), 3h. (Hungry Horse and near Kulyab), 4h. (Ashkabad, College (3), and Hungry Horse), 8h. (Ksara and College), 9h. (College, La Paz, Samarkand, Andijan, near Kulyab, Stalinabad, Obi-garm, and near Bogota), 12h. (Santa Lucia), 13h. (Ksara, Helwan, Istanbul, Ashkabad, College, and near Misusawa), 15h. (College, Ashkabad, and near Balboa Heights), 16h. (Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Mount Wilson, Andijan, near Stalinabad, and Obi-garm), 17h. (near Andijan), 18h. (near Boulder City and Pierce Ferry), 19h. (Overton), 20h. (Stuttgart, Collmberg, Raciborzu, Andijan, near Stalinabad, and Obi-garm), 21h. (near Murgab), 23h. (Messina, College, Boulder City, Hungry Horse, Pierce Ferry, and Shasta Dam).

April 25d. 5h. Undetermined shock.

Grahamstown iZ =6m.58s., eZ =9m.42s., iZ =22m.1s.
Pretoria iZ =8m.2s. and 8m.11s.
Tananarive eP =8m.38s., S =13m.0s., SS =14m.21s., eL =15m.1s.
Helwan ePZ =14m.54s., eZ =15m.30s. and 17m.52s.
Ksara eP =15m.15s.
College ePKP =23m.16s.
Pasadena ePKPZ =23m.20s., iZ =24m.12s., eZ =24m.35s.
Hungry Horse ePKP =23m.21s., e =24m.11s.
Pierce Ferry ePKP =23m.21s., e =24m.4s.
Tucson ePKP =23m.22s., i =23m.46s., e =24m.23s., ePP =27m.17s.
Riverside ePKPZ =23m.24s., eZ =24m.9s.
Boulder City ePKP =23m.32s., e =24m.6s.
Palomar eN =24m.7s.
Tinemaha iZ =24m.20s.
Shasta Dam iPKP =24m.37s., i =24m.43s. and 25m.22s.
Bogota eP? =37m.43s., e =44m.43s.
La Paz PEN =39m.10s., iSN =40m.24s., i =40m.46s. and 41m.0s., L =57m.0s.
Rome e =44m.52s.

April 25d. 13h. 55m. 0s. Epicentre 19°·5S., 69°·4W. Depth of focus 0·005.
(as on 1948, October 29d.).

Destructive at Iquique and Pisaqua (according to La Paz). Damage at Zapiga; felt strongly at Arica (press report). Intensity IV-V at Candarave; IV at Moquequa; III-IV at Iacna; III at Arequipa (Peru). Macroseismic radius about 900km.

Suggested epicentre: 19°·75S., 69°·W. (Pasadena).
20°·0S., 68°·7W. (J.S.A.).

F. Greve.
"Descripcion de los principalo efectos producidos por los siemos destructores de Chile y ubicacion de sus epicentros, Santiago de Chile, 1953, p. 26, with isoseismic chart.

E. Silgado.
"Datos sismologicos del Perú, 1949-1950," Instituto geologico del Perú, Lima, 1952, Bulletin No. 4, p. 11.

$A = +·3319$, $B = -·8830$, $C = -·3318$; $\delta = -6$; $h = +4$;
$D = -·936$, $E = -·352$; $G = -·117$, $H = +·311$, $K = -·943$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
La Paz		3·2	22	i 0 51k	+ 2	i 1 40	sS	i 1 0 pP	—
Copiapo	N.	7·9	186	e 1 44	−11	—	—	1 52 pP	—
Huancayo		9·4	321	i 2 21	+ 6	i 4 19	sS	— —	i 4·8
Santiago		13·9	184	i 3 12	− 3	i 6 2	sS	3 46 pP	—
Santa Lucia		13·9	184	e 3 11	− 4	5 46	− 2	3 25 pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata	E.	18·4	150	i 3 59	−13	7 8	−24	4 25	PP	8·0
	Z.	18·4	150	4 0	−12	7 24	− 8	—	—	8·0
Bogota		24·4	349	i 5 16	+ 3	i 9 31	+ 5	i 5 52	PP	13·0
Rio de Janeiro		24·7	103	i 5 15	− 1	i 9 30	− 1	5 40	pP	—
Balboa Heights		30·0	341	i 6 12	+ 7	e 11 12	+15	—	—	—
Galerazamba		30·6	350	e 6 37	pP	i 11 9	+ 3	e 14 21	Q	—
Punta Arenas	N.	33·6	181	6 34	− 2	11 41	−12	—	—	—
Fort de France		35·0	15	i 6 49	+ 1	i 12 3	−12	7 19	sP	e 16·7
San Juan		37·8	6	i 7 11	− 1	i 12 50	+ 7	i 7 40	pP	i 15·5
Merida		44·8	333	i 8 19	pP	e 14 50	+ 9	e 8 55	sP	—
Puebla		47·6	322	—	—	e 15 30	+ 9	e 16 14	sS	—
Tacubaya		48·5	322	i 8 43k	+ 5	i 15 43	+10	i 9 8	pP	i 20·2
Bermuda		51·8	6	e 9 0	− 3	i 16 12	− 7	e 10 40	PP	e 21·0
Mobile		53·1	340	i 9 14	+ 1	i 16 33	− 4	e 11 59	PPP	—
Columbia		54·3	348	e 9 22	0	i 16 53	0	e 9 47	pP	e 23·1
Little Rock		58·2	337	i 10 29	+39	i 18 21	+36	—	—	—
Georgetown		58·5	353	i 9 52	0	i 17 48	− 1	—	—	—
Washington		58·5	353	i 9 54	+ 2	e 17 54	+ 5	i 10 22	pP	e 28·5
Woodstock		58·9	354	e 9 46	− 9	e 17 41	−13	—	—	—
Cincinnati		60·0	346	i 10 2	0	—	—	i 10 20	pP	—
City College, N.Y.		60·2	357	e 10 5	+ 1	e 18 7	− 4	i 10 33	pP	—
Fordham		60·2	357	i 10 4	0	i 18 10	− 1	i 10 30	pP	—
New Kensington	E.	60·5	352	e 10 5	− 1	i 18 15	+ 1	i 10 31	pP	e 24·7
Pennsylvania		60·5	352	i 10 5	− 1	i 18 17	+ 3	i 10 24	pP	—
St. Louis		61·0	342	i 10 9	0	i 18 22	+ 1	i 10 36	pP	—
Weston		61·6	358	e 10 12	− 1	18 26	− 2	i 10 38	pP	—
Harvard		61·7	358	i 10 11	− 3	i 18 29	− 1	i 10 40	pP	—
Cleveland		61·7	349	i 10 14	0	i 18 30	0	i 10 41	pP	—
Chicago		63·4	344	i 10 22	− 3	i 18 42	− 9	i 19 32	sS	e 28·5
Ottawa		64·8	355	10 33	− 1	19 8	0	11 4	pP	37·0
Tucson		64·9	322	e 10 36	+ 1	e 19 13	+ 3	i 11 1	pP	i 27·1
Lincoln	E.	65·1	337	e 10 33	− 3	i 19 8	− 4	i 11 3	pP	e 26·6
Shawinigan Falls	N.	65·8	358	10 42	+ 1	19 16	− 5	11 6	pP	—
Seven Falls	E.	66·3	359	10 45	+ 1	19 26	− 1	i 11 15	pP	28·4
Palomar		69·4	319	i 11 5	+ 2	i 20 41	sS	i 20 53	PPS	—
Pierce Ferry		69·6	323	i 11 5	+ 1	e 20 9	+ 3	i 11 39	pP	—
Boulder City		69·9	322	i 11 7	+ 1	e 20 13	+ 3	e 21 0	sS	—
Overton	Z.	70·1	323	i 11 8	+ 1	i 20 52	S_cS	i 11 33	pP	—
Riverside		70·1	319	i 11 9k	+ 2	i 20 17	+ 5	i 11 36	pP	—
Rapid City	E.	70·4	335	i 11 0?	− 9	i 20 6?	− 9	i 11 28?	pP	e 28·8
Pasadena		70·7	319	i 11 12k	+ 1	i 20 24	+ 5	i 11 40	pP	—
Salt Lake City		71·7	328	e 11 16	− 1	i 20 34	+ 4	i 21 10	sS	e 28·8
Logan		72·5	329	e 11 19	− 3	i 20 38	− 2	i 21 13	sS	e 33·0
Tinemaha		72·7	321	i 11 25	+ 2	i 20 40?	− 2	i 11 52	pP	—
Fresno		73·4	320	i 11 28k	+ 1	e 20 55	+ 5	i 11 56a	pP	—
Lick		74·9	319	i 11 37k	+ 1	e 21 13	+ 7	—	—	—
Bozeman		75·1	331	e 11 39	+ 2	i 21 11	+ 2	i 21 55	PS	e 34·9
Santa Clara		75·1	319	e 11 38	+ 1	i 21 16	+ 7	e 12 16	sP	e 33·2
Reno		75·2	321	i 9 41k	−116	e 21 14	+ 4	—	—	—
Branner		75·3	319	i 11 41	+ 3	—	—	e 12 13	sP	—
Berkeley		75·6	319	i 11 41k	+ 1	e 21 20	+ 6	i 12 17	sP	—
Butte	N.	76·0	331	e 11 43	+ 1	e 21 14	− 5	e 12 17	pP	e 33·3
Mineral		76·8	322	e 11 50	+ 4	e 21 31	+ 4	e 27 0	SS	—
Ukiah		77·0	320	e 11 50	+ 2	e 21 35	+ 6	e 15 12	PP	e 33·9
Shasta Dam		77·5	322	e 11 49	− 1	e 21 22	−13	e 15 36	pPP	—
Saskatoon		78·3	338	11 56	+ 1	21 42	− 1	22 34	PS	38·0
Hungry Horse		78·4	331	i 11 55	0	e 21 44	0	e 12 24	pP	—
Arcata		78·6	320	i 12 0a	+ 4	e 21 55	+ 8	e 12 14	pP	—
Lisbon		80·8	44	12 10	+ 2	i 22 8	− 2	12 37	pP	37·3
Seattle		81·9	327	e 12 20	+ 6	e 22 26	+ 5	e 15 24	PP	e 37·4

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ivigtut		82·2	10	e 12 16	+ 1	i 22 26	+ 2	i 12 44	pP	39·0
Malaga	z.	82·9	47	i 12 17k	− 2	i 22 29	− 2	i 12 51	pP	39·7
Victoria		83·1	327	i 12 20k	0	i 22 37	+ 4	12 53	pP	34·0
Granada		83·7	47	i 12 27a	+ 4	i 22 39	0	13 6	pP	40·3
Grahamstown	z.	84·3	122	i 12 23	− 3	—	—	e 12 52	pP	—
Tamanrasset	z.	84·3	63	i 12 25k	− 1	e 22 40	− 5	i 12 52k	pP	39·0
Almeria		84·4	48	i 12 23	− 4	i 22 45	− 1	15 41	PP	40·5
Toledo		84·8	45	i 12 29	0	i 22 44	− 6	i 12 56	pP	41·7
Alicante		86·5	47	i 12 37	0	22 53	[− 2]	13 17	sP	e 41·0
Algiers		88·2	50	12 43	− 2	23 3	[− 3]	i 12 57	PP	42·0
Pretoria	z.	88·2	116	i 12 42	− 3	i 32 2	SSS	i 13 5	pP	—
Tortosa		88·3	46	e 12 55	+ 9	i 23 4	[− 2]	23 20	S_cS	42·0
Barcelona		89·7	45	—	—	i 23 12	[− 3]	—	—	e 36·9
Rathfarnham Castle		90·5	32	e 12 51	− 5	i 23 30	[+10]	—	—	—
Jersey	E.	90·7	37	e 13 30	sP	e 23 17	[− 4]	e 29 58	SS	45·0
Clermont-Ferrand		92·2	42	e 13 4	0	i 23 30	[0]	i 13 29	pP	43·0
Kew		92·8	35	i 13 5	− 2	e 23 29	[− 4]	e 13 35	pP	e 36·0
Paris		93·2	39	i 13 8	0	i 24 8	+ 1	i 13 34	pP	e 44·0
Edinburgh	E.	93·4	31	13 8	− 1	24 7	− 2	13 49	pP	—
Sitka		94·1	330	13 12	0	e 23 39	[− 1]	i 24 14	S	e 38·7
Aberdeen		94·6	30	—	—	i 23 37	[− 6]	i 24 20	S	44·9
Neuchatel		95·1	42	e 13 16	− 1	—	—	—	—	—
Wellington		95·3	222	13 16	− 2	23 38	[− 9]	17 2	PP	43·5
Christchurch		95·4	220	13 17	− 1	23 26	[−21]	17 4	PP	43·6
Honolulu		95·5	290	e 13 27	+ 8	e 24 49	+22	e 13 54	pP	e 44·2
Basle		95·7	42	e 13 30	+10	e 23 52	[+ 3]	—	—	—
Scoresby Sund		95·8	14	13 50	pP	24 26	− 3	23 46	SKS	—
Pavia		95·9	44	13 58	pP	—	—	—	—	—
De Bilt		96·1	36	e 13 12	−10	i 23 50	[− 1]	e 17 5	PP	e 40·0
Arapuni	E.	96·3	226	18 0	PP	24 6	[+14]	—	—	—
Strasbourg		96·3	40	e 13 19	− 3	e 23 49	[− 3]	e 13 50	pP	45·0
Zürich		96·3	42	e 13 23a	+ 1	e 23 46	[− 6]	e 16 45	PP	—
Chur		96·7	42	e 13 23k	− 1	e 23 51	[− 3]	—	—	—
Kaimata	N.E.	96·7	220	13 30	+ 6	—	—	—	—	—
Prato		96·7	46	i 17 24	PP	i 24 48	+11	—	—	—
Apia		96·8	253	e 13 20	− 5	—	—	e 17 14	PP	—
Salo		96·9	44	13 31	+ 6	i 23 54	[− 1]	e 14 2	pP	—
Rome		97·0	48	13 26	0	i 24 41	+ 1	i 17 15	PP	—
Bologna		97·1	46	e 13 32	+ 6	e 23 53	[− 3]	e 17 28	PP	—
Stuttgart		97·2	40	e 13 24	− 3	e 23 50	[− 7]	e 13 38	pP	e 40·0
Padova		97·4	45	e 13 45	pP	23 53	[− 5]	17 23	PP	—
Auckland	N.	97·5	226	—	—	24 45	+ 1	e 33 0?	?	42·0
Triest		99·1	44	e 13 47	pP	i 24 5	[− 1]	i 17 36	PP	e 47·0
Jena		99·4	39	e 13 26	−11	e 24 9	[+ 1]	e 17 35	PP	e 49·0
Bergen		99·5	28	(e 13 54)	pP	(24 10)	[+ 2]	(17 19)	PP	(40·0)
Taranto		99·0	51	e 14 8	pP	e 24 7	[− 3]	—	—	—
Collmberg		100·4	39	e 13 40	− 1	e 24 10	[− 3]	e 14 0	pP	e 42·0
Zagreb		100·6	45	e 13 49	+ 7	e 24 4	[−10]	e 17 51	PP	—
Potsdam		100·7	37	e 14 18	+36	i 24 12	[− 2]	i 14 34	pP	e 32·0
Prague		100·9	40	14 7	pP	24 13	[− 2]	—	—	—
Copenhagen		101·4	35	e 14 8	pP	i 24 16	[− 2]	i 17 55	PP	—
Ogyalla		102·6	43	—	—	e 23 51	[−32]	—	—	e 47·0
College		102·7	335	i 13 51	0	e 24 24	[0]	e 14 18	pP	e 44·9
Kalossa		102·8	44	e 17 50	PP	e 24 28	[+ 4]	e 27 8	PS	—
Budapest		103·1	44	e 18 10	PP	e 24 27	[+ 1]	28 16	PPS	43·0
Belgrade		103·4	47	e 18 3a	PP	i 24 25	[− 2]	(e 32 27)	SS	e 32·5
Sofia		104·9	49	e 18 8	PP	i 24 30	[− 4]	i 25 16	SKKS	—
Upsala		105·2	31	e 18 14	PP	e 24 33	[− 2]	25 44	S	e 43·0
Tananarive		107·1	118	18 35	PP	24 42	[− 1]	19 1	pPP	e 51·1
Bucharest	E.	107·2	48	e 18 41	PP	i 24 42	[− 2]	e 26 19	S	—

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		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		108·5	64	e 14 18	P	i 24 48	[− 2]	14 44	pP	—
Istanbul		108·8	52	e 14 21	P	i 28 8	PS	—	—	—
Helsinki		108·9	30	—	—	i 24 44	[− 7]	e 25 35	SKKS	e 49·0
Ksara		113·0	61	e 18 41	[+11]	i 28 49	PS	—	—	—
Yalta		113·0	49	18 0	[−30]	—	—	—	—	—
Theodosia		113·9	48	e 19 23	PP	—	—	—	—	—
Riverview		114·4	216	e 14 45	P	i 25 13	[0]	e 15 26	sP	e 52·8
Moscow		115·5	36	18 35	[0]	25 14	[− 4]	19 36	PP	—
Sotchi		116·9	50	e 19 22	PP	—	—	—	—	—
Brisbane		117·8	223	i 19 55	PP	i 25 28	[+ 2]	i 29 44	PS	—
Grozny		121·3	50	20 7	PP	—	—	—	—	—
Baku		124·5	53	e 18 34	[−18]	—	—	—	—	—
Sverdlovsk		127·6	31	18 58	[0]	25 56	− 2	i 21 0	PP	—
Perth		128·6	186	i 21 5	PP	i 35 40	?	—	—	—
Ashkabad		131·3	56	e 19 7	[+ 2]	—	—	—	—	—
Samarkand		137·6	52	e 19 21	[+ 5]	—	—	—	—	—
Tashkent		138·8	48	e 19 12	[− 7]	i 22 39	PKS	i 28 54	SKKS	—
Stalinabad		139·2	52	e 19 18	[− 1]	—	—	e 22 8	PP	—
Obi-garm		139·9	52	i 18 24?	[−57]	—	—	—	—	—
Kulyab		140·1	53	i 19 16	[− 5]	—	—	—	—	—
Andijan		141·1	48	e 19 18	[− 5]	—	—	—	—	—
Frunse		141·8	44	e 19 25	[+ 1]	e 23 1	PKS	e 22 26	PP	—
Almata		143·1	41	e 19 25	[− 2]	—	—	—	—	—
Murgab		143·1	50	i 19 27	[0]	—	—	—	—	—
Bombay	E.	144·4	84	i 19 29	[0]	26 15	[−15]	e 22 44	PP	68·0
Poona		145·3	86	19 33	[+ 2]	i 29 32	SKKS	i 19 58	pPKP	69·0
Kodaikanal		146·7	100	i 19 35	[+ 2]	—	—	—	—	—
Irkutsk		146·9	7	19 36	[+ 3]	29 41	SKKS	i 20 10	pPKP	—
Mizusawa		147·2	313	19 39	[+ 5]	20 27	?	e 19 43	PKP	—
Colombo	E.	147·6	108	19 41	[+ 7]	—	—	—	—	74·0
New Delhi		148·3	67	e 19 40	[+ 4]	e 27 41	[+66]	i 41 35	SS	—
Dehra Dun	N.	148·7	63	e 20 18?	pPKP	—	—	—	—	—
Batavia		154·2	171	i 20 5	pPKP	i 30 8	SKKS	(43 4)	SS	43·1
Calcutta	E.	159·0	77	i 20 1	[+11]	30 45	SKKS	—	—	—

Additional readings and notes :—
La Paz iN =1m.9s.
Copiapo ePE =1m.48s., E =2m.11s. and 2m.29s.
Santa Lucia N =3m.43s. and 4m.23s., E =4m.32s., N =4m.41s., E =5m.48s., eN = 6m.2s.
La Plata E =4m.55s., Z =5m.2s., E =5m.34s., and 6m.5s., Z =7m.10s.
Bogota i =6m.32s., iS_cP? =12m.39s., eS_cSEN =18m.23s.
Punta Arenas N =7m.15s., 8m.29s., and 9m.25s., iN =13m.23s.
San Juan isP =7m.56s., iPP =8m.28s., iP_cP =8m.52s., iP_cS =13m.11s., isS =13m.56s.
Merida esS =15m.37s., e =18m.7s.
Puebla eSS =19m.9s.
Tacubaya 9m.17s., isS =16m.21s., i =17m.45s., iSS =19m.7s.
Bermuda ePPP? =11m.26s., iS =15m.53s., iS_cS =18m.40s.
Mobile e =9m.52s., 17m.10s. and 21m.26s.
Columbia eP_cP? =10m.21s., eS =16m.47s., isS =17m.35s., iS_cS =19m.1s., i =19m.50s., eSS =20m.45s.
Washington esS? =18m.44s.
Cincinnati iPP =12m.47s.
City College N.Y. e =14m.3s. and 14m.36s.
Fordham i =14m.34s., isS =18m.53s.
Pennsylvania eSPN =10m.31s., iN =11m.32s., eE =11m.46s., eEN =13m.29s., eSSN = 22m.9s., eN =24m.26s.
St. Louis isP =10m.47s., iP_cP =11m.2s., i =11m.47s., iPP =12m.3s., ipPP =12m.30s., eS_cP =14m.36s., i =15m.41s., e =17m.13s., iS =18m.10s. and 18m.17s., ipS = 18m.46s., isS =19m.5s., ePKP,PKP =39m.31s.
Weston sS =19m.12s., SS =22m.42s.
Harvard isS =19m.12s., eS_cS =19m.48s., esS_cS? =20m.42s., eSS =22m.20s.
Cleveland iEN =10m.18s., isPN =11m.1s., eSN =18m.21s., iSE =18m.27s., isSE = 19m.12s., isSN =19m.17s., iE =20m.45s.
Chicago i =19m.16s., iSS? =23m.33s.
Ottawa PP =13m.43s., PPP =15m.2s., sS =19m.52s., PS =21m.3s., SS =23m.30s., SSS =26m.48s.
Tucson esP =11m.12s., ePP =13m.20s., epPP =13m.37s., iPPP? =15m.6s., e =18m.25s., isS =19m.57s., eS_cS =20m.13s., ePKP,PKP =39m.15s.
Lincoln iPE =10m.36s., ePPE =12m.55s., isSE =19m.52s., eSSE =23m.34s.

Continued on next page.

Shawinigan Falls sSN =20m.3s., SSN =26m.36s.
Seven Falls sSE =20m.11s., PSE =21m.14s.
Pierce Ferry esS? =20m.29s., eS_cS? =20m.57s.
Overton iPKP,PKPZ =39m.7s.
Riverside eZ =19m.39s., eE =21m.2s., ePKP,PKPZ =39m.5s.
Rapid City ePP?E =14m.6s.?, ePPP?E =15m.30s.?, isSE =20m.50s.?, eSSE =24m.30s.?, eSSSE =27m.38s.?
Pasadena iZ =11m.53s., iPPZ =13m.50s., iSP?Z =20m.59s., ePKP,PKPZ =39m.6s.
Salt Lake City ipP? =11m.57s., e =14m.32s., 21m.0s., and 21m.52s., esPS? =22m.4s., eSS =25m.19s., eSSS? =28m.13s.
Logan ipP? =11m.59s., iPP =14m.18s., e =14m.48s., iPPP =15m.37s., i =24m.34s., esS =25m.31s., iSSS =28m.41s., ePKP,PKP =39m.0s.
Fresno iP_cPNZ =11m.36s.a, isPZ =12m.10s., iN =12m.22s., eN =21m.40s. and 22m.5s.
Lick eEN =11m.40s., iE =11m.48s., iZ =12m.11s.
Bozeman ePP? =14m.56s., ePPP =16m.29s., eSS =26m.9s., esSS? =26m.31s., eSSS =29m.48s.
Santa Clara isSE =21m.57s., eSSE =26m.40s.
Berkeley iE =12m.23s., iPPE =15m.16s., iPPN =15m.26s., iSN =20m.27s., eZ =21m.57s., isSE =22m.8s., iN =26m.26s., iSSE =27m.34s., iSSSN =30m.30s.
Butte eN =15m.14s., ePPP?N =16m.38s., ePSN =22m.15s., eSSN =26m.13s., eSSS?N =30m.1s.
Mineral iPN =11m.55s.
Ukiah epPP? =15m.25s., ePPP =17m.17s., eS_cS =21m.55s., ePS =22m.55s., eSS =26m.46s., eSSS? =30m.51s.
Saskatoon SS =27m.1s.
Hungry Horse i =11m.58s., iPP? =15m.31s., iS_eS? =22m.4s., esS =22m.30s.
Lisbon SP =22m.51s., iPSN =22m.59s., NZ =23m.52s., SSEN =27m.30s., Q?EN =32m.42s.
Seattle eSS =27m.38s., e =29m.40s., eSSS =30m.50s.
Ivigtut iS =22m.20s. and 23m.8s., iSS =27m.33s., i =28m.23s., SSS =31m.18s.
Malaga PPZ =15m.33s., PPPZ =17m.33s.
Victoria PS =23m.24s., PPS =24m.43s.
Granada P_cP =12m.42s., sP =13m.33s., iPP =15m.53s., pPP =16m.33s., PPP =17m.39s. pPPP =18m.18s., sS =23m.31s., PPS =24m.26s., iSS =27m.57s., sSS =29m.54s., SSS =32m.3s.
Grahamstown eZ =12m.33s.
Tamanrasset iP_cPZ =12m.27s.a, isPZ =13m.12s.k, iPPZ =15m.46s.k, ipPPZ =16m.10s.k, iPPPZ =17m.31s.k, eZ =22m.56s., iSPZ =23m.30s., iPSZ =23m.41s., eSS?Z =27m.52s.
Almeria PPP =17m.33s., iS =22m.57s., iS_cS =23m.5s., PPS =24m.17s., SS =28m.33s., SSS =31m.53s.
Toledo iZ =13m.16s., iPPZ =15m.48s., iE =23m.35s., iN =28m.18s., eN =31m.44s.
Alicante P_cP =13m.1s., PP =16m.13s., PPP =18m.5s., S_cS =23m.13s., PS =24m.35s., SS =29m.1s., SSS =32m.1s., Q =36m.5s.
Algiers PP =16m.22s., iS =23m.26s., iPS =24m.31s., iPPS =24m.52s., SS? =29m.0s.
Pretoria eZ =12m.48s., eZ =38m.36s.
Tortosa PSN =24m.12s., PPSE =24m.34s., eQ?N =36m.0s.?
Jersey epPP?E =17m.1s., esS?E =24m.18s.
Clermont-Ferrand iP? =13m.11s., i =13m.38s., isP =13m.44s., i =14m.29s., iPP? =16m.35s., iS =23m.42s., i =24m.21s., iPS =25m.5s., iSS =29m.35s., iSSS? =32m.48s.
Kew ePP =16m.31s., ePPP =19m.39s., eS =24m.26s., isSEN =25m.19s., e =29m.35s., eSSZ =31m.11s., eEN =32m.1s., eSSS =33m.35s.
Paris i =13m.24s., ipP =13m.38s., isP =13m.52s., iPP =16m.48s. and 16m.52s., iSKS =23m.32s., iPS =25m.23s., SS =29m.37s., eSSS =34m.0s.?, iPKP,PKP =38m.29s.
Edinburgh PPE =17m.3s., SKSE =23m.27s., sSE =25m.19s., PSE =25m.52s., PPSE =26m.33s., iE =30m.15s., SSE =30m.43s., SSPE =30m.51s.
Sitka ePP =17m.5s., isPP =17m.42s., ePPP =19m.5s., iSKS =23m.43s., iSP =25m.35s., eSS =30m.24s., isSS =31m.32s., iSSS =34m.25s.
Aberdeen iSPE =25m.41s., iPPSE =26m.22s., iSSE =30m.55s., iSSSE =35m.3s., iE =41m.42s.
Wellington iZ =13m.56s., PP =17m.18s., iZ =17m.31s., PPPZ =18m.54s., PS =25m.34s., PPSZ =26m.12s., i =27m.4s., PKKP =30m.27s., SS =31m.41s., SSS =35m.20s., SKKS =37m.35s., PKP,PKP =39m.15s., SKKKS? =41m.48s., PKP,PKS =42m.21s.
Christchurch iZ =13m.55s. and 17m.51s., PPPZ =18m.48s., iEZ =22m.40s., PS =25m.7s., iZ =26m.4s., SS =31m.38s., SSSEN =36m.5s., QN =37m.15s.
Honolulu e =17m.45s. and 26m.56s., eSS? =31m.35s., eSSS? =35m.46s.
Scoresby Sund 25m.24s. and 30m.54s.
Pavia e =45m.58s.
De Bilt ePPS =25m.54s.
Strasbourg isP? =14m.14s., ePP =17m.13s. and 17m.18s., epPP? =17m.47s., ePPP =19m.31s. and 19m.36s., iS =24m.27s. and 24m.31s., isS? =25m.24s., iPS =25m.58s., ePS =26m.1s., ePPS =26m.43s., iPPS =26m.50s., iSS =31m.7s., isSS =31m.47s., iSSS =34m.40s., and many other readings without phase.
Zürich eS =24m.23s.
Apia eEN =21m.0s.?
Salo PP =17m.12s., eS =24m.34s., ePS =25m.40s.
Rome iSKS =23m.51s.

Continued on next page.

Bologna eSKKS =24m.46s., e =28m.18s.
Stuttgart ePZ =13m.32s., e =13m.54s. a, eZ =14m.4s., 14m.17s., 14m.20s., and 16m.12s., ePP =17m.10s., iPP =17m.22s., e =18m.0s. and 22m.12s., ePS =26m.4s., ePKKP? =30m.24s., e =33m.49s.
Padova e =24m.53s.
Triest ipPP =18m.3s., iSKKS =24m.35s., iS =24m.50s., iPS =25m.41s., iPPS =26m.25s., iSS =31m.27s.
Jena ePP?N =17m.27s., eS?N =24m.58s., ePS?N =26m.26s., ePS?Z =26m.29s., ePS?E =26m.33s., eE =30m.28s., eN =30m.51s., eSS?E =32m.21s., eSS?N = 32m.30s.
Bergen eN =(23m.18s.) and (25m.2s.?), SSE =(30m.26s.), PKKPN =(31m.10s.), eN = (36m.30s.), readings reduced by 1m.
Taranto e =16m.49s., 28m.27s., and 38m.39s.
Collmberg eE =13m.44s., eZ =13m.51s., 13m.56s., and 14m.48s., ePPEZ =17m.46s., eN =24m.15s., eE =25m.3s., ePSZ =26m.30s., eE =26m.39s., eSSN =31m.47s.
Zagreb eE =16m.41s., e =26m.49s., 27m.31s., 32m.14s., 37m.42s., 41m.49s., and 48m.0s.?
Potsdam eE =14m.23s., iSKS?N =24m.20s.
Copenhagen 18m.14s., pSKS =24m.49s., S =25m.6s., sS =26m.6s., SP =26m.46s., 27m.30s.
College iPP =18m.0s., epPP =18m.34s., ePPP? =20m.37s., i =26m.7s., eSP =27m.11s., eSS =32m.31s., eSSS =36m.32s.
Kalossa eN =18m.7s., eE =28m.24s.
Budapest SKSE =25m.14s., eN =26m.20s., SKKSE =27m.13s., SKKSN =27m.25s., PSN =28m.20s., eN =32m.16s., SSE =33m.0s.?, eSSN =37m.30s.
Upsala iPP?N =18m.27s., iPKS?N =21m.20s., eN =23m.49s., eSKSE =24m.30s., eSKKSE =25m.10s., eN =26m.35s., iPSE =27m.22s., PPS?N =28m.36s., eSS = 33m.0s.?, eSSS?E =38m.0s.?
Tananarive sSKS =25m.30s., eSKKS =26m.14s., SP =27m.42s., SS =33m.43s., SSS = 37m.28s., Q =45m.24s.,
Bucharest eN =18m.48s., eE =25m.35s.
Helwan eZ =18m.12s., PP?Z =18m.38s., pPP?Z =19m.2s., iZ =19m.20s. and 19m.46s., iSEN =25m.38s., eZ =26m.29s. and 27m.55s., eE =28m.54s. and 33m.6s.
Helsinki ePS =28m.0s., e =28m.39s. and 29m.51s., eSS =33m.10s., e =33m.56s.
Riverview iPP =19m.30s., iZ =19m.41s., i =19m.49s. and 20m.6s., iZ =20m.11s., ePPPZ =22m.1s., ipPPPZ =22m.26s., iSKKSE =25m.59s., iEN =26m.23s., iSN = 27m.5s., ipSN =27m.41s., iSPN =28m.55s., iPSZ =29m.8s., iPSEN =29m.13s., ipPSEN =29m.34s., isPSZ =29m.45s., iSPPE =29m.56s., iSPPZ =30m.0s., iPPSN =30m.13s., iSSN =35m.17s., eN =35m.41s., isSSE =36m.5s., iPKP,PKPZ =39m.24s., eQE =47·3m.
Moscow pPP =20m.5s., esSKS =25m.59s., SKKS =26m.28s., PS =28m.52s., SS = 35m.22s.
Brisbane iE =20m.26s., iSN =29m.50s.
Sverdlovsk iSKKS =27m.43s., SKSP =30m.41s., iSS =37m.58s.
Bombay iPKSE =23m.36s., ePPPE =25m.29s., PKKPE =28m.28s., iSKKSE = 29m.29s., SKSPE =32m.56s., PSE =33m.36s., iSSE =41m.28s., iSSSE =46m.58s., QE =60·0m.
Poona iE =20m.18s., PPE =22m.48s., iPKSE =23m.9s., iPKS$_2$E =23m.34s., iE = 30m.23s., iPSE =33m.11s., SSE =41m.7s., SSPE =41m.40s., QE =47m.0s.
Irkutsk PP =23m.12s.
New Delhi iEN =23m.35s., iSKKKSEN =29m.44s., iEN =30m.24s., iN =44m.46s. and 52m.51s.
Calcutta iE =21m.47s., and 32m.21s., SKSPE =34m.41s., iE =39m.6s.

April 25d. 19h. 25m. 40s. Epicentre 2°·5S. 146°·5E.

A = −·8331, B = +·5514, C = −·0433 ; δ = −3 ; h = +7 ;
D = +·552, E = +·834 ; G = +·036, H = −·024, K = −·999.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane		25·6	167	e 5 34	+ 2	i 10 0	+ 1	i 6 5 PP	—
Riverview		31·5	172	5 50	−36	e 11 33	− 1	i 13 24 SS	e 15·0
Perth		41·1	221	—	—	i 18 12	SSS	i 19 28 Q	i 20·5
Auckland	N.	43·0	146	—	—	e 18 20?	SSS	—	—
Christchurch		47·0	154	—	—	19 20?	?	—	—
Calcutta	E.	61·9	297	e 10 21	− 3	e 18 51	+ 4	—	—
Irkutsk		65·1	333	e 10 42?	− 3	19 25?	− 2	—	—
Almata		77·0	316	e 11 48	− 8	—	—	—	—
Murgab		78·0	310	e 12 5	+ 3	21 53	− 2	—	—
Frunse		78·5	314	11 58?	− 6	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		79·7	312	e 12 9	− 2	—	—	—	—	—
Stalinabad		82·0	310	e 12 23?	0	i 22 32?	− 5	—	—	—
Tchimkent		82·0	313	e 12 28	+ 5	—	—	—	—	—
College		82·1	23	e 12 23	− 1	e 22 40	+ 2	e 29 4	?	e 42·4
Tashkent		82·1	312	e 12 24	0	e 22 31	− 7	—	—	—
Sitka		85·8	32	—	—	e 23 30	+15	—	—	e 38·8
Sverdlovsk		89·8	327	13 3	+ 1	e 23 48	− 5	—	—	—
Shasta Dam		92·5	50	e 13 14	0	—	—	—	—	—
Pasadena		95·8	56	e 13 21	− 8	—	—	e 18 8	?	e 43·9
Riverside	z.	96·5	56	e 13 35	+ 3	—	—	—	—	—
Hungry Horse		98·1	41	e 13 39	− 1	—	—	e 13 42	PcP	—
Overton	z.	98·8	54	e 13 54	+11	—	—	e 17 4	PP	—
Pierce Ferry		99·1	54	i 13 59	+15	—	—	—	—	—
Tucson		102·0	58	e 17 32	?	—	—	—	—	—
Ksara		108·5	305	e 18 55	PP	e 29 19	PPS	—	—	—
Copenhagen		115·4	334	—	—	35 46	SS	40 1	SSS	55·3
Istanbul		112·1	314	e 19 28	PP	—	—	—	—	—
Stuttgart		121·2	328	e 18 53	[− 2]	—	—	—	—	e 60·3
Rome		123·2	320	—	—	e 38 22	SSP	—	—	—
Philadelphia		127·0	40	—	—	e 38 4	SS	—	—	e 59·1
Granada		135·9	325	—	—	e 52 19	?	e 55 29	Q	70·0
Huancayo		136·0	111	e 23 32	PKS	e 40 50	PSPS	e 29 27	PKKP	e 56·9

Additional readings :—
Brisbane iPN = 5m.37s., iSE = 10m.9s.
Riverview iN = 12m.13s. and 13m.49s.
Huancayo e = 29m.43s.
Long waves were also recorded at other North American and European stations, Bermuda, and Honolulu.

April 25d. 23h. 9m. 11s. Epicentre 38°·2N. 39°·0E.

$A = +\cdot6123$, $B = +\cdot4958$, $C = +\cdot6159$; $\delta = +6$; $h = -1$;
$D = +\cdot629$, $E = -\cdot777$; $G = +\cdot479$, $H = +\cdot388$, $K = -\cdot788$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Leninakan	4·5	54	—	—	3 5	?	—	—	—
Erevan	4·7	64	1 44	P_g	—	—	—	—	—
Ksara	5·0	211	i 1 21k	+ 3	i 2 53?	S_g	—	—	—
Sotchi	5·4	6	e 1 25	+ 1	2 33	+ 5	—	—	—
Grozny	7·2	43	e 1 56	+ 7	—	—	—	—	—
Theodosia	7·3	340	e 2 10?	P*	3 25?	+10	—	—	—
Istanbul	8·2	293	i 2 8	+ 5	i 4 34	S_g	—	—	—
Baku	8·7	72	e 3 4?	P_g	—	—	—	—	—
Helwan	10·5	220	i 2 36	+ 1	6 28	?	2 58	PP	—
Bucharest	11·5	307	e 3 13	PPP	—	—	—	—	e 5·6
Sofia	12·8	296	e 3 7	+ 1	—	—	—	—	7·0
Belgrade	15·4	301	e 3 40a	0	—	—	—	—	i 9·2
Kalossa	16·9	306	4 5	+ 6	e 7 22	+15	—	—	e 11·8
Taranto	17·0	285	3 59?	− 2	e 7 6?	− 4	—	—	e 11·0
Budapest	17·3	309	4 5	+ 1	7 34	+18	—	—	10·8
Moscow	17·6	357	e 4 3	− 5	e 7 12	−11	—	—	—
Ogyalla	18·0	309	e 4 21	+ 8	e 7 46	+14	—	—	—
Zagreb	18·7	301	e 4 18	− 4	8 6	+18	—	—	e 12·4
Raciborzu	19·0	316	e 4 27	+ 1	—	—	—	—	e 13·1
Triest	20·2	300	i 4 38	− 1	i 8 29	+ 8	i 5 14	PPP	i 11·5
Rome	20·6	289	4 42	− 1	8 36	+ 7	5 4	PP	—
Prague	21·1	312	4 50k	+ 2	e 8 47	+ 8	—	—	—
Padova	21·2	297	e 4 58	+ 9	e 8 12	−29	—	—	—
Bologna	21·6	294	i 4 59	+ 5	e 8 15	−34	—	—	—
Prato	21·7	294	i 4 55	0	e 8 29	−22	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Salo		22·4	298	e 5 0k	− 2	e 9 12	+ 8	—	—	—
Collmberg		22·5	312	e 5 1	− 1	e 9 10	+ 5	e 5 22	PP	e 14·3
Jena		23·1	311	e 5 8	0	e 9 24	+ 8	e 6 12	PP	—
Chur		23·2	301	e 5 9	0	e 9 21	+ 3	—	—	—
Pavia		23·2	298	e 4 54	−15	—	—	—	—	—
Stalinabad		23·3	78	e 5 9	− 1	e 9 23	+ 3	—	—	—
Tashkent		23·4	72	e 5 7	− 4	e 9 21	0	e 5 32	PP	—
Sverdlovsk		23·5	29	i 5 9	− 3	9 22	− 1	—	—	—
Tchimkent		23·6	69	e 5 17	+ 4	—	—	—	—	—
Helsinki		23·7	342	—	—	e 9 28	+ 1	—	—	e 12·8
Stuttgart		23·9	306	i 5 15k	− 1	e 9 33	+ 3	i 5 34	PP	e 14·3
Obi-garm		24·0	78	i 4 13?	−64	—	—	—	—	—
Zürich		24·0	303	i 5 17k	0	e 9 33	+ 1	—	—	e 15·1
Kulyab		24·2	80	e 5 20	+ 1	—	—	—	—	—
Basle		24·7	303	e 5 23k	− 1	—	—	—	—	—
Strasbourg		24·8	305	e 5 22	− 3	e 9 55	+ 9	e 6 12	PP	15·0
Copenhagen		24·9	323	i 5 25	− 1	i 10 1	+14	—	—	13·8
Upsala		25·6	334	e 5 27?	− 5	e 10 3	+ 4	e 9 49?	?	e 15·8
Andijan		25·8	73	e 5 33	− 1	—	—	—	—	—
Murgab		27·3	78	5 48	0	10 51	+24	—	—	—
Clermont-Ferrand		27·5	297	e 6 42	PP	—	—	—	—	—
Paris		28·3	304	e 5 53	− 4	e 11 7	+24	e 6 31	pP	—
Kew		30·5	309	—	—	e 11 16	− 2	—	—	e 28·8
Tamanrasset		32·5	253	i 6 35a	+ 1	—	—	—	—	—
Almeria		32·7	280	i 6 39	+ 3	12 11	+19	8 23	PPP	—
Granada		33·5	281	6 43k	0	15 31	SS	7 52	PP	19·6
Malaga	z.	34·3	281	i 6 50	0	—	—	e 13 19	SS	20·9
Scoresby Sund		44·9	335	—	—	15 5	+ 9	18 25	SS	25·8
Hungry Horse		90·5	342	i 13 4	− 1	—	—	—	—	—

Additional readings :—
Helwan eE =5m.19s., P_cP?E =6m.44s.
Bucharest eE =4m.2s.
Belgrade e =4m.39s. and 5m.14s.
Kalossa eN =4m.25s., eE =7m.25s.
Raciborzu eE =5m.30s.
Salo eZ =5m.25s., e =8m.7s. and 8m.51s.
Collmberg eEZ =5m.5s., eE =9m.3s.
Jena eS?E =9m.27s.
Tashkent ePPP =5m.53s., iSS =10m.33s.
Stuttgart eSS =10m.55s.
Strasbourg e =7m.16s., iS =10m.2s., eSSS =11m.59s.
Paris e =6m.14s.
Tamanrasset iP =6m.40s.k.
Almeria P_cP =9m.15s.
Long waves were also recorded at De Bilt and Alicante.

April 25d. Readings also at 0h. (Istanbul, Helwan, and Ksara), 1h. (Boulder City, Hungry Horse, Overton, Pierce Ferry, Tucson, Merida, near Puebla, and Tacubaya), 2h. (near Kulyab (2)), 4h. (Boulder City, Hungry Horse, Overton, Pierce Ferry, Shasta Dam, Riverside, Tinemaha, and near Ashkabad), 8h. (Pavia), 11h. (Boulder City, Hungry Horse, Overton, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Riverside, Tinemaha, Lick, Tacubaya, Ksara, and near Ashkabad), 13h. (College), 14h. (Stuttgart and near Grozny), 15h. (College, Tucson, and Mount Wilson), 16h. (La Paz), 19h. (Tamanrasset), 20h. (Overton and Tucson), 21h. (College, La Paz (2), Ksara, and near Andijan), 22h. (Shasta Dam), 23h. (College, Ksara, near Kulyab, Obi-garm, Stalinabad, Murgab, Samarkand, and Andijan).

April 26d. 10h. 11m. 30s. Epicentre 10°·6S. 165°·5E. (as on 1947, August 22d.).

A = −·9518, B = +·2461, C = −·1828; δ = −10; h = +6;
D = +·250, E = +·968; G = +·177, H = −·046, K = −·983.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		20·5	213	i 4 45	+ 3	i 8 30	+ 3	i 5 40	sP	—
Apia		22·4	102	e 4 57	− 5	e 9 0	− 4	—	—	—
Riverview		26·6	208	e 5 40	− 2	e 10 8	− 8	i 6 0	pP	12·6
Tuai	N.	30·0	163	6 6	− 6	—	—	—	—	—
Wellington		31·6	167	6 19	− 7	12 18	+43	—	—	16·5
Kaimata	N.E.	32·2	173	6 30	− 2	—	—	—	—	—
Christchurch	N.	33·4	172	—	—	e 11 44	−19	—	—	14·8
Perth		50·4	238	—	—	i 16 25	+11	—	—	—
Batavia		58·1	270	i 9 47	−11	e 17 40	−18	—	—	—
Santa Clara		82·8	51	e 12 44	+17	—	—	—	—	e 38·4
College		82·9	19	i 12 31	+ 3	—	—	i 12 45	pP	e 41·5
Lick	Z.	83·1	51	i 12 32a	+ 3	—	—	—	—	—
Shasta Dam		83·6	47	i 12 34	+ 3	—	—	e 16 1	PP	—
Fresno	Z.	84·3	52	i 12 38	+ 3	—	—	e 12 52	pP	—
Pasadena		84·8	55	i 12 40	+ 3	—	—	i 12 53	pP	e 39·1
Reno	Z.	85·1	49	e 12 43k	+ 4	—	—	e 12 58	pP	—
Riverside	Z.	85·4	55	i 12 43	+ 3	—	—	i 12 56	pP	—
Palomar		85·6	56	e 12 48	+ 7	—	—	—	—	—
Tinemaha	Z.	85·6	52	i 12 45	+ 4	—	—	i 13 4	pP	—
Victoria		85·7	40	12 44	+ 2	—	—	—	—	39·5
Boulder City		87·9	53	e 12 54	+ 1	e 26 33	?	e 13 8	pP	—
Overton	Z.	88·4	52	e 12 57	+ 2	—	—	—	—	—
Pierce Ferry		88·6	54	i 12 58	+ 2	—	—	e 30 40	PKKP	—
Kodaikanal	E.	89·9	281	e 21 30	?	—	—	—	—	—
Tucson		90·3	57	e 13 7	+ 3	—	—	e 13 20	pP	e 41·2
Hungry Horse		91·6	42	e 13 10	0	e 30 31	SS	i 13 32	pP	—
Logan		91·6	47	e 13 9	− 1	—	—	—	—	e 42·7
Huancayo		115·5	109	—	—	e 29 45	PS	e 36 2	SS	e 54·1
Ksara		128·5	304	e 19 16	[+ 7]	—	—	21 32	PP	—
Stuttgart	Z.	137·0	338	e 19 32	[+ 7]	—	—	e 23 6	PKS	—

Additional readings :—
Brisbane iN = 5m.3s., iSE = 8m.35s.
Apia eN = 5m.13s., e = 5m.26s.
Riverview iPNZ = 5m.43s.k, iPPZ = 6m.29s., iN = 10m.23s. and 10m.31s., iE = 10m.34s., iEN = 10m.51s.
Fresno eZ = 13m.24s.
Pasadena iZ = 13m.5s.
Reno eE = 13m.2s., eN = 13m.8s., eZ = 15m.14s.
Pierce Ferry i = 16m.4s.
Tucson e = 15m.39s.
Long waves were also recorded at Auckland, La Paz, and other American and European stations.

April 26d. Readings also at 6h. (near Ashkabad), 7h. (near Victoria), 8h. (near Andijan), 11h. (near Kulyab, Murgab, and Obi-garm), 12h. (College and La Paz), 13h. (Ashkabad (2) and near Granada), 14h. (New Delhi, College, Hungry Horse, and Shasta Dam), 15h. (Ashkabad, Klyuchi, Overton, and near La Paz), 16h. (Stuttgart, near Basle, Neuchatel, and Zürich), 18h. (Berkeley, Branner, Lick, Tucson, and Pierce Ferry), 19h. (Ashkabad, La Paz, Copiapo, Bogota, and near Balboa Heights), 20h. (Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Hungry Horse (2)), 21h. (Tananarive), 22h. (Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and La Paz).

April 27d. Readings at 0h. (Overton), 1h. (Lick and near Kulyab), 2h. (near Kulyab), 3h. (Collmberg and Hungry Horse), 4h. (Balboa Heights, Bogota, Huancayo, La Paz, Fort de France, and Hungry Horse), 5h. (near La Paz), 6h. (Santa Lucia, Tacubaya, Tucson, and Shasta Dam), 9h. (near Ashkabad), 16h. (College (5), Toledo, and near Ashkabad (2)), 17h. (Ksara), 18h. (College), 19h. (La Paz and Santa Lucia), 20h. (Collmberg and near Klyuchi), 21h. (near Obi-garm), 23h. (Ashkabad (2), Boulder City, Pierce Ferry, Shasta Dam, and Hungry Horse).

April 28d. 1h. 30m. 7s. Epicentre 3°·8S. 102°·2E.(as on 1949, March 4d.).

A = −·2109, B = +·9753, C = −·0658 ; δ = +2 ; h = +7 ;
D = +·977, E = +·211 ; G = +·014, H = −·064, K = −·998.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Batavia		5·2	117	i 1 21a	0	i 2 25	+ 3	—	—
Bombay		36·7	309	e 8 41	PP	e 12 45	− 9	—	—
Murgab		49·4	331	8 56	+ 3	16 3	+ 3	—	—
Obi-garm		51·9	328	i 9 13	+ 1	—	—	—	—
Andijan		52·1	331	e 9 16	+ 2	e 16 42	+ 4	—	—
Stalinabad		52·3	327	e 9 14	− 1	—	—	—	—
Samarkand		54·0	326	e 9 23	− 5	16 53	−10	—	—
Tashkent		54·0	330	e 9 26?	− 2	e 16 59?	− 4	—	—
Tchimkent		54·6	331	e 9 32	0	i 17 12	+ 1	—	—
Sverdlovsk		69·2	337	i 11 9	− 1	—	—	—	—
Ksara		72·7	306	e 11 33	+ 1	e 21 24	PS	—	—
Collmberg	z.	92·4	320	e 13 13	− 1	—	—	—	—
Stuttgart	z.	94·8	318	e 13 24	− 1	—	—	—	—
College		101·8	25	e 18 12	PP	—	—	—	—
Shasta Dam		125·7	41	i 19 3	[− 1]	—	—	i 19 13	pPKP
Hungry Horse		125·9	28	i 19 3	[− 1]	—	—	e 19 18	pPKP
Tinemaha	z.	130·3	43	i 19 14	[+ 1]	—	—	e 22 38	PKS
Pasadena	z.	131·9	45	e 19 17	[+ 1]	i 23 10	PKS	i 19 28	pPKP
Boulder City		133·2	42	e 19 17	[− 1]	—	—	i 19 33	pPKP
Pierce Ferry		133·7	40	e 19 18	[− 1]	e 21 48	PP	i 19 33	pPKP
Tucson		138·1	43	e 19 29	[+ 2]	—	—	e 23 0	PKS

Additional readings :—
Tinemaha eZ = 22m.57s.
Boulder City e = 19m.44s.
Pierce Ferry i = 19m.45s.
Long waves were also recorded at New Delhi and Zi-ka-wei.

April 28d. 20h. 41m. 51s. Epicentre 42°·4N. 147°·0E. Depth of focus 0·030.
(as on 1949, March 18d.).

Intensity V at Attoko (Hokkaido) ; IV at Kusiro and Nemuro ; II-III at Ochiishizaki Light House (Hokkaido).
Epicentre 42°·4N. 146°·8E. Shallow. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1949. Tokyo, 1950, p.11. Macroseismic chart.

A = −·6212, B = +·4034, C = +·6718 ; δ = −6 ; h = −3 ;
D = +·545, E = +·839 ; G = −·563, H = +·366, K = −·741.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Nemuro		1·4	312	0 33a	− 2	0 45	−18
Kusiro		2·0	287	0 23	−18	0 46	−26
Mori		4·8	269	1 4	− 9	2 3	− 8
Morioka		5·2	241	1 17	− 1	2 20	+ 1
Mizusawa	E.	5·5	236	1 29	+ 7	2 31	+ 5
Sendai		6·2	230	1 35	+ 4	2 49	+ 7
Kakioka		8·1	223	2 1	+ 6	3 36	+10
Shasta Dam		64·5	58	i 10 33	+18	—	—
Hungry Horse		64·9	47	e 10 18	+ 1	—	—
Boulder City		72·1	58	i 11 6	+ 4	—	—
Pierce Ferry		72·5	57	i 11 9	+ 5	—	—
Collmberg	z.	78·5	333	e 11 38	0	—	—
Stuttgart	z.	81·9	334	e 11 57	+ 1	—	—

Mizusawa gives also SN = 2m.34s.

April 28d. Readings also at 0h. (Tacubaya, Mount Wilson, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, College, and near Bogota), 1h. (Hungry Horse), 3h. (near Bogota), 5h. (Huancayo, La Paz, near Ashkabad, and near Andijan), 7h. (Almata, Tchimkent, near Andijan, Obi-garm, Murgab, Samarkand, Stalinabad, and near Granada), 8h. (Andijan, Samarkand, near Murgab, Obi-garm, and Stalinabad), 10h. (Tucson, Shasta Dam, Hungry Horse, Zi-ka-wei, near Obi-garm, near Klyuchi and near Copiapo), 11h. (Irkutsk, Paris, and near Obi-garm), 13h. (Samarkand, near Murgab, Obi-garm, Stalinabad, and near Ashkabad), 14h. (near Ashkabad), 16h. and 17h. (College), 18h. (near Tacubaya), 19h. (College), 20h. (Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, and near Messina), 21h. (Ashkabad, Klyuchi (2), and College (2)), 23h. (Klyuchi, near Obi-garm, near Berkeley, Branner, Fresno, Lick, and Santa Clara).

April 29d. Readings at 2h. (Copiapo), 3h. (near College, Bombay, Poona, Calcutta, and New Delhi), 5h. (near Berkeley, Brauner, and Lick), 6h. (New Delhi and near Mizusawa), 9h. (College, Tacubaya, and near Klyuchi), 12h. (Tucson, Shasta Dam, Hungry Horse, and College), 14h. (Samarkand, Tchimkent, near Andijan, Obi-garm, and Stalinabad), 17h. (Tucson, Pierce Ferry, Shasta Dam, near Berkeley, Branner, and Lick), 18h. (Copiapo, La Paz, New Delhi, Kulyab, Tchimkent, near Andijan, Murgab, Obi-garm, Samarkand, and Stalinabad), 19h. (Santa Lucia), 20h. (College, Tucson, Boulder City, Pierce Ferry, near Berkeley, Branner, Lick, and near Murgab), 21h. (La Paz), 22h. (College and near Ashkabad), 23h. (near College and near Seven Falls).

April 30d. 1h. 23m. 31s. Epicentre 6°·2N. 125°·6E. Depth of focus 0·010.

$A = -\cdot5788$, $B = +\cdot8084$, $C = +\cdot1073$; $\delta = +3$; $h = +7$;
$D = +\cdot813$, $E = +\cdot582$; $G = -\cdot062$, $H = +\cdot087$, $K = -\cdot994$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia	Z.	22·4	237	i 4 51 a	0	i 8 53	+ 7	—	—	—
Zi-ka-wei		25·2	352	i 5 19	+ 1	i 9 55	+21	—	—	—
Kagosima		25·7	10	5 28	+ 5	9 49	+ 7	—	—	—
Nanking		26·5	347	e 5 34	+ 4	10 17	+22	—	—	—
Hukuoka		27·6	9	5 40	0	10 9	− 4	—	—	—
Kôti		28·2	14	5 42	− 4	10 18	− 5	—	—	—
Hirosima		28·7	12	5 50?	0	10 35	+ 4	—	—	—
Osaka		29·8	17	5 58	− 2	10 50	+ 2	—	—	—
Nagoya		30·7	19	6 5	− 3	11 6	+ 4	—	—	—
Tokyo		32·1	22	6 19	− 1	11 53	+29	—	—	—
Sendai		34·8	22	6 43	0	12 13	+ 7	—	—	—
Mizusawa		35·7	21	6 55	+ 4	—	—	—	—	e 20·7
Aomori		37·0	20	7 16	+14	12 57	+17	—	—	—
Perth		39·1	193	7 24	+ 5	13 14	+ 3	7 34	PP	—
Calcutta	E.	39·4	298	e 7 23	+ 1	i 13 19	+ 3	i 9 7	PP	20·8
Nemuro		41·0	22	7 35	0	13 38	− 2	—	—	—
Brisbane		42·7	143	i 7 48	− 1	i 13 59	− 6	i 9 19	PP	—
Colombo	E.	45·4	273	8 13	+ 3	14 46	+ 2	—	—	21·8
Riverview		46·6	151	i 8 22 a	+ 2	i 15 2	+ 1	i 8 48	pP	—
Kodaikanal	E.	47·8	279	i 8 34	+ 5	—	—	10 44	PP	—
Irkutsk		49·2	343	i 8 40	0	15 33	− 4	i 9 14	pP	—
Dehra Duu	N.	50·6	305	e 10 29?	PP	e 17 29?	?	—	—	e 27·5
New Delhi		50·8	302	i 8 52	0	i 15 59	0	10 52	PP	—
Poona		51·8	288	i 8 59	− 1	i 16 15	+ 2	i 9 34	pP	23·8
Bombay		52·9	289	9 9	+ 1	i 19 37	SS	i 11 12	PP	25·8
Almata		56·4	320	i 9 39	+ 5	—	—	—	—	—
Murgab		56·6	313	i 9 33	− 2	—	—	—	—	—
Klyuchi		57·2	23	e 9 46?	+ 7	e 17 31?	+ 6	—	—	—
Andijan		58·5	315	9 52	+ 4	e 17 44	+ 2	—	—	—
Kulyab		59·5	311	i 9 54	− 1	—	—	—	—	—
Obi-garm		59·8	312	i 10 22?	+25	i 18 27?	+28	—	—	—
Stalinabad		60·5	312	i 10 0	− 2	i 18 4	− 4	—	—	—
Tashkent		60·9	315	i 10 3	− 2	i 18 12	− 1	e 12 28	PP	—
Tchimkent		61·0	316	i 10 9	+ 3	—	—	—	—	—
Samarkand		62·1	312	i 10 12	− 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	62·8	137	10 20	+ 2	—	—	—	—	—
Apia		65·2	108	e 10 36	+ 3	e 19 10	+ 3	—	—	—
Ashkabad		68·3	309	e 11 0	+ 7	—	—	—	—	—
Sverdlovsk		71·3	329	i 11 10	− 1	i 20 16	− 3	—	—	—
Baku		75·1	310	12 31?	+58	22 2?	+60	—	—	—
Honolulu		75·3	70	e 11 37	+ 3	i 21 4	0	e 12 7	pP	e 31·2
Grozny		78·4	313	11 54	+ 2	21 39	+ 1	—	—	—
Erevan		79·2	310	e 12 1	+ 5	21 51	+ 5	—	—	—
Leninakan		79·7	311	12 14	+15	22 7	+15	—	—	—
Tananarive		80·8	250	12 2	− 2	22 1	− 2	i 12 55	sP	36·9
Sotchi		82·8	313	i 12 17	+ 2	22 25	+ 2	—	—	—
College		83·0	26	i 12 14	− 2	i 22 21	− 4	i 15 32	PP	e 36·0
Moscow		83·8	326	12 18	− 2	22 27	− 6	12 54	pP	—
Theodosia		85·8	315	12 35	+ 5	22 51	− 2	—	—	—
Ksara		86·4	303	i 12 33	0	i 23 7	+ 8	13 29	pP	—
Simferopol		86·7	315	12 39	+ 5	23 0	− 2	—	—	—
Yalta		86·7	314	12 36	+ 2	—	—	16 6	PP	—
Sitka		89·7	33	i 12 53	+ 5	i 23 35	+ 5	i 13 25	pP	e 40·7
Helsinki		89·9	331	e 12 49	0	e 23 25	− 6	e 13 25	pP	e 42·5
Helwan		90·6	300	i 12 50	− 3	23 35	− 3	i 13 27	pP	—
Istanbul		90·9	311	i 12 52	− 2	i 22 58	[−17]	—	—	—
Bucharest		92·5	315	e 13 5	+ 4	i 23 23	[− 1]	e 18 1	PPP	39·5
Upsala		93·6	331	i 13 8k	+ 2	24 5	+ 1	19 9	PPP	e 38·5
Sofia		94·8	314	e 13 19	+ 7	23 39	[+ 2]	i 24 43	S	—
Belgrade		96·3	316	i 13 21a	+ 2	i 26 51	PPS	e 19 49	PPP	e 41·5
Raciborzu		96·3	322	e 13 22	+ 3	e 23 47	[+ 2]	e 13 52?	pP	e 40·5
Budapest		96·5	319	e 13 24	+ 4	e 23 47	[+ 1]	e 17 23	PP	48·5
Kalossa		96·8	319	e 13 25	+ 4	e 23 47	[− 1]	e 17 25	PP	e 46·5
Ogyalla		96·9	320	e 13 56	pP	e 23 42	[− 6]	—	—	—
Copenhagen		97·6	328	i 13 27	+ 2	i 23 51	[− 1]	17 27	PP	—
Potsdam		98·6	325	i 13 29?a	0	e 23 51	[− 7]	e 13 58	pP	e 41·5
Prague		98·6	323	e 13 20	− 9	—	—	e 17 30	PP	—
Bergen		99·0	335	e 16 29	?	32 33?	SS	e 17 3	PP	44·5
Collmberg		99·0	324	e 13 29	− 2	e 23 56	[− 3]	e 17 34	PP	e 47·5
Victoria		99·0	39	13 36	+ 5	23 57	[− 2]	17 14	PP	45·5
Zagreb		99·0	318	e 13 34	+ 3	e 25 6	+16	e 17 40	PP	e 35·5
Pretoria	Z.	99·3	245	i 13 35	+ 3	e 30 5	?	i 17 37	PP	—
Jena		100·0	323	e 13 35	− 1	e 24 0	[− 4]	e 17 35	PP	—
Seattle		100·0	40	e 14 32	+56	e 23 59	[− 5]	e 30 57	SS	e 43·1
Scoresby Sund		100·4	350	13 39a	+ 2	24 5	[− 1]	17 47	PP	—
Triest		100·5	318	e 13 43?	+ 5	i 24 2	[− 4]	i 14 20	pP	—
Grahamstown	Z.	100·9	238	i 13 42	+ 2	e 29 53	PKKP	i 14 2	pP	—
Ferndale	E.	101·0	47	—	—	i 24 15	[+ 6]	—	—	i 52·2
Arcata	Z.	101·1	47	i 17 50a	PP	—	—	—	—	—
Padova		102·2	318	e 13 50	+ 5	24 14	[− 1]	17 59	PP	—
Stuttgart		102·2	322	e 13 44a	− 1	e 24 14	[− 1]	e 14 19	pP	e 48·5
Ukiah		102·2	48	e 15 23	?	i 24 20	[+ 5]	e 17 38	PP	e 41·2
Shasta Dam		102·3	46	i 13 45	− 1	—	—	e 29 27	PKKP	—
Bologna		102·6	317	e 13 51	+ 4	e 24 21	[+ 5]	e 18 0	PP	—
Rome		102·7	315	e 13 45a	− 3	i 25 14	− 6	e 14 19	pP	—
Salo		102·7	319	e 13 49	+ 1	e 24 12	[− 4]	e 18 4	PP	—
Chur		102·8	321	e 13 47	− 1	e 24 15	[− 2]	—	—	—
Florence		102·9	317	e 13 51	+ 3	e 24 17	[0]	e 18 8	PP	—
Prato		102·9	317	e 13 49	+ 1	i 25 18	− 4	—	—	—
Mineral		103·0	46	e 13 48	− 1	e 24 22	[+ 4]	i 18 17	PP	—
De Bilt		103·1	327	i 13 51a	+ 2	i 24 18	[0]	e 18 7	PP	e 46·5
Strasbourg		103·2	323	i 13 48	− 2	i 24 16	[− 3]	e 14 27	pP	i 47·3
Zürich		103·2	322	e 13 52a	+ 2	e 24 16	[− 3]	e 17 44	PP	—
Berkeley		103·4	49	i 13 54a	+ 4	i 24 21	[+ 1]	i 18 10	PKP	—
Basle		103·7	322	e 14 0	+ 8	e 25 36	+ 7	e 18 50	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pavia		103·7	320	e 16 36?	?	—	—	—	—	e 55·1
Santa Clara		103·8	49	e 13 58	+ 6	e 25 19	−11	i 18 58	PP	e 50·9
Aberdeen	E.	104·0	334	e 17 19	?	i 24 19	[− 4]	i 18 50	PP	e 47·6
Lick		104·0	49	i 13 54k	+ 1	e 24 26	[+ 3]	—	—	—
Neuchatel		104·4	322	e 14 40	pP	—	—	—	—	—
Reno		104·6	47	e 13 59k	+ 4	e 24 32	[+ 6]	e 18 14	PP	—
Hungry Horse		104·8	36	i 13 56	0	i 29 37	PKKP	i 14 38	pP	—
Durham		105·1	331	—	—	i 24 29	[+ 1]	i 29 26	PKKP	—
Edinburgh	E.	105·2	333	e 13 17	P	24 49	[+20]	17 39	PP	—
Fresno		105·6	49	i 14 5k	P	i 24 37	[+ 7]	i 18 41	PP	e 51·6
Paris		106·2	324	i 14 7	P	i 24 29	[− 4]	i 14 39	pP	e 50·5
Kew		106·3	328	i 14 5a	P	e 24 32	[− 1]	i 14 41	pP	e 51·5
Tinemaha		106·6	49	i 18 29	PP	i 24 42	[+ 8]	—	—	—
Butte	N.	106·8	37	e 13 59	P	i 24 39	[+ 4]	i 14 40	pP	e 44·8
Saskatoon		106·9	30	18 37	PP	24 43	[+ 8]	27 40	PS	—
Haiwee		107·2	49	e 14 12	P	i 24 44	[+ 7]	—	—	—
Clermont-Ferrand		107·3	322	i 14 12	P	i 25 33	SKKS	e 14 48	pP	51·0
Pasadena		107·7	51	i 14 14	P	i 24 43	[+ 4]	i 15 9	sP	e 43·5
Bozeman		107·9	37	e 14 48	P	i 24 43	[+ 3]	e 17 59	PKP	e 44·5
Rathfarnham Castle		108·2	332	e 14 12	P	—	—	i 18 44	PP	—
Riverside		108·4	51	i 14 16	P	i 24 47	[+ 5]	e 14 47	pP	—
Jersey	E.	108·5	327	e 19 32	PP	e 26 59	SKKS	e 35 9	SS	48·5
Logan		109·2	41	e 14 18	P	e 24 45	[0]	e 17 48	PKP	e 45·0
Boulder City		109·6	48	e 14 22	P	—	—	e 14 52	pP	—
Overton	Z.	109·6	47	e 14 22	P	—	—	i 18 25	PP	—
Salt Lake City		109·7	42	e 14 17	P	e 24 41	[− 6]	e 18 35	PP	e 45·2
Barcelona		110·0	318	e 19 2	PP	35 8	SS	—	—	e 53·1
Pierce Ferry		110·1	48	e 14 20	P	—	—	—	—	—
Algiers		111·4	313	e 14 31	P	24 54	[0]	e 19 7	PP	e 46·0
Tortosa		111·4	318	19 11	PP	25 45	SKKS	19 38	pPP	51·9
Ivigtut		112·6	356	e 19 16	PP	24 59	[0]	i 19 45	pPP	54·5
Alicante		113·2	316	18 35	[+ 9]	25 11	[+ 9]	19 25	PP	e 53·8
Tucson		114·1	50	e 14 34	P	i 24 57	[− 8]	e 15 13	pP	e 45·6
Tamanrasset	Z.	114·7	300	14 46	P	e 29 13	PKKP	e 18 28	PKP	—
Toledo		114·8	319	i 18 35	[+ 6]	e 25 13	[+ 5]	e 19 38	PP	e 53·7
Almeria		115·3	316	i 18 33	[+ 3]	25 16	[+ 6]	19 50	PP	58·1
Granada		115·9	317	i 18 41a	[+ 9]	26 8	SKKS	19 28	pPKP	57·0
Malaga	Z.	116·7	317	i 18 38a	[+ 5]	i 29 3	PS	i 19 53	PP	48·5
Lisbon		118·7	321	18 42k	[+ 5]	25 21	[− 1]	19 55	PP	54·5
Lincoln	E.	119·2	35	e 18 29	[− 9]	e 29 12	PS	e 19 18	PP	e 48·6
Chicago		123·4	29	e 18 50	[+ 4]	i 25 38	[+ 1]	e 20 36	PP	e 53·1
St. Louis		124·4	33	e 18 48	[0]	e 25 38	[− 3]	i 19 22	pPKP	—
Seven Falls	E.	125·0	13	18 55	[+ 6]	26 8	[+26]	21 6	PP	57·5
Shawinigan Falls	N.	125·0	14	e 18 50	[+ 1]	—	—	—	—	—
Ottawa		125·2	18	i 18 49	[0]	25 44	[+ 1]	20 44	PP	e 51·5
Cleveland		126·4	25	e 18 52	[0]	i 25 53	[+ 6]	e 20 51	PP	—
Pennsylvania		128·5	22	i 19 1	[+ 5]	i 25 50	[− 2]	i 20 51	PP	—
Harvard		129·1	15	e 18 58	[+ 1]	i 23 9	PKS	e 21 29	PP	e 57·5
Tacubaya		129·1	59	i 19 4	[+ 7]	25 53	[− 1]	i 38 52	SS	e 58·4
Weston		129·2	15	i 18 58	[+ 1]	38 24	SS	i 19 13	pPKP	—
Fordham		129·9	18	e 18 49	[− 9]	i 27 57	SKKS	i 21 9	PP	—
Philadelphia		130·2	20	e 19 4	[+ 5]	e 27 57	SKKS	e 21 47	PP	e 54·8
Georgetown		130·4	22	i 19 1	[+ 2]	e 31 2	PS	i 22 14	PP	e 78·0
Washington		130·4	22	i 19 1	[+ 2]	e 31 2	PS	e 22 14	PP	e 78·0
Mobile		131·1	39	18 59	[− 2]	e 25 54	[− 5]	21 32	PP	—
Punta Arenas	N.	131·3	167	19 44	[+43]	22 28	PKS	31 44	PS	—
Columbia		132·7	30	e 21 35	PP	22 38	PKS	e 38 34	SS	e 55·0
Merida		136·1	51	19 48	sPKP	26 10	[+ 1]	e 23 3	PKS	—
Bermuda		140·4	13	e 19 9	[− 9]	i 26 27	[+11]	e 22 22	PP	e 60·4
Santa Lucia	N.	148·9	154	e 19 42	[+ 9]	—	—	20 19	pPKP	—
Balboa Heights		150·8	58	e 19 36	[+ 1]	—	—	—	—	—
La Plata		151·3	175	19 40	[+ 4]	26 46	[+14]	23 6	PP	69·3
San Juan		153·0	24	e 19 44	[+ 6]	e 33 40	PSKS	e 20 19	pPKP	e 65·2
Galerazamba		153·2	49	i 20 3	[+24]	e 49 47	SSS	—	—	—
Copiapo	N.	154·1	146	19 35	[− 5]	—	—	23 11	PP	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota	157·6	60	e 19 49	[+ 4]	i 23 20	PKS	i 30 42	sKKS	76·5
Fort de France	158·2	16	i 19 46	[+ 1]	e 30 6	PKKP	e 20 26	pPKP	—
Huancayo	158·5	108	e 18 50	[−56]	i 29 44	PKKP	i 23 47	PP	e 62·1
La Paz	163·1	129	i 19 53a	[+ 2]	26 56	[+12]	i 31 5	sKKS	75·5

Additional readings :—
Nanking i =7m.38s. and 9m.37s.
Mizusawa PN =6m.59s.
Perth PPP =8m.1s., i =9m.49s., SS =15m.21s., SSS =15m.57s.
Calcutta iSE =14m.14s., iSSE =17m.22s.
Brisbane eN =13m.51s., iSZ =14m.4s., iN =17m.5s. and 18m.46s
Riverview iZ =8m.38s. and 8m.56s., isP =9m.4s., iNZ =9m.20s., iZ =9m.35s., iPPZ = 10m.10s., iEN =10m.13s., iPPP =10m.58s., iPcSZ =13m.40s., iE =14m.16s., iZ = 14m.45s. and 15m.6s., iPSN=15m.32s., iN=15m.45s., isSE=15m.52s., isSN =15m.58s., iE =18m.5s., iN =18m.8s. and 18m.27s., iZ =18m.40s., iSSSN =19m.28s., iSSSZ = 19m.31s.
Dehra Dun eN =21m.29s.?
New Delhi PPPN =11m.37s., PPPE =11m.40s., iN =13m.4s., and 16m.44s., S_cSE = 18m.29s., SSN =19m.29s.
Poona sPEN =9m.50s., P_cPE =10m.5s., iPPEN =10m.45s., PPPE =12m.2s., isSEN = 17m.6s., S_cSN =18m.36s., SSN =19m.54s., QN =21m.50s.
Bombay ePPN =11m.17s.
Honolulu esP? =12m.39s., ePP? =14m.39s., ePPP =16m.5s., esS =21m.34s., eSS = 25m.42s., esSS =26m.51s.
Tananarive i =12m.8s., PP =15m.11s., PPP =17m.8s., PS =23m.24s., sS =23m.39s., SS =27m.21s., SSS =31m.23s., Q =33m.47s.
College i =12m.49s. and 14m.59s., ePPP? =17m.11s., eS? =21m.57s., esS =23m.9s., eSS =27m.47s.
Moscow sS =23m.37s.
Sitka iPP? =16m.57s., epPP? =17m.14s., ePPP =18m.37s., epPPP? =18m.53s., iSKS? = 23m.11s., eSS =29m.4s., i =29m.54s., eSSS =32m.59s.
Helsinki ePP =16m.21s., ePPP =18m.55s., eSKS =22m.53s., c =24m.14s., ePS = 25m.6s., eSS =30m.24s., c =34m.2s. and 37m.47s.
Helwan iZ =13m.46s., PPZ =16m.22s., SKSEN =23m.13s., PSEN =24m.35s., iN = 25m.52s. and 30m.29s.
Bucharest ePPP?N =18m.41s., eE =22m.47s., ePSN =24m.11s., ePSE =24m.14s., eSSE =28m.48s.
Upsala iSKS =23m.25s., iN =25m.3s., eE =25m.50s., eSSN =30m.25s., eSSE =30m.29s., eSSSN =34m.51s.
Belgrade e =17m.14s.
Raciborzu eEN =15m.8s., ePP? =17m.8s., eEN =25m.6s.
Budapest PPPE =20m.3s., eN =24m.29s.?, eEN =25m.19s., PSE =26m.29s., PPSN = 27m.41s., SSE =32m.11s., SSN =32m.15s., SSSEN =35m.59s.
Kalossa eE =25m.6s., eN =27m.42s.
Copenhagen 17m.57s., sSKS =24m.41s., e =25m.34s., 26m.57s., and 31m.47s.
Potsdam ipPZ =14m.8s., eE =16m.53s., iPPZ =17m.34s., eN =18m.33s., iPPPZ = 20m.11s., eN =25m.43s.
Bergen PPSN =26m.9s., eE =32m.55s., and 36m.9s., eN =36m.33s.
Collmberg eE =13m.32s., 17m.39s., and 20m.16s., eN =25m.44s., eE =25m.48s., eSSN = 32m.35s., eE =32m.47s.
Victoria SKS =23m.29s., PS =25m.0s., PPS =26m.24s., SS =31m.29s.
Zagreb ePS =25m.17s., e =31m.29s.?
Pretoria iZ =18m.10s.
Jena ePEZ =13m.38s., eE =21m.37s., eN =21m.40s. and 26m.9s., eE =26m.45s., eSS?N =32m.38s., eSS?E =32m.44s.
Seattle e =18m.31s. and 36m.36s.
Scoresby Sund 18m.21s., 24m.53s., 25m.53s., and 26m.59s.
Triest iPKP? =17m.50s., iPP =18m.17s., ipPP =18m.50s., eSKKS =24m.38s., iS = 25m.19s., iPS =27m.25s., iSS =33m.0s., iSSS =37m.4s.
Grahamstown iZ =16m.45s. and 18m.10s.
Ferndale eSKSN =24m.33s., eN =42m.9s.
Padova S? =25m.16s.
Stuttgart iP =13m.49s.k, eZ =14m.48s., ePP =17m.51s., iZ =18m.13s., e =18m.35s., eZ =18m.49s., ePPP =20m.4s., e =22m.29s., eSKKS =24m.53s., e =26m.3s., eSS = 32m.47s.
Ukiah e =19m.16s. and 20m.46s., ePS =26m.54s., eSS =32m.5s.
Shasta Dam iPKKP =29m.51s.
Bologna e =37m.56s.
Rome iPP =18m.3s., iSKKS? =25m.5s., SS =32m.38s.
Salo eZ =17m.34s. and 18m.33s., e =24m.4s., eS? =26m.19s., e =26m.28s.
Chur e =13m.51s.
Florence iSKKSE? =25m.22s., ePPS =27m.29s., eSS =32m.59s.?
Mineral iPZ =13m.53s.k, eZ =17m.27s., eSKSZ =24m.25s., eZ =27m.3s.
De Bilt eS =25m.29s., eSS =32m.53s.

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Strasbourg isP =14m.43s., ePP =17m.55s., iPP =18m.5s., ipPP =18m.41s. and 18m.47s., iPPP =20m.16s., ipPPP? =21m.8s., eS =25m.13s., esS =26m.25s., iSP =26m.29s., iPS =26m.57s., iSPP =27m.35s., iPPS? =28m.34s., iSS? =33m.9s., isSS =33m.39s., iSSS =37m.18s., iPKP,PKP =38m.22s. and 38m.36s., also many other readings without phase.
Zürich eS =25m.21s.
Berkeley ePE =14m.25s., iZ =17m.49s., eE =18m.5s., iE =18m.53s., iN =19m.1s., iPPN =19m.23s., eSKSZ =24m.23s., iS_cSE =25m.21s. iZ =27m.3s., iE =32m.36s., iN =32m.46s., eZ =45m.5s.
Basle e =27m.2s.
Santa Clara iEZ =24m.27s., iZ =27m.5s., iEZ =32m.49s.
Aberdeen iPKPE =18m.12s., iPPPE =20m.59s., iPSE =27m.35s., iSSE =33m.57s., iSSSE =38m.27s.
Lick iZ =13m.58s. and 19m.10s., eZ =23m.23s., eN =24m.29s., iZ =29m.53s.
Reno eZ =14m.40s.
Edinburgh eE =18m.52s., PPPE =19m.54s., iE =25m.44s., PSE =26m.50s., PPSE =27m.48s., iE =29m.14s., SSE =32m.11s., SSPE =32m.21s., SSSE =36m.11s.
Fresno ipPKPZ =18m.17s.a, iZ =18m.27s.
Paris i =15m.6s. and 18m.7s., ePP =18m.20s., ipPP =19m.5s., iPPP? =20m.21s., ipPPP? =21m.1s., e =21m.7s., i =23m.7s., iSKS =24m.34s., eS =25m.40s., esS =26m.37s., iSP =27m.27s., ePS =27m.52s., iPKKP? =29m.54s. and 29m.58s., iSS =31m.55s., iPKKS? =33m.59s., e =34m.7s., eQ =44·5m.
Kew iPPNZ =18m.32s., ipPP =19m.5s., iZ =22m.52s., eSEN =26m.1s., epSEN =26m.48s., esPS?EN =28m.30s., eSSE =33m.12s., esSSEN =34m.16s., eSSSE =37m.54s., eE =39m.44s., eEN =42m.16s.
Butte ePKPN =17m.58s., iS?N =25m.30s., eSPN =27m.40s., epPSN =28m.30s., eSSN =33m.40s., eSSSN =38m.0s.
Saskatoon SKKS =25m.27s., SS =33m.36s., SSS =37m.57s.
Clermont-Ferrand iPP =18m.42s., ipPP =19m.14s., iPPP =20m.51s., iPKS? =21m.35s., i =27m.10s., iPS =28m.2s., iPPS =29m.7s., iSS =33m.55s. iSSS =38m.12s., Q =44·5m.
Pasadena $ePKP_2Z$ =18m.14s., iZ =18m.22s., iEZ =19m.15s., iEN =25m.34s., iZ =27m.44s., iPKKPZ =29m.36s., ePKP,PKPZ =37m.29s.
Bozeman e =19m.11s., epPPP? =21m.49s., eS =25m.39s., ePS =27m.50s., epPS =28m.40s., e =30m.52s., eSS =33m.43s., esSS =34m.56s.
Riverside ePKKPZ =29m.47s., ePKP,PKPZ =37m.25s.
Jersey eE =39m.29s.?
Logan ePP =18m.49s., ipPP =19m.42s., e =27m.3s., eSP =27m.55s., eSPP =28m.51s., eSSS? =37m.37s.
Salt Lake City epPP? =19m.39s., i =24m.52s., eSKKS =25m.13s., eSP =28m.4s., epPS =28m.55s., esPS =29m.34s., eSS =33m.44s., eSSS? =33m.49s.
Algiers SKKS =25m.31s., S =26m.31s., PS =28m.39s., SS =35m.23s., SSS =39m.31s.
Tortosa pPP?N =20m.28s., PPP?E =22m.15s., SKKSEN =26m.25s., PSEN =28m.45s., PPSEN =29m.59s., SSE =34m.33s., SSSEN =38m.36s., QN =45m.40s.
Ivigtut SKKS =25m.48s., i =26m.4s., 28m.35s.
Alicante i =20m.1s. and 20m.29s., PKS =21m.33s., PPP =22m.1s., SKKS =26m.5s., PS =28m.37s., PKKP =29m.35s., PPS =29m.55s., i =31m.29s., PKKS =33m.5s., SS =34m.53s., SSP =35m.7s., i =36m.3s., SSS =39m.17s., Q =46m.47s.
Tucson iPKP =18m.34s., iPP =19m.14s., epPP =20m.2s., esPP =20m.44s., ePPP =21m.53s., e =24m.24s., iS =26m.21s., iSP =28m.46s., iPKKP =29m.22s., i =33m.12s., eSS? =34m.34s., eSSS =39m.17s.
Tamanrasset iZ =18m.36s.a, eZ =19m.36s., and 29m.21s.
Toledo ipPPZ =20m.5s., ePPPE =22m.2s., iN =30m.6s., eE =35m.51s. and 36m.15s.
Almeria PKS =22m.6s., PPP =22m.18s., PS =29m.26s., PPS =30m.50s., SS =35m.52s., SSS =40m.6s.
Granada sPKP =19m.50s., iPP =20m.8s., pPP =20m.55s., SKP =21m.56s., PPP =22m.12s., SKKS =26m.50s., S =27m.47s., pS =28m.35s., sS =29m.12s., PS =29m.38s., PPS =31m.29s., iSS =36m.2s., SSS =40m.20s.
Malaga PPPZ =22m.17s.
Lisbon PP =20m.1s., PS?E =29m.38s., PS?EN =30m.24s., SSP? =36m.50s., N =44m.29s.?, Q? =48·5m.
Lincoln ePP?E =23m.7s.
Chicago ipPP? =21m.11s., i =22m.30s., iS? =27m.16s., eSP =30m.1s., ePS =30m.23s., eSS? =37m.11s., iSSS? =40m.21s.
St. Louis iPP =20m.31s., i =30m.5s.
Seven Falls SKKSE =28m.31s., PSE =32m.29s., iE =37m.29s., eE =38m.48s., iE =40m.12s., SSE =42m.16s.
Shawinigan Falls iN =18m.54s.
Ottawa eZ =16m.2s., i =18m.53s. and 21m.9s., SKKS =27m.53s., PS =30m.19s., PPS =31m.59s., SS =35m.54s.
Cleveland iPKPN =18m.55s., iPKPEN =18m.58s., iN =21m.20s., iE =21m.25s. and 22m.41s., iN =25m.47s., iSKKSE =27m.34s., iPSN =31m.14s., iN =32m.6s., ePPSE =32m.18s., eN =33m.29s., iSSN =37m.29s., iSSE =37m.36s., iN =40m.33s.
Pennsylvania iPPPN =21m.37s., iEN =27m.48s., eEN =28m.47s., iEN =30m.49s., ePPS?N =31m.44s.
Harvard iPKP =19m.2s., i =19m.34s., 19m.44s., 19m.50s., and 19m.58s., e =21m.3s., i =21m.10s. and 22m.9s., iSKSP =30m.50s., eSS =38m.23s.

Continued on next page.

Tacubaya i=21m.48s., 22m.16s., 24m.53s., 25m.42s., and 29m.54s., e=33m.46s., 38m.7s., 43m.10s., 44m.55s., 45m.58s., and 48m.28s.
Weston isPKP=19m.31s., iPP=21m.9s., iPKS=22m.9s.
Fordham iPKP=18m.53s., i=19m.26s., iPKS=22m.15s., i=23m.9s., iSS=38m.31s.
Philadelphia isPP=22m.29s., i=22m.59s., e=31m.4s., eSS=38m.31s., eSSS=44m.24s.
Georgetown e=45m.57s.
Mobile eSKP=22m.17s., e=23m.3s., ePPP=24m.15s.
Punta Arenas N=21m.21s.
Columbia epPKS?=23m.8s., e=28m.14s., eSSS=44m.16s.
Merida e=25m.57s., SKKS=27m.57s., e=29m.24s.
Bermuda epPP=22m.49s., e=26m.44s., iSS=40m.29s., eSSS=45m.21s.
Santa Lucia N=21m.8s. and 21m.50s.
La Plata PKPZ=19m.43s., Z=19m.49s. and 20m.39s., N=21m.29s., PPP?E=25m.23s., PPP?N=25m.57s., SKKSE=29m.29s., SKKSN=30m.41s., E=31m.48s., PPPE ($\Delta>180°$)=33m.1s., SKSPN=33m.31s., SKKSE ($\Delta>180°$)=34m.10s., PSE=34m.51s., PPSN=36m.16s., N=37m.23s., SKSPN ($\Delta>180°$)=38m.39s., PPSE=38m.41s., SSE=42m.50s., SSN=43m.21s., PSSN=43m.54s., PSSE=44m.32s., SSSE=48m.21s., SSSN=48m.40s., QN=61m.16s., QE=61m.37s.
San Juan isPKP?=20m.57s., ePP=23m.22s., ePPP?=27m.36s., ePS?=34m.29s., eSS?=43m.5s., eSSS=48m.54s.
Copiapo N=19m.41s., 19m.56s., and 20m.49s.
Bogota iPKP$_3$=20m.12s.
Huancayo i=19m.55s. and 21m.54s., isPP?=25m.41s., iPPP?=27m.16s., i=34m.31s. and 36m.41s., iSS=43m.29s.
La Paz iPZ=19m.36s.k, iPKP$_2$=20m.25s., iPPZ=24m.27s., ipPPZ=24m.41s., PPSZ=38m.23s., iN=39m.39s., iSSN=44m.45s., iE=47m.29s.

April 30d. 16h. 7m. 23s. Epicentre 38°·2N. 142°·0E. Depth of focus 0·010.
(as on 1946, August 14d.).

Intensity VII-VIII at Senmaya (Iwate Prep.); V at Itsumi (Iwate Pref.); IV at Sendai and Isinomaki; II-III at Miyako, Morioka, Hukusima, and Tukubasan. Epicentre 38°·3N. 142°·1E. Depth of focus 60km. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs. Japan for 1949. Tokyo 1950, p. 12, with macroseismic chart.

$A=-\cdot6208$, $B=+\cdot4850$, $C=+\cdot6159$; $\delta=-5$; $h=-1$;
$D=+\cdot616$, $E=+\cdot788$: $G=-\cdot485$, $H=+\cdot379$, $K=-\cdot788$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Isinomaki	0·6	294	0 9	− 8	0 19	−10
Sendai	0·9	274	0 17	− 2	0 28	− 6
Hukusima	1·3	250	0 23	− 1	0 40	− 2
Mizusawa	1·3	324	0 19	− 5	0 30	−12
Miyako	1·4	0	0 19	− 6	0 34	−10
Morioka	1·6	337	0 22	− 6	0 40	− 9
Akita	2·1	315	0 33	− 1	—	—
Mito	2·2	214	0 36	0	1 4	+ 2
Hatinohe	2·3	351	0 37	0	1 1	− 4
Kakioka	2·4	216	0 41	+ 3	1 9	+ 2
Utunomiya	2·4	226	0 41	+ 3	—	—
Tukubasan	2·5	217	0 40	0	1 7	− 3
Aomori	2·8	340	0 42	− 2	—	—
Kumagaya	2·9	225	0 55	+10	1 31	+12
Maebasi	3·0	232	0 48	+ 1	1 24	+ 2
Tokyo	3·1	216	0 52	+ 4	1 29	+ 5
Nagano	3·4	245	0 57	+ 5	—	—
Hunatu	3·8	224	0 58	0	—	—
Osima	4·0	212	1 2	+ 2	1 47	+ 1
Mori	4·1	344	1 3	+ 1	—	—
Wazima	4·1	260	1 5	+ 3	2 16	+27
Sapporo	4·9	354	1 54	+41	—	—

April 30d. Readings also at 1h. (Boulder City and Stuttgart), 2h. (La Paz and Sotchi), 3h. (Fort de France, near Tacubaya, Stuttgart, Pasadena, Riverside (2), Tucson (2), Boulder City, Overton (2), Pierce Ferry (2), Shasta Dam (2), Mineral, Hungry Horse (2), and College), 4h. (Andijan, Kulyab, Murgab, Samarkand, near Obi-garm, and Stalinabad), 5h. (near Kulyab), 6h. (College), 7h. (Andijan, Samarkand, Tchimkent, near Murgab, Obi-garm, and Stalinabad), 9h. (near Ashkabad), 10h. and 12h. (College), 13h. (Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Ksara, and near Pavia), 14h. (Kew and Tacubaya), 15h. (Ashkabad, College, and near Tacubaya), 16h. (La Paz and College), 17h. (Ashkabad), 18h, (near La Paz), 22h. (near Tucson), 23h. (Victoria and near Istanbul).

May 1d. Readings at 0h. (Ksara, near Bogota, Balboa Heights, and near Istanbul), 1h. (Klyuchi), 2h. (La Paz), 3h., 4h., 5h., and 9h. (near College), 11h. (College, Overton, and near Apia (2)), 12h. (College), 13h. (near Tananarive), 15h. (Sofia), 16h. (near Bogota, near Murgab, and Obi-garm), 17h. (near Murgab), 18h. (Florence Arc), 19h. (Huancayo), 20h. (Tacubaya), 22h. (near Apia), 23h. (College and near La Paz).

May 2d. 5h. 35m. 33s. Epicentre 4°·0S. 110°·5E. Depth of focus 0·070.

Rough.

$A = -\cdot3494$, $B = +\cdot9344$, $C = -\cdot0693$; $\delta = -1$; $h = +7$;
$D = +\cdot937$, $E = +\cdot350$; $G = +\cdot024$, $H = -\cdot065$, $K = -\cdot998$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		4·2	239	i 1 18a	− 1	1 2 20	− 2	—	—	—
Poona	E.	42·5	303	i 7 14	0	i 13 3	+ 2	—	—	—
Murgab		54·1	325	e 8 42	+ 1	15 43	+ 3	—	—	—
Andijan		56·6	326	e 9 5?	+ 7	i 16 17?	+ 4	—	—	—
Frunse		56·8	328	e 9 7	+ 7	—	—	—	—	—
Obi-garm		56·8	322	e 9 19?	+19	e 16 33?	+18	—	—	—
Stalinabad		57·3	322	i 9 1	− 2	i 16 15	− 7	—	—	—
Tashkent		58·7	325	i 9 15	+ 3	i 16 42	+ 2	i 11 2	pP	—
Samarkand		59·0	321	—	—	e 16 45	+ 2	—	—	—
Tchimkent		59·1	326	i 9 17	+ 2	e 16 46	+ 1	—	—	—
Baku		70·8	315	—	—	e 19 8	+ 3	—	—	—
Sverdlovsk		72·8	334	i 10 41	+ 1	e 19 29	+ 2	e 12 37	pP	—
Grozny		74·7	316	10 53	+ 2	19 46	− 2	—	—	—
Tiflis		74·9	314	i 10 52	0	i 19 48	− 2	i 12 47	pP	—
Ksara		79·5	304	i 11 17	0	e 20 37	− 2	—	—	—
Pretoria	Z.	81·4	245	i 11 15?	−12	—	—	—	—	—
Helwan		82·6	300	i 11 30k	− 3	e 21 3	− 7	—	—	—
Grahamstown	Z.	82·7	236	i 11 22	−12	—	—	—	—	—
Yalta		83·1	315	—	—	e 21 2	−13	—	—	—
Moscow		83·7	327	e 11 37	− 2	e 21 18	− 3	e 13 38	pP	—
Istanbul		86·2	311	e 11 48	− 3	e 21 45	+ 1	e 13 48	pP	—
College		98·6	25	e 17 8	PP	—	—	—	—	—
Shasta Dam		120·2	44	i 17 51	[− 5]	—	—	—	—	—
Mineral	Z.	120·9	44	i 17 52a	[− 5]	—	—	—	—	—
Hungry Horse		121·7	33	i 17 53	[− 6]	—	—	e 20 1	pPKP	—
Lick	Z.	122·0	48	i 17 54a	[− 5]	—	—	—	—	—
Tinemaha	Z.	124·6	47	i 18 16	[+12]	—	—	i 20 27	PP	—
Pasadena	Z.	125·8	50	i 18 2	[− 5]	—	—	i 20 30	PP	—
Riverside	Z.	126·5	50	i 18 4	[− 4]	—	—	i 20 31	PP	—
Logan		126·7	39	e 19 3	[+55]	—	—	e 21 31	PP	—
Boulder City		127·5	47	i 18 6	[− 4]	—	—	—	—	—
Overton	Z.	127·6	46	i 18 7	[− 3]	—	—	i 20 15	pPKP	—
Pierce Ferry		128·1	46	e 18 6	[− 5]	—	—	i 20 37	pPKP	—
Tucson		132·2	49	e 18 4	[−15]	—	—	e 20 52	PP	—
Harvard		141·6	2	i 18 29	[− 8]	—	—	—	—	—
Weston		141·7	2	i 18 35	[− 2]	—	—	—	—	—
Tacubaya		147·2	60	e 18 51	[+ 5]	—	—	—	—	—

Additional readings :
Sverdlovsk esS = 22m.57s.
Tiflis i = 20m.12s.
College e = 17m.28s.
Hungry Horse e = 20m.37s.
Overton iZ = 20m.36s.
Tucson iPKP = 18m.16s.

May 2d. 11h. 24m. 57s. I
11h. 25m. 49s. II
Epicentre 34°·0N. 115°·8W. (as on 1942, March 3d.).

Intensity VI at Amboy, Desert Center, Desert Hot Springs, Indio, Pearblossom, Rice; V at Essex, Los Angeles, Palm Springs, and Riverside. Macroseismic Area 16,000 sq. miles. Epicentre 34°1'N. 115°41'W.

L. M. Murphy and F. P. Ulrich.
United States Earthquakes, 1949, Serial 748, Washington, 1951, p.13 with macroseismic chart p. 12.,

$A = -\cdot3616$, $B = -\cdot7480$, $C = +\cdot5566$; $\delta = +6$; $h = 0$;
$D = -\cdot900$, $E = +\cdot435$; $G = -\cdot242$, $H = -\cdot501$, $K = -\cdot831$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I Palomar		1·1	234	i 0 22	0	—	—	—	—	—
I Riverside		1·3	270	i 0 26	+ 1	i 0 44	0	—	—	—
II		1·3	270	i 0 23	− 2	i 0 41	− 3	—	—	—
I La Jolla		1·7	227	i 0 30	− 1	i 0 54	0	—	—	—
II	Z.	1·7	227	i 0 27	− 4	—	—	—	—	—
II Mount Wilson		1·9	277	i 0 34	0	—	—	—	—	—
I Pasadena		2·0	274	i 0 38	+ 3	i 1 5	+ 3	—	—	—
II		2·0	274	i 0 35	0	i 1 1	− 1	—	—	—
I Boulder City		2·1	22	i 0 39	+ 2	i 1 15	+11	—	—	—
II		2·1	22	i 0 39	+ 2	—	—	—	—	—
I Pierce Ferry		2·6	35	i 0 44	0	—	—	—	—	—
II		2·6	35	i 0 44	0	—	—	—	—	—
I Tinemaha		3·7	330	e 1 0	0	—	—	—	—	—
II		3·7	330	i 0 56	− 4	—	—	—	—	—
I Fresno		4·3	311	e 1 20	+12	i 1 57	− 3	—	—	—
II	Z.	4·3	311	i 1 17	+ 9	i 2 11	+11	—	—	—
I Tucson		4·5	112	e 1 9	− 2	—	—	—	—	i 2·1
II		4·5	112	i 1 5	− 6	i 2 1	− 4	i 1 21	P*	i 2·4
I Lick		5·8	306	i 1 29 s	0	—	—	i 1 51	P_g	—
II		5·8	306	i 1 27	− 2	i 2 36	− 2	i 3 9	S_g	—
II Santa Clara		6·0	306	e 1 34	+ 2	i 2 37	− 6	e 1 50	P*	—
II Branner		6·2	305	i 1 33	− 2	—	—	i 2 12	P_g	—
I Reno		6·4	331	e 1 59 s	P_g	i 2 54	+ 1	—	—	—
II		6·4	331	i 1 43	+ 5	i 3 30	S_g	i 1 56	P*	—
II Berkeley		6·5	308	i 1 37 s	− 2	i 2 55	0	i 2 10	P_g	—
II Salt Lake City		7·5	24	e 1 55	+ 2	i 3 3	−17	e 2 45	P_g	e 4·0
II Mineral		7·8	326	e 1 58	0	i 4 24	S_g	i 2 35	P_g	—
II Ukiah		7·9	313	e 2 19	P*	e 3 38	+ 8	e 2 43	P_g	e 4·3
II Logan		8·4	21	e 2 2	− 4	e 3 44	+ 1	—	—	i 4·4
II Shasta Dam		8·5	324	e 2 8	+ 1	—	—	—	—	e 4·4
II Arcata		9·5	319	e 4 58	S*	—	—	e 5 7	S_g	—
II Chihuahua		9·9	120	e 4 40	?	e 5 4	S*	—	—	—
II Bozeman		12·2	16	e 3 18	+20	—	—	—	—	e 6·4
II Hungry Horse		14·4	5	e 3 27	0	—	—	—	—	e 6·6
II Victoria		15·6	341	e 3 46	+ 3	—	—	—	—	e 8·6
II Lincoln	E.	16·7	60	e 4 5	+ 8	—	—	—	—	e 8·8
II Saskatoon	N.	19·3	17	i 4 32	+ 3	i 8 13	+11	—	—	e 10·4
II Little Rock		19·4	82	—	—	e 8 34	SS	—	—	e 9·5
II Tacubaya		20·7	131	e 4 49	+ 5	—	—	—	—	e 10·8
II Florissant		21·0	70	e 4 45	− 2	e 8 38	+ 1	—	—	e 10·6
II St. Louis		21·1	70	e 4 47	− 1	e 8 44	+ 5	—	—	e 10·6
II Chicago		23·5	61	e 5 14	+ 2	e 9 32	+ 9	—	—	e 10·5
II Mobile		23·6	90	—	—	9 37	+12	—	—	12·2
II Sitka		27·0	337	—	—	e 10 35	+13	—	—	e 12·7
II Cleveland		28·0	64	e 5 53	− 2	e 11 3	+25	—	—	—
II Harvard		35·4	63	i 6 59	− 1	—	—	—	—	e 18·2
II Weston		35·6	63	i 7 2	+ 1	—	—	—	—	e 18·4
II College		36·5	338	e 7 50	+41	e 13 43	+52	i 8 11	PP	e 19·9
II Paris		81·0	37	e 12 18	0	—	—	—	—	e 44·2
II Strasbourg		83·6	34	e 13 0	+29	—	—	—	—	—
II Besançon		83·7	37	e 12 34	+ 2	—	—	—	—	—
II Stuttgart		84·1	33	e 12 34	0	—	—	—	—	e 46·2

For Notes see next page.

NOTES TO MAY 2d. 11h. 24m. 57s. I.
11h. 25m. 49s. II.

Additional readings :—
Boulder City I i = 43s. and 49s.
Pierce Ferry I i = 47s.
Tucson I i = 1m.15s. and 1m.27s., II iS? = 1m.39s.
Lick I iZ = 1m.32s. and 2m.16s., II iE = 1m.35s., iN = 1m.44s., iEZ = 1m.48s., iN = 2m.44s. and 3m.4s.
Santa Clara II iS_g = 3m.13s.
Berkeley II iEZ = 1m.48s., iE = 2m.3s., iN = 2m.13s., iE = 2m.17s., iZ = 2m.27s., iE = 2m.33s., iZ = 3m.16s., eE = 3m.27s.
Mineral II iPN = 2m.1s., iE = 3m.44s., iZ = 4m.7s., eE = 4m.10s., iZ = 7m.3s.
Ukiah II e = 3m.49s.
Logan II i = 2m.37s.
Arcata II eZ = 5m.10s.
Hungry Horse II i = 3m.46s.
Victoria II eZ = 3m.51s.
Cleveland II eE = 11m.52s.
Paris II e = 12m.38s.
Long waves were also recorded at Puebla, Tamanrasset, Scoresby Sund, and other American and European stations.

May 2d. Readings also at 0h. (Fresno, Overton (2), Pierce Ferry, Tucson, near La Jolla, and Pasadena), 1h. (Istanbul), 2h. (Christchurch and Wellington), 3h. (Auckland, Christchurch, Wellington, and New Deli), 4h. (Taranto), 6h. (College, Brisbane, Copiapo, and near La Paz), 7h. (Overton, Tacubaya, Stalinabad, near Andijan, Obi-garm, and Murgab), 11h. (near Obi-garm), 12h. (Pasadena, Tinemaha, Tucson, Pierce Ferry, College, Hungry Horse, and near La Paz), 13h. (Pierce Ferry, Boulder City (2), and College), 14h. (Boulder City, Overton, Pierce Ferry, and near Alicante), 15h. (Overton and Honolulu), 16h. (Overton, Besançon, Clermont-Ferrand, Collmberg, Jena, Paris, Strasbourg, Stuttgart, Basle, and Zürich), 17h. (Overton and Stuttgart), 18h. (Overton (3), Reno, Stuttgart, near Collmberg, and Jena), 19h. (Ksara, near Andijan, Kulyab, Obi-garm, Stalinabad, and near Ashkabad), 20h. (Christchurch, Wellington, Collmberg, and Stuttgart), 21h. (Helwan, Ksara, Grozny (2), near Leninakan, and Tiflis (2)), 22h. (near Mizusawa), 23h. (Manzanillo, Tacubaya, Tucson, and Hungry Horse).

May 3d. 5h. 56m. 41s. Epicentre 48°·6N. 153°·5E. Depth of focus 0·010.

A = −·5940, B = +·2962, C = +·7479 ; δ = −8 ; h = −5 ;
D = +·446, E = +·895 ; G = −·669, H = +·334, K = −·664.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		8·9	27	2 15	PP	e 4 13	SSS	—	—	—
Mizusawa		13·0	228	3 6	+ 4	5 18	− 7	—	—	—
Zi-ka-wei		29·8	247	i 6 3	+ 3	11 49	+61	—	—	—
Irkutsk		31·1	296	i 6 12	+ 1	e 11 4	− 4	—	—	—
College		34·6	40	i 6 41	− 1	i 12 1	− 2	i 12 58	sS	e 14·6
Sitka		41·8	51	i 7 46	+ 5	i 13 56	+ 4	i 8 14	pP	e 16·9
Honolulu		47·3	107	i 8 25	− 1	e 15 14	+ 3	i 8 52	pP	e 19·6
Almata		51·4	295	8 56	− 1	—	—	—	—	—
Victoria		52·3	57	i 9 3k	− 1	e 16 13	− 7	—	—	—
Sverdlovsk		52·7	317	i 9 4	− 3	i 16 18	− 7	i 9 39	pP	—
Frunse		53·1	296	e 9 9	− 1	—	—	—	—	—
Andijan		55·7	294	9 36?	+ 7	—	—	—	—	—
Murgab		56·2	292	9 33	+ 1	17 11	− 1	—	—	—
Tchimkent		56·4	298	i 9 32	− 2	—	—	—	—	—
Tashkent		57·2	298	i 9 39	0	i 17 28?	+ 3	i 10 11	pP	—
Hungry Horse		57·5	52	i 9 41	0	e 17 27	− 2	—	—	—
Shasta Dam		57·5	64	i 9 42	+ 1	—	—	—	—	—
Ukiah		58·0	66	e 9 51	+ 6	e 17 45	+ 9	e 18 43	?	e 24·8
Mineral	z.	58·2	64	i 9 46a	0	e 18 25	PPS	i 11 54	PP	—
Obi-garm		58·5	295	9 50?	+ 2	17 44	+ 2	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Saskatoon		58·8	46	9 53	+ 3	17 47	+ 3	10 19	pP	26·6
Kulyab		59·0	294	9 51	− 1	17 45	− 4	10 26	pP	—
Stalinabad		59·2	295	i 9 51	− 2	17 45	− 7	10 27	pP	—
Berkeley		59·3	66	i 9 53k	− 1	i 17 55	+ 2	i 10 25	pP	—
Samarkand		59·5	297	i 9 59	+ 4	—	—	—	—	—
Butte	N.	59·7	53	e 9 57	0	e 18 2	+ 4	e 10 31	pP	e 29·5
Reno		59·8	64	i 9 58a	+ 1	e 18 0	+ 1	—	—	—
Santa Clara		59·9	66	e 9 59	+ 1	i 18 1	+ 1	i 10 31	pP	—
Lick	Z.	60·1	66	i 9 59a	0	—	—	i 10 43	PcP	—
New Delhi		60·4	281	i 9 59	− 2	i 19 1	sS	i 10 46	PcP	—
Bozeman		60·7	53	e 10 4	+ 1	i 18 12	+ 1	e 10 37	pP	e 25·3
Scoresby Sund		61·2	356	10 5a	− 2	18 13	− 4	i 19 46	ScS	—
Fresno		61·6	66	i 10 9a	− 1	—	—	i 10 40a	pP	—
Tinemaha		62·3	65	i 10 14	0	e 18 32	+ 1	i 10 51	pP	—
Logan		62·9	57	i 10 19	+ 1	e 18 32	− 7	i 10 52	pP	—
Moscow		63·1	326	10 16	− 4	18 32	− 9	10 51	pP	—
Salt Lake City		63·5	58	e 10 20	− 2	i 18 46	0	e 19 43	sS	e 26·4
Helsinki		63·8	335	e 10 21	− 3	e 18 41	− 9	—	—	e 30·3
Pasadena	Z.	64·3	67	i 10 27a	0	i 18 54	− 2	i 11 0	pP	—
Overton	Z.	64·9	63	i 10 32	+ 1	—	—	—	—	—
Riverside		64·9	67	i 10 30a	− 1	i 11 17	sP	i 11 1	pP	—
Pierce Ferry		65·5	63	i 10 36	+ 1	—	—	i 13 1	PP	—
Palomar		65·6	67	i 10 36	0	i 19 10	− 2	e 20 16	ScS	—
Ashkabad		65·7	301	e 10 35	− 1	—	—	—	—	—
Upsala		66·1	338	i 10 36k	− 3	i 19 13	− 5	i 10 59	pP	e 26·3
Hyderabad	N.	67·3	272	i 10 46	0	e 19 30	− 2	e 20 13	PPS	—
Batavia		68·1	232	i 10 50k	− 1	i 19 39	− 3	—	—	—
Bergen		68·3	344	i 10 51a	− 2	19 37	− 7	20 39	ScS	—
Baku		68·7	308	i 10 56	+ 1	e 20 33?	PS	—	—	—
Grozny		68·7	312	i 10 56	+ 1	—	—	—	—	—
Ivigtut		69·2	11	i 10 57k	− 1	i 19 51	− 4	i 20 44	PPS	—
Apia		69·4	144	e 10 59	− 1	—	—	—	—	—
Poona		69·6	275	i 11 1	0	i 19 58	− 2	i 11 34	pP	—
Bombay		70·0	277	i 11 4	+ 1	e 20 0	− 4	—	—	—
Tucson		70·0	64	i 11 4	+ 1	e 19 59	− 5	i 11 38	pP	e 28·2
Tiflis		70·3	312	i 11 5	0	e 20 49	PS	i 11 40	pP	—
Copenhagen		71·1	338	i 11 8k	− 2	i 20 11	− 6	11 35	pP	—
Sotchi		71·4	316	11 10	− 2	—	—	—	—	—
Leninakan		71·5	312	11 7?	− 5	—	—	—	—	—
Theodosia		72·2	320	e 11 14	− 2	—	—	—	—	—
Aberdeen	E.	72·7	347	—	—	e 20 4	−31	i 20 38	S	—
Kodaikanal	E.	73·2	268	e 11 20	− 2	—	—	—	—	—
Yalta		73·2	320	11 18	− 4	—	—	15 48	PPP	—
Potsdam		73·9	337	e 11 19	− 7	i 20 47	− 2	i 11 59	pP	—
Colombo	E.	74·0	262	11 25	− 2	21 22	SP	—	—	41·2
Raciborzu		74·5	332	e 11 29	− 1	e 20 57	+ 2	e 12 30	?	—
Skalnate Pleso		74·6	330	i 11 28	− 2	e 20 48	− 8	—	—	—
Collmberg		74·9	336	i 11 30k	− 2	e 20 55	− 5	e 11 54	pP	—
Chicago		75·1	43	e 12 7	pP	e 20 47	−15	i 21 30	ScS	e 29·6
Jena		75·6	336	e 11 35	− 1	—	—	e 12 4	pP	—
Prague		75·6	334	i 11 34	− 2	e 21 1	− 7	—	—	—
Brisbane	Z.	75·7	181	i 11 37a	+ 1	e 21 9	0	i 12 13	pP	—
De Bilt		76·1	341	i 11 39k	0	i 21 11	− 2	e 22 7	sS	e 33·3
Budapest		76·4	330	i 11 40	0	e 21 19?	+ 3	e 22 29	PPS	—
Ogyalla		76·4	331	e 11 41	+ 1	e 21 13	− 3	—	—	—
St. Louis		76·4	47	i 11 40	0	i 21 13	− 3	i 12 15	pP	—
Bucharest		76·5	324	e 11 41	0	e 21 14	− 3	—	—	—
Ottawa		77·0	34	11 42	− 2	21 16	− 7	e 12 17	pP	30·3
Shawinigan Falls	N.	77·0	31	e 10 44	−60	e 21 20	− 3	—	—	—
Seven Falls	E.	77·2	29	—	—	(23 19?)	?	—	—	23·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Kalossa	E.	77·3	330	11 47	+ 1	21 47	+21	e 22 45 PPS	—
Kew		77·8	344	i 11 48	0	e 21 27	− 4	i 12 16 pP	e 38·3
Cleveland		78·0	40	i 11 50	+ 1	i 21 29	− 5	e 12 23 pP	—
Istanbul		78·1	321	i 11 49	− 1	i 21 30	− 5	— —	—
Stuttgart		78·2	337	i 11 49k	− 1	e 21 31	− 5	i 12 12 pP	e 37·3
Belgrade		78·3	328	i 11 50a	− 1	i 21 58	+21	e 17 9 pPPP	e 31·6
Strasbourg		78·8	338	i 11 53k	− 1	e 21 42	0	i 12 23 pP	e 38·3
Zagreb		78·9	331	e 11 53	− 1	e 21 37	− 6	e 12 3 P_cP	—
Ravensburg		79·0	337	i 11 55k	0	—	—	— —	—
Zürich		79·7	337	i 11 58k	− 1	e 21 46	− 6	— —	—
Basle		79·8	338	i 11 58k	− 1	e 21 47	− 6	— —	—
Paris		79·8	342	i 12 0	+ 1	i 21 49	− 4	e 12 49 sP	e 49·3
Triest		79·8	333	i 11 57	− 2	i 21 47	− 6	i 22 7 S_cS	—
Pennsylvania		80·1	37	i 12 2	+ 1	i 21 49	− 7	i 12 33 pP	—
Jersey	E.	80·3	345	e 12 2	0	e 21 54	− 4	— —	—
Neuchatel		80·4	338	i 12 2	0	—	—	— —	—
Besançon		80·4	338	i 12 3	+ 1	e 12 52	sP	e 12 16 P_cP	—
Salo		80·8	334	i 12 4k	0	i 22 0	− 3	12 30 pP	—
Ksara		80·9	312	i 12 5k	0	22 5?	+ 1	12 33 pP	—
Harvard		81·0	32	i 12 6	0	i 22 1	− 4	i 12 40 pP	—
Weston		81·2	32	i 12 6	0	i 22 3	− 4	i 27 25 SS	—
Padova		81·4	333	i 12 4	− 4	22 1	− 8	12 27 pP	—
Bologna		81·5	334	i 12 10k	+ 2	e 22 11	+ 1	e 12 32 pP	—
Pavia		81·5	336	i 12 8	0	—	—	e 12 41 pP	—
Fordham		81·6	34	i 12 9	0	i 22 7	− 4	i 12 44 pP	—
Philadelphia		81·9	36	e 12 43	pP	e 22 7	− 7	e 27 37 SS	e 39·1
Florence Xin.		82·2	333	i 12 12	0	i 22 13	− 4	— —	—
Florence Arc.		82·2	333	i 12 13k	+ 1	e 22 13	− 4	e 12 37 pP	—
Prato		82·2	333	e 12 10	− 2	i 22 8	− 9	— —	—
Clermont-Ferrand		82·5	340	i 12 14	+ 1	e 22 18	− 2	i 12 50 pP	40·3
Rome		83·5	332	i 12 17k	− 1	i 22 28	− 2	i 12 54 pP	—
Mobile		83·8	50	e 12 56	pP	e 22 31	− 2	e 23 51 PPS	—
Columbia		84·5	43	—	—	e 22 29	−11	e 24 37 ?	e 38·7
Messina		85·9	328	i 12 28	− 2	—	—	e 12 44 ?	—
Helwan		86·4	313	i 12 32k	− 1	22 43	[− 4]	13 11 pP	—
Tacubaya		86·5	65	i 12 39k	+ 6	e 22 57	− 3	e 22 44 SKS	—
Auckland	N.	87·2	163	—	—	22 52	[0]	— —	—
Tortosa		87·8	340	12 44	+ 5	23 13	+ 1	24 14 PS	e 49·3
Arapuni	E.	88·5	163	—	—	23 19	+ 1	— —	—
Tual	N.	89·5	162	—	—	22 59	[− 8]	— —	—
Toledo	Z.	89·7	343	i 12 47	− 1	e 23 19	−11	13 24 sP	—
Alicante		90·4	340	13 0	+ 8	i 23 36	0	13 33 pP	e 42·0
Algiers		91·0	336	i 12 54	0	23 40	− 1	e 25 49 PPS	—
Wellington		91·5	164	12 51	− 6	23 45	− 1	13 32 pP	42·3
Granada		92·2	343	13 6k	+ 6	23 55	+ 3	30 25 SS	—
Almeria		92·3	342	e 13 5	+ 5	—	—	13 30 pP	51·3
Bermuda		92·5	32	e 13 49	pP	i 23 54	0	e 24 52 sS	e 37·6
Malaga	Z.	92·8	344	i 13 1a	− 2	e 23 55	− 2	16 45 PP	42·4
Christchurch		93·3	167	13 49	pP	23 22	[− 7]	17 14 PP	33·4
Tamanrasset	Z.	103·4	331	i 13 51a	+ 1	—	—	e 14 26 pP	49·3
San Juan		104·5	39	e 18 51	pPP	i 24 22	[− 3]	i 25 32 S	e 55·1
Bogota	Z.	112·7	53	i 19 17	PP	—	—	— —	—
Huancayo		125·6	66	(e 18 55)	[+ 5]	—	—	— —	—
La Paz		133·4	61	19 7	[+ 2]	i 28 3	SKKS	i 21 39 PP	—
Grahamstown	Z.	138·0	272	i 19 4	[−10]	—	—	i 22 3 PP	—

Additional readings and note :—
College i =7m.11s., iPP? =7m.49s., e =13m.56s.
Sitka ePP =9m.25s., epPP =9m.51s., esPP =10m.2s., esS =14m.49s.
Honolulu esP =9m.16s., iP_cP =10m.6s., ePP? =10m.31s., epPP? =10m.57s., ePPP? =11m.42s., iP_cS? =14m.7s.
Sverdlovsk iPP =11m.6s., ipPP? =11m.39s.?, isS =17m.20s.
Tashkent ePP =11m.45s., epPP =12m.31s., iS_cS =19m.10s.
Saskatoon SS =21m.34s., SSS =23m.31s.

Continued on next page,

Berkeley iN =11m.22s., iZ =11m.59s., iN =19m.21s., iE =25m.29s.
Butte eS$_c$S?N =19m.35s., eN =22m.44s.
Reno iE =17m.28s.
Santa Clara esSE =19m.0s.
Lick iZ =10m.4s. and 10m.8s.
New Delhi iN =10m.36s., 19m.32s., 19m.38s., and 20m.39s.
Bozeman ePP? =12m.55s., esS =19m.5s., eSS =22m.8s.
Scoresby Sund 14m.19s., 19m.15s., 20m.49s.
Fresno eN =15m.21s.
Tinemaha ePKP,PKPZ =39m.21s.
Logan iPP =12m.39s., ipPP =12m.58s., ePKP,PKP? =39m.7s.
Moscow sS =19m.33s.
Salt Lake City ePP =12m.48s., ePPP =14m.17s., eSS =23m.19s.
Helsinki e =19m.43s. and 19m.59s.
Pasadena iP$_c$PZ =10m.44s., isPZ =11m.14s., eS$_c$SZ =19m.39s., isSZ =20m.7s., eSSSZ =26m.37s., ePKP,PKP =39m.6s.
Riverside iP$_c$PZ =10m.46s., iPKP,PKPZ =39m.8s.
Upsala iPPPN =15m.44s., eSN =19m.9s., esS =19m.52s., eS$_c$SE =20m.11s., iS$_c$SN = 20m.16s., eSSN =23m.55s.
Hyderabad iN =21m.31s.
Ivigtut 21m.47s.
Poona P$_c$P?N =11m.21s., ipPE =11m.37s., isSN =20m.44s., isSE =20m.48s., iN = 21m.57s.
Tucson iPP =13m.40s., epPP =14m.10s., eS =19m.40s., esS =20m.54s., e =23m.55s., ePKP,PKP =38m.55s.
Tiflis sPS =21m.10s.
Copenhagen 15m.34s., 20m.55s., and 25m.43s.
Potsdam iPZ =11m.24s.k, ipPPP?Z =16m.36s., iSE =20m.44s.
Collmberg eP$_c$PZ =11m.42s., esPE =12m.7s., epPP?Z =14m.39s., eSE =20m.52s., and other unidentified readings.
Chicago e =14m.55s., eSS? =25m.37s.
Jena eP$_c$P?N =11m.44s.
De Bilt ePP =14m.25s.
Budapest eS?N =21m.40s., eE =22m.38s.
St. Louis isP =12m.20s., i =21m.45s., isS =22m.13s.
Ottawa SKS =21m.42s.
Kew isPZ =12m.47s., iPPZ =15m.21s., esPPE =16m.18s., esSE =22m.30s., eE = 23m.29s., iSSE =26m.27s., eSSSE =33m.2s., i =34m.50s.
Cleveland esPE =12m.36s., eN =15m.20s. and 15m.34s., iE =21m.44s., iPSN =21m.50s., isSE =22m.25s., isSEN =22m.30s., iSPSEN =22m.49s., eSSN =26m.14s., eE = 26m.40s.
Stuttgart iP$_c$P =12m.8s., epP =12m.29s., esPZ =12m.44s., e =13m.35s., i =13m.50s., ePP =14m.45s., epPPP? =17m.49s., esS? =22m.29s., eSS =27m.26s., eSSS = 31m.19s.
Strasbourg isP? =12m.35s., iPP =14m.51s., epPP =15m.30s., and 15m.33s., isPP = 15m.43s., ePPP? =17m.1s., iS =21m.39s., ePS =22m.39s., ePPS? =22m.56s., esSS =27m.44s., and other unidentified readings.
Paris epPP =15m.35s., e =18m.58s., eS =21m.46s., e =22m.32s., ePPS =22m.51s., e = 42m.19s.?
Pennsylvania iPSEN =23m.57s.
Harvard iP$_c$P =12m.9s., esS =22m.55s.
Padova i =13m.6s., PP =15m.0s., i =23m.6s.
Bologna e =22m.42s.
Fordham i =12m.25s., isS =23m.9s.
Florence eZ =13m.25s., eE =14m.27s.
Clermont-Ferrand iP$_c$P =12m.20s., i =12m.30s., and 12m.35s., isP =13m.7s., eSP = 23m.8s., esS =23m.23s., esSS =28m.38s., eSSS =31m.20s., Q =33·8m.
Besançon e =13m.43s., ePP =15m.0s., esPP? =16m.7s., ePPP =16m.40s., e =18m.9s.
Rome eS$_c$S =22m.59s., iPS =23m.30s., sS =24m.4s.
Mobile e =22m.41s.
Helwan eZ =13m.21s., 14m.3s., 14m.21s., and 15m.30s., PPZ =15m.57s., pPPZ = 16m.32s., sSE =23m.47s.
Toledo eZ =15m.40s., PPZ =16m.21s., SKS?Z =22m.57s., eE =25m.28s.
Alicante PP =16m.36s., PS =24m.30s., PPS =25m.12s., SS =29m.20s., SSS =32m.42s.
Wellington PPZ =16m.25s., SKS =23m.7s., PS =24m.31s., SS =25m.26s.
Almeria PPP =18m.51s., PPS =26m.15s.
Bermuda e =19m.57s., eS =23m.51s., isS =24m.57s., eSS =29m.49s., eSSS =33m.59s.
Malaga PPPZ =18m.49s.
Christchurch PS =24m.0s., S$_c$S? =24m.59s., SSEN =27m.25s.
Tamanrasset iZ =13m.56s. and 14m.3s., eZ =16m.20s., iZ =17m.6s., iPPZ =18m.39s., ipPPZ =18m.44s.
San Juan isS? =26m.52s., ePS =27m.40s., ePPS? =28m.57s., iSS =32m.54s., eSSS? = 36m.35s.
Huancayo reading has been reduced by 1h.
La Paz iEZ =22m.11s., iEN =23m.15s., iSSN =39m.11s., iSSP =40m.19s.
Grahamstown iZ =19m.3s., 19m.30s., and 22m.33s.

May 3d. 11h. Off Kamchatka.

College eP =0m.6s.
Hungry Horse iP =3m.21s., e =3m.47s.
Shasta Dam iP =3m.27s.
Tinemaha iPZ =4m.3s., iZ =4m.13s.
Logan eP =4m.4s., e =4m.9s.
Pasadena iPZ =4m.18s., iZ =4m.27s.
Overton ePZ =21s.
Riverside iPZ =4m.21s., iZ =4m.31s.
Pierce Ferry iP =4m.24s.
Tucson eP =4m.55s.
St. Louis eP =5m.31s., e =5m.42s., eS? =14m.35s., eSSS =22m.33s.
Florissant eP =5m.33s.
Collmberg eEZ =5m.46s.
Weston iP =5m.58s.
Stuttgart ePZ =6m.5s., e =18m.0s. and 22m.6s., eL =42m.
Strasbourg iP =6m.8s., eP_cP =6m.22s.
Besançon e =6m.11s., eP? =6m.17s., e =6m.23s.
Paris iP =6m.13s., i =6m.20s. and 6m.27s., eL =47m.
Triest eP? =6m.18s.
Clermont-Ferrand eP =6m.28s., L =36m.
Salo eP?Z =6m.42s., e =7m.16s.
Ksara e =12m.2s. and 21m.29s.
Rome eE =18m.23s.? and 26m.57s.
Christchurch 40m.?
Long waves were also recorded at Scoresby Sund and De Bilt.

May 3d. Readings also at 0h. (Ashkabad, Andijan, near Kulyab, Stalinabad, Obi-garm, and Murgab), 1h. (near Obi-garm (2), Murgab (2), Kulyab (2), Stalinabad (2), and Andijan (2)), 2h. (Ksara and near Klyuchi), 3h. (Bombay, Kodaikanal, New Delhi, Poona, Kulyab, Murgab, Tashkent, Ksara, Collmberg, Stuttgart, Granada, Tananarive, and Mineral), 4h. (near Fort de France, near Tacubaya, and near Victoria), 5h. (Rome), 6h. (College and Helwan), 7h. (College and near Tacubaya), 8h. (Ksara), 10h. (near Klyuchi), 11h. (Overton), 12h. (College), 13h. (Overton), 14h. (Apia and Brisbane), 15h. (Ksara, Pasadena, Riverside, Palomar, and Shasta Dam), 16h. (College), 18h. (near Klyuchi), 19h. (near Klyuchi, near Obi-garm, Andijan, and Kulyab), 20h. (Paris, near Andijan, Obi-garm, Kulyab, Stalinabad, and Tchimkent), 21h. (Overton), 23h. (Ashkabad).

May 4d. 1h. 34m. 2s. Epicentre 40°·4N. 124°·2W. (as on 1946, Dec. 18d.).

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

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Ferndale		0·2	343	i 0 11	+ 1	i 0 14	− 2
Arcata		0·5	12	i 0 11	− 3	i 0 18	− 5
Shasta Dam		1·4	78	i 0 28	+ 1	—	—
Ukiah		1·5	149	e 0 51	S	(e 0 51)	+ 2
Mineral		2·0	91	i 0 36	+ 1	i 1 2	0
Berkeley		2·9	149	i 0 48k	0	i 1 23	− 1
Branner	N.	3·4	152	e 0 54	− 1	—	—
Reno		3·5	103	i 0 59a	+ 2	i 1 41	+ 1
Lick	Z.	3·6	146	i 0 58k	0	i 1 43	+ 1
Fresno	Z.	5·0	135	i 1 20	+ 2	—	—
Tinemaha		5·7	124	i 1 35	+ 7	i 2 54	S*
Haiwee		6·5	129	i 1 45	+ 6	e 3 46	Se
Pasadena		7·9	140	i 1 57	− 2	—	—
Riverside	Z.	8·4	137	i 2 5	− 1	—	—
Hungry Horse		10·8	39	e 2 38	− 1	—	—
Tucson		13·5	123	e 3 21	+ 6	—	—

Additional readings :—
Arcata i =15s.
Ukiah e =1m.10s., eS =1m.30s., eL =1m.58s.
Berkeley iZ =1m.34s. and 1m.44s.
Reno iZ =1m.2s., iE =2m.2s., iZ =2m.5s.
Fresno iZ =3m.2s. and 3m.20s., iN =3m.23s.
Riverside iZ =2m.15s.

May 4d. 2h. 54m. 21s. Epicentre 42°·5N. 144°·4E. Depth of focus 0·010.
(as on 1945, Sept. 19d.).

Intensity V at Kusiro ; IV at Nemuro ; II-III at Hatinohe. Macroseismic radius >300km.
Epicentre 42°·7N 144°·4E. Depth 30-100km.
Seismo. Bull. Cent. Met. Obs. Japan, for 1949. Tokyo, 1950, pp. 12-13, with macroseismic chart.

$A = -\cdot6013$, $B = +\cdot4305$, $C = +\cdot6731$; $\delta = -4$; $h = -3$;
$D = +\cdot582$, $E = +\cdot813$; $G = -\cdot547$, $H = +\cdot392$, $K = -\cdot740$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Nemuro		1·2	46	0 15a	− 8	0 27	−13
Sapporo		2·3	284	0 38	+ 1	1 12	+ 7
Hatinohe		2·9	228	0 41	− 4	1 18	− 1
Aomori		3·2	238	0 46	− 4	1 25	− 2
Miyako		3·4	214	0 52	0	1 25	− 7
Morioka		3·7	222	0 54	− 2	1 34	− 5
Mizusawa		4·2	218	1 1	− 2	1 42	− 9
Akita		4·3	231	1 13	+ 8	1 57	+ 3
Sendai		5·0	214	1 36	?	2 26	?
Hukusima		5·6	214	1 22	0	2 24	− 2
Onahama		6·2	207	1 37	+ 7	2 36	− 5
Mito		6·8	208	1 56	+17	2 50	− 5
Utunomiya		6·9	213	1 54	+14	—	—
Kakioka		7·0	209	1 44	+ 2	2 54	− 6
Tukubasan		7·1	210	1 40	− 3	—	—
Kumagaya		7·4	213	2 5	+18	3 13	+ 3
Maebasi		7·4	216	1 47	0	—	—
Hunatu		8·3	214	2 9	+10	—	—
Nagoya		9·3	221	2 25	+12	—	—
Shasta Dam		66·1	57	e 10 38	− 1	—	—
Hungry Horse		66·3	46	i 10 39	− 1	—	—
Overton	z.	73·5	56	i 11 25	+ 1	—	—
Tucson		78·6	57	e 11 53	0	—	—

May 4d. Readings also at 0h. (Huancayo and Weston), 6h. (La Paz, Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse, Cleveland, Philadelphia, Bermuda, and Stuttgart), 8h. (Overton), 10h. (Bogota), 11h. and 13h. (near Ashkabad), 14h. (Messina and Toledo), 17h. (Santa Lucia), 18h. (Ashkabad), 19h. (Upsala and near La Paz), 20h. (Auckland, Christchurch, Tuai, Wellington, Pasadena, Riverside, Tinemaha, Tucson, Pierce Ferry, Shasta Dam, Victoria, College, Weston, Ksara, Istanbul, Strasbourg, and Stuttgart), 21h. (near Ashkabad (2) and near Alicante), 22h. (Granada, Paris, and Rome), 23h. (near Mizusawa and near Murgab).

May 5d. 18h. 35m. 13s. Epicentre 41°·2N. 84°·5E. (as on 1949, March 9d.).

$A = +\cdot0723$, $B = +\cdot7512$, $C = +\cdot6561$; $\delta = 0$; $h = -2$;
$D = +\cdot995$, $E = -\cdot096$; $G = +\cdot063$, $H = +\cdot653$, $K = -\cdot755$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Almata		6·0	293	1 32	0	2 42	− 1
Frunse		7·6	286	e 1 59	+ 4	—	—
Murgab		8·6	254	2 9	0	3 45	− 3
Andijan		9·2	271	e 2 26	+10	e 4 9	+ 6
Tchimkent		11·2	281	e 2 49	+ 5	—	—
Tashkent		11·4	276	—	—	e 4 39	−17
Obi-garm		11·6	263	e 2 50	0	—	—
Kulyab		11·8	259	e 2 54?	+ 1	—	—
Stalinabad		12·4	263	e 2 52	− 9	—	—
Samarkand		13·4	269	3 21	+ 7	—	—
New Delhi	E.	13·9	208	e 3 26	+ 5	—	—
Irkutsk		17·5	43	—	—	e 7 30	+ 9
Sverdlovsk		22·0	323	4 49	− 9	e 8 41	−15
Bombay		24·4	207	—	—	e 8 47	−52
Collmberg	z.	48·6	306	e 8 42	− 5	—	—
Stuttgart	z.	51·8	305	e 9 11	− 1	—	—

New Delhi gives also iE =3m.35s. and 3m.49s.
Long waves were recorded at De Bilt.

May 5d. Readings also at 3h. (Tchimkent, near Kulyab, Murgab, Obi-garm, and Stalinabad), 4h. (Murgab, near Andijan (2), and near Obi-garm), 6h. (Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Reno, Lick, Huancayo, Klyuchi, and near Murgab), 7h. (Christchurch, Auckland, Wellington, and near Ashkabad), 9h. (Collmberg), 10h. (Huancayo, and near College), 11h. (Klyuchi), 13h. (Branner, Fresno, near Berkeley, Lick, Mineral, Reno, near Chur, and near New Delhi), 14h. (Apia, Palomar, Pasadena (2), Pierce Ferry, Tucson, Shasta Dam, Hungry Horse (2), College, Collmberg, Stuttgart, and near Batavia), 15h. (near Copiapo and near Alicante), 18h. (near Granada), 19h. (Tucson), 21h. (Bogota, La Paz (2), Punta Arenas, Weston, Tucson, Wellington, Auckland, Tamanrasset, Clermont-Ferrand, Paris, Strasbourg, Stuttgart, Rome, Istanbul, Helwan, and Ksara), 22h. (Hungry Horse, De Bilt, Kew, Istanbul, Murgab, Stalinabad, near Kulyab, and Obi-garm).

May 6d. 8h. 31m. 16s. Epicentre 37°·7N. 141°·8E. Depth of focus 0·005.
(as on 1947, Dec. 26d.).

Intensity V at Namie and Shioyazaki (Hukusima Pref.); IV at Onahama, Sendai, Shirakawa, Mito, Tukubasan, and Kakioka; II-III at Isinomaki, Miyako and Morioka.
Epicentre 37°·5N. 141°·8E. Depth 60km. Macroseismic radius 200-300km.
Seismo. Bull. Cent. Met. Obs., Japan, for 1949, Tokyo, 1950, pp. 13-14, with macroseismic chart.

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Sendai		0·9	309	0 18	0	0 32	+ 1	—	—
Hukusima		1·1	273	0 18a	− 2	0 31	− 5	—	—
Onahama		1·1	223	0 17	− 3	0 28	− 8	—	—
Mizusawa	E.	1·5	343	0 30	+ 4	0 49	+ 4	—	—
Mito		1·7	219	0 26	− 2	0 43	− 7	—	—
Kakioka		1·9	221	0 30	− 1	0 49	− 5	—	—
Miyako		1·9	4	0 34a	+ 3	0 58	+ 4	—	—
Utunomiya		1·9	233	0 27	− 4	0 48	− 6	—	—
Morioka		2·0	347	0 37a	+ 5	1 2	+ 5	—	—
Tukubasan		2·0	322	0 29	− 3	0 49	− 8	—	—
Akita		2·4	326	0 26	−12	1 1	− 6	—	—
Kumagaya		2·5	231	0 34	− 5	0 57	−12	—	—
Maebasi		2·6	239	0 38a	− 3	1 6	− 6	—	—
Tokyo		2·6	219	0 39	− 2	1 6	− 6	—	—
Nagano		3·0	247	0 30	−17	1 22	0	—	—
Aomori		3·2	346	0 55	+ 6	1 34	+ 7	—	—
Mera		3·2	210	0 54	+ 5	1 39	+12	—	—
Hunatu		3·3	228	0 39	−12	1 23	− 6	—	—
Toyama		3·8	256	1 6	+ 8	1 40	− 2	—	—
Shizuoka		3·9	226	0 59	0	1 37	− 7	—	—
Gihu		4·6	242	1 9	0	2 11	+ 9	—	—
Nagoya		4·7	237	1 7	− 3	2 11	+ 7	—	—
Osaka		5·9	241	1 38	+11	—	—	—	—
College		48·4	33	e 8 38	+ 1	—	—	—	—
Victoria	Z.	65·7	48	e 10 40	0	—	—	—	—
Shasta Dam		70·5	53	i 11 8	− 2	—	—	—	—
Hungry Horse		71·1	43	i 11 13	0	—	—	i 11 34	pP
Overton		77·9	53	e 11 53	+ 1	—	—	—	—
Boulder City		78·0	54	i 11 53	0	—	—	i 12 15	pP
Pierce Ferry		78·5	53	i 11 56	0	—	—	i 12 18	pP
Tucson		82·9	54	e 12 20	+ 1	—	—	e 12 42	pP
Stuttgart	Z.	84·2	234	e 12 23	− 3	—	—	—	—

May 6d. 12h. 45m. 50s. Epicentre 10°·6S. 165°·5E. (as on 1949, April 26d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	E.	20·5	213	i 4 48	+ 6	i 8 40	+13	—	—	—
	N.	20·5	213	i 4 45	+ 3	i 8 34	+ 7	i 5 2	PP	—
Apia		22·4	102	e 5 0	− 2	—	—	—	—	—
Riverview		26·6	208	i 5 55k	+13	i 10 34	+18	i 10 51	sS	13·0
Wellington		31·6	167	6 23	− 3	e 12 10?	+35	—	—	—
Kaimata	N.E.	32·2	173	6 32	0	—	—	—	—	—
Christchurch		33·4	172	—	—	13 10?	+67	—	—	—
College		82·9	19	e 12 28	0	—	—	i 12 44	pP	e 42·0
Shasta Dam		83·6	47	i 12 30	− 1	—	—	i 12 43	pP	—
Mineral	Z.	84·1	48	i 28 3k	?	—	—	—	—	—
Pasadena	Z.	84·8	55	i 12 37	0	—	—	i 12 50	pP	—
Reno		85·1	49	e 12 39a	0	—	—	e 16 9	PP	—
Riverside		85·4	55	i 12 39	− 1	—	—	i 12 53	pP	—
Palomar		85·6	56	i 12 41	0	—	—	i 12 54	pP	—
Tinemaha		85·6	52	i 12 41	0	—	—	i 12 54	pP	—
Victoria	Z.	85·7	40	e 12 42	0	—	—	—	—	—
Boulder City		87·9	53	i 12 53	0	—	—	i 13 6	pP	—
Pierce Ferry		88·6	54	i 12 56	0	—	—	i 13 9	pP	—
Tucson		90·3	57	i 13 4	0	—	—	i 13 35	pP	e 41·5
Hungry Horse		91·6	42	i 13 9	− 1	—	—	i 13 22	pP	—
Ksara		128·5	304	e 21 22	PP	e 26 42	[+26]	—	—	—
Stuttgart		137·0	338	e 19 17?	[− 8]	—	—	e 22 25	PP	—
Strasbourg		137·8	338	e 19 30	[+ 3]	—	—	e 22 28	PP	—
Toledo	Z.	149·4	344	i 19 54	[+ 8]	e 27 52	[+59]	e 29 42	SKKS	—

Additional readings :—
Brisbane iZ = 7m.0s. and 9m.3s.
Riverview iN = 11m.22s., iS_cSN = 16m.37s.
Mineral iZ = 28m.11s.
Riverside iZ = 13m.15s.
Tinemaha iZ = 13m.21s.
Tucson ePP = 16m.51s.
Stuttgart eZ = 19m.41s.
Toledo iZ = 20m.19s.
Long waves were also recorded at Arapuni, Auckland, and Weston.

May 6d. 14h. 30m. 13s. Epicentre 53°·9N. 109°·6E.

A = −·1985, B = +·5575, C = +·8061 ; δ = +1 ; h = −7 ;
D = +·942, E = +·335 ; G = −·270, H = +·759, K = −·592.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Irkutsk		3·6	245	0 57	− 1	i 1 36	− 6	i 1 52	S*	—
Almata		23·9	258	5 14	− 2	—	—	—	—	—
Zi-ka-wei	Z.	24·2	153	5 47	PP	10 17	SS	—	—	—
Frunse		25·5	259	e 5 33	+ 1	—	—	—	—	—
Sverdlovsk		27·5	297	e 5 51	+ 1	e 10 36?	+ 6	—	—	—
Andijan		28·1	257	5 55	0	—	—	—	—	—
Murgab		28·8	252	6 2	0	e 10 57	+ 6	—	—	—
Tashkent		29·5	262	i 6 8	0	e 11 4?	+ 2	—	—	—
Obi-garm		31·0	257	i 6 24?	+ 3	—	—	—	—	—
Kulyab		31·5	256	i 6 25	− 1	—	—	—	—	—
Stalinabad		31·6	258	i 6 24	− 2	i 11 39	+ 4	—	—	—
Samarkand		31·9	262	6 35?	+ 6	—	—	—	—	—
Moscow		39·8	303	e 7 39	+ 3	—	—	—	—	—
Baku		41·6	277	—	—	e 13 51	−17	—	—	—
Grozny		42·1	282	e 8 31	+36	—	—	—	—	—
Hyderabad	N.	43·7	225	8 5	− 3	e 14 47	+ 8	—	—	—
Tiflis		43·7	281	8 9	+ 1	—	—	—	—	—
Leninakan		44·8	281	8 15?	− 2	—	—	—	—	—
Bombay		44·9	233	—	—	e 13 47?	−69	—	—	—
College		47·6	34	e 8 39	0	e 16 40	+65	e 11 42	PPP	e 19·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copenhagen		51·5	314	9 10	+ 1	—	—	—	—	—
Raciborzu		52·6	306	e 9 5?	−13	e 23 39	?	—	—	e 30·1
Istanbul		53·0	291	—	—	e 21 5	SS	—	—	e 36·1
Potsdam		53·4	311	e 21 30	SS	—	—	—	—	i 29·5
Collmberg		54·2	309	e 9 35	+ 6	—	—	—	—	—
Ksara		54·2	280	i 9 30k	+ 1	17 16?	+10	—	—	—
Stuttgart		57·7	310	e 9 55k	0	e 18 0	+ 7	e 22 41	SS	e 26·8
Strasbourg		58·5	311	e 10 1	+ 1	—	—	e 22 9	SS	e 34·8
Chur		59·0	308	e 10 3	− 1	—	—	—	—	e 38·2
Zürich		59·0	310	e 10 3k	− 1	—	—	e 12 32	PP	—
Basle		59·4	310	e 10 2	− 4	—	—	—	—	—
Helwan		59·7	280	i 10 8k	− 1	i 18 25	+ 6	e 12 14	PP	—
Kew		59·8	317	e 10 9	0	—	—	e 27 17	Q	e 37·8
Rathfarnham Castle		60·7	322	i 12 42	PP	i 22 30	SS	—	—	—
Rome	z.	61·2	302	—	—	e 25 13	SSS	—	—	—
Clermont-Ferrand		62·7	311	e 10 19	−10	—	—	—	—	e 31·6
Victoria	z.	68·6	34	e 6 20	?	—	—	—	—	—
Alicante		70·2	308	—	—	(e 18 30)	?	—	—	e 18·5
Toledo	z.	70·6	311	e 11 20	+ 1	—	—	—	—	e 42·2
Hungry Horse		71·7	29	i 11 25	− 1	—	—	—	—	—
Almeria		72·4	308	e 13 18	?	e 18 37	?	—	—	36·8
Granada		72·6	310	e 12 54 a	+83	29 19	SSS	—	—	43·7
Tinemaha	z.	80·5	37	e 12 15	0	—	—	—	—	—
Overton	z.	82·2	34	e 12 24	0	—	—	—	—	—
Boulder City		82·6	35	e 12 31	+ 5	—	—	—	—	—
Pierce Ferry		82·8	34	e 12 27	0	—	—	—	—	—
Pasadena	z.	83·1	38	i 12 29	0	—	—	—	—	—
Riverside	z.	83·5	38	e 12 30	− 1	—	—	—	—	—
Palomar	z.	84·3	37	e 12 34	− 1	—	—	—	—	—
Cleveland		84·5	8	i 12 36	0	—	—	—	—	e 44·2
St. Louis		86·3	15	i 12 43	− 2	e 23 19	− 1	e 23 27	SKKS	—
Tucson		87·3	33	e 12 51	+ 1	—	—	—	—	—
Pretoria	z.	105·6	248	i 12 4	?	—	—	—	—	—

Additional readings :—
College iP =8m.45s.
Raciborzu eN =23m.48s.
Stuttgart e =21m.53s.
Strasbourg e =22m.17s., 27m.21s., and many later readings.
Zürich e =13m.37s.
Helwan eZ =10m.16s. and 10m.36s.
Cleveland iN =12m.41s.
St. Louis e =20m.55s., and 29m.35s.
Pretoria iZ =12m.7s. and 12m.14s., probably not due to this shock.
Long waves are also recorded at Weston, Bermuda, Tamanrasset, and other European stations.

May 6d. Readings also at 2h. (Ashkabad), 3h. (Overton, near Pierce Ferry, Tucson, and near Messina), 5h. (near Klyuchi), 6h. and 7h. (near Ashkabad), 8h. (near Stuttgart), 9h. (Santa Lucia and near Mizusawa), 10h. (near Ashkabad), 11h. (Hungry Horse, Overton, and Weston), 12h. (Overton), 14h. (Overton), 15h. (Stuttgart), 16h. (Alicante and Bologna (2)), 19h. (near Tacubaya), 20h. (near La Paz, near Andijan, Kulyab, Obi-garm, Stalinabad, and near Batavia), 21h. (Pasadena, Riverside, Tinemaha, Tucson, Overton, and Pierce Ferry).

May 7d. 13h. 1m. 33s. Epicentre 23°·3S. 66°·4W. (as on 1949, Jan. 9d.).

Intensity IV between 20° and 21°S. Lat. Epicentre 23°·0S. 67°·0W. (Strasbourg).
23°·5S. 66°·0W. (U.S.C.G.S.).

F. Greve.
Boletin del Año, 1949, primer semestre. Instituto Sismológico. Santiago p.19. Macroseismic radius 200km.

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copiapo	N.	5·4	220	i 1 41	P*	—	—	—	—	2·7
La Paz		6·9	346	i 2 5a	P*	i 3 1	− 4	i 3 23	S*	—
Santa Lucia	N.	10·8	200	e 3 8	P*	4 36	− 6	—	—	5·6
Huancayo		14·1	321	e 3 37	+14	i 6 11	+ 9	—	—	i 6·6
Fort de France		38·1	9	i 7 27	+ 5	i 13 2	−14	—	—	—
San Juan		41·4	0	e 10 44	?	e 15 4	?	(e 17 0)	SS	e 17·0
Tacubaya		53·2	320	i 9 27	+ 5	—	—	—	—	—
Little Rock		62·8	336	e 10 27	− 3	—	—	e 12 49	PP	—
Fordham		64·2	355	i 10 38	− 1	—	—	—	—	—
St. Louis		65·5	339	i 10 45	− 2	i 19 10	−22	e 20 10	PPS	—
Weston		65·5	357	i 10 47	0	—	—	—	—	—
Harvard		65·6	357	i 10 48	0	—	—	—	—	—
Cleveland	N.	66·0	348	i 10 49	− 1	e 19 17	−21	—	—	—
Ottawa	Z.	68·9	353	e 11 7	− 2	—	—	—	—	—
Tucson		69·7	320	i 11 13	− 1	e 19 34	−48	e 11 32	PcP	—
Seven Falls	E.	70·2	357	e 11 17	0	—	—	—	—	—
Palomar		74·1	318	i 11 40k	0	—	—	i 11 54	PcP	—
Pierce Ferry		74·3	322	i 11 41	0	—	—	—	—	—
Boulder City		74·6	321	i 11 43	0	—	—	—	—	—
Overton	Z.	74·8	321	e 11 44	0	i 17 49	?	—	—	—
Riverside		74·8	318	i 11 45k	+ 1	—	—	—	—	—
Pasadena		75·4	318	i 11 47k	0	—	—	i 12 0	pP	—
Tinemaha	Z.	77·4	320	i 11 58k	0	—	—	—	—	—
Fresno	Z.	78·1	319	e 12 2k	0	—	—	—	—	—
Lick		79·6	318	e 12 12	+ 2	—	—	e 15 14	PP	—
Reno		79·9	321	i 12 12k	0	—	—	—	—	—
Berkeley	Z.	80·3	318	i 12 14k	0	—	—	—	—	—
Shasta Dam		82·2	320	e 12 22	− 2	—	—	—	—	—
Hungry Horse		83·1	331	i 12 28	− 1	e 22 27	−21	e 15 31	PP	—
Pretoria	Z.	84·0	115	i 12 35	+ 2	—	—	—	—	i 33·1
Stuttgart	Z.	98·3	41	e 13 39	− 2	—	—	—	—	—
College		107·3	334	e 14 28	P	—	—	—	—	—
Ksara		112·4	61	e 16 45	?	e 28 46	PS	—	—	—

Additional readings :—
Santa Lucia N = 4m.12s. and 5m.18s.
Huancayo i = 4m.3s. and 4m.57s.
St. Louis i = 11m.14s.
Pierce Ferry i = 11m.54s.
Pasadena iZ = 12m.24s.
Fresno eZ = 12m.12s., 12m.18s., and 12m.24s., eN = 12m.49s.
Lick iPZ = 11m.41s.

May 7d. Readings also at 0h. (near Ashkabad (2)), 1h. (New Delhi, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Berkeley, Fresno, Lick, Shasta Dam, Hungry Horse, College, and La Paz), 4h. (Rome (2), Stuttgart, Istanbul, and near Tunis), 5h. (Pierce Ferry), 6h. (Tucson and near Tacubaya), 8h. (Obi-garm and near Kulyab), 9h. (Overton and near Ashkabad), 10h. (Tucson, Hungry Horse, Overton (2), and Salo), 12h. (Apia, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 13h. (La Paz (2), Lick, Shasta Dam, and Hungry Horse), 14h. Grahamstown, Tucson, Overton, Hungry Horse, and near Lincoln), 15h. (Collmberg, Ottawa, La Paz, and Overton), 16h. (near College), 17h. (near Murgab), 19h. (Tucson), 20h. (Ashkabad (2), Frunse, near Andijan, and Murgab), 23h. (Stuttgart, and near Chur).

May 8d. 7h. 0m. 25s. Epicentre 41°·0N. 143°·3E. Depth of focus 0·020.
(as on 1948, Nov. 26d.).

Intensity IV at Urakawa and Hatinohe. Epicentre 42°N. 142°E. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs., Japan, 1949, Tokyo, 1950, p.14 with macroseismic chart.

A = −·6069, B = +·4523, C = +·6535 ; δ = −3 ; h = −2 ;
D = +·598, E = +·802 ; G = −·524, H = +·391, K = −·757.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Hatinhoe		1·4	251	0 54	S	(0 54)	+ 2
Miyako		1·7	216	0 28	− 5	0 55	− 3
Aomori		1·9	264	0 20	−15	0 45	−17
Morioka		2·1	232	0 25	−12	0 58	− 8
Mizusawa	E.	2·5	222	0 11	?	1 17	+ 3
Sapporo		2·5	325	0 42k	0	0 59	−15
Akita		2·8	242	1 8	+22	—	—
Nemuro		2·9	44	0 43	− 4	1 6	−17
Sendai		3·3	214	0 48	− 4	1 36	+ 4
Hukusima		3·9	214	1 11	+11	1 55	+ 9
Onahama		4·5	205	2 3	S	(2 3)	+ 3
Mito		5·1	206	2 17	S	(2 17)	+ 3
Utunomiya		5·2	212	2 5	S	(2 5)	−12
Kakioka		5·3	208	1 23	+ 5	—	—
Tukubasan		5·4	208	1 22	+ 2	2 24	+ 3
Kumagaya		5·7	213	2 6	?	—	—
Nagano		5·9	224	1 38	+12	—	—
Tokyo		6·0	206	2 21	S	(2 21)	−15
College		45·0	35	i 8 1	0	—	—
Shasta Dam		67·6	55	i 10 44	+ 3	—	—
Hungry Horse		67·9	44	i 10 44	+ 1	—	—
Boulder City		75·2	55	e 11 30	+ 4	—	—
Pierce Ferry		75·6	54	i 11 32	+ 3	—	—
Tucson		80·1	56	e 11 58	+ 5	—	—
Stuttgart	z.	81·9	332	e 11 59	− 4	—	—

Additional readings :—
College i = 8m.9s.
Pierce Ferry e = 11m.52s.

May 8d. 21h. 24m. 31s. Epicentre 20°·8S. 69°·0W. Depth of focus 0·015.
(as on 1949, Feb. 13d.).

Intensity IV between 20° 21°S. Lat. Macroseismic radius over 500km. Depth 60km.
Suggested epicentres 20°·75S. 68°·5W. (Strasbourg).
21°·5S. 69°·0W. (U.S.C.G.S.).

Boletin del Año 1949, primer semestre. Instituto Sismológico. Santiago p. 19.

A = +·3353, B = −·8735, C = −·3531 ; δ = +11 ; h = +4 ;
D = −·943, E = −·358 ; G = −·127, H = +·330, K = −·936.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		4·4	11	i 1 3k	− 3	i 1 53	− 4	i 1 19	pP	—
Copiapo	N.	6·6	190	1 40	+ 4	—	—	—	—	i 3·1
Huancayo		10·6	325	e 2 29	0	i 4 19	− 7	e 2 53	pP	i 4·8
Santa Lucia	N.	12·7	186	e 3 8	+11	—	—	3 15	pP	6·3
La Plata	E.	17·1	147	3 53	+ 1	7 2	+ 5	—	—	10·0
Bogota		25·7	348	e 5 19	− 1	i 9 37	0	e 5 46	PP	—
Galerazamba		32·0	350	e 6 58	+42	e 11 27	+10	e 15 9	S_cS	—
Fort de France		36·1	14	i 6 48	− 3	e 12 10	−10	—	—	—
San Juan		39·0	5	e 7 20	+ 5	i 13 43	+39	e 7 51	pP	e 16·3
Tacubaya		49·7	322	i 8 45	+ 4	e 16 37	PS	i 9 26	sP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		53·0	5	—	—	e 16 16	− 8	e 17 9	sS	—
Georgetown		59·9	353	i 10 22	pP	—	—	—	—	—
Washington		59·9	353	e 9 53	− 2	—	—	i 10 24	pP	—
Philadelphia		60·7	355	e 10 25	pP	e 17 56	− 9	e 18 50	sS	e 24·5
Cincinnati		61·4	347	i 10 29	pP	i 18 8	− 6	i 18 59	sS	—
Fordham		61·5	357	e 9 55	−10	—	—	i 10 36	sP	—
Pennsylvania		61·9	352	10 37	pP	i 18 16	− 4	i 19 12	sS	—
St. Louis		62·4	341	i 10 9	− 2	i 18 22	− 4	i 10 38	pP	—
Weston		62·9	358	i 10 12	− 3	18 28	− 5	i 10 43	pP	26·3
Harvard		63·0	358	i 10 13	− 3	—	—	i 10 45	pP	—
Cleveland		63·1	349	i 10 14	− 2	i 18 31	− 4	e 10 44	pP	—
Ottawa		66·2	354	e 10 34	− 2	e 20 17	sS	i 11 4	pP	26·5
Tucson		66·2	322	i 10 37	+ 1	e 19 17	+ 4	i 11 6	pP	e 38·0
Seven Falls	E.	67·6	359	e 11 16	pP	i 19 22	− 8	i 20 18	sS	27·5
Palomar		70·6	317	i 11 5k	+ 2	—	—	i 11 35	pP	—
Pierce Ferry		70·8	323	i 11 7	+ 3	—	—	i 11 36	pP	—
Boulder City		71·2	322	i 11 9	+ 2	—	—	i 11 38	pP	—
Riverside		71·3	319	i 11 10k	+ 3	—	—	i 11 42	pP	—
Overton	Z.	71·4	322	i 11 10	+ 2	—	—	i 11 39	pP	—
Pasadena		71·9	319	i 11 12k	+ 1	i 20 24	+ 4	i 11 42	pP	—
Tinemaha		74·0	321	i 11 24k	+ 1	—	—	i 11 53	pP	—
Fresno		74·6	320	e 11 27k	0	e 20 56	+ 6	i 11 58a	pP	—
Lick	Z.	76·2	319	i 11 37k	+ 1	—	—	i 12 7k	pP	—
Santa Clara		76·3	319	e 12 8	pP	e 21 20	+11	—	—	—
Branner	Z.	76·5	319	e 11 39k	+ 2	—	—	i 12 10a	pP	—
Reno		76·5	322	e 11 40k	+ 3	e 21 17	+ 6	e 12 9	pP	—
Berkeley		76·9	319	i 11 41k	+ 1	i 21 22	+ 7	i 12 11	pP	—
Butte	N.	77·3	331	e 12 13	pP	e 21 22	+ 2	e 25 43	sS	—
Mineral	Z.	78·1	321	i 11 47k	+ 1	—	—	i 12 17k	pP	—
Shasta Dam		78·8	321	i 11 50	0	—	—	i 12 20	pP	—
Hungry Horse		79·7	331	i 11 56	+ 1	e 21 45	0	i 12 27	pP	—
Grahamstown	Z.	83·3	123	i 12 16	+ 2	—	—	e 12 41	pP	—
Malaga	Z.	83·6	47	i 12 15k	0	22 23	− 2	i 12 49	pP	e 40·5
Granada		84·3	47	i 12 19a	0	i 22 33	+ 1	12 54	pP	40·5
Victoria		84·4	327	i 12 20k	+ 1	e 22 36	+ 3	i 12 51	pP	—
Tamanrasset	Z.	84·6	63	i 12 21	+ 1	—	—	e 12 55	pP	40·5
Almeria		85·0	47	e 12 22	0	i 22 35	− 4	12 52	pP	43·5
Toledo		85·5	44	i 12 27	+ 2	i 22 42	− 2	i 13 0	pP	—
Alicante		87·1	47	e 12 56	pP	23 31	+32	16 17	PP	e 36·5
Tortosa		88·9	45	—	—	e 23 0	[+ 4]	i 24 2	PS	—
Clermont-Ferrand		92·9	42	e 12 48	−12	i 23 26	[+ 6]	i 16 40	PP	47·5
Kew		93·6	36	e 16 33	PP	e 23 26	[+ 2]	e 26 13	PPS	48·5
Paris		93·9	39	e 13 4	0	e 16 41	PP	e 13 36	pP	e 50·5
Strasbourg		97·0	40	e 13 49	pP	e 24 41	+15	—	—	e 52·0
Zürich		97·0	42	e 13 19	+ 1	e 24 43	+17	—	—	—
Florence Xim		97·4	46	—	—	i 18 55	PPP	—	—	—
Rome		97·6	48	e 17 7	PP	i 23 50	[+ 5]	—	—	—
Stuttgart		97·9	41	e 13 21	− 1	e 24 44	+10	e 13 54	pP	e 53·5
Triest		99·7	45	—	—	i 24 1	[+ 5]	i 24 53	S	—
Taranto		100·5	51	e 14 16	pP	e 23 56	[− 3]	—	—	—
Prague		101·6	41	e 13 53	pP	i 25 8	+ 3	—	—	—
College		104·0	334	e 13 49	− 1	—	—	e 14 20	pP	—
Helwan		108·7	65	e 18 14	[+ 1]	e 24 44	[+ 7]	e 18 41	pPKP	—
Istanbul		109·3	52	—	—	e 24 29?	[−10]	—	—	—
Ksara		113·3	61	e 19 12	PP	28 39	PS	—	—	—

Additional readings :—
La Paz iS_g =2m.21s.
Huancayo e =3m.2s., i =4m.7s., and 4m.39s.
Santa Lucia N =4m.7s. and 5m.51s.
La Plata E =5m.20s. and 6m.17s., SE =7m.25s., E =8m.41s.
Bogota eSS =10m.49s., eS_cS =15m.56s.
San Juan ePP? =8m.41s., ePPP? =9m.53s., iS_cP =12m.52s.
Bermuda e =19m.44s., eSS =20m.19s.
Philadelphia eS_cS =19m.34s., e =20m.31s. and 22m.49s.
Cincinnati i =10m.45s.

Continued on next page.

Pennsylvania iN =20m.44s.
St. Louis iP_cP =10m.53s., ipP_cP =11m.22s., epPP? =12m.57s., isS =19m.11s., e =19m.48s., eS_cS? =20m.45s.
Weston sS =19m.20s.
Cleveland isPZ =10m.58s., isSE =19m.20s., isSN =19m.23s., iE =20m.51s.
Tucson isP =11m.21s., epPP? =13m.36s., esPP? =13m.51s., esS? =20m.24s., e =22m.0s., ePKP,PKP =39m.14s.
Pierce Ferry isP =11m.49s.
Boulder City isP =11m.52s.
Riverside isPZ =11m.53s.
Pasadena isPZ =11m.56s., ePPZ =14m.12s., epPPZ =14m.32s., iS_cSN =21m.0s., isSN =21m.14s.
Tinemaha isPZ =11m.59s.
Fresno isPZ =12m.11s., iN =12m.25s.
Lick eN =12m.10s.
Branner isPZ =12m.23s.k.
Berkeley isPZ =12m.25s., iSKSEN =22m.14s.
Shasta Dam isP =12m.33s.
Malaga PPZ =15m.23s.
Granada PS =23m.30s., SS =27m.49s.
Tamanrasset iP_cPZ =12m.22s.a, e =12m.53s.
Almeria PP =15m.35s., S_cS =22m.47s., sS =23m.19s., PS =23m.38s., SS =28m.33s.
Toledo ePPZ =15m.45s., iSPE =23m.41s.
Alicante PPP =18m.9s., S_cS =23m.11s.
Clermont-Ferrand iS =24m.24s., ePS =25m.57s., ePPS =26m.45s., eSS =30m.49s., Q =41·5m.
Kew eSEZ =24m.21s., eN =35m.13s.
Strasbourg e =15m.19s.
Rome i =24m.37s.?.
Stuttgart eSKS =23m.47s., ePPS? =26m.59s.
Triest iPS =26m.33s.
College e =17m.9s., ePKP =17m.49s.
Helwan PPZ =19m.41s., eE =25m.44s., eZ =32m.29s.
Long waves were also recorded at Seattle and Scoresby Sund.

May 8d. Readings also at 1h. (Victoria), 2h. (Batavia), 4h. (near Victoria), 6h. (Ksara, Huancayo, and Tinemaha), 8h. (Mizusawa, Andijan, Frunse, Samarkand, Tchimkent, near Kulyab, Murgab, Obi-garm, Stalinabad, Tashkent, and near Bogota), 9h. (Belgrade, Sofia, Ksara, Bucharest, and near Istanbul), 11h. (Hungry Horse, Istanbul, and Stuttgart), 13h. (Scoresby Sund (2)), 14h. (Scoresby Sund and Stuttgart), 15h. (Helwan, Ksara, Tashkent, Rome, Baku, Erevan, Grozny, Leninakan, Yalta, near Tiflis, and near Istanbul), 16h. (near Mizusawa, and near Algiers), 17h. (near Klyuchi), 18h. (Istanbul), 19h. (Tacubaya, Istanbul, and Victoria), 21h. (Scoresby Sund), 22h. (near Tacubaya).

May 9d. 8h. 35m. 7s. Epicentre 40°·5N. 84°·5E.

Epicentre given by U.S.S.R.

$A = +·0731$, $B = +·7591$, $C = +·6469$; $\delta = +6$; $h = -2$;
$D = +·995$, $E = -·096$; $G = +·062$, $H = +·644$, $K = -·763$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Almata		6·3	299	1 35	− 1	2 45	− 5
Frunse		7·8	291	e 2 15	P*	i 3 45	SS
Murgab		8·4	259	2 11	+ 5	3 46	+ 3
Andijan		9·2	276	e 2 16	0	—	—
Tashkent		11·5	279	e 3 6?	PPP	—	—
Obi-garm		11·6	266	e 2 50	0	—	—
Kulyab		11·7	262	e 2 52	+ 1	—	—
Stalinabad		12·3	266	e 2 59	0	—	—
New Delhi	E.	13·3	209	e 3 30	PPP	i 6 11	SSS
Irkutsk		18·0	41	—	—	e 8 45?	+73
Ashkabad		20·4	270	e 4 42	+ 1	—	—
Sverdlovsk		22·5	324	4 55	− 7	—	—
Collmberg	E.	49·1	306	e 8 51	0	—	—
Stuttgart	Z.	52·2	305	e 9 13	− 2	—	—
College		67·3	21	e 10 56	− 3	—	—
Hungry Horse		90·0	12	e 13 1	− 2	—	—
Shasta Dam		95·0	20	i 13 28	+ 2	—	—

Additional readings :—
New Delhi iE =3m.37s., 3m.45s., and 6m.29s,
College iP =11m.2s,

May 9d. 13h. 36m. 15s. Epicentre 4°·5N. 95°·5E. (as on 1945, July 23d.).

Suggested deep by J.S.A. and Poona.

$A = -\cdot0956$, $B = +\cdot9924$, $C = +\cdot0779$; $\delta = +7$; $h = +7$;
$D = +\cdot995$, $E = +\cdot096$; $G = -\cdot007$, $H = +\cdot078$, $K = -\cdot997$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		15·5	133	e 3 42	0	e 6 38	+ 3	—	—	—
Colombo	E.	15·7	279	3 50	+ 6	5 5	?	—	—	7·8
Kodaikanal	E.	18·7	290	i 4 17	− 5	7 54	+ 6	8 17	SS	9·6
Calcutta	E.	19·2	340	4 27	− 1	i 8 9	+10	e 4 40	PP	—
Hyderabad	N.	21·1	310	i 4 48	0	i 8 40	+ 1	—	—	10·9
Poona		25·3	306	i 5 29	− 1	i 10 3	+ 9	5 50	pP	—
Bombay		26·4	305	i 5 47	+ 7	i 10 24	+12	—	—	12·9
New Delhi	N.	29·6	327	i 6 10	+ 1	i 10 59	− 5	i 13 4	SSS	14·5
Dehra Dun	N.	30·5	330	e 6 19?	+ 2	e 11 16?	− 2	—	—	e 15·7
Nanking		35·0	36	e 6 57	+ 1	—	—	—	—	e 15·8
Zi-ka-wei	Z.	36·0	40	i 7 5	0	12 31	−13	—	—	15·5
Murgab		39·0	333	7 30	0	13 23	− 6	—	—	—
Kulyab		40·7	329	i 7 45	+ 1	i 13 51	− 4	—	—	—
Perth		41·1	153	8 0	+13	14 13	+12	9 30	PP	—
Obi-garm		41·3	330	i 7 52	+ 3	14 1	− 3	—	—	—
Andijan		41·7	333	e 7 53	+ 1	i 14 10	0	—	—	—
Stalinabad		41·7	329	i 7 52	0	i 14 4	− 6	—	—	—
Almata		42·0	341	7 56	+ 2	14 15	+ 1	—	—	—
Frunse		42·5	338	e 8 1?	+ 2	e 14 19?	− 3	—	—	—
Hukuoka		43·5	45	e 7 52	−15	13 31	−65	—	—	—
Samarkand		43·5	327	8 11?	+ 4	14 35?	− 1	—	—	—
Tashkent		43·5	332	i 8 7	0	i 14 33	− 3	—	—	—
Koti		45·7	46	8 25	+ 1	15 17	+ 9	19 39	SSS	19·9
Ashkabad		47·5	320	8 42?	+ 4	15 36?	+ 2	—	—	—
Irkutsk		48·2	7	8 43	− 1	15 44	+ 1	—	—	—
Maebasi		51·0	46	e 9 22	+16	16 59	+37	—	—	—
Tokyo		51·2	47	e 9 16	+ 9	16 45	+20	—	—	—
Tananarive		52·6	243	e 9 25	+ 7	e 16 52	+ 8	12 40	PPP	e 24·9
Sendai		53·2	45	e 9 25	+ 3	17 0	+ 8	—	—	24·3
Mizusawa	E.	53·8	44	9 34	+ 8	—	—	—	—	—
Baku		54·3	318	9 38	+ 8	17 18	+11	—	—	—
Erevan		57·9	316	9 51	− 5	—	—	—	—	—
Grozny		58·4	320	i 10 3	+ 3	i 18 1	− 1	—	—	—
Tiflis		58·4	318	i 10 0	0	i 18 5	+ 3	e 12 8	PP	—
Leninakan		58·6	316	9 52?	− 9	—	—	—	—	—
Sverdlovsk		59·0	339	—	—	i 18 11	+ 1	—	—	—
Piatigorsk		60·5	319	10 14	0	18 23	− 6	—	—	—
Melbourne	E.	62·3	137	i 11 5	+39	i 19 35	+43	—	—	—
Ksara		62·4	306	i 10 30a	+ 3	19 4	+11	—	—	—
Sotchi		62·6	318	e 10 28	0	18 53	− 3	—	—	—
Brisbane		63·9	124	i 10 40	+ 3	i 19 19	+ 7	i 11 11	PcP	—
Riverview		64·8	131	i 10 48k	+ 5	i 19 29	+ 6	i 11 16	pP	31·7
Helwan		65·4	301	i 10 51?a	+ 4	19 36?	+ 6	13 18	PP	—
Theodosia		66·0	318	—	—	19 34	− 4	—	—	—
Yalta		66·6	317	10 56	+ 2	19 46	+ 1	—	—	—
Moscow		68·6	330	11 6	− 1	20 9	0	—	—	—
Istanbul		69·4	312	i 11 11	− 1	i 20 16	− 2	—	—	—
Bucharest		72·2	316	e 11 24	− 5	e 20 54	+ 3	i 21 22	PS	34·8
Sofia		73·9	313	e 11 41	+ 2	e 21 9	− 1	—	—	—
Belgrade		76·2	315	i 11 54a	+ 2	e 21 49	+13	e 14 49	PP	e 43·5
Helsinki		76·5	332	—	—	e 21 45	+ 6	—	—	e 39·7
Skalnate Pleso		77·0	320	e 11 59	+ 3	e 21 59?	+14	—	—	—
Budapest		77·5	317	12 2	+ 3	21 51	+ 1	e 14 53	PP	e 37·8
Kalossa	N.	77·5	317	12 3	+ 4	e 22 17	PS	e 14 43	PP	—
Ogyalla		78·2	318	e 12 3	0	e 22 0	+ 3	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		78·2	310	e 11 56	− 7	21 51	− 6	e 29 15	?	—
Raciborzu		78·4	320	e 12 5?	+ 1	e 22 5?	+ 5	—	—	—
Zagreb		79·5	316	e 12 12a	+ 2	e 22 17	+ 6	e 22 30	ScS	e 43·7
Upsala		80·0	330	e 12 16	+ 3	e 22 15	− 2	e 27 38	SS	e 37·3
Prague		80·8	320	e 12 19	+ 2	e 22 22	− 3	e 22 45	PS	—
Triest		81·0	316	i 12 21	+ 3	e 22 27	0	i 22 57	pS	—
Collmberg		81·8	321	e 11 34	−48	—	—	—	—	e 41·7
Potsdam	z.	81·8	322	i 12 23	+ 1	i 22 40?	+ 5	—	—	e 41·7
Rome		81·8	312	i 12 23a	+ 1	i 22 34	− 1	e 15 31	PP	e 29·4
Padova		82·3	315	12 26	+ 1	22 46	+ 6	e 23 25	PS	—
Copenhagen		82·4	326	i 12 27	+ 2	22 42	+ 1	23 1	ScS	—
Bologna		82·7	314	e 12 30k	+ 3	e 22 51	+ 7	—	—	—
Jena		82·7	321	e 12 29	+ 2	e 22 44	0	—	—	—
Florence Xim.		82·8	313	i 12 29	+ 2	—	—	—	—	—
Florence Arc.		82·8	313	e 12 27	0	e 22 48	+ 3	e 15 46	PP	—
Prato		82·9	313	e 12 29	+ 1	i 22 45	− 1	—	—	—
Salo		83·3	316	12 23?a	− 7	22 49	− 1	23 28	PS	—
Chur		84·0	316	e 12 35	+ 2	e 22 54	− 3	—	—	—
Stuttgart		84·2	318	e 12 35	+ 1	i 23 3	+ 4	e 15 53	PP	43·7
Pavia		84·3	315	e 12 39	+ 4	i 23 3	+ 3	—	—	—
Zürich		84·6	317	e 12 37a	+ 1	e 22 59	− 4	e 15 58	PP	—
Strasbourg		85·2	319	i 12 42	+ 3	e 23 6	{ 0}	e 24 10	PS	e 41·2
Basle		85·3	317	e 12 42	+ 2	e 23 6	{− 1}	e 13 20	?	—
Bergen	E.	86·2	331	—	—	e 23 15	{+ 1}	—	—	e 41·8
Besançon		86·4	316	e 12 46	+ 1	—	—	—	—	—
De Bilt		86·7	322	i 12 50k	+ 3	i 23 17	{ 0}	i 16 25	PP	e 41·8
Clermont-Ferrand		88·1	316	i 12 58	+ 4	i 23 28	{ 0}	e 16 31	PP	42·8
Tamanrasset	z.	88·3	293	i 13 1k	+ 6	e 23 51	+12	i 16 43	PP	40·8
Paris		88·6	319	i 12 59	+ 3	e 23 27	[+ 3]	e 16 32	PP	45·7
Algiers		89·3	306	13 7	+ 8	23 49	+ 1	—	—	—
Barcelona		89·6	312	—	—	e 23 34	[+ 4]	—	—	—
Kew		90·1	322	i 13 5a	+ 2	e 23 58	+ 3	e 16 40	PP	e 43·8
Aberdeen	E.	90·4	327	e 19 52	?	i 23 42	{− 3}	e 32 38	SSS	e 47·6
Durham		90·4	325	i 15 20	?	i 23 55	− 3	i 23 37	SKS	—
Tortosa		90·9	311	13 12	+ 5	23 42	[+ 4]	13 15	PcP	e 46·7
Edinburgh		91·2	326	16 4	PP	—	—	—	—	—
Jersey	E.	91·6	319	e 12 47	−23	e 24 15	+ 6	e 25 26	PS	—
Alicante		91·9	309	13 15	+ 4	24 10	− 1	13 25	pP	e 42·3
Rathfarnham Castle		93·4	324	e 13 12	− 6	—	—	17 18	PP	—
Almeria		93·7	307	i 13 20	0	23 55	[+ 1]	13 52	pP	47·2
Toledo	z.	94·4	311	i 13 28	+ 5	i 24 3	[+ 5]	i 17 3	PP	48·2
Granada		94·5	308	i 13 31a	+ 8	24 37	+ 3	17 18	PP	47·3
Scoresby Sund		94·7	343	13 25	+ 1	24 1	[+ 2]	25 55	PPS	—
Malaga	z.	95·3	308	e 13 15	−12	e 24 19	{− 1}	—	—	e 43·8
College		96·9	23	e 13 36	+ 2	e 23 51	[−20]	e 17 32	PP	e 43·8
Sitka		105·9	26	e 15 37	?	e 25 1	[+ 6]	e 18 37	PP	e 45·2
Victoria	z.	117·2	28	e 18 51	[+ 4]	—	—	—	—	—
Hungry Horse		121·4	22	i 18 58	[+ 3]	—	—	—	—	—
Shasta Dam		123·2	34	e 19 1	[+ 2]	—	—	e 28 55	PKKP	—
Butte	N.	123·9	23	e 20 46	PP	e 30 44	PS	e 37 37	SS	e 66·6
Mineral	z.	123·9	34	i 19 3k	[+ 3]	e 32 34	PPS	e 28 58	PKKP	—
Bozeman		124·7	23	e 20 51	PP	e 37 57	SS	e 33 26	?	e 61·1
Berkeley		125·2	36	i 19 6a	[+ 3]	e 42 6	SSS	e 52 30	Q	e 58·8
Reno		125·4	33	e 19 7	[+ 4]	e 22 27	PKS	e 19 23	?	—
Lick	z.	125·9	36	i 19 8a	[+ 4]	—	—	—	—	—
Seven Falls	E.	127·2	347	—	—	(37 45?)	SS	—	—	37·8
Tinemaha	z.	128·0	35	—	—	i 22 36	PKS	—	—	—
Ottawa		129·7	352	i 19 14k	[+ 2]	e 22 36	PKS	—	—	61·8
Pasadena		130·1	37	i 19 17	[+ 5]	e 22 37	PKS	e 21 41	PP	e 54·8
Overton	z.	130·5	32	e 19 15	[+ 2]	i 22 40	PKS	i 19 18	PKP	—
Boulder City		130·7	33	e 19 17	[+ 4]	—	—	—	—	—
Riverside		130·7	37	i 19 17	[+ 4]	i 22 38	PKS	—	—	—
Pierce Ferry		131·1	32	i 19 18	[+ 4]	i 22 40	PKS	—	—	—
Palomar		131·5	37	i 19 20	[+ 5]	i 22 41	PKS	i 19 42	?	—
Weston		131·6	347	i 19 19	[+ 4]	e 22 43	PKS	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Harvard		131·8	347	i 19 20	[+ 4]	i 22 45	PKS	—	—	e 69·8
Chicago		133·8	4	—	—	e 22 51	PKS	—	—	e 62·7
Fordham		133·8	349	i 19 23	[+ 4]	i 22 52	PKS	—	—	—
Cleveland		134·2	356	i 19 24	[+ 4]	i 22 52	PKS	—	—	59·1
Pennsylvania	N.	134·5	352	i 21 53	PP	i 22 55	PKS	—	—	—
Philadelphia		134·9	350	—	—	e 22 56	PKS	e 39 32	SS	e 56·9
Tucson		135·7	33	e 19 26	[+ 3]	e 22 55	PKS	e 24 39	PPP	e 63·8
Georgetown		136·3	350	e 19 28	[+ 4]	—	—	—	—	—
Washington		136·3	350	e 19 32	[+ 8]	i 23 5	PKS	—	—	e 81·5
Cincinnati		136·6	0	—	—	i 22 55	PKS	—	—	—
St. Louis		136·8	7	i 19 28	[+ 3]	i 23 1	PKS	—	—	—
Little Rock		140·2	10	—	—	i 23 9	PKS	—	—	76·7
Fort de France		150·0	309	i 19 56	PKP_2	—	—	—	—	—
San Juan		150·9	322	e 19 59	PKP_2	e 42 55	SS	e 49 3	SSS	e 60·1
Tacubaya		152·2	31	i 19 58	PKP_2	—	—	—	—	—
La Paz		160·0	311	i 20 9	[+ 8]	31 25	{+13;	i 20 52	PKP_2	76·3
Huancayo		168·2	230	e 20 14	[+ 6]	e 45 56	SS	e 25 10	PP	e 63·2

Additional readings :—
Kodaikanal PPE =4m.31s.
Calcutta iSSE =8m.29s.
Poona iPE =5m.35s., sPEN =6m.0s., PPN =6m.15s., P_cPN =9m.0s., sSE =10m.25s.
New Delhi iEN =6m.40s., iN =11m.49s.
Perth SSS =17m.35s.
Tananarive PS =17m.4s., SS =22m.3s.
Tiflis PPP =13m.20s., SS =22m.9s., eSSS =24m.15s.
Brisbane iZ =12m.29s., iE =19m.26s., iPSEZ =19m.37s.
Riverview iE =19m.36s. and 19m.45s., isSE =20m.6s., iPPSE =20m.16s., iE =20m.36s. and 20m.44s., iN =21m.0s. and 25m.26s., eQ =28m.51s.
Helwan PPPZ =14m.51s.?
Bucharest ePZ =11m.32s., ePN =11m.35s., iSE =20m.57s., iN =21m.18s., iE =21m.35s.
Budapest ePPPN =17m.8s., PSN =22m.21s.
Raciborzu eE =13m.36s., eN =21m.18s., eEN =29m.5s.?
Upsala SE =22m.11s., iSKS =22m.28s., iN =22m.39s., eN =28m.45s.? and 31m.45s.?.
Prague e =12m.56s.
Triest ipP? =12m.47s., iPPP =17m.43s., iSKS =22m.38s., isS =23m.17s., iPS? =24m.10s., iSSS =32m.23s.
Rome iE =23m.1s. and 23m.29s.
Padova eE =24m.32s.
Copenhagen e =13m.12s., 29m.31s.
Florence Arc. eN =13m.14s.
Salo i =22m.57s.
Stuttgart epP? =13m.9s., eS_cS? =23m.21s., ePS =24m.1s., ePPS =24m.22s., e =25m.51s., eSS? =29m.21s., eQ =39·8m.
Strasbourg e =12m.52s., 13m.1s., 15m.14s., 15m.21s., and 16m.49s., ePPP =18m.15s., e =22m.59s., eS =23m.31s., iSP? =24m.29s., eSPP? =25m.1s., eSS =28m.51s., eSSS =32m.41s.
Besançon e =13m.37s. and 13m.56s.
De Bilt eS =23m.47s., ePS =24m.45s., eSS =29m.15s.
Clermont-Ferrand ePPP =18m.32s., eS =23m.55s., ePS =25m.8s., ePPS =25m.43s., eSS =30m.4s., eSSS =33m.46s., Q =38·8m.
Tamanrasset iZ =13m.35s. and 15m.27s., ePPPZ =18m.39s.
Paris i =13m.8s. and 13m.19s., e =24m.47s., iPS =24m.57s., ePPS =25m.39s., eQ =42·8m.
Algiers pP? =24m.5s., sS? =24m.13s.
Kew iZ =13m.33s., iSKSEZ =23m.36s., ePS =24m.26s., ePPS =26m.26s., eSSEN =29m.54s., eSSSEZ =35m.30s., eEZ =37m.29s., eQEN =38·8m.
Aberdeen iSKSE =23m.21s.
Tortosa PP?E =16m.57s., SEN =24m.8s., S_cS?EN =24m.28s., PSEN =25m.20s., PPS?E =25m.46s., SSS?N =33m.46s., eQ?N =36m.45s.?
Jersey eE =14m.36s.
Alicante PP =16m.49s., SKS =23m.45s., PS =24m.55s., PPS =25m.33s., SS =29m.47s., SSS =33m.29s.
Almeria PP =17m.17s., pPP =17m.48s., PPP =19m.19s., SKKS =24m.13s., iS =24m.39s., sS =25m.5s., PS =26m.2s., SS =30m.56s., SSS =34m.40s.
Toledo iSZ =24m.43s., PS?Z =26m.3s., SS?Z =31m.48s., eZ =38m.10s.
Granada PPP =19m.28s., iSKS =24m.4s., S =25m.13s., PS =26m.1s., iSS =31m.19s.
Scoresby Sund 17m.15s., S =24m.42s., SS =31m.21s.
College e =16m.12s.
Sitka ePPS =29m.12s., e =30m.26s. and 35m.15s.
Berkeley eN =32m.46s., eE =38m.36s.
Pasadena iZ =19m.38s.
Cleveland eSKPEN =22m.49s., eSKKS?N =29m.10s., eSS?N. =40m26s., eSS?E =40m.30s,

Continued on next page.

Philadelphia ePPS =35m.37s.
Tucson e =19m.41s., ePKS =23m.58s., eSKSP =32m.9s.
St. Louis iSKP =23m.4s., i =23m.33s., e =36m.58s.
Little Rock e =23m.16s.
San Juan e =20m.19s. and 23m.1s., eSKKS? =29m.34s., e =32m.29s.
La Paz iPPZ =24m.37s., PPS =37m.57s.
Huancayo i =21m.31s., e =24m.25s. and 30m.31s., eSKSP =35m.32s. ,ePPS =39m.53s., e =41m.8s.
Long waves were also recorded at Pretoria, Ivigtut, Wellington, Auckland, Arapuni, Christchurch, Honolulu, Columbia, Lincoln, Salt Lake City, Ukiah, and La Plata.

May 9d. Readings also at 0h. (Almata, near Murgab, Andijan, Obi-garm, Kulyab, Stalinabad, Tashkent, Samarkand, and Frunse), 2h. (Kew and Collmberg), 3h. (Andijan, near Obi-garm, Kulyab, and Murgab (2)), 10h. (Dehra Dun, near Kulyab, Obi-garm, Andijan, Murgab, Samarkand, and Stalinabad), 11h. (near Ashkabad), 12h. (College, La Paz, Grahamstown, near Kulyab, Murgab, and Obi-garm), 13h. (Overton, near Tucson, and near Ashkabad), 14h. (Rome, Taranto, Stuttgart, Pretoria, Andijan, and near Ashkabad), 15h. (Overton, Tucson, Stuttgart, and near Ashkabad), 16h. (Pretoria, Stuttgart, and Andijan), 17h. (Lisbon), 18h. (Grahamstown), 20h. (La Paz), 21h. (La Paz, Bogota, and near Huancayo), 22h. (Istanbul), 23h. (Batavia and Basle).

May 10d. 0h. 24m. 36s. Epicentre 18°·9N. 107°·0W. (as on 1946, March 20d.).

$A = -\cdot2768$, $B = -\cdot9054$, $C = +\cdot3220$; $\delta = +5$; $h = +5$;
$D = -\cdot956$, $E = +\cdot292$; $G = -\cdot094$, $H = -\cdot308$, $K = -\cdot947$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manzanillo		2·5	87	0 41	− 2	—	—	—	—	1·3
Tacubaya		7·4	85	i 1 46	− 6	i 3 25	+ 7	—	—	i 3·6
Puebla		8·3	88	1 56	− 8	—	—	—	—	4·0
Tucson		13·7	346	e 3 21	+ 3	e 6 11	+19	—	—	e 7·0
Lubbock		15·3	16	3 43	+ 4	—	—	—	—	—
Palomar	z.	16·9	330	e 4 5	+ 6	—	—	—	—	—
Riverside	z.	17·7	331	e 4 13	+ 3	—	—	—	—	—
Pasadena		18·2	331	i 4 20	+ 4	—	—	—	—	e 8·8
Pierce Ferry		18·2	342	e 4 20	+ 4	—	—	—	—	—
Boulder City		18·4	340	e 4 24	+ 6	—	—	—	—	—
Overton	z.	18·7	341	e 4 26	+ 4	—	—	—	—	—
Little Rock		20·5	37	e 4 51	+ 9	e 9 0	SS	—	—	—
Tinemaha	z.	20·6	334	e 4 47	+ 4	—	—	—	—	—
Mobile		20·7	50	i 4 41	− 3	i 8 30	− 1	—	—	—
Fresno		21·0	331	e 4 50k	+ 3	e 8 50	+13	—	—	e 14·3
Salt Lake City		22·2	352	e 5 27	+27	e 9 16	+16	—	—	e 11·0
Santa Clara		22·6	329	e 5 11	+ 8	e 9 41	+34	—	—	e 12·4
Berkeley		23·1	329	i 5 12k	+ 4	—	—	e 5 52	PP	e 13·0
Logan		23·1	353	e 5 10	+ 2	—	—	e 5 49	PP	e 10·6
Reno		23·3	334	e 5 3	− 7	—	—	—	—	e 13·1
Lincoln	E.	23·6	21	—	—	e 9 36	+11	—	—	e 12·0
St. Louis		24·5	33	i 5 20	− 2	i 9 52	+12	—	—	i 12·8
Ukiah		24·6	329	—	—	e 9 32	−10	e 10 14	SS	e 13·6
Shasta Dam		25·4	332	i 5 31	0	—	—	—	—	—
Bozeman		26·9	355	e 6 0	+15	e 10 32	+12	e 6 37	PP	e 14·2
Butte	N.	27·4	354	e 5 55	+ 6	e 10 38	+10	—	—	e 16·0
Colombia		27·6	51	—	—	e 10 34	+ 2	—	—	e 16·2
Cincinnati		28·0	39	e 5 53	− 2	e 10 45	+ 7	—	—	—
Chicago		28·2	31	—	—	e 10 35	− 6	—	—	e 14·2
Hungry Horse		29·9	351	i 6 12	0	—	—	—	—	—
Cleveland		31·3	38	i 6 20	− 4	e 11 25	− 6	e 7 12	PP	e 14·5
Galerazamba		31·7	100	—	—	e 12 4	+27	—	—	20·0
Georgetown		32·7	45	e 6 36	0	—	—	—	—	—
Pennsylvania	E.	33·1	42	i 7 30	PP	i 11 58	− 1	—	—	—
Saskatoon		33·2	0	e 8 18	PPP	12 7	+ 7	14 30	SSS	17·4
Philadelphia		34·5	46	e 6 49	− 3	e 12 15	− 5	e 7 47	PP	e 14·2
Bogota		35·1	109	i 7 0	+ 3	i 12 32	+ 2	—	—	e 21·0
City College, N.Y.		35·7	44	e 7 2	0	e 12 42	+ 3	e 8 9	PP	—
Fordham		35·8	44	e 7 1	− 2	e 12 43	+ 2	e 8 7	PP	—
Ottawa		37·0	36	7 16	+ 3	12 54	− 5	8 26	PP	15·7

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Harvard		38·1	40	e 7 19	− 3	—	—	e 8 46	PP	e 23·4
Weston		38·2	40	i 7 26	+ 3	e 13 14	− 3	i 8 48	PP	—
San Juan		38·7	83	e 7 28	+ 1	e 13 11	−14	—	—	e 17·6
Bermuda		40·0	62	e 7 37	− 1	e 13 44	0	e 8 54	PP	e 19·1
Seven Falls	E.	40·8	38	—	—	e 13 53	− 3	—	—	22·4
Huancayo		43·8	131	—	—	e 14 39	− 1	—	—	e 17·9
Sitka		43·9	338	—	—	14 49	+ 7	—	—	e 18·5
La Paz		52·0	129	e 9 11	− 2	—	—	—	—	25·6
Kew		85·3	36	—	—	e 23 15	+ 5	—	—	e 41·4
De Bilt		88·1	34	—	—	e 23 44	+ 7	—	—	e 42·4
Alicante		90·7	49	e 13 24	+18	—	—	—	—	e 47·0
Ksara		116·8	34	e 15 14?	P	e 27 31	{+38}	—	—	—

Additional readings :—
Tucson iP = 3m.24s., i = 3m.46s. and 4m.31s.
Palomar i = 4m.11s. and 4m.32s.
Riverside iZ = 4m.26s. and 4m.49s.
Pasadena iZ = 4m.36s., iEN = 4m.58s., eZ = 7m.17s., iN = 7m.55s.
Boulder City e = 4m.33s.
Fresno iZ = 4m.56s., and 5m.26s., iN = 6m.7s.
Berkeley eN = 5m.16s., eZ = 8m.15s., eE = 9m.36s., eZ = 9m.46s., iN = 10m.4s., eE = 10m.30s., eN = 12m.18s., eZ = 12m.24s.
Reno eNZ = 5m.14s., eE = 5m.26s.
Cleveland ePE = 6m.24s., iZ = 6m.32s., eN = 13m.48s.
Long waves are also recorded at Ivigtut, Scoresby Sund, and other American and European stations.

May 10d. 3h. 12m. 33s. Epicentre 18°·9N. 107°·0W. (as at 0h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manzanillo		2·5	87	0 52	P_g	—	—	—	—	2·0
Tacubaya		7·4	85	i 2 4	+12	i 3 58	S_g	—	—	i 4·6
Puebla		8·3	88	—	—	e 4 2	+22	—	—	—
Tucson		13·7	346	e 3 16	− 2	e 6 2	+10	—	—	e 7·0
Lubbock		15·3	16	3 41	+ 2	6 49	+19	—	—	e 8·7
Riverside		17·7	331	e 4 9	− 1	—	—	—	—	—
Pasadena		18·2	331	e 4 15	− 1	—	—	—	—	e 6·3
Pierce Ferry		18·2	342	e 4 16	0	—	—	—	—	—
Overton	Z.	18·7	341	e 4 19	− 3	—	—	—	—	—
Salt Lake City		22·2	352	e 4 56	− 4	e 9 13	+13	—	—	e 10·2
Santa Clara		22·6	329	—	—	e 11 33	Q	—	—	e 13·0
Logan		23·1	353	e 5 1	− 7	—	—	—	—	—
Lincoln	E.	23·6	21	—	—	9 31	+ 6	—	—	e 12·0
St. Louis		24·5	33	e 5 18	− 4	e 9 48	+ 8	—	—	—
Butte	N.	27·4	354	—	—	e 10 34	+ 6	—	—	e 17·3
Cleveland		31·3	38	—	—	e 11 25	− 6	e 14 34	SS	—
Philadelphia		34·5	46	—	—	e 12 18	− 2	—	—	e 14·2
Weston		38·2	40	e 8 47	PP	e 13 17	0	—	—	e 20·5

Additional readings :—
Tacubaya i = 3m.35s.
Tucson e = 3m.48s.
Cleveland eSE = 11m.28s.
Long waves were also recorded at Scoresby Sund, and other American stations.

May 10d. 4h. 6m. 36s. Epicentre 34°·0N. 115°·8W. (as on May 2d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palomar	Z.	1·1	234	i 0 21	− 1	—	—	—	—	—
Riverside		1·3	270	i 0 25	0	i 0 43	− 1	—	—	—
La Jolla		1·7	227	i 0 31	0	—	—	—	—	—
Pasadena		2·0	274	i 0 37	+ 2	i 1 6	+ 4	—	—	—
Boulder City		2·1	22	i 0 37	0	i 1 15	S_g	i 0 42	P_g	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pierce Ferry		2·6	35	i 0 44	0	i 1 23	S*	—	—	—
Tinemaha		3·7	330	i 0 59	− 1	—	—	—	—	—
Tucson		4·5	112	e 1 8	− 3	i 1 56	− 9	i 1 30	P_g	e 2·4
Logan		8·4	21	e 2 9	+ 3	(e 3 42)	− 1	—	—	e 3·7
Shasta Dam		8·5	324	e 1 56	−11	—	—	—	—	—
Hungry Horse		14·4	5	i 3 36	+ 9	—	—	—	—	—

Additional readings :—
Tucson i = 1m.15s., 1m.47s., and 2m.17s.
Shasta Dam i = 2m.16s.
Long waves were also recorded at Salt Lake City.

May 10d. 9h. 13m. 26s. Epicentre 36°·7N. 70°·5E. Depth of focus 0·020.
(as on 1949, April 5d.).

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.	n. s.		m.
Kulyab		1·3	335	i 0 27	− 2	e 0 49	− 2	—	—	—
Obi-garm		2·1	342	i 0 35	− 2	e 1 3	− 3	—	—	—
Stalinabad		2·3	323	e 0 39	− 1	i 1 9	− 1	—	—	—
Samarkand		4·1	319	1 2	− 1	1 46	− 5	—	—	—
Andijan		4·3	20	e 1 6	+ 1	i 1 58	+ 3	—	—	—
Tashkent		4·7	349	i 1 9	− 1	i 2 2	− 3	—	—	—
Frunse		6·9	26	e 1 42	+ 2	e 3 0	+ 3	—	—	—
Almata		8·2	35	e 2 3	+ 6	e 3 36	+ 8	—	—	—
Ashkabad		9·8	281	e 2 11	− 7	—	—	—	—	—
New Delhi	N.	9·8	143	i 2 8	−10	i 3 52	−14	—	—	i 4·7
Baku		16·5	289	e 3 50	+ 7	e 6 28	+17	—	—	—
Grozny		20·0	297	i 4 24	+ 2	—	—	—	—	—
Tiflis		20·5	293	e 4 27	0	e 8 15?	+13	—	—	—
Leninakan		21·1	290	4 37?	+ 4	—	—	—	—	—
Sverdlovsk		21·2	245	i 4 37	+ 3	8 30	+15	—	—	—
Collmberg		42·8	309	e 7 44	+ 1	—	—	e 9 55	PPP	—
Stuttgart	z.	45·5	306	e 8 4?	− 1	—	—	e 8 34	pP	—
College		74·4	17	i 11 23	+ 1	—	—	e 11 55	pP	—
Hungry Horse		95·2	4	e 13 53	+47	—	—	—	—	—

Additional readings :—
New Delhi iN = 2m.23s., iE = 2m.26s., iN = 2m.45s., iE = 3m.45s. and 3m.50s., iN = 4m.14s.
Collmberg eE = 10m.12s.
College i = 12m.6s.

May 10d. 14h. Recorded in most stations of the Western States of America and in Apia.

Apia eP = 13m.36s., eS = 14m.51s.
Berkeley iPZ = 23m.9s. a.
Lick iPZ = 23m.10s. a.
Pasadena iPZ = 23m.13s.
Fresno iZ = 23m.14s. a.
Riverside iPZ = 23m.14s. k.
Palomar iP = 23m.15s.
Shasta Dam iP = 23m.17s.
Mineral iPZ = 23m.19s. k
Boulder City iP = 23m.21s.
Tinemaha iPZ = 23m.22s.
Overton iPZ = 23m.33s.
Pierce Ferry iP = 23m.33s.
Tucson iP = 23m.35s.
College iP = 23m.56s., e = 24m.14s.
Logan eP = 23m.57s.
Hungry Horse iP = 24m.3s,

May 10d. Readings also at 2h. (New Delhi, Almata, Ashkabad, Frunse, near Andijan, Kulyab, Obi-garm, Samarkand, Stalinabad, and Tashkent), 3h. (College and Logan), 6h. (near Batavia, Kew, College, Copiapo, and La Paz), 7h. (near College and Ksara), 8h. (College, Lick, Raciborzu, Ashkabad, Frunse, near Stalinabad, Andijan, Kulyab, Obi-garm, and Samarkand), 9h. (near Andijan (2), Tashkent, Kulyab (2), Obi-garm (2), and Stalinabad (2)), 10h. (Apia), 11h. (Almata, Andijan, Frunse, College, Hungry Horse, Branner, near Berkeley, and Lick), 12h. (Branner, near Berkeley and Lick), 16h. (Copiapo), 17h. (near Berkeley,Branner, and Lick), 18h. (Istanbul, Ksara, Overton, and near Apia), 19h. (Ashkabad), 20h. (Mizusawa), 21h. (Bogota, Galerazamba, San Juan, Huancayo, Boulder City, Overton, Pierce Ferry, Hungry Horse, and near Almata), 22h. (Tucson, Overton, Pierce Ferry, Shasta Dam, Victoria, Hungry Horse, Bozeman, College, and Philadelphia), 23h. (near Andijan).

May 11d. Readings at 3h. (Messina, near Kulyab, Stalinabad, Andijan, and Obi-garm), 5h. (La Paz), 6h. (Andijan and near Murgab (2)), 7h. (Overton), 9h. (Ksara), 11h. (Hungry Horse and near Ashkabad), 13h. (Kew), 14h. (Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, La Paz, and near Kulyab), 16h. (Frunse), 17h. (Overton, near Kulyab, Andijan, Murgab, Obi-garm, and Stalinabad), 20h. (near Victoria), 21h. (Ashkabad, Kulyab, near Andijan, and Murgab), 22h. (near Murgab).

May 12d. 1h. 2m. 7s. Epicentre 36°·4N. 140°·6E. Depth of focus 0·005.
(as on 1942, Nov. 7d.).

Intensity V at Mito, Kakioka, and Tukubasan ; IV at Onahama, Utunomiya, Shirakawa, and Titibu ; II-III at Tokyo, Kumagaya, Maebasi, Hukusima, Ito, and Kohu. Epicentre 36°·5N. 140°·8E. Depth 30-100km. Macroseismic radius 200-300km.
Seismo. Bull. Cent. Met. Obs., Japan, for 1949. Tokyo, 1950, p. 15, with Macroseismic Chart.

$A = -\cdot6235$, $B = +\cdot5121$, $C = +\cdot5908$; $\delta = +4$; $h = 0$;
$D = +\cdot635$, $E = +\cdot773$; $G = -\cdot457$, $H = +\cdot375$, $K = -\cdot807$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Mito		0·1	261	0 9k	− 1	0 15	− 1
Kakioka		0·4	244	0 10	− 2	0 19	− 3
Tukubasan		0·5	246	0 10k	− 3	0 18	− 5
Onahama		0·6	24	0 12	− 2	0 21	− 4
Utunomiya		0·6	284	0 12	− 2	0 22	− 3
Kumagaya		1·0	256	0 19k	0	0 33	0
Tokyo		1·0	224	0 18	− 1	0 31	− 2
Maebasi		1·3	270	0 21k	− 2	0 34	− 6
Yokohama		1·3	219	0 24	+ 1	0 38	− 2
Hukusima		1·4	356	0 21k	− 3	0 37	− 6
Mera		1·6	203	0 33	+ 6	—	—
Hunatu		1·8	239	0 29k	− 1	0 48	− 4
Osima		1·9	211	0 31	0	0 56	+ 2
Sendai		1·9	7	0 29	− 2	0 48	− 6
Nagano		2·0	278	0 58	S	(0 58)	+ 1
Aikawa		2·5	311	0 33	− 6	—	—
Mizusawa		2·8	9	0 46	+ 2	1 15	− 2
Toyama		2·8	276	0 46	+ 2	1 20	+ 3
Wazima		3·1	288	0 48	0	1 26	+ 2
Nagoya		3·2	247	0 53	+ 4	1 34	+ 7
Gihu		3·3	252	0 52	+ 1	1 31	+ 2
Akita		3·4	355	0 53	+ 1	1 36	+ 4
Miyako		3·4	18	0 55	+ 3	—	—
Hikone		3·7	253	0 57	+ 1	1 43	+ 4
Kameyama		3·7	247	1 7	+11	—	—
Kyoto		4·2	252	1 4	+ 1	2 10	+18
Aomori		4·4	1	1 11	+ 5	2 8	+11
Osaka		4·5	249	1 24	+17	2 20	+21
Kobe		4·7	250	1 36	+26	2 33	+29
Toyooka		4·8	261	1 12	0	2 7	0
Sumoto		5·1	247	1 42	+26	—	—
Copenhagen		78·2	334	11 54	0	—	—
Overton	z.	79·5	53	e 12 1	0	—	—
Collmberg		81·3	330	e 12 9	− 2	—	—
Stuttgart	z.	84·8	331	e 12 27	− 2	—	—

May 12d. 10h. 18m. 37s. Epicentre 4°·5N. 95°·5E. (as on 9d.).

$A = -·0956$, $B = +·9924$, $C = +·0779$; $\delta = +7$; $h = +7$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		15·5	133	i 5 6 a	+84	i 7 38	+63	—	—	—
Colombo	E.	15·7	279	3 48	+ 4	—	—	—	—	9·5
Kodaikanal	E.	18·7	290	i 4 23	+ 1	e 7 58	+10	8 18	SS	9·8
Calcutta	E.	19·2	340	—	—	e 8 45	SSS	—	—	—
Hydcrabad	N.	21·1	310	e 4 51	+ 3	e 8 43	+ 4	—	—	10·9
Poona		25·3	306	e 5 45	+15	e 10 13	+19	—	—	—
Bombay		26·4	305	e 5 23	−17	e 10 31	+19	—	—	—
Murgab		39·0	333	7 28	− 2	13 26	− 3	—	—	—
Kulyab		40·7	329	i 7 43	− 1	—	—	—	—	—
Obi-garm		41·3	330	i 7 45	− 4	e 13 57	− 7	—	—	—
Andijan		41·7	333	7 51	− 1	i 14 8	− 2	—	—	—
Stalinabad		41·7	329	i 7 51	− 1	14 5	− 5	—	—	—
Tashkent		43·5	332	i 8 7	0	i 14 35	− 1	—	—	—
Grozny		58·4	320	10 2	+ 2	e 18 6	+ 4	—	—	—
Tiflis		58·4	318	e 9 58	− 2	—	—	—	—	—
Sverdlovsk		59·0	339	i 10 1	− 3	—	—	—	—	—
Ksara		62·4	306	i 10 29	+ 2	e 19 21?	+28	—	—	—
Sotchi		62·6	318	e 10 28	0	—	—	—	—	—
Helwan	Z.	65·4	301	e 10 48	+ 1	—	—	—	—	—
Moscow		68·6	330	11 4	− 3	e 20 5	− 4	—	—	—
Collmberg	Z.	81·8	321	e 12 24	+ 2	—	—	—	—	—
Jena	E.	82·7	321	e 12 26	− 1	—	—	—	—	—
Stuttgart		84·2	318	e 12 33	− 1	—	—	e 15 47	PP	—
Zürich		84·6	317	e 12 37	+ 1	e 23 3	0	—	—	—
Strasbourg		85·2	319	e 12 40	+ 1	—	—	—	—	—
Basle		85·3	317	e 13 2	+22	e 22 29	−41	—	—	—
Clermont-Ferrand		88·1	316	e 12 57	+ 3	—	—	—	—	—
Tamanrasset	Z.	88·3	293	i 12 58 k	+ 3	—	—	—	—	—
Paris		88·6	319	e 12 57	+ 1	—	—	—	—	—
Hungry Horse		121·4	22	i 18 55	[0]	—	—	—	—	—
Shasta Dam		123·2	34	i 18 59	[0]	—	—	—	—	—
Mineral	Z.	123·9	34	i 19 0 k	[0]	—	—	—	—	—
Lick	Z.	125·9	36	i 19 5 a	[+ 1]	—	—	—	—	—
Logan		127·7	25	e 19 6	[− 2]	—	—	—	—	—
Pasadena	Z.	130·1	37	i 19 13	[+ 1]	—	—	—	—	—
Overton	Z.	130·5	32	e 19 16	[+ 3]	—	—	—	—	—
Riverside	Z.	130·7	37	e 19 15	[+ 2]	—	—	—	—	—
Boulder City		130·7	33	i 19 15	[+ 2]	—	—	i 22 43	PKS	—
Pierce Ferry		131·1	32	e 19 15	[+ 1]	—	—	—	—	—
Palomar	Z.	131·5	37	i 19 16	[+ 1]	—	—	—	—	—
Tucson		135·7	33	e 19 25	[+ 2]	—	—	e 22 53	PKS	—
St. Louis		136·8	7	e 19 25	[0]	—	—	e 22 57	PKS	—

Additional readings :—
Collmberg eZ = 12m.41s., eE = 12m.55s.
Stuttgart eZ = 12m.43s.
Strasbourg e = 14m.7s.
Clermont-Ferrand e = 12m.45s.
Tamanrasset iZ = 13m.4s.k.
Paris e = 13m.9s.
Hungry Horse e = 19m.29s.
Tucson e = 19m.43s.
Long waves were also recorded at New Delhi, Copenhagen, De Bilt, and Kew.

May 12d. Readings also at 0h. (near Bogota), 5h. (Ashkabad and Overton), 6h. (near Andijan), 7h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 8h. (Overton, and near Zürich), 9h. (Kodaikanal, Stuttgart, and near Collmberg), 10h. (near Pavia), 11h. (near Mizusawa), 14h. (near Boulder City and Pierce Ferry), 15h. (near Murgab), 16h. (near Granada), 17h. (Almata, Obi-gram, Stalinabad, near Andijan, Frunse and Murgab), 18h. (near Ashkabad), 20h. (Klyuchi), 21h. (Frunse, near Andijan, Murgab, and near Obi-garm), 22h. (Overton, Hungry Horse, Ashkabad, Almata, Frunse, Samarkand, near Andijan, Kulyab, Murgab, Obi-garm, Stalinabad, and Tashkent), 23h. (Stalinabad and near Kulyab).

May 13d. 5h. 3m. 12s. Epicentre 27°·2N. 56°·2E. (as on April 24d.).

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

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Baku	14·2	340	—	—	e 6 26	+22
Stalinabad	15·5	40	i 3 36	− 6	e 6 18	−17
Kulyab	15·7	44	e 3 39	− 5	e 6 25	−14
Obi-garm	16·1	41	e 3 50	+ 1	e 6 44	− 5
Tiflis	17·2	329	e 4 14?	+11	—	—
Grozny	18·2	335	e 4 23	+ 7	e 7 38	+ 1
Ksara	18·7	294	e 4 28	+ 6	e 8 4?	+16
Andijan	19·0	41	e 4 20	− 6	—	—
Helwan	22·0	282	e 9 12	S	(e 9 12)	+16
Istanbul	26·3	309	—	—	e 10 32	+21

Helwan gives also eZ = 10m.5s., SN = 12m.38s., iZ = 12m.55s. and 13m.12s., P_cPN = 13m.36s.

May 13d. 7h. 15m. 46s. Epicentre 69°·5N. 16°·0W. Off Coast of Greenland.

A = +·3387, B = −·0971, C = +·9359; δ = +5; h = −12;
D = −·276, E = −·961; G = ·+900, H = −·258, K = −·352.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		2·3	296	0 36	− 4	1 7	− 2	—	—	—
Kew		19·5	148	e 4 37	+ 6	e 8 23	+17	—	—	e 10·2
Collmberg	z.	22·8	128	e 5 18	+13	—	—	—	—	—
Strasbourg		24·0	137	e 5 20	+ 3	—	—	—	—	—
Stuttgart		24·1	135	e 5 20	+ 2	e 11 2	Q	—	—	e 14·2
College		41·8	332	e 7 53	0	—	—	—	—	—
Overton		59·1	292	e 10 1	− 3	—	—	—	—	—
Pierce Ferry		59·4	291	e 10 7	+ 1	—	—	—	—	—
Tucson		61·9	287	e 10 24	0	—	—	—	—	—

Collmberg gives also eZ = 5m.30s.

May 13d. 7h. 24m. 17s. Epicentre 47°·0N. 4°·1E.

Felt throughout the departments of La Nièvre and Saône-et-Loire. Intensity V at Levault-de-Frétoy and Planchez; IV at Anost. Epicentre 46°58′N. 4°4′E. Macroseismic Area, 1000sq.km.

J. P. Rothé and N. Dechevoy.
La Séismicité en France de 1940-1950. Annales de l'Institut de Physique du Globe de Strasbourg. 3e partie, Géophysique, Nouvelle Série T. VII. Le Puy, 1954, p. 55, with Macroseismic Chart.

A = +·6827, B = +·0489, C = +·7291; δ = +6; h = −4;
D = +·071, E = −·997; G = +·727, H = +·052, K = −·684.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Besançon	1·3	79	—	—	e 0 34	−10	—	—	—
Clermont-Ferrand	1·4	209	e 0 25	− 2	i 0 39	− 7	i 0 44	S_g	i 1·0
Basle	2·4	77	e 0 45	+ 4	e 1 9	− 3	—	—	—
Paris	2·9	329	e 0 48?	0	i 1 12	−12	—	—	—
Strasbourg	2·9	57	—	—	e 1 32	+ 8	e 1 39	S_e	—
Zürich	3·1	83	e 0 50	− 1	e 1 28	− 1	—	—	—
Stuttgart	3·9	61	e 1 36?	?	e 1 54	+ 4	e 1 59	S*	—

Additional readings:—
Paris eS = 1m.0s. and 1m.6s.
Strasbourg e = 1m.51s. and 1m.56s.
Stuttgart e = 1m.41s and 2m.3s.

May 13d. 20h. 14m. 1s. Epicentre 40°·8N. 32°·9E.

Felt throughout western Anatolia and north of Cerkes.
Monthly Seismological Bulletin for Istanbul, May, 1949.
Suggested Epicentres 40°·8N. 33°·0E. (Strasbourg).
40°·7N. 32°·8E. (Jesuit Seismological Assn.).

$A = +·6374$, $B = +·4124$, $C = +·6509$; $\delta = +2$; $h = -2$;
$D = +·543$, $E = -·840$; $G = +·546$, $H = +·354$, $K = -·759$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		2·9	275	e 0 46	− 2	i 1 21	− 3	—	—	—
Yalta		3·8	14	i 1 0	− 1	i 1 45	− 2	—	—	—
Theodosia		4·6	23	e 1 14	+ 2	i 2 3	− 4	—	—	—
Sotchi		5·8	59	i 1 29	0	i 2 53	S*	—	—	—
Bucharest		6·2	308	i 1 33	− 2	i 2 54	+ 6	i 2 7	P_g	—
Ksara		7·4	160	e 1 55	+ 3	e 4 15?	S_g	—	—	—
Sofia		7·4	288	e 2 51	+59	4 15	+57	3 25	P_g	—
Piatigorsk		8·2	64	2 6?	+ 3	—	—	—	—	e 4·6
Erevan		8·9	90	2 23?	+11	—	—	—	—	e 5·4
Tiflis		9·0	80	i 2 20	+ 7	i 4 13	+15	—	—	—
Belgrade		10·0	298	e 3 7k	+40	i 4 31	+ 9	—	—	i 5·1
Helwan	z.	11·0	187	e 2 42	0	e 4 44	− 3	5 19	SS	—
Kalossa		11·6	304	e 2 53	+ 3	—	—	—	—	8·3
Taranto		11·9	274	e 2 58	+ 4	—	—	—	—	i 6·7
Budapest		12·0	309	e 2 53	− 2	6 22	L	7 14	SS	8·5
Skalnate Pleso		12·3	317	i 2 52	− 7	—	—	—	—	e 6·3
Ogyalla		12·7	309	e 3 14	PP	e 5 41	+13	—	—	e 6·8
Baku		12·9	86	e 3 17	+10	e 5 53	+20	—	—	—
Zagreb		13·3	298	e 3 12	− 1	e 7 5	L	—	—	(e 7·1)
Raciborzu		13·9	317	e 3 13?	− 8	e 6 39	+42	—	—	e 7·8
Triest		14·8	296	i 3 31	− 1	e 6 27	+ 9	—	—	i 9·7
Moscow		15·3	10	e 3 36	− 3	e 6 21	− 9	—	—	—
Rome		15·4	281	e 3 37	− 3	e 6 40	+ 8	e 4 0	PP	e 7·5
Padova		15·9	290	e 3 44	− 3	e 6 11	−33	4 23	PP	e 9·3
Prague		15·9	312	e 3 43	− 4	—	—	e 4 31	PP	e 8·6
Bologna		16·3	290	e 3 53k	+ 1	e 6 44	− 9	i 4 19	PP	e 10·4
Florence Arc.		16·3	288	3 57k	+ 5	e 7 27	SS	e 4 9	PP	e 9·3
Florence Xim		16·3	288	e 3 34	−18	e 6 38	−15	—	—	—
Prato		16·4	288	e 3 57	+ 4	—	—	—	—	—
Salo		17·0	293	3 59	− 2	e 7 17	+ 7	—	—	—
Collmberg		17·3	312	e 4 5	+ 1	e 7 24	+ 8	e 4 23	PP	e 10·3
Potsdam		17·8	317	e 4 4?	− 7	e 7 34	+ 6	—	—	e 13·1
Jena	E.	17·9	310	e 4 10	− 2	—	—	—	—	—
Chur		17·9	309	e 4 12	0	—	—	—	—	—
Pavia		17·9	293	3 59	−13	—	—	—	—	—
Stuttgart		18·6	303	e 4 17	− 4	e 7 50	+ 4	i 4 33	PP	e 10·1
Zürich		18·6	299	e 3 57k	−24	e 7 29	−17	e 4 54	PPP	e 10·0
Basle		19·3	299	e 4 26	− 3	e 8 11	+ 9	—	—	—
Strasbourg		19·4	302	e 4 29	− 1	e 8 13	+ 9	e 4 52	PP	e 10·5
Neuchatel		19·7	298	e 4 31	− 3	—	—	—	—	—
Helsinki		20·0	348	—	—	e 8 20	+ 3	—	—	e 11·0
Copenhagen		20·1	325	e 4 34	− 4	i 8 22	+ 3	—	—	10·3
Besançon		20·4	298	i 4 36	− 5	—	—	e 5 18	PPP	—
Upsala		21·3	338	i 4 53k	+ 3	8 28	−15	5 5	PP	e 9·9
De Bilt		22·1	311	i 4 58k	− 1	e 8 59	+ 1	—	—	e 11·0
Clermont-Ferrand		22·2	292	i 5 0	0	i 9 10	+10	i 5 29	PP	14·0
Paris		22·9	301	i 5 3	− 3	e 9 13	0	i 5 52	PPP	12·0
Sverdlovsk		24·1	39	i 5 21	+ 3	9 38	+ 4	—	—	—
Tortosa		24·5	280	i 5 20	− 2	e 9 43	+ 3	5 54	PP	e 13·0
Kew		25·2	307	i 5 26	− 3	e 9 55	+ 3	i 5 39	PP	e 13·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Alicante	N.	25·8	276	i 5 38	+ 4	e 10 14	+12	6 24	PP	e 13·4
Bergen		26·0	329	e 5 34	− 2	—	—	—	—	—
Samarkand		26·0	82	5 44	+ 8	—	—	—	—	—
Tashkent		27·3	77	e 5 49	+ 1	—	—	—	—	—
Stalinabad		27·6	83	i 5 53	+ 2	i 10 41	+ 9	—	—	—
Almeria		27·7	274	i 5 49	− 3	10 45	+12	6 59	PPP	17·4
Aberdeen	E.	27·8	318	e 6 23	+30	—	—	i 20 23	?	—
Toledo	Z.	28·0	280	i 5 53	− 2	e 10 46	+ 8	—	—	—
Obi-garm		28·2	83	i 6 2	+ 6	e 10 51	+10	—	—	—
Kulyab		28·5	84	e 6 4	+ 5	—	—	—	—	—
Granada		28·5	275	i 5 59k	0	i 10 36	−10	6 33	PP	14·3
Rathfarnham Castle		29·1	309	e 5 21	−43	e 9 48	−68	—	—	—
Malaga	Z.	29·2	275	i 6 2	− 3	i 12 27	SS	—	—	17·8
Andijan		29·7	78	e 6 14	+ 4	—	—	—	—	—
Frunse		30·9	73	e 6 24	+ 4	—	—	—	—	—
Murgab		31·5	81	e 6 30	+ 4	—	—	—	—	—
Irkutsk		48·5	51	e 8 50	+ 4	e 15 56	+ 8	—	—	—
Nanking		67·1	67	—	—	e 25 46	SSP	—	—	—
College		74·7	1	e 11 43	0	—	—	—	—	—
St. Louis		85·4	319	e 12 40	0	—	—	—	—	—
Hungry Horse		86·5	338	i 12 46	0	—	—	—	—	—
Victoria	Z.	88·6	344	e 12 59	+ 3	—	—	—	—	—
Pierce Ferry		97·6	333	e 13 39	+ 1	—	—	—	—	—

Additional readings :—
Yalta i = 1m.5s.
Theodosia i = 4m.5s., e = 5m.17s.
Sotchi i = 4m.42s.,
Bucharest iP*EN = 1m.53s., iP_gN = 2m.10s., iS*N = 3m.9s., iS*E = 3m.15s.
Sofia S_g = 5m.0s.
Helwan eZ = 3m.32s., SSS?EN = 5m.47s.
Kalossa eN = 6m.14s., eE = 6m.47s., eN = 7m.11s.
Ogyalla e = 4m.24s.
Raciborzu eZ = 3m.55s.
Triest $iS_gS_gS_g$ = 8m.19s.
Bologna eZ = 3m.57s.
Florence Arc. ePPZ = 4m.15s.
Salo 4m.8s. and 5m.32s., eS = 7m.22s.
Collmberg eEZ = 4m.9s., eE = 4m.13s. and 4m.18s.
Potsdam iPZ = 4m.8s., eE = 7m.48s., eZ = 10m.4s.?
Jena eEN = 4m.13s.
Stuttgart iP = 4m.20s.k, e = 4m.46s., eZ = 5m.21s. and 5m.36s., e = 5m.51s.
Strasbourg e = 4m.36s., ePPP = 5m.7s. and 5m.13s., e = 5m.16s., 5m.37s., 6m.19s., 8m.19s., and 8m.25s., eSS = 8m.42s. and 8m.46s., eSSS = 9m.11s., e = 9m.19s.
Besançon e = 4m.45s. and 5m.53s.
Upsala SE = 8m.30s., iN = 8m.36s., iP_cP?E = 8m.46s., iSSN = 8m.55s.
Clermont-Ferrand iPPP = 5m.45s., eSSS? = 10m.7s.
Paris e = 5m.16s., 6m.43s.?, and 8m.43s.
Tortosa PPP?N = 6m.10s., iEN = 9m.48s., SSSEN = 11m.2s.
Kew eSS = 10m.22s., eP_cSEN = 12m.4s.
Alicante PPP = 6m.36s., SS = 11m.30s., SSS = 11m.48s.
Almeria P_cP = 8m.49s., P_cS = 12m.33s.
Aberdeen iE = 18m.29s.
Toledo eZ = 11m.1s.
Granada SS = 13m.9s.
Nanking e = 26m.20s.
Long waves were also recorded at Tamanrasset and Seven Falls.

May 13d. Readings also at 0h. (near Ashkabad), 2h. (Bogota, near San Juan, Fresno, Reno, Mineral, near Arcata, Berkeley, Lick, and Shasta Dam), 4h. (Palomar, Tinemaha, Tucson, Overton, and Pierce Ferry), 5h. (La Paz and Messina), 6h. (Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Hungry Horse, College, and Ksara), 7h. (Messina), 8h. (Ashkabad, Helwan, and Pavia (2)), 10h. (Strasbourg, Palomar, near Mount Wilson, Pasadena, Riverside, Pierce Ferry, and Boulder City), 11h. (near Ashkabad), 12h. (near Balboa Heights), 13h. (near La Paz), 14h. (Huancayo, near Ferndale and near Ashkabad), 15h. (Collmberg, Stuttgart, College, and near Mizusawa), 16h. (near Murgab, near Collmberg, Jena, Strasbourg, and Stuttgart), 19h. (Bombay, Hyderabad, Andijan, Kulyab, Murgab, and Stalinabad), 20h. (Ashkabad, Boulder City, and Pierce Ferry), 22h. (Istanbul).

May 14d. Readings at 0h. (Granada, Huancayo, and near Ashkabad), 2h. (Hungry Horse and Victoria), 3h. (Mizusawa, near Klyuchi (2), and near Tucson), 4h. (near Tananarive and near Ashkabad), 5h. (Santa Lucia), 6h. (near Apia), 7h. (La Paz and College), 11h. (Basle, Zürich, Stuttgart, and College), 12h. (Pierce Ferry, Tucson (2), Hungry Horse, Alicante, near Malaga and near La Paz), 15h. (Kalossa and near Ashkabad), 16h. (Collmberg and Copiapo), 17h. (Istanbul, Stuttgart, Clermont-Ferrand, and near La Paz), 20h. (Alicante), 21h. (Brisbane, La Paz, and near Santa Lucia), 22h. (College, Tamanrasset, Murgab, Stalinabad, near Almata, Andijan, Frunse, and Tashkent), 23h. (Pasadena, Riverside, Tinemaha, Shasta Dam, Hungry Horse, Victoria, Sitka, College, Chicago, Apia, and near Ashkabad).

May 15d. 5h. Probably Gulf of California.

Merida 29m.56s.
Tucson eP =31m.37s., i =31m.43s. and 32m.2s., eS =32m.35s., i =32m.47s., iL? = 33m.20s.
Pierce Ferry iP =32m.38s., i =33m.9s., eL =35m.27s.
Boulder City eP =32m.42s., eL =35m.47s.
Tinemaha eP =33m.12s.
Reno ePN =33m.45s., ePE =33m.55s., eE =34m.11s.
Tacubaya iP =33m.51s., eS =37m.5s.
Berkeley ePZ =33m.54s.k, eEN =37m.48s.
Logan eP =33m.54s., eL =38m.37s.
Mineral ePZ =34m.7s.
Shasta Dam eP =34m.12s.
Santa Clara eSE =34m.58s., eLE =37m.52s.
Riverside eZ =35m.1s.
Butte eS?N =35m.1s., eLN =42m.44s.
Hungry Horse eP? =35m.6s.
Palomar iZ =35m.6s.
Salt Lake City eS =36m.17s., eL =37m.57s.
College eP =38m.29s.
Long waves were also recorded at many other American stations.

May 15d. 6h. Solomon Islands.

Brisbane iPNZ =32m.3s., iZ =32m.29s. and 33m.11s., iSZ =35m.54s., iSN =35m.58s., iSSN =36m.22s.
Riverview iPZ =33m.8s.k, ipPNZ =33m.20s., PPZ =34m.2s., eSN =37m.57s., iE = 38m.6s., iN =38m.10s., eRNZ =40·5m.
Wellington P =34m.19s., L =44·5m.
Ksara e =38m.13s.? and 40m.28s.
College eP =39m.50s., eS =50m.2s., eL =64m.33s.
Lick eZ =40m.9s.
Shasta Dam eP =40m.11s., i =40m.20s.
Mount Wilson ePZ =40m.20s., eZ =40m.30s.
Riverside ePZ =40m.22s., iZ =40m.32s.
Tinemaha ePZ =40m.24s.
Palomar iZ =40m.32s.
Boulder City eP =40m.33s.
Overton ePZ =40m.36s.
Pierce Ferry eP =40m.36s., e =40m.48s.
Logan eP =40m.49s.
Hungry Horse e =40m.53s.
Tucson eP? =40m.58s., eL =70m.14s.
Auckland eN =42m.?
Christchurch 45m.
Stuttgart eZ =46m.44s., 50m.12s., and 52m.6s.
St. Louis eSKS =52m.46s., ePS =56m.7s.
Florissant ePS =56m.5s.
Long waves were also recorded at Berkeley, Santa Clara, Philadelphia, Seven Falls, and Rome.

May 15d. Readings also at 0h. (Paris, Strasbourg, Stuttgart, Ksara, Philadelphia, Bozeman, Istanbul, and near Alicante), 2h. (Kulyab, Samarkand, Stalinabad, near Andijan, and Murgab), 5h. (Tucson, Pierce Ferry, Overton, Berkeley, and Hungry Horse), 6h. (Istanbul, Leninakan, Tiflis, near Erevan, Tucson, near Boulder City, and Pierce Ferry), 7h. (College, and near Tacubaya (2)), 8h. (near Overton), 9h. (Tucson, Hungry Horse, and Rome), 11h. (Brisbane, Riverview, Wellington, Pasadena, Riverside, Tinemaha, Boulder City, Overton (2), Pierce Ferry, Hungry Horse, and College), 12h. (New Delhi and Overton), 14h. (Hungry Horse), 16h. (New Delhi), 17h. (near Andijan), 21h. (Overton, Pierce Ferry, Shasta Dam, and College).

May 16d. 4h. 32m. 19s. Epicentre 9°·5S. 120°·5E.

$A = -·5007$, $B = +·8500$, $C = -·1640$; $\delta = +10$; $h = +7$;
$D = +·862$, $E = +·508$: $G = +·083$, $H = -·141$, $K = -·986$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		13·9	280	i 3 18k	− 3	i 5 55	− 2	—	—	10·7
Perth		22·8	190	e 5 5	0	9 1	−10	5 26	PP	—
Brisbane		35·5	125	i 6 56	− 4	i 12 41	+ 5	—	—	i 17·4
Riverview		37·1	135	i 7 26k	+12	i 12 56	− 5	i 8 39	PP	e 17·9
Colombo	E.	43·6	290	8 2	− 6	14 32	− 6	—	—	21·2
Calcutta	E.	44·8	316	e 9 44	PP	i 15 8	+13	—	—	—
Kodaikanal	E.	47·1	294	i 5 15	?	(e 15 27)	− 1	—	—	19·8
Hyderabad	N.	49·4	303	8 51	− 2	15 51	− 9	—	—	23·0
Poona		53·8	301	9 26	0	i 16 56	− 5	e 11 18	PP	24·7
Bombay		54·8	301	9 38	+ 4	e 17 13	− 1	—	—	25·0
Auckland	N.	56·0	128	—	—	17 31	+ 1	—	—	26·7
New Delhi		56·4	314	i 9 45	0	i 17 28	− 8	i 17 40	PS	—
Christchurch		56·4	137	9 36	− 9	17 23	−13	11 38	PP	27·3
Arapuni	E.	56·9	129	—	—	18 41?	+59	—	—	26·7
Wellington		57·2	133	9 45	− 6	17 33	−13	—	—	28·7
Irktusk		63·1	349	10 32	0	e 19 7	+ 5	—	—	—
Murgab		64·4	321	10 41	+ 1	19 16	− 2	—	—	—
Andijan		66·8	322	e 10 56	0	e 19 48	0	—	—	—
Frunse		66·8	325	e 10 59	+ 3	e 19 51	+ 3	—	—	—
Kulyab		66·8	318	e 10 53	− 3	e 19 42	− 6	—	—	—
Stalinabad		67·8	319	i 11 0	− 2	i 19 55	− 5	—	—	—
Tashkent		69·0	321	e 11 10	+ 1	e 20 17	+ 3	—	—	—
Samarkand		69·6	318	e 11 17?	+ 4	e 20 21?	0	—	—	—
Sverdlovsk		82·2	331	i 12 24	0	e 22 39	0	—	—	—
Grozny		85·6	315	12 45	+ 4	23 15	+ 2	—	—	—
Tiflis		85·8	313	i 12 44	+ 2	23 15	0	—	—	—
Ksara		90·8	303	i 13 8	+ 2	24 7	+ 5	—	—	—
Moscow		93·8	325	e 13 19	− 1	e 24 23	− 5	—	—	—
Helwan		93·9	299	e 13 20	− 1	e 24 35	+ 6	25 53	PS	—
Yalta		94·0	314	e 13 19	− 2	—	—	—	—	—
Istanbul		97·2	310	e 13 26	−10	—	—	e 17 22	PP	—
Belgrade		103·8	313	e 19 15	PP	e 24 53	[+ 8]	—	—	e 65·8
Upsala	N.	104·6	329	—	—	—	—	e 49 7	Q	e 52·7
Ogyalla		105·2	317	—	—	e 25 17	[+26]	e 32 41	SS	50·4
Sitka		105·6	33	—	—	e 24 53	[0]	—	—	e 52·7
Prague		107·5	319	e 18 41	PP	—	—	—	—	e 54·7
Copenhagen		108·0	325	i 18 58	PP	28 23	PS	34 18	SS	50·7
Potsdam	Z.	108·1	322	e 18 48	PP	—	—	—	—	e 61·4
Triest		109·4	315	e 18 54	PP	e 25 1	[− 9]	e 26 11	S	e 47·7
Rome		109·7	311	e 19 2	PP	e 28 24	PS	e 29 33	PPS	—
Prato		110·5	313	e 18 54	[+20]	—	—	—	—	—
Stuttgart		111·1	318	e 18 38	[+ 3]	e 26 59	S	e 19 15	PP	e 59·7
Strasbourg		112·1	318	e 19 11	PP	e 28 58	PS	e 21 37	PPP	—
De Bilt		112·9	323	e 19 23	PP	e 29 11	PS	—	—	e 47·7
Scoresby Sund		114·7	347	19 46	PP	29 29	PS	—	—	—
Paris		115·4	320	e 18 43	[− 1]	e 29 40	PS	e 19 41	PP	e 62·7
Clermont-Ferrand		115·8	316	e 19 49	PP	e 29 47	PS	—	—	63·7
Kew		116·4	323	e 19 56	PP	e 29 40	PS	e 22 0	PPP	e 61·7
Tamanrasset	Z.	116·6	292	e 18 46	[0]	e 27 47	S	e 19 52	PP	e 59·7
Jersey		118·2	321	—	—	e 29 38	PS	—	—	48·7
Rathfarnham Castle		119·1	327	e 20 9	PP	e 30 15	PS	—	—	—
Hungry Horse		120·3	39	e 18 51	[− 2]	—	—	e 20 20	PP	—
Tinemaha		120·5	52	i 18 56	[+ 2]	—	—	—	—	—
Pasadena		121·1	56	—	—	(e 25 53)	[− 1]	—	—	e 25·9
Mount Wilson	Z.	121·2	56	e 18 57	[+ 2]	—	—	e 20 36	PP	—
Riverside	Z.	121·8	56	e 18 59	[+ 3]	—	—	e 20 31	PP	—
Boulder City		123·4	52	e 19 1	[+ 2]	—	—	—	—	—
Overton	Z.	123·6	52	e 19 2	[+ 2]	—	—	—	—	—
Pierce Ferry		124·1	52	e 19 4	[+ 3]	—	—	—	—	—
Logan		124·1	45	e 19 0	[− 1]	—	—	e 20 48	PP	e 61·1

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		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		127·5	56	e 19 10	[+ 3]	—	—	e 21 17	PP	e 61·4
Florissant		139·8	38	e 19 25	[− 5]	e 23 8	PKS	e 22 27	PP	—
St. Louis		140·0	38	e 19 25	[− 5]	i 29 27	{+ 6}	e 22 27	PP	—
Ottawa		141·6	18	e 19 26	[− 7]	—	—	—	—	70·7
Cleveland	N.	142·7	27	e 23 3	PP	e 42 9	SS	e 25 43	PPP	—
Harvard		145·5	15	i 19 43	[+ 3]	—	—	—	—	e 79·7
Weston		145·6	15	i 19 42	[+ 2]	—	—	—	—	—
Fordham		146·3	18	i 19 43	[+ 2]	—	—	—	—	—
Philadelphia		146·6	21	e 19 45	[+ 3]	e 31 5	?	e 45 28	SSS	e 75·0
La Paz	z.	152·8	161	20 2	[+10]	—	—	—	—	—
San Juan		169·1	35	e 20 28	[+19]	e 39 52	PPS	e 22 8	PKP_2	e 84·0

Additional readings :—
Perth i = 6m.11s.
Brisbane iZ = 8m.33s.
Riverview isSN? = 13m.12s., iE = 13m.26s., eE = 13m.37s., eN = 13m.48s. and 15m.34s., iZ = 15m.58s.
Kodaikanal eSE = 12m.15s., S_cSE = 14m.5s., true S is given as SS, trace readings are erroneous.
Poona iPPPE? = 12m.35s., iPSEN = 17m.2s.
New Delhi eS_cSN = 19m.41s., iSSN = 21m.24s., eSSSN = 22m.58s.
Christchurch PZ = 9m.53s., e = 18m.22s., S_cSZ = 19m.19s., SS?Z = 21m.57s., eEN = 22m.26s.
Wellington PZ = 9m.57s., eZ = 10m.45s. and 23m.46s.
Helwan eZ = 13m.35s., PPSZ = 26m.32s.
Belgrade e = 19m.50s. and 21m.13s.
Ogyalla e = 29m.29s.
Copenhagen 21m.13s., iS = 26m.48s., PPS = 30m.7s.
Triest ePPS = 28m.30s., eSS = 33m.35s.
Stuttgart ePPP = 21m.26s., ePS = 28m.52s., ePPS = 29m.47s., e = 33m.41s.
Strasbourg e = 19m.21s., 32m.43s., 38m.17s., and 48m.41s.
Paris e = ?1m.14s., and 37m.52s., eSSS? = 40m.36s., e = 44m.40s.
Kew eZ = 20m.9s., e = 30m.54s., and 31m.51s., eEZ = 36m.34s.
Tamanrasset eZ = 22m.7s., ePPPZ = 22m.36s., eZ = 29m.47s.,
Tucson e = 19m.52s.
St. Louis PKP = 19m.35s., iSKP? = 23m.11s., eSSS = 46m.28s.
Cleveland eE = 56m.19s.
San Juan e = 32m.47s. and 49m.31s.
Long waves were also recorded at Nanking, College, Seven Falls, Huancayo, and other European stations.

May 16d. Readings also at 0h. (near Neuchatel and Zürich), 2h. (Upsala, near Granada, and Malaga), 3h. (near Kulyab, Murgab, and Stalinabad), 4h. (Christchurch, Wellington, Auckland, Harvard, Weston, Tucson, Hungry Horse, Tiflis, Stalinabad, Andijan, Kulyab, Murgab (2), and near Messina), 5h. (Overton, near Kulyab, and near Ashkabad), 7h. (near Ashkabad), 9h. (near Pavia), 10h. (Istanbul, Ksara, near Pavia, and near Overton), 12h. (near Tananarive), 14h. (Overton, Pierce Ferry, Hungry Horse (2), College (2), and Sitka), 15h. (Ottawa), 17h. (near Andijan, Kulyab, Murgab, Samarkand, and Stalinabad), 18h. (Ottawa, New Delhi, Frunse, near Tashkent, and near Ashkabad), 20h. (La Paz, Ashkabad, and near Leninakan), 23h. (near Huancayo).

May 17d. 2h. 29m. 52s. Epicentre 48°·3N. 154°·7E. Focus at Base of the Superficial Layers.

$A = -·6037$, $B = +·2854$, $C = +·7444$; $\delta = +4$; $h = -5$;
$D = +·427$, $E = +·904$; $G = -·673$, $H = +·318$, $K = -·668$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		13·4	232	3 11	+ 1	e 5 28	−11	—	—	—
Zi-ka-wei		30·4	249	e 6 14	+ 3	e 11 15	+ 7	—	—	—
Irkutsk		31·9	297	e 6 23	− 1	—	—	—	—	—
College		34·3	40	i 6 48	+ 3	i 12 12	+ 3	—	—	e 14·9
Sitka		41·4	51	i 7 48	+ 3	e 14 5	+ 8	e 9 34	PP	e 17·3
Victoria	z.	51·8	57	e 9 6	− 1	—	—	—	—	—
Frunse		53·9	297	e 9 22	0	—	—	—	—	—
Andijan		56·5	296	9 40	− 1	e 17 31	+ 3	—	—	—
Shasta Dam		56·9	65	i 9 44	0	—	—	—	—	—
Hungry Horse		57·0	53	i 9 46	+ 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Murgab		57·0	293	9 45?	0	17 33?	−2	—	—	—
Mineral	z.	57·6	65	i 9 48a	− 1	—	—	—	—	—
Tashkent		58·0	298	—	—	i 17 42	− 6	e 19 30	ScS	—
Reno		59·2	64	e 10 1	+ 1	—	—	e 10 14	pP	—
Stalinabad		60·0	296	e 10 4	− 2	e 18 12	− 2	—	—	—
Samarkand		60·4	298	e 10 9	+ 1	—	—	—	—	—
Scoresby Sund		61·5	359	i 10 16a	0	18 39	+ 6	—	—	30·1
Tinemaha	z.	61·7	66	i 10 18a	+ 1	—	—	i 10 34	pP	—
Logan		62·4	58	i 10 22	0	—	—	e 12 50	PP	—
Pasadena		63·7	68	i 10 30a	0	—	—	i 10 44	pP	—
Moscow		63·8	326	e 10 29	− 2	e 18 57	− 5	—	—	—
Overton	z.	64·3	64	i 10 35	+ 1	—	—	—	—	—
Riverside	z.	64·3	68	i 10 34	0	—	—	i 10 48a	pP	—
Boulder City		64·5	64	i 10 36	0	—	—	—	—	—
Pierce Ferry		64·9	64	i 10 38	0	—	—	—	—	—
Palomar		65·0	68	i 10 39	0	—	—	i 10 50	pP	—
Hyderabad	N.	68·1	272	—	—	e 19 49	− 5	—	—	—
Tucson		69·4	65	i 11 7	+ 1	—	—	e 11 21	pP	—
Grozny		69·5	313	11 39?	+32	—	—	—	—	—
Bombay		70·8	278	—	—	e 20 24	− 2	—	—	—
Tiflis		71·1	312	i 11 17	0	e 20 29	− 1	—	—	—
Copenhagen		71·7	339	e 11 20	0	i 20 36	− 1	—	—	34·1
Yalta		73·9	320	11 33	0	21 0	− 2	—	—	—
Potsdam	z.	74·5	337	i 11 37	0	—	—	—	—	e 45·1
Raciborzu		75·1	333	e 11 40	0	—	—	e 11 43	P	—
Skalnate Pleso		75·2	331	e 11 41	0	e 20 24	−52	—	—	—
Collmberg		75·5	336	e 11 42	− 1	e 21 54	+34	e 11 56	PcP	e 43·1
St. Louis		76·0	47	i 11 43	− 3	i 21 25	0	i 11 59	pP	—
Jena		76·2	337	e 11 46	− 1	—	—	—	—	—
Prague		76·2	335	i 11 47	0	e 21 27	0	—	—	—
De Bilt		76·6	342	i 11 49	0	e 21 38	+ 6	—	—	e 39·1
Ottawa	z.	76·8	34	e 11 49	− 1	—	—	e 12 3	pP	42·1
Cleveland		77·7	41	e 11 55	0	i 21 43	− 1	i 12 8	pP	—
Kew		78·3	345	i 11 57	− 1	e 21 55	+ 5	e 34 40	Q	e 39·1
Stuttgart		78·8	338	i 12 2a	+ 1	e 21 53	− 2	e 12 24	?	40·1
Istanbul		78·9	321	e 11 58	− 4	—	—	—	—	—
Belgrade		79·0	329	i 12 1k	− 1	e 22 24	ScS	e 17 22	PPP	e 47·9
Strasbourg		79·3	339	i 12 4	0	e 22 2	+ 2	e 12 17	pP	39·1
Paris		80·3	343	i 12 10	+ 1	e 22 40	PS	e 12 35	sP	e 45·1
Zürich		80·3	338	i 12 9a	0	e 22 10	− 1	—	—	—
Basle		80·4	339	e 12 10a	0	e 22 55	PS	—	—	—
Triest		80·4	334	e 12 23	pP	e 22 9	− 3	—	—	e 38·1
Jersey	E.	80·8	347	—	—	e 21 38	−38	e 31 28	SSS	—
Besançon		81·0	339	i 12 12	− 1	—	—	e 12 51	?	—
Neuchatel		81·0	339	e 12 13	0	—	—	—	—	—
Weston		81·0	33	e 12 13	0	e 22 18?	0	—	—	—
City College, N.Y.		81·4	35	i 12 15	0	e 22 22	0	e 12 30	pP	—
Fordham	z.	81·4	35	i 12 15	0	—	—	i 12 29	pP	—
Salo		81·4	336	12 14a	− 1	22 22	0	12 32	pP	—
Ksara		81·7	313	i 12 16a	− 1	22 40	ScS	—	—	—
Padova		82·0	335	e 12 16	− 2	e 22 22	− 7	—	—	—
Bologna		82·2	335	e 12 21	+ 2	e 22 34	+ 3	e 12 34	pP	—
Prato		82·8	334	e 12 26	+ 4	e 23 25	PS	—	—	—
Clermont-Ferrand		83·1	341	i 12 25	+ 1	e 22 41	+ 1	e 12 39	pP	43·1
Rome		84·2	333	i 12 29a	0	e 22 48	− 3	e 12 55	pP	—
Helwan		87·1	314	i 12 43a	− 1	e 23 6	[+ 1]	e 12 57	pP	—
Alicante		90·9	341	e 13 40	+38	e 23 48	− 6	16 26	PP	e 42·6
Tamanrasset	z.	104·0	332	e 14 1	0	—	—	e 17 20	?	—
La Paz	N.	132·8	63	19 18	[+ 6]	—	—	—	—	—

Additional readings :—
Mizusawa ePN = 3m.17s., SE = 5m.25s.
Hungry Horse i = 10m.17s. and 10m.39s.
Collmberg eE = 12m.37s. and 12m.54s.
Cleveland isSE = 22m.7s.
Strasbourg e = 12m.40s., eScS = 22m.23s.
Rome eZ = 13m.16s.
Helwan eSEN = 23m.20s.
Alicante PPP = 16m.36s., SS = 30m.0s.
Long waves were also recorded at Seven Falls, Upsala, Granada, and Almeria.

May 17d. 4h. Argentina.

Santa Lucia iPN = 2m.45s., N = 2m.55s., L?N = 3m.3s.
Copiapo ePN = 3m.48s., N = 4m.10s. and 5m.13s.
La Plata PE = 4m.52s., P?N = 5m.30s., E = 5m.54s., SEN = 6m.42s., LN = 7·0m.
La Paz iPZ = 6m.15s., iS? = 9m.24s., L = 10m.32s.
Huancayo eP = 7m.11s.
Tucson eP = 14m.4s., e = 14m.23s.
Palomar iPZ = 14m.27s., eZ = 14m.37s.
Pierce Ferry iP = 14m.30s., i = 15m.2s.
Riverside iPZ = 14m.31s., iZ = 14m.43s.
Boulder City eP = 14m.33s.
Overton ePZ = 14m.33s.
Pasadena iPZ = 14m.35s., iZ = 14m.44s.
Tinemaha iPZ = 14m.46s., eZ = 14m.55s.
Logan eP = 14m.48s.
Shasta Dam iP = 15m.9s.
Hungry Horse eP = 15m.19s.
Victoria eZ = 38m.34s.
Long waves were also recorded at Auckland.

May 17d. 13h. 56m. 34s. Epicentre 41°·5N. 16°·1E. (as on 1948, Aug. 22d.).

$A = +·7217$, $B = +·2083$, $C = +·6601$; $\delta = -3$; $h = -2$;
$D = +·277$, $E = -·961$; $G = +·634$, $H = +·183$, $K = -·751$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto	1·3	140	0 30	P_g	0 52	+ 8	e 0 46	S*	—
Rome	2·7	279	e 0 56	P_g	i 1 34	S_g	—	—	—
Florence Arc.	4·2	304	e 1 37	+30	e 2 29	S_g	—	—	—
Florence Xim	4·2	304	e 0 58	− 9	e 1 54	− 3	—	—	—
Zagreb	4·3	359	1 4	− 4	e 1 53	− 7	—	—	e 2·4
Prato	4·4	305	—	—	e 1 59	− 3	—	—	—
Triest	4·5	339	e 1 30	P_g	i 2 22	S*	i 2 48	S_g	—
Bologna	4·6	312	e 1 18	P*	e 2 14	+ 7	e 1 28	P_g	—
Zürich	8·0	320	e 1 56	− 4	e 3 6	−27	—	—	—
Basle	8·6	318	e 2 2	− 7	e 3 31	−17	—	—	—
Stuttgart	8·8	329	e 2 12	+ 1	e 3 49	− 4	e 4 49	S_g	—
Collmberg	10·1	349	—	—	e 3 53	−32	—	—	—

Additional readings :—
Rome iN = 2m.8s., iE = 2m.46s.
Florence Arc. eE = 2m.41s.
Triest iP_gP_gN = 1m.48s.
Bologna e = 1m.54s. and 2m.48s.
Stuttgart eZ = 3m.16s.
Collmberg eE = 4m.15s. and 4m.49s., eZ = 5m.0s., eE = 5m.14s.

May 17d. 22h. 37m. 43s. Epicentre 22°·9S. 171°·7E. (as on 1948, Feb. 14d.).

$A = -·9125$, $B = +·1331$, $C = -·3869$; $\delta = +6$; $h = +4$;
$D = +·144$, $E = +·990$; $G = +·383$, $H = -·056$, $K = -·992$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Auckland	N.	14·2	170	—	—	5 47	−17	—	—
New Plymouth	E.	16·2	174	—	—	e 6 35	−16	—	—
Tuai	N.	16·5	165	—	—	e 6 6	−52	—	—
Apia		18·1	63	e 4 11	− 3	e 6 38	−57	—	—
Wellington		18·5	173	4 22	+ 3	6 53	−51	—	—
Kaimata	N.E.	19·6	181	4 44	PP	7 42	−26	—	—
Pasadena	Z.	87·5	52	i 12 49	− 2	—	—	—	—
Palomar		88·0	53	i 12 50a	− 3	—	—	i 13 5	pP
Riverside	Z.	88·0	52	i 12 50a	− 3	—	—	—	—
Shasta Dam		88·0	44	i 12 55	+ 2	—	—	—	—
Boulder City		90·8	51	e 13 3	− 3	—	—	—	—
Pierce Ferry		91·4	52	i 13 8	− 1	—	—	—	—
Tucson		92·1	56	i 13 7	− 5	—	—	—	—

Long waves were recorded at Pretoria.

May 17d. 23h. 57m. 54s. Epicentre 35°·7N. 121°·2W. (as on 1948, Dec. 31d.).

A = −·4217, B = −·6962, C = +·5810; δ = +9; h = 0;
D = −·855, E = +·518; G = −·301, H = −·497, K = −·814.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Fresno		1·5	48	i 0 29	+ 1	i 0 50	+ 1	—	—
Lick		1·7	348	i 0 29a	− 2	i 0 54	0	i 0 32	P*
Santa Barbara	z.	1·7	136	e 0 33	+ 2	i 1 3	S_g	—	—
Branner	z.	1·9	335	i 0 30	− 4	—	—	—	—
Berkeley		2·3	338	i 0 36k	− 4	i 1 13	+ 4	i 0 44	P_g
Haiwee	z.	2·6	81	i 0 45	+ 1	i 1 24	S_g	—	—
Tinemaha		2·7	61	i 0 46a	+ 1	i 1 23	S*	—	—
Pasadena		2·9	119	i 0 46k	− 2	i 1 20	− 4	—	—
Reno		4·0	16	i 1 6	+ 2	e 1 55	+ 3	i 1 23	P*
Shasta Dam		5·1	350	i 1 33	P*	i 2 31	S*	i 2 42	S*
Boulder City		5·2	85	i 1 33	P*	—	—	—	—

Additional readings :—
Lick iN = 0m.41s., iSZ = 0m.49s.
Berkeley iZ = 1m.7s.
Reno iZ = 1m.42s., eZ = 2m.6s., iN = 2m.11s.

May 17d. Readings also at 0h. (Misusawa, Ashkabad, Catania, and near Messina), 1h. (Ashkabad), 4h. (Shasta Dam), 6h. (Auckland, Mount Wilson, Riverside, Boulder City, Overton, Pierce Ferry, Tucson, La Paz, Bogota, and near Huancayo), 9h. (Overton, Ashkabad, and Santa Lucia), 11h. (Overton, Tiflis, and near Zürich), 13h. (Overton), 15h. (Riverside, Tinemaha, Hungry Horse, Overton, Shasta Dam, and Pretoria), 16h. (near Messina), 18h. (near Sotchi and near Ashkabad), 19h. (near Ashkabad, near Apia and near Batavia), 21h. (Ksara, Sofia, Stuttgart, and near Istanbul), 23h. (Hungry Horse, Logan, Shasta Dam, Tucson, Pasadena, Riverside, Palomar, Copiapo, Santa Lucia, and La Plata.)

May 18d. Readings at 1h. (Erevan, Leninakan, near Grozny and Tiflis (2)), 4h. (near Kulyab), 5h. (New Delhi), 8h. (Hungry Horse), 9h. (near Messina (2) and near Kulyab), 10h. (Reykjavik, near Kulyab, and near Murgab), 11h. (near New Delhi), 16h. (Copiapo), 17h. (Kew, near Tacubaya, and near Kulyab), 18h. (Tucson, Grozny, Erevan, Tiflis, and near Leninakan), 20h. (Hungry Horse, Shasta Dam, Tacubaya, and Stuttgart), 22h. (Pretoria), 23h. (Mineral).

May 19d. 5h. 5m. 20s. Epicentre 9°·5S. 120°·5E. (as on 16d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia	z.	13·9	280	e 3 29	+ 8	i 5 11	−46	—	—	—
Brisbane		35·5	125	i 6 55	− 5	—	—	—	—	e 18·2
Riverview		37·1	135	e 15 37?	?	—	—	—	—	e 20·9
Poona	E.	53·8	301	e 9 13	−13	i 16 56	− 5	i 10 17	PP	—
Bombay		54·8	301	—	—	e 17 7	− 7	—	—	—
Murgab		64·4	321	10 40	0	19 16	− 2	—	—	—
Andijan		66·8	322	10 56	0	e 19 44	− 4	—	—	—
Kulyab		66·8	318	10 57	+ 1	—	—	—	—	—
Stalinabad		67·8	319	e 11 2	0	e 19 56	− 4	—	—	—
Tashkent		69·0	321	e 11 9	0	e 20 28?	+14	i 21 19	S_eS	—
Sverdlovsk		82·2	331	12 24	0	22 36	− 3	—	—	—
Ksara		90·8	303	e 13 4	− 2	—	—	17 24	PP	—
Moscow		93·8	325	e 13 33	+13	—	—	—	—	—
Hungry Horse		120·3	39	e 18 53	[0]	—	—	—	—	—
Overton	z.	123·6	52	e 19 8	[+ 8]	—	—	—	—	—
Pierce Ferry		124·1	52	e 19 4	[+ 3]	—	—	—	—	—
Tucson		127·5	56	e 19 8	[+ 1]	—	—	—	—	—
Harvard		145·5	15	i 19 52	[+12]	—	—	—	—	—
Weston		145·6	15	i 19 49	[+ 9]	—	—	—	—	—

Additional readings :—
Brisbane iZ = 7m.56s.
Riverview ipPN = 15m.46s., iPPN = 16m.6s., eSE = 19m.35s., iSN = 19m.42s., iSSN = 20m.13s., iN = 20m.34s. Timing appears wrong.
Poona eE = 9m.39s., esSE = 18m.58s.
Long waves were also recorded at Auckland, Christchurch, Wellington, De Bilt, Kew, and Granada.

May 19d. Readings also at 0h. (Istanbul and near Victoria), 1h. (near La Paz), 3h. (Copiapo and Perth), 4h. (Huancayo and Istanbul), 8h. (Hungry Horse (2), Overton (3), Pierce Ferry (2), and near Klyuchi), 9h. (Overton and near Fort de France), 11h. (Overton, near Messina, and near San Juan), 12h. (Strasbourg), 13h. (Mizusawa), 14h. (near Ashkabad), 15h. (Tucson, Overton, Pierce Ferry, and near Barcelona), 17h. (Arapuni, Christchurch, and Wellington), 20h. (near Bogota).

May 20d. 8h. 12m. 36s. Epicentre 19°·0S. 175°·5W. Depth of focus 0·020.
(as on 1947, Sept. 2d.).

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

		△	Az.	P.	O−C.	S.	O−C.		Supp.
		°	°	m. s.	s.	m. s.	s.	m.	s.
Apia		6·3	35	1 32	0	2 33	−10	—	—
Auckland	N.	19·7	204	6 15	?	i 7 59	+12	—	—
Tuai	N.	20·7	197	e 4 36	+ 7	—	—	—	—
New Plymouth	E.	21·9	202	e 4 40	− 1	8 44	+17	—	—
Wellington		23·7	199	5 1	+ 3	9 0	+ 2	15 44	S_eS
Kaimata	N.E.	26·0	203	5 24	+ 4	9 44	+ 8	—	—
Brisbane	Z.	30·1	248	i 5 56	− 1	—	—	i 6 37	pP
Riverview		33·1	237	i 6 23k	0	e 14 5	SSS	i 7 59	PPP
Berkeley	Z.	75·5	42	i 11 38k	+10	—	—	i 12 22a	pP
Lick	Z.	75·6	42	i 11 29k	0	—	—	i 12 22a	pP
Pasadena	Z.	75·9	47	i 11 30	0	—	—	i 12 24	pP
Palomar	Z.	76·4	48	i 11 33	0	—	—	i 12 21	pP
Riverside	Z.	76·4	47	i 11 32	− 1	—	—	i 12 26	pP
Fresno	N.	76·4	43	e 12 28	pP	—	—	—	—
Shasta Dam		77·2	39	i 11 37	− 1	—	—	e 12 30	pP
Mineral	Z.	77·5	40	i 11 38k	− 1	—	—	i 12 31k	pP
Tinemaha		77·6	45	i 11 41	+ 1	—	—	i 12 35	pP
Boulder City		79·2	46	e 11 49	0	—	—	e 12 43	pP
Overton	Z.	79·8	46	e 11 52	0	—	—	i 12 47	pP
Pierce Ferry		79·9	47	i 11 52	0	—	—	i 12 45	pP
Tucson		80·1	51	i 11 54	+ 1	—	—	i 12 44	pP
Victoria	Z.	81·7	33	e 11 59	− 3	—	—	e 12 53	pP
Hungry Horse		86·5	37	i 12 25	− 1	—	—	i 13 20	pP
St. Louis		98·1	52	—	—	e 23 39	[− 1]	e 24 30	S
Collmberg		147·1	350	e 19 27	[+ 5]	—	—	—	—
Ksara		148·4	304	e 19 28	[+ 4]	e 29 9	?	—	—
Stuttgart	Z.	150·1	354	e 19 26	[0]	—	—	e 20 33	pPKP
Paris		150·2	4	e 19 28	[+ 2]	—	—	e 20 33	pPKP
Strasbourg		150·4	355	i 19 33	[+ 6]	—	—	i 20 35	pPKP
Clermont-Ferrand		153·3	2	e 19 41	[+10]	—	—	—	—
Helwan	Z.	153·3	297	e 19 39	[+ 8]	—	—	e 20 45	pPKP

Additional readings:—
New Plymouth PE = 4m.50s.
Brisbane iZ = 7m.7s.
Lick iZ = 11m.35s.k
Pasadena iP_cPZ = 11m.36s.
Mineral iZ = 11m.44s.
Tucson iP_cP = 12m.7s.
Hungry Horse epPP = 16m.36s.
St. Louis esS? = 26m.26s.
Collmberg eEZ = 18m.24s., eZ = 19m.31s., 19m.36s., and 20m.24s., eE = 20m.30s.
Stuttgart iZ = 19m.32s.k, eZ = 19m.38s.
Paris e = 19m.33s. and 19m.39s.
Strasbourg i = 19m.46s.
Clermont-Ferrand i = 20m.0s.
Helwan iZ = 19m.54s.

May 20d. 22h. 35m. 26s. Epicentre 33°·0N. 126°·0W.

A = −·4939, B = −·6798, C = +·5421; δ = −6; h = +1;
D = −·809, E = +·588; G = −·319, H = −·439, K = −·840.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Branner	Z.	5·4	35	i 1 23	− 1	—	—	—
Santa Barbara		5·4	73	i 1 24	0	i 2 25	− 3	—
Lick	Z.	5·6	39	e 1 26	− 1	—	—	—
Berkeley		5·7	31	i 1 27k	− 1	e 2 26	− 9	—
Fresno	N.	6·3	52	e 1 38	+ 2	i 2 46	− 4	—
Ukiah		6·5	20	—	—	e 2 44	−11	e 2·9
Pasadena		6·6	78	i 1 40	− 1	i 2 55	− 3	—
Mount Wilson		6·7	78	i 1 43	+ 1	i 3 0	0	—
Haiwee		7·3	63	i 1 52	+ 2	i 3 20	+ 5	—
Tinemaha		7·5	56	i 1 55	+ 2	i 3 18	− 2	—
Palomar		7·7	85	i 1 53	− 3	i 3 19	− 6	—
Mineral	Z.	8·1	25	i 2 1	− 1	—	—	—
Shasta Dam		8·2	20	i 3 4	+61	—	—	—
Overton	Z.	10·1	67	e 2 30	+ 2	—	—	—
Pierce Ferry		10·4	69	i 2 32	− 2	—	—	—
Tucson		12·8	89	e 3 7	+ 1	—	—	—
Logan		14·2	48	e 3 29	+ 5	—	—	—
Hungry Horse		17·8	27	i 4 13	+ 2	—	—	—

Additional readings :—
Lick iZ = 1m.30s.
Berkeley iE = 1m.30s., eZ = 2m.6s.
Pierce Ferry i = 2m.37s.

May 20d. Readings also at 0h. (Ottawa and near Tacubaya (2)), 1h. (near Batavia), 10h. (Collmberg), 13h. (Tucson, near Boulder City, Pierce Ferry, Erevan, Grozny, near Leninakan, and Tiflis), 14h. (La Paz), 15h. (Huancayo), 16h. (Arapuni, Auckland, Christchurch, and Wellington), 17h. (Ashkabad), 19h. (New Delhi and near Mizusawa), 22h. (Victoria), 23h. (Huancayo and near Tacubaya).

May 21d. 7h. Undetermined Shock.

Apia eP = 45m.32s., eS = 47m.25s.
Brisbane iPZ = 48m.47s., iZ = 49m.31s., iN = 57m.19s.
Tuai eN = 49m.17s. and 49m.39s.
Arapuni S?E = 50m.0s.
Wellington P = 50m.20s., e = 53m.?.
Kaimata P?NE = 51m.32s.
Pasadena iPZ = 55m.5s., ipPZ = 55m.20s.
Lick iPZ = 55m.6s.a.
Mount Wilson iPZ = 55m.6s., ipPZ = 55m.24s.
Palomar iPZ = 55m.8s.a, ipPZ = 55m.24s.
Fresno ePN = 55m.12s.
Shasta Dam iP = 55m.15s.
Mineral iPZ = 55m.16s.k.
Boulder City iP = 55m.24s., i = 55m.35s.
Tinemaha iPZ = 55m.17s.a.
Overton iPZ = 55m.27s.
Pierce Ferry iP = 55m.27s.
Tucson iP = 55m.27s., e = 56m.6s.
Victoria eZ = 55m.38s.
Logan eP = 55m.49s.
Hungry Horse eP = 56m.0s.
College eP = 56m.5s.
Ksara eP = 62m.44s.?, PP = 66m.30s.
Collmberg eEZ = 62m.51s., eE = 63m.6s., E = 63m.29s.
Tamanarasset ePKPZ = 63m.8s., ePKP$_2$Z = 64m.56s., ePPZ = 68m.47s., eZ = 71m.50s.
Paris ePKP$_1$ = 63m.16s.?, eL = 126m.
Clermont-Ferrand e = 63m.17s., ePKP$_2$? = 63m.38s., L = 132m.
Helwan eZ = 63m.17s. and 63m.28s.
Strasbourg ePKP$_2$ = 63m.17s., e = 63m.53s.
Long waves were also recorded at Auckland, Christchurch, Berkeley, Granada, and Stuttgart.

May 21d. 17h. Undetermined Shock.

Istaubul eP =42m.2s., iS_g =42m.50s.
Sofia eP =42m.21s., iS =43m.36s.
Yalta P =43m.15s., S =45m.42s.
Bucharest e =43m.36s., iE =43m.52s. and 44m.14s., iN =44m.22s.
Belgrade e =44m.14s.k, and 44m.50s., i =45m.23s.
Collmberg eEZ =44m.54s., eE =45m.6s., eZ =45m.12s., eE =45m.22s.
Stuttgart ePZ =44m.55s., e =46m.18s., eQ =49·8m.
Strasbourg eP? =45m.6s., iPP? =45m.11s., e =45m.26s., eL =50·5m.
Triest eS? =45m.6s., eL =47m.39s.
Ksara e =45m.34s.? and 47m.29s.
Clermont-Ferrand ePP =45m.36s., L =53·5m.
Paris eP =45m.36s.?, ePP =53m.56s.
Tamanarasset ePZ =46m.24s., iZ =46m.27s. and 46m.30s., eZ =46m.40s.
Rome eN =46m.53s.
Budapest e =47m.
Zagreb e =47m.12s.
Hungry Horse eP =53m.52s.
Long waves were also recroded at De Bilt, Kew, Copenhagen, Upsala, and Columbia.

May 21d. 21h. 40m. 4s. Epicentre 37°·3N. 142°·0E. (as on 1945, June 7d.).

Intensity VI at Hanakami (Iwate Pref.), Hiraisi (Totigi Pref.), and Nakahata (Hukusima Pref.); V at Tukubasan, Onahama, Isinomaki, Hukusima, Shirakawa, and Kakioka; IV at Sendai, Mito, Utunomiya, Kumagaya, Tokyo, Miyako, Hunatu, Morioka, Titibu, Yokohama, Oiwake, Ito, and Hatinohe; II-III at Maebasi, Sakata, Akita, Osima, Turuga, and Kohu. Macroseismic radius >300km.
Epicentre 37°·3N. 141°·8E. Depth of focus 40km.

The Seismological Bulletin of the Central Meterological Observatory, Japan, for the year 1949; Tokyo, 1950, p.p. 16-17, with macroseismic chart.

$A = -·6284$, $B = +·4910$, $C = +·6034$; $\delta = +6$; $h = -1$;
$D = +·616$, $E = +·788$; $G = -·476$, $H = +·372$, $K = -·797$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Onahama		1·0	247	0 20k	− 1	0 30	− 6	—	—	—
Hukusima		1·3	290	0 24k	− 1	0 40	− 4	—	—	—
Sendai		1·3	318	0 25k	0	0 39	− 5	—	—	—
Mito		1·5	233	0 29	+ 1	0 46	− 3	—	—	—
Kakioka		1·8	234	0 31k	− 1	0 54	− 2	—	—	—
Tukubasan		1·8	235	0 33k	+ 1	0 53	− 3	—	—	—
Utunomiya		1·9	246	0 32k	− 2	1 5	S_g	—	—	—
Mizusawa	E.	2·0	340	i 0 38	+ 3	1 0	− 2	—	—	—
Miyako		2·3	0	0 42k	+ 2	1 7	− 2	—	—	—
Kumagaya		2·4	241	0 40k	− 1	1 11	− 1	—	—	—
Tokyo		2·4	228	0 42k	+ 1	1 9	− 3	—	—	—
Maebasi		2·5	249	0 44k	+ 1	1 12	− 2	—	—	—
Morioka		2·5	345	0 43k	0	1 11	− 3	—	—	—
Yokohama		2·6	226	0 48	+ 4	1 18	− 1	—	—	—
Akita		2·8	328	0 49	+ 2	1 29	S*	—	—	—
Matusiro		3·1	256	0 49k	− 2	1 21	− 8	—	—	—
Nagano		3·1	258	0 54k	+ 3	1 31	+ 2	—	—	—
Hunatu		3·2	235	0 42k	−10	1 18	−14	—	—	—
Hatinhoe		3·3	354	0 54	+ 1	1 29	− 6	—	—	—
Osima		3·3	220	0 54	+ 1	1 39	+ 4	—	—	—
Shizuoka		3·7	232	1 1a	+ 1	1 45	0	—	—	—
Toyama		3·9	262	1 0k	− 2	—	—	—	—	—
Wazima		4·1	272	1 3	− 2	—	—	—	—	—
Gihu		4·6	247	1 16k	+ 4	2 22	S*	—	—	—
Nagoya		4·6	243	1 14a	+ 2	2 6	− 1	—	—	—
Mori		4·9	347	1 20	+ 3	2 29	S*	—	—	—
Hikone		5·1	247	1 17a	− 3	—	—	—	—	—
Kameyama		5·1	242	1 30a	P*	—	—	—	—	—
Kyoto		5·5	247	1 25	0	2 53	S_g	—	—	—
Owase		5·7	237	1 29	+ 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sapporo		5·8	356	1 38	+ 9	2 39	+ 1	—	—	—
Osaka		5·9	245	1 32	+ 1	2 40	0	—	—	—
Toyooka		6·0	255	1 32	0	3 6	S_g	—	—	—
Kobe		6·1	246	1 36	+ 2	2 44	− 1	—	—	—
Siomisaki		6·4	234	1 37	− 1	2 49	− 4	—	—	—
Sumoto		6·5	245	1 38	− 1	2 45	−10	—	—	—
Nemuro		6·6	24	1 41	0	2 48	−10	—	—	—
Koti		7·9	244	1 59	0	3 22	− 8	—	—	—
Hirosima		8·3	252	2 13	+ 9	3 44	+ 4	—	—	—
Hamada		8·4	256	2 8	+ 2	3 51	+ 8	—	—	—
Hukuoka		10·1	152	2 30k	+ 2	4 46	SSS	—	—	—
Miyazaki		10·2	241	2 30	− 1	4 26	− 1	—	—	—
Kumamoto		10·3	247	2 36	+ 4	5 2	+32	—	—	—
Klyuchi		22·8	27	e 5 17	+12	—	—	—	—	—
Irkutsk		30·3	313	6 11	− 4	11 15?	0	—	—	—
Calcutta	E.	48·2	269	e 8 40	− 4	i 15 36	− 7	i 10 31	PP	22·4
College		48·6	32	e 8 47	0	i 15 46	− 3	e 10 42	PP	e 20·3
Almata		48·9	299	8 48	− 2	—	—	—	—	—
Frunse		50·6	299	e 9 1	− 1	—	—	—	—	—
Murgab		52·6	294	9 16	− 2	16 42	− 2	—	—	—
Dehra Dun	N.	52·7	283	e 14 44?	?	—	—	e 23 38?	Q	e 30·3
Andijan		52·9	294	e 9 18	− 2	16 46	− 2	—	—	—
Honolulu		54·0	89	—	—	e 17 4	+ 1	e 21 10	SS	e 22·5
New Delhi		54·1	281	i 9 24	− 5	i 16 51	−14	e 19 29	S_cS	—
Batavia		54·3	226	i 9 29k	− 1	i 17 13	+ 6	—	—	—
Tashkent		54·9	299	i 9 32	− 3	i 17 5	−11	—	—	—
Sverdlovsk		55·3	319	i 9 34	− 4	i 17 14	− 7	i 9 46	pP	—
Obi-garm		55·6	297	i 9 35	− 5	i 17 13	−12	9 47	pP	—
Sitka		55·7	41	e 9 42	+ 2	e 17 31	+ 5	e 11 52	PP	e 23·6
Kulyab		55·8	295	i 9 39	− 2	i 17 23	− 5	—	—	—
Stalinabad		56·3	297	i 9 44?	− 1	i 17 22?	−12	—	—	—
Samarkand		57·1	298	9 44	− 6	—	—	—	—	—
Hyderabad	N.	58·8	270	e 9 55	− 7	e 17 51	−16	12 5	PP	29·0
Poona		61·8	273	i 10 19	− 4	18 38	− 8	12 24	PP	—
Bombay		62·4	274	e 10 24	− 3	e 18 48	− 5	i 19 15	PPS	29·1
Kodaikanal	E.	63·6	264	i 10 22	−13	e 18 52	−16	—	—	30·3
Ashkabad		63·9	300	e 10 33	− 4	—	—	—	—	—
Brisbane		65·3	170	i 10 44	− 2	i 19 26	− 3	—	—	—
Victoria	Z.	65·9	47	e 10 48	− 2	—	—	—	—	—
Moscow		67·3	324	10 56	− 3	19 47	− 7	11 9	pP	—
Grozny		69·6	310	e 11 10	− 3	e 20 36	PS	—	—	—
Helsinki		70·1	333	e 11 14	− 2	e 20 24	− 3	e 21 8	PPS	e 33·9
Shasta Dam		70·6	53	e 11 19	0	e 20 32	− 1	—	—	—
Piatigorsk		70·8	312	11 16	− 4	20 51	PS	—	—	—
Ukiah		70·9	55	e 11 27	+ 6	i 20 37	+ 1	—	—	e 29·5
Tiflis		71·0	309	e 11 28?	+ 6	e 20 28?	− 9	—	—	—
Mineral	Z.	71·3	54	e 11 23k	0	—	—	—	—	—
Hungry Horse		71·3	44	e 11 24	+ 1	e 20 38	− 3	e 39 2	P'P'	—
Riverview		71·3	172	11 23	0	i 20 20	−21	i 11 35	pP	33·1
Scoresby Sund		71·9	355	i 11 26a	− 1	i 20 45	− 3	i 14 7	PP	—
Berkeley		72·2	56	e 11 29a	0	i 20 52	+ 1	i 21 34	PPS	e 30·0
Branner	Z.	72·5	56	e 11 31	+ 1	—	—	—	—	—
Santa Clara		72·7	56	e 11 41	PcP	e 20 59	+ 2	i 12 15	pP	e 33·4
Saskatoon		72·8	37	e 16 12	PPP	i 20 57	− 1	e 19 42	?	—
Lick	Z.	72·9	56	e 11 33	0	—	—	i 14 30	PP	—
Reno		72·9	54	e 11 33	0	e 20 58	− 1	—	—	—
Upsala		72·9	335	11 29a	− 4	i 20 48	−11	14 9	PP	e 33·9
Sotchi		73·1	313	e 11 33	− 1	—	—	—	—	—
Bozeman		74·5	44	11 58	PcP	e 21 14	− 3	e 26 4	SS	e 30·1
Fresno	N.	74·5	55	e 11 44	+ 2	e 21 24	+ 7	e 21 54	PS	—
Theodosia		74·7	316	e 11 40	− 3	—	—	—	—	—
Tinemaha	Z.	75·2	56	e 11 47	+ 1	—	—	i 11 58	pP	—
Yalta		75·7	316	i 11 46	− 3	21 24	− 6	—	—	—
Bergen	N.	76·4	340	—	—	e 21 56?	PS	—	—	e 36·9
Logan		76·5	47	e 11 52	− 2	e 21 47	+ 8	e 14 17	PP	e 30·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pasadena		77·0	58	i 11 57a	+ 1	i 21 42	− 3	i 12 5	pP	e 31·8
Salt Lake City		77·1	48	e 12 2	+ 5	i 21 45	− 1	e 24 57	?	e 33·3
Riverside	Z.	77·7	58	i 12 1	+ 1	—	—	i 12 9	pP	—
Copenhagen		77·9	335	i 11 59	− 2	i 21 48	− 6	14 55	PP	35·9
Boulder City		78·1	54	e 12 4	+ 2	e 21 58	+ 2	—	—	—
Palomar		78·4	58	i 12 4	0	i 21 59	− 1	i 12 15	pP	—
Skalnate Pleso		79·6	326	e 12 5	− 5	e 22 3	− 9	—	—	—
Auckland	N.	79·8	154	—	—	22 8	− 6	—	—	38·9
Raciborzu		79·9	328	e 12 7?	− 5	e 22 25	+ 9	e 15 42	PP	—
Bucharest		80·1	319	e 12 12	− 1	e 22 15	− 3	e 22 37	S_cS	40·9
Potsdam		80·2	332	i 12 12	− 2	—	—	i 15 14	PP	e 40·9
Istanbul		80·8	315	i 12 14	− 3	i 23 15	PS	—	—	—
Aberdeen	E.	81·1	342	e 12 47	+29	i 22 46	+18	i 35 35	Q	e 39·2
Collmberg		81·1	330	e 12 16	− 2	e 22 20	− 8	e 15 22	PP	e 42·3
Arapuni	E.	81·2	154	—	—	22 26	− 3	—	—	39·9
Budapest		81·4	325	e 12 6	−14	e 22 27	− 4	27 51	SS	42·9
Ksara		81·4	306	i 12 19a	− 1	22 40?	+ 9	—	—	—
Ogyalla		81·5	326	i 12 22	+ 1	22 28	− 4	—	—	—
Prague		81·5	329	i 12 19	− 2	i 22 26	− 6	—	—	—
Jena		81·9	331	e 12 20	− 3	e 22 26	−10	—	—	e 41·9
Kalossa		82·2	325	e 12 38	P_cP	—	—	—	—	—
Belgrade		82·7	322	e 12 27k	0	e 22 41	− 3	e 15 41	PP	e 44·7
Durham		83·1	340	—	—	e 23 8	S_cS	—	—	—
Tucson		83·1	55	e 12 29	0	e 22 46	− 2	e 15 51	PP	e 38·4
De Bilt		83·3	335	i 12 29a	− 1	i 22 46	− 4	e 15 41	PP	e 38·9
Wellington		83·8	156	—	—	22 46	− 9	28 20	SS	39·0
Zagreb		84·1	326	e 12 32	− 2	e 22 52	− 6	—	—	e 44·9
Stuttgart		84·6	331	i 12 35a	− 1	e 22 58	− 5	i 12 48k	pP	e 41·9
Christchurch		85·1	158	12 51	P_cP	23 6	− 2	24 6	PS	39·1
Triest		85·2	327	e 12 45?	+ 6	i 23 2	[0]	i 15 58?	PP	e 40·9
Strasbourg		85·3	332	e 12 38a	− 2	i 23 6	[+ 3]	i 12 52	pP	e 43·4
Kew		85·6	337	e 12 39	− 2	e 23 10	[+ 5]	e 16 4	PP	e 36·9
Rathfarnham Castle		85·7	342	e 12 39	− 3	e 23 29	+15	—	—	—
Chur		86·0	330	e 12 41	− 2	—	—	—	—	e 45·4
Zürich		86·0	331	e 12 41a	− 2	e 23 12	[+ 5]	e 16 12	PP	—
Basle		86·2	331	e 12 49a	+ 5	e 23 13	[+ 4]	e 16 24	PP	—
Salo		86·6	329	e 12 43	− 3	e 23 8	[− 3]	e 12 57	pP	—
Neuchatel		86·9	331	e 12 53	+ 5	—	—	—	—	—
Helwan		86·9	306	i 12 44a	− 4	23 17	[+ 4]	i 16 11	PP	—
Padova		86·9	327	e 12 43	− 5	23 12	[− 1]	16 12	PP	—
Paris		87·0	335	i 12 47	− 1	e 23 28	+ 1	i 13 1	pP	e 42·9
Besançon		87·1	332	e 12 46	− 3	—	—	e 13 0	pP	—
Bologna		87·2	327	e 12 48	− 1	e 23 27	− 1	e 23 52	S	—
Florence Arc.		87·8	327	e 12 48	− 4	e 23 26	{ 0}	e 13 3	pP	—
Florence Xim		87·8	327	e 12 49	− 3	i 23 39	+ 5	—	—	—
Lubbock		87·8	49	12 58	+ 6	—	—	—	—	—
Prato		87·8	327	e 12 56	+ 4	i 23 27	{+ 1}	—	—	—
Jersey	E.	88·2	339	—	—	e 23 36	− 2	e 29 39	SS	49·9
Rome		88·7	325	i 12 55a	− 2	e 23 34	{+ 2}	e 13 8	pP	e 43·5
Chicago		89·2	36	—	—	e 23 31	[+ 3]	e 29 32	SS	e 35·5
Clermont-Ferrand		89·4	333	i 12 59	− 1	i 23 48	− 1	i 13 16	pP	43·4
St. Louis		90·4	39	i 13 4	0	i 23 30	[− 5]	i 13 14	pP	—
Ottawa		90·9	25	e 13 5	− 2	e 23 56	− 7	—	—	e 46·9
Seven Falls	E.	91·0	21	e 13 11	+ 4	e 23 59	− 4	—	—	e 35·9
Cleveland		92·1	31	e 13 13	+ 1	i 24 13	0	e 30 29	SS	—
Tortosa	E.	94·3	331	—	—	25 58	PS	—	—	e 47·9
City College, N.Y.		94·6	26	—	—	e 23 58	[− 1]	e 26 18	PS	e 43·9
Harvard		94·9	24	—	—	e 25 36	PS	e 51 26	Q	e 54·9
Weston		95·1	24	e 13 27	+ 1	e 24 35	− 4	e 31 6	SS	—
Philadelphia		95·9	27	—	—	e 24 1	[− 5]	e 31 20	SS	e 38·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Toledo		97·1	335	i 13 34	− 1	—	—	e 17 29	PP	47·0
Alicante		97·2	331	e 13 33	− 3	e 25 12	+15	e 17 56	PP	e 46·9
Almeria		99·2	331	e 13 40	− 5	25 5	− 9	17 41	PP	50·2
Granada		99·4	333	e 13 29k	−17	24 42	{− 8}	17 48	PP	54·5
Malaga	Z.	100·0	333	i 13 46	− 2	—	—	i 17 52	PP	52·1
Bermuda		106·3	23	—	—	e 26 16	+ 3	—	—	e 50·8
Tamanrasset	Z.	107·5	318	e 17 40	?	e 28 27	PS	i 18 47k	PP	e 51·9
Bogota		126·5	46	e 19 20	[+15]	e 22 29	PKS	—	—	63·9
Huancayo		138·2	63	e 19 30	[+ 3]	e 40 36	SS	e 22 44	PP	e 58·1
La Paz		146·3	59	i 19 44a	[+ 3]	—	—	20 0	PKP_2	69·9
La Plata	E.	163·7	87	—	—	—	—	66 14	Q	83·6
	N.	163·7	87	—	—	—	—	65 56	Q	96·9

Additional readings :—
Calcutta iSSE =19m.17s., iSSSE =20m.13s.
College i =8m.54s. and 9m.32s., ePcP =9m.58s., eS =15m.35s., iScS =18m.34s.
Sitka ePPP? =13m.40s., iS =17m.41s., e =19m.4s., iScS =19m.28s., eSS =21m.18s.
Hyderabad PSN =18m.9s.
Poona S?N =18m.23s. and 18m.35s., PPSEN =18m.50s., ScSE =20m.20s., SSE = 22m.38s., SSN =22m.43s.
Kodaikanal ScSE =19m.2s., SSE =22m.50s.
Brisbane iZ =11m.40s., eSKSN =20m.35s., iSKSE =20m.41s.
Moscow sS =20m.10s.
Helsinki e =11m.28s. and 20m.44s.
Mineral iZ =11m.29s. and 11m.32s.
Riverview eQE =30m.14s.
Scoresby Sund 21m.10s., SS =25m.20s.
Berkeley iPZ =11m.36s., iE =11m.40s., iZ =12m.12s., and 12m.43s.
Santa Clara isSE =21m.44s.
Lick iZ =11m.43s.s
Reno iN =11m.41s., eEN =11m.44s., eSN =20m.49s.
Upsala ipP?N =11m.42s., ePPPN =15m.56s., SSN =25m.13s., SSE =25m.18s., eSSS?N =28m.56s.
Fresno eN =11m.54s.
Tinemaha iPPZ =15m.13s.
Logan i =12m.1s., e =15m.2s.
Pasadena ePP =14m.58s., eZ =22m.18s., eSSS =30m.20s.
Riverside eZ =14m.44s.
Copenhagen i =12m.12s., 22m.11s., and 27m.56s.
Palomar iNZ =12m.30s., iZ =14m.44s. and 15m.11s., eE =21m.12s., eN =22m.22s.
Aberdeen iE =22m.11s.
Collmberg eE =12m.19s., epP?NZ =12m.30s., esP?E =12m.33s., eZ =12m.39s., 13m.6s., and 13m.57s., eE =16m.40s., ePPP?E =17m.28s., eE =22m.38s.
Budapest PE =12m.18s., eN =28m.56s.?
Jena eN =12m.24s., eS?N =22m.18s.
Belgrade eSS =28m.12s.
Tucson i =12m.39s., e =15m.26s., eScS? =23m.4s., e =23m.50s. and 24m.21s., eSS? = 27m.38s., eSSS =32m.18s., ePKP,PKP =39m.2s.
De Bilt ePPP =17m.2s., eSS =27m.56s.
Wellington PS =23m.12s., SSS =31m.56s.?
Stuttgart eZ =13m.5s. and 13m.48s., ePP =15m.44s., ePPP =17m.50s., eScS? =23m.21s., eSS =28m.44s.
Christchurch iZ =13m.37s., SS =28m.42s., SSS =32m.31s., QEN =35m.32s.
Triest ePPP =18m.2s., iS =23m.25s., iPS =24m.17s.
Strasbourg e =12m.42s. and 14m.9s., ePP =16m.0s., e =16m.18s. and 17m.16s., ePPP = 17m.54s. and 17m.58s., iS =23m.18s., e =23m.26s., esS? =23m.57s., ePS =24m.18s., ePPS? =25m.6s., e =26m.38s., eSS =28m.56s., eSSS? =33m.4s.
Kew ePPP =17m.56s., eSEN =23m.33s., ePSZ =24m.3s., eSS =29m.10s., e =32m.17s.
Zürich ePS =24m.3s.
Salo eS =23m.32s.
Helwan eZ =14m.0s., SNZ =23m.35s.
Padova SKKS? =23m.30s., ePS? =24m.26s.
Paris e =13m.9s., 13m.15s., 14m.43s., and 14m.52s., ePP =16m.14s., ePPP =18m.6s., ePS =24m.23s., eSSS =32m.20s., e =35m.20s.
Besançon e =13m.10s. and 13m.19s.
Florence Arc. eZ =13m.56s., ePSN =24m.28s.
Rome iPPZ =16m.25s., eSN =23m.40s., ePSN =24m.41s.?, eSSN =30m.7s.?, eSSSN = 33m.35s.
Clermont-Ferrand iPP =16m.34s., ePPP =18m.29s., iS =24m.16s., isS =24m.48s., iPS = 25m.16s., eSS =30m.1s., eSSS =33m.37s., Q =37·9m.
St. Louis iSKKS =23m.54s., iS =24m.7s.
Cleveland eZ =13m.23s., iSKKSE =24m.9s., eSN =24m.29s., iSE =24m,34s., eSSN = 30m.47s.
City College N.Y. eSS =30m.54s.

Continued on next page,

Toledo eZ =14m.54s.
Alicante PPP =19m.53s., PS =26m.50s., PPS =27m.26s., SS =31m.50s., SSS =35m.42s., Q =40m.6s.
Almeria PPP =19m.49s., SKKS =24m.39s., PS =26m.33s., SS =31m.53s.
Granada PS =27m.0s., iSS =32m.54s., SSS =35m.42s.
Malaga eZ =15m.6s.
Tamanrasset iZ =18m.54s., ePPPZ =21m.3s., eSSS?Z =39m.15s.
Huancayo e =22m.59s., ePKS =24m.9s., ePPS =35m.11s., eSSS =45m.7s.
La Paz iPPZ =23m.36s.
Long waves were also recorded at Barcelona, Lisbon, Ivigtut, Columbia, and Galera-zamba.

May 21d. Readings also at 0h. (Santa Lucia), 2h. (Tashkent, near Kulyab, and Stalinabad), 3h. (Overton and near Murgab), 4h. (Overton), 5h. (Boulder City, Hungry Horse, Overton, Pierce Ferry, Tucson, Mount Wilson, Palomar, Tinemaha, Bogota, La Paz and near Huancayo), 7h. (Overton), 8h. (College), 9h. (Overton), 10h. (College, Overton, Helwan, Ksara, near Ashkabad, and near Klyuchi (5)), 11h. (Strasbourg, near Klyuchi (9), near Stalinabad, Kulyab, and Murgab), 12h. (near Tacubaya (3)), 13h. (Overton, near Helwan and near Klyuchi), 14h. (Huancayo), 16h. (Ashkabad), 18h. (Ksara), 21h. (Overton), 22h. (near Ottawa), 23h. (Klyuchi, near Ashkabad, and near Batavia).

May 22d. 14h. 36m. 40s. Epicentre 38°·2N. 142°·0E. (as on 1949, April 30d.).

Intensity V at Tono (Iwate Pref.) ; IV at Miyako and Mito ; II-III at Isinomaki, Sendai, Huhusima, Onahama, Morioka, and Hatinohe. Epicentre 38°·4N. 142°·0E. Shallow. Macroseismic radius 200-300km.
Seismo. Bull. Cent. Met. Obs., Japan, 1949. Tokyo, 1950, p. 17, with macroseismic chart.

$A = -\cdot6208$, $B = +\cdot4850$, $C = +\cdot6159$; $\delta = -5$; $h = -1$;
$D = +\cdot616$, $E = +\cdot788$; $G = -\cdot485$, $H = +\cdot379$, $K = -\cdot788$.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Isinomaki		0·6	294	0 12k	− 3	0 19	− 7
Sendai		0·9	274	0 18k	− 2	0 29	− 5
Hukusima		1·3	250	0 24k	− 1	0 40	− 4
Mizusawa	E.	1·3	324	0 24	− 1	0 34	−10
Miyako		1·4	0	0 26	− 1	—	—
Onahama		1·5	215	0 26	− 2	0 46	− 3
Morioka		1·6	337	0 28	− 2	0 43	− 8
Akita		2·1	315	0 39	+ 2	1 4	0
Mito		2·2	214	0 39	+ 1	1 2	− 4
Hatinohe		2·3	351	0 39	− 1	1 6	− 3
Kakioka		2·4	216	0 42	+ 1	1 9	− 3
Utunomiya		2·4	226	0 42	+ 1	1 10	− 2
Tukubasan		2·5	217	0 43	0	1 12	− 2
Aomori		2·8	340	0 48	+ 1	1 26	+ 4
Kumagaya		2·9	225	0 55	+ 7	1 32	+ 8
Maebasi		3·0	232	0 51	+ 1	1 26	− 1
Tokyo		3·1	216	0 53	+ 2	1 25	− 4
Nagano		3·4	245	0 58	+ 3	—	—
Osima		4·0	212	1 5	+ 1	1 51	− 1
Mori		4·1	344	1 3	− 2	1 59	+ 4
Toyama		4·1	250	0 59	− 6	—	—
Shizuoka		4·4	223	1 32	+22	—	—
Kyoto		6·0	240	1 1	−31	—	—
Shasta Dam		70·0	54	e 11 25	+10	—	—
Hungry Horse		70·6	44	e 11 15	− 4	—	—
Overton	Z.	77·5	54	e 12 10	+11	—	—
Boulder City		77·6	55	e 12 12	+12	—	—
Pierce Ferry		78·0	54	i 12 13	+11	—	—
Collmberg	E.	80·3	332	e 12 8	− 6	—	—
Stuttgart	Z.	83·8	332	e 12 27	− 5	—	—

Additional readings :—
Hungry Horse i =11m.49s.
Collmberg eE =12m.19s.

May 22d. 15h. 25m. 36s. Epicentre 6°·7S. 81°·4W.

A = +·1485, B = −·9821, C = −·1159; δ = +1; h = +7;
D = −·989, E = −·150; G = −·017, H = +·115, K = −·993.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		8·0	132	e 1 57	− 3	e 3 37	+ 4	—	—	e 4·0
Bogota		13·4	33	e 3 13	− 1	e 6 18	+33	—	—	e 7·0
La Paz	z.	16·2	128	3 51	+ 1	—	—	—	—	—
Tucson		47·8	327	e 8 41	0	—	—	—	—	—
Palomar	z.	52·1	322	e 9 16	+ 2	—	—	—	—	—
Pierce Ferry		52·4	327	i 9 17	+ 1	—	—	—	—	—
Boulder City		52·8	327	e 9 20	+ 1	—	—	—	—	—
Riverside	z.	52·9	322	e 9 20	0	—	—	—	—	—
Overton	z.	53·0	327	i 9 21	0	—	—	—	—	—
Mount Wilson	z.	53·5	322	e 9 24	0	—	—	—	—	—
Tinemaha	z.	55·5	325	i 9 39	0	—	—	—	—	—
Hungry Horse		61·9	337	e 10 21	− 3	—	—	—	—	—

Palomar gives also iZ = 9m.34s.

May 22d. Readings also at 3h. (Mineral, Overton, Reno, near Berkeley (2), Branner (2), Lick (2), Fresno, Santa Clara, near Kulyab (2), Murgab (2), and Obi-garm (2)), 5h. (Overton (2) and Ashkabad (2)), 8h. (Overton, Mineral, Reno, Berkeley, Branner, Lick, near Fresno, and Santa Clara), 9h. (near Grozny), 10h. (Overton and near Mizusawa), 11h. (near Alicante), 14h. (College and Hungry Horse), 15h. (Wellington, Palomar, Tinemaha, Tucson, Overton, Shasta Dam, Ottawa, Samarkand, Tchimkent, near Andijan, Murgab, Kulyab, Obi-garm, and Stalinabad), 16h. (Puebla, Tacubaya (2), and Tucson), 17h. and 18h. (Overton), 19h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Logan, Salt Lake City, Hungry Horse, near Puebla, and Tacubaya), 20h. (Overton, and near Shasta Dam), 21h. (Christchurch, Kaimata, New Plymouth, Wellington, Tuai, Tucson, Boulder City, Overton (3), Pierce Ferry (2), Shasta Dam (2), Andijan, Kulyab, and Obi-garm), 22h. (San Juan and Overton), 23h. (Ksara, near Oaxaca, Puebla, Tacubaya, near Tucson (2), Boulder City, Overton (2), Pierce Ferry, Obi-garm, near Kulyab, Stalinabad, and near Ashkabad).

May 23d. 4h. 17m. 44s. Epicentre 31°·0S. 178°·5W. Depth of focus 0·020. (as on 1948, Aug. 20d.).

A = −·8584, B = −·0225, C = −·5125; δ = +1; h = +2;
D = −·026, E = +1·000; G = +·512, H = +·103, K = −·859.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Auckland	N.	8·1	222	2 1	+ 5	3 52	+26	2 11	pP	—
Tuai	N.	8·6	203	1 59	− 3	3 35	− 3	—	—	—
New Plymouth	E.	10·1	215	2 46	+24	—	—	—	—	—
Wellington		11·6	206	2 35	− 7	4 42	− 6	15 53	S_eS	—
Kaimata	N.E.	14·1	212	3 19	+ 5	5 38	− 8	—	—	—
Christchurch		14·4	207	—	—	5 46	− 7	—	—	7·4
Apia		18·2	23	e 3 52	−11	e 6 50	−28	e 5 10	PP	—
Brisbane		25·1	271	i 5 13a	+ 2	i 10 8	+46	i 5 50	pP	—
Riverview		25·7	255	i 5 21a	+ 4	e 9 42	+10	i 5 42	pP	12·2
Branner	z.	86·0	41	i 12 21a	− 2	—	—	—	—	—
Santa Clara		86·1	41	e 12 24	0	e 22 47	+ 4	e 12 40	pP	e 38·8
Pasadena		86·2	46	i 12 22a	− 2	—	—	i 12 37	pP	e 36·3
Berkeley		86·3	41	i 12 24a	− 1	e 22 56	+11	i 12 39	pP	e 39·3
Lick	z.	86·3	41	i 12 23a	− 2	—	—	i 12 39	pP	—
Palomar		86·5	47	i 12 25a	− 1	—	—	i 12 39	pP	—
Riverside		86·6	46	i 12 24a	− 2	—	—	i 12 37	pP	—
Fresno		87·0	43	i 12 26a	− 2	—	—	e 12 43	pP	—
Arcata	z.	87·4	37	i 12 28	− 2	—	—	i 12 43	pP	—
Tinemaha		88·1	44	i 12 32a	− 2	—	—	—	—	—
Shasta Dam		88·2	38	i 12 32	− 2	e 23 14	+11	i 12 53	pP	—
Mineral	z.	88·4	39	i 12 32a	− 3	e 23 25	+21	—	—	—
Reno		88·8	41	i 12 36a	− 1	e 23 25	+17	e 12 52	pP	—
Boulder City		89·5	46	i 12 39	− 1	e 23 8	− 7	e 38 25	P'P'	—
Tucson		89·9	50	i 12 40	− 2	e 24 35	PS	i 21 54	pP	e 40·7
Overton	z.	90·1	46	e 12 42	− 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pierce Ferry		90·1	47	i 12 42	− 1	e 23 33	+13	e 22 53	SKS	—
Tacubaya		91·1	68	e 12 52	+ 4	—	—	i 18 28	PP	—
Victoria	z.	93·2	32	e 12 53	− 4	—	—	—	—	—
Huancayo		94·9	107	e 13 8	+ 3	—	—	—	—	—
Logan		94·9	43	e 13 1	− 4	—	—	e 13 24	pP	—
Sitka		95·4	22	—	—	e 23 36	[+10]	—	—	e 46·8
Hungry Horse		97·8	37	e 13 14	− 4	e 24 14	−12	e 17 3	PP	—
La Paz	z.	98·2	114	e 13 40	+20	—	—	—	—	—
College		98·5	12	e 13 16	− 5	—	—	—	—	—
Irkutsk		106·7	320	—	—	e 24 31	[+10]	—	—	—
St. Louis		107·4	55	e 18 30	PP	e 24 36	[+12]	e 33 36	SS	—
San Juan		118·1	84	e 15 21	P	e 25 20	[+14]	e 19 45	PP	e 57·5
Ottawa	z.	119·8	52	e 18 30	[− 1]	—	—	—	—	—
City College, N.Y.		119·8	57	—	—	e 25 17	[+ 5]	e 37 12	sSS	e 78·2
Murgab		121·4	298	18 36	[+ 2]	—	—	—	—	—
Kulyab		124·4	296	e 18 42	[+ 2]	—	—	—	—	—
Stalinabad		125·3	297	e 18 43	[+ 1]	—	—	—	—	—
Tashkent		125·6	300	e 18 54	[+12]	e 25 37	[+ 7]	e 20 33	PP	—
Sverdlovsk		132·1	319	i 18 56	[+ 1]	i 22 22	PKS	—	—	—
Scoresby Sund		138·4	12	—	—	22 44	PKS	—	—	66·3
Tiflis		143·9	298	i 19 15	[− 1]	—	—	—	—	—
Erevan		144·1	296	e 19 40?	[+23]	—	—	—	—	—
Leninakan		144·6	297	19 19	[+ 1]	—	—	—	—	—
Moscow		144·6	323	e 19 14	[− 4]	—	—	—	—	—
Theodosia		150·1	307	e 19 34	[+ 8]	—	—	—	—	—
Ksara		150·9	282	e 19 30?	[+ 3]	—	—	23 11	PP	—
Yalta		151·1	306	19 28	[0]	—	—	—	—	—
Copenhagen		154·1	346	e 19 33	[+ 1]	—	—	i 19 56	pPKP	—
Helwan	z.	154·3	274	19 35	[+ 3]	—	—	22 22	PP	—
Istanbul		155·6	302	19 34	[0]	—	—	—	—	—
Potsdam	z.	157·0	342	e 19 35	[− 1]	—	—	—	—	e 78·3
Collmberg	z.	158·0	340	e 19 37	[0]	—	—	—	—	—
Prague		158·6	336	e 20 35	PKP_2	31 51	?	—	—	—
De Bilt		158·7	353	e 19 40	[+ 2]	e 34 16?	SS	e 23 48	PP	e 72·3
Kew		159·5	2	e 19 39	[0]	e 29 43	SKKS	—	—	e 77·3
Stuttgart		161·3	343	e 19 41a	[0]	e 30 34	SKKS	e 19 56	pPKP	e 79·3
Strasbourg		161·8	346	i 19 42k	[+ 1]	—	—	e 19 56	pPKP	e 80·3
Paris		162·2	357	i 19 43	[+ 1]	—	—	i 20 10	sPKP	e 79·3
Basle		162·8	346	e 19 42	[0]	—	—	—	—	—
Zürich		162·8	344	e 19 42	[0]	—	—	—	—	—
Chur		163·0	341	e 19 41	[− 2]	—	—	—	—	—
Besançon		163·4	348	e 19 45	[+ 2]	—	—	e 20 0	pPKP	—
Clermont-Ferrand		165·2	356	i 19 48	[+ 3]	—	—	i 20 43	PKP_2	82·3
Rome		166·0	323	e 19 46a	[+ 1]	e 44 36?	SS	e 20 44	PKP_2	—
Toledo	z.	170·1	25	i 19 51	[+ 3]	—	—	i 20 8	pPKP	—
Tamanrasset	z.	171·1	205	i 19 52	[+ 4]	e 52 16?	SSS	i 20 9	pPKP	86·3
Alicante		172·5	12	20 11	[+22]	23 42	PKS	21 47	PKP_2	e 78·1
Granada		172·5	33	i 20 12a	[+23]	i 31 52	SKKS	21 16	PKP_2	84·6
Malaga	z.	172·5	39	i 19 49	[0]	—	—	i 21 12	PKP_2	82·3
Almeria		173·3	28	i 19 52	[+ 2]	26 48	[+13]	21 16	PKP_2	86·6

Additional readings :—
Auckland iN =2m.43s.
Wellington i =13m.12s.
Christchurch S =6m.4s.
Brisbane iZ =6m.55s. and 8m.7s.
Riverview iZ =5m.47s., iE =5m.51s. and 6m.2s., iZ =6m.53s. and 10m.19s.
Santa Clara esSE =23m.28s.
Pasadena isPZ =12m.46s., ePPZ =16m.0s.
Berkeley ePEN =12m.35s., iZ =12m.48s., eE =23m.0s.
Palomar isPZ =12m.45s.
Shasta Dam esS? =23m.45s.
Reno eN =12m.59s. and 14m.4s., eE =14m.11s., eSE =23m.29s.
Tucson ePP =16m.10s., e =34m.49s.
Tacubaya e =26m.58s. and 27m.20s., ePSPS =30m.32s., e =31m.6s.
Logan ePP? =16m.28s.
Sitka e =24m.45s. and 25m.58s.

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Hungry Horse eSKS =23m.46s.
St. Louis epPP? =18m.43s., e =29m.41s.
San Juan eSP =29m.3s., ePS =29m.29s., eSS =35m.50s.
Tashkent eSKKS =27m.28s., eSKSP =30m.24s.
Helwan eZ =19m.58s., eE =20m.28s.
Collmberg eZ =19m.50s., eE =19m.56s., eZ =20m.10s., eE =20m.18s.
Kew eEN =44m.27s. and 48m.39s.
Stuttgart ePPZ =24m.4s.
Strasbourg e =20m.16s., ePKP$_2$ =20m.27s. and 20m.33s., e =21m.48s., ePP =24m.0s., e =25m.19s.
Paris iPKP$_2$ =20m.29s., ePP =24m.11s., 24m.19s., and 24m.28s.
Besançon ePKP$_2$ =20m.33s.
Clermont-Ferrand iPP =24m.30s.
Rome ePPZ =24m.28s., eSSSE =51m.38s.?
Toledo iPKP$_2$Z =21m.5s., ePPZ =24m.53s., eZ =34m.3s.
Tamanrasset iPKP$_2$Z =21m.15s., ePPZ =25m.2s., eZ =28m.26s., ePPPZ =29m.14s., Q =71·3m.
Alicante PPS =39m.22s.
Granada pPKP$_2$ =21m.34s., iPP =25m.1s., PPP =29m.15s., SKSP =35m.43s., SS =46m.40s., SSS =53m.4s.
Malaga iPPZ =25m.4s., ePPPZ =29m.18s.
Almeria PKS =23m.18s., PP =25m.4s., PPP =29m.8s., SKKS =31m.46s., SKSP =35m.18s., PPS =38m.58s., SS =46m.0s., SSS =52m.48s.
Long waves were also recorded at Arapuni, Seven Falls, Weston, and Jersey.

May 23d. Readings also at 0h. (Istanbul, Overton, and Tacubaya), 1h. (near Tucson, Boulder City, Overton (2), and Pierce Ferry), 2h. (Collmberg, Salo, near Chur, and Zürich), 5h. (Brisbane, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Ottawa, Tamanrasset, and near Reykjavik (3)), 6h. (Hungry Horse, College, Besançon, Rome, Stuttgart, Belgrade, Helwan, Ksara, and near Istanbul), 7h. (Overton and near Murgab), 8h. (Overton), 9h. (Auckland, Wellington, and Ottawa), 11h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Ottawa, La Paz, near Oaxaca, Puebla, Tacubaya, and near Bogota), 12h. (Tinemaha, Tucson (2), Overton, and Pierce Ferry), 15h. (near Pavia), 16h. (Istanbul, Ksara, Paris, and near Mizusawa), 17h. (Pierce Ferry), 18h. (near Andijan and near Tucson), 19h. (Boulder City, Overton, Pierce Ferry, and near Tucson), 22h. (Auckland, Wellington, Brisbane, and near Askhabad), 23h. (Riverview, Overton, and Helwan).

May 24d. 2h. Tonga.

Apia P =31m.3s., eS =32m.51s., eL =33m.
Tuai eN =34m.53s.
Riverview ePN? =35m.18s., eS?E =40m.9s., eLE =42·3m.
Arapuni S?E =35m.48s.
Lick ePZ =40m.37s.
Palomar iPZ =40m.37s.
Pasadena iPZ =40m.37s., iZ =40m.50s., eLN =62m.
Riverside iPZ =40m.38s., iZ =40m.53s.
Fresno iPN =40m.41s., iN =41m.11s.
Mineral ePZ =40m.45s.
Shasta Dam eP =40m.45s.
Reno ePEZ =40m.45s., eN =40m.55s., eEZ =41m.12s., eN =41m.53s.
Tinemaha iPZ =40m.47s., iZ =40m.59s.
Boulder City eP =40m.55s.
Overton iPZ =40m.57s.
Pierce Ferry iP =40m.58s.
Tucson eP =40m.58s., ePP =44m.14s., eS =50m.54s., eSS =56m.15s., eSSS? =60m.15s., eL =69m.32s.
Victoria e =41m.9s., L =73m.
Logan eP =41m.19s., eL =72m.54s.
Hungry Horse eP? =41m.30s.
La Paz eP? =44m.40s., e =46m.6s.
Ksara ePKP =47m.54s., e =48m.11s., PP =51m.45s.?
Helwan eZ =48m.2s., 48m.45s., and 50m.9s.
Copenhagen eP =48m.15s., e =51m.52s., iL =110·0m.
Istanbul eP =48m.20s.
Potsdam eZ =48m.20s., eLZ =64m.
Stuttgart ePKP?Z =48m.23s., ePP?Z =52m.23s., eQ =118m.
Collmberg eEZ =48m.25s., eE =48m.36s., eZ =48m.45s.
Strasbourg ePKP =48m.26s., e =48m.38s., and 49m.24s., ePP =52m.28s., ePPP =56m.8s.
Paris ePKP =48m.26s., ePKP$_2$ =48m.50s.
Jena eEN =48m.27s.

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Toledo e =48m.32s. and 49m.37s.
Tamanrasset PKPZ =48m.41s., ePKP$_2$Z =50m.30s., ePPZ =54m.30s., Z =57m.29s.
Malaga ePKPZ =48m.44s., iPKP$_2$Z =49m.44s., iPPZ =53m.31s., SKSZ =55m.54s., SKKS =60m.22s., LZ =57m.8s.
Rome ePKPN =49m.9s., ePPN =52m.57s., eSSE =73m.15s.
Clermont-Ferrand ePKP$_2$? =49m.16s., R =114m.
Berkeley eN =50m.45s., eE =50m.59s., eN =64m.36s., cE =64m.42s.
Jersey E =51m., eE =78m.
Scoresby Sund 51m.9s., L =102m.
Sitka eS =52m.5s., eL =67m.42s.
Granada i =73m.56s., iSS =84m.3s., L =112·5m.
Long waves were also recorded at Auckland, Wellington, Bermuda, Huancayo, Bogota, and other American and European stations.

May 24d. 16h. 20m. 7s. Epicentre 17°·8N. 105°·5W. (as on 1949, Feb. 18d.).

A = −·2546, B = −·9181, C = +·3038; δ = +2; h = +5;
D = −·964, E = +·267; G = −·081, H = −·293, K = −·953.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Manzanillo		1·7	42	0 33	+ 2	—	—	—	—	—
Tacubaya		6·2	74	1 40	+ 5	e 2 51	+ 3	3 7	S*	—
Puebla		7·0	77	1 56	+10	c 3 15	+ 7	—	—	—
Oaxaca		8·4	94	i 3 14	?	—	—	—	—	—
Tucson		15·2	342	i 3 35	− 3	c 6 25	− 3	i 4 11	pP	e 7·2
Lubbock		16·1	11	3 51	+ 2	—	—	—	—	c 8·4
Palomar		18·5	330	i 4 17	− 2	—	—	—	—	—
Riverside		19·3	329	i 4 27	− 2	—	—	—	—	—
Pierce Ferry		19·7	340	i 4 32	− 2	e 8 20	+10	—	—	—
Pasadena		19·8	329	i 4 32	− 3	i 8 16	+ 3	—	—	—
Boulder City		19·9	338	e 4 33	− 3	e 8 23	+ 8	—	—	—
Overton	z.	20·3	339	e 4 37	− 3	—	—	—	—	—
Tinemaha		22·2	333	i 4 52	− 8	—	—	—	—	—
Fresno	z.	22·7	330	i 5 6	+ 2	—	—	—	—	—
Salt Lake City		23·5	348	e 5 12	0	e 9 26	+ 3	—	—	e 12·1
Lick	z.	24·1	328	e 5 17	− 1	—	—	—	—	—
Lincoln	E.	24·2	16	—	—	e 9 43	+ 8	—	—	e 12·4
Santa Clara		24·3	328	e 5 19	− 1	e 9 51	+14	e 5 57	PP	e 12·6
Logan		24·5	349	e 5 13	− 9	e 9 45	+ 5	—	—	e 12·2
St. Louis		24·7	29	i 5 25	+ 1	i 9 53	+ 9	—	—	—
Berkeley		24·8	328	e 5 26	+ 1	e 9 50	+ 4	—	—	e 12·6
Reno		25·0	334	e 5 25	− 2	—	—	e 6 19	PP	e 13·7
Rapid City	E.	26·3	4	e 5 45	+ 6	e 10 28	+17	e 6 38	PP	e 13·4
Mineral	z.	26·4	332	i 5 38a	− 2	—	—	—	—	e 17·0
Shasta Dam		27·1	332	i 5 41	− 5	—	—	—	—	—
Bozeman		28·2	353	e 8 35	?	e 11 1	+20	—	—	e 13·4
Chicago		28·4	27	—	—	e 10 53	+ 8	—	—	e 14·4
Butte	N.	28·7	350	—	—	e 10 57	+ 7	—	—	e 15·6
Cleveland		31·3	36	i 6 25	+ 1	e 11 37	+ 6	i 7 10	PP	—
Hungry Horse		31·3	350	e 6 21	− 3	—	—	—	—	—
Philadelphia		34·3	44	e 7 0	+10	e 12 23	+ 6	—	—	c 14·8
Saskatoon		34·3	359	—	—	e 12 20	+ 3	e 15 0	SS	17·9
City College, N.Y.		35·5	43	e 7 1	+ 1	e 12 48	+12	—	—	—
Ottawa		37·0	35	e 7 12	− 1	—	—	—	—	20·1
Weston		38·0	42	—	—	—	—	e 18 39	Q	e 21·2
Sitka		45·5	338	—	—	e 15 7	+ 2	—	—	e 18·6
La Paz		50·2	130	9 5	+ 5	e 16 33	+22	—	—	25·9
College		54·9	340	e 9 29	− 6	—	—	—	—	e 29·2
Granada		88·5	52	i 13 5a	+ 9	23 35	− 6	—	—	47·9
Almeria		89·5	52	12 57	− 3	23 47	− 3	23 23	SKS	48·9
Strasbourg		91·3	38	—	—	e 22 49	[−51]	e 29 33	SS	—
Stuttgart		92·0	37	e 13 28	+16	—	—	—	—	e 49·9
Triest		96·3	38	—	—	e 24 7	[− 1]	e 26 12	PS	—
Istanbul		107·9	34	—	—	e 27 52	PS	—	—	—
Ksara		116·8	36	e 19 22?	PP	e 28 48	PS	—	—	—

For Notes see next page.

NOTES TO MAY 24d. 16h. 20m. 7s.

Additional readings :—
Pierce Ferry i = 5m.41s.
Pasadena iZ = 5m.6s., eZ = 5m.31s.
Santa Clara esSE = 10m.36s.
Berkeley eN = 9m.54s., iN = 10m.43s.
Bozeman e = 10m.3s.
Cleveland iPPN = 7m.13s., eN = 7m.21s.
Almeria SSS = 33m.19s.
Strasbourg e = 29m.53s.?.
Long waves were also recorded at Scoresby Sund, other American and European stations.

May 24d. 18h. 59m. 18s. Epicentre 37°·3N. 142°·0E. (as on 21d.).

Intensity VI at Iwaizawa ; V at Shioyazaki (both Hukusima Pref.) ; IV at Hukusima, Utunomiya, Shirakawa, Mito Tukubasan, Kakioka, Inawashiro, Yokohama ; II-III at Isinomaki, Sendai, Yamagata, Kumagata, Tokyo, Mivako, Maebasi, Morioka, Titibu, Oiwake, Ito, and Kohu. Epicentre 37°·3N. 141°·9E. shallow. Macroseismic radius > 300km.

Seismo. Bull. Cent. Met. Obs., Japan for 1949. Tokyo, 1950, p. 18, with macroseismic chart.

A = −·6284, B = +·4910, C = +·6034 ; δ = +6 ; h = −1 ;
D = +·616, E = +·788 ; G = −·476, H = +·372, K = −·797.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Onahama		1·0	247	0 20k	− 1	0 28	− 8	—	—	—
Hukusima		1·3	290	0 25k	0	0 39	− 5	—	—	—
Sendai		1·3	318	0 26	+ 1	0 39	− 5	—	—	—
Mito		1·5	233	0 28a	0	0 45	− 4	—	—	—
Kakioka		1·8	234	0 32	0	0 49	− 7	—	—	—
Tukubasan		1·8	235	0 32k	0	0 51	− 5	—	—	—
Mizusawa	E.	2·0	340	0 39	+ 4	1 0	− 2	—	—	—
Miyako		2·3	0	0 42	+ 2	1 8	− 1	—	—	—
Kumagaya		2·4	241	0 36	− 5	1 5	− 7	—	—	—
Tokyo		2·4	228	0 40	− 1	1 5	− 7	—	—	—
Maebasi		2·5	249	0 43k	0	1 9	− 5	—	—	—
Morioka		2·5	345	0 43	0	1 15	+ 1	—	—	—
Yokohama		2·6	226	0 48a	+ 4	1 10	− 7	—	—	—
Akita		2·8	328	0 52	+ 5	1 35	+13	—	—	—
Matusiro		3·1	256	1 3	+12	1 49	+20	—	—	—
Nagano		3·1	258	0 50	− 1	1 32	+ 3	—	—	—
Hunatu		3·2	235	1 5	+13	1 54	+22	—	—	—
Osima		3·3	220	0 55	+ 2	1 30	− 5	—	—	—
Aomori		3·6	345	1 4	+ 6	1 56	+14	—	—	—
Shizuoka		3·7	232	1 0	0	1 45	0	—	—	—
Toyama		3·9	262	1 2	0	1 50	0	—	—	—
Omaesaki		4·1	249	1 9	+ 4	1 58	+ 3	—	—	—
Wazima		4·1	272	1 0	− 5	2 11	+16	—	—	—
Gihu		4·6	247	1 13	+ 1	2 21	+14	—	—	—
Nagoya		4·6	243	1 12	0	2 8	+ 1	—	—	—
Mori		4·9	347	1 27	+10	2 29	+14	—	—	—
Hikone		5·1	247	1 21	+ 1	2 20	0	—	—	—
Kameyama		5·1	242	1 14	− 6	2 18	− 2	—	—	—
Kyoto		5·5	247	1 24	− 1	2 24	− 6	—	—	—
Owase		5·7	237	1 28	0	1 54	−41	—	—	—
Sapporo		5·8	356	1 37	+ 8	2 37	− 1	—	—	—
Osaka		5·9	245	1 34	+ 3	3 0	+20	—	—	—
Toyooka		6·0	255	1 34	+ 2	2 40	− 3	—	—	—
Kobe		6·1	246	1 35	+ 1	3 0	+15	—	—	—
Siomisaki		6·4	234	1 40	+ 2	3 1	+ 8	—	—	—
Sumoto		6·5	245	1 37	− 2	3 4	+ 9	—	—	—
Nemuro		6·6	24	2 26	+45	—	—	—	—	—
Kôti		7·9	244	1 54	− 5	3 25	− 5	—	—	—
Hukuoka		10·1	252	2 30	+ 2	4 38	+13	—	—	—
Miyazaki		10·2	241	2 31	0	4 26	− 1	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kagosima		11·0	242	2 48	+ 6	5 15	+28	—	—	—
Irkutsk		30·3	313	e 6 13	− 2	—	—	—	—	—
College		48·6	32	i 8 46	− 1	—	—	—	—	—
Murgab		52·6	294	i 9 16	− 2	i 16 41	− 3	—	—	—
Andijan		52·9	294	e 9 18	− 2	—	—	—	—	—
New Delhi	E.	54·1	281	e 9 25	− 4	—	—	—	—	—
Tashkent		54·9	299	e 9 31	− 4	e 17 11	− 5	—	—	—
Sverdlovsk		55·3	319	i 9 34?	− 4	—	—	—	—	—
Stalinabad		56·3	297	i 9 41	− 4	e 17 29	− 5	—	—	—
Samarkand		57·1	298	e 9 33?	−17	—	—	—	—	—
Victoria	Z.	65·9	47	e 11 48	+58	—	—	—	—	—
Moscow		67·3	324	10 55	− 4	—	—	—	—	—
Shasta Dam		70·6	53	i 12 19	+60	—	—	—	—	—
Tiflis		71·0	309	11 20	− 2	—	—	—	—	—
Hungry Horse		71·3	44	i 11 24	+ 1	—	—	—	—	—
Tinemaha	Z.	75·2	56	i 11 49	+ 3	—	—	—	—	—
Yalta		75·7	316	e 11 45	− 4	—	—	—	—	—
Pasadena	Z.	77·0	58	e 11 51	− 5	—	—	—	—	—
Riverside	Z.	77·7	58	e 12 0	0	—	—	—	—	—
Copenhagen		77·9	335	11 59	− 2	—	—	—	—	40·7
Boulder City		78·1	54	i 12 5	+ 3	—	—	—	—	—
Overton	Z.	78·1	54	i 12 3	+ 1	—	—	—	—	—
Palomar	Z.	78·4	58	i 12 4	0	—	—	—	—	—
Pierce Ferry		78·6	54	i 12 7	+ 2	—	—	—	—	—
Istanbul		80·8	315	e 12 15	− 2	—	—	—	—	—
Collmberg		81·1	330	e 12 16	− 2	—	—	—	—	—
Ksara		81·4	306	e 12 17	− 3	—	—	e 15 33	PP	—
Tucson		83·1	55	i 12 30	+ 1	—	—	—	—	—
Stuttgart		84·6	331	e 12 35a	− 1	—	—	e 15 26	PP	e 49·7
Strasbourg		85·3	332	e 12 39	− 1	—	—	e 12 51	pP	—
Paris		87·0	335	i 12 47	− 1	—	—	i 13 0	pP	e 50·7
St. Louis		90·4	39	e 13 5	+ 1	e 23 57	− 1	e 26 1	PPS	—
Ottawa	Z.	90·9	25	e 13 6	− 1	—	—	—	—	—
La Paz		146·3	59	19 54	[+13]	—	—	—	—	—

Additional readings :—
New Delhi iE =9m.36s. and 9m.44s.
Tinemaha iZ =11m.59s.
Pasadena eZ =12m.6s.
Riverside eZ =12m.12s.
Copenhagen i =12m.12s.
Boulder City eS =12m.17s.
Palomar iZ =12m.15s.
Pierce Ferry i =12m.19s.
Collmberg eEZ =12m.29s.
Stuttgart eZ =12m.46s.
Long waves were also recorded at De Bilt, Potsdam, Kew, Clermont-Ferrand, Rome, and Triest.

May 24d. Readings also at 0h. (near Batavia, near San Juan, and near Fort de France), 1h. (near Branner and Lick), 3h. (La Paz (2)), 4h. (Istanbul), 5h. (New Delhi, near Ashkabad, near Boulder City, Overton, Pierce Ferry, and Tucson), 6h. (Overton), 7h. (Oaxaca, Tacubaya, and near Klyuchi), 9h. (near Ashkabad), 10h. (near Piatigorsk), 11h. (Merida, Tacubaya, San Juan, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Chicago, Philadelphia, Huancayo, La Paz, and near Pavia), 12h. (Christchurch, Palomar (3), Pasadena (2), Riverside (2), Tinemaha (3), Tucson (2), Boulder City (3), Overton (4), Pierce Ferry (3), Shasta Dam (3), Hungry Horse (3), Victoria, College, Logan (2), Kew, Stuttgart, Istanbul, and Ksara), 13h. (Auckland, Wellington, Manzanillo, Tacubaya (2), Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse, St. Louis, Lick, New Delhi, Frunse, Samarkand, Tashkent, Tchimkent, near Andijan, Kulyab, Murgab, Obi-garm, and Stalinabad), 14h. (Manzanillo, Tacubaya, Mount Wilson, Palomar, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Berkeley, Santa Clara, Bozeman, College, Salt Lake City, Rapid City, Lincoln, City College N.Y., Weston, Philadelphia, and Scoresby Sund), 15h. (Mount Wilson, Palomar, Tinemaha, Tucson, Pierce Ferry, and Lincoln), 17h. (Istanbul), 19h. (Tucson, near Boulder City, and Pierce Ferry), 20h. (Andijan, Murgab, Tashkent, Hungry Horse, and College), 23h. (La Paz, Stalinabad, near Kulyab, and Murgab).

May 25d. 8h. 23m. 44s. Epicentre 41°·8N. 83°·7E.

A = +·0820, B = +·7432, C = +·6641 ; δ = +10 ; h = −2 ;
D = +·994, E = −·110 ; G = +·073, H = +·660, K = −·748.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Almata		5·2	289	1 22	+ 1	2 22	0	—	—	—
Frunse		6·8	282	e 1 46	+ 2	—	—	—	—	—
Murgab		8·2	249	i 2 5	+ 2	e 3 39	+ 1	—	—	—
Andijan		8·6	267	e 2 12	+ 3	—	—	—	—	—
Tashkent		10·8	272	i 0 49?	?	—	—	—	—	—
Obi-garm		11·1	259	i 2 38	− 5	—	—	—	—	—
Kulyab		11·4	255	e 2 46	− 1	—	—	—	—	—
Stalinabad		11·9	259	i 2 49	− 5	4 59	−10	—	—	—
Dehra Dun	N.	12·3	203	e 5 6?	S	(e 5 6?)	−12	e 6 2	Q	e 7·0
New Delhi		14·2	204	i 3 24	0	i 5 57	− 7	—	—	—
Irkutsk		17·4	46	i 4 9	+ 3	—	—	—	—	—
Calcutta	E.	19·6	167	e 4 37	+ 3	i 8 11	+ 3	i 4 56	PP	—
Ashkabad		19·8	267	e 4 16	−19	—	—	—	—	—
Sverdlovsk		21·1	324	i 4 47	− 1	i 8 36	− 3	—	—	—
Bombay		24·6	206	i 5 30	+ 7	i 9 53	+11	—	—	12·2
Hyderabad	N.	24·7	192	e 5 15	− 9	i 9 43	− 1	10 30	SS	12·6
Poona		24·7	202	5 27	+ 3	9 42	− 2	6 1	PP	11·4
Baku		25·4	279	i 5 37	+ 6	—	—	—	—	—
Grozny		27·8	286	e 5 54	+ 1	—	—	—	—	—
Tiflis		28·8	283	i 6 2	0	i 0 55	+ 4	e 6 51	PP	—
Erevan		29·5	280	6 16	+ 8	—	—	—	—	—
Leninakan		29·8	284	6 13?	+ 2	—	—	—	—	—
Kodaikanal	E.	31·9	192	e 11 39	S	(e 11 39)	− 1	—	—	—
Sotchi		32·1	289	6 31?	0	e 11 46	+ 3	—	—	—
Moscow		32·8	312	i 6 35	− 2	11 49	− 5	—	—	—
Theodosia		34·8	293	e 6 57	+ 3	e 12 25	0	e 15 31	SSS	—
Colombo	E.	34·9	187	14 9	?	17 14	?	—	—	19·3
Yalta		35·8	292	i 7 2	− 1	—	—	—	—	—
Ksara		38·2	274	i 7 25a	+ 2	15 28	SS	8 50	pP	—
Helsinki		39·7	319	i 7 36	0	e 13 31	− 9	i 9 7	PP	e 17·3
Istanbul		40·4	288	i 7 42	+ 1	i 13 50	0	—	—	—
Bucharest		41·4	294	e 7 51	+ 1	e 14 5	0	e 9 34	PP	20·3
Upsala		43·4	318	i 8 6a	0	i 14 34	− 1	i 9 45	PP	e 20·8
Helwan		43·5	272	i 8 7a	0	i 14 36	0	8 40	PP	—
Sofia		43·8	293	8 12	+ 3	14 44	+ 4	—	—	26·4
Skalnate Pleso		43·9	303	i 8 7	− 3	e 17 34	SS	—	—	—
Raciborzu		45·0	305	e 8 20	+ 1	—	—	—	—	e 23·6
Belgrade		45·1	296	i 8 19k	− 1	i 15 3	+ 4	e 10 31	PPP	e 24·9
Budapest	E.	45·2	300	8 21	+ 1	e 18 39	SS	e 10 8	PP	e 21·8
	N.	45·2	300	8 26	+ 6	e 18 27	SS	e 16 6	?	24·8
Kalossa		45·5	300	e 8 27	+ 4	e 18 29	SS	e 10 10	PP	e 21·3
Ogyalla		45·6	301	e 8 26	+ 2	—	—	e 10 6	PP	—
Copenhagen		46·9	313	i 8 34	0	i 15 26	+ 1	10 23	PP	22·3
Prague		47·3	305	i 8 35	− 2	—	—	e 12 24	?	—
Potsdam		47·4	309	i 8 38	0	e 15 33	+ 1	i 10 26	PP	—
Zagreb		47·7	299	e 8 40	0	—	—	e 8 51	P	—
Collmberg		47·8	307	e 8 40	− 1	e 15 36	− 2	e 9 7	pP	—
Jena		48·7	306	e 8 48	0	e 15 51	+ 1	e 10 36	PP	e 23·1
Taranto		48·9	292	8 47	− 3	15 46	− 7	10 47	PP	e 23·9
Triest		49·2	300	i 8 52	0	i 15 52	− 6	i 10 47	PP	i 27·4
Bergen		49·4	321	e 8 50	− 3	15 50	−10	19 27	SS	—
Padova		50·9	299	e 9 5	0	16 30	+ 9	11 6	PP	—
Stuttgart		50·9	305	i 9 5a	0	e 16 26	+ 5	e 9 34	pP	e 26·3
Messina		51·1	291	e 9 6	0	e 16 29	+ 5	—	—	—
Ravensburg		51·1	303	e 9 6	0	—	—	e 11 26	PP	e 27·2
Bologna		51·3	299	e 9 8	0	e 16 32	+ 6	e 11 8	PP	—
Salo		51·3	301	e 9 8	0	e 16 27	+ 1	—	—	—
Chur		51·5	302	e 9 8a	− 1	e 16 25	− 4	—	—	e 25·6
Florence Arc.		51·6	298	i 9 17a	+ 7	e 16 43	+12	e 9 40	pP	e 24·3
Florence Xim		51·6	298	i 9 8	− 2	i 16 36	+ 5	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
	Rome	51·6	296	i 9 9a	− 1	i 16 28	− 3	i 9 32	pP	e 26·6
	Prato	51·7	298	e 8 34	−37	e 16 16	−16	—	—	—
	Strasbourg	51·9	306	i 9 12a	0	e 16 32	− 3	e 11 10	PP	e 26·3
	Zürich	51·9	304	e 9 11	− 1	e 16 32	− 3	e 11 6	PP	—
	De Bilt	52·1	311	i 9 15a	+ 1	e 16 38	0	i 11 16	PP	e 24·3
	Batavia	52·2	150	i 9 14a	− 1	e 16 37	− 2	—	—	—
	Basle	52·4	304	e 9 15a	− 1	e 20 3	SS	—	—	—
	Pavia Z.	52·4	301	e 9 16	0	e 19 3	S_cS	—	—	—
	Neuchatel	53·0	304	e 9 20	− 1	—	—	—	—	—
	Durham N.	54·8	315	—	—	e 21 27	SS	i 24 12	Q	e 28·4
	Paris	55·0	307	i 9 34	− 1	e 17 16	− 1	e 11 35	PP	e 29·3
	Edinburgh	55·1	317	9 20	−16	—	—	—	—	—
	Kew	55·5	311	i 9 38	− 1	e 17 27	+ 3	e 12 49	PPP	e 25·3
	Clermont-Ferrand	56·0	304	i 9 43	0	i 17 37	+ 7	i 12 0	PP	27·3
	Scoresby Sund	56·1	338	i 9 43a	0	17 42	+10	11 46	PP	—
	Jersey E.	57·5	310	e 9 52	− 1	—	—	—	—	29·3
	Rathfarnham Castle	57·9	315	e 10 1	+ 5	17 58	+ 3	—	—	—
	Barcelona	58·7	300	e 9 20	−42	e 17 59	− 7	—	—	28·3
	Tortosa	60·0	300	i 10 10	− 1	i 18 27	+ 4	12 19	PP	e 31·3
	Alicante	62·0	298	10 23	− 1	18 46	− 2	10 34	pP	e 29·4
	Toledo Z.	63·5	301	i 10 33	− 1	e 19 2	− 5	i 11 9	PcP	—
	Almeria	64·1	297	i 10 40	+ 2	i 19 12	− 2	11 17	PcP	36·0
	Granada	64·7	298	i 10 44k	+ 2	i 19 29	+ 7	10 55	pP	i 35·2
	Malaga Z.	65·5	298	i 10 44k	− 3	i 19 29	− 3	11 11	pP	38·3
	College	66·3	22	i 10 52	0	e 19 47	+ 5	e 14 57	PPP	e 29·6
	Tamanrasset Z.	66·6	282	i 10 55k	+ 1	—	—	i 13 22k	PP	—
	Lisbon	67·4	303	10 58k	− 1	19 55	0	27 16?	SSS	33·5
	Ivigtut	70·2	338	i 11 14	− 3	e 20 24	− 4	i 21 26	PPS	33·3
	Sitka	75·7	21	i 11 53	+ 4	e 21 44	+14	e 14 46	PP	e 33·4
	Saskatoon	86·0	7	—	—	e 23 16	− 1	—	—	51·3
	Victoria	86·9	18	12 48k	0	23 23	− 3	—	—	49·3
	Seven Falls E.	88·6	343	—	—	e 23 53	+11	—	—	40·3
	Hungry Horse	88·9	12	i 12 57	− 1	e 23 28	[+ 2]	e 16 31	PP	—
	Ottawa	91·3	346	e 13 8	− 1	e 21 28	?	—	—	51·3
	Butte N.	91·4	12	e 13 10	+ 1	e 23 46	[+ 5]	e 25 18	PS	e 50·9
	Bozeman	91·9	10	e 13 18	+ 7	e 23 46	[+ 2]	e 25 22	PS	e 47·7
	Weston	93·2	342	25 50	PS	23 56	[+ 5]	30 40	SS	—
	Brisbane Z.	94·0	124	i 13 25	+ 4	—	—	—	—	—
	Shasta Dam	94·5	20	i 13 25	+ 2	—	—	e 17 5	PP	—
	Mineral Z.	95·1	19	i 13 27a	+ 1	e 24 10	[+ 8]	i 17 18k	PP	—
	City College, N.Y.	95·3	343	—	—	e 24 7	[+ 4]	e 24 47	S	e 42·3
	Fordham	95·3	343	—	—	e 24 5	[+ 2]	—	—	e 52·3
	Logan	95·7	12	e 13 29	0	—	—	—	—	e 47·5
	Cleveland N.	96·0	349	e 17 22	PP	e 24 4	[− 3]	e 24 50	S	—
	Reno Z.	96·3	18	i 13 34a	+ 2	—	—	i 17 30a	PP	—
	Chicago	96·4	354	e 26 13	PS	e 24 13	[+ 4]	e 31 40	SS	e 38·1
	Philadelphia	96·4	344	e 17 25	PP	e 24 15	[+ 6]	e 30 36	SS	e 43·9
	Salt Lake City	96·6	12	e 26 26	PS	e 24 16	[+ 6]	e 31 5	SS	e 39·1
	Berkeley	97·2	21	e 17 28	PP	e 24 19	[+ 6]	i 25 14	S	—
	Riverview	97·4	129	—	—	e 24 20	[+ 6]	e 26 34	PS	—
	Lincoln E.	97·7	0	—	—	e 24 24	[+ 9]	—	—	e 54·8
	Santa Clara E.	97·8	21	—	—	e 24 27	[+11]	—	—	—
	Tinemaha Z.	99·0	18	e 13 48	+ 4	—	—	i 17 42	PP	—
	St. Louis	99·7	355	e 13 48	+ 1	i 24 26	[0]	i 26 46	PS	—
	Bermuda	100·6	333	—	—	e 24 31	[+ 1]	—	—	e 48·3
	Boulder City	100·8	15	e 13 55	+ 3	—	—	e 18 4	PP	—
	Pierce Ferry	100·8	14	e 13 54	+ 2	—	—	e 17 53	PP	—
	Pasadena Z.	101·8	18	e 13 59	+ 3	—	—	e 18 4	PP	—
	Riverside Z.	102·1	18	i 14 0	+ 2	—	—	e 17 56	PP	—
	Palomar Z.	102·9	17	i 14 3	+ 2	—	—	i 18 6	PP	—
	Tucson	105·1	12	e 14 13	+ 2	e 24 49	[− 2]	e 18 35	PP	e 42·5
	San Juan	113·9	328	—	—	e 29 9	PS	—	—	e 61·2
	La Paz	145·1	307	i 19 45k	[+ 6]	—	—	23 2	PP	73·0
	Huancayo	145·2	322	e 19 42	[+ 2]	—	—	e 23 16	PP	e 77·3

For Notes see next page.

NOTES TO MAY 25d. 8h. 23m. 44s.

Additional readings :—
New Delhi ePN =3m.30s., SSN =6m.8s.
Calcutta iSSE =8m.36s.
Poona PPPN =6m.14s., P_cPN =9m.2s., QEN =10m.1s., SSE =10m.35s., SSSEN = 10m.45s., P_cSEN =12m.47s.
Tiflis PPP =7m.10s., iSS =12m.9s.
Helsinki e =13m.57s.
Bucharest eP_cPE =10m.4s., eSE =14m.13s., eS_cSN =17m.59s., eS_cSE =18m.2s.
Upsala iE =8m.11s., iN =8m.38s., iPPPE =10m.24s., iN =13m.1s., eE =13m.49s., eN =13m.59s., iE =14m.5s., iSE =14m.37s., eN =14m.52s. and 15m.16s.?, eSS?E = 17m.16s.?, eSSN =17m.30s., iE =19m.25s., iN =19m.37s.
Helwan eZ =8m.22s., iZ =9m.36s., PPE =9m.54s., SSN =18m.0s.
Belgrade e =18m.29s.
Kalossa eEN =11m.51s.
Copenhagen i =8m.40s., 18m.41s., 18m.59s.
Potsdam iPPPN =11m.33s., eZ =15m.19s., iSZ =15m.51s., iN =16m.2s., iE =16m.8s., eN =18m.27s., iSSZ =19m.41s.
Collmberg eZ =8m.44s., eE =8m.49s., eZ =9m.13s., eE =10m.25s., ePP?Z =10m.29s., eE =10m.32s., epPP?EZ =10m.51s., esPP?E =11m.0s., eSE =15m.30s., eE = 15m.48s., eSS?N =19m.22s.?.
Jena eS?E =15m.36s., eS?Z =15m.46s., eSS?E =19m.28s.
Triest iPPP =11m.43s., iS_cS? =18m.51s., iSS =19m.40s.
Padova PPP =12m.56s.
Stuttgart ePP =11m.9s., epPP? =11m.37s., epPPP? =12m.53s., ePS_cS =18m.55s., eSS =19m.56s.
Ravensburg eZ =9m.10s.
Bologna eE =9m.31s. and 11m.31s.
Florence Arc. eZ =9m.23s., ePPE =11m.14s., eSSE =20m.9s.
Rome iPPE =11m.12s., iPPPE =12m.56s., iSSE =20m.9s.
Strasbourg ipP? =9m.35s., esP? =9m.44s. and 9m.51s., iPP =11m.14s., ipPP? =11m.34s., epPP?=11m.40s., esPP?=11m.49s., ePPP=12m.19s., eS_cP=13m.47s., eP_cS=14m.27s., ePS? =16m.38s., eSS? =20m.13s., eSS =20m.26s., iSS =20m.36s., eSSS =21m.52s., and other unidentified readings.
Zürich epP? =9m.44s.
De Bilt e =19m.9s., eSS =20m.46s.
Durham iN =23m.27s.
Paris i =9m.40s., ePPP =12m.32s., eS =17m.20s. and 17m.23s., eS_cS =19m.40s., eSS = 21m.34s.
Clermont-Ferrand ipP? =10m.8s., isP? =10m.21s., iPPP =13m.15s., iSS =21m.12s.
Scoresby Sund 12m.52s., 19m.38s., 23m.16s.
Kew eP_cSEZ =14m.49s., ePS?EZ =17m.41s., eEN =18m.17s., eS_cSEN =19m.33s., eSS =21m.51s.
Tortosa PPP?EN =13m.47s., PSN =18m.43s.
Alicante P_cP =11m.5s., PP =12m.45s., PPP =14m.12s., P_cS =14m.54s., PS =19m.5s., S_cS =20m.15s., SS =22m.55s., SSS =25m.45s.
Toledo iZ =11m.57s., ePPZ =12m.48s., eSKSZ =20m.20s.
Almeria PP =13m.4s., PPP =14m.36s., P_cS =15m.16s., S_cS =20m.28s., SS =22m.16s., SSS =26m.8s.
Granada PP =13m.2s., PPP =14m.41s., SS =23m.5s., SSS =26m.44s.
Malaga PPZ =13m.5s., PPPZ =14m.49s.
College ePP? =13m.43s., eS_cS =20m.55s., eSS =24m.1s.
Tamanrasset iZ =11m.2s.a, iP_cPZ =11m.9s.k.
Lisbon SE =19m.45s., SN =20m.6s., SKS?N =20m.49s., NZ =30m.52s.
Ivigtut 25m.10s.
Sitka ePPP? =16m.41s., eS_cS? =22m.11s., eSS =26m.32s., eSSS =29m.56s.
Butte eSSN =30m.29s.
Bozeman eS =24m.32s., eSS? =30m.35s.
City College, N.Y. e =26m.49s. and 38m.37s.
Logan e =13m.49s., ePP? =16m.48s.
Cleveland eN =22m.2s., iSKSE =24m.11s., eSSN =34m.57s.
Riverview ePSE =26m.39s.
St. Louis e =14m.51s. and 32m.34s.
Tucson ePPP =20m.47s., ePS =27m.46s., eSS =33m.28s., eSSS =37m.48s.
La Paz iN =19m.52s.
Huancayo e =22m.10s.
Long waves were also recorded at Rapid City and Ukiah.

May 25d. 22h. 54m. 23s. Epicentre 45°·8N. 10°·3E.
(as on 1948, July 19d. and foreshock of 27d. 16h.).

Felt in the region of Arco. Epicentre 45°55′N. 10°50′E. (Rome). Monthly Seismic Bulletin, Rome, May 1949.

A = +·6883, B = +·1251, C = +·7146 ; δ = +6 ; h = −4 ;
D = +·179 E = −·984 ; G = +·703, H = +·128, K = −·700.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Salo		0·2	143	e 0 2	P_g	0 7	S_g	—	—	—
Bologna		1·5	151	0 37	+ 9	0 45	− 4	—	—	—
Padova		1·7	140	e 0 16	−15	—	—	—	—	e 1 8
Basle		2·5	313	e 0 51	P_g	e 1 28	S_g	—	—	—
Stuttgart		3·1	346	e 0 57	P*	e 1 39	S*	e 0 59	P_g	—
Strasbourg		3·3	330	—	—	e 1 51	S_g	—	—	e 2·0
Collmberg	E.	5·8	18	—	—	e 2 59	S*	—	—	—

Additional readings :—
Stuttgart iS_g = 1m.43s.
Collmberg eE = 3m.3s.

May 25d. 23h. Chile. Intensity III between south latitudes 27° and 28°.

La Paz P = 34m.5s., iZ = 35m.5s., iNZ = 35m.42s., iSN = 36m.24s., SS = 36m.32s., L = 37m.24s.
Copiapo ePN = 34m.45s., iL?N = 35m.43s.
Huancayo i = 36m.38s. and 39m.20s., eL = 40m.26s.
Bogota eP? = 40m.3s., iPP = 43m.52s., eEN = 48m.48s. and 51m.34s.
Tucson iP = 44m.12s., i = 44m.31s., e = 45m.11s.
Palomar iPNZ = 44m.39s.k.
Pierce Ferry iP = 44m.39s., i = 44m.52s.
Riverside iPEZ = 44m.41s.k.
Boulder City iP = 44m.42s.
Overton iPZ = 44m.43s.
Pasadena iP = 44m.46sk.
Tinemaha iP = 44m.57s.k, epPZ = 45m.15s.
Lick iPZ = 45m.10s.k.
Mineral iPZ = 45m.18s.
Shasta Dam iP = 45m.21s.
Hungry Horse iP = 45m.26s.
Tamanrasset iPZ = 45m.37s.k, ePZ = 45m.41s., eZ = 45m.46s.

May 25d. Readings also at 0h. (Boulder City, Hungry Horse, Pierce Ferry, Tucson, Mount Wilson, Paris, Strasbourg, Stuttgart, Collmberg, and Scoresby Sund), 2h. (Hungry Horse and near Victoria), 3h. (near Murgab), 5h. (Ksara, Almeria, Granada, Rome, Collmberg, Potsdam, Stuttgart, Clermont-Ferrand, Paris, Kew, De Bilt, Copenhagen, near Mizusawa, Hungry Horse, near Berkeley, Lick, and Branner), 6h. (College, near Kulyab, Obi-garm, Murgab, and Stalinabad), 7h. (Scoresby Sund, Tortosa, Copenhagen, De Bilt, Kew, Paris, Stuttgart, Weston, Mount Wilson, Palomar, Tinemaha, Boulder City, Hungry Horse, Pierce Ferry, Tucson, Bermuda, San Juan, La Paz, and near Tacubaya : more than one shock), 8h. (Frunse, Murgab, near Almata, near Alicante, and near Ashkabad), 9h. (College, Tucson, near Apia, near Pavia, near Pasadena, Palomar, Riverside, La Jolla, Haiwee, and Tinemaha), 10h. (Shasta Dam, Ashkabad, and near Mizusawa), 11h. (near Fort de France), 15h. (Pavia), 17h. (near Boulder City, Overton, Pierce Ferry, Tucson, near Kulyab, Obi-garm, Stalinabad, Murgab, and Andijan), 18h. (Overton, Pierce Ferry, Tucson, Wellington (2), and Auckland (2)), 19h. (Auckland, Boulder City, Overton, Pierce Ferry, Tucson, Philadelphia, near Besançon, Paris, Strasbourg, Clermont-Ferrand, Stuttgart, Zürich, and Basle), 21h. (Padova, La Paz, Overton, and near Klyuchi), 22h. (Ashkabad).

May 26d. 6h. Probably South-West of the Azores. The observations do not lead to determination of the Epicentre.

Toledo iPZ =28m.28s., iZ =28m.41s., eSE? =33m.27s., eE =36m.18s.
Malaga iPZ =28m.30s., PPZ =29m.18s., PPPZ =31m.38s., iSZ =33m.8s., LZ =35m.10s.
Granada iP =28m.35s.a, pP =28m.46s.k, iPP =29m.36s., iS =33m.4s., eL =33·2m.
Almeria eP =28m.38s., PP =29m.32s., P_cP =32m.2s., eS =33m.6s., P_cS =35m.46s., L =38m.48s., S_cS =39m.42s.
Alicante P? =28m.41s., PP =30m.4s., S =33m.42s., eL =39m.0s.
Clermont-Ferrand eP =29m.18s., L =37m.30s.
Stuttgart eP?Z =29m.55s.?, eL? =39m.
Strasbourg eP? =30m.6s.
Rome eE =30m.29s.?
St. Louis eP =31m.36s.
Kew eZ =32m.
Ksara e =32m.56s. and 37m.46s.
Paris e =33m., eL =38m.
Hungry Horse eP =33m.14s.
Bermuda eS =33m.30s., eL =38m.21s.
Tucson eP? =33m.48s.
Pierce Ferry eP =33m.51s.
Overton iPZ =33m.52s.
Boulder City eP =33m.55s.
Tinemaha ePZ =34m.3s.
Palomar ePZ =34m.11s.
Mount Wilson ePZ =34m.14s.
Riverside ePZ =34m.15s.
Long waves were also recorded at San Juan, Scoresby Sund, Philadelphia, Seven Falls, Weston, and other European stations.

May 26d. Readings also at 1h. (Punta Arenas, Overton, Murgab, near Kulyab, Obi-garm, and Stalinabad), 2h. (Ksara, Helwan, Tashkent, and near Huancayo), 3h. (Istanbul), 4h. (Batavia), 5h. (Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Huancayo, La Paz, near Copiapo, near Murgab, Obi-garm, Kulyab, and Stalinabad), 6h. (La Plata and near Ashkabad), 7h. (Logan and Ashkabad), 8h. (College), 9h. (Santa Lucia, Palomar, Tinemaha, Tucson (2), Overton, Pierce Ferry, Shasta Dam, Stuttgart, near Ashkabad, and near Apia), 10h. (Santa Lucia), 14h. (Bogota, Overton, Logan, near Frunse, and near Mizusawa), 15h. (Tamanrasset, Strasbourg, Stuttgart, near Messina, near Boulder City, Pierce Ferry, Overton, Frunse, and near Murgab), 17h. (Hungry Horse and near Alicante (2)), 18h. (Hungry Horse and Stuttgart), 19h. (Overton), 20h. (near Ashkabad and near Tacubaya (2)), 22h. (Tananarive, New Delhi, Klyuchi, Andijan, Frunse, near Kulyab, Murgab, Obi-garm, Stalinabad, and Tashkent), 23h. (Ashkabad, Ottawa, Overton, Victoria, and Huancayo).

May 27d. 8h. 54m. 7s. Epicentre 45°·0S. 167°·0E. (as on 1943, Aug. 2d.).

Felt widely in the Southern part of South Island. Intensity VI in the neighbourhood of the Epicentre. Suggested origin 45°·5S. 167°·0E.

R. C. Hayes.
Earthquake Origins in New Zealand during the year, 1949. New Zealand Journal of Science and Technology, Sect. B., Vol. 31, No. 4, January, 1959, p. 444.

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m.	s.
Monowai	E.	0·9	151	0 53?	?	1 3?	?	—	—
Kaimata	N.E.	4·1	54	1 7	+ 2	1 55	0	—	—
Christchurch		4·3	71	1 7	− 1	1 57	− 3	—	—
Wellington		6·8	59	1 42	− 2	2 55	− 8	—	—
New Plymouth	E.	7·9	44	1 59	0	3 28	− 2	—	—
Tuai	N.	9·8	54	2 23	− 1	4 9	− 8	—	—
Riverview		16·5	307	i 3 58a	+ 4	e 7 2	+ 4	i 4 14	PP
Brisbane	Z.	20·7	324	i 4 42	− 2	—	—	—	—
Shasta Dam		106·2	48	e 18 29	PP	—	—	—	—
Overton	Z.	107·7	55	e 17 42	PP	—	—	—	—
Hungry Horse		115·8	47	e 19 2	PP	e 28 51	PS	—	—
Ottawa	Z.	136·8	66	e 19 38	[+13]	—	—	—	—
Istanbul		149·2	278	e 19 33	[−13]	—	—	e 20 1	PKP_a
Stuttgart	Z.	164·4	293	e 20 17	[+12]	—	—	e 21 12	PKP_a
Strasbourg		165·3	292	e 20 20	[+14]	—	—	—	—

For Notes see next page,

NOTES TO MAY 27d. 8h. 54m. 7s.

Additional readings :—
Wellington i = 2m.43s.
Tuai iN = 4m.21s.
Riverview iE = 7m.11s., iN = 7m.14s., iSSE = 7m.22s.
Brisbane iZ = 5m.1s.
Stuttgart eZ = 20m.47s.

May 27d. 10h. 59m.21s. Epicentre 15°·8S. 172°·8W. Focus at Base of superficial layers. (as on 1949, April 18d.).

A = −·9551, B = −·1207, C = −·2706; δ = +1; h = +6;
D = −·125, E = +·992; G = +·268, H = +·034, K = −·963.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		2·2	26	0 34	− 1	0 59	− 2	—	—	—
Tuai	N.	24·6	199	5 21	+ 3	9 39	+ 5	—	—	—
Wellington		27·6	201	5 46	0	e 10 45	+21	e 6 38	PP	—
Kaimata	N.E.	29·9	204	6 12	+ 5	—	—	—	—	—
Pasadena	Z.	71·9	46	i 11 21	− 1	—	—	i 11 37	pP	—
Palomar		72·3	47	i 11 23k	− 1	—	—	—	—	—
Riverside	Z.	72·3	46	i 11 22	− 2	—	—	i 11 39	pP	—
Fresno	Z.	72·3	43	i 11 24a	0	—	—	—	—	—
Shasta Dam		73·1	38	i 11 27	− 2	—	—	i 11 34	pP	—
Mineral	Z.	73·4	39	i 10 29	−61	—	—	—	—	—
Tinemaha	Z.	73·5	43	i 11 31k	0	—	—	i 11 42	pP	—
Reno	Z.	73·9	41	e 11 33	0	—	—	—	—	—
Boulder City		75·2	46	e 11 40	− 1	—	—	—	—	—
Overton	Z.	75·7	45	i 11 43	− 1	—	—	—	—	—
Pierce Ferry		75·8	46	i 11 44	0	—	—	—	—	—
Tucson		76·1	51	i 11 45	− 1	—	—	e 15 48	PPP	e 34·8
Victoria	Z.	77·6	31	e 11 52	− 2	—	—	—	—	—
Logan		80·2	42	e 12 7	− 2	—	—	e 12 15	pP	—
Hungry Horse		82·5	35	i 12 18	− 3	—	—	—	—	—
College		82·6	11	i 12 21	0	—	—	—	—	—
St. Louis		94·1	51	—	—	e 23 49	[+ 2]	e 24 28	S	e 45·6
Scoresby Sund		122·5	11	—	—	—	—	(e 23 39?)	PPP	23·6
Paris		146·9	5	e 19 40	[+ 3]	—	—	—	—	—
Stuttgart	Z.	147·1	357	e 19 41	[+ 4]	—	—	—	—	—
Strasbourg		147·3	358	e 19 29	[− 9]	—	—	e 19 44	pPKP	—
Ksara		148·5	309	e 19 47	[+ 7]	e 26 1	[−42]	—	—	—
Clermont-Ferrand		149·9	5	e 19 51	[+ 9]	—	—	e 20 1	pPKP	—

Additional readings :—
Tinemaha eZ = 11m.37s.
Tucson i = 12m.2s.
College i = 12m.29s. and 12m.37s.
Long waves were also recorded at Weston, Almeria, and Granada.

May 27d. 16h. 45m. 0s. Epicentre 45°·8N. 10°·3E. (as on 25d.).

A = +·6883, B = +·1251, C = +·7146; δ = +6; h = −4.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Salo	0·2	143	e 0 8	− 2	i 0 14	− 2	—	—	—
Chur	1·2	333	e 0 28	+ 4	e 0 41	+ 6	—	—	—
Bologna	1·5	151	e 0 27	− 1	e 0 47	− 2	—	—	—
Padova	1·7	140	0 25	− 6	e 1 8	+14	—	—	—
Zürich	1·8	323	e 0 47	P_g	i 1 16	S_g	—	—	—
Ravensburg	2·1	347	e 0 44	P_g	e 1 11	S_g	—	—	—
Basle	2·5	313	e 0 56	P_g	e 1 35	S_g	—	—	—
Stuttgart	3·1	346	e 0 55?	+ 4	e 1 44	S_g	e 1 4	P_g	—
Strasbourg	3·3	330	e 1 12	P_g	—	—	—	—	i 2·1
Collmberg	5·8	18	—	—	e 2 42	+ 4	e 3 0	S*	—

Additional readings :—
Padova e = 1m.24s. and 1m.54s.
Ravensburg eS_g = 1m.18s.
Stuttgart eZ = 1m.12s., e = 1m.48s., iS_g = 1m.52s.
Collmberg eE = 3m,6s,

May 27d. Readings also at 3h. (Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Hungry Horse, and near Copiapo), 4h. (Overton (3), Pierce Ferry (2), Hungry Horse, and near Batavia), 6h. (Santa Lucia, Overton, Istanbul, and near Ashkabad), 7h. (Ashkabad and Overton), 8h. (near Pavia), 11h. (near Pavia), 14h. (Tucson and near Pavia), 17h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Huancayo, and Rome), 18h. (Kaimata, Tuai, Wellington, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, Belgrade, Bucharest, Sotchi, and near Istanbul), 19h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, and Shasta Dam), 20h. (Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Lick, and Shasta Dam), 21h. (Ashkabad and College), 22h. (College).

May 28d. 16h. South-West Pacific.
Brisbane iPZ =5m.48s., iSE =9m.26s., iSN =9m.30s., eLE =11m.4s.
Riverview iPZ =7m.5s.a, iZ =9m.1s., eSN =11m.55s., eQN =13·3m., eRN =14·7m.
Wellington P =11m.32s., S =17m.4s.
Lick ePZ =13m.52s.
Shasta Dam eP =13m.56s.
Mount Wilson ePZ =13m.56s., iZ =14m.4s.
Riverside ePZ =14m.1s., iZ =14m.8s.
Tinemaha iZ =14m.5s.
Palomar iZ =14m.9s.
Overton eZ =14m.23s.
Tuai eN =15m.57s., SN =16m.53s.
Kaimata SNE =18m.9s.

May 28d. Readings also at 1h. (Ottawa), 2h. and 4h. (near Andijan), 5h. (Mount Wilson, Riverside, Tinemaha, Tucson, Boulder City, Overton, and Pierce Ferry), 6h. (Hungry Horse), 7h. (near Andijan, Kulyab, Obi-garm, and Stalinabad), 8h. (near Pavia), 11h. (near Klyuchi), 12h. (near Kulyab), 14h. and 15h. (2) (College), 16h. (Lick, Hungry Horse, Shasta Dam, and near Apia), 17h. (Reno, near Berkeley, Branner, Fresno, Lick, Santa Clara, and San Francisco), 18h. (Overton), 21h. (Tortosa), 22h. (Tucson), 23h. (Tucson, Overton, Reno, near Berkeley, Branner, Fresno, Lick, Santa Clara, and San Francisco).

May 29d. Readings at 0h. (San Francisco, near Berkeley, Branner, Fresno, Lick, and Santa Clara), 3h. (Ashkabad), 4h. (near Kulyab, Murgab, and Stalinabad), 8h. (near Ashkabad), 9h. (near Apia), 10h. (College and near Erevan), 11h. (near Bogota), 12h. (Apia, Shasta Dam, Hungry Horse, College, Collmberg, Stuttgart, and near Frunse), 13h. (near Ashkabad, near Andijan, Murgab, Obi-garm, and Stalinabad), 17h. (near Malaga), 18h. (near Kaimata, New Plymouth, Tuai, and Wellington), 21h. (Grozny and near Tiflis), 22h. (near Obi-garm, near Tiflis, and near Batavia), 23h. (College and near Batavia).

May 30d. 1h. 32m. 50s. Epicentre 20°·8S. 69°·0W. Depth of focus 0·010.
(as on May 8d.).

Intensity IV between 20° and 21° South Latitude. Macroseismic radius >400km. Depth 100km.

F. Greve.
Boletín del año, 1949, primer semestre. Instituto Sismológico, Santiago, p. 20.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		4·4	11	i 1 8a	+ 2	i 1 50	− 6	i 1 25	pP	—
Copiapo	N.	6·6	190	1 35	− 1	3 8	+18	1 52	pP	—
Huancayo		10·6	325	e 2 33	+ 3	e 4 41	+13	—	—	i 5·2
Santa Lucia	N.	12·7	186	2 59	+ 1	5 21	+ 3	3 28	pP	—
Bogota		25·7	348	i 5 23	0	i 9 43	+ 1	i 5 51	pP	11·9
Punta Arenas	N.	32·3	182	—	—	e 11 32	+ 5	13 6	sS	16·2
Fort de France		36·1	14	i 6 36	−18	—	—	—	—	—
San Juan		39·0	5	e 7 16	− 2	e 12 57	−13	e 7 41	pP	e 16·1
Tacubaya		49·7	332	8 49k	+ 5	e 16 45	SS	i 10 52	PP	—
Bermuda		53·0	5	e 9 8	− 1	e 16 25	− 4	i 9 30	pP	e 23·0

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Georgetown		59·9	353	e 9 56	− 2	i 17 57	− 3	i 10 19	pP	—
Washington		59·9	353	e 9 57	− 1	—	—	e 10 22	pP	—
Philadelphia		60·7	355	e 9 57	− 6	e 18 8	− 3	e 10 27	pP	e 25·0
Cincinnati		61·4	347	i 10 17	+ 9	18 21	+ 1	i 10 33	pP	—
City College, N.Y.		61·5	357	i 10 9	0	e 18 20	− 1	i 10 36	pP	e 25·7
Fordham		61·5	357	i 10 8	− 1	i 18 20	− 1	i 10 35	pP	—
New Kensington	E.	61·8	351	—	—	e 18 18	− 7	e 19 3	sS	e 23·2
St. Louis		62·4	341	i 10 17	+ 2	i 18 35	+ 3	i 10 45	pP	—
Lubbock		62·5	330	10 16	0	—	—	—	—	—
Florissant		62·6	341	e 10 16	0	i 18 35	0	e 10 44	pP	—
Weston		62·9	358	i 10 17	− 1	e 18 38	− 1	10 43	pP	—
Harvard		63·0	358	i 10 19	0	e 18 38	− 2	i 10 45	pP	—
Cleveland		63·1	349	i 10 18	− 2	i 18 39	− 2	e 10 43	pP	e 27·2
Chicago		64·6	345	e 10 25	− 4	e 18 51	− 9	e 10 53	pP	e 26·4
Ottawa		66·2	354	10 38k	− 2	i 19 18	− 1	e 11 5	pP	—
Tucson		66·2	322	i 10 40	0	e 19 20	+ 1	i 11 6	pP	e 28·0
Shawinigan Falls		67·1	358	e 10 44	− 1	—	—	—	—	—
Seven Falls		67·6	359	e 10 49	+ 1	i 19 39	+ 3	e 20 19	sS	e 27·2
Palomar		70·6	317	i 11 8	+ 1	i 20 18	+ 7	e 38 56	P′P′	—
Pierce Ferry		70·8	323	i 11 9	+ 1	e 21 2	+48	—	—	—
Riverside	Z.	71·3	319	i 11 13k	+ 2	—	—	i 11 40	pP	—
Overton	Z.	71·4	322	i 11 13	+ 1	—	—	e 39 1	P′P′	—
Rapid City	E.	71·8	335	i 11 14	0	i 20 25	0	i 11 41	pP	—
Pasadena		71·9	319	i 11 16k	+ 2	i 20 33	+ 7	i 11 42	pP	—
Salt Lake City		73·1	327	e 11 25	+ 3	e 20 43	+ 3	e 11 53	pP	e 30·5
Tinemaha		74·0	321	i 11 27k	0	e 20 56	+ 6	i 11 56	pP	—
Fresno		74·6	320	e 11 30	0	e 21 3	+ 7	e 11 53	pP	—
Lick	Z.	76·2	319	i 11 41k	+ 2	e 21 23	+ 9	i 12 8	pP	—
Santa Clara		76·3	319	i 11 44	+ 4	e 21 23	+ 8	e 12 10	pP	—
Branner	Z.	76·5	319	i 11 42k	+ 1	—	—	i 12 10	pP	—
Reno		76·5	322	i 11 43k	+ 2	e 21 24	+ 7	e 13 55	PP	—
Berkeley		76·9	319	i 11 44k	+ 1	—	—	i 12 12a	pP	—
Butte	N.	77·3	331	e 11 46	0	e 21 28	+ 2	e 12 18	pP	e 37·5
Mineral	Z.	78·1	321	i 11 50k	0	—	—	—	—	—
Shasta Dam		78·8	321	i 12 3	+ 9	e 21 52	+10	i 12 30	pP	—
Hungry Horse		79·7	331	i 11 59	0	e 21 53	+ 1	—	—	—
Saskatoon		79·7	337	—	—	i 21 52	0	i 22 34	PS	—
Seattle		83·2	327	—	—	e 22 33	+ 6	—	—	—
Grahamstown		83·3	123	i 15 19	PP	—	—	i 15 46	pPP	—
Ivigtut		83·4	11	i 12 16	− 2	e 22 28	− 1	i 12 42	pP	—
Malaga	N.	83·6	47	i 12 24	+ 5	i 22 44	+13	—	—	e 47·2
Granada		84·3	47	i 12 47a	+25	i 22 38	0	13 12k	pP	e 45·0
Victoria		84·4	327	12 23	0	22 38	− 1	13 2	pP	—
Tamanrasset	Z.	84·6	63	i 12 24k	0	e 22 39	− 2	i 12 52	pP	—
Almeria		85·0	47	e 12 40	+14	i 22 42	− 3	15 44	PP	48·5
Toledo		85·5	44	i 12 28	0	i 22 50	0	i 12 57	pP	—
Alicante		87·1	47	12 53	+17	23 0	− 5	16 1	PP	e 38·9
Tortosa		88·9	45	—	—	i 23 28	+ 6	i 23 8	SKS	—
Barcelona		90·3	45	—	—	i 23 13	[+ 1]	—	—	—
Clermont-Ferrand		92·9	42	e 13 5	+ 2	e 23 59	+ 1	i 13 34	pP	42·2
Kew		93·6	36	e 16 49	PP	e 24 21	+17	i 23 32	SKS	e 41·2
Paris		93·9	39	i 13 8	0	e 24 6	0	i 13 35	pP	e 45·2
Sitka		95·4	330	e 16 45	PP	e 24 18	− 1	e 23 43	SKS	e 46·2
Aberdeen	E.	95·5	30	e 21 50	?	i 23 43	[+ 2]	i 30 42	SS	—
Basle		96·5	41	e 13 43	+23	e 24 40	+12	e 17 21	PP	—
Scoresby Sund		96·8	13	—	—	i 23 51	[+ 3]	31 52	SS	—
De Bilt		96·9	36	i 13 48a	+27	i 24 35	+ 3	e 17 20	PP	e 47·2
Strasbourg		97·0	40	e 13 30	+ 8	e 24 23	−10	e 13 50	pP	e 41·2
Zürich		97·0	42	e 13 26	+ 4	e 24 40	+ 7	e 17 13	PP	—
Prato		97·3	46	e 17 17	PP	i 26 31	PS	—	—	—
Florence Arc.		97·4	46	e 16 28	?	e 23 50	[− 1]	e 24 56	S	—
Florence Xim		97·4	46	e 17 21	PP	i 23 53	[+ 2]	—	—	—
Salo		97·6	44	—	—	e 24 32	− 6	e 23 57	SKS	—
Rome		97·6	48	e 13 25a?	0	i 23 56	[+ 4]	i 13 59	pP	—
Stuttgart		97·9	41	e 13 25	− 1	e 24 40	0	e 13 53	pP	e 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.
Padova		98·1	46	e 17 13	PP	24 47	+ 5	—	—	—
Triest		99·7	45	e 17 36	PP	i 24 55	0	e 18 24	pPP	—
Taranto		100·5	51	—	—	24 12	[+ 6]	e 28 46	PPS	—
Collmberg		101·1	39	e 13 40	0	e 25 6	− 1	e 17 40	PP	—
Zagreb		101·3	45	e 17 45	PP	e 24 14	[+ 4]	—	—	—
Potsdam	z.	101·5	38	e 17 47	PP	e 26 45	PS	—	—	—
Prague		101·6	41	e 17 52	PP	i 24 15	[+ 3]	—	—	—
Copenhagen		102·3	35	i 24 20	SKS	e 25 19	+ 2	32 28	SS	—
Ogyalla		103·3	43	e 17 24	PP	e 24 19	[0]	—	—	—
Belgrade		104·0	47	—	—	e 24 25	[+ 2]	i 25 18	S	—
Helwan		108·7	65	18 15	PP	i 24 46	[+ 2]	18 43	pPP	—
Istanbul		109·3	52	e 18 31	PP	—	—	—	—	—
Ksara		113·3	61	e 17 10?	?	—	—	—	—	—
Yalta		113·5	49	e 19 18	PP	—	—	—	—	—
Moscow		116·3	36	e 19 38	PP	e 25 13	[0]	20 4	pPP	—
Tiflis		121·1	52	e 19 13?	[+32]	—	—	e 21 50	pPP	—
Grozny		121·8	50	e 19 13	[+30]	—	—	—	—	—
Sverdlovsk		128·5	32	i 18 57	[+ 1]	25 56	[+ 3]	i 19 26	pPKP	—
Tashkent		139·3	49	e 19 21	[+ 5]	i 28 52	SKKS	e 19 46	pPKP	—
Stalinabad		139·7	53	i 19 18	[+ 1]	—	—	—	—	—
Obi-garm		140·3	53	i 19 17	[− 1]	—	—	—	—	—
Andijan		141·7	50	e 19 18	[− 2]	—	—	—	—	—
Batavia		152·9	171	e 19 41	[+ 3]	e 24 11	pPP	—	—	—

Additional readings :—
La Paz iS_gN =2m.5s.
Copiapo N =2m.14s.
Huancayo i =4m.1s., iS =4m.47s.
Santa Lucia N =5m.37s. and 5m.43s.
Bogota iPPP =6m.4s., iZ =9m.59s.
Punta Arenas N =14m.12s. and 14m.46s.
San Juan ePP =8m.44s., iS =13m.1s., isS =13m.32s.
Tacubaya eS_cS =18m.25s.
Bermuda ePP? =10m.58s., eSS =20m.45s., e =21m.35s.
Philadelphia e =11m.28s., esS =18m.51s., eS_cS =19m.42s., e =20m.32s., eSS =22m.25s.
City College, New York esS =19m.4s.
Fordham i =10m.58s. and 19m.5s.
St. Louis i =10m.21s., isS =19m.20s., i =20m.4s. and 20m.46s.
Florissant isS =19m.28s., e =19m.59s. and 20m.47s.
Weston esS =19m.21s.
Harvard iP_cP =10m.58s., e =11m.8s.
Cleveland ipPE =10m.47s., iZ =10m.51s., iSPZ =10m.56s., esSE =19m.20s., iE = 20m.0s. and 20m.49s.
Chicago epPP =13m.13s., e =20m.9s. and 20m.57s., eSS? =22m.57s., eSSS =26m.10s.
Ottawa e =11m.20s., PP =13m.25s., PPP =14m.40s., PS =20m.0s., SS =26m.46s.
Tucson ePP? =13m.24s., esPP? =14m.7s., ePPP? =16m.0s., eS_cS? =20m.27s., e = 21m.15s. and 25m.18s., ePKP,PKP =39m.9s.
Rapid City epPP?E =14m.14s., esSE? =21m.8s., eE =21m.54s., eSSE =25m.18s.
Pasadena isPZ =11m.54s., eZ =12m.10s., ePPZ =13m.58s., esPPZ =14m.29s., iEN = 21m.15s.
Fresno eZ =12m.10s., eN =12m.19s., eZ =12m.48s., eN =14m.9s., eSN =19m.7s.
Santa Clara esSE =22m.5s.
Reno eZ =12m.50s., eSN =21m.27s.
Berkeley iE =22m.24s., eZ =22m.28s., iN =23m.12s.
Butte eSSN =22m.19s.
Shasta Dam eS_cS? =22m.7s.
Granada PP =15m.53s.k, PPP =17m.24s., S =23m.32s., SS =28m.2s.
Victoria SS =23m.28s.
Tamanrasset iP_cP =12m.33s.a, isP =13m.7s., epS =23m.31s.
Almeria PPP =17m.32s., S_cS =22m.58s., PPS =23m.43s., SS =28m.2s., SSS =31m.20s.
Toledo ePPZ =15m.56s., eZ =22m.47s. and 23m.34s., esSN =23m.39s.
Alicante PPP =17m.58s., PS =23m.40s., PPS =24m.0s.
Tortosa PS?E =24m.44s.
Clermont-Ferrand iPP =16m.45s., ePPP =18m.42s., iSKS =23m.34s., isSKS =24m.26s., eSP =25m.3s., ePPS =25m.31s., eSS =29m.52s., Q =38·2m.
Kew ePSEN =25m.21s., eN =29m.41s., eSSSEN =37m.43s.
Paris ePP? =16m.48s., iPP =16m.52s., iSKS =23m.35s., and 23m.38s., iPS =25m.24s., e =27m.58s.
Sitka e =29m.48s., eSS? =30m.48s., eSSS? =34m.25s.
Aberdeen iE =25m.44s.
Basle eSKS =23m.50s.
De Bilt iSKS =23m.52s., ePS =25m.52s., eSS =30m.10s.?

Continued on next page.

Strasbourg e =13m.47s., ePP? =17m.4s., ePP =17m.10s., e =18m.10s. and 22m.43s., eSKS =23m.42s., and 23m.50s., eSP =25m.50s., e =27m.32s. and 27m.54s., eSS = 30m.42s., esSS? =31m.22s.
Zürich eSKS =23m.53s.
Rome eZ =14m.31s., iPP =17m.17s.
Stuttgart ePP =17m.10s., eSKS =23m.57s., ePS =26m.3s., ePKKP =30m.46s.
Padova 22m.0s.
Triest iPPP =19m.34s., iSKS =24m.6s., iPS =26m.37s., eSS =31m.41s., eSSS =35m.35s.
Taranto e =33m.46s.
Collmberg eE =17m.43s., eEZ =17m.46s., eSKSE =24m.14s.
Copenhagen 28m.54s.
Belgrade e =26m.14s. and 28m.29s.
Helwan eZ =19m.13s., and 21m.1s., PPZ =21m.28s., pPPZ =21m.49s., iEN =25m.40s. SZ =28m.5s., sSEZ =29m.0s., phases wrongly identified.
Moscow sSKS =26m.5s., eSKKS =26m.30s., eSP =29m.17s., ePPS =30m.37s., eSS = 35m.28s.
Sverdlovsk ePP =20m.55s., epPP =21m.24s., iPKS =22m.8s.
Tashkent pPP =22m.41s., PPP =25m.2s., i =29m.22s., 29m.48s., 32m.16s., 34m.56s., 40m.19s., and 40m.47s.
Long waves were also recorded at Columbia and Bombay.

May 30d. 21h. 40m. 41s. Epicentre 16°·0N. 145°·7E. Depth of focus 0·090.

A = −·7945, B = +·5420, C = +·2739 ; δ = +2 ; h = +6 ;
D = +·564, E = +·826 ; G = −·226, H = +·154, K = −·962.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Wellington		63·0	155	9 31	0	—	—	—	—
College		65·7	25	e 9 44	− 4	—	—	—	—
Murgab		66·1	305	9 50	0	17 54	+ 2	—	—
Andijan		67·2	307	9 54	− 3	i 18 9	+ 4	i 11 44	pP
Tchimkent		69·2	309	i 10 9	0	—	—	—	—
Tashkent		69·5	308	i 11 11	+60	i 19 34	+62	12 58	pP
Stalinabad		70·1	305	i 10 15	+ 1	i 18 39	+ 1	—	—
Sverdlovsk		74·1	325	i 10 36	− 1	i 19 22	0	i 12 27	pP
Victoria	z.	78·8	42	e 11 3	0	—	—	—	—
Shasta Dam		81·2	50	i 11 16	+ 1	e 20 39	+ 3	i 13 11	pP
Mineral	z.	81·8	50	i 11 18k	0	—	—	e 13 16	pP
Berkeley	z.	81·9	53	i 11 19k	+ 1	—	—	—	—
Lick	z.	82·5	53	i 11 23k	+ 2	e 20 47	− 2	i 13 25	pP
Reno		83·4	51	i 11 27k	+ 1	e 20 55	− 3	e 12 54	pP
Fresno	z.	84·1	53	e 11 30a	+ 1	e 21 15	+11	e 13 25	pP
Hungry Horse		84·9	41	i 11 34	+ 1	e 21 4	− 8	—	—
Tinemaha	z.	85·2	52	i 11 36k	+ 1	—	—	—	—
Pasadena		86·1	55	i 11 39k	0	i 21 19	− 4	e 13 33	pP
Grozny		86·2	313	e 11 33	− 7	e 21 13	−11	e 13 37	pP
Moscow		86·7	327	e 11 41	− 1	e 21 32?	+ 3	e 21 15	SKS
Riverside	z.	86·8	55	i 11 43k	+ 1	—	—	e 13 39	pP
Tiflis		87·4	312	e 13 42	pP	e 21 40	+ 5	—	—
Palomar	z.	87·4	56	i 11 46k	+ 1	—	—	e 13 42	pP
Boulder City		88·2	53	e 11 50	+ 1	—	—	—	—
Overton	z.	88·2	52	e 11 51	+ 2	—	—	—	—
Logan		88·5	46	i 11 50	0	e 21 37	− 8	—	—
Pierce Ferry		88·8	52	i 11 53	+ 1	—	—	—	—
Tucson		92·5	55	e 12 11	+ 2	—	—	e 14 7	pP
Istanbul		98·4	317	e 20 51	PPP	—	—	—	—
Collmberg	z.	101·3	331	e 12 47	− 1	—	—	—	—
Stuttgart	z.	104·9	332	e 17 29	PP	—	—	—	—
Rome	z.	108·0	325	—	—	e 26 23	SP	—	—
La Paz	z.	147·5	96	i 18 41a	[+ 7]	—	—	—	—

Additional readings :—
Tashkent isS =22m.54s.?.
Berkeley iZ =11m.23s.
Reno eEN =12m.41s.
Fresno eZ =21m.29s.
Pasadena iZ =12m.1s.
Palomar iZ =12m.9s.
Logan e =12m.46s.
Collmberg eZ =12m.52s.

May 30d. Readings also at 0h. (Stuttgart, Santa Lucia, Ottawa, Tucson, Hungry Horse, and near Bogota), 1h. (near Tacubaya (2)), 3h. (La Plata and Tinemaha), 4h. (near Tananarive), 6h. (near Bogota), 7h. (Mount Wilson, Tinemaha, Tucson, Pierce Ferry, Shasta Dam, Hungry Horse (2), near Apia, and near Murgab), 8h. (Ashkabad, Bogota, Huancayo, and La Paz), 10h. (Pierce Ferry, Shasta Dam, Hungry Horse, and Ksara), 12h. (Sotchi), 13h. (near Huancayo, and La Paz), 15h. (near Ashkabad), 18h. (near Shasta Dam), 20h. (College, Samarkand, near Kulyab, Obi-garm, and Stalinabad), 23h. (Stuttgart, Branner, near Berkeley, Lick, and near La Paz).

May 31d. 2h. 26m. 46s. Epicentre 6°·5S. 130°·0E. Depth of focus 0·020.
(as on 1946, June 24d.).

A = −·6387, B = +·7612, C = −·1125 ; δ = +2 ; h = +7 ;
D = +·766, E = +·643 ; G = +·072, H = −·086, K = −·994.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Batavia		23·0	269	i 4 47	− 4	i 9 51	+65	— —	—
Brisbane		30·2	137	i 5 57	− 1	i 12 27	?	i 6 35 pP	i 15·4
Riverview		33·5	147	i 6 27k	+ 1	e 12 39	+64	— —	e 18·7
Kaimata	N.E.	51·2	141	8 54	+ 5	—	—	— —	—
Wellington		52·7	138	8 59	− 1	—	—	— —	—
Murgab		68·5	315	11 10?	+23	e 19 36?	+ 2	— —	—
Andijan		70·7	317	i 11 1	+ 1	e 20 0	0	e 11 37 pP	—
Kulyab		71·2	330	e 11 3	0	—	—	— —	—
Obi-garm		71·6	314	i 11 7	+ 1	e 20 12	+ 2	— —	—
Stalinabad		72·2	314	i 11 10	+ 1	e 20 18	+ 1	e 11 45 pP	—
Tchimkent		73·2	317	i 11 14	− 1	—	—	— —	—
Samarkand		73·9	314	e 11 10?	− 9	—	—	— —	—
Sverdlovsk		84·3	329	e 12 17	+ 2	e 22 17	− 8	i 12 54 pP	—
Ksara		97·0	303	e 14 14?	?	—	—	e 16 14? PP	—
Istanbul		102·5	311	e 17 47	PP	e 26 39	PS	— —	—
Collmberg		111·8	323	e 18 34	[+18]	—	—	e 19 2 pPKP	—
Stuttgart	Z.	114·9	321	e 18 24	[+ 3]	—	—	e 19 16 PP	—
Ottawa	Z.	135·3	26	e 19 2	[+ 1]	e 22 16	PKS	— —	—
La Paz	N.	150·9	143	19 38	[+11]	—	—	i 21 49 ?	—

Additional readings :—
Brisbane iN =12m.53s., iE =12m.56s., iSS?N =13m.24s., iSS?Z =13m.28s.
Riverview eN =12m.56s., iN =15m.20s., 15m.42s., 16m.15s., and 16m.40s., iE =16m.49s., iEN =17m.46s., iE =17m.56s., iN =18m.5s. and 18m.17s.
Andijan ePS =20m.48s.
Stalinabad PS =21m.1s.
Sverdlovsk PP =15m.30s., esS =23m.29s.

May 31d. 6h. 39m. 36s. Epicentre 45°·8N. 10°·3E. (as on 27d.).

A = +·6883, B = +·1251, C = +·7146 ; δ = +6 ; h = −1.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Salo		0·2	143	e 0 9	− 1	0 14	− 2
Zürich		1·8	323	e 0 40	P_g	e 1 12	S_g
Ravensburg	z.	2·1	347	e 0 40	+ 3	—	—
Basle		2·5	313	e 0 42	− 1	e 1 34	S_g
Stuttgart		3·1	346	e 1 2	P_g	e 1 48	S_g
Strasbourg		3·3	330	—	—	e 1 59	S_g
Collmberg		5·8	18	—	—	e 2 53	S*

Additional readings :—
Stuttgart e =1m.42s. and 1m.46s.
Collmberg eEZ =2m.56s.

May 31d. Readings also at 4h. (Ashkabad, Samarkand, near Andijan, Kulyab, Murgab, Obi-garm, Stalinabad, and Tchimkent), 5h. (Overton), 7h. (Lick, Overton (2), and near Bogota), 8h. (Lick), 9h. (Weston), 10h., 11h., and 13h. (near Ashkabad), 14h. (Shawinigan Falls, near Ottawa, and near Stalinabad), 17h. (near Stalinabad), 19h. (La Paz, Santa Lucia, and Ottawa), 20h. (Frunse, near Kulyab, Murgab, Obi-garm, Samarkand, Stalinabad, and Tchimkent), 23h. (Overton).

June 1d. 21h. 52m. 7s. Epicentre 36°·7N. 141°·2E.

Intensity IV at Mito, Onahama, Tukubasan, Utunomiya; II-III at Kakioka, Tokyo, Inawashiro, Shirakawa, and Kohn. Epicentre as adopted, macroseismic radius 200-300km.

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

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Onahama		0·3	314	0 10	− 1	0 16	− 2
Mito		0·7	242	0 16k	− 1	0 25	− 3
Kakioka		0·9	240	0 19k	− 1	0 28	− 6
Tukubasan		1·0	241	0 20k	− 1	0 32	− 4
Utunomiya		1·1	262	0 21	− 1	0 39	0
Kumagaya		1·6	249	0 29	− 1	0 47	− 4
Sendai		1·6	351	0 30k	0	0 49	− 2
Tokyo		1·6	229	0 26	− 4	0 46	− 5
Maebasi		1·8	260	0 32	0	—	—
Yokohama		1·8	225	0 43	+11	1 4	+ 8
Matusiro		2·4	266	0 40	− 1	1 11	− 1
Mizusawa	E.	2·4	359	0 46	+ 5	1 11	− 1
Nagano		2·4	269	0 43	+ 2	—	—
Osima		2·4	217	0 39	− 2	—	—
Shizuoka		2·8	233	0 50	+ 3	1 26	+ 4
Miyako		3·0	12	0 53	+ 3	1 27	0
Morioka		3·0	0	0 50	0	1 30	+ 3
Akita		3·1	344	0 54	+ 3	1 31	+ 2
Toyama		3·2	270	1 1	P_g	1 47	S_g
Wazima		3·5	283	0 46	−11	1 41	+ 1
Gihu		3·8	251	1 2	+ 1	1 40	− 7
Nagoya		3·8	247	1 3	+ 2	1 48	+ 1
Hikone		4·3	252	1 10	+ 2	1 58	− 2
Kameyama		4·3	245	1 13	+ 5	1 58	− 2
Osaka		5·1	248	1 40	P_g	2 51	S_g
Toyooka		5·3	259	1 35	P*	2 28	+ 3
Hungry Horse		72·1	43	e 11 25	− 3	—	—
Boulder City		79·0	53	i 12 4	− 3	—	—
Pierce Ferry		79·5	52	i 12 7	− 3	—	—

Mizusawa gives also PN = 50s.

June 1d. Readings also at 1h. (Copiapo), 2h. (near Apia, near Kulyab, and Tashkent), 5h. (Palomar, Pasadena, Tinemaha, Tucson, Boulder City, Pierce Ferry, Hungry Horse, and near Granada), 7h. (Christchurch, Perth, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry (2), Berkeley, Lick, Fresno, Reno, Mineral, Hungry Horse (2), and Logan), 8h. (Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Lick, Hungry Horse, Victoria, Sitka, Saskatoon, Seven Falls, Philadelphia, near Tacubaya, Kew, and near Messina), 9h. (near Ashkabad), 10h. (Kaimata, Wellington, Ashkabad, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, and Pierce Ferry), 11h. (Tucson, Boulder City, Overton, Pierce Ferry (2), Hungry Horse, Strasbourg, Stuttgart, Rome, Triest, Ksara, and near Istanbul), 12h. (near Ashkabad), 13h. (near La Paz), 14h. (near Klyuchi), 15h. (Wellington), 17h. (Hungry Horse and near Murgab), 18h. (Ottawa), 19h. (Ksara, Overton, and Santa Lucia), 20h. (Overton), 21h. (Santa Lucia, Boulder City, Overton, Pierce Ferry, and Hungry Horse), 22h. (Frunse, near Kulyab, Murgab, Obi-garm, Samarkand, Stalinabad, and near Ashkabad), 23h. (near Apia and near Balboa Heights),

June 2d. Readings at 2h. (near Tananarive), 4h. (near Kulyab, Murgab, Obi-garm, and Stalinabad), 8h. (Stalinabad, near Kulyab, Murgab, and Obi-garm), 11h. (La Paz and near Andijan), 12h. (near Tacubaya), 13h. (near Messina), 15h. (near Istanbul), 16h. (Fresno, near Ashkabad, Tucson, near Boulder City, Overton, and Pierce Ferry), 17h. (Auckland, Christchurch, and Wellington), 18h. (Alicante), 20h. (near Kulyab, Obi-garm, and Stalinabad), 22h. (La Paz), 23h. (near Ashkabad).

June 3d. Readings at 0h. (Santa Lucia), 2h. (Mount Wilson, Palomar, Boulder City, and Pierce Ferry), 3h. (Pierce Ferry, Logan, Hungry Horse, Tucson, and near Rapid City), 4h. (Collmberg), 6h. (Collmberg, Stuttgart, Sverdlovsk, Ksara, Baku, Grozny, Piatigorsk, Sotchi, Yalta, near Erevan, Leninakan, and Tiflis), 7h. (Istanbul, Copiapo, Santa Lucia, and Hungry Horse), 11h. (Victoria, near La Paz, and near Murgab), 14h. (Istanbul), 15h. (Copiapo, Santa Lucia, Collmberg, near Kulyab, Murgab, Obi-garm, and Stalinabad), 18h. (Ashkabad), 19h. (Paris), 20h. (Hungry Horse), 21h. (near Bagnères and near La Paz).

June 4d. 0h. Tonga.

Apia P =57m.33s., e =58m.45s,. eS =59m.28s.
Tuai eN =58m.32s., SN =61m.14s.
Wellington P? =58m.56s., i =59m.2s., S? =62m.11s.
Kaimata eNE =59m.24s.
Lick iPZ =66m.18s. a.
Pasadena iPNZ =66m.19s. a.
Palomar iPZ =66m.21s. a.
Fresno ePZ =66m.22s.
Shasta Dam iP =66m.25s.
Tinemaha iPZ =66m.28s.
Boulder City iP =66m.36s.
Pierce Ferry iP =66m.40s.
Tucson iP =66m.42s.
Victoria eZ =66m.48s.
Logan eP =67m.0s.
Hungry Horse iP =67m.8s.
Copenhagen PKP =73m.37s.

June 4d. 23h. 26m. 31s. Epicentre 19°·1N. 67°·1W. (as on 1949, March 23d.).

Uncertain.

$A = +\cdot3680$, $B = -\cdot8711$, $C = +\cdot3252$; $\delta = -1$; $h = +5$;
$D = -\cdot921$, $E = -\cdot389$; $G = +\cdot127$, $H = -\cdot300$, $K = -\cdot946$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
San Juan		1·2	128	i 0 25	+ 1	i 0 43	+ 2	—	i 1·1
Fort de France		7·2	127	e 1 44	− 5	—	—	—	—
Galerazamba		11·4	225	—	—	e 6 13	S_n	—	—
Bogota		15·9	206	e 3 52	+ 5	e 6 42	− 2	e 6 55	SS
Fordham		22·4	348	e 4 56	− 6	e 8 52	−12	—	—
Weston		23·5	353	i 5 21	+ 9	i 9 18	− 5	—	—
Cleveland		25·5	334	i 5 41	+ 9	e 10 28	+31	—	e 12·4
St. Louis		28·0	319	e 6 13	+18	e 11 9	+31	—	—
Tucson		41·3	298	e 7 47	− 2	—	—	—	—
Logan		44·1	312	e 8 4	− 8	—	—	—	—
Pierce Ferry		44·4	303	e 8 9	− 5	—	—	—	—
Hungry Horse		47·7	320	i 8 34	− 6	—	—	—	—
Shasta Dam		51·6	307	e 9 2	− 8	—	—	—	—
Victoria	z.	53·7	317	e 9 19	− 7	—	—	—	—
College		69·0	334	e 11 2	− 7	—	—	—	—

Additional readings :—
San Juan i =33s.
Cleveland iN =5m.52s. and 6m.3s.
Long waves also recorded at Seven Falls, Philadelphia, Bermuda, and Kew.

June 4d. Readings also at 0h. (Bogota), 3h. (Tacubaya), 4h. (Brisbane, Wellington, Murgab, Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Berkeley, Fresno, Lick, Shasta Dam, Hungry Horse, Victoria, Logan, and La Paz), 7h.(Mizusawa,Frunse,Obi-garm,Stalinabad,Tashkent,near Andijan,Kulyab,Murgab, and near Chur), 9h. (La Paz, near Huancayo, near Tacubaya, Ashkabad (2), near Andijan, Kulyab, Murgab, Obi-garm, and Stalinabad),10h. (Bogota), 11h. (Alicante), 13h. (near La Paz), 16h. (near Andijan, Kulyab, Obi-garm, and Stalinabad), 19h. (Pierce Ferry and near Apia), 20h. (near Yalta).

June 5d. Readings at 2h. (near Mizusawa), 3h. (near Murgab, and Obi-garm), 4h. (Tucson, Pierce Ferry, Andijan (2), Frunse, Stalinabad, near Kulyab, Murgab, and Obi-garm), 6h. (La Paz, Huancayo, Bogota, and Tucson), 7h. (near Salo), 9h. (Alicante, near Stalinabad, Kulyab, Murgab, and Obi-garm), 11h. (College and Tucson), 12h. (Butte), 13h. (near Tortosa), 15h. (Wellington), 17h. (Samarkand, Tashkent (2), Tchimkent (2), Andijan (2), near Kulyab, Murgab, Obi-garm (2), Stalinabad, near Ashkabad, near Granada, Boulder City, Pierce Ferry, and near Tucson), 18h. (La Paz (2), Frunse, Shasta Dam, Hungry Horse, Murgab, near Andijan, Kulyab, Obi-garm, Samarkand, Stalinabad, Tashkent, and Tchimkent), 19h. (Osaka, Tokyo, Nagoya, Sendai, Collmberg, Paris, Stuttgart, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Logan, Hungry Horse, Victoria, and College), 20h. (Strasbourg and Triest), 22h. (Boulder City, Pierce Ferry, near Tucson, Murgab, near Kulyab, Obi-garm, and Stalinabad (2)), 23h. (Frunse, Tashkent, near Andijan, Murgab, Kulyab, Obi-garm, and Stalinabad).

June 6d. 6h.-7h. South Pacific.

Apia P? =59m.3s., e =61m.21s., iS? =62m.54s., eL =63·8m.
Riverview iPZ =65m.33s., eLE =75·5m.
Berkeley eZ =71m.5s.
Lick iPZ =71m.5s.k., iZ =71m.16s.
Pasadena iPZ =71m.6s., ipP? =71m.17s.
Riverside iPZ =71m.7s., ipP?Z =71m.19s.
Palomar iPZ =71m.8s., ipP?Z =71m.20s.
Fresno ePZ =71m.10s.k, eZ =71m.22s.
Shasta Dam eP =71m.14s., epP? =71m.25s.
Tinemaha iPZ =71m.16s., ipP?Z =71m.27s.
Boulder City eP =71m.24s.
Pierce Ferry eP =71m.25s., epP? =71m.38s.
Overton ePZ =71m.27s.
Tucson eP =71m.27s., epP? =71m.39s., eL =97m.30s.
Hungry Horse e =71m.56s.
College iP =72m.3s., ipP? =72m.15s.
Ksara e =77m.7s. and 79m.5s.
Collmberg eZ =78m.57s., eEZ =79m.9s., eZ =79m.31s.
Stuttgart eZ =79m.9s.
Long waves were also recorded at Strasbourg, Almeria, Alicante, Granada, Malaga, Auckland, Christchurch, Wellington, Huancayo, Philadelphia, Seven Falls, and Weston.

June 6d. Readings also at 0h. (near Andijan, Obi-garm, Kulyab, Murgab, and Stalinabad), 6h. (Copiapo, Overton, and Tucson), 8h. (Mizusawa, and College), 12h. (Tucson, near Boulder City, Overton, and Pierce Ferry), 14h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse and College), 18h. (Overton), 20h. (Ottawa and Overton), 21h. (College), 22h. (Palomar, Pasadena, Riverside, Tinemaha, Boulder City, Pierce Ferry, Lick, Shasta Dam, Hungry Horse, and near Ottawa), 23h. (near Andijan).

June 7d. 5h. 24m. 8s. Epicentre 55°·6N. 162°·0E. (as on 1946, March 9d.).

$A = -·5398$, $B = +·1754$, $C = +·8233$; $\delta = -3$; $h = -7$;
$D = +·309$, $E = +·951$; $G = -·783$, $H = +·254$, $K = -·568$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		1·0	316	0 3	?	0 56	?	—	—	—
College		25·9	48	i 5 34	− 1	—	—	—	—	—
Hungry Horse		49·2	61	i 8 52	0	—	—	—	—	—
Shasta Dam		50·1	73	i 8 58	− 1	—	—	—	—	—
Mineral	z.	50·7	73	i 9 3k	0	—	—	—	—	—
Reno	z.	52·3	73	i 9 15a	0	—	—	—	—	—
Lick	z.	52·8	77	i 9 18k	− 1	—	—	e 11 29	PP	—
Logan		54·9	66	e 9 34	− 1	—	—	—	—	—
Tinemaha		54·9	74	i 9 34k	− 1	—	—	i 9 53	pP	—
Pasadena		57·1	76	i 9 49k	− 1	—	—	i 10 8	pP	—
Overton	z.	57·4	71	i 9 53	0	—	—	—	—	—
Boulder City		57·6	72	i 9 54	0	—	—	—	—	—
Riverside	z.	57·7	76	i 9 53	− 2	—	—	e 10 11	pP	—
Pierce Ferry		57·9	71	i 9 56	0	—	—	—	—	—
Palomar		58·4	76	i 9 58k	− 2	—	—	i 10 9	pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		62·6	72	i 10 26	− 2	—	—	—	—	—
St. Louis		67·9	54	i 11 2	0	e 19 56	− 5	—	—	—
Ottawa	z.	68·2	40	11 3k	− 1	—	—	13 29	PP	—
Collmberg		70·4	340	e 11 19	+ 1	—	—	—	—	—
Weston		72·4	38	i 11 30	0	—	—	—	—	—
Stuttgart		73·5	342	e 11 39	+ 3	—	—	—	—	e 50·7
Strasbourg		74·0	343	i 11 42	+ 3	—	—	—	—	—
Paris		74·6	346	e 11 45	+ 2	—	—	—	—	e 50·9
Clermont-Ferrand		77·5	346	i 12 2	+ 3	—	—	—	—	—

Additional readings :—
Hungry Horse i = 10m.15s. and 10m.47s.
Shasta Dam e = 9m.18s., i = 9m.39s.
Pasadena iZ = 9m.59s., isP?Z = 10m.22s.
Overton iZ = 10m.18s.
Collmberg eZ = 11m.30s., eE = 11m.36s.
Long waves were also recorded at Scoresby Sund, Alicante, Granada, and Tricst.

June 7d. Readings also at 1h. (near Andijan, Murgab, and Obi-garm), 3h. (near La Paz), 4h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Lick, Mineral, Hungry Horse (2), Logan, and near College), 8h. (Tacubaya, Riverside, Tinemaha, Tucson, Overton, and Pierce Ferry), 9h. (near Grozny), 11h. (Paris and near Mizusawa), 12h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Fresno, Reno, Shasta Dam, Hungry Horse, Logan, and College), 14h. (Reykjavik), 15h. (Ashkabad and Overton), 17h. (Alicante, near Puebla, and Tacubaya), 21h. (Brisbane, Overton, and near Santa Lucia), 23h. (Wellington, Andijan, near Kulyab, Murgab (2), and Obi-garm).

June 8d. 5h. 0m. 56s. Epicentre 63°·6N. 150°·8W. (as on 1940, March 6d.).

$A = -\cdot3902$, $B = -\cdot2181$, $C = +\cdot8945$; $\delta = -5$; $h = -10$;
$D = -\cdot488$, $E = +\cdot873$; $G = -\cdot781$, $H = -\cdot436$, $K = -\cdot447$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		1·8	46	i 0 36	+ 4	i 1 0	+ 4	—	—	i 1·5
Sitka		9·7	121	e 2 18	− 4	e 4 13	− 2	—	—	e 4·7
Victoria		21·3	123	i 4 48k	− 2	e 9 4	+21	—	—	13·1
Hungry Horse		25·1	109	i 5 29	+ 1	—	—	—	—	e 14·0
Shasta Dam		28·4	130	e 5 58	0	—	—	—	—	—
Mineral	z.	29·0	129	i 6 3a	− 1	i 12 52	SSS	i 9 10	PcP	—
Logan		31·4	115	e 6 22	− 3	—	—	e 9 15	PcP	e 16·7
Lick	z.	31·6	132	i 6 26a	0	—	—	i 9 16	PcP	—
Fresno	z.	32·8	129	e 6 37	0	—	—	—	—	—
Tinemaha	z.	33·0	128	i 6 39a	0	e 13 5	SS	i 9 21	PcP	—
Overton	z.	34·9	123	i 6 56	+ 1	—	—	i 9 27	PcP	—
Boulder City		35·3	123	i 6 59	0	—	—	—	—	—
Pierce Ferry		35·4	123	i 7 0	0	—	—	i 9 28	PcP	—
Pasadena	z.	35·7	129	i 7 1	− 1	—	—	i 9 33	PcP	—
Riverside	z.	36·1	129	i 7 5a	0	—	—	i 9 29	PcP	—
Palomar	z.	36·9	128	i 7 10	− 2	—	—	—	—	—
Tucson		40·1	122	i 7 39	0	—	—	i 9 42	PcP	e 23·4
St. Louis		43·3	95	i 8 4	− 1	i 23 31	L	i 9 45	PcP	(i 23·5)
Ottawa		44·3	77	e 8 13	0	—	—	—	—	23·4
Shawinigan Falls	N.	44·7	73	e 8 16	0	—	—	—	—	22·1
Cleveland		44·8	85	i 8 19a	+ 2	e 18 24	ScS	—	—	e 23·9
Weston		48·6	76	i 8 47	0	—	—	—	—	—
Collmberg	z.	64·7	12	e 10 40	− 2	—	—	—	—	—
Paris		66·0	20	e 10 50	0	—	—	—	—	—
Stuttgart	z.	66·9	15	e 10 56	0	—	—	—	—	—
Bogota		80·0	99	e 12 9	− 4	—	—	—	—	—
Grahamstown	z.	149·6	4	i 19 51	[+ 4]	—	—	—	—	—

For Notes see next page.

NOTES TO JUNE 8d. 5h 0m 56s.

Additional readings :—
Sitka e = 3m.19s.
Hungry Horse i = 5m.33s.
Shasta Dam i = 6m.2s.
Tinemaha iZ = 9m.27s.
Overton iZ = 7m.11s.
Pasadena iZ = 7m.18s.
Riverside iZ = 9m.35s.
Tucson e = 8m.51s.
Cleveland iZ = 8m.24s.
Collmberg eZ = 10m.46s. and 11m.12s.
Paris i = 10m.56s.
Long waves were also recorded at Granada and at other American stations.

June 8d. Readings also at 0h. (Riverside and Tinemaha), 2h. (near Kulyab, Murgab, and Obi-garm), 4h. (Boulder City, Pierce Ferry, Tucson, and Rome), 6h. (near Klyuchi and near Puebla), 7h. (Boulder City), 9h. (near Kulyab, Obi-garm, Stalinabad, and near Grozny), 11h. (Strasbourg (2)), 13h. (Nanking and near Klyuchi), 14h. (Clermont-Ferrand), 15h. (Paris, Strasbourg, and Santa Lucia), 16h. (Ashkabad and Victoria), 17h. (Collmberg), 18h. (Victoria), 19h. (near Stalinabad, Andijan, Murgab, and Obi-garm (2)), 22h. (near Obi-garm, Stalinabad, Andijan, Kulyab, and Murgab).

June 9d. 10h. 49m. 2s. Epicentre 14°·3N. 91°·2W. (as on 1943, Aug. 31d.).

$A = -\cdot0203$, $B = -\cdot9692$, $C = +\cdot2454$; $\delta = -2$; $h = +5$;
$D = -1\cdot000$, $E = +\cdot021$; $G = -\cdot005$, $H = -\cdot245$, $K = -\cdot969$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		6·8	13	1 52	+ 8	—	—	—	—	3·2
Tacubaya		9·2	305	2 26	+10	—	—	—	—	4·3
Bogota		19·4	118	i 4 32	+ 2	—	—	—	—	—
St. Louis		24·3	2	e 5 19	− 1	i 9 35	− 2	—	—	—
Tucson		25·3	319	e 5 30	0	e 9 41	−13	e 6 4	pP	c 13·8
Pierce Ferry		29·8	322	e 6 11	0	—	—	i 9 12	PcP	—
Palomar	z.	30·0	315	i 6 11	− 1	—	—	i 9 14	PcP	—
Boulder City		30·2	321	i 6 15	+ 1	—	—	e 6 34	pP	—
Overton	z.	30·4	322	i 6 16	0	—	—	i 9 14	PcP	—
Riverside	z.	30·8	314	i 9 15	PcP	—	—	—	—	—
Mount Wilson	z.	31·4	314	e 6 33	+ 8	—	—	i 9 16	PcP	—
Pasadena	z.	31·4	314	i 9 18	PcP	—	—	—	—	—
Logan		32·7	331	e 6 35	− 1	—	—	—	—	—
Tinemaha	z.	33·1	318	i 6 41	+ 1	—	—	i 9 21	PcP	—
Ottawa	z.	33·7	20	e 6 43	− 2	—	—	—	—	—
Reno		35·5	321	e 7 2	+ 2	—	—	—	—	—
Mineral	z.	37·1	321	i 7 14a	0	—	—	i 9 33	PcP	—
Shasta Dam		37·8	321	e 7 17	− 3	—	—	i 9 33	PcP	—
Hungry Horse		38·8	337	e 7 27	− 1	—	—	i 9 37	PcP	—
Victoria	z.	43·2	330	i 8 4a	0	—	—	—	—	—

Additional readings :—
Tucson iPcP = 9m.2s.
Palomar iZ = 6m.33s.
Boulder City iPcP = 9m.14s.
Mount Wilson iZ = 8m.52s.
Tinemaha iZ = 9m.35s.
Reno ePZ = 7m.7s.

June 9d. 21h. 18m. 45s. Epicentre 17°·2S. 174°·4W. Depth of focus 0·020.
(as on 1948, July 12d.).

Intensity III at Apia.
Epicentre 17°·25S. 173°·5W. (Strasbourg), 16°·5S. 174°·0W. (U.S.C.G.S.).
Apia Observatory, Western Samoa, Preliminary Seismological Bulletin, April-June, 1949, p. 4.

$A = -·9513$, $B = -·0933$, $C = -·2939$; $\delta = +5$; $h = +5$;
$D = -·098$, $E = +·995$; $G = +·292$, $H = +·029$, $K = -·956$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		4·2	37	0 59	− 5	1 38	−15	—	—	—
Auckland	N.	21·8	205	i 6 57	?	9 43	SSS	—	—	—
Tuai	N.	22·8	198	4 56	+ 7	e 9 6	+23	—	—	—
New Plymouth	E.	24·0	202	5 34	PP	—	—	—	—	—
Wellington		25·7	200	5 22	+ 5	e 10 5	+33	—	—	—
Kaimata	N.E.	28·0	203	5 43	+ 5	—	—	—	—	—
Riverview		35·0	235	i 6 48a	+ 9	i 16 50	S_cS	i 8 13	PP	e 17·2
Lick	Z.	73·5	42	i 11 16k	− 1	—	—	i 14 1	PP	—
Berkeley	Z.	73·5	42	i 11 15	− 2	—	—	—	—	—
Pasadena		73·9	47	i 11 18k	− 1	—	—	e 11 59	pP	—
Fresno	Z.	74·4	43	i 11 21	− 1	—	—	—	—	—
Palomar		74·4	48	i 11 20k	− 2	—	—	i 12 6	pP	—
Riverside	N.	74·4	47	i 11 22	0	—	—	—	—	—
Shasta Dam		75·1	39	i 11 25	− 1	—	—	i 12 8	pP	—
Mineral	N.	75·4	40	e 11 27k	− 1	—	—	—	—	—
Tinemaha		75·6	44	i 11 27k	− 2	—	—	i 12 13	pP	—
Reno		76·0	42	i 11 30k	− 1	e 21 1	+ 2	—	—	—
Boulder City		77·2	47	i 11 38	0	—	—	—	—	—
Overton	Z.	77·8	46	i 11 40	− 1	—	—	—	—	—
Pierce Ferry		77·9	47	i 11 41	− 1	e 21 20	0	e 11 51	P_cP	—
Tucson		78·2	52	i 11 43	0	e 21 28	+ 5	e 12 25	pP	—
Victoria	Z.	79·6	32	i 11 49a	− 2	—	—	—	—	—
Logan		82·3	42	i 12 3	− 2	e 22 2	− 3	e 14 51	PP	—
College		84·3	10	i 12 13	− 2	—	—	i 12 56	pP	—
Hungry Horse		84·5	36	i 12 14	− 2	—	—	i 15 29	PP	—
St. Louis		96·1	51	i 13 10	0	e 23 31	[+ 1]	e 17 2	PP	—
City College N.Y.		108·8	52	—	—	e 28 23	PS	—	—	e 46·1
Copenhagen		141·2	354	22 37	PP	—	—	—	—	—
De Bilt		145·2	0	i 19 18k	[0]	—	—	e 22 45	PP	—
Kew		145·5	6	i 19 20	[+ 1]	e 32 26	SKSP	e 20 22	PKP_2	e 51·3
Collmberg		145·5	353	e 19 19	[0]	—	—	e 19 37	pPKP	—
Raciborzu		145·7	344	e 19 23	[+ 4]	—	—	—	—	—
Jena	E.	146·0	351	e 19 23	[+ 3]	—	—	—	—	—
Prague		146·5	348	i 19 21	[0]	e 27 39	?	—	—	—
Ksara		148·2	307	i 19 29	[+ 6]	—	—	23 0	PP	—
Stuttgart		148·4	355	e 19 26	[+ 2]	e 30 26	SKKS	e 22 47	PP	—
Paris		148·4	5	e 19 26	[+ 2]	—	—	e 22 53	PP	—
Strasbourg		148·6	357	i 19 30k	[+ 6]	—	—	e 20 18	pPKP	—
Istanbul		148·8	325	e 19 28	[+ 4]	—	—	—	—	—
Basle		149·7	356	e 19 32k	[+ 6]	—	—	—	—	—
Zürich		149·8	355	e 19 32k	[+ 6]	—	—	—	—	—
Zagreb		150·2	345	e 19 35	[+ 9]	—	—	e 23 12	PP	—
Chur		150·3	354	e 19 33k	[+ 7]	—	—	—	—	—
Triest		151·1	348	e 19 31	[+ 3]	—	—	e 22 59	PP	—
Salo		151·4	352	e 19 36k	[+ 8]	—	—	e 23 1	PP	—
Clermout-Ferrand		151·5	3	e 19 31	[+ 2]	—	—	—	—	—
Padova		152·3	349	e 19 35	[+ 5]	—	—	—	—	—
Helwan	Z.	153·3	302	19 44	[+13]	—	—	e 23 30	PP	—
Rome		154·7	347	e 19 35	[+ 2]	e 33 30	PS	e 19 56	pPKP	—
Alicante		158·3	13	19 53	pPKP	—	—	24 25	PP	—
Granada		158·5	20	i 20 52	$pPKP_2$	e 45 29	SSP	i 23 49	PP	—
Malaga	Z.	158·6	21	e 19 40	[+ 2]	—	—	i 20 18a	pPKP	e 70·2
Almeria		159·2	18	i 20 11	pPKP	44 11	SS	20 48	$pPKP_2$	79·6
Tamanrasset	Z.	174·4	—	e 19 55	[+ 5]	e 31 58	SKKS	e 20 44	$pPKP_2$	—

For Notes see next page.

NOTES TO JUNE 9d. 21h. 18m. 45s.

Additional readings :—
Pasadena iZ =11m.26s., ipP?Z =12m.4s., eZ =12m.17s., iPP?Z =14m.3s.
Pierce Ferry e =11m.59s.
Tucson ipP =12m.29s., esP =12m.47s., e =13m.22s. and 13m.51s.
St. Louis eS =24m.15s., ePS =24m.53s.
Kew ePPZ =21m.39s., eZ =24m.12s.
Collmberg eZ =19m.24s., ePP?Z =22m.47s., eE =22m.51s.
Stuttgart iPKPZ =19m.29s.k, eZ =19m.44s., 20m.17s., 20m.29s., and 24m.0s.
Paris i =19m.29s., e =19m.35s., esPKP? =20m.28s., e =22m.47s.
Strasbourg i =19m.45s., esPKP =20m.33s., e =22m.51s.
Zagreb eZ =23m.3s.
Clermont-Ferrand i =19m.37s., 19m.59s., and 20m.50s.
Helwan iZ =19m.56s., eZ =20m.51s.
Rome e =24m.12s.
Malaga iPPZ =23m.59s.a, PPPZ =27m.31s.k.
Almeria PP =24m.23s., PPP =27m.56s.
Tamanrasset iPKP$_2$Z =21m.25s.k, eZ =22m.15s., ePPZ =25m.15s., ePPP?Z =29m.13s.

June 9d. Readings also at 1h. (Collmberg and Overton), 2h. (near Obi-garm), 3h. (Copiapo, Punta Arenas, La Paz, Tucson, Mount Wilson, and Riverside), 4h. (Puebla, Tucson, Tinemaha, Overton (2), Clermont-Ferrand, Kew, and near Mizusawa), 5h. (Bogota and Wellington), 6h. (Collmberg, Ravensburg, and Stuttgart), 7h. (Mount Wilson, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Hungry Horse, Merida, Puebla, and near Tacubaya), 8h. (Misuzawa), 9h. (Tucson, Overton, Pierce Ferry, Hungry Horse, and near Logan), 11h. (Istanbul), 15h. (Overton and Victoria), 16h. (Huancayo, La Paz, and near Obi-garm), 18h. (Riverview, Lick, and near Branner), 19h. (Ashkabad and Hungry Horse), 21h. (Auckland, Wellington, and near Mizusawa), 22h. (Santa Lucia).

June 10d. 3h. 6m. 37s. I, 5h. 4m. 36s. II } Epicentre 37°·3N. 121°·7W. (as on 1948, July 20d.).

Intensity VI at San Jose (slight damage), Watsonville ; V at Morgan Hill, Mount Hamilton, and San Francisco. Epicentre 37°21′N. 121°37′W. Macroseismic area 8000 sq.m.

L. M. Murphy and F. P. Ulrich.
United States Earthquakes, 1949. Serial No. 748, Washington, 1951, pp. 14-15 with macroseismic chart.

A = −·4190, B = −·6784, C = +·6034 ; δ = −12 ; h = −1 ;
D = −·851, E = +·525 ; G = −·317, H = −·513, K = −·797.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Lick	0·0	—	i 0 4	− 3	—	—	—	—	—
II		0·0	—	i 0 3	− 4	—	—	—	—	—
I	Santa Clara	0·2	284	i 0 7	− 3	i 0 13	− 3	—	—	—
II		0·2	284	i 0 5	− 5	i 0 10	− 6	—	—	—
I	Branner	z. 0·4	287	i 0 11	− 2	—	—	—	—	—
II		0·4	287	i 0 9	− 4	e 0 16	− 5	—	—	—
I	Berkeley	0·7	321	i 0 17k	0	i 0 27	− 1	—	—	—
II		z. 0·7	321	i 0 15a	− 2	i 0 24	− 4	—	—	—
I	San Francisco	0·7	308	i 0 17	0	e 0 26	− 2	—	—	—
II		0·7	308	i 0 15	− 2	i 0 26	− 2	—	—	—
I	Fresno	z. 1·6	110	i 0 29a	− 1	—	—	—	—	—
II		N. 1·6	110	e 0 30	0	i 0 51	0	—	—	—
I	Ukiah	2·2	327	e 0 43	+ 5	e 1 18	+12	—	—	e 1·5
I	Reno	2·7	34	i 0 47a	+ 2	i 1 25	+ 6	e 0 57	P_g	—
II		2·7	34	e 0 50	+ 5	e 1 16	− 3	e 1 32	S_g	—
I	Tinemaha	2·7	94	i 0 48	+ 3	i 1 19	0	—	—	—
I	Mineral	3·1	2	i 0 51a	0	i 1 35	+ 6	i 0 58	P*	—
II		z. 3·1	2	i 0 50	− 1	—	—	—	—	—
I	Haiwee	3·2	111	i 0 53	+ 1	i 1 34	+ 2	—	—	—
I	Santa Barbara	3·3	151	i 0 52	− 1	i 1 33	− 2	—	—	—
I	Shasta Dam	3·4	351	i 0 54	− 1	i 1 38	+ 1	i 0 59	P*	—
I	Pasadena	4·2	137	i 1 6	− 1	i 1 56	− 1	—	—	—
I	Riverside	N. 4·9	133	e 1 15	− 2	—	—	—	—	—

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
I Boulder City		5·7	102	i 1 28	0	—	—	—	—	e 3·0
II		5·7	102	e 1 44	P*	—	—	—	—	—
I Overton	z.	5·9	96	e 1 31	0	—		i 1 52	P_g	i 3·2
II	z.	5·9	96	e 1 50	P*	—	—	—	—	i 3·4
I Pierce Ferry		6·3	99	e 1 36	0	—	—	—	—	e 3·3
II		6·3	99	e 1 36	0	—	—	—	—	—
I Logan		8·8	57	e 2 23	+12	—	—	—	—	e 4·8
I Tucson		10·3	117	e 2 28	− 4	e 3 45	−45	—	—	e 4·7
I Hungry Horse		12·4	25	i 3 3	+ 2	—	—	—	—	e 6·7

Additional readings :—
Berkeley I iE = 20s., II iZ = 27s.
San Francisco II iE = 18s. and 41s.
Ukiah I e = 1m.2s.
Reno I iZ = 50s., eZ = 1m.5s., eSZ = 1m.28s.
Mineral ePN = 54s.
Tucson I e = 2m.55s.
Long waves to shock I were also recorded at Bozeman, Butte, and Philadelphia.

June 10d. 20h. 3m. 17s. Epicentre 46°·3N. 15°·2E. (as on 1948, Sept. 27d.).

Intensity VI at Videm Savi (45°58′N. 15°30′E.); V at Vel. Kamen. Epicentre 46°·1N. 15°·3E. (Strasbourg). Macroseismic radius 9km.

M. D. Uzelac.
Annuaire microséismique et macroséismique de l'Institut séismologique de Beograd, 1949, Nouvelle Série No. 9. Belgrade 1950, p. 59.

$A = +·6690$, $B = +·1818$, $C = +·7206$; $\delta = -12$; $h = -4$;
$D = +·262$, $E = -·965$; $G = +·695$, $H = +·189$, $K = -·693$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Zagreb		0·7	132	0 7?	P_g	i 0 13	S_g	—	—	—
Triest		1·2	237	i 0 25	+ 1	i 0 40	− 1	—	—	—
Ogyalla		2·6	53	e 0 54	P_g	e 1 30	S_g	—	—	—
Padova		3·0	232	e 0 49	− 1	e 1 24	− 3	—	—	—
Salo		3·3	260	e 1 3	P_g	e 1 47	S_g	—	—	—
Florence Arcet	N.	3·8	229	—	—	e 2 4	S_g	—	—	—
Florence Xim		3·8	229	—	—	e 2 6	S_g	—	—	i 2·4
Prague		3·8	353	—	—	e 1 49	+ 2	i 2 18	S_g	—
Prato		3·8	232	—	—	e 2 1	S*	—	—	—
Chur		4·0	280	e 1 6	+ 2	e 2 1	S*	—	—	—
Ravensburg		4·1	293	e 1 7?	+ 2	e 2 25	S_g	e 1 20	P_g	—
Zürich		4·7	286	e 1 12	− 2	e 2 20	S*	e 2 43	S_g	—
Stuttgart		4·8	303	e 1 14	− 1	e 2 23	S*	e 1 36	P_g	—
Rome		4·9	205	—	—	e 2 22	S*	e 2 33	S_g	e 3·1
Jena	E.	5·2	334	e 1 48	P_g	e 2 55	S_g	—	—	—
Collmberg		5·3	345	e 1 21	− 1	e 2 31	+ 6	e 1 43	P_g	—
Basle		5·4	286	e 2 22	S	(e 2 22)	− 6	—	—	e 3·3
Strasbourg		5·5	297	e 2 46	S*	i 3 9	S_g	—	—	e 3·2
Potsdam	z.	6·2	348	—	—	e 3 28	S_g	—	—	i 4·2

Additional readings :—
Salo i = 1m.58s.
Florence eE = 2m.17s.
Ravensburg eZ = 1m.29s.
Stuttgart eZ = 1m.50s., eS* = 2m.42s., e = 2m.45s., eS_g = 2m.51s.
Jena eP_g?E = 2m.23s., eE = 3m.0s., iS_g = 3m.4s.
Collmberg eE = 1m.47s. and 2m.4s., eZ = 2m.44s., eSE = 2m.52s., iS_gE = 3m.4s.
Potsdam eE = 3m.31s.

June 10d. Readings also at 0h. (near Bogota and near Fort de France), 1h. (Tacubaya and Tucson), 3h. (Lick, near Berkeley, Branner, San Francisco, and Santa Clara), 4h. (Neuchatel), 5h. (Lick, near Berkeley, and Branner), 6h. (Mount Wilson, Tinemaha, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Copenhagen, Kew, De Bilt, Paris, Potsdam, Clermont-Ferrand, Strasbourg, and Stuttgart), 7h. (Ashkabad), 9h. (Tashkent, Tchimkent, near Kulyab, Murgab, Obi-garm, Samarkand, and Stalinabad), 10h. (Hungry Horse), 11h. (near La Paz), 12h. (Nanking, Overton, Pierce Ferry, Shasta Dam, and Hungry Horse), 14h. (Ashkabad and Hungry Horse), 16h. (Ashkabad), 20h. (Christchurch, Overton, Zagreb, near Balboa Heights, near Kulyab, Murgab, and Obi-garm), 21h. (Lick, San Francisco, near Berkeley, and Branner), 22h. (Ashkabad, Collmberg, Stuttgart, Salo, near Triest, Zagreb, near Fort de France, Lick, near Berkeley, and Branner), 23h. (San Francisco, Frunse, Kulyab, Obi-garm, near Andijan, and Murgab).

June 11d. 7h. 34m. 44s. Epicentre 12°·1N. 87°·9W.

$A = +\cdot0358$, $B = -\cdot9774$, $C = +\cdot2083$; $\delta = -2$; $h = +6$;
$D = -\cdot999$, $E = -\cdot037$; $G = +\cdot008$, $H = -\cdot208$, $K = -\cdot978$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		8·8	110	e 2 14	+ 3	—	—	—	—	—
Merida		8·9	349	2 19	+ 7	—	—	—	—	4·6
Bogota		15·6	118	e 3 40	− 3	—	—	e 4 5	PP	e 9·6
San Juan		21·9	70	e 4 52	+ 5	e 9 1	+ 7	e 5 35	PP	e 9·9
Lubbock		24·9	333	5 30	+ 4	e 9 52	+ 5	—	—	—
St. Louis		26·5	357	i 5 39	− 2	e 10 38	sS	i 6 0	pP	—
Florissant		26·7	357	e 5 40	− 3	e 10 41	sS	e 11 13	SS	—
Huancayo		27·1	152	e 5 50	+ 4	—	—	—	—	—
Georgetown		28·4	18	e 5 56	− 2	—	—	—	—	—
Washington		28·4	18	i 5 57	− 1	—	—	—	—	e 12·1
Tucson		29·1	318	i 6 5	+ 1	e 10 27	−29	i 6 47	PP	e 12·3
Cleveland		29·8	9	i 6 5	− 6	e 11 27	+20	i 7 19	PPP	—
Pennsylvania		29·9	15	i 6 10	− 2	e 11 32	+23	i 7 34	PPP	—
Philadelphia		30·0	20	e 6 9	− 3	e 10 57	−13	e 6 24	pP	e 16·2
City College, N.Y.		31·1	21	e 6 19	− 3	e 11 26	− 2	i 7 34	pPP	e 16·5
Harvard		33·5	23	i 6 40	− 3	—	—	e 7 54	PP	e 17·3
Pierce Ferry		33·6	321	e 6 45	+ 1	e 13 12	S_cP	e 7 57	PP	—
Palomar		33·9	314	i 6 48	+ 1	i 13 15	S_cP	e 8 0	PP	—
Boulder City		34·0	319	e 6 49	+ 1	e 13 14	S_cP	e 9 26	P_cP	—
Overton	Z.	34·1	320	e 6 49	+ 1	—	—	i 9 26	P_cP	—
Rapid City	E.	34·5	341	e 6 56	+ 4	—	—	e 8 17	PP	—
La Paz		34·5	144	6 55	+ 3	i 12 23	+ 3	—	—	17·6
Riverside	Z.	34·6	315	e 6 53	0	e 13 15	S_cP	i 9 28	P_cP	—
Ottawa		34·8	15	e 6 51	− 3	(12 16?)	− 9	—	—	12·3
Pasadena		35·2	315	i 6 59	+ 1	i 13 15	S_cP	i 9 28	P_cP	e 17·3
Logan		36·2	330	i 7 6	0	e 12 37	−10	—	—	—
Shawinigan Falls	N.	36·7	18	e 7 7	− 3	—	—	—	—	—
Tinemaha	Z.	36·9	318	i 7 15	+ 3	e 12 21	−37	i 9 34	P_cP	—
Lick	Z.	39·3	317	i 7 34k	+ 2	—	—	i 9 41a	P_cP	—
Mineral	Z.	40·9	320	i 7 46a	0	—	—	i 9 45	P_cP	—
Shasta Dam		41·6	320	i 7 50	− 1	—	—	i 9 47	P_cP	—
Hungry Horse		42·2	335	i 7 56	0	i 9 50	P_cP	i 8 15	pP	—
Victoria	Z.	46·8	328	i 8 34k	+ 1	—	—	—	—	—
Malaga	Z.	77·7	55	i 11 51k	− 9	e 21 37	−15	e 14 45	PP	—
Almeria		79·2	55	12 6	− 2	22 4	− 4	15 4	PP	43·9
Kew		79·2	39	e 15 20	PP	e 22 19	+11	—	—	e 38·3
Paris		81·3	42	e 12 32	pP	—	—	—	—	38·3
Strasbourg		84·7	42	e 12 36?	− 1	e 24 16	PPS	e 29 16	SSP	e 41·9
Stuttgart		85·6	41	e 12 36	− 5	—	—	e 12 54	pP	e 41·3
Collmberg	Z.	87·4	38	e 12 39	−11	—	—	—	—	—
Rome		89·6	47	e 16 6	PP	e 20 26	?	—	—	—

For Notes see next page,

NOTES TO JUNE 11d. 7h. 34m. 44s.

Additional readings :—
San Juan e =5m.54s.
St. Louis esS =10m.46s., eSS? =11m.16s.
Tucson iP_cP =9m.12s., eS_cS =15m.46s.
Cleveland iPE =6m.8s.
Philadelphia esS =11m.43s.
City College, N.Y. esS =11m.49s., eSS? =12m.48s.
Pierce Ferry eP_cP =9m.25s.
Palomar iP_cPZ =9m.26s.
Logan i =7m.16s., e =7m.57s.
Malaga PPPZ =16m.43s.
Almeria PPP =16m.58s., PPS =23m.12s., SS =27m.16s.
Collmberg eZ =12m.48s. and 13m.4s.
Long waves were also recorded at Scoresby Sund, and other American and European stations.

June 11d. 14h. 14m. 9s. Epicentre 23°·4N. 121°·6E. (as on 1948, Dec. 20d.).

A = −·4814, B = +·7825, C = +·3949 ; δ = 0 ; h = +4 ;
D = +·852, E = +·524 ; G = −·207, H = +·336, K = −·919.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Zi-ka-wei		7·8	359	e 3 17	S	(e 3 17)	−11	3 50	SS	—
Nanking		9·0	345	e 2 7	− 6	e 3 38	−20	—	—	—
Calcutta	E.	30·6	276	—	—	e 13 52	Q	—	—	e 18·6
Irkutsk		31·7	340	e 6 27	0	—	—	—	—	—
Hyderabad	N.	40·8	271	—	—	e 14 3	+ 7	—	—	—
Murgab		43·1	302	8 6	+ 2	e 14 36	+ 6	—	—	—
Andijan		44·6	305	e 8 18	+ 2	e 14 55	+ 3	—	—	—
Bombay		45·6	274	e 4 10	?	e 9 51?	?	—	—	—
Obi-garm		46·4	303	i 8 37	+ 7	—	—	—	—	—
Tashkent		46·9	306	e 10 9	P_cP	e 18 28	S_cS	—	—	—
Stalinabad		47·1	303	e 8 28	− 7	—	—	—	—	—
Sverdlovsk		54·9	325	9 34	− 1	e 17 13	− 3	—	—	—
Baku		61·6	305	—	—	e 17 53	−50	—	—	—
Tiflis		65·2	307	e 11 0	+15	—	—	—	—	—
Yalta		72·2	312	e 11 34	+ 5	—	—	—	—	—
Istanbul		76·8	309	—	—	e 21 41	− 1	—	—	—
Helwan		78·9	298	e 12 57	+50	e 22 9	+ 4	—	—	—
Copenhagen		81·1	328	—	—	e 22 25	− 3	—	—	43·8
Collmberg	Z.	82·9	324	e 12 29	+ 1	—	—	—	—	—
Scoresby Sund		82·9	349	—	—	22 46	0	—	—	43·8
Stuttgart		86·3	323	e 12 48	+ 3	e 23 7	[− 2]	—	—	e 44·8
De Bilt		86·6	327	(e 12 39)	− 7	—	—	—	—	(e 36·8)
Aberdeen	E.	86·9	334	—	—	e 22 51?	[−22]	—	—	e 47·2
Strasbourg		87·2	323	—	—	e 23 27	− 1	—	—	e 43·8
Rome		87·8	315	—	—	e 23 23	[+ 4]	—	—	e 47·0
Kew		89·8	328	—	—	e 21 56	?	—	—	e 43·8
Paris		90·1	325	—	—	e 24 53?	PS	—	—	e 46·8
Rathfarnham Castle		91·3	332	e 12 32	−37	22 24	?	—	—	—
Shasta Dam		92·9	44	i 13 18	+ 2	—	—	—	—	—
Hungry Horse		93·0	34	i 13 17	0	—	—	—	—	—
Overton	Z.	100·3	43	e 14 6	+16	—	—	e 17 22	PP	—

Additional readings and note :—
De Bilt readings increased by 2m.
Strasbourg e =23m.39s.
Long waves were laso recorded at Poona and other European stations.

June 11d. Readings also at 0h. (Overton, Frunse, near Andijan, and Murgab), 1h. (Apia, Pierce Ferry, Hungry Horse, and near Stalinabad), 2h. (Ashkabad, and Huancayo), 3h. (Alicante), 4h. (near Ashkabad), 5h. (Sotchi, Kaimata, Tuai, and near Wellington), 9h. (Alicante), 10h. (Sotchi, Yalta, near Theodosia, and near Murgab), 11h. (Tucson), 12h. (near Alicante), 14h. (Stuttgart, Calcutta, and Copiapo), 15h. (Mount Wilson, Palomar, Riverside, Tinemaha, Tucson (2), Boulder City, Overton (2), Pierce Ferry (2), Hungry Horse (2), Logan, Huancayo, Collmberg, and Stuttgart), 17h. (Overton and near Tananarive), 18h. (Mount Wilson, Tinemaha, Tucson, Overton, Pierce Ferry, Hungry Horse, Scoresby Sund, Collmberg, and Stuttgart), 20h. (Scoresby Sund), 21h. (Overton, College, and near Piatigorsk), 23h. (Bucharest).

June 12d. 4h. 31m. 35s. Epicentre 18°·9N. 68°·9W. (as on 1948, May 28d.).

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		2·7	101	e 0 44	− 1	i 1 16	− 3	e 1 2	P_g	i 1·4
Bogota		15·1	200	e 3 45	+ 9	e 6 37	+12	e 3 53	PP	—
Philadelphia		21·7	348	—	—	e 8 45	− 6	—	—	e 10·6
City College, N.Y.		22·3	352	—	—	e 8 57	− 5	—	—	e 10·6
Cleveland		25·0	337	i 5 25	− 2	e 9 54	+ 5	—	—	—
St. Louis		27·0	321	e 5 50	+ 5	e 10 33	+11	—	—	—
La Paz	N.	35·2	178	e 6 45	−13	—	—	—	—	—
Tucson		39·8	298	e 7 37	+ 1	—	—	—	—	—
Logan		42·9	313	e 7 59	− 3	—	—	—	—	—
Pierce Ferry		43·1	303	e 8 5	+ 1	—	—	—	—	—
Overton	z.	43·5	304	e 8 7	0	—	—	—	—	—
Boulder City		43·7	303	e 8 10	+ 2	—	—	—	—	—
Riverside	z.	45·5	300	i 8 24	+ 1	—	—	—	—	—
Pasadena	z.	46·2	300	e 8 28	0	—	—	—	—	—
Hungry Horse		46·7	320	i 8 30	− 2	—	—	—	—	—
Tinemaha	z.	46·7	304	i 8 32	0	—	—	—	—	—
Shasta Dam		50·4	308	e 8 49	−12	—	—	—	—	—
Tamanrasset	z.	69·0	72	11 10	+ 1	—	—	—	—	—

Additional readings :—
Bogota eSSEN = 6m.53s., eP_cPEN = 9m.44s.
Cleveland iPE = 5m.32s.
Long waves were also recorded at Bermuda and Granada.

June 12d. 17h. 52m. 24s. Epicentre 28°·0S. 63°·5W. Depth of focus 0·090.
(as on 1948, Nov. 30d.).
Intensity III between South latitudes 27° and 28°.
Epicentre 26°·5S. 62°·5W. (Pasadena). Depth of focus 600km.

F. Greve.
Boletin del año 1949, primer semestre, Instituto Sismologico, Santiago, p. 22.

A = +·3946, B = −·7914, C = −·4670; δ = +11; h = +2;
D = −·895, E = −·446; G = −·208, H = +·418, K = −·884.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copiapo		6·1	275	1 41	− 2	3 6	+ 2	1 48	?	—
Buenos Aires		7·8	148	i 2 2	+ 4	2 53	−39	i 2 7	?	e 3·6
Santa Lucia		8·2	228	i 2 2	0	3 33	− 6	—	—	—
La Plata	N.	8·4	147	i 2 7	+ 3	i 3 47	+ 5	7 13	P_cP	4·6
	Z.	8·4	147	i 2 8	+ 4	3 48	+ 6	7 13	P_cP	4·6
La Paz		12·2	338	i 2 40k	− 1	i 4 48	− 2	5 28	SSS	—
Huancayo		19·4	324	i 3 51	+ 2	i 6 53	− 1	i 14 8	S_cS	i 7·8
Bogota		34·0	342	i 5 56	0	—	—	i 8 19	P_cP	—
Fort de France		42·5	5	i 7 3	− 2	i 12 37	− 9	—	—	—
San Juan		46·2	358	e 7 28	− 6	i 13 24	−13	e 8 58	P_cP	e 14·8
Bermuda		60·1	359	e 10 6	+54	i 17 36	+56	e 20 51	sS	e 24·3
Georgetown		67·8	350	i 10 0	0	i 18 11	− 1	e 12 0	pP	—
Washington		67·8	350	i 9 59	− 1	e 18 14	+ 2	i 11 59	pP	—
Philadelhpia		68·5	351	e 10 3	− 2	e 18 18	− 2	e 12 6	pP	e 28·8
City College, N.Y.		69·1	353	e 10 8	0	e 18 26	− 1	i 12 8	pP	e 28·8
Fordham		69·1	353	i 10 9	+ 1	i 18 28	+ 1	—	—	—
Pennsylvania		69·7	349	i 10 13	+ 1	i 18 24	−10	i 12 15	pP	—
Harvard		70·5	355	i 10 17	+ 1	—	—	e 12 18	pP	—
St. Louis		70·8	339	i 10 16	− 2	i 18 41	− 5	i 12 17	pP	—
Cleveland		71·1	346	i 10 20s	0	i 18 47	− 3	i 12 21	pP	—

Continued on next page.

		△	Az.	P.	O − C.	S.	O − C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lubbock		71·2	327	e 10 24	+ 3	18 52	+ 1	12 26	pP	—
Ottawa		73·9	352	10 36k	0	18 58	−22	12 11	pP	25·6
Shawinigan Falls	N.	74·7	354	10 40k	0	—	—	—	—	—
Tucson		74·9	320	i 10 44	+ 2	e 19 34	+ 3	i 12 47	pP	e 28·3
Seven Falls	E.	75·1	356	10 43	0	19 32	− 1	—	—	—
Grahamstown	Z.	75·3	120	i 10 46	+ 2	—	—	e 12 48	pP	—
Palomar	E.	79·2	318	i 11 11	+ 6	e 20 20	+ 4	e 13 12	pP	—
Pierce Ferry		79·6	321	i 11 9	+ 2	e 20 19	− 1	i 13 16	pP	—
Riverside		80·0	317	i 11 12a	+ 3	e 20 28	+ 4	i 13 17	pP	—
Overton	Z.	80·1	321	i 11 12	+ 3	—	—	i 13 16	pP	—
Rapid City	E.	80·4	333	e 11 20	+ 9	i 20 37	+ 9	e 13 25	pP	—
Pasadena		80·6	317	i 11 14a	+ 2	i 20 33	+ 3	e 13 18	pP	—
Logan		82·5	327	i 11 22	+ 1	e 20 45	− 4	e 13 28	pP	—
Tinemaha		82·7	319	i 11 24	+ 2	e 20 54	+ 3	i 13 32	pP	—
Fresno		83·3	318	e 11 30	+ 5	—	—	e 11 34	P	—
Tamanarasset	Z.	83·5	60	i 11 28a	+ 2	e 20 49	−10	e 13 35	pP	e 33·6
Lick	Z.	84·8	317	i 11 36a	+ 3	—	—	i 13 41	pP	—
Malaga	N.	85·0	44	i 11 32	− 2	i 21 2	[+ 2]	i 13 46	pP	e 36·4
Bozeman		85·1	329	e 13 46	pP	e 21 6	[+ 6]	e 27 20	SS	—
Branner	Z.	85·2	317	i 11 37a	+ 2	—	—	—	—	—
Reno		85·2	320	i 11 38	+ 3	i 21 22	+ 7	—	—	—
Berkeley		85·6	317	i 11 38a	+ 1	i 21 23	+ 5	e 21 11	SKS	—
Granada		85·8	45	i 11 39	+ 1	i 21 21	+ 1	13 54a	pP	33·7
Butte	N.	86·0	329	e 11 39	0	e 21 7	[+ 1]	e 15 6	PP	e 32·3
Almeria		86·3	46	12 16	+36	22 46	+81	28 30	SS	46·3
Mineral		86·8	320	i 11 44a	+ 2	e 21 31	+ 1	e 13 52	pP	—
Shasta Dam		87·5	320	i 11 46	0	i 21 36	0	i 13 54	pP	—
Hungry Horse		88·4	329	i 11 51	+ 1	e 21 21	[0]	i 13 59	pP	—
Alicante		88·5	45	11 51	+ 1	i 21 17	[− 5]	14 18	pP	e 35·1
Ivigtut		89·7	8	i 11 54	− 2	e 22 0	+ 4	—	—	—
Tortosa		90·5	44	i 12 0	0	i 21 36	[+ 2]	i 22 5	S	—
Victoria		93·1	325	12 13k	+ 2	—	—	—	—	—
Clermont-Ferrand		95·0	41	i 12 21	+ 1	i 22 3	[+ 5]	i 16 1	PP	38·6
Paris		96·5	38	i 12 25	− 2	e 22 5	[− 1]	e 14 38	pP	e 43·6
Kew		96·6	35	e 12 27	0	e 22 6	[0]	e 14 39	pP	e 37·6
Basle		98·6	41	e 12 36k	0	e 23 14	+ 3	—	—	—
Rome		98·7	47	i 18 25	?	i 22 5	[−12]	e 25 17	SP	—
Zürich		99·1	42	e 12 38k	0	e 22 20	[+ 1]	e 14 48	pP	—
Strasbourg		99·2	40	i 12 39	0	e 23 16	0	e 14 48	pP	—
Aberdeen	E.	99·3	30	—	—	i 22 20	[0]	i 26 20	sS	—
Salo		99·3	43	e 12 39	0	e 22 28	[+ 8]	e 16 55	PP	—
Chur		99·4	43	e 12 39	− 1	—	—	—	—	—
De Bilt		99·7	36	i 12 41	0	e 23 23	+ 3	e 14 51	pP	—
Stuttgart		100·1	41	i 12 43k	0	e 22 26	[+ 2]	e 14 53	pP	—
Triest		101·3	45	i 17 3	PP	i 22 30	[0]	—	—	—
Cheb		102·6	40	e 15 26	?	e 26 34	PS	—	—	—
Jena		102·6	39	e 12 54	0	e 22 40	[+ 4]	e 15 3	pP	—
Scoresby Sund		102·6	13	16 6	?	23 47	+ 3	27 36	sS	—
Collmberg		103·5	40	e 12 58	P	e 22 41	[+ 1]	e 15 10?	pP	—
Prague		103·8	41	e 17 20	PP	e 24 2	+ 8	—	—	—
Potsdam		104·1	38	e 17 20	PP	e 22 47	[+ 5]	—	—	—
Copenhagen		105·3	35	—	—	i 22 52	[+ 4]	e 28 3	sS	—
Helwan		107·2	66	e 17 39	PP	e 23 0	[+ 4]	e 27 12	sSKS	—
Istanbul		109·6	54	e 13 28	?	e 26 20	S	—	—	—
Riverview	E.	110·3	211	—	—	i 24 15	SKKS	—	—	—
Ksara		112·3	63	i 18 24	PP	27 16	SP	20 26	pPP	—
Yalta		114·2	52	e 18 34	PP	i 23 25	[+ 1]	—	—	—
Moscow		118·8	40	e 17 42	[+ 1]	e 23 42	[+ 2]	e 18 57	PP	—
Leninakan		120·3	58	e 17 59?	[+16]	—	—	—	—	—
Tiflis		121·2	57	e 18 49	PP	e 25 25	SKKS	e 21 25	PPP	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grozny	122·1	55	17 50	[+ 3]	23 47	[− 4]	—	—	—
Ashkabad	130·5	63	e 20 27	PP	—	—	—	—	—
Sverdlovsk	131·5	37	i 18 6	[+ 1]	—	—	20 21	PP	—
Samarkand	137·3	62	e 18 15	[− 1]	—	—	i 20 56	PP	—
Bombay	139·1	94	e 21 1	PP	e 22 4	PKS	—	—	—
Stalinabad	139·1	62	e 18 13	[− 6]	—	—	e 21 3	PP	—
Tashkent	139·4	59	e 18 5	[−15]	e 24 21	[−11]	i 21 5	PP	—
Andijan	141·8	60	e 18 19	[− 6]	—	—	i 21 15	PP	—
Frunse	143·2	55	e 18 28	[+ 1]	—	—	—	—	—
Murgab	143·2	63	i 18 27	[0]	—	—	i 21 15	PP	—
Irkutsk	154·1	18	18 55?	[+12]	—	—	21 5?	pPKP	—

Additional readings :—
Santa Lucia N = 2m.22s., E = 2m.31s., N = 2m.43s., 3m.1s., 3m.9s., and 3m.25s., E = 3m.38s., iN = 3m.45s.
La Plata Z = 2m.24s., iN = 2m.32s., N = 3m.17s. and 4m.10s.
Huancayo i = 4m.26s., e = 5m.35s. and 6m.24s.
San Juan e = 9m.57s.
Bermuda eS_cS = 18m.58s., e = 22m.57s.
Philadelphia eS_cS = 19m.5s., esS = 21m.47s.
City College, N.Y. esS = 21m.56s., eSS = 23m.12s.
Pennsylvania iS_cSEN = 19m.5s., iEN = 22m.3s., eSSE = 23m.5s., eE = 25m.26s.
Harvard e = 18m.42s.
St. Louis ePP = 13m.19s., iS_cS = 19m.22s., esS = 22m.8s., isS = 22m.11s., iSS = 23m.50s.
Cleveland iZ = 10m.23s., ipPN = 12m.24s., iN = 18m.56s., iE = 18m.59s., iPSE = 19m.26s. isSN = 22m.19s., isPSN = 22m.53s.
Tucson $ePcP?$ = 11m.6s., i = 13m.13s., eSP = 20m.2s., ePKP,PKP = 37m.54s., eSKP,PKP = 40m.44s.
Grahamstown iZ = 13m.6s. and 13m.29s.
Pierce Ferry ePKP,PKP = 37m.59s.
Riverside eSKP,PKPZ = 39m.29s.
Overton iPPZ = 14m.39s., ePKP,PKPZ = 37m. 57s., eSKP,PKPZ = 40m.3s.
Rapid City ePPE = 14m.45s., esSE = 24m.26s.
Pasadena iSKP,PKPZ = 40m.29s.
Logan ePP? = 15m.6s., esS = 24m.20s., eSKP,PKP = 40m.13s.
Tamanarasset iZ = 11m.46s.k, ePPZ = 14m.49s.
Malaga SKS?N = 21m.34s.
Bozeman epP = 14m.0s.
Reno ePN = 11m.41s.
Berkeley iZ = 11m.42s.a, eZ = 13m.48s.
Granada sS = 25m.19s., SS = 27m.13s., sSS = 31m.0s.
Butte eN = 21m.23s., eSPN = 22m.21s., esS?N = 25m.14s.
Mineral eN = 15m.13s., eSZ = 21m.34s.
Alicante SS = 27m.51s., SSS = 31m.26s.
Clermont-Ferrand iPP? = 15m.48s., ePS? = 25m.29s., e = 26m.9s.
Paris i = 12m.42s., esP = 15m.36s., e = 26m.50s.
Kew esPZ = 15m.37s., ePPZ = 16m.33s., eEZ = 24m.56s., esSEN = 26m.14s., eSSNZ = 29m.39s., eSSSE = 33m.11s.
Zürich ePP = 16m.43s., iS = 23m.13s.
Strasbourg e = 13m.16s. and 14m.14s., esP = 15m.50s., ePP = 16m.46s., epPP = 18m.41s., esPP = 19m.42s., eSKS = 22m.22s., ePS = 26m.8s. and 26m.12s., esS = 27m.16s., esPS = 28m.30s. and 28m.40s., eSS = 29m.50s., e = 30m.16s., esSS = 32m.56s., eSSS = 34m.28s. and 34m.31s.
Aberdeen eE = 25m.6s., iE = 28m.28s.
Salo e = 12m.44s.
De Bilt iPP = 16m.51s., ipPP = 18m.47s., eSKS = 22m.26s., esS = 27m.18s.
Stuttgart eZ = 15m.46s., ePP = 16m.52s., epPP = 18m.42s., esPP = 19m.49s., eS = 23m.26s., esS = 27m.21s., eSS? = 28m.42s.
Jena esP?N = 16m.3s., esP?Z = 16m.22s., ePP?Z = 17m.9s., eN = 20m.45s.
Scoresby Sund 17m.12s., 20m.12s., SKS = 22m.40s., SP = 25m.25s., PS = 26m.46s.
Collmberg esP?E = 16m.17s.?, ePPEZ = 17m.17s., eE = 17m.47s., eZ = 20m.45s.
Copenhagen iS = 24m.9s., 26m.3s.
Helwan eZ = 17m.58s., iZ = 19m.42s., eZ = 30m.4s., iZ = 30m.36s., eE = 38m.43s.
Irkutsk ePP = 22m.38s.

June 12d. 17h. 55m. 52s. Epicentre 28°·0S. 63°·5W. Depth of focus 0·090. (as at 17h. 52m.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		12·2	338	i 2 44	+ 3	i 4 56	+ 6	—	—	—
Huancayo		19·4	324	i 6 15	?	i 6 57	+ 3	i 7 43	PcP	e 7·2
Bogota		34·0	342	i 5 56	0	i 10 37	− 5	i 7 7	pP	—
Fort de France		42·5	5	i 7 3	− 2	e 12 23	−23	—	—	—
San Juan		46·2	358	e 7 45	+11	e 13 21	−16	i 12 52	PcS	—
Fordham		69·1	353	i 10 8	0	—	—	—	—	—
Harvard		70·5	355	i 10 16	0	—	—	—	—	—
St. Louis		70·8	339	i 10 15	− 3	e 18 40	− 6	e 12 16	pP	—
Cleveland		71·1	346	i 10 19	− 1	i 18 47	− 3	e 19 57	SP	—
Lubbock		71·2	327	10 18	− 3	—	—	—	—	—
Ottawa		73·9	352	i 10 35k	− 1	i 19 29	+ 9	—	—	—
Shawinigan Falls	N.	74·7	354	e 10 40	0	—	—	—	—	—
Tucson		74·9	320	i 10 43	+ 1	e 19 35	+ 4	i 12 45	pP	—
Seven Falls	E.	75·1	356	i 10 44	+ 1	e 19 43	+10	—	—	—
Grahamstown	Z.	75·3	120	i 10 45	+ 1	—	—	i 12 48	pP	—
Palomar	E.	79·2	318	i 11 7	+ 2	—	—	—	—	—
Pierce Ferry		79·6	321	i 11 7	0	e 20 24	+ 4	—	—	—
Riverside	Z.	80·0	317	i 11 11k	+ 2	—	—	—	—	—
Pasadena		80·6	317	i 11 13k	+ 1	e 20 33	+ 3	—	—	—
Logan		82·5	327	i 11 22	+ 1	i 20 50	+ 1	—	—	—
Tinemaha		82·7	319	i 11 24k	+ 2	—	—	—	—	—
Tamanrasset	Z.	83·5	60	i 11 28k	+ 2	—	—	e 13 34	pP	—
Lick	Z.	84·8	317	i 11 35k	+ 2	—	—	—	—	—
Malaga	N.	85·0	44	i 11 37	+ 3	e 21 7	− 6	—	—	—
Branner	Z.	85·2	317	i 12 37k	+62	—	—	—	—	—
Reno		85·2	320	i 11 37	+ 2	i 21 37	+22	e 21 40	S	—
Berkeley	Z.	85·6	317	i 11 38k	+ 1	—	—	—	—	—
Granada		85·8	45	11 39k	+ 1	—	—	—	—	—
Almeria		86·3	46	12 4	+24	—	—	14 4	pP	—
Mineral	Z.	86·8	320	i 11 40k	− 2	—	—	—	—	—
Shasta Dam		87·5	320	i 11 46	0	i 22 1	+25	—	—	—
Hungry Horse		88·4	329	i 11 51	+ 1	e 21 22	[+ 1]	—	—	—
Alicante		88·5	45	11 39	−11	—	—	—	—	—
Ivigtut		89·7	8	i 11 53	− 3	e 21 44	−12	—	—	—
Victoria		93·1	325	i 12 11	0	—	—	—	—	—
Paris		96·5	38	i 12 25	− 2	e 22 14	[+ 8]	e 14 45	pP	—
Strasbourg		99·2	40	e 12 38	− 1	e 22 2	[−17]	e 14 44	pP	—
Stuttgart	Z.	100·1	41	e 12 42	− 1	—	—	—	—	—

Additional readings :—
Bogota isS =11m.41s.
San Juan e =14m.33s.
St. Louis ePP =13m.47s., eSP? =19m.46s.
Cleveland iZ =10m.25s., eSN =18m.42s., eE =18m.57s., eN =22m.54s.
Tucson e =18m.30s.
Tamanrasset iZ =11m.44s. a.
Paris e =14m.13s. and 15m.54s.
Strasbourg ePP =16m.44s., epPP =18m.44s., ePPP =19m.10s., eS =22m.58s., esPS? = 28m.31s., eSS? =30m.24s., eSSS =34m.42s.

June 12d. Readings also at 0h. (near Stalinabad), 2h. (Overton), 3h. (Christchurch, near Kulyab, Obi-garm, Stalinabad, and Murgab), 5h. (near Murgab, Andijan, Frunse, Obi-garm, and Stalinabad), 6h. (Wellington), 7h. (Ksara, Strasbourg, and near Balboa Heights), 9h. (Hungry Horse, Ksara, and near Alicante), 10h. (Ashkabad), 12h. (Tucson, Arapuni, and near Ashkabad), 13h. (near Ashkabad), 14h. (Overton and Tucson), 15h. (Tortosa), 16h. (Murgab and near Obi-garm), 17h. (Stuttgart, Collmberg, Triest, Rome, Istanbul, near Erevan, Tiflis, and Leninakan), 19h. (Grozny and Ksara), 20h. (Grozny), 21h. (Overton), 23h. (near Obi-garm).

June 13d. 1h. 58m. 57s. Epicentre 28°·0S. 63°·5W. Depth of focus 0·090. (as on 12d.).

$A = +·3946$, $B = -·7914$, $C = -·4670$; $\delta = +11$; $h = +2$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Lucia	E.	8·2	228	e 2 2	0	i 3 48	+ 9	—	—	—
La Plata	E.	8·4	147	—	—	i 3 53	+11	—	—	4·8
	N.	8·4	147	2 7	+ 3	3 46	+ 4	3 27	?	4·4
	Z.	8·4	147	—	—	3 51	+ 9	—	—	—
La Paz		12·2	338	2 34	− 7	i 4 43	− 7	—	—	5·5
Bogota		34·0	342	i 5 55	− 1	e 10 35	− 7	e 7 13	pP	—
Harvard		70·5	355	i 10 16	0	—	—	—	—	—
St. Louis		70·8	339	e 10 16	− 2	—	—	—	—	—
Ottawa	Z.	73·9	352	i 10 35k	− 1	—	—	—	—	—
Shawinigan Falls	N.	74·7	354	e 10 39	− 1	—	—	—	—	—
Tucson		74·9	320	i 10 43	+ 1	—	—	—	—	—
Grahamstown	Z.	75·3	120	i 10 45	+ 1	—	—	—	—	—
Pierce Ferry		79·6	321	i 11 8	+ 1	—	—	—	—	—
Riverside	Z.	80·0	317	i 11 12	+ 3	—	—	—	—	—
Overton	Z.	80·1	321	i 11 12	+ 3	—	—	i 13 17	pP	—
Mount Wilson	Z.	80·6	317	i 11 15	+ 3	—	—	—	—	—
Tinemaha	Z.	82·7	319	i 11 24	+ 2	—	—	—	—	—
Tamanrasset	Z.	83·5	60	i 11 27a	+ 1	—	—	i 11 37k	P_cP	—
Hungry Horse		88·4	329	i 11 51	+ 1	—	—	—	—	—
Clermont-Ferrand		95·0	41	i 12 21	+ 1	—	—	—	—	—
Stuttgart	Z.	100·1	41	e 12 42	− 1	—	—	—	—	—

Bogota also gives eSSEN =11m.39s.

June 13d. Readings also at 4h. and 5h. (Santa Lucia), 6h. (Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Lick, Hungry Horse, College, Logan, St. Louis, Clermont-Ferrand, Paris, Strasbourg, Stuttgart, and near Mizusawa), 7h. (Andijan and near Ashkabad), 10h. (Alicante, Grozny, Leninakan, near Tiflis, near Irkutsk and near Bogota), 13h. (Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, and Apia), 14h. (Ottawa and Pavia), 15h. (Collmberg and Stuttgart), 16h. (near Copiapo), 17h. (Ashkabad and Balboa Heights), 18h. (near Tacubaya (2)), 19h. (Brisbane, Riverview, and Wellington), 20h. (De Bilt, Paris, Potsdam, Strasbourg, and Stuttgart), 21h. (Collmberg, Andijan, Tashkent, near Kulyab, Murgab, Obi-garm, Samarkand, and Stalinabad), 22h. (Andijan, Samarkand, near Kulyab, Murgab, Obi-garm, and Stalinabad).

June 14d. 0h. 21m. 15s. Epicentre 11°·5N. 95°·0E. (as on 1940, July 2d.).

$A = -·0854$, $B = +·9765$, $C = +·1981$; $\delta = +9$; $h = +6$;
$D = +·996$, $E = +·087$; $G = -·017$, $H = +·197$, $K = -·980$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	12·7	331	e 3 14	+ 9	i 5 19	− 9	i 5 38	SS	—
Colombo	E.	15·6	254	3 49	+ 6	6 23	−14	—	—	7·7
Hyderabad	N.	17·1	291	e 4 2	0	i 7 27	+15	7 48	SS	8·9
Kodaikanal	E.	17·3	267	i 4 4	0	i 7 59	+43	—	—	9·3
Poona		21·6	291	i 4 53	− 1	e 8 46	− 3	5 5	pP	10·6
Bombay		22·6	291	e 5 3	0	e 9 14	+ 7	i 10 24	SS	12·3
Zi-ka-wei	Z.	31·3	47	7 25	+61	11 26	− 5	—	—	e 12·2
Murgab		32·7	329	e 6 33	− 3	11 48	− 4	—	—	—
Kulyab		34·6	324	i 6 50	− 3	i 12 19	− 3	—	—	—
Obi-garm		35·2	326	i 6 56	− 2	12 27	− 4	—	—	—
Andijan		35·3	329	i 6 58	− 1	i 12 31	− 2	—	—	—
Stalinabad		35·7	325	e 6 58	− 4	i 12 33	− 6	—	—	—
Tashkent		37·3	328	e 7 16	0	e 12 57?	− 7	—	—	—
Samarkand		37·4	323	e 7 15	− 1	—	—	—	—	—
Irkutsk		41·4	8	e 7 48	− 2	14 4	− 1	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		49·0	314	e 9 1	+11	e 16 5	+10	—	—	—
Sverdlovsk		52·4	337	i 9 14	− 2	i 16 39	− 3	—	—	—
Grozny		53·0	317	e 9 33	+12	17 1	+11	—	—	—
Tiflis		53·1	314	9 20	− 1	e 16 51?	0	—	—	—
Leninakan		53·4	313	9 28?	+ 4	17 2?	+ 7	—	—	—
Ksara		58·1	302	e 9 56	− 2	e 18 22?	+24	—	—	—
Yalta		61·3	315	10 18	− 2	18 36	− 3	—	—	—
Helwan		61·6	297	e 10 28	+ 6	e 19 33	+50	e 12 3	PP	—
Moscow		62·5	328	e 10 35	+ 7	e 25 39	SSS	—	—	—
Istanbul		64·4	310	e 10 39	− 1	e 19 12	− 6	—	—	—
Riverview		69·8	133	—	—	e 20 37	PS	e 27 7	SSS	e 32·2
Belgrade		71·0	313	e 11 28a	+ 6	e 21 26	PPS	—	—	e 48·2
Upsala		73·8	329	—	—	e 21 3	− 6	e 29 45	SSS	e 41·8
Prague		75·2	319	e 15 3	?	e 21 21	− 4	—	—	—
Triest		75·8	315	e 11 51	+ 1	e 21 36	+ 5	e 22 36	PPS	—
Collmberg		76·1	320	e 11 49	− 2	—	—	—	—	e 46·6
Potsdam	z.	76·1	322	e 11 52	+ 1	—	—	—	—	e 47·2
Cheb		76·5	319	e 19 47	?	e 24 21	?	—	—	—
Rome		76·9	311	e 11 59	+ 3	e 21 37	− 6	e 26 37	SS	—
Jena	E.	77·0	320	e 11 54	− 2	—	—	—	—	—
Padova		77·1	314	e 12 13	+16	e 22 21	PS	—	—	—
Bologna		77·5	313	e 12 7	+ 8	e 23 32	?	e 14 3	PP	—
Salo		78·0	315	e 12 0	− 2	e 22 16	+21	—	—	—
Chur		78·6	316	e 12 2	− 3	—	—	—	—	—
Stuttgart		78·7	318	e 12 4	− 2	e 22 0	− 3	e 12 13	PcP	e 44·8
Zürich		79·2	316	e 12 5a	− 3	e 22 3	− 5	—	—	—
Strasbourg		79·7	318	e 12 9	− 2	e 22 10	− 3	e 12 21	PcP	e 42·8
Basle		79·9	316	e 12 20	+ 8	e 21 24	−52	—	—	—
De Bilt		80·9	322	e 12 27	+10	e 22 30	+ 4	e 15 31	PP	e 38·8
Paris		83·1	318	i 12 28	− 1	e 22 53	+ 5	e 23 45	PS	e 44·8
Clermont-Ferrand		83·2	315	e 12 31	+ 2	—	—	—	—	45·8
Kew		84·4	322	—	—	e 23 2?	+ 1	e 39 58	Q	e 45·7
Tamanrasset	z.	85·2	293	i 12 39k	0	—	—	e 12 46	PcP	39·8
Alicante		87·2	309	e 13 0	+11	e 23 35	+ 7	—	—	e 43·8
Scoresby Sund		87·9	343	—	—	23 35	0	25 15	PPS	43·8
Hungry Horse		115·1	21	e 17 17	?	—	—	e 19 44	PP	—
Shasta Dam		117·6	32	e 20 9	PP	—	—	—	—	—
Logan		121·5	23	e 20 30	PP	—	—	—	—	—
Tinemaha	z.	122·5	32	i 19 11	[+13]	—	—	—	—	—
Pasadena	z.	124·7	33	e 19 15	[+13]	—	—	—	—	—
Overton	z.	124·8	29	e 19 3	[+ 1]	—	—	—	—	—
Pierce Ferry		125·3	29	e 19 5	[+ 2]	—	—	—	—	—
Riverside	z.	125·3	33	i 19 12	[+ 9]	—	—	—	—	—
Philadelphia		128·0	350	—	—	—	—	e 38 33	SS	e 54·3
Tucson		130·0	28	e 19 13	[+ 1]	—	—	e 21 26	PP	—
La Paz		162·9	251	e 20 5	[+ 1]	—	—	—	—	86·2

Additional readings :—
Poona PPEN =5m.15s., PPPE =5m.30s., iE =5m.43s., Q?EN =9m.10s., SSEN =9m.30s.
Riverview ePSE? =20m.40s.
Prague e =20m.5s., 20m.18s., and 23m.45s.
Collmberg eEZ =11m.57s. and 12m.1s., eZ =12m.18s., eE =12m.31s.
Jena eE =12m.3s.
Stuttgart e =23m.51s.
Strasbourg ePS? =22m.55s., e =23m.45s., eSS? =27m.21s., eSSS? =30m.39s.
Paris i =12m.36s. and 12m.49s., e =13m.13s., 13m.59s., and 36m.45s.?
Clermont-Ferrand e =12m.39s.
Tamanrasset e =13m.11s., i =13m.19s.k, e =13m.29s., ePP =15m.46s., e =16m.26s.
Scoresby Sund 35m.57s.
Overton iPKPZ =19m.16s.
Tucson e =19m.24s.
Long waves were also recorded at Aberdeen, Copenhagen, Helsinki, Bergen, Tortosa, Almeria, Malaga, and Seven Falls.

June 14d. Readings also at 2h. (near Kulyab, Murgab, Obi-garm, and Stalinabad), 3h. (Galerazamba), 4h. (Overton, Tucson, near Boulder City and Pierce Ferry), 5h. (Mount Wilson, Riverside, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Logan, College, and Ottawa), 6h. (Clermont-Ferrand, Paris, Strasbourg, Stuttgart, Collmberg, and Scoresby Sund), 7h. (near Kulyab, Obi-garm, and Stalinabad), 8h. (Riverside, Tucson, Overton, and Pierce Ferry), 9h. (Baku, Grozny, Andijan, Kulyab, Obi-garm, Samarkand, Stalinabad, Tashkent, and near Ashkabad), 11h. (Tucson, Overton, Pierce Ferry, Hungry Horse, and near Grozny), 12h. (Pierce Ferry, near Berkeley, Branner, Lick, Reno, and Shasta Dam), 13h. (La Paz and Ottawa), 14h. (Balboa Heights and La Paz), 15h. (near Stalinabad), 16h. (near Victoria), 19h. (College, Frunse, Obi-garm, Stalinabad, Tashkent, and Brisbane), 20h. (Raciborzu and Santa Lucia), 23h. (Ashkabad, Collmberg, Jena, Padova, Strasbourg, Stuttgart, Salo, Zagreb, and near Triest).

June 15d. 1h. 47m. 17s. Epicentre 51°·4N. 179°·2W. (as on 1946, July 25d.).

$A = -\cdot6264$, $B = -\cdot0087$, $C = +\cdot7795$; $\delta = +7$; $h = -6$;
$D = -\cdot014$, $E = +1\cdot000$; $G = -\cdot779$, $H = -\cdot011$, $K = -\cdot626$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		21·1	38	i 4 50	+ 2	e 7 29	?	i 5 31	PP	—
Victoria	Z.	35·3	73	i 6 59	0	—	—	—	—	—
Shasta Dam		39·9	82	i 7 38	+ 1	—	—	—	—	—
Hungry Horse		40·9	68	i 7 45	− 1	e 13 47	−11	—	—	—
Lick	Z.	42·4	87	i 7 57	− 1	—	—	—	—	—
Tinemaha	Z.	44·7	85	i 8 16	0	—	—	—	—	—
Irkutsk		45·2	303	e 8 19	− 1	e 14 52?	− 9	—	—	—
Logan		45·8	75	e 8 26	+ 1	—	—	—	—	—
Mount Wilson	Z.	46·6	88	e 8 30	− 2	—	—	—	—	—
Riverside	Z.	47·2	88	e 8 36	0	—	—	—	—	—
Overton	Z.	47·4	81	e 8 42	+ 4	—	—	—	—	—
Boulder City		47·5	83	e 8 38	0	—	—	e 14 0	P_cS	—
Pierce Ferry		47·9	82	e 8 11	−31	—	—	—	—	—
Palomar	Z.	47·9	88	i 8 41	− 1	—	—	—	—	—
Tucson		52·4	84	i 9 15	− 3	—	—	—	—	—
St. Louis		60·4	65	i 10 12	− 1	e 18 25	− 3	—	—	e 29·8
Sverdlovsk		61·4	328	—	—	e 19 1	+21	—	—	—
Cleveland	N.	63·2	57	i 10 28	− 4	—	—	—	—	—
Ottawa	Z.	63·2	50	e 10 30	− 2	—	—	—	—	—
Philadelphia		67·6	55	—	—	e 19 41	−16	—	—	e 37·2
Murgab		70·2	307	11 19	+ 2	20 30	+ 2	—	—	—
Obi-garm		72·0	310	i 11 28	0	e 20 50	+ 1	—	—	—
Stalinabad		72·6	311	11 30	− 1	20 56?	0	—	—	—
Collmberg	Z.	77·2	352	e 11 55	− 2	—	—	—	—	—
Jena	N.	77·6	353	e 11 59	− 1	—	—	—	—	—
Ashkabad		77·8	317	14 49	PP	—	—	—	—	—
Prague		78·2	351	e 14 25	?	e 23 17	PPS	e 14 53	PP	e 26·7
Stuttgart		79·9	355	e 12 12	0	—	—	—	—	e 47·7
Paris		80·2	359	e 12 12	− 2	—	—	i 12 32	pP	e 50·7
Strasbourg		80·2	355	i 12 14	0	—	—	—	—	—
Clermont-Ferrand		83·2	358	e 12 34	+ 5	—	—	—	—	53·7
Rome		86·5	352	—	—	e 23 34	+12	—	—	e 43·6
Ksara		89·7	332	e 11 27	?	e 22 43	−69	—	—	—
Alicante		90·6	2	e 13 12	+ 7	—	—	—	—	e 51·5
Grahamstown	Z.	154·0	304	i 20 2	[+ 9]	—	—	—	—	—

Additional readings :—
Tinemaha iZ = 8m.22s. and 8m.29s.
Mount Wilson iZ = 8m.37s. and 8m.47s.
Palomar iZ = 8m.48s. and 8m.57s.
Cleveland eE = 10m.51s.
Prague ePPP = 16m.46s., SS is given as L.
Paris i = 12m.16s.
Grahamstown iZ = 20m.16s.
Long waves were also recorded at Seven Falls, City College (New York), De Bilt, Istanbul, Almeria, and Granada.

June 15d. 9h. 42m. 42s. Epicentre 33°·3N. 100°·0E.

A = −·1454 B = +·8248, C = +·5464 ; δ = −1 ; h = +1 ;
D = +·985, E = +·174 ; G = −·095, H = +·538, K = −·838.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	14·9	227	e 6 28	S	(e 6 28)	+ 8	—	—	—
Zi-ka-wei	Z.	18·3	90	i 4 18	+ 1	7 53	+14	—	—	9·2
Irkutsk		19·2	8	4 27	− 1	e 8 6	+ 7	—	—	—
Murgab		21·7	291	4 53	− 2	—	—	—	—	—
Frunse		22·1	303	e 5 0	+ 1	—	—	—	—	—
Andijan		23·2	297	e 5 4	− 5	i 9 25	+ 7	—	—	—
Kulyab		24·9	289	e 5 32	+ 6	—	—	—	—	—
Hyderabad	N.	25·0	236	e 5 25	− 2	(e 9 50)	+ 1	—	—	(e 12·5)
Obi-garm		25·0	292	i 5 26	− 1	e 9 57	+ 8	—	—	—
Tashkent		25·6	297	e 5 34	+ 2	i 10 12	+13	—	—	—
Stalinabad		25·8	292	e 5 33	− 1	e 10 11	+ 9	—	—	—
Samarkand		27·2	293	e 5 48	+ 1	e 10 38	+13	—	—	—
Poona		27·6	244	e 10 37	S	(e 10 37)	+ 5	—	—	15·5
Bombay		28·2	246	e 10 53	S	(e 10 53)	+12	—	—	i 15·4
Sverdlovsk		35·7	324	7 0	− 2	e 12 44	+ 5	—	—	—
Grozny		43·1	300	e 9 27	PcP	—	—	—	—	—
Leninakan		44·8	297	e 7 42?	−35	—	—	—	—	—
Yalta		51·2	303	—	—	e 15 58	−27	—	—	—
Stuttgart		66·3	314	e 10 50	− 2	—	—	—	—	e 33·3
Rome		67·0	306	e 16 34	?	—	—	—	—	—
College		69·0	25	e 11 6	− 3	—	—	—	—	—
Hungry Horse		93·2	22	i 13 16	− 1	—	—	—	—	—

Additional readings and notes :—
Calcutta gives S as P for a shock for which iSE = 7m.56s., iS*E = 8m.26s.
Hyderabad gives S as eP and L as eS, the true P being given without phase.
Poona eSEN = 14m.15s., QEN = 14m.34s.
Bombay eSEN = 14m.40s.
Long waves were also recorded at other European stations.

June 15d. Readings also at 0h. (Rome), 2h. (College), 5h. (near La Paz), 7h. (Cheb, Messina, Padova, Rome, Salo, Stuttgart, Triest, Zagreb, near Taranto, Tucson, near Boulder City, and Pierce Ferry), 8h. (Overton), 9h. (near College), 10h. (Santa Lucia), La Plata, Zi-ka-wei, and Hungry Horse), 12h. (near Klyuchi), 13h. (Ksara), 14h. (La Paz), 15h. and 16h. (near Ashkabad), 18h. (Rome), 21h. (Calcutta and near Klyuchi), 23h. (Calcutta, near College and near Mizusawa).

June 16d. 3h. 47m. 33s. Epicentre 36°·9N. 121°·7W. (as on 1949, Jan. 31d.).

A = −·4213, B = −·6821, C = +·5978 ; δ = +12 ; h = −1 ;

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick	0·4	6	i 0 12$_a$	− 1	i 0 20	− 1	—	—	—
Santa Clara	0·5	336	e 0 14	0	i 0 23	0	—	—	—
Branner	0·6	323	i 0 16	+ 1	e 0 28	+ 2	—	—	—
Berkeley	1·1	335	i 0 22$_a$	0	i 0 41	+ 2	—	—	—
Fresno	1·5	96	i 0 26$_a$	− 2	e 0 46	− 3	—	—	—
Reno	3·0	29	e 0 56	P*	i 1 43	S_g	—	—	—
Shasta Dam	3·8	352	i 1 3	+ 2	—	—	—	—	—
Boulder City	5·6	98	e 1 39	P*	—	—	—	—	—
Pierce Ferry	6·2	94	e 1 35	0	—	—	e 2 5	P_g	—
Tucson	10·1	114	e 3 11	P_g	—	—	—	—	e 5·6

Additional readings :—
Berkeley iZ = 25s. and 31s.
Fresno iZ = 44s.
Reno iPE = 1m.1s., iN = 1m.7s., eZ = 2m.15s., eE = 3m.9s.

June 16d. 17h. 58m. 0s. Epicentre 11°·2N. 42°·7E. (as on 1945, Oct. 28d.).

Intensity VI at Djibouti (French Somaliland).
Epicentre 10°·75N. 42°·5E. (Strasbourg).

Letter from Chief of French Meteorological Service in Somaliland.

$A = +·7211$, $B = +·6654$, $C = +·1930$; $\delta = -1$; $h = +6$;
$D = +·678$, $E = -·735$; $G = +·142$, $H = +·131$, $K = -·981$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		21·4	332	i 4 51	0	e 8 57	+12	5 29	PPP	—
Ksara		23·4	345	i 5 12a	+ 1	9 41	+20	—	—	—
Erevan		28·9	4	e 6 7	+ 4	—	—	—	—	—
Leninakan		29·4	2	e 6 13	+ 6	—	—	—	—	—
Bombay		30·0	72	—	—	e 10 26	?	e 12 45	SS	—
Tananarive		30·3	172	e 7 32	PP	e 13 25	SSS	—	—	e 15·7
Tiflis		30·4	3	6 17	+ 1	—	—	—	—	—
Poona		30·9	73	—	—	e 11 22	− 2	e 13 10	SSS	—
Grozny		32·1	5	e 6 35	+ 4	—	—	—	—	—
Istanbul		32·1	340	6 26	− 5	11 46	+ 3	—	—	—
Piatigorsk		32·7	1	e 6 28	− 8	—	—	—	—	—
Yalta		34·0	349	6 46	− 2	—	—	—	—	—
Kodaikanal	E.	34·2	88	—	—	e 12 14	− 2	—	—	—
Stalinabad		35·8	36	i 7 3	0	e 12 45	+ 4	—	—	—
Bucharest		36·0	340	—	—	e 12 52	+ 8	e 15 41	SSS	e 20·0
Kulyab		36·0	38	i 7 7	+ 2	—	—	—	—	—
Obi-garm		36·5	37	i 7 7	− 2	i 12 55	+ 4	—	—	—
Tamanrasset	Z.	37·3	293	e 7 17	+ 1	—	—	e 8 20	PP	20·0
Tashkent		38·0	33	e 7 23	+ 2	i 13 19	+ 5	—	—	—
Belgrade		38·6	334	e 7 23a	− 3	e 13 26	+ 3	e 8 51	PP	e 25·5
Murgab		38·9	41	e 7 30	+ 1	13 26	− 2	—	—	—
Andijan		39·3	37	e 7 33	+ 1	13 38	+ 4	—	—	—
Rome		40·4	325	e 7 43	+ 2	e 13 52	+ 2	e 9 45	PPP	—
Ogyalla		41·9	336	e 10 9	PPP	e 14 39	+26	—	—	—
Frunse		42·0	36	7 55	+ 1	e 14 17	+ 3	—	—	—
Florence Arc.		42·3	326	e 13 9	PcS	e 16 7	?	—	—	—
Triest		42·3	330	i 7 58	+ 1	i 14 22	+ 3	e 9 23	PP	—
Padova		42·5	327	e 8 47	?	e 9 57	PP	—	—	—
Bologna		42·7	326	e 8 15	+15	—	—	e 10 26	PPP	—
Salo		43·9	328	e 9 30	PP	—	—	—	—	—
Moscow		44·6	356	e 8 16	0	e 15 3	+11	—	—	—
Calcutta	E.	44·9	70	—	—	e 15 1	+ 5	e 18 38	SS	—
Prague		45·2	335	e 8 19	− 1	e 14 54	− 7	—	—	e 27·0
Barcelona		46·5	318	e 12 12	?	—	—	—	—	e 25·0
Collmberg		46·7	335	e 8 29	− 3	—	—	—	—	e 24·6
Stuttgart		46·7	330	e 8 33	+ 1	e 15 22	0	e 10 27	PP	e 23·0
Alicante		47·0	313	e 9 31	+56	e 16 25	+59	—	—	e 23·2
Strasbourg		47·3	330	e 8 36	− 1	e 15 30	− 1	e 10 43	PP	e 24·1
Tortosa		47·4	316	—	—	15 40	+ 8	19 24	SS	e 23·0
Potsdam		47·5	336	e 8 34	− 4	e 19 0?	SS	e 11 24	PPP	e 30·0
Sverdlovsk		47·6	13	8 38	− 1	15 38	+ 3	—	—	—
Almeria		47·9	310	8 58	+16	16 0	+21	10 40	PcP	24·9
Clermont-Ferrand		48·1	323	e 9 20	+37	e 15 52	+10	e 19 15	SS	23·0
Granada		48·9	310	i 8 53a	+ 3	i 15 53	0	10 6a	PcP	23·0
Paris		50·2	326	—	—	—	—	e 19 59?	SS	e 27·0
Copenhagen		50·3	339	—	—	16 23	+10	19 56	SS	23·0
De Bilt		50·8	332	—	—	e 16 30	+10	e 20 30	SS	e 25·0
Jersey	E.	53·0	325	—	—	e 16 40	−10	—	—	25·0
Kew		53·2	328	e 8 52	−30	e 17 4	+12	e 21 8	SSS	e 23·0
Lisbon		53·5	310	—	—	—	—	24 18	Q	28·5
Irkutsk		64·0	37	e 10 37	− 1	e 19 10	− 3	—	—	—
Scoresby Sund		71·2	341	—	—	20 48	+ 8	—	—	—
La Paz		112·9	257	e 18 20	[−19]	—	—	i 20 50	PP	58·0
St. Louis		113·8	321	—	—	—	—	e 39 54	SSS	—

For Notes see next page.

NOTES TO JUNE 16d. 17h. 58m. 0s.

Additional readings :—
Helwan eZ =5m.11s., iZ =9m.0s., iN =9m.6s., SSN =9m.40s.
Bombay eN =12m.49s.
Tamanrasset iP =7m.20s.
Belgrade e =16m.54s.
Rome eSSN =16m.52s., eE =17m.16s.
Triest iPPP =10m.5s., isS =14m.45s., iSS =16m.58s., iSSS =17m.53s.
Prague e =11m.30s. and 23m.48s.
Collmberg eZ =8m.34s.
Stuttgart eSS =19m.0s.
Strasbourg e =8m.54s. and 10m.51s., ePS =15m.43s., and 15m.46s., e =17m.30s. and 18m.11s., eSS =19m.12s., e =19m.20s., eSSS =20m.29s.
Almeria PP =10m.52s., PPP =11m.40s., P_cS =14m.12s., S_cS =18m.44s.
Granada iPP =10m.42s.a, PPP =11m.30s., SS =19m.47s.
Long waves were also recorded at Aberdeen, Helsinki, Upsala, Malaga, Bermuda, City College (New York), Philadelphia, Seven Falls, and Huancayo.

June 16d. Readings also at 0h. (near Andijan, Obi-garm, and Stalinabad), 1h. (Bogota, Tucson, and near Ashkabad), 2h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson (2), Boulder City, Overton, (2) Pierce Ferry, Shasta Dam, Hungry Horse, Logan, Grahamstown, Pretoria, La Paz, near Huancayo, and near Batavia ; several shocks), 3h. (near Ashkabad (2)), 6h. (Zi-ka-wei, Tucson, near Boulder City, Overton, and Pierce Ferry), 7h. (Kew), 10h. (Tucson, Shasta Dam, Hungry Horse, and near Victoria), 11h. (near Zürich), 12h. (near Murgab), 15h. (near Andijan, Obi-garm, Stalinabad, Tashkent, near Chur, Neuchatel, Basle, Stuttgart, and Zürich), 16h. (Ottowa), 17h. (near Zürich), 18h. (Almeria, Alicante, and Granada), 20h. (Overton, near Branner, and Lick), 21h. (Poona), 22h. (near Ottawa), 23h. (near Andijan).

June 17d. 1h. 34m. 46s. Epicentre 3°·0S. 12°·5W. given by U.S.C.G.S.

A = +·9750, B = −·2161, C = −·0520 ; δ = +3 ; h = +7 ;
D = −·216, E = −·976 ; G = −·051, H = +·011, K = −·999.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tamanarsset	z.	31·1	32	e 6 25	+ 3	e 13 38	SSS	—	—	15·2
Almeria		40·7	12	—	—	e 11 22	?	—	—	e 21·0
Granada		40·8	10	i 7 39k	− 6	i 14 1	+ 5	9 23a	PP	20·3
Alicante		42·6	13	—	—	e 13 43	−40	—	—	e 23·0
Tortosa	N.	45·2	14	e 9 21	?	15 12	+11	10 19	PP	e 22·2
Grahamstown	z.	47·3	134	i 8 45	+ 8	—	—	—	—	—
Rome		50·1	24	e 8 59	0	i 16 10	0	—	—	—
Clermont-Ferrand		50·5	14	e 8 57	− 5	—	—	—	—	27·2
Bologna		51·9	21	e 10 22	PcP	—	—	—	—	—
Paris		53·2	12	e 9 10?	−12	—	—	—	—	e 28·2
Triest		53·8	22	e 9 28?	+ 2	e 17 2	+ 1	—	—	e 20·2
Strasbourg		54·3	16	e 9 23	− 7	—	—	—	—	e 22·2
Stuttgart		54·9	17	e 9 36	+ 1	—	—	—	—	e 28·2
Kew		55·2	9	e 8 36	−61	e 17 12	− 8	e 21 18	SS	e 26·2
De Bilt		56·9	13	—	—	e 17 14?	−28	—	—	e 29·2
Istanbul		57·9	36	e 9 56	0	—	—	—	—	—
Ksara		58·4	47	e 10 5	+ 5	18 46	+44	—	—	—
Bogota		62·0	277	e 10 27	+ 3	e 18 54	+ 6	—	—	—
Ottawa	z.	73·7	319	i 11 38	0	—	—	—	—	—
St. Louis		82·3	309	e 12 25	0	—	—	—	—	—
Tucson		95·5	302	(e 13 38)	+10	—	—	—	—	—

Additional readings and note :—
Tamanrasset e =14m.41s.
Tortosa PPPN =11m.2s.
Strasbourg e =9m.52s.
Tucson reading increased by 6m.
Long waves were also recorded at Huancayo, La Paz, and Potsdam.

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.

June 17d. 4h. 20m. 56s. Epicentre 34°·4N. 28°·5E.

Felt in Cairo, Seismo. Bull, Royal Obs., Helwan, 1949. Epicentre as adopted.

$A = +\cdot7267$, $B = +\cdot3945$, $C = +\cdot5624$; $\delta = +2$; $h = 0$;
$D = +\cdot477$, $E = -\cdot879$; $G = +\cdot494$, $H = +\cdot268$, $K = -\cdot827$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Helwan		5·1	151	i 1 20	0	i 2 16	− 4	1 30	P*	—
Ksara		6·2	93	i 1 34k	− 1	i 2 46	− 2	—	—	—
Istanbul		6·7	4	e 1 44	+ 2	i 3 23	S*	—	—	—
Bucharest		10·2	350	e 2 48	+17	i 5 40	S_e	—	—	—
Taranto		10·8	308	2 32	− 7	4 20	−22	—	—	e 5·1
Yalta		11·0	22	i 2 42	0	4 43	− 4	—	—	—
Messina		11·1	294	2 39a	− 4	i 4 31	−18	—	—	i 5·0
Catania		11·3	290	e 2 46	0	e 4 37	−17	—	—	—
Theodosia		11·8	24	e 2 55	+ 2	—	—	—	—	—
Belgrade		12·1	332	i 2 56k	− 1	e 5 6	− 8	e 3 8	PP	e 6·8
Sotchi		12·6	40	3 9	+ 6	—	—	i 3 32	PP	—
Leninakan		13·7	58	i 3 24	+ 6	—	—	—	—	—
Erevan		14·0	61	i 3 27	+ 5	—	—	—	—	—
Kalossa		14·1	332	e 3 28	+ 5	—	—	—	—	—
Rome		14·6	306	e 3 23	− 7	e 5 57	−16	i 6 27	SS	i 6·8
Piatigorsk		14·8	45	3 32?	0	6 33?	+15	—	—	—
Tiflis		14·8	56	i 3 35	+ 3	—	—	—	—	—
Zagreb		14·8	324	e 3 30	− 2	e 6 34	+16	—	—	—
Budapest		14·9	334	3 36	+ 2	e 6 23	+ 3	—	—	e 9·1
Ogyalla		15·5	333	e 3 46	+ 4	e 5 15	?	—	—	—
Lwow		15·8	349	e 3 44	− 1	—	—	—	—	—
Triest		15·9	319	e 3 45	− 2	i 6 47	+ 3	i 3 57	PP	—
Skalnate Pleso		16·0	340	e 3 51	+ 3	e 7 15	+29	—	—	—
Grozny		16·1	51	3 55	+ 6	7 1	+12	—	—	—
Florence, Arc.		16·3	310	e 3 38	−14	e 6 44	− 9	—	—	—
Florence, Xim		16·3	310	e 3 59	+ 7	i 6 34	−19	—	—	—
Padova		16·3	313	e 4 25	+33	e 7 0	+ 7	—	—	—
Prato		16·4	310	e 4 1	+ 8	e 6 42	−14	—	—	—
Bologna		16·6	312	e 3 55a	− 1	e 6 48	−12	e 7 20	SS	—
Raciborzu	N.	17·4	338	e 4 8	+ 2	—	—	—	—	—
Salo		17·7	315	e 4 7	− 3	e 7 10	−16	—	—	—
Baku		18·0	64	—	—	e 7 45	+13	—	—	—
Pavia		18·3	313	e 4 23?	+ 6	e 7 33	− 6	—	—	—
Prague		18·7	332	e 4 16	− 6	e 7 40	− 8	e 4 29	PP	e 10·1
Chur		19·0	317	e 4 24	− 2	e 7 38	−17	—	—	—
Ravensburg		19·5	318	e 4 29	− 2	e 7 58	− 8	e 4 44	PP	—
Zürich		19·8	317	e 4 30	− 5	e 8 2	−11	—	—	—
Stuttgart		20·3	322	i 4 38k	− 2	e 8 16	− 7	i 5 12	PP	—
Collmberg		20·3	331	e 4 36	− 4	e 8 21	− 2	—	—	—
Basle		20·5	317	e 4 39k	− 3	e 8 19	− 8	e 5 44	PP	—
Neuchatel		20·5	316	e 4 39	− 3	e 8 19	− 8	—	—	—
Jena	N.	20·6	328	e 4 40	− 3	—	—	e 5 12	PP	—
Strasbourg		20·9	320	i 4 45a	− 1	e 8 33	− 2	e 5 0	pP	e 11·4
Potsdam	Z.	21·1	303	e 4 44	− 4	—	—	—	—	—
Moscow		22·3	14	5 0	− 1	9 0	− 2	e 5 15	pP	—
Clermont-Ferrand		22·4	308	i 5 0	− 2	i 9 0	− 4	i 5 32	PP	—
Tortosa		23·0	295	i 5 13	+ 6	i 9 12	− 2	5 42	PP	—
Tamanrasset	Z.	23·2	247	i 5 8a	− 1	i 9 28	+10	e 5 35	PP	12·6
Alicante		23·6	289	i 5 13	0	i 9 24	− 1	5 40	PP	e 11·3
Copenhagen		24·0	338	5 15	− 2	—	—	—	—	—
Paris		24·0	315	i 5 16	− 1	i 9 31	− 1	i 5 27	pP	e 15·1
De Bilt		24·4	325	e 5 23	+ 2	e 9 52	+13	—	—	e 12·1
Almeria		25·2	285	i 5 32	+ 3	i 9 57	+ 5	6 12	PP	14·9
Granada		26·1	286	i 5 46a	+ 9	i 10 13	+ 6	6 7a	pP	13·5
Malaga	Z.	26·8	285	i 5 42k	− 2	i 10 4	−15	i 6 26a	PP	12·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kew		26·9	319	i 5 41	− 4	e 10 17	− 3	e 6 20	PP	e 14·1
Jersey	E.	27·0	313	e 6 24	PP	e 10 22	0	—	—	—
Samarkand		31·0	70	e 6 14	− 7	—	—	—	—	—
Sverdlovsk		31·3	35	e 6 20	− 4	11 24	− 7	—	—	—
Tashkent		32·7	66	—	—	i 11 48	− 4	—	—	—
Kulyab		33·3	73	e 6 42	+ 1	—	—	—	—	—
Andijan		35·1	67	6 57	0	—	—	—	—	—
Murgab		36·5	71	e 7 11	+ 2	12 51	0	—	—	—
Frunse		36·6	64	e 7 12	+ 2	e 12 52	− 1	—	—	—
Irkutsk		55·4	47	e 9 37?	− 1	e 17 19?	− 3	—	—	—
Grahamstown	Z.	67·4	182	i 10 58	− 1	—	—	—	—	—
Seven Falls	E.	71·4	315	e 11 20	− 4	—	—	—	—	—
Ottawa	Z.	75·2	315	i 11 43	− 3	—	—	—	—	—
College		81·0	359	i 11 19	−59	—	—	—	—	—
St. Louis		87·8	317	i 12 50	− 2	e 23 26	− 8	i 13 9	pP	—
Hungry Horse		91·1	336	i 13 6	− 2	e 23 31	[− 8]	—	—	—
Tucson		103·5	326	e 14 3	− 1	—	—	—	—	—
Riverside	Z.	104·8	332	e 18 26	PP	—	—	—	—	—
Mount Wilson	Z.	104·9	332	e 18 28	PP	—	—	—	—	—

Additional readings :—
Bucharest eN =3m.53s., iS?E =5m.44s.
Belgrade i =5m.59s.
Rome eZ =6m.5s.
Zagreb e =4m.49s.
Triest iPPP =4m.6s.
Ravensburg eZ =4m.50s., 5m.16s. and 5m.38s., e =8m.24s.
Stuttgart i =4m.49s., e =8m.25s.
Collmberg eZ =4m.41s., eE =4m.48s.
Strasbourg ePP =5m.9s., e =6m.18s. and 8m.25s., eS =8m.39s., e =8m.44s., iSS =9m.11s. e =9m.19s., eSSS =9m.22s., e =9m.54s. and 10m.19s.
Potsdam eE =4m.47s.
Clermont-Ferrand i =9m.7s. and 9m.34s.
Tortosa PPPEN =5m.49s., iE =9m.28s., iEN =9m.40s., SSN =10m.1s., SSSN =10m.17s.
Tamanrasset iP$_c$PZ =9m.17s., eZ =9m.35s.
Alicante PPP =5m.50s., SS =10m.11s., SSS =10m.28s.
Copenhagen 5m.25s.
Paris i =5m.21s., ipP =5m.36s., ePP? =5m.44s., i =8m.4s., iS =9m.25s., e =10m.7s.
Almeria P$_c$P =9m.2s., P$_c$S =13m.24s.
Granada iPP =6m.29s.k, pPP =7m.4s.a, sS =10m.56s., SS =11m.34s., S$_c$S =17m.7s.
Kew iZ =5m.46s., e =10m.30s., eSS =11m.20s.

June 17d. Readings also at 0h. (Calcutta, Andijan, Murgab, Tashkent, and Stuttgart), 1h. (Rome), 2h. (Tucson, near Puebla, and Tacubaya), 3h. (near Bogota), 4h. (College near Kulyab, Murgab, and Obi-garm, Catania, Rome, Triest, Zagreb, near Messina, and Taranto), 5h. (Santa Lucia, and near Murgab), 6h. (Overton), 7h. (College, Stuttgart, Bombay, Murgab, Stalinabad, and Tashkent), 11h. (Ksara), 14h. (Victoria, Messina, and near Mizusawa), 15h. (Pavia and near Tucson), 16h. (La Paz, and near Kulyab), 18h. (Auckland, Wellington, Overton, and near Kulyab), 19h. (La Paz and near Cleveland), 20h. (near Andijan, Frunse, Kulyab, Obi-garm, Samarkand, Stalinabad, and Tashkent), 21h. (Frunse).

June 18d. Readings at 0h. (Pennsylvania), 1h. (Grozny, Leninakan, and near Erevan), 2h. (La Paz and near Kulyab), 3h. (Hungry Horse, near Frunse, and near Mizusawa), 5h. (Tucson and near Bogota), 8h. (Santa Lucia, Pavia, and near Frunse), 11h. (Tucson and near Victoria), 13h. (Tucson), 14h. (Helwan, Ksara, Istanbul, and Stuttgart), 16h. (Andijan, Frunse, Tashkent, near Kulyab, Obi-garm, and Stalinabad), 17h. (near Murgab), 18h. (Frunse, Samarkand, Tashkent, near Andijan, Kulyab, Murgab, Obi-garm, and Stalinabad), 23h. (San Juan, Galerazamba, Columbia, Ottawa, Logan, Boulder City, Tucson, Hungry Horse, and Victoria).

June 19d. 8h. South Pacific, near Macquarie Islands.

Christchurch PEN =44m.59s., SEN =46m.51s., LZ =48m.20s.
Kaimata PNE =45m.14s.
Wellington P =45m.49s., S? =48m.5s., L =50m.20s.
Melbourne iPE =46m.28s., iSE =50m.8s., iLE =51m.26s.
Tuai PN =46m.36s.
Riverview iPZ =46m.47s.a, iN =46m.50s., iPPN =47m.8s., iSE =50m.24s., iEN = 50m.42s., eLZ =51·1m.
Brisbane iPZ =47m.51s., iZ =48m.19s., iN =52m.28s., iE =52m.43s. and 53m.50s.
Hungry Horse iP =61m.31s.
Logan e =61m.38s.
Tucson e =61m.39s.
Istanbul e =62m.8s.
Ottawa e =62m.8s.
Tamanrasset ePKPZ =62m.8s., iZ =62m.16s. and 62m.26s., LZ =121m.
Ksara ePKP? =62m.14s.
Stuttgart eZ =63m.21s., 66m.38s., 67m.9s. and 72m.21s., e =76m.19s. and 84m.38s., eL =132m.
Clermont-Ferrand ePKPZ? =63m.36s., eSKS? =74m.5s., L =130m.
Paris ePKP$_2$? =63m.36s.?, e =68m.2s. and 95m., eL =126m.
Helwan eZ =66m.34s., 67m.0s., 69m.25s., and 69m.49s.
Granada PP =67m.3s., PPS =86m.40s., SS =92m.57s., L =120m.9s.
Kew eZ =67m.14s., 68m.32s., and 71m.56s., eEZ =81m.11s., e =125m.2s., eEN = 127m.48s., eL =137m.
Alicante e =68m.7s., eL =121m.11s.
De Bilt eSS =88m., eL =115m.
Long waves were also recorded at Auckland, Scoresby Sund, Bombay, Huancayo, Copenhagen, Potsdam, Rome, Almeria, and Malaga.

June 19d. 12h. 24m. 15s. Epicentre 23°·6N. 44°·9W.

A = +·6498, B = −·6475, C = +·3981 ; δ = −2 ; h = +4 ;
D = −·706, E = −·708 ; G = +·282, H = −·281, K = −·917.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		19·5	302	e 5 20	PPP	—	—	—	—	e 8·8
San Juan		20·5	260	e 4 48	+ 6	e 8 37	+10	—	—	e 9·3
City College, N.Y.		29·8	314	—	—	e 11 10	+ 3	—	—	e 13·2
Shawinigan Falls	N.	32·0	324	e 6 29	− 1	—	—	—	—	—
Ottawa	Z.	33·1	320	e 6 38	− 2	—	—	—	—	—
Granada		37·8	59	7 56a	+36	e 13 13	+ 2	—	—	18·3
Alicante		40·4	58	e 7 56	+15	14 10	+20	9 32	PP	e 19·4
St. Louis		41·2	303	i 7 48	0	e 14 8	+ 6	e 16 56	SS	—
Kew		44·0	39	e 8 9	− 2	e 15 7	+24	—	—	e 19·8
Clermont-Ferrand		44·4	48	e 8 15	+ 1	e 14 56	+ 7	—	—	20·8
Paris		44·8	44	i 8 17	0	e 15 3	+ 8	e 9 58	PP	e 20·8
La Paz		45·9	211	8 22	− 4	i 15 39	+28	—	—	22·5
Tamanrasset	Z.	46·1	80	i 8 29k	+ 1	—	—	i 10 6k	PcP	22·8
De Bilt		47·4	40	—	—	e 15 30	− 2	—	—	e 20·8
Strasbourg		48·2	45	i 8 44a	0	—	—	e 9 17	?	—
Scoresby Sund		48·8	10	—	—	19 21	SS	—	—	—
Stuttgart		49·1	45	e 8 49	− 2	e 15 56	0	—	—	e 22·8
Lubbock		50·4	295	9 17	+16	—	—	—	—	—
Rome	E.	50·7	55	—	—	e 16 19	+ 1	—	—	—
Jena	E.	51·0	43	e 9 4	− 2	—	—	—	—	—
Collmberg		52·0	43	e 9 11	− 2	—	—	e 9 21	P	—
Copenhagen		52·5	37	—	—	e 16 48	+ 5	—	—	—
Logan		57·6	306	e 9 53	− 1	—	—	—	—	—
Tucson		58·1	295	i 9 57	− 1	—	—	e 10 58	PcP	—
Hungry Horse		59·0	314	i 10 2	− 2	—	—	—	—	—
Pierce Ferry		60·1	300	i 10 10	− 1	—	—	—	—	—
Overton	Z.	60·4	300	i 10 13	0	—	—	—	—	—
Boulder City		60·8	300	e 10 17	+ 1	—	—	—	—	—
Riverside	Z.	63·2	298	i 10 32	0	—	—	i 11 2	PcP	—
Tinemaha	Z.	63·3	301	i 10 33	0	—	—	—	—	—
Pasadena	Z.	63·8	298	i 10 35	− 1	—	—	i 11 5	PcP	—
Victoria	Z.	65·2	314	e 10 43	− 2	—	—	—	—	—
Mineral	Z.	65·3	305	i 10 45	− 1	—	—	—	—	—
Shasta Dam		65·8	305	i 10 47	− 2	—	—	—	—	—
Lick	Z.	65·9	302	i 9 50a	−60	—	—	—	—	—

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara	70·0	62	e 11 18	+ 3	e 19 59	−27	—	—	—
College	74·2	335	e 11 39	− 1	—	—	—	—	—
Sverdlovsk	78·6	33	e 12 5	0	e 22 5	+ 3	—	—	—

Additional readings :—
Paris ipP? =8m.26s., e =8m.54s.
Tamanrasset iZ =8m.40s., iPPZ =10m.22s.
Tucson e =12m.54s.
Riverside iZ =10m.40s.
Tinemaha iZ =10m.40s.
Mineral iZ =10m.52s.
Lick eZ =11m.35s.
Long waves were also recorded at Almeria, Potsdam, and Aberdeen.

June 19d. 22h. 4m. 26s. Epicentre 61°·8N. 150°·9W. Depth of focus 0·005.
(as on 1943, Nov. 3d.).

Felt at Anchorage.
Epicentres : 62°N. 149°·25W. (Strasbourg).
61°N. 150°W. (U.S.C.G.S.).
Depth greater than normal.

L. M. Murphy and F. P. Ulrich.
United States Earthquakes, 1949, serial No. 748, Washington, 1951, p. 29.

A = −·4151, B = −·2310, C = +·8799 ; δ = −11 ; h = −9 ;
D = −·486, E = +·874 ; G = −·769, H = −·428, K = −·475.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		3·4	24	i 0 57	+ 5	i 2 6	?	—	—	i 3·3
Sitka		9·0	112	—	—	e 3 32	−19	—	—	e 4·5
Victoria		20·4	118	e 4 31	− 3	—	—	—	—	—
Hungry Horse		24·6	105	i 5 12	− 3	e 9 44	+15	e 5 28	pP	—
Butte	N.	27·0	107	—	—	e 10 28	+19	—	—	e 13·8
Shasta Dam		27·3	127	i 5 37	− 4	—	—	e 5 53	pP	—
Berkeley	Z.	29·8	130	i 6 1a	− 2	—	—	e 6 17a	pP	—
Lick	Z.	30·5	130	i 6 6a	− 3	—	—	i 6 23k	pP	—
Logan		30·7	112	e 6 7	− 4	—	—	e 6 21	pP	—
Tinemaha	Z.	32·0	126	i 6 21	− 1	—	—	i 9 14	P_cP	—
Overton	Z.	34·0	121	e 6 37	− 3	—	—	i 6 56	pP	—
Boulder City		34·3	121	e 6 40	− 2	—	—	—	—	—
Pierce Ferry		34·5	120	i 6 39	− 5	—	—	—	—	—
Pasadena	Z.	34·6	128	i 6 43	− 2	—	—	i 7 1	pP	—
Riverside	Z.	35·0	128	i 6 47	− 1	—	—	e 7 6	pP	—
Palomar		35·8	127	i 6 52	− 3	—	—	i 7 9	pP	—
Tucson		39·2	120	e 7 21	− 2	—	—	e 7 33	pP	—
St. Louis		43·2	94	e 7 55	− 1	e 14 13	− 5	e 8 7	pP	—
Ottawa	Z.	44·8	75	i 9 7	+58	—	—	e 9 19	pP	e 23·2
Shawinigan Falls	N.	45·2	72	e 8 23	pP	—	—	—	—	—
Seven Falls	E.	45·7	70	e 8 27	pP	—	—	—	—	23·6
Sverdlovsk		59·2	341	i 10 4	+ 7	e 18 12	+14	—	—	—
Moscow		62·6	355	e 10 27	+ 7	—	—	—	—	—
Collmberg		66·5	11	e 10 49	+ 4	—	—	—	—	—
Paris		67·7	19	i 10 55	+ 2	—	—	—	—	—
Strasbourg		68·6	15	i 11 15	pP	—	—	—	—	—
Stuttgart	Z.	68·6	14	e 11 2	+ 4	—	—	—	—	—
Clermont-Ferrand		70·8	19	e 11 10	− 2	—	—	—	—	—
Ksara		84·6	355	e 6 46	?	—	—	e 11 3	?	—
Pretoria	Z.	144·0	2	i 19 32	[+ 4]	—	—	—	—	—

Additional readings :—
Berkeley iZ =6m.9s.
Riverside iZ =7m.9s., eZ =9m.20s.
St. Louis esP =8m.15s.
Paris e =11m.8s., i =11m.13s.
Long waves were also recorded at Saskatoon, Chicago, Philadelphia, Rapid City, Alicante, Almeria, and Granada.

June 19d. Readings also at 0h. (Seven Falls, Bermuda, Chicago, and Philadelphia), 2h. (Tucson and Copenhagen), 6h. (Santa Lucia), 9h. (near Alicante), 10h. (near Andijan, Tashkent, and Murgab), 14h. (near Victoria, near Rome, and near Santa Lucia), 17h. (near Leninakan and near Santa Lucia), 18h. (near Mizusawa), 19h. (Lick, Riverside, Shasta Dam, and Tucson), 20h. (La Paz).

June 20d. Readings at 4h. (Christchurch, Kaimata, Wellington, near Tuai, Samarkand, near Andijan, Frunse, and Murgab), 5h. (Scoresby Sund, Stuttgart, near Basle and Zürich), 7h. (near Leninakan), 8h. (Santa Lucia, Overton, and Hungry Horse), 9h. (Mount Wilson, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Stuttgart, Collmberg, and near Pavia), 10h. (Scoresby Sund), 14h. (Stuttgart, Jena, and near Messina), 16h. (Tacubaya, Stuttgart, and near Pavia), 18h. (Riverside, Tucson, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Logan, near Apia and near Ottawa), 19h. (Collmberg, Paris, Strasbourg, Stuttgart, Clermont-Ferrand, Zürich, near Ottawa and near Overton), 21h. (Ottawa, St. Louis, Tucson, Overton, Pierce Ferry, Hungry Horse, Bogota, La Paz, near Huancayo, Obi-garm, Samarkand, near Andijan and Murgab).

June 21d. Readings at 0h. (Ksara and near Hungry Horse), 2h. (Granada, Pretoria, and near Tacubaya), 3h. (Pierce Ferry, near Salo, Chur, Stuttgart, Zürich, and near Copiapo), 8h. (near La Paz), 9h. (Tacubaya, Tucson (2), Boulder City, Pierce Ferry (2), Shasta Dam, and Hungry Horse), 10h. (Pierce Ferry, Tucson, Sverdlovsk, and near Pavia), 13h. (Pierce Ferry, Shasta Dam, and Hungry Horse), 14h. (Sotchi, and near Theodosia), 16h. (Santa Lucia and near Pavia), 17h. (Grozny and near Leninakan), 18h. (Samarkand, near Andijan, Murgab, Obi-garm, Stalinabad, and near Pavia), 19h. (near Leninakan), 20h. (Christchurch, Paris, Collmberg, Stuttgart, Boulder City, Overton, and Pierce Ferry).

June 22d. 1h. 50m. 45s. Epicentre 34°·0N. 45°·5E.

$A = +\cdot5823$, $B = +\cdot5926$, $C = +\cdot5566$; $\delta = +5$; $h = 0$;
$D = +\cdot713$, $E = -\cdot701$; $G = +\cdot390$, $H = +\cdot397$, $K = -\cdot831$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Erevan		6·2	353	2 3?	+28	—	—	3 22?	SSS	—
Leninakan		6·9	350	e 1 47?	+ 2	3 18?	+13	—	—	—
Tiflis		7·7	356	e 2 0	+ 4	—	—	—	—	—
Ksara		8·0	271	e 2 23?	+23	i 4 21?	S_g	—	—	—
Grozny		9·3	1	e 2 23	+ 6	—	—	—	—	—
Helwan	z.	12·7	255	e 3 6	+ 1	—	—	—	—	—
Yalta		13·6	323	3 14	− 3	—	—	—	—	—
Istanbul		14·8	303	e 3 31	− 1	—	—	—	—	—
Bucharest		18·2	311	—	—	e 7 38	+ 1	—	—	e 11·1
Stalinabad		19·3	68	e 4 29	0	e 8 11	+ 9	—	—	—
Obi-garm		20·0	68	i 4 36	− 1	—	—	—	—	—
Tashkent		20·2	62	e 4 37	− 2	e 8 26	+ 5	—	—	—
Andijan		22·3	65	e 5 1	0	—	—	—	—	—
Moscow		22·4	348	e 4 59	− 3	8 57	− 7	—	—	—
Sverdlovsk		25·1	19	5 23	− 5	—	—	—	—	—
Triest		26·8	305	—	—	10 21?	+ 2	—	—	e 14·4
Rome		27·1	297	e 8 9	P_cP	e 10 42	+18	e 11 5	SS	e 15·4
Clermont-Ferrand		34·3	303	e 6 49	− 1	—	—	—	—	21·2
Paris		35·0	308	e 6 55	− 1	—	—	7 25	PP	e 20·2
Kew		37·2	312	e 6 15?	−60	—	—	—	—	—

Helwan also gives eZ = 3m.45s. and 4m.0s., S? = 7m.3s., iN = 7m.23s., SS?N = 7m.42s.
Long waves were also recorded at De Bilt, Copenhagen, Potsdam, Strasbourg, and Stuttgart.

June 22d. 18h. 8m. 43s. Epicentre 37°·3N. 121°·7W. (as on 10d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick		0·0	—	i 0 4	− 3	—	—	—	—	—
Santa Clara		0·2	284	i 0 7	− 3	i 0 16	0	—	—	—
Branner		0·4	287	i 0 11	− 2	i 0 19	− 2	—	—	—
Berkeley		0·7	321	i 0 16k	− 1	i 0 28	0	—	—	—
San Francisco		0·7	308	i 0 17	0	i 0 26	− 2	—	—	—
Fresno	z.	1·6	110	i 0 30k	0	i 0 53	+ 2	—	—	—
Mineral		3·1	2	e 0 51	0	—	—	i 0 54k	P*	—
Shasta Dam		3·4	351	e 0 55	0	e 1 25	−12	e 1 7	P_g	e 1·6
Boulder City		5·7	102	e 1 51	P_g	—	—	—	—	—
Overton		5·9	96	e 1 34	+ 3	—	—	i 1 53	P_g	—
Pierce Ferry		6·3	99	e 1 39	+ 3	—	—	—	—	—

Additional readings :—
Branner iE = 30s.
Berkeley iE = 21s.
Fresno iN = 59s.
Mineral eN = 58s.
Long waves were also recorded at Tucson.

June 22d. Readings also at 2h. (College and near Murgab), 3h. (Collmberg and near Tucson), 4h. (near Bogota and near Mizusawa), 5h. (Murgab, Andijan, near Obi-garm, Stalinabad and near College), 8h. (Tucson, Pierce Ferry, and Shasta Dam), 9h. (Overton, near Alicante and Apia), 10h. (Grahamstown), 11h. (Overton (2), Pierce Ferry, near College, near Ashkabad, Stuttgart, near Basle, Chur, Zürich, and Salo), 12h. (near Pavia), 13h. (Mount Wilson, Riverside, Tinemaha, Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, Logan, St. Louis, Chicago, City College, N.Y., Philadelphia, Bermuda, Kew, near San Juan, near Pavia, and near Obi-garm), 14h. (Alicante, Overton, near Obi-garm and near Pavia), 16h. (Rome, near Ashkabad, and near Leninakan), 18h. (near College), 19h. (3) and 20h. (Victoria), 21h. (Victoria and near Piatigorsk).

June 23d. 22h. 27m. 11s. Epicentre 16°·1S. 168°·3E. Depth of focus 0·015.
(as on 1949, Feb. 14d.).
A = −·9413, B = +·1949, C = −·2756 ; δ = −1 ; h = +6 ;
D = +·203, E = +·979 ; G = +·270, H = −·056, K = −·961.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		18·1	229	i 4 2k	− 2	i 7 17	− 2	i 4 11	pP	—
Apia		19·4	86	e 3 46	−32	e 7 11	−35	e 3 57	pP	e 8·8
Auckland	N.	21·5	166	4 39	− 1	8 39?	+14	i 6 25	?	—
Riverview		23·5	217	i 4 57k	− 2	i 9 1	+ 1	i 5 29	pP	—
Tuai	N.	23·9	163	5 2	− 1	9 6	− 1	15 49	S_eS	—
Wellington		25·7	170	5 19	− 1	11 10	SSS	5 55	pP	—
Kaimata	N.E.	26·5	175	5 27	0	—	—	—	—	—
Christchurch		27·6	173	5 34	− 3	10 4	− 4	i 6 33	pP	—
Honolulu		49·9	43	e 9 37	?	e 15 38	− 3	e 16 53	sS	e 20·9
Perth		50·0	242	—	—	i 15 34	− 8	i 19 44	SS	—
Batavia		60·9	272	i 9 50k	−11	e 17 53	−14	—	—	—
Branner	z.	84·2	49	i 13 6	+48	—	—	—	—	—
Berkeley		84·3	49	i 12 20k	+ 1	e 22 13	−19	i 23 54	PS	—
Santa Clara	E.	84·3	49	i 14 2	?	—	—	—	—	—
Lick	z.	84·6	49	i 12 21k	+ 1	—	—	i 13 6	pP	—
Shasta Dam		85·5	46	e 12 25	0	—	—	i 13 11	pP	—
Fresno	z.	85·7	50	i 12 27k	+ 1	—	—	e 13 12	pP	—
Mineral		85·9	46	e 13 14	pP	—	—	—	—	—
Pasadena		85·9	53	i 12 26a	− 1	e 22 44	− 3	i 13 10	pP	e 39·0
Riverside	z.	86·4	53	i 12 30a	+ 1	—	—	i 13 14	pP	—
Palomar		86·6	55	i 12 31a	+ 1	—	—	i 13 17	pP	—
Reno		86·8	48	e 12 31	0	e 24 22	PS	e 13 15	pP	—
Tinemaha		86·9	50	i 12 34a	+ 3	—	—	i 13 15	pP	—
College		87·3	17	e 13 17	pP	—	—	—	—	—
Irkutsk		87·6	326	e 12 33	− 2	i 22 43	[− 5]	e 13 16	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Victoria	z.	88·2	39	e 13 25	pP	—	—	—	—	—
Seattle		88·5	39	—	—	e 22 42	[−12]	—	—	—
Boulder City		89·1	52	e 12 43	+ 1	e 24 25	SP	e 13 29	pP	e 40·7
Overton	z.	89·6	52	i 12 45	+ 1	—	—	i 13 30	pP	—
Pierce Ferry		89·8	52	i 12 44	− 1	e 24 29	SP	i 13 32	pP	—
Tucson		91·0	57	e 12 51	0	e 23 39	+ 5	i 13 39	pP	e 40·1
Logan		93·2	47	e 13 48	pP	e 23 57	+ 3	e 17 35	pPP	—
Hungry Horse		93·9	41	e 13 48	pP	e 24 43	SP	e 17 37	pPP	—
Butte	N.	94·1	43	e 14 8	?	e 24 4	+ 3	e 24 23	?	—
Bozeman		95·0	44	—	—	e 24 55	SP	e 25 32	PS	e 40·7
Tacubaya		97·5	72	—	—	e 31 26	SS	—	—	—
Poona	E.	99·1	286	—	—	i 23 39	[−14]	—	—	—
Rapid City	E.	100·0	47	e 18 22	PP	e 23 54	[− 3]	e 24 54	S	—
Bombay		100·1	286	—	—	e 23 50	[− 7]	—	—	—
Murgab		103·2	306	i 17 58	PP	i 24 6	[− 6]	—	—	—
Andijan		104·8	308	e 18 14	PP	e 24 9	[−11]	—	—	—
Tashkent		107·1	309	e 18 5	PP	e 25 14	SKKS	—	—	—
St. Louis		108·7	54	e 19 22	PP	e 24 34	[− 3]	e 19 31	pPP	—
Sverdlovsk		113·0	325	e 18 21	[− 1]	e 24 49	[− 5]	—	—	—
Cleveland		115·5	52	i 20 19	?	e 27 0	?	—	—	—
La Paz	N.	115·6	118	e 18 41	[+14]	—	—	—	—	—
Ottawa		118·8	46	18 32	[− 2]	e 37 13	SSP	—	—	62·3
Philadelphia		120·4	52	—	—	e 29 11	SP	e 36 20	SS	e 48·9
City College, N.Y.		121·3	51	—	—	e 29 26	SP	e 31 3	PPS	e 54·6
Fordham		121·3	51	i 21 1	pPP	e 26 48	SKKS	—	—	—
Seven Falls	E.	122·6	43	—	—	(37 49?)	SSP	—	—	37·8
Grozny		124·5	312	19 22	pPKP	—	—	—	—	—
Scoresby Sund		125·3	4	21 13	pPP	24 19	?	38 31	SSP	—
Tiflis		125·5	310	18 47	[+ 1]	—	—	i 19 35	pPKP	—
Moscow		125·6	328	e 18 44	[− 2]	—	—	e 19 33	pPKP	—
Leninakan		126·3	310	18 55	[+ 8]	—	—	19 51	pPKP	—
San Juan		128·1	78	e 19 54	pPKP	e 22 12	PKS	e 24 13	PPP	—
Yalta		132·2	316	e 19 47	pPKP	—	—	—	—	—
Ksara		133·8	301	e 19 3	[+ 1]	i 22 16	PKS	19 52	pPKP	—
Lwow		135·7	327	e 19 59	pPKP	—	—	—	—	—
Copenhagen		136·4	341	19 9	[+ 2]	22 21	PKS	—	—	—
Istanbul		137·0	314	e 19 56	pPKP	e 31 24	SP	—	—	—
Bucharest		137·4	320	—	—	e 22 16	SKP	—	—	—
Helwan	z.	138·3	297	19 57	pPKP	22 27	PKS	22 1	PP	—
Potsdam	z.	138·8	337	e 19 57	pPKP	i 22 29	PKS	e 21 50	PP	—
Collmberg	z.	139·7	335	e 19 6	[− 6]	—	—	e 20 1	pPKP	—
De Bilt		141·7	343	e 19 13	[− 3]	—	—	e 22 36	PP	—
Zagreb		142·4	328	e 19 13k	[− 5]	—	—	—	—	—
Stuttgart		143·2	337	e 19 15	[− 4]	e 22 36	SKP	e 20 1	pPKP	—
Kew		143·6	348	e 19 21	[+ 1]	e 26 0	[−14]	e 20 1	pPKP	e 60·8
Triest		143·6	330	i 19 15?k	[− 5]	—	—	i 20 7	pPKP	—
Strasbourg		143·9	339	e 19 17a	[− 3]	e 26 25	[+10]	i 20 8	pPKP	—
Chur		144·6	335	e 19 19	[− 2]	—	—	—	—	—
Zürich		144·6	336	e 19 21	[0]	—	—	e 22 4	PP	—
Basle		144·8	337	e 19 19a	[− 3]	—	—	e 20 14	pPKP	—
Salo		145·2	333	e 18 49	[−33]	—	—	—	—	—
Padova		145·4	331	e 19 16	[− 7]	—	—	—	—	—
Paris		145·4	334	e 19 20	[− 3]	—	—	i 20 9	pPKP	e 75·8
Bologna		145·6	330	e 19 24	[+ 1]	—	—	e 20 12	pPKP	—
Jersey	E.	146·1	350	e 25 11	?	e 29 49?	SKKS	—	—	—
Pavia		146·1	334	e 19 24	[0]	—	—	e 20 11	pPKP	—
Florence Arc.		146·2	329	i 19 25a	[+ 1]	e 29 49?	SKKS	i 20 13	pPKP	—
Florence Xim		146·2	329	i 19 23k	[− 1]	—	—	i 20 14	pPKP	—
Prato		146·2	330	e 19 24	[0]	e 29 15	SKKS	—	—	—
Rome		146·9	325	i 19 24a	[− 1]	e 26 12	[− 7]	i 20 14	pPKP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Messina		147·5	320	e 19 29	[+ 3]	—	—	e 20 15 pPKP	—
Clermont-Ferrand		147·9	341	i 19 31	[+ 4]	i 23 0	PKS	i 20 19 pPKP	67·8
Toledo	z.	155·4	346	i 20 7	PKP_2	—	—	i 20 51 $pPKP_2$	—
Alicante		155·7	339	21 1	$pPKP_2$	44 32	PSS	24 30 PP	e 70·2
Granada		157·8	343	i 21 11	$pPKP_2$	—	—	— —	92·5
Malaga	z.	158·5	344	e 20 14	pPKP	—	—	— —	83·8
Tamanrasset	z.	162·5	296	e 19 46	[0]	—	—	i 20 38 a pPKP	—

Additional readings and notes :—
Brisbane isP?NZ =5m.5s., iZ =5m.42s. and 6m.45s., iSSE =7m.31s., iSSN =7m.34s.
Apia e =4m.25s. and 4m.30s., ePP? =4m.50s.
Riverview iPPZ =5m.42s., isP =5m.55s., iSN =8m.54s., ipS?EN =9m.35s., isSN = 9m.57s., iSS?N =10m.11s., iS_cPE =11m.45s., iS_cSE =15m.50s., and many other unidentified readings.
Wellington i =5m.41s., PPZ =6m.10s., i =6m.43s., iZ =6m.52s., i =7m.1s., P_cP =9m.3s., P_cS? =12m.11s., iZ =12m.56s.
Christchurch eNZ =6m.51s., eEN =8m.49s., i =10m.43s., iEZ =11m.5s., e =11m.27s.
Honolulu ePP? =10m.23s., e =20m.6s.
Berkeley iZ =13m.6s.k, eE =40m.55s., eZ =42m.43s., eE =42m.55s.
Lick eN =13m.10s.
Pasadena esPZ =13m.29s., ePPZ =16m.23s., eN =23m.56s., and 35m.13s.
Reno iEZ =13m.19s.
Boulder City ePP =16m.19s.
Tucson ePP =16m.24s., ePPP? =18m.9s., eSP =24m.33s., esS =24m.59s., ePS? = 25m.17s., e =31m.15s.
Logan esP =14m.1s., ePP =16m.49s., eSKS? =22m.48s., esS =24m.50s., ePS =25m.19s.
Bozeman e =35m.9s.
Tacubaya i =32m.33s., e =36m.28s.
Rapid City eE =25m.22s. and 29m.4s.
St. Louis e =25m.27s., eS? =25m.55s., i =26m.57s., ePPS =29m.5s., i =29m.12s. and 29m.43s., eSS =34m.17s., esSS =35m.4s.
Cleveland eN =28m.28s., eSS?N =36m.33s.
Philadelphia esSS =37m.31s., eSSS =40m.58s.
City College, N.Y. eSS =36m.40s., eSSS =41m.5s.
Fordham eS =28m.0s., esS =29m.20s.
San Juan epPKS =23m.17s., epPS =32m.1s., e =34m.6s., eSS =37m.58s., eSSS = 43m. 16s.
Ksara i =21m.38s. and 23m.42s.
Copenhagen e =19m.55s., 23m.28s., 28m.25s., and 29m.58s.
Bucharest iN =23m.31s. and 28m.34s., L?EN =34m.49s.?
Helwan eZ =20m.10s., pPP?Z =22m.40s., iPPP?Z =24m.53s., eE =28m.36s., eN = 41m.13s.
Collmberg eE =22m.8s., eZ =22m.31s., eE =30m.40s., eSKP?Z =30m.45s.
Stuttgart epPKPZ =20m.7s., ePPZ =21m.59s., e =23m.7s., ePPPZ =26m.14s., eSKKS = 29m.3s., e =30m.9s., eS?Z =30m.50s., ePS? =33m.49s., e =43m.43s.
Kew eZ =20m.14s., esPKPZ =20m.27s., eEZ =33m.53s., eSSEZ =41m.13s., eEZ = 50m.53s., eZ =55m.51s.
Triest iSKP? =22m.3s., iPP =22m.32s., ipPP =23m.46s., ePPP =26m.0s., esPP = 27m.2s., iSKKS =29m.4s., i =30m.36s., eSS =37m.36s., eSSS =42m.24s.
Strasbourg esPKP? =20m.26s., esPKP =20m.46s., eSKP =22m.0s., iPP =23m.0s., esPP =24m.7s., ePPP =25m.30s., eSKKS =28m.38s., eSS? =42m.30s., eL? = 50m.49s., and other unidentified readings.
Paris i =19m.34s., isPKP =20m.29s., e =21m.18s., ePP =22m.43s., epPP? =23m.30s., ePPP =25m.55s., e =41m.55s.
Bologna e =20m.37s. and 24m.17s.
Florence Arc. ePP? =23m.49s., e =51m.49s.
Rome eN =21m.22s., eSKP?Z =23m.26s., ePSKS?N =32m.51s., eN =33m.42s., e = 37m.59s., SS =41m.37s.
Clermont-Ferrand $iPKP_2$ =19m.36s., $ipPKP_2$ =20m.25s., ePP =23m.9s., epPP = 24m.7s., eSS? =43m.15s., e =49m.0s.
Toledo eZ =24m.17s. and 24m.29s.
Granada PP =25m.30s., SKKS =34m.57s., SS =50m.17s. Readings wrongly identified.
Malaga $iPKP_2Z$ =21m.26s.k, iPPZ =25m.2s.a, PPPZ =28m.58s., PPSZ =38m.42s., SSZ =45m.34s. Readings wrongly identified.
Tamanrasset eZ =20m.35s., ePP?Z =23m.22s., epPP?Z =24m.5s.
Long waves were also recorded at Bogota, Sitka, and Ivigtut.

June 23d. Readings also at 1h. (Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Florence Arc. (2), and near Ashkabad), 4h. (Florence Arc.), 6h. (Istanbul, Ksara, near Erevan and near Messina), 7h. (College, Hungry Horse, Pierce Ferry, and Shasta Dam), 8h. (College, Overton, and near Apia), 9h. (College), 10h. (near Rome), 11h. (near Hungry Horse), 13h. (College and Pierce Ferry), 14h. (Boulder City, Hungry Horse, Logan, Overton, Shasta Dam, Tucson, Pasadena, Palomar, Tinemaha, and near Pavia), 16h. (Alicante (2)), 17h. (near College), 18h. (Mizusawa, College, Hungry Horse, Shasta Dam, Overton, Pierce Ferry, Collmberg, Paris, and Stuttgart), 21h. (near Ottawa), 23h. (near Ashkabad).

June 24d. 22h. 38m. 49s. Epicentre 6°·2S. 105°·7E. Depth of focus 0·005.
(as on 1948, July 25d.).

$A = -\cdot2690$, $B = +\cdot9571$, $C = -\cdot1073$; $\delta = -9$; $h = +7$;
$D = +\cdot963$, $E = +\cdot271$: $G = +\cdot029$, $H = -\cdot103$, $K = -\cdot994$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		1·1	90	i 0 23a	+ 3	i 0 52	+16	—	—	—
Colombo	E.	28·9	296	5 51	− 4	10 44	+ 5	—	—	13·6
Kodaikanal	E.	32·5	300	i 6 28	+ 1	i 11 43	+ 7	7 31	PP	15·2
Calcutta	E.	33·2	330	e 8 18	?	i 14 14	Q	e 10 36	PcP	19·1
Hyderabad	N.	35·7	312	i 6 56	+ 2	i 12 29	+ 4	8 2	PP	16·9
Poona	E.	39·9	309	i 7 29	0	i 13 24	− 5	i 7 44	pP	18·0
Zi-ka-wei	Z.	40·1	21	i 7 35	+ 4	e 13 43	+11	i 9 11	PP	—
Bombay		40·9	308	i 7 38	+ 1	e 13 43	− 1	e 9 16	PP	19·5
Melbourne	E.	47·6	137	i 8 37	+ 6	i 15 25	+ 4	—	—	—
Brisbane		49·6	120	e 8 47	0	e 15 51	+ 2	—	—	—
Riverview		50·2	129	i 8 53a	+ 2	i 16 4	+ 7	i 9 5	pP	e 25·0
Murgab		53·3	328	i 9 14	− 1	i 16 38	− 2	—	—	—
Kulyab		55·2	325	9 16	−12	16 43	−22	—	—	—
Obi-garm		55·8	326	i 9 29	− 4	i 17 9	− 4	—	—	—
Andijan		55·9	329	i 9 33	− 1	—	—	—	—	—
Stalinabad		56·2	325	i 9 33	− 3	i 17 15	− 3	—	—	—
Frunse		56·4	332	e 9 36	− 1	e 17 23	+ 2	—	—	—
Tananarive		57·9	251	10 2	+14	e 17 40	− 1	10 26	pP	e 26·6
Samarkand		58·0	324	i 9 48	0	i 17 38	− 4	—	—	—
Irkutsk		58·3	358	i 9 52	+ 2	17 51	+ 5	—	—	—
Christchurch		69·1	134	11 3	+ 2	20 4	+ 4	14 26	PP	33·7
Wellington		70·2	131	11 9	+ 1	20 12	− 1	24 32	SS	34·2
Arapuni	E.	70·4	128	—	—	e 20 11?	− 4	—	—	33·2
Tuai	N.	71·7	129	11 27	+10	—	—	—	—	—
Erevan		72·7	315	i 11 23	0	—	—	—	—	—
Sverdlovsk		73·0	336	i 11 23	− 2	i 20 43	− 2	—	—	—
Grozny		73·1	318	e 11 25	0	i 20 48	+ 2	11 56	PcP	—
Tiflis		73·1	317	i 11 25	0	i 20 50	+ 4	11 58?	PcP	—
Leninakan		73·4	315	11 23	− 4	20 48	− 2	—	—	—
Piatigorsk		75·2	318	12 31?	+54	22 5?	+55	—	—	—
Ksara		76·9	306	i 11 46a	− 1	21 36	+ 8	—	—	—
Sotchi		77·3	317	11 49	0	21 31	− 2	—	—	—
Helwan		79·6	301	i 12 1	− 1	21 57	0	e 15 5	PP	—
Theodosia		80·7	317	12 8	0	e 22 8	− 1	—	—	—
Yalta		81·4	316	i 12 10	− 1	22 13	− 3	—	—	—
Moscow		83·0	328	12 25	+ 5	22 38	+ 6	—	—	—
Istanbul		84·1	312	i 12 25	0	i 22 44	+ 1	—	—	—
Bucharest	E.	86·9	315	e 12 43	+ 4	i 23 14	+ 4	i 23 55	PS	43·2
	N.	86·9	315	i 12 41	+ 2	i 23 14	+ 4	i 16 26	PP	43·2
Lwow		89·3	320	e 12 52	+ 2	—	—	e 16 23	PP	—
Helsinki		90·7	331	i 12 28	−29	e 23 25	[+ 4]	e 23 44	S	e 49·2
Belgrade		91·0	314	e 12 58a	0	i 24 16	ScS	e 16 42	PP	e 51·7
Skalnate Pleso		91·7	319	e 13 0	− 2	—	—	i 16 40	PP	—
Kalossa	E.	92·2	316	e 13 7	+ 3	e 23 55	− 3	e 24 27	ScS	—
Budapest	E.	92·3	317	e 13 7	+ 3	e 23 56	− 3	e 24 24	ScS	e 49·2
Ogyalla		92·9	318	e 13 3	− 4	—	—	e 16 52	PP	—
Raciborzu		93·1	320	e 13 10	+ 2	e 24 14	+ 8	e 16 51?	PP	—
Zagreb		94·2	315	e 13 20	+ 7	e 24 25	+ 9	—	—	—
Upsala	E.	94·3	330	e 13 25	+12	i 23 43	[+ 2]	i 16 55	PP	e 42·2
	N.	94·3	330	e 13 21	+ 8	24 4	SKKS	e 16 44	PP	e 43·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Prague		95·5	320	e 13 18	− 1	e 24 28	+ 1	—	—	—
Triest		95·7	315	i 13 20	0	i 24 55	+27	i 17 10	PP	—
Collmberg		96·5	321	e 13 22	− 1	e 24 5	[+12]	e 17 17	PP	e 51·6
Potsdam	z.	96·5	322	i 13 23	0	—	—	i 17 15	PP	e 48·2
Rome		96·5	311	i 13 21a	− 2	e 23 48	[− 5]	i 13 39	pP	—
Copenhagen		96·9	325	i 13 26	+ 1	i 24 15	−24	26 0	PS	—
Padova		97·0	315	e 13 30	+ 4	e 24 22	−18	e 17 25	PP	—
Bologna		97·4	314	e 13 29	+ 1	e 23 36	[−22]	i 17 28	PP	—
Jena		97·4	320	e 18 14	?	—	—	—	—	—
Florence Arc.		97·5	313	e 13 25	− 3	e 26 22	PS	i 17 25	PP	—
Florence Xim.		97·5	313	e 13 32	+ 4	i 25 37	+53	—	—	—
Prato		97·6	314	e 13 31	+ 3	—	—	i 17 23	PP	—
Salo		98·0	315	e 13 31	+ 1	e 24 46	− 2	i 17 31	PP	—
Stuttgart		98·9	318	i 13 33a	− 1	e 24 17	[+12]	e 13 52	pP	e 50·2
Pavia		99·0	315	e 16 41?	PP	—	—	—	—	—
Zürich		99·3	317	e 13 35	− 1	e 24 7	[0]	—	—	—
Strasbourg		99·9	318	e 13 38	− 1	e 24 24	[+14]	i 17 41	PP	e 49·2
Basle		100·0	317	e 17 0	PP	e 24 19	[+ 8]	—	—	—
De Bilt		101·3	322	i 13 45k	0	e 24 21	[+ 4]	i 17 54	PP	e 46·2
Tamanrasset	z.	101·7	292	i 13 48k	+ 1	—	—	e 17 56	PP	—
College		102·6	25	e 20 17	PPP	—	—	—	—	—
Clermont-Ferrand		103·2	315	e 13 55	+ 1	e 24 34	[+ 8]	i 18 7	PP	52·2
Paris		103·3	319	i 13 53	− 1	e 24 28	[+ 1]	i 18 2	PP	e 54·2
Aberdeen		104·8	328	i 18 23	PP	e 24 40	[+ 7]	i 27 23	PPS	e 51·7
Kew		104·8	322	e 14 3	P	e 24 37	[+ 4]	e 18 13	PP	e 53·2
Edinburgh	E.	105·7	326	—	—	e 23 50	[−47]	—	—	—
Alicante		106·5	309	17 13	PKP	23 49	[−52]	17 39	PP	e 47·6
Scoresby Sund		107·8	344	14 15	P	24 57	[+11]	18 45	PP	—
Almeria		108·2	307	17 31	PKP	27 19	PS	18 7	PP	57·4
Granada		109·1	308	17 22k	PKP	i 26 27	S	18 0k	PP	59·4
Toledo		109·1	310	e 17 24	?	e 28 11	PS	e 18 52	PP	—
Malaga	z.	109·8	307	i 17 47a	?	24 57	[+ 2]	i 18 59k	PP	53·3
Lisbon		113·2	310	19 23a	PP	28 58	PS	—	—	44·2
Victoria		120·9	36	e 18 48	[+ 3]	—	—	—	—	—
Ivigtut		121·7	345	i 20 19	PP	—	—	—	—	57·2
Shasta Dam		125·1	44	i 18 55	[+ 2]	—	—	e 19 27	pPKP	—
Mineral	z.	125·8	43	i 18 57a	[+ 2]	—	—	—	—	—
Hungry Horse		126·2	32	i 18 57	[+ 2]	e 27 49	SKKS	—	—	—
Berkeley		126·3	47	i 18 59a	[+ 4]	e 22 32	PKS	—	—	e 58·3
Lick	z.	127·0	47	i 19 0a	[+ 3]	—	—	i 19 15	pPKP	—
Reno		127·4	44	i 19 1	[+ 3]	—	—	—	—	—
Butte	N.	128·4	33	—	—	e 22 24	PKS	—	—	e 69·5
Fresno	z.	128·6	47	e 19 3k	[+ 3]	—	—	e 21 34	PP	—
Bozeman		129·4	33	—	—	e 22 30	PKS	e 31 33	PS	e 63·7
Tinemaha	z.	129·5	46	i 19 6	[+ 4]	i 22 24	PKS	i 19 30	pPKP	—
Santa Barbara	z.	129·6	49	e 19 6	[+ 4]	i 22 23	PKS	—	—	—
Pasadena		130·9	49	e 18 58	[− 6]	i 22 27	PKS	e 21 20	PP	e 62·7
Logan		131·4	37	i 19 7	[+ 2]	i 22 29	PKS	i 19 23	pPKP	e 63·4
Riverside	z.	131·5	49	i 19 8	[+ 3]	i 22 30	PKS	i 19 28	pPKP	—
Boulder City		132·5	45	e 19 4	[− 3]	e 22 35	PKS	—	—	—
Overton	z.	132·5	44	i 19 11	[+ 4]	i 22 36	PKS	i 22 6	PP	—
Pierce Ferry		133·0	45	e 19 2	[− 6]	e 22 36	PKS	e 19 12	pPKP	—
Rapid City	E.	134·6	29	e 19 16	[+ 5]	e 26 19	[+ 5]	e 22 46	PKS	e 63·5
Tucson		137·2	47	i 19 20	[+ 4]	e 22 56	PKS	e 19 38	pPKP	e 56·5
Seven Falls	E.	139·1	357	e 19 23	[+ 4]	i 40 24	SS	e 22 20	PP	59·2
Shawinigan Falls	N.	139·8	358	e 19 22	[+ 1]	—	—	e 22 16	PP	—
Halifax		140·6	348	e 24 49	PPP	—	—	—	—	82·2
Ottawa		140·9	2	i 19 21	[− 2]	e 23 6	PKS	i 22 22	PP	55·2
Chicago		142·6	17	e 19 23	[− 3]	e 26 57	[+30]	e 22 35	PP	e 60·0
Lubbock		142·6	38	19 9	[−17]	—	—	—	—	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
	°	°	m. s.	s.	m. s.	s.	m. s.			m.
Harvard	143·8	356	i 19 26	[− 2]	e 34 15	PPS	i 22 41	PP		e 75·2
Cleveland	144·3	9	e 19 29	[0]	e 23 11	PKS	e 22 44	PP		—
St. Louis	144·6	22	i 19 30	[+ 1]	e 29 33	SKKS	e 22 44	PP		—
Pennsylvania N.	145·4	5	i 19 31	[0]	29 34	SKKS	e 22 48	PP		73·7
City College, N.Y.	145·5	359	i 19 31	[0]	e 29 55	SKKS	i 22 51	PP		e 70·0
Fordham	145·5	359	i 19 32	[+ 1]	—	—	i 22 52	PP		e 78·9
Cincinnati	145·9	14	i 19 33	[+ 1]	e 22 51	PP	i 19 55	pPKP		—
Philadelphia	146·4	0	e 19 32	[0]	e 29 43	SKKS	i 20 18	pPKP		e 64·9
Washington	147·3	3	i 19 37	[+ 3]	e 33 40	PS	e 23 1	PP		—
Bermuda	152·4	343	e 20 36	[+54]	e 34 42	SKSP	e 24 21	PP		e 61·9
La Paz	156·6	196	i 19 50	[+ 3]	i 30 41	SKKS	i 24 8	PP		75·2
Huancayo	161·8	176	e 19 57	[+ 4]	e 31 7	SKKS	e 29 1	PPP		e 80·2
Fort de France	164·5	302	e 25 8	PP	—	—	—	—		—
San Juan	165·5	327	e 19 56	[− 1]	e 31 48	SKKS	i 24 40	PP		e 83·4
Galerazamba	175·4	—	e 20 22	[+20]	e 25 2	?	e 33 42	SKKS		e 91·2
Bogota	178·4	—	i 20 5	[+ 2]	e 26 1	[−56]	e 32 26	SKKS		e 85·2

Additional readings :—
Kodaikanal SSE =13m.43s.
Calcutta iSSE =16m.44s.
Hyderabad SSN =14m.40s.
Poona isPE =8m.0s., iE =8m.30s., iPPE =8m.59s., ePPPE =9m.19s., SSE =15m.59s., QE =16m.23s., SSSE =16m.38s., S_cSE =17m.29s.
Bombay iSE =13m.46s., SSE =16m.59s., SSN =17m.7s.
Riverview iEN =16m.28s., iSSE =19m.38s.
Tananarive PS =17m.52s., sS =18m.31s., SS =21m.5s.
Christchurch SSEN =24m.11s., QEN =28m.23s.
Wellington SSS? =27m.11s., Q =28·9m.
Tiflis S_cS =21m.38s.?
Helwan eZ =15m.1s. and 16m.38s., SKSN =22m.17s., PSEN =22m.35s.
Bucharest iPPPN =18m.29s., iSKKSE =23m.30s., iSN =23m.51s.
Helsinki e =13m.36s. and 24m.7s.
Belgrade e =13m.55s., eSS =30m.6s.
Kalossa eE =16m.45s. and 17m.35s., SN =24m.5s.
Budapest SN =24m.7s.
Raciborzu eE =17m.26s., ePSE =25m.24s., ePPS?E =25m.41s.
Upsala eSKKSE =23m.59s., eN =24m.44s., iPSE =25m.30s., eN =28m.4s., eSS = 30m.11s., eSSS?N =33m.11s. ?
Triest iPPP =19m.14s., iSKS =24m.10s., iPPS =26m.42s, eSS =31m.14s.
Collmberg eZ =13m.48s., eE =17m.32s. and 17m.39s.?
Potsdam eE =16m.12s., eN =17m.4s.
Rome iPPZ =17m.17s., ePPP? =19m.15s., i =24m.14s., iS =24m.59s., e =25m.29s., eSS =31m.41s., eSSS =35m.40s.
Copenhagen 17m.22s. and 25m.4s.
Bologna e =15m.32s. and 24m.25s.
Florence Arc. e =28m.24s.
Stuttgart eZ =16m.41s., iPP =17m.33s., ePPP =19m.32s., e =21m.53s., eS =25m.11s., ePS =26m.29s., eSS =31m.29s.
Strasbourg ePP =17m.55s., ePPP =19m.23s. and 19m.34s., eSP? =26m.23s., ePS = 26m.34s., ePPS =27m.1s. and 27m.18s., eSS =31m.20s. and 31m.34s., eSSS = 35m.22s. ; also many other unidentified readings.
De Bilt eZ =17m.16s., ePPP =20m.7s., e =24m.41s., eS =25m.42s., eZ =26m.45s., ePS = 27m.41s.
Tamanrasset eZ =17m.27s.
Clermont-Ferrand ePPP =20m.21s., e =24m.55s., eS =25m.37s., ePS =27m.22s., eSS = 33m.7s., eSSS =37m.22s.
Paris e =14m.35s., 18m.10s., and 18m.36s., ePPP =20m.18s., e =24m.46s., ePS = 27m.10s., e =28m.14s., 35m.8s., and 42m.18s.
Aberdeen eE =30m.45s., iSSSE =37m.22s.
Kew ePPPZ =20m.33s., eE =24m.55s., ePPSEZ =27m.25s., eSSSE =37m.3s., eE = 44m.39s.
Alicante PPP =19m.51s., PPS =27m.57s., SS =32m.49s., SSS =36m.57s.
Scoresby Sund 25m.12s., PS =28m.11s., SS =33m.11s.
Almeria PPP =20m.27s., PPS =28m.27s.
Granada PPP =20m.27s. a.
Toledo eE =26m.13s.
Malaga PPPZ =21m.13s., PPSZ =29m.39s., QZ =47m.23s.
Shasta Dam ePP =20m.43s.
Berkeley iZ =19m.21s. a, eZ =33m.39s.
Fresno eN =23m.7s.
Bozeman ePPP? =24m.31s.
Pasadena iPKP,Z =19m.7s., eZ =19m.22s. and 19m.45s., iEN =22m.36s., iZ =22m.46s., eN =33m.23s.
Logan eSKSP =31m.30s., eSPP =33m.22s.

Continued on next page.

Tucson e = 19m.8s. and 21m.56s., ePP? = 22m.3s., e = 22m.20s. and 24m.39s., epPPP = 25m.58s., eSKSP = 32m.24s., eSPP = 34m.21s.
Chicago eSKP = 23m.3s., e = 29m.41s. and 37m.22s.
Cleveland eE = 19m.45s., ePPSE = 34m.51s., eE = 36m.47s.
St. Louis i = 19m.42s., 19m.50s., and 19m.56s., iPP = 22m.50s., ipPP = 23m.29s., e = 31m.0s., 33m.0s., and 35m.58s.
Pennsylvania iN = 19m.44s.
City College, N.Y. e = 31m.22s.
Philadelphia e = 22m.38s. and 23m.37s., eSKSP? = 33m.26s.
La Paz PPP = 27m.29s., PPS = 37m.3s., iSS = 43m.38s.
Huancayo eSKSP = 34m.53s., iSS? = 44m.19s.
San Juan ePKP = 20m.6s., e = 28m.2s., eSKSP = 35m.26s., e = 43m.53s., eSS? = 45m.54s., e = 50m.41s. and 51m.45s.
Galerazamba eEN = 49m.11s.
Bogota iPKP$_2$ = 22m.9s., eSKSEZ = 26m.5s., e = 33m.11s., ePSKSEN = 35m.47s., eEN = 54m.11s.
Long waves were also recorded at Auckland, Honolulu, Ukiah, Sitka, Columbia, Jersey, and Tortosa.

June 24d. Readings also at 0h. (Stuttgart), 1h. (Basle and near Zürich), 2h. (Murgab, near Andijan, Kulyab, Samarkand, and Stalinabad), 4h. (near Kulyab), 5h. (Tacubaya), 6h. (Tacubaya and near Obi-garm), 7h. (Auckland, Wellington, Boulder City, Pierce Ferry, Shasta Dam, Tucson, and near Sotchi), 8h. (Andijan, Samarkand, near Kulyab, Murgab. Obi-garm, Stalinabad, and near Ashkabad), 9h. (Tacubaya, Andijan, near Kulyab, Murgab, Obi-garm, Stalinabad, and near La Paz), 10h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Pierce Ferry, Shasta Dam, Hungry Horse, and College), 11h. (Ashkabad), 12h. (College, Tucson, Stalinabad, near Andijan, Murgab (2), Obi-garm, and near Ashkabad (2)), 16h. (Tucson, Boulder City, Overton, Pierce Ferry, Shasta Dam, Hungry Horse, College, and near Apia), 17h. (Overton, near Murgab, and Obi-garm), 20h. (Kulyab, Murgab, near Obi-garm, Samarkand, and Stalinabad), 21h. (Mount Wilson, Riverside, Tucson, Boulder City, Pierce Ferry, and Shasta Dam), 22h. (Grahamstown, near New Plymouth, Christchurch, Tuai, and Wellington), 23h. (Overton and Irkutsk).

June 25d. 0h. 21m. 26s. Epicentre 42°·2N. 84°·1E. (as on 1949 March 6d.).
$A = +·0764$, $B = +·7391$, $C = +·6692$; $\delta = -7$; $h = -2$;
$D = +·995$, $E = -·103$: $G = +·069$, $H = +·666$, $K = -·743$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Frunse		7·1	279	e 2 0	+12	e 3 22	+12	—	—	—
Murgab		8·6	247	i 2 13	+ 4	—	—	—	—	—
Andijan		8·9	264	e 2 14	+ 2	i 3 51	− 4	—	—	—
Obi-garm		11·5	257	i 2 47	− 1	—	—	—	—	—
Kulyab		11·8	253	e 2 37	−16	—	—	—	—	—
Stalinabad		12·2	258	i 2 58	0	—	—	—	—	—
Samarkand		13·2	265	e 3 12	+ 1	—	—	—	—	—
Irkutsk		17·0	47	—	—	e 7 14?	+ 4	—	—	—
Sverdlovsk		21·0	323	e 4 45	− 2	8 38	+ 1	—	—	—
Tiflis		29·1	283	e 6 55	+51	—	—	—	—	—
Moscow		32·7	311	e 6 40	+ 4	—	—	—	—	—
Upsala	N.	43·3	318	—	—	e 18 48	Q	—	—	e 22·6
Copenhagen		46·8	313	—	—	e 19 46	Q	—	—	24·6
Collmberg		47·8	307	e 8 40	− 1	—	—	e 10 35	PP	—
Stuttgart		51·0	305	e 9 4	− 2	—	—	—	—	e 27·6
Chur		51·5	302	e 9 7	− 2	—	—	—	—	—
Paris		55·0	307	i 9 34	− 1	—	—	—	—	—
Clermont-Ferrand		56·0	303	e 9 58	+15	—	—	—	—	24·6
Hungry Horse		88·4	12	e 12 54	− 1	—	—	—	—	—
Shasta Dam		94·1	20	i 13 24	+ 2	—	—	—	—	—

Additional readings :—
Upsala eN = 19m.4s.
Collmberg eE = 8m.44s.
Paris iP = 9m.39s., i = 9m.47s.
Hungry Horse i = 12m.58s.
Long waves were also recorded at Potsdam, Strasbourg, and Alicante.

June 25d. 19h. 17m. 10s. Epicentre 19°·7S. 175°·9W. (as on 1948, Dec. 16d.).

$A = -·9397$, $B = -·0674$, $C = -·3351$; $\delta = -13$; $h = +5$;
$D = -·071$, $E = +·997$; $G = +·334$, $H = +·024$, $K = -·942$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		7·1	35	1 53	+ 5	e 3 11	+ 1	—	—	e 3·6
Tuai	N.	19·9	196	4 51	+15	7 50	−25	—	—	—
Wellington		22·8	197	5 0	− 5	8 45	−26	9 50?	Q	11·3
Brisbane	Z.	29·5	249	i 6 9	+ 1	—	—	e 9 5	P_cP	e 15·9
Berkeley		76·3	42	i 11 53a	+ 1	e 21 42	+ 5	i 12 5a	P_cP	e 38·2
Lick	Z.	76·3	42	i 11 52a	0	—	—	i 12 5k	P_cP	—
Pasadena	Z.	76·8	47	i 11 52	− 3	—	—	—	—	e 40·3
Riverside	Z.	77·2	47	i 11 55	− 2	—	—	i 12 8	P_cP	—
Fresno	Z.	77·2	44	e 11 57k	0	—	—	e 12 4	P_cP	—
Shasta Dam		78·0	39	e 12 1	− 1	—	—	i 12 13	P_cP	—
Mineral	Z.	78·2	40	i 11 58	− 5	—	—	i 12 3	P	—
Tinemaha	Z.	78·4	44	i 12 4	0	—	—	i 12 17	P_cP	—
Reno		78·8	42	e 12 6	0	—	—	e 12 13	P_cP	—
Boulder City		80·0	47	e 12 12	− 1	—	—	—	—	—
Overton	Z.	80·6	46	i 12 16	0	—	—	—	—	—
Pierce Ferry		80·6	47	e 12 15	− 1	—	—	—	—	—
Tucson		80·9	51	e 12 16	− 1	e 22 26	0	e 15 20	PP	e 37·2
Victoria		82·5	33	e 12 29	+ 3	—	—	—	—	50·8
Logan		85·1	42	e 12 36	− 3	—	—	e 15 49	PP	—
College		87·2	12	e 12 53	+ 4	—	—	—	—	—
Hungry Horse		87·3	36	e 12 49	− 1	—	—	—	—	—
St. Louis		98·8	52	—	—	i 25 18	+ 8	e 31 56	SS	—
La Paz		100·4	112	i 13 34	−16	24 20	[− 9]	i 18 6	PP	47·8
Washington		108·8	54	e 19 2	PP	—	—	—	—	e 55·4
Philadelphia		110·4	53	e 28 57	PS	e 34 36	SS	—	—	e 53·4
Tashkent		121·2	307	e 19 5	PP	e 26 3	[+ 9]	41 27	SSS	—
Stalinabad		121·6	304	e 18 55	[− 1]	e 26 12	[+17]	—	—	—
Sverdlovsk		124·4	327	e 19 11	[+10]	—	—	e 20 57	PP	—
Scoresby Sund		126·9	11	21 32	PP	—	—	31 14	PS	—
Moscow		136·1	333	e 19 58	[+35]	—	—	e 22 19	PP	—
Tiflis		139·2	312	e 19 27	[− 2]	—	—	i 23 15	PKS	—
Copenhagen		143·5	353	i 19 38a	[+ 1]	—	—	22 13	PP	—
Yalta		145·0	322	i 19 47	[+ 8]	—	—	—	—	—
Potsdam		146·6	351	e 19 47	[+ 5]	(e 22 44)	PKS	e 20 2	PKP_2	e 22·7
De Bilt		147·6	358	i 19 50	[+ 7]	—	—	—	—	e 76·8
Raciborzu		147·7	343	e 19 52	[+ 8]	—	—	e 20 9	PKP_2	—
Kew		148·1	6	e 19 48	[+ 4]	—	—	e 21 14	PKP_2	e 76·8
Ksara		148·5	304	e 19 50a	[+ 5]	—	—	23 37	PP	—
Istanbul		149·9	321	e 19 50	[+ 3]	—	—	—	—	e 87·8
Jersey	E.	150·2	8	—	—	43 50?	SSP	—	—	—
Paris		150·5	4	e 19 50	[+ 2]	42 50?	SS	i 20 24	PKP_2	e 80·8
Stuttgart		150·7	353	e 19 51	[+ 3]	e 48 50	SSS	e 20 9	PKP_2	e 81·8
Strasbourg		151·0	356	e 19 53	[+ 4]	e 23 30	PKS	i 20 9	PKP_2	e 75·8
Basle		152·1	356	e 20 8	[+18]	—	—	—	—	—
Zürich		152·2	354	e 19 56	[+ 5]	—	—	—	—	—
Triest		152·9	347	e 19 59	[+ 7]	e 26 55	[− 2]	e 23 40	PP	—
Helwan	Z.	153·3	298	e 19 58	[+ 6]	—	—	e 24 3	PP	—
Clermont-Ferrand		154·0	3	e 19 40	[−13]	—	—	e 24 8	PP	83·8
Rome		156·7	345	i 18 3a	?	e 27 42	[+41]	33 46	PSKS	76·3
Alicante		161·0	13	20 18	[+16]	—	—	—	—	e 83·8
Granada		161·3	20	i 20 3a	[+ 1]	26 57	[− 9]	20 57	PKP_2	82·4
Malaga	Z.	161·5	22	e 20 4	[+ 2]	—	—	i 21 8k	PKP_2	88·4
Almeria		162·0	17	20 6	[+ 3]	27 0	[− 6]	45 22	SS	82·8
Tamanrasset	Z.	176·6	—	20 13	[+ 1]	—	—	22 2	PKP_2	—

Additional readings :—
Brisbane iZ = 7m.20s.
Berkeley eZ = 12m.1s. and 12m.10s., eSN = 21m.46s. eN = 32m.20s., eE = 32m.59s.
Mineral iZ = 12m.11s.
Reno eZ = 12m.46s.
Tucson ePPP = 17m.25s., eSS? = 27m.8s.

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College i =13m.4s.
La Paz SE =23m.6s.
Tashkent ePS =30m.22s.
Paris i =19m.57s., and 20m.8s., ePP =23m.52s.
Stuttgart ePP =23m.45s., ePPP =27m.8s., ePSKS =33m.38s.
Strasbourg e =19m.58s., ePKP$_2$? =20m.16s., e =20m.30s. and 21m.25s., ePP =24m.10s., ePP(Δ >180°) =28m.28s., e =30m.7s., and 33m.23s., eSS =43m.5s.
Triest e =26m.28s., ePPS? =36m.7s., eSS =42m.44s.?, eSSS =49m.32s.?
Helwan eZ =20m.18s. and 20m.41s.
Clermont-Ferrand ePKP =20m.0s.
Rome eZ =19m.57s., eSKS? =24m.39s., eE =31m.37s., eSS?E =38m.20s.?, e =44m.20s.
Granada PP =24m.36s., iSKKS =31m.29s., SKSP =35m.14s., SS =44m.57s.
Malaga ePPZ =24m.58s.
Almeria PKP$_2$ =21m.6s., PP =24m.30s., SKKS =31m.34s.
Tamanrasset PPZ =25m.54s., Z =29m.3s.
Long waves were also recorded at Arapuni, Auckland, Honolulu, Bogota, Aberdeen, and other American stations.

June 25d. Readings also at 0h. (Paris and Stuttgart), 1h. and 2h. (Overton), 4h. (near La Paz), 6h. (Cleveland), 7h. (La Paz, near Andijan, Kulyab, and Murgab), 10h. (near College), 11h. (Ashkabad, near Andijan and near College (2)), 12h. and 14h (Ashkabad), 16h. (College and Overton), 17h. (Ashkabad (2), Overton, and near College (2)), 19h. (near Ashkabad), 20h. (Huancayo), 21h. (Ashkabad, Frunse, Kulyab, Samarkand, near Andijan, Murgab, Obi-garm, Stalinabad, and near Tucson), 23h. (Huancayo and La Paz).

June 26d. 5h. 42m. 20s. Epicentre 38°·8N. 20°·6E. (as on 1948, June 30d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		3·1	304	e 0 53	P*	e 1 56	S_g	—	—	—
Messina		4·0	263	e 1 10k	P*	i 1 56	+ 4	—	—	—
Sofia		4·4	27	e 1 8	− 2	2 3	+ 1	2 13	S*	—
Catania		4·6	255	e 1 40?	?	—	—	—	—	—
Belgrade		6·0	359	e 1 24k	− 8	i 2 54	+11	i 2 0	P_g	—
Istanbul		6·9	68	e 1 48	+ 3	3 40	S_g	—	—	—
Rome		6·9	299	e 1 45	0	3 1	− 4	i 2 24	P_g	3·7
Bucharest		7·0	35	e 1 44	− 2	e 3 4	− 4	i 2 10	P*	—
Kalossa		7·8	353	e 2 12	P*	e 3 59	S*	e 2 49	P_g	4·9
Triest		8·5	326	e 1 59	− 8	e 3 27	−18	i 2 54	P_g	i 4·7
Florence Arc.		8·6	308	e 2 21	+12	e 3 49	+ 1	—	—	e 4·6
Florence Xim		8·6	308	e 2 5	− 4	e 4 6	S*	—	—	—
Prato		8·8	308	e 2 21	+10	e 4 44	S_g	—	—	—
Budapest	E.	8·8	353	2 50	P_g	4 22	S*	—	—	4·8
	N.	8·8	353	e 2 53	P_g	4 46	S_g	—	—	5·0
Bologna		9·0	312	e 2 10	− 3	e 4 3	+ 5	e 2 48	P_g	i 4·8
Ogyalla		9·2	350	e 2 30?	+14	e 4 2	− 1	—	—	—
Padova		9·3	317	e 2 19	+ 2	e 4 2	− 3	—	—	5·3
Salo		10·1	315	e 2 22	− 6	e 4 4	−21	—	—	—
Pavia		10·6	310	e 2 48?	+12	—	—	—	—	—
Raciborzu		11·4	352	e 2 43	− 4	—	—	—	—	e 6·5
Yalta		11·6	57	2 47	− 3	5 47	+46	—	—	(5·8)
Prague		12·1	341	3 58	+61	—	—	—	—	e 6·8
Zürich		12·3	316	e 2 55	− 4	e 5 8	−10	—	—	—
Helwan		12·6	132	—	—	e 5 46	+20	—	—	e 6·5
Basle		12·9	317	e 3 1	− 6	e 5 11	−22	—	—	e 6·7
Stuttgart		12·9	324	e 2 58	− 9	e 5 54	+21	—	—	e 6·9
Ksara		13·3	107	e 3 22	+ 9	6 16	+34	—	—	—
Strasbourg		13·5	321	e 3 7	− 8	e 5 46	− 1	e 3 21	PP	e 7·2
Potsdam		14·6	341	e 3 34	+ 4	e 7 23	+70	7 57	SS	8·5
Clermont-Ferrand		14·7	304	e 3 36	+ 5	—	—	—	—	8·2
Tortosa	E.	15·6	284	e 3 33	−10	—	—	3 47	PP	e 8·7
Paris		16·4	313	i 3 53	0	—	—	—	—	—
Alicante		16·5	275	4 1	+ 7	i 7 47	SS	4 6	pP	e 9·3
De Bilt		17·1	326	e 3 59	− 3	e 7 20	+ 8	—	—	e 8·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copenhagen		17·8	344	—	—	e 7 21	− 7	—	—	9·5
Leninakan		17·8	76	4 24	+13	—	—	—	—	—
Almeria		18·3	273	4 27	+10	8 19	SS	4 57	PP	11·4
Tiflis		18·7	73	4 27	+ 5	e 7 57	+ 9	—	—	—
Toledo		19·1	283	i 4 28	+ 1	e 8 3	+ 6	—	—	11·8
Granada		19·2	274	4 22	− 6	8 10	+11	8 4	P_cP	10·9
Jersey	E.	19·3	312	e 4 23	− 6	—	—	—	—	—
Kew		19·4	319	e 4 24	− 6	e 8 0	− 4	—	—	e 13·7
Malaga	z.	19·9	274	i 4 35k	− 1	i 8 19	+ 4	—	—	11·1
Moscow		20·4	29	e 4 34	− 7	e 8 10	−15	—	—	—
Tamanrasset	z.	20·5	223	i 4 51k	+ 9	—	—	e 5 20	PP	e 11·1
Upsala		21·2	355	e 4 40	− 9	—	—	—	—	e 11·7
Aberdeen		23·7	330	—	—	e 9 20	− 7	—	—	e 13·0
Sverdlovsk		31·8	42	i 6 27	− 1	e 11 29	− 9	—	—	—
Stalinabad		37·3	74	e 7 28	+12	—	—	—	—	—
Obi-garm		37·9	74	i 7 27	+ 7	—	—	—	—	—
St. Louis		80·2	313	e 12 12	− 2	—	—	—	—	—
Hungry Horse		84·3	332	i 12 34	− 1	—	—	—	—	—
Victoria	z.	87·4	337	e 12 49	− 1	—	—	—	—	—
Logan		88·9	327	e 13 33	+35	—	—	—	—	—
Tucson		96·1	321	e 13 31	0	—	—	—	—	—

Additional readings :—
Sofia i = 1m.51s.
Belgrade eP* = 1m.36s., iP_gS_c = 2m.26s.
Rome iE = 1m.55s., eZ = 2m.32s., eS*N = 3m.25s.
Kalossa eE = 3m.1s., iN = 4m.9s., eN = 4m.36s., eE = 4m.39s.
Prague e = 4m.48s. and 6m.15s.
Zürich e = 3m.18s.
Stuttgart eZ = 3m.4s., and 3m.51s.
Strasbourg e = 4m.30s., 4m.47s., 5m.58s., and 6m.10s., i = 6m.51s.
Potsdam ePE = 3m.38s., eE = 7m.5s., iE = 8m.1s., iSSSE = 8m.11s.
Clermont-Ferrand e = 4m.40s.
Tortosa PPPE = 3m.53s.
Paris i = 4m.3s. and 4m.16s.
Alicante PP = 4m.21s., PP = 4m.31s., SS = 8m.15s., SSS = 8m.31s.
Almeria P_cP = 8m.27s., P_cS = 12m.7s.
Kew eEN = 11m.10s., eE = 11m.19s., eEN = 12m.10s.
Tamanrasset iZ = 4m.55s. and 5m.1s., ePPPZ = 5m.29s.
Long waves were also recorded at Collmberg and Helsinki.

June 26d. 8h. 41m. 17s. Epicentre 0°·2N. 125°·2E. (as on 1947, July 29d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		19·4	251	i 4 40a	+10	i 8 21	+17	—	—	—
Zi-ka-wei	z.	31·0	354	6 23	+ 2	e 11 43	+17	i 7 41	PPP	13·8
Perth		33·2	195	i 7 14	+34	i 11 56	− 4	—	—	—
Brisbane		38·4	138	i 7 24	− 1	i 13 8	−12	i 8 51	PP	—
Mizusawa		41·4	19	7 56	+ 6	e 14 23	+18	—	—	—
Riverview		41·7	147	i 7 51	− 1	i 14 9	− 1	i 8 15k	pP	e 20·9
Calcutta	E.	42·2	305	e 7 58	+ 2	i 14 9	− 8	10 1	P_cP	19·4
Colombo	E.	45·7	279	8 23	− 1	15 18	+10	—	—	21·6
Poona		53·6	293	e 9 1	−24	—	—	—	—	—
Bombay	E.	54·6	293	e 7 55	?	e 17 37	+26	—	—	—
Irkutsk		54·8	345	9 34	0	17 9	− 5	—	—	—
Auckland	N.	58·8	134	10 23	+21	18 9	+ 2	12 24	PP	25·5
Kaimata	N.E.	59·4	142	10 13	+ 7	—	—	—	—	—
Arapuni	E.	60·0	136	—	—	e 18 43?	+20	—	—	—
Murgab		60·4	315	i 10 11	− 2	i 18 24	− 4	—	—	—
Wellington		60·9	140	10 16	− 1	18 28	− 6	10 48	P_cP	36·7
Tuai	N.	61·4	136	e 10 25	+ 5	—	—	—	—	—
Frunse		62·0	320	e 10 24?	0	e 18 51?	+ 3	—	—	—
Andijan		62·5	317	10 28	0	i 18 54	0	—	—	—
Kulyab		63·2	313	10 32	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Obi-garm		63·6	314	i 10 33	− 2	i 19 5	− 3	—	—	—
Stalinabad		64·2	314	e 10 36	− 3	i 19 5	−11	—	—	—
Tashkent		64·9	317	i 10 32	−11	—	—	—	—	—
Samarkand		65·9	314	i 10 56	+ 6	—	—	—	—	—
Ashkabad		71·8	310	e 11 25	− 1	—	—	—	—	—
Sverdlovsk		76·3	330	i 11 50	− 2	21 24	−13	—	—	—
Honolulu		77·8	68	e 12 18	+17	e 21 52	− 1	—	—	e 38·8
Tananarive		78·4	251	e 11 34	−30	e 22 13	+13	e 22 32	S_eS	e 37·8
Baku		78·7	312	e 12 11	+ 5	—	—	e 22 27	S_eS	—
Grozny		82·2	314	e 12 25	+ 1	i 22 37	− 2	—	—	—
Tiflis		82·7	312	i 12 26	− 1	e 22 40	− 4	e 23 10	S_eS	—
Leninakan		83·3	311	e 12 30	0	e 22 47	− 3	—	—	—
Piatigorsk		84·2	314	12 32	− 2	e 22 50	− 9	—	—	—
College		88·5	26	e 12 57	+ 1	—	—	e 16 27	PP	—
Moscow		88·5	326	13 1	+ 5	23 38	− 3	e 13 15	pP	—
Ksara		89·3	304	i 12 59a	0	—	—	i 16 33	PP	—
Yalta		90·6	315	i 13 4	− 1	23 28	[− 8]	—	—	—
Helwan		93·3	300	i 13 16	− 2	26 12	PPS	17 1	PP	—
Sitka		94·9	33	—	—	e 24 11	[+10]	e 25 59	PS	e 48·2
Pretoria	z.	96·4	244	i 13 43	+11	—	—	—	—	—
Grahamstown	z.	97·3	237	i 13 35	− 1	—	—	—	—	—
Upsala		98·6	331	e 16 24	?	24 14	[− 6]	17 45?	PP	e 39·7
Raciborzu		100·7	321	e 13 52	0	—	—	e 18 47	PP	—
Ogyalla		101·2	319	e 19 7	PP	e 23 26	?	—	—	—
Copenhagen		102·5	328	e 13 59	− 1	24 31	[− 8]	i 18 44	PP	—
Prague		103·0	322	e 14 1	− 1	e 25 49	+ 3	e 18 23	PP	—
Potsdam		103·2	324	e 14 2	− 1	i 25 47	0	e 18 19	PP	e 54·1
Collmberg		103·6	323	e 14 3	− 1	e 25 21	{+ 1}	e 18 21	PP	e 41·9
Victoria	z.	103·9	39	e 14 8	+ 2	e 30 14	PKKP	e 18 25	PP	—
Triest		104·7	318	e 14 11	+ 2	i 24 52	[+ 3]	i 18 34	PP	—
Scoresby Sund		106·2	350	14 23	+ 7	26 19	+ 7	24 53	SKS	51·7
Padova		106·3	317	e 17 53	?	—	—	e 18 51	PP	—
Rome		106·4	314	e 18 43	PP	e 28 13	PS	e 21 20	PPP	e 56·2
Bologna	z.	106·7	316	e 18 47	PP	—	—	—	—	—
Stuttgart	z.	106·7	322	e 14 17a	P	e 24 54	[− 4]	e 17 46	PKP	e 54·7
Shasta Dam		106·7	47	e 14 20	P	—	—	i 18 6	PKP	—
Florence Arc.		107·0	316	e 18 39?	PP	e 24 57	[− 2]	e 28 39?	PS	—
Prato		107·0	316	e 18 43	PP	—	—	—	—	—
Mineral	z.	107·4	47	e 18 4	[−23]	i 29 58	PPS	e 18 52	PP	—
Berkeley		107·5	50	—	—	e 25 1	[− 1]	e 28 1	PS	—
Zürich		107·6	321	e 14 5	P	e 24 59	[− 3]	e 17 57	PKP	—
Strasbourg		107·7	323	e 14 22	P	e 25 3	[+ 1]	i 18 54	PP	e 51·7
De Bilt		107·8	326	e 18 56	PP	e 25 17	[+14]	e 28 33	PS	e 51·7
Basle		108·1	321	e 17 57	[−32]	e 24 50	[−14]	—	—	—
Reno	z.	108·9	48	e 19 2	PP	—	—	—	—	—
Aberdeen		109·1	333	—	—	e 28 58	PS	e 35 0	SS	e 55·0
Hungry Horse		109·8	37	e 14 19	P	e 28 36	PS	e 18 9	PKP	—
Paris		110·8	324	e 14 36	P	i 28 27	PS	i 18 35	PKP	—
Kew		111·1	327	e 18 49	[+14]	e 25 23	[+ 6]	e 19 25	PP	e 55·7
Clermont-Ferrand		111·7	320	e 18 9	[−28]	e 28 56	PS	i 19 21	PP	59·7
Pasadena		111·7	53	e 14 59	P	—	—	e 18 29	PKP	e 46·1
Riverside	z.	112·4	53	e 14 58	P	—	—	e 29 27	PKKP	—
Palomar	z.	113·0	53	e 19 1	?	—	—	e 29 35	PKKP	—
Logan		113·9	43	e 18 42	[+ 1]	—	—	e 29 48	PKKP	—
Pierce Ferry		114·4	50	e 18 46	[+ 4]	e 29 27	PS	—	—	—
Tortosa	E.	115·5	316	19 49	PP	26 34	{− 9}	—	—	e 59·7
Tamanrasset	z.	117·1	296	15 53	?	—	—	e 18 49	PKP	—
Tucson		118·1	52	e 18 53	[+ 4]	e 25 52	[+ 9]	e 20 6	PP	e 54·6
Toledo	z.	119·0	317	e 20 6	PP	e 26 55	{−12}	—	—	—
Almeria		119·2	313	19 11	[+20]	28 27	?	21 39	?	65·8
Granada		119·9	314	20 7k	PP	29 13	PS	22 22	PKS	65·3
Malaga	z.	120·7	314	i 18 52a	[− 2]	i 25 42	[−10]	i 22 26	PKS	59·4
Chicago		128·8	31	e 19 19	[+ 9]	e 31 22	PS	e 21 23	PP	e 62·2
St. Louis		129·5	36	i 19 12	[+ 1]	i 38 50	SS	i 21 22	PP	—
Seven Falls	E.	130·8	14	e 22 36	PKS	—	—	(39 43?)	SSP	39·7

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Shawinigan Falls N.	130·8	15	e 18 50	[−24]	—	—	e 23 31 PPP	—
Ottawa	131·0	19	e 19 16	[+ 2]	e 39 13	SS	e 22 35 PKS	61·7
Cleveland	132·0	27	e 22 39	PKS	e 31 37	PS	e 39 23 SS	—
Pennsylvania N.	134·1	24	e 22 16	PKS	i 28 43	{− 3}	i 31 57 PS	69·4
Harvard	134·9	17	i 19 23	[+ 2]	—	—	e 21 57 PP	e 68·7
City College, N.Y.	135·6	21	e 21 59	PP	e 28 52	{− 3}	e 22 56 PKS	e 50·4
Fordham	135·6	21	e 19 22	[0]	e 22 57	PKS	e 22 4 PP	71·7
Philadelphia	135·9	22	e 22 4	PP	e 40 4	SS	e 23 0 PKS	e 55·3
Washington	136·0	24	i 19 27	[+ 4]	—	—	e 22 6 PP	e 62·6
Bermuda	146·9	15	e 20 46	[+64]	e 42 28	SS	e 24 28 PKS	e 56·2
Huancayo	156·4	120	e 20 2	[+ 6]	e 30 52	{− 1}	e 42 59 SS	e 65·7
San Juan	158·4	29	e 20 40	PKP_2	e 31 1	{− 3}	e 24 6 PP	e 75·0
La Paz	159·1	139	i 20 3a	[+ 3]	26 55	[− 9]	i 24 15 PP	74·7
Bogota	160·2	74	i 20 1	[0]	e 31 10	{− 3}	e 20 39 PKP_2	78·7

Additional readings :—
Brisbane iSN =13m.11s., iSSE =15m.54s., iSSZ =16m.2s.
Mizusawa ePN =8m.2s.
Riverview iP_ePP =9m.41s., iE =14m.41s., isSN =14m.46s., iZ =15m.14s., eE =15m.49s., eSSZ =17m.12s., iN =17m.21s., iEN =17m.28s., iN =18m.13s. and 18m.41s.
Calcutta iE =11m.59s., iSSE =17m.9s., iS_eSE =17m.54s.
Bombay eN =14m.28s. and 19m.11s. All readings for this station are given without phase.
Auckland P_eSN =14m.38s., $S_eS?N$ =20m.21s., SSN =21m.49s., SSSN =23m.37s.
Wellington eZ =10m.29s., SS =22m.13s.
Helwan eZ =13m.28s., 14m.13s., and 15m.7s.
Sitka eS? =24m.53s.
Upsala eN =24m.43s.?, eE =24m.55s., eSSE =32m.13s.?
Raciborzu eZ =18m.57s.
Copenhagen iE =24m.51s., 25m.19s., 27m.49s., SS =33m.31s., SSS =36m.49s.
Prague e =14m.23s., 22m.51s., and 24m.7s., ePPS =28m.23s., e =32m.49s. and 36m.55s.
Potsdam cPEN =14m.7s., eN =14m.17s., eZ =17m.15s., eN =17m.22s., eE =18m.25s. and 24m.52s.
Collmberg eSSSE =37m.55s.
Triest iSKKS =24m.59s., eS =26m.11s., ePS =28m.9s., iPPS =28m.49s., eSS =33m.47s., eSSS =37m.43s.?
Scoresby Sund 28m.3s., SS =33m.49s.
Padova e =20m.5s.
Rome e =23m.13s.
Bologna e =19m.14s.
Stuttgart ePPZ =18m.32s., ePP =18m.47s., ePPP =20m.58s., eS =26m.12s., ePS =28m.16s., ePPS =29m.3s., eSS =33m.25s., eSSS =38m.13s.
Shasta Dam iPP =18m.41s., iPKKP =30m.0s.
Berkeley eN =37m.12s. and 44m.49s., eZ =49m.19s., eE =49m.31s.
Strasbourg e =14m.47s. and 19m.57s., ePPP =21m.16s., e =22m.54s., 24m.46s., and 24m.51s., eSKS =25m.6s., eS =26m.22s., ePS =28m.3s. and 28m.10s., ePPS =29m.3s. and 29m.23s., ePKKS =32m.36s., eSS =33m.55s., eSSS =38m.3s.
Reno eEN =19m.18s., eN =19m.43s.
Paris e =18m.2s., iPP =19m.12s. and 19m.16s., iPPP =21m.35s., ePPS =29m.52s., eSSS =38m.43s.?
Kew eS?EN =27m.19s., ePPSEN =30m.9s., eSSEN =34m.25s.
Clermont-Ferrand iPPP =21m.45s., eSKP =22m.17s., ePPS =30m.9s., eSS =35m.23s., eSSS =39m.18s.
Pasadena ePKKPZ =29m.31s.
Riverside eZ =18m.46s. and 19m.35s.
Palomar eZ =19m.34s. and 32m.27s.
Tortosa SKSE =23m.5s.
Tamanrasset Z =18m.31s.
Tucson e =20m.28s., ePPP =22m.29s., eSP =29m.53s., ePS =30m.11s., eSS? =35m.21s.
Toledo eZ =27m.32s.
Almeria PPP =24m.31s., SS =39m.43s.
Granada PP =21m.1s., SS =40m.37s.
Chicago eSS =38m.49s.
St. Louis e =19m.37s., iSKP =22m.30s.
Cleveland ePPZ =22m.42s., iPPN =22m.45s., eE =33m.14s.
Pennsylvania iN =22m.51s., eN =23m.23s., e =27m.54s.
City College N.Y., ePPS =34m.8s., e =40m.16s.
Philadelphia e =40m.23s.
Huancayo e =21m.19s., eSKSP =34m.30s., eSS? =44m.49s., eSSS =50m.10s.
San Juan e =28m.23s. and 32m.16s., ePPS? =38m.33s., eSS? =43m.43s., eSS =44m.10s., e =49m.24s., eSSS =50m.2s.
La Paz $iPKP_2$ =20m.39s., iEN =35m.5s., iSS =45m.11s.
Bogota ePSKSEN =35m.28s.
Long waves were also recorded at Alicante, Helsinki, and Ivigtut.

June 26d. 20h. 59m. 26s. Epicentre 54°·6N. 163°·5E. (as on 1949, Jan. 27d.).
Uncertain.

$A = -·5579$, $B = +·1653$, $C = +·8133$; $\delta = +3$; $h = -7$;
$D = +·284$, $E = +·959$; $G = -·780$, $H = +·231$, $K = -·582$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Klyuchi		2·3	318	e 1 22?	?	i 1 41	S$_n$	—	—	—
College		25·9	47	i 5 32	− 3	—	—	e 6 12	PP	—
Hungry Horse		49·0	61	e 8 50	0	—	—	—	—	—
Shasta Dam		49·5	74	e 8 55	+ 1	—	—	—	—	—
Tinemaha	z.	54·4	75	e 9 31	0	—	—	—	—	—
Logan		54·6	66	e 9 32	0	—	—	—	—	—
Scoresby Sund		55·2	3	11 52	PP	17 22	+ 2	21 10	SS	27·6
Pasadena	z.	56·5	77	e 9 47	+ 1	—	—	—	—	—
Overton	z.	56·9	72	i 9 53	+ 4	—	—	—	—	—
Riverside	z.	57·1	77	e 9 52	+ 2	—	—	—	—	—
Palomar	z.	57·8	76	i 9 58	+ 3	—	—	—	—	—
Tucson		62·0	73	e 10 26	+ 2	—	—	—	—	—
St. Louis		67·8	55	i 11 2	0	e 19 52	− 8	—	—	—

Additional readings :—
Tinemaha eZ = 10m.44s.
Pasadena eZ = 10m.15s.
Palomar iZ = 10m.43s.
Long waves were also recorded at Rome and Harvard.

June 26d. Readings also at 0h. (near Grozny, Tiflis, and near Mizusawa), 1h. (Overton, Pierce Ferry, Mount Wilson, Riverside, near Palomar, and Tucson), 2h. (Ashkabad), 4h. (La Paz, near Granada and near Huancayo), 5h. (La Paz, Hungry Horse, and Messina), 6h. (Paris, Kew, Strasbourg, Stuttgart, Triest, Zürich, Rome, Istanbul, Belgrade, Sofia, Taranto, Tamanrasset, and Wellington,) 7h. (near Ashkabad), 9h. (Stuttgart, near Mizusawa, near Andijan, Kulyab, Obi-garm, and Stalinabad), 10h. (Alicante (2) and near Mizusawa), 11h. (Ashkabad and near Tucson), 12h. (Stalinabad, near Kulyab and Obi-garm), 13h. (near Ashkabad (2)), 14h. (La Paz, Palomar, Pasadena, Pierce Ferry, Shasta Dam, Hungry Horse, College, Upsala, and Ashkabad (2)), 15h. (College, near Klyuchi and near Ashkabad), 16h. (Kew, Tortosa, Santa Lucia, and Klyuchi), 17h. (Ashkabad), 18h. (near Granada and near Hungry Horse), 20h. (near College), 21h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Hungry Horse, and College), 22h. (Tinemaha, Shasta Dam, Hungry Horse (2), College, and Toledo), 23h. (Mount Wilson, Tucson, and College).

June 27d. 0h. Indonesia. U.S.S.R. gives 0°, 117°·5E.

Murgab P = 23m.23s., S = 30m.58s.
Andijan P = 23m.35s., S = 31m.27s.
Frunse eP = 23m.41s.
Stalinabad P = 23m.52s., eS = 31m.54s.
Tashkent eP = 23m.53s.?, eS = 32m.1s.?
Sverdlovsk P = 24m.57s.
Leninakan ePcP = 26m.3s.
Rome eE = 34m.5s. and 40m.45s., e = 50m.12s.
Triest eS? = 39m.10s.?, ePS? = 40m.21s.
Pretoria iZ = 58m.0s., eZ = 59m.54s., iZ = 60m.12s.
Long waves were also recorded at other European stations and at Scoresby Sund.

June 27d. 4h. 48m. 12s. Epicentre 44°·4N. 11°·8E.

Felt at Imola. Epicentre as adopted (Rome). Monthly Seismological Bulletin, Rome, June, 1949, p. 16.

$A = +·7017$, $B = +·1466$, $C = +·6972$; $\delta = -4$; $h = -3$;
$D = +·204$, $E = -·979$; $G = +·682$, $H = +·143$, $K = -·717$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Padova	0·1	—	e 0 25	?	—	—	e 0 36	?	—
Bologna	0·3	287	i 0 9	P*	i 0 14	S_g	—	—	—
Prato	0·7	226	e 0 16	P*	i 0 23	S_g	—	—	—
Florence Arc.	0·8	212	i 0 17	P*	i 0 26	S_g	—	—	—
Florence Xim	0·8	212	i 0 17	P*	i 0 25	S_g	—	—	—
Salo	1·5	337	e 0 28	P*	e 0 47	S*	i 0 51	S_g	—
Triest	1·9	48	i 0 41	P_g	i 1 8	S_g	—	—	—
Pavia	2·0	293	e 0 52	?	e 1 11	S_g	—	—	—
Rome	2·5	169	—	—	e 1 29	S_g	—	—	e 2·0
Chur	2·9	328	e 0 50	+ 2	e 1 37	S_g	—	—	—
Zürich	3·7	325	e 0 59	− 1	e 2 2	S_g	e 1 10	P_g	—
Basle	4·3	319	—	—	e 1 48	−12	e 2 20	S_g	—
Stuttgart	4·7	339	e 1 30?	P_g	e 2 24	S*	e 2 40	S_g	—
Strasbourg	5·0	328	e 1 36	P_g	i 2 48	S_g	1 53	?	—
Clermont-Ferrand	6·3	286	—	—	e 2 28?	−22	—	—	—
Collmberg	7·0	6	e 2 20	P_g	e 3 13	+ 5	e 3 49	S_g	e 3·9

June 27d. 10h. 35m. 29s. Epicentre 35°·7N. 121°·2W. (as on May 17d.).

$A = -·4217$, $B = -·6962$, $C = +·5810$; $\delta = +9$; $h = 0$;
$D = -·855$, $E = +·518$; $G = -·301$, $H = -·497$, $K = -·814$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fresno	1·5	48	i 0 27a	− 1	i 0 47	− 2	—	—	—
Lick	1·7	348	i 0 30k	− 1	i 0 55	+ 1	—	—	—
Santa Barbara	1·7	126	i 0 32	+ 1	i 1 6	S_g	—	—	—
Santa Clara	1·7	340	e 0 34	+ 3	i 0 55	+ 1	—	—	—
Branner	1·9	335	i 0 32	− 2	i 1 0	+ 1	i 0 35	P*	—
Berkeley	2·3	338	i 0 38k	− 2	i 1 14	+ 5	i 0 46	P_g	—
San Francisco	2·3	334	i 0 38	− 2	i 1 13	+ 4	i 0 45	P_g	—
Tinemaha	2·7	61	i 0 45	0	i 1 17	− 2	—	—	—
Pasadena	2·9	119	i 0 47a	− 1	i 1 23	− 1	—	—	—
Mount Wilson	3·0	119	i 0 48a	− 2	i 1 25	− 2	—	—	—
Riverside	3·6	117	i 0 55	− 3	—	—	i 3 2	?	—
Reno	4·0	16	e 1 3	− 1	i 1 53	+ 1	i 1 20	P_g	—
Palomar	4·3	122	i 1 7a	− 1	—	—	—	—	—
Mineral	4·7	356	i 1 12a	− 2	i 2 27	S*	i 1 19	P*	—
Shasta Dam	5·1	350	e 1 19	− 1	e 2 1	−19	—	—	—
Overton z.	5·5	79	i 1 26	+ 1	—	—	i 1 42	P*	i 5·2
Pierce Ferry	5·9	84	e 1 27	− 4	—	—	e 1 45	P*	—
Tucson	9·3	109	i 2 13	− 4	e 4 5	0	i 3 3	P_g	e 4·9
Logan	9·5	48	e 2 23	+ 3	—	—	—	—	e 5·0
Hungry Horse	13·7	21	i 3 21	+ 3	—	—	—	—	—

Additional readings :—
Berkeley iZ = 0m.43s., eN = 0m.50s., lZ = 1m.18s.
San Francisco iN = 1m.5s.
Reno iEZ = 1m.10s., iSE = 1m.56s.
Tucson i = 4m.32s.
Long waves were also recorded at Bozeman.

June 27d. 23h. 7m. 10s. Epicentre 7°·5S. 129°·0E. (as on 1946, Nov. 17d.).

Approximate.

$A = -·6240$, $B = +·7706$, $C = -·1297$; $\delta = +2$; $h = +7$;
$D = +·777$, $E = +·629$; $G = +·082$, $H = -·101$, $K = -·992$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		30·2	134	i 6 10	− 4	i 12 38	SS	—	—	—
Riverview		33·3	146	i 6 37a	− 4	i 12 21	+19	i 14 3	SS	—
Wellington		52·7	137	—	—	21 32	SSS	28 40	Q	29·8
Bombay		61·3	297	—	—	e 20 50?	S_cS	—	—	e 32·8
Irkutsk		63·2	344	e 10 35	+ 3	—	—	—	—	—
Murgab		68·5	317	e 11 10	+ 4	20 8	0	—	—	—
Frunse		70·4	320	e 11 20	+ 2	—	—	—	—	—
Andijan		70·7	317	e 11 23	+ 3	—	—	—	—	—
Obi-garm		71·6	315	11 27	+ 2	—	—	—	—	—
Stalinabad		72·2	314	i 11 29	0	—	—	—	—	—
Tashkent		73·1	317	i 11 36	+ 2	e 21 2	+ 1	—	—	—
Sverdlovsk		84·7	329	i 12 39	+ 2	23 1	− 3	—	—	—
Tiflis		90·6	312	e 13 8	+ 3	e 23 40	[+ 4]	—	—	—
Leninakan		91·2	311	13 38?	+30	—	—	—	—	—
Grahamstown	z.	96·2	236	i 13 1	−30	—	—	—	—	—
Ksara		96·7	303	e 22 7	?	e 32 45	?	—	—	—
Shasta Dam		109·0	49	e 18 32	[+ 1]	—	—	e 19 3	PP	—
Collmberg	z.	112·0	322	e 18 51?	[+14]	—	—	—	—	—
Pasadena	z.	113·0	57	e 18 56	[+17]	—	—	e 19 31	PP	—
Hungry Horse		113·4	40	e 18 23	[−17]	—	—	e 19 33	PP	—
Riverside	z.	113·7	57	e 19 36	PP	—	—	—	—	—
Palomar	z.	114·2	57	e 19 58	PP	—	—	e 20 7	?	—
Rome		114·6	313	e 24 37	?	e 29 28	PS	e 39 22?	SSS	—
Stuttgart		115·0	320	e 18 45	[+ 2]	—	—	e 19 58	PP	e 70·8
Overton	z.	115·7	52	i 18 49	[+ 5]	—	—	—	—	—
Strasbourg		116·0	321	e 19 54	PP	—	—	—	—	e 61·8
Pierce Ferry		116·1	53	e 18 48	[+ 3]	—	—	—	—	—
Logan		116·6	47	e 18 48	[+ 2]	—	—	e 19 59	PP	—
Paris		119·2	322	e 18 53	[+ 2]	—	—	e 20 18	PP	—
Tucson		119·4	57	e 18 55	[+ 3]	—	—	e 20 5	PP	e 60·7
Kew		119·6	326	e 6 10	?	—	—	—	—	e 60·8
Clermont-Ferrand		120·0	319	e 18 54	[+ 1]	e 30 18	PS	e 22 56	PPP	63·8
Ottawa	z.	136·6	26	e 19 26	[+ 2]	—	—	—	—	—
Huancayo		149·0	130	e 18 54	[−52]	—	—	—	—	—
La Paz		150·7	145	i 19 59	PKP_2	—	—	—	—	—

Additional readings :—
Brisbane iZ = 12m.34s.
Riverview iZ = 14m.30s., iN = 14m.52s. and 15m.27s., iE = 17m.39s., iZ = 17m.44s. and 17m.57s., iN = 18m.16s., 18m.37s., and 18m.52s.
Long waves were also recorded at Auckland, De Bilt, and Scoresby Sund.

June 27d. Readings also at 1h. (near Granada), 2h. (College), 4h. (Strasbourg, Rome, Florence Arc., Salo, Bologna (4), Padova, and near Balboa Heights), 6h. (near Bologna, and near Leninakan), 8h. (Kaimata, Christchurch, near Tuai, Auckland, and Wellington), 9h. (near Murgab (2), and near Obi-garm), 10h. (College), 11h. (Istanbul, and near Obi-garm), 12h. (Apia, College, Hungry Horse, Overton, Pierce Ferry, and Tucson), 13h. (Aberdeen and near Zürich), 14h. (Hungry Horse), 15h. (Hungry Horse, and near College), 16h. (Istanbul, Triest, Rome, and Bologna), 18h. (near Ebingen), 20h. (Bucharest, Bogota, College, and Hungry Horse), 21h. (Scoresby Sund, Victoria (2), and near Grozny), 22h. (near Kulyab, Stalinabad, Obi-garm, Murgab, and Andijan), 23h. (La Paz and Huancayo).

June 28d. 20h. 8m. 28s. Epicentre 23°·6N. 44°·9W. (as on 19d.).

$A = +\cdot6498$, $B = -\cdot6475$, $C = +\cdot3981$; $\delta = -2$; $h = +4$.

		Δ	Az.	P.	O−C.	S.	O−C.	Surp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		20·5	260	e 4 37	− 5	—	—	e 5 30	PPP	e 9·4
Harvard		29·0	318	e 5 54	−10	—	—	—	—	e 13·5
Seven Falls	E.	31·3	326	—	—	(11 32?)	+ 1	—	—	11·5
Ottawa	Z.	33·1	320	e 6 37	− 3	—	—	—	—	—
Bogota		33·9	241	e 6 52	+ 5	e 12 20	+ 9	—	—	—
Malaga	Z.	37·1	59	i 7 15	+ 1	i 13 18	+17	9 8	PcP	18·6
Granada		37·8	59	i 7 22k	+ 2	e 13 25	+14	9 27s	PPP	16·2
Almeria		38·7	60	i 7 25	− 2	i 13 25	0	8 59	PP	19·0
St. Louis		41·2	303	e 7 45	− 3	e 16 51	SS	e 9 8	PP	e 18·3
Rathfarnham Castle		41·4	35	—	—	e 14 0	− 5	—	—	—
Tortosa	E.	41·6	55	7 55	+ 4	14 16	+ 8	17 17	SS	e 19·5
Kew		44·0	39	e 8 10	− 1	e 14 44	+ 1	e 17 28	SS	e 20·5
Clermont-Ferrand		44·4	48	e 8 16	+ 2	14 54	+ 5	e 9 58	PP	21·5
Paris		44·8	44	i 8 18	+ 1	e 15 1	+ 6	—	—	e 20·5
La Paz	N.	45·9	211	e 8 23	− 3	—	—	—	—	—
Tamanrasset	Z.	46·1	80	e 8 32	+ 4	—	—	—	—	—
De Bilt		47·4	40	—	—	e 15 32	0	—	—	e 21·5
Strasbourg		48·2	45	e 8 45	+ 1	e 15 49	+ 6	e 10 53	PP	e 22·5
Stuttgart		49·1	45	e 8 52	+ 1	e 16 1	+ 5	—	—	e 23·0
Bologna		50·0	51	e 8 51	− 7	—	—	e 10 34	PP	—
Rome		50·7	55	e 9 4	+ 1	e 16 18	0	—	—	e 24·1
Rapid City	E.	51·4	309	e 9 10	+ 1	—	—	—	—	—
Triest		51·8	50	e 9 10?	− 2	—	—	—	—	—
Collmberg	Z.	52·0	43	e 9 12	− 1	—	—	—	—	—
Copenhagen		52·5	37	—	—	e 16 48	+ 5	—	—	25·5
Logan		57·6	306	e 9 52	− 2	—	—	—	—	—
Tucson		58·1	295	e 9 56	− 2	—	—	—	—	—
Hungry Horse		59·0	314	e 10 0	− 4	—	—	—	—	—
Pierce Ferry		60·1	300	e 10 10	− 1	—	—	—	—	—
Overton	Z.	60·4	300	i 10 14	+ 1	—	—	—	—	—
Boulder City		60·8	300	e 10 15	− 1	—	—	e 10 22	pP	—
Palomar	Z.	62·9	297	i 10 30	0	—	—	i 10 37	pP	—
Riverside	Z.	63·2	298	i 10 32	0	—	—	i 10 39	pP	—
Tinemaha	Z.	63·3	301	i 10 34	+ 1	—	—	i 10 40	pP	—
Pasadena	Z.	63·8	298	i 10 35	− 1	—	—	—	—	—
Victoria	Z.	65·2	314	e 10 42	− 3	—	—	—	—	—
Mineral	Z.	65·3	305	i 9 43k	−63	—	—	—	—	—
Lick	Z.	65·9	302	i 10 50k	0	—	—	—	—	—
Ksara		70·0	62	e 7 24	?	—	—	e 13 12	PP	—
College		74·2	335	e 11 38	− 2	—	—	—	—	—
Sverdlovsk		78·6	33	12 5	0	e 22 5	+ 3	—	—	—

Additional readings :—
Almeria PPP = 9m.29s., P_cP = 9m.35s., SS = 16m.5s.
St. Louis i = 7m.52s.
Paris e = 8m.37s., i = 8m.51s.
Strasbourg e = 9m.35s.
Bologna eZ = 8m.59s.
Long waves were also recorded at Bermuda, Scoresby Sund, Aberdeen, and Alicante.

June 28d. Readings also at 0h. (Potsdam, Stuttgart, Collmberg, and Paris), 1h. (Alicante and Granada), 8h. (Overton, near Berkeley, Lick, and Branner), 9h. (College, Overton, and near Apia), 14h. (Durham and Raciborzu), 15h. (Toledo), 17h. (Paris), 19h. (Toledo), 21h. (Samarkand, near Murgab, Andijan, Obi-garm, and Stalinabad).

June 29d. Readings at 1h. (Ksara), 2h. (near College), 4h. (Hungry Horse and College), 5h. (Overton and Tucson), 8h. (near Murgab, near Kulyab, near Leninakan, near Zürich, near College, and near Mizusawa), 9h. (Tananarive, Ksara, Strasbourg, Collmberg, near Stuttgart, Basle, Chur, Zürich, Samarkand, near Kulyab, and Stalinabad), 10h. (College and Overton), 12h. (Tucson), 13h. (Belgrade, Palomar, and near Andijan), 14h. (Murgab, near Andijan, and Kulyab), 16h. (near Copiapo and Santa Lucia), 17h. (Santa Lucia, Pasadena, Riverside, Overton, Pierce Ferry, and Bucharest), 18h. (near Andijan and near Leninakan), 20h. (4) and 21h. (2) (near Ashkabad), 23h. (Columbia).

June 30d. 23h. 18m. 9s. Epicentre 50°·9N. 6°·3E. Given by Strasbourg.

$A = +·6294$, $B = +·0695$, $C = +·7740$; $\delta = +5$; $h = -6$;
$D = +·110$, $E = -·994$; $G = +·769$, $H = +·085$, $K = -·633$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Heerlen		0·2	265	i 0 11	+ 1	i 0 13	− 3	—	—
Strasbourg		2·5	158	e 0 52	P_g	e 1 13	− 1	e 1 23	S_g
Stuttgart	z.	2·8	139	e 0 50	+ 3	e 1 21	− 1	e 1 30	S_g
Paris		3·2	230	e 0 51	− 1	i 1 28	− 4	e 1 5?	P_g
Jena		3·3	89	e 0 52	− 1	e 1 31	− 4	—	—
Basle		3·5	166	e 0 54	− 3	e 1 47	S*	—	—
Zürich		3·8	156	e 0 49	−12	e 1 53	+ 6	—	—
Collmberg		4·2	82	e 1 6	− 1	e 1 57	0	e 2 20	S_g
Clermont-Ferrand		5·6	204	—	—	e 2 43	+10	i 2 55	S*

Additional readings :—
Strasbourg i = 1m.3s., e = 1m.6s. and 1m.9s.
Stuttgart ePZ = 35s., e = 1m.9s., eZ = 1m.25s., eS_g? = 1m.34s.
Paris i = 55s., iP_g = 57s., i = 1m.12s., e = 1m.17s.
Jena eSEN = 1m.17s., eE = 1m.37s.
Collmberg eE = 2m.1s., 2m.4s., and 2m.11s.

June 30d. Readings at 1h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Mineral, Reno, Lick, Fresno, Hungry Horse, College, Logan, Collmberg, Clermont-Ferrand, Paris, Strasbourg, Stuttgart, Istanbul, Ksara, Auckland, Wellington, near Apia, and near Tortosa), 2h. (Apia, Tinemaha, Tucson, Overton, Pierce Ferry, College, Logan, Seven Falls, La Paz, Almeria, Kew, and Rome), 5h. (Granada), 6h. (Ashkabad), 8h. (Strasbourg, Tananarive, College (2), Tucson, and near Bogota), 10h. (College), 11h. (Istanbul), 13h. (Obi-garm, and near Murgab), 14h. (Obi-garm, near Andijan, Murgab, and Stalinabad (2)), 17h. (Arapuni, Wellington, Boulder City, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Overton, Pierce Ferry, Hungry Horse, Logan, College, Ksara, Paris, Strasbourg, Stuttgart, and near Apia (2)), 18h. (Overton), 20h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson (2), Boulder City, Overton, Pierce Ferry, and Columbia).

The scanned images of the bulletins of the International Seismological Summary (ISS) have been obtained as part of a global earthquake relocation project (Villaseñor et al., 1997) initiated with funding from the US National Science Foundation through grant EAR-9725140 and collected by SGA Storia Geofisica Ambiente (Bologna) on behalf of the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of Euroseismos project.

A digital hypocenter file of the ISS (Villaseñor and Engdahl, 2005) can be obtained from the USGS web site: http://earthquake.usgs.gov/scitech/iss/

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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