The International Seismological Summary.

1942 October, November, December.

INTERNATIONAL GEODETIC AND GEOPHYSICAL UNION.
ASSOCIATION OF SEISMOLOGY.
FORMERLY THE BULLETIN OF
THE BRITISH ASSOCIATION SEISMOLOGY COMMITTEE.

The Director of the I.S.S. wishes to express his thanks to U.N.E.S.C.O. and H.M. Treasury for financial support, which has covered the cost of preparation of this volume.

The last quarter of 1942 contains 94 epicentres, 62 of which are repetitions from previous determinations.

Cases of abnormal focal depth are noted below :—

Oct.	6d.	11h.	6·5S.	155·0E.	Base of Superficial Layers
	6d.	14h.	6·5S.	155·0E.	Base of Superficial Layers
	17d.	20h.	42·4N.	139·0E.	0·025
	26d.	21h.	46·2N.	151·2E.	Base of Superficial Layers
	29d.	21h.	17·5N.	146·0E.	0·015
Nov.	6d.	13h.	6·6S.	76·9W.	0·005
	7d.	7h.	9·2S.	123·0E.	0·010
	11d.	13h.	11·0N.	84·0W.	Suggested Deep
	12d.	4h.	16·5N.	94·4W.	,, ,,
	13d.	0h.	0·4N.	80·4W.	,, ,,
	16d.	21h.	36·3N.	71·0E.	0·005
	20d.	4h.	16·5N.	94·4W.	Suggested Deep
	26d.	14h.	45·8N.	149·8E.	0·010
	30d.	0h.	28·0S.	63·5W.	0·070
Dec.	13d.	8h.	53·0N.	152·5E.	0·060
	19d.	23h.	31·5N.	142·4E.	Suggested Deep
	22d.	4h.	16·6S.	174·0W.	,, ,,
	26d.	12h.	9·5N.	75·3W.	,, ,,

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

KEW OBSERVATORY,
RICHMOND, SURREY.

February, 1953.

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1942 OCTOBER, NOVEMBER, DECEMBER.

Oct. 1d. Readings at 0h. (Branner and Copenhagen), 1h. (near Mizusawa), 7h. (Pasadena and Tucson), 13h. (near Lick), 14h. (Sofia), 15h. (Fordham and Jena), 18h. (Tucson and Aberdeen), 19h. (Huancayo, La Paz, Pasadena, Riverside, Tucson, and Fordham), 20h. (Harvard and near Ottawa).

Oct. 2d. Readings at 0h. (Bombay, New Delhi, Andijan, Semipalatinsk, Sverdlovsk, Potsdam, Stuttgart, and near Balboa Heights), 10h. (Ferndale), 17h. (Harvard and La Paz), 20h. (La Paz, Tucson, and Mount Wilson), 21h. (near Algiers).

Oct. 3d. Readings at 0h. (Fordham), 5h. (near Algiers), 10h. (Haiwee (2), Mount Wilson (2), Pasadena (2), Riverside (2), Santa Barbara, Tucson (2), Lincoln, and Granada), 11h. (near Lick), 12h. (near Bucharest, Cernauti, Focsani, and Sofia), 19h. (Oaxaca, Tacubaya, and near Berkeley), 21h. (Auckland), 22h. (Tacubaya, Triest, and near Sofia), 23h. (Auckland, Wellington, Stuttgart (2), Haiwee, Mount Wilson, Tucson, and Riverside).

Oct. 4d. Readings at 1h. (Haiwee, Mount Wilson, and Riverside), 5h. (Haiwee, Mount Wilson, Pasadena, Riverside, Tinemaha, Tucson, and near La Paz), 12h. (near St. Louis), 14h. (Balboa Heights, La Paz, Mount Wilson, Pasadena, Riverside, Tucson, and near Lick), 17h. (near Berkeley, Branner, Lick, Santa Clara, Fresno, and San Francisco), 19h. (Florissant), 23h. (near Berkeley, San Francisco, and Lick).

Oct. 5d. 1h. Undertermined shock. South America or South Atlantic ocean.

La Plata ePE = 2m.0s., SNZ = 4m.18s., SE = 4m.36s., LE = 5m.12s.
La Paz iPZ = 3m.24s.k, S?N = 7m.12s., iSZ = 7m.24s., LZ = 10m.36s.
Huancayo eP = 4m.14s., i = 5m.43s. and 6m.2s., iS = 8m.26s., eL = 10m.43s.
Rio de Janeiro ePN = 5m.0s., eSN = 10m.0s., eLN = 13m.2s.
Tucson iP = 10m.55s., i = 11m.3s., e = 13m.28s. and 15m.12s., eL = 37m.56s.
Riverside ePZ = 11m.20s., iZ = 11m.29s.
Mount Wilson iPZ = 11m.24s., iZ = 11m.35s.
Pasadena iPZ = 11m.25s., i = 11m.32s., eLNZ = 39m.6s.
Haiwee ePZ = 11m.32s., iZ = 11m.41s.
Tinemaha iZ = 11m.36s.
San Juan eS = 15m.46s., eL = 31m.45s.
Ksara eP = 16m.52s., eS = 18m.51s.
Helwan PZ = 18m.18s., SNZ = 21m.15s., eNZ = 21m.30s., SSN = 21m.45s., eN = 22m.18s.
Tashkent eP = 19m.13s., eS = 22m.24s.
Sverdlovsk P = 21m.45s.
Uccle eE = 27m.24s., eLEN = 56m.
Long waves were also recorded at Auckland, Wellington, and other European stations.

Oct. 5d. Readings also at 1h. (Ksara and near Almata), 6h. (Cheb), 7h. (De Bilt, Copenhagen, Potsdam, Stuttgart, Triest, Sofia, Helwan, and Ksara), 9h. (Mount Wilson and Tucson), 15h. (Mount Wilson, Pasadena, Riverside, and Tinemaha), 16h. (Bombay, Calcutta, and Tashkent), 20h. (near Oaxaca, Tacubaya, and Vera Cruz).

Oct. 6d. 2h. 58m. 20s. Epicentre 43°·5N. 126°·5W. (as on 1937 Nov. 10d.).

$A = -\cdot4329$, $B = -\cdot5850$, $C = +\cdot6859$; $\delta = +9$; $h = -3$;
$D = -\cdot804$, $E = +\cdot595$; $G = -\cdot408$, $H = -\cdot551$, $K = -\cdot728$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Ferndale	E.	3·4	150	—	—	e 1 23	−14	—	—	—
Seattle		5·0	33	e 0 53	−25	—	—	—	—	e 4·0
Ukiah		5·0	149	e 1 12	− 6	e 2 11	− 7	—	—	e 2·6
Berkeley		6·5	149	e 1 36	− 3	e 2 5	P_g	—	—	e 2·4
San Francisco	E.	6·5	150	e 1 35	− 4	e 1 45	P^*	—	—	—
Branner	E.	6·9	150	i 1 37	− 8	—	—	—	—	—
Lick		7·1	147	e 1 48	0	—	—	—	—	e 4·7
Santa Clara		7·1	149	i 1 48	0	e 3 22	+12	—	—	—
Tinemaha	Z.	9·0	133	i 2 16	+ 3	—	—	—	—	—
Haiwee	Z.	9·8	135	i 2 28	+ 4	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Butte		10·2	71	e 2 30	− 1	e 5 14	S*	e 2 46	?	e 6·1
Santa Barbara	z.	10·5	147	e 2 33	− 2	—	—	—	—	—
Logan		11·0	94	i 2 44	+ 2	e 5 5	+18	—	—	e 5·8
Bozeman		11·2	73	e 2 45	+ 1	—	—	—	—	e 6·0
Salt Lake City		11·2	99	e 2 52	+ 8	e 5 4	+12	—	—	i 6·8
Mount Wilson	z.	11·3	142	i 2 46k	0	—	—	—	—	—
Pasadena		11·4	142	i 2 44k	− 3	—	—	—	—	e 5·0
Riverside	z.	11·9	140	i 2 52k	− 2	—	—	—	—	—
La Jolla	z.	12·8	143	e 3 8	+ 2	—	—	—	—	—
Tucson		16·7	127	i 3 58	+ 1	e 7 24	+21	—	—	e 8·6
Lincoln		22·2	87	e 5 24	+24	e 9 18	+18	—	—	e 13·2
College		24·5	340	—	—	(e 9 48)	+ 8	—	—	e 9·8
Florissant	E.	27·5	88	i 5 55	+ 5	e 10 38	+ 8	—	—	—
St. Louis		27·6	88	i 5 49	− 2	i 10 58	+26	i 5 54	pP	e 14·7
Chicago		28·4	81	e 6 8	+10	e 10 36	− 9	—	—	e 14·0
Honolulu		34·2	241	e 8 52	?	e 13 1	?	—	—	e 14·5
Ottawa		35·8	69	7 2	− 1	12 47	+ 6	8 25	PPP	18·7
Columbia		36·3	90	e 12 2	?	e 12 57	+ 9	—	—	e 19·2
Philadelphia		38·0	78	e 8 48	PP	e 13 13	− 1	—	—	e 19·3
Fordham		38·6	76	e 9 59	?	e 16 25	SSS	—	—	—
Seven Falls		38·9	65	—	—	e 13 40	+12	—	—	21·7
Fort de France		62·2	96	e 10 23	− 3	—	—	—	—	—
Stuttgart		80·2	29	e 12 12	− 2	—	—	—	—	—

Additional readings :—
Ferndale gives eN at 2h. 57m. 13s. and 2h. 58m. 28s.
Berkeley ePE = 1m.40s., eSZ = 2m.15s.
Bozeman e = 3m.45s. and 4m.16s.
Salt Lake City e = 5m.45s.
Tucson i = 4m.34s., e = 4m.54s.
Florissant iSE = 10m.57s.
Chicago e = 8m.38s.
Long waves were also recorded at Harvard, Bermuda, Scoresby Sund, Granada, Kew, and Uccle.

Oct. 6d. 11h. 50m. 22s. Epicentre 6°·5S. 155°·0E. Focus at base of superficial layers.

$A = -\cdot9006$, $B = +\cdot4200$, $C = -\cdot1125$; $\delta = +14$; $h = +7$;
$D = +\cdot423$, $E = +\cdot906$; $G = +\cdot102$, $H = -\cdot048$, $K = -\cdot994$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	E.	20·9	187	e 4 48	+ 6	i 8 36	+ 8	i 5 10	PP	—
	N.	20·9	187	i 4 45	+ 3	i 8 32	+ 4	i 5 10	PP	—
Riverview		27·4	188	e 5 44	0	i 10 21	0	i 6 4	PP	e 13·6
Sydney		27·4	188	—	—	e 10 26	+ 5	—	—	—
Auckland		35·2	153	6 53	0	11 25	?	16 8	Q	17·6
Arapuni		36·6	153	—	—	12 38	− 7	15 38?	SS	17·6
Tuaf		37·9	152	7 17	+ 1	13 4	− 1	—	—	—
Wellington		38·9	157	7 23a	− 1	13 25	+ 5	7 39	pP	18·6
Christchurch		40·0	161	7 33	0	13 36	0	9 19	P_cP	19·4
Perth		44·4	230	i 14 43	S	—	—	—	—	—
Vladivostok		53·7	339	e 8 30	?	i 15 7	?	—	—	—
Honolulu		53·9	57	e 12 6	?	e 16 37	−17	e 12 41	PPP	25·7
Calcutta	N.	71·3	296	e 15 27	PPP	i 20 14	−18	—	—	—
Irkutsk		72·7	330	e 11 19	− 7	e 20 3	?	—	—	—
New Delhi	N.	82·5	300	e 11 8	?	i 21 17	?	—	—	—
College		82·6	20	e 12 35	+14	e 22 28	− 7	e 15 18	PP	e 38·7
Bombay		84·7	290	e 12 31	− 1	i 22 49	− 7	28 25	SS	e 40·6
Sitka		84·8	31	e 23 17	S	(e 23 17)	+20	—	—	e 39·2
Berkeley		88·2	52	e 12 46	− 3	—	—	—	—	e 39·1
Santa Clara		88·4	52	e 12 51	+ 1	—	—	—	—	e 43·3
Andijan		88·6	311	e 12 51	0	i 23 32	− 1	—	—	—
Victoria		89·3	41	e 23 38?	S	(e 23 38?)	− 1	—	—	41·6
Santa Barbara	z.	89·8	56	e 12 57	+ 1	—	—	—	—	—
Pasadena		91·0	56	i 13 1a	− 1	—	—	—	—	e 41·6
Tashkent		91·0	311	e 13 0	− 2	23 50	− 5	13 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.
Mount Wilson	z.	91·1	56	i 13 1a	− 2	—	—	— —	—
Tinemaha	z.	91·2	53	i 13 3	0	—	—	— —	—
Haiwee	z.	91·4	54	i 13 4	0	—	—	— —	—
Riverside	z.	91·6	56	i 13 5a	0	—	—	— —	—
La Jolla	z.	91·6	57	e 13 5	0	—	—	— —	—
Tucson		96·9	58	e 13 30	+ 1	—	—	e 17 23 PP	e 43·9
Bozeman		97·4	45	—	—	e 24 2	[− 3]	— —	e 48·3
Florissant	E.	113·2	50	i 29 5	PS	—	—	— —	e 53·9
St. Louis	E.	113·3	50	29 24	PS	—	—	— —	e 53·5
Scoresby Sund		116·1	359	e 20 17	PP	—	—	— —	e 50·5
Ksara		117·7	304	e 19 57	PP	—	—	— —	—
Helwan	z.	118·6	301	e 20 17	PP	—	—	— —	—
Ottawa		121·5	39	e 28 49	?	—	—	— —	63·6
Stuttgart		128·9	331	i 18 59	[− 6]	—	—	— —	—
Granada		143·8	331	i 19 8a	[−23]	—	—	25 50 PPP	e 83·0

Additional readings :—
Riverview iPPPN =6m.38s., iN =10m.38s., iSSN =11m.27s., iE =12m.25s.
Wellington PPPZ =9m.35s., i =13m.45s., SS =16m.28s.
Christchurch Q =16m.33s., S_cS =17m.15s.
Perth i =18m.8s. and 25m.23s.
Vladivostok isS =15m.57s.
Irkutsk PS =20m.41s.
College e =22m.53s.
Santa Barbara eZ =13m.10s.
Pasadena iZ =13m.16s.
Mount Wilson iZ =13m.17s.
Riverside iZ =13m.19s.
La Jolla iZ =13m.20s.
Tucson e =27m.9s. and 29m.26s.
Ksara e =23m.25s.
Helwan eZ =20m.47s., eN =37m.38s.
Granada pPP =19m.38s., sSKS =24m.23s.
Long waves were also recorded at Huancayo, La Paz, Bermuda, and other American and European stations.

Oct. 6d. 14h. 15m. 31s. Epicentre 6°·5S. 155°·0E. Focus at base of superficial layers.
(as at 11h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		° ′	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane		20·9′	187	e 5 23	PPP	i 9 16	SSS	— —	—
Riverview		27·4	188	i 5 24k	−20	i 9 24	?	i 11 3 SS	—
Branner		88·2	52	i 13 4	+15	—	—	— —	—
Lick		88·6	52	e 13 4	+13	—	—	— —	—
Santa Barabara	z.	89·8	56	i 13 1	+ 5	—	—	— —	—
Pasadena		91·0	56	i 13 2k	0	i 23 8	[−22]	— —	—
Mount Wilson		91·1	56	i 13 3k	0	e 23 10	[−20]	e 16 31 PP	—
Tinemaha		91·2	53	i 13 11	+ 8	i 23 20	[−11]	— —	—
Haiwee		91·4	54	i 13 10	+ 6	e 23 15	[−17]	— —	—
La Jolla		91·6	57	i 13 1	− 4	—	—	— —	—
Riverside		91·6	56	i 13 5k	0	e 23 11	[−22]	e 16 40 PP	—
Tucson		96·9	58	i 13 19	−10	e 24 16	[+14]	e 16 23 PP	e 52·6
St. Louis	z.	113·3	50	i 19 13	PP	—	—	— —	—
Ksara		117·7	304	e 19 54	PP	—	—	e 22 16 PPP	—
Helwan	z.	118·6	301	19 51	PP	—	—	— —	—
Stuttgart		128·9	331	i 20 5	?	—	—	e 20 56 PP	—
Granada		143·8	331	i 22 2k	PP	—	—	22 11 pPKP	93·5

Additional readings :—
Brisbane iSE =9m.19s.
Riverview iN =9m.26s., iE =9m.38s., iN =10m.46s.
Pasadena iZ =14m.28s., 16m.38s., and 16m.44s.
Mount Wilson iZ =13m.21s. and 16m.44s.
Riverside iZ =16m.46s.
Tucson e =14m.27s. and 17m.0s., and 19m.6s.
Ksara e =20m.57s.
Helwan iZ =20m.1s., 20m.11s., 21m.11s., and 24m.44s.
Stuttgart e =21m.55s.
Granada iPP =25m.44s., pPP =26m.1s., SKKS =32m.7s., sSKKS =32m.57s., SKSP =37m.5s.
Long waves were also recorded at Calcutta.

Oct. 6d. Readings also at 1h. (La Paz), 3h. (near Oaxaca (5), Tacubaya (6), Vera Cruz (5), and Guadalajara (3), also Spokane, Chicago, Logan (2), Columbia, Butte, Salt Lake City (2), San Juan, Bozeman (2), Tucson (3), Pasadena, Tinemaha (2), La Jolla (2), Haiwee (3), Mount Wilson (3), Riverside (3), and near Lick), 7h. and 8h. (near Mizusawa), 11h. (Tacubaya), 12h. (Pasadena, Mount Wilson, Riverside, Haiwee, Tucson, and Tinemaha), 13h. (Stuttgart), 16h. (near Oaxaca and Tacubaya), and near Harvard), 17h. (Tacubaya, Mount Wilson (3), Tinemaha, Haiwee, Tucson (3), Riverside, Pasadena, and near Mizusawa), 18h. (near Granada (2), 21h. (near St. Louis), 22h. (Spokane, and near Branner (2), and Berkeley), 23h. (Tacubaya and near Mizusawa).

Oct. 7d. Readings at 6h. (near Mizusawa), 8h. (Haiwee, Mount Wilson, Pasadena, Riverside, Tucson, and Tinemaha), 9h. (Haiwee, Mount Wilson, Riverside, Tucson, Tashkent, and Tchimkent), 16h. (near Fort de France), 19h. (La Paz), 21h. (near Berkeley).

Oct. 8d. 3h. 2m. 42s. Epicentre 6°·2N. 82°·4W. (as on 1942, Sept. 29d.).

$A = +\cdot1315$, $B = -\cdot9855$, $C = +\cdot1073$; $\delta = +2$; $h = +7$;
$D = -\cdot991$, $E = -\cdot132$; $G = +\cdot014$, $H = -\cdot106$, $K = -\cdot994$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		3·9	45	i 1 6	+ 4	—	—	—	—	1·8
Huancayo		19·4	159	i 4 27	− 3	i 8 3	− 1	—	—	i 9·3
San Juan		20·0	51	i 4 39	+ 2	i 8 36	+19	i 5 29	PPP	i 9·9
Fort de France		22·5	68	i 4 43	−19	e 9 33	+28	—	—	—
Mobile		24·9	348	e 5 32	+ 6	e 9 59	+12	—	—	—
La Paz		26·6	147	i 5 38	− 4	i 10 24	+ 8	—	—	14·3
Columbia		27·7	3	e 5 50	− 2	e 10 36	+ 3	e 6 24	PP	e 12·4
Bermuda		30·8	31	e 6 18	− 2	e 11 19	− 4	e 7 3	PP	e 12·8
Cape Girardeau	E.	31·6	351	e 6 28	+ 2	e 11 43	+ 8	—	—	—
Philadelphia		34·2	10	e 6 51	+ 2	e 12 23	+ 7	—	—	e 14·5
Fordham		35·4	11	e 7 5	+ 5	e 12 40	+ 6	e 8 21	PP	e 15·4
Chicago		35·9	353	e 6 56	− 8	e 12 33	− 9	e 8 23	PP	e 14·9
Lincoln		36·8	343	e 6 36	−35	e 12 50	− 6	—	—	e 16·8
Tucson		37·1	318	i 7 11	− 3	e 13 6	+ 5	i 8 41	PP	e 15·8
Harvard		37·4	14	e 7 18	+ 2	—	—	e 8 36	PP	e 15·8
Ottawa		39·5	7	7 32	− 2	13 37	0	9 0	PP	20·3
La Jolla		41·9	314	i 7 53	− 1	—	—	—	—	—
Seven Falls		42·0	12	8 0	+ 6	14 22	+ 8	—	—	17·3
Mount Wilson	Z.	43·2	315	e 8 3	− 1	—	—	—	—	—
Pasadena		43·2	315	i 8 2	− 2	e 14 42	+10	—	—	e·21·2
Salt Lake City		43·3	328	e 8 16	+11	e 14 35	+ 2	e 9 46	PP	e 18·4
Haiwee	Z.	44·1	318	e 8 4	− 8	—	—	—	—	—
Santa Barbara	Z.	44·5	314	e 8 15	0	—	—	—	—	—
Tinemaha	Z.	44·9	319	e 8 18	0	—	—	—	—	—
Bozeman		46·5	333	e 8 10	−21	e 15 26	+ 7	—	—	e 22·9
La Plata	E.	46·9	152	8 12	−22	15 18	− 7	18 36	SS	24·3
	N.	46·9	152	8 24	−10	15 0	−25	10 12	PP	27·5
Butte		47·5	333	e 8 40	+ 2	e 15 20	−14	e 15 40	PS	e 22·6
Santa Clara	E.	47·8	317	e 8 39	− 2	e 15 40	+ 2	—	—	e 24·2
Rio de Janeiro		48·0	127	e 8 46	+ 3	e 15 43	+ 2	—	—	e 24·1
Berkeley	E.	48·0	317	e 8 46	+ 3	e 15 48	+ 7	e 19 12	SS	e 24·2
	Z.	48·0	317	e 8 43	0	e 15 41	0	—	—	e 25·0
Victoria		54·6	328	e 17 18?	S	(e 17 18?)	+ 7	—	—	28·3
College		74·1	337	e 12 33	?	e 21 22	+10	—	—	e 35·8
Honolulu		74·2	291	e 23 33	?	—	—	—	—	e 33·7
Granada		77·4	54	i 12 2	+ 4	21 20	−29	12 20	pP	39·4
Neuchatel		85·1	44	e 12 42	+ 3	—	—	—	—	—
Basle		85·5	43	e 12 44	+ 3	—	—	—	—	—
Zurich		86·2	43	e 12 47	+ 3	—	—	—	—	—
Stuttgart		86·4	42	e 12 46	+ 1	—	—	e 16 18	PP	—
Cheb		88·4	40	—	—	e 23 34	− 6	e 29 18?	SS	e 43·3
Christchurch		105·1	226	26 53	?	33 5	SS	28 42	PPS	48·8

For Notes see next page.

NOTES TO OCTOBER 8d. 3h. 2m. 42s.

Additional readings :—
La Paz iSZ = 10m.28s.
Columbia e = 7m.11s.
Philadelphia i = 7m.12s.
Tucson e = 9m.51s.
Harvard e = 9m.16s. and 10m.36s.
Ottawa SS = 16m.18s.
La Plata QN = 19m.0s.
Butte e = 18m.8s.
Berkeley eN = 20m.56s.
College e = 20m.38s.
Granada iPS = 21m.59s., sS = 24m.23s.
Christchurch PS? = 33m.49s.
Long waves were also recorded at Bombay, Ukiah, Sitka, Kew, De Bilt, Potsdam, Auckland, and Wellington.

Oct. 8d. 20h. 2m. 34s. Epicentre 10°·4S. 163°·9E. (as on 1938, Dec. 4d.).

$A = -\cdot 9452$, $B = +\cdot 2728$, $C = -\cdot 1790$; $\delta = -14$; $h = +6$;
$D = +\cdot 277$, $E = +\cdot 961$; $G = +\cdot 172$, $H = -\cdot 050$, $K = -\cdot 984$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		19·9	210	i 4 34	− 2	e 8 19	+ 4	i 4 59	PP	—
Riverview		26·1	205	i 5 36k	− 1	e 10 6	− 1	—	—	—
Sydney		26·2	205	e 5 44	+ 6	e 10 11	+ 2	—	—	e 12·5
Wellington		32·2	165	6 20	−12	13 1	P_cS	i 7 29	PP	19·4
Christchurch		33·9	168	4 10	?	—	—	—	—	14·5
Santa Clara	E.	83·9	50	e 12 57	+24	—	—	—	—	e 38·6
Santa Barbara	Z.	84·6	54	e 12 37	+ 1	—	—	—	—	—
Pasadena		85·9	54	i 12 42a	− 1	—	—	—	—	e 41·2
Mount Wilson	Z.	86·1	54	i 12 43	− 1	—	—	—	—	—
La Jolla		86·4	56	i 12 44	− 1	—	—	—	—	—
Riverside	Z.	86·5	54	i 12 46a	0	—	—	—	—	—
Victoria		86·5	39	—	—	e 22 26?	−56	—	—	41·4
Haiwee	Z.	86·6	52	e 12 46	0	—	—	—	—	—
Tinemaha		86·7	52	i 12 47	0	—	—	—	—	—
Palomar	Z.	86·8	55	i 12 46a	− 1	—	—	—	—	—
Tucson		91·5	57	i 13 10a	0	e 23 52	[+10]	e 16 44	PP	e 41·8
Ottawa		118·5	43	e 18 52	[+ 2]	—	—	—	—	61·4

Additional readings :—
Brisbane iPPN = 5m.4s., iSE = 8m.22s.
Wellington iZ = 6m.44s., SS = 15m.21s.
Christchurch the reading entered is given as SS.
Tucson e = 14m.9s.
Long waves were also recorded at Auckland, Bombay, La Paz, Granada, and other American stations.

Oct. 8d. Readings also at 1h. (near Berkeley), 2h. (near Berkeley, Lick, Branner, Santa Clara, Fresno, and San Francisco (2)), 7h. (La Paz), 22h. (Triest and Sofia).

Oct. 9d. 0h. Undetermined shock.

Huancayo eP = 47m.32s., e = 48m.16s., ePPP = 48m.35s., eS = 52m.39s., eL = 54m.39s.
La Paz PZ = 47m.46s., LZ = 56m.30s.
San Juan P = 50m.12s., e = 56m.6s., eS = 59m.40s., e = 62m.8s., eL = 72m.56s.
Tucson eP = 52m.8s., e = 54m.8s., ePPP = 56m.6s., e = 72m.7s.
Palomar ePZ = 52m.18s.
Riverside ePZ = 52m.21s.
Mount Wilson ePZ = 52m.26s.
Pasadena iPZ = 52m.29s., eLZ = 75m.24s.
Haiwee ePZ = 52m.41s.
St. Louis iZ = 52m.42s., eE = 62m.17s.
Santa Barbara ePZ = 52m.43s.
Tinemaha ePZ = 52m.46s.
Ottawa eZ = 53m.30s., e = 64m., L = 76m.
Wellington S? = 59m.40s., Q = 70m., R = 72m.
Christchurch SS = 60m.32s., SSS = 63m.58s., Q = 66m.8s., R = 70m.59s.
Philadelphia eS = 62m.45s., eL = 68m.13s.
Fordham e = 63m.8s.
Long waves were also recorded at La Plata, Honolulu, Auckland, Bozeman, Columbia and Harvard.

Oct. 9d. 15h. 46m. 7s. Epicentre 11°·4S. 34°·5E.

A = +·8081, B = +·5554, C = −·1964 ; δ = +7 ; h = +6 ;
D = +·566, E = −·824 ; G = −·162, H = −·111, K = −·980.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		14·7	122	3 30	− 1	i 6 30	+14	i 3 39	PP	8·0
Johannesburg		15·9	201	e 3 47	0	i 6 35	− 9	—	—	—
Helwan		41·1	355	i 7 45a	− 2	13 35	−26	9 24	PP	—
Ksara		45·0	1	e 8 22	+ 3	e 15 2	+ 4	e 10 2	PP	—
Kodaikanal	E.	47·8	64	e 8 44	+ 3	i 15 41	+ 3	10 39	PP	—
Bombay		48·3	52	i 8 42	− 3	i 15 42	− 3	10 32	PP	23·9
Colombo	E.	48·7	70	—	—	15 53	+ 3	—	—	23·7
Hyderabad	N.	52·0	57	—	—	16 29	− 7	—	—	—
Sofia		54·8	350	e 9 35	+ 1	—	—	e 12 53	PPP	—
Algiers		56·3	330	i 9 49	+ 4	e 17 38	+ 4	12 8	PP	24·9
New Delhi	N.	57·3	46	i 9 39a?	−13	i 17 36?	−11	—	—	—
Dehra Dun	N.	58·9	44	e 11 10?	?	—	—	—	—	—
Triest		59·8	344	e 10 9	0	—	—	—	—	e 30·9
Granada		60·1	325	i 10 12a	+ 1	18 32	+ 8	10 50	PcP	28·6
San Fernando	E.	61·1	322	e 10 17	− 1	—	—	—	—	—
Tashkent		61·5	29	10 20	− 1	18 40	− 2	—	—	—
Chur		62·1	341	e 10 24	− 1	—	—	e 12 39	PP	—
Andijan		62·6	32	10 29	+ 1	18 55	− 1	—	—	—
Calcutta	N.	62·6	57	e 10 22	− 6	i 18 59	+ 3	—	—	—
Zurich		62·9	340	e 10 29k	− 1	—	—	e 12 41	PP	—
Neuchatel		63·1	340	e 10 31	− 1	—	—	—	—	—
Basle		63·4	340	e 10 32	− 2	—	—	—	—	—
Clermont-Ferrand		63·5	336	i 10 38k	+ 4	—	—	—	—	—
Stuttgart		63·9	342	i 10 37k	0	e 23 23	SS	i 12 55	PP	—
Cheb		64·2	345	—	—	e 25 53?	SSS	—	—	e 33·9
Strasbourg		64·2	341	10 40k	+ 1	—	—	—	—	—
Lisbon		64·4	324	10 45a	+ 5	19 51	PPS	10 57	?	33·8
Potsdam		66·2	346	i 10 50k	− 2	—	—	—	—	e 30·9
Uccle		67·3	340	i 10 58k	− 1	e 19 51	− 3	e 24 23	SS	e 30·9
De Bilt		68·1	341	i 11 5k	+ 1	i 20 13	+10	—	—	e 32·9
Copenhagen		69·3	347	i 11 11k	0	20 19	+ 2	—	—	—
Kew		69·5	338	i 11 12k	0	e 20 21	+ 1	e 24 36	SS	e 31·9
Sverdlovsk		71·3	15	11 23	0	20 35	− 6	—	—	—
Rio de Janeiro		74·4	250	e 21 23	S	(e 21 23)	+ 7	25 53	SS	—
La Plata	E.	85·5	235	23 5	SKS	(23 5)	[+ 1]	—	—	41·5
Irkutsk		87·0	36	12 49	+ 1	23 9	[− 5]	—	—	—
La Paz		98·6	252	e 14 23	?	24 41	[+21]	i 17 32	PP	48·9
San Juan		103·5	286	e 14 15	+11	24 54	[+10]	e 18 17	PP	e 46·4
Riverview		104·9	130	e 27 42	PS	e 37 5	SSS	e 27 50	?	e 51·0
Huancayo		106·5	254	e 17 58	PP	e 25 13	[+16]	e 34 1	SS	e 45·2
Seven Falls		108·7	317	e 16 59	?	e 28 17	PS	e 19 0	PP	52·9
Harvard		109·4	311	i 19 2	PP	e 28 31	PS	i 19 14	?	e 53·9
Fordham		111·3	310	i 19 17	PP	—	—	—	—	—
Ottawa		112·2	315	e 18 39	[+ 2]	e 29 5	PS	—	—	48·9
Philadelphia		112·3	308	i 29 13	PS	e 26 41	{+20}	e 35 11	SS	e 47·3
Christchurch		113·3	149	29 21	PS	41 26	?	35 28	SS	56·7
Columbia		117·4	303	—	—	e 37 11	SS	e 40 13	SSS	e 57·2
St. Louis		124·0	310	i 19 1	[0]	—	—	i 20 50	PP	e 46·9
College		126·6	2	e 20 59	PP	e 26 13	[+ 2]	e 32 50	PPS	65·2
Lincoln		128·1	314	e 22 26	?	e 27 32	{−36}	e 37 39	SS	e 69·6
Bozeman		135·0	327	e 22 53	PP	—	—	—	—	e 68·2
Salt Lake City		138·4	321	e 20 8	[+40]	—	—	e 23 14	?	e 64·1
Tucson		142·0	309	e 19 30	[− 4]	e 33 16	PS	i 22 39	PP	e 68·2
Tinemaha	N.	144·6	320	e 19 42	[+ 4]	—	—	—	—	—
Haiwee	Z.	145·0	319	i 19 42k	[+ 3]	—	—	—	—	—
Palomar	Z.	145·9	315	i 19 44	[+ 4]	—	—	i 22 6	?	—
Riverside		145·9	316	i 19 43	[+ 3]	—	—	i 19 56	?	—
Mount Wilson		146·2	316	i 19 44	[+ 3]	—	—	i 19 58	?	—
Pasadena		146·3	316	i 19 45k	[+ 4]	e 26 17	[−32]	e 22 53	PP	e 74·2
Berkeley		146·4	325	i 19 43	[+ 2]	—	—	—	—	e 75·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick		146·4	325	e 19 47	[+ 6]	—	—	—	—	—
La Jolla	z.	146·4	314	i 19 46	[+ 5]	—	—	—	—	—
Santa Clara		146·6	325	i 19 45	[+ 3]	—	—	i 23 5	pPKP	e 81·1
Santa Barbara		147·2	318	i 19 47	[+ 4]	—	—	—	—	—

Additional readings :—
Tananarive i = 3m.59s., P_cP = 8m.30s., P_cS = 12m.9s.
Helwan eZ = 8m.1s., sPZ = 8m.23s., P_cPZ = 9m.47s., sSZ = 14m.28s., eZ = 17m.19s., S_cSZ = 17m.37s.
Kodaikanal SSE = 18m.41s.
Bombay eQE = 17m.18s., eSSEN = 18m.50s.
Algiers P_cP = 10m.13s.
Granada pP_cP = 11m.23s., pPP = 13m.20s., P_cS = 14m.4s., PS = 18m.58s., S_cS = 20m.23s., SS = 22m.32s., SSS = 25m.14s.
Calcutta iSN = 18m.39s., true S given as SS.
Stuttgart ePKP,PKP = 39m.33s.
Lisbon Z = 11m.0s.
Potsdam i = 11m.9s.
Uccle ePSN = 20m.26s.
Kew eSSSE = 27m.6s.
Rio de Janeiro eSE = 25m.58s.
La Paz SZ = 26m.49s.
San Juan e = 20m.3s., eS = 26m.5s.
Huancayo ePP = 19m.16s., ePPP = 21m.10s., eS = 26m.33s., e = 28m.11s.
Philadelphia e = 42m.47s.
Christchurch SS = 45m.35s.
Tucson i = 21m.17s., e = 31m.36s.
Pasadena i = 19m.58s.
Berkeley ePE = 19m.47s.
Lick eEN = 19m.50s.
Long waves were also recorded at Sydney, Auckland, Wellington, and other European and American stations.

Oct. 9d. Readings also at 5h. (Granada and near Angra do Heroismo), 11h. (Palomar and Tucson), 13h. (Harvard), 15h. (Paris), 16h. (Bombay, New Delhi, Dehra Dun, Algiers, and Granada), 19h. (near Berkeley), 22h. (Cape Girardeau and Palomar), 23h. (Palomar and Tucson).

Oct. 10d. Readings at 1h. (Basle, Stuttgart, Clermont-Ferrand, Helwan, St. Louis, Tucson (2), Pasadena (2), Haiwee, Mount Wilson, La Jolla, Riverside (2), Santa Barbara, Tinemaha, Palomar (2), Auckland, and near Apia), 6h. (Mizusawa, Vladivostok, Tucson, Pasadena, Mount Wilson, Riverside, Santa Barbara, La Jolla, Tinemaha, Haiwee, Palomar, and Kew), 16h. (Harvard), 17h. (Guadalajara, Tacubaya, Cape Girardeau, Strasbourg, near Basle, Chur, Neuchatel, Zurich, Clermont-Ferrand, Stuttgart, and near Angra do Heroismo), 22h. (La Paz (2)).

Oct. 11d. Readings at 1h. (Riverview, Uccle, and near Angra do Heroismo), 3h. (Granada and near Angra do Heroismo), 18h. (San Francisco (2)), 20h. (Samarkand), 23h. (near Berkeley, Branner, Lick, and San Francisco).

Oct. 12d. 1h. 16m. 34s. Epicentre 15°·1S. 75°·0W. (as on 1942 Sept. 30d.).

$A = +·2500$, $B = -·9330$, $C = -·2589$; $\delta = +2$; $h = +5$;
$D = -·966$, $E = -·259$; $G = -·067$, $H = +·250$, $K = -·966$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		3·1	354	i 0 53	+ 2	—	—	—	—	i 4·8
La Paz		6·7	103	i 1 52	+10	i 3 18	+18	—	—	3·8
La Plata		25·0	145	5 26	− 1	10 2	+13	—	—	13·5
Rio de Janeiro		31·0	109	e 11 26	S	(e 11 26)	0	—	—	—
Fort de France		32·6	27	e 6 33	− 2	—	—	—	—	—
San Juan		34·4	15	e 6 58	+ 7	12 11	− 8	8 18	PP	e 15·2
Philadelphia		54·8	0	—	—	i 17 9	− 5	e 21 31	SS	—
Florissant	z.	55·5	346	—	—	i 17 13	−11	—	—	e 26·2
Harvard		57·4	5	e 8 50	−63	—	—	—	—	e 30·4
Chicago		57·8	348	—	—	e 17 43	−11	—	—	e 27·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		58·3	325	i 9 53	− 6	—	—	e 12 46	PP	e 29·2
Ottawa		60·2	0	e 10 6	− 6	e 18 16	− 9	—	—	25·4
Seven Falls		62·0	4	—	—	e 18 43	− 5	—	—	29·4
Palomar	z.	62·6	322	i 10 23	− 5	—	—	i 10 34	?	—
Riverside	z.	63·3	321	e 10 27	− 6	—	—	i 10 37	?	—
Mount Wilson		63·9	321	e 10 34	− 3	—	—	—	—	—
Pasadena	z.	63·9	321	i 10 31	− 6	—	—	—	—	—
Tinemaha	z.	66·0	323	e 10 46	− 4	—	—	e 10 55	?	—
Bozeman		68·7	334	e 18 9	?	e 20 5	− 5	—	—	e 38·4
Granada		84·8	50	i 12 35k	− 2	i 23 12	+ 7	12 50	pP	44·2
Stuttgart		97·4	41	e 13 26?	−11	—	—	—	—	—

Additional readings :—
La Paz iSZ = 3m.22s.
La Plata PE = 5m.30s.
Philadelphia e = 19m.14s.
Florissant eZ = 19m.8s., iZ = 19m.20s.
Chicago e = 19m.36s.
Tucson i = 10m.26s., e = 14m.29s.
Granada PS = 24m.11s.
Long waves are also recorded at Auckland, Kew, De Bilt, and Potsdam.

Oct. 12d. 6h. 9m. 57s. Epicentre 37°·6S. 100°·6W.

A = −·1461, B = −·7807, C = −·6076 ; δ = +2 ; h = −1 ;
D = −·983, E = +·184 ; G = +·112, H = +·597, K = −·794.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata		34·3	99	7 0	+10	12 21	+ 4	8 15	PPP	15·0
La Paz	z.	35·5	64	i 7 3k	+ 3	i 12 47	+11	—	—	16·5
San Juan		64·5	37	e 18 27	?	e 18 38	?	e 19 8	S	e 26·2
Tucson		70·1	352	i 11 11	− 5	—	—	—	—	e 36·7
La Jolla	z.	71·8	346	e 11 22	− 4	—	—	—	—	—
Palomar	z.	72·2	347	e 11 23	− 6	—	—	—	—	—
Riverside	z.	72·9	346	e 11 27	− 6	—	—	—	—	—
Pasadena	z.	73·2	346	i 11 30	− 5	—	—	—	—	—
Haiwee	z.	75·1	347	e 11 42	− 4	—	—	—	—	—
Tinemaha	z.	76·1	347	e 11 48	− 3	—	—	—	—	—
Florissant		76·6	10	i 21 36	S	(i 21 36)	− 4	—	—	e 35·9
Philadelphia		80·6	20	e 25 6	?	—	—	—	—	e 33·1
Bozeman		83·4	354	e 12 21	− 9	e 22 48	− 3	—	—	e 36·7
Ottawa		85·6	18	12 39	− 2	e 23 3	[− 1]	—	—	35·1
Stuttgart		129·3	54	e 19 15	[+ 4]	—	—	e 21 13	PP	—

Additional readings :—
La Plata SN = 12m.32s.
Tucson e = 12m.8s. and 12m.53s.
Tinemaha iZ = 12m.6s. and 12m.15s.
Florissant eZ = 23m.45s.
Philadelphia e = 26m.18s.
Bozeman e = 13m.9s. and 25m.9s.
Long waves were also recorded at Harvard, Kew, and Uccle.

Oct. 12d. Readings also at 0h. (near Mizusawa), 1h. (near Tashkent), 4h. (Granada), 8h. (La Paz), 10h. (Tashkent), 11h. (Stuttgart and near Mizusawa), 16h. (Ksara), 21h. (near St. Louis), 23h. (near Berkeley).

Oct. 13d. Readings at 0h. (Neuchatel), 2h. (Sofia, Stuttgart, Huancayo, and La Paz), 3h. (near Mizusawa), 4h. (near La Paz), 14h. (near St. Louis), 22h. (Auckland and Stuttgart), 23h. (near Berkeley and near Branner).

Oct. 14d. 0h. 14m. 44s. Epicentre 32°·1N. 114°·3W. (as on 1940 Sept. 13d.).

$A = -·3493$, $B = -·7735$, $C = +·5288$; $\delta = -6$; $h = +1$;
$D = -·911$, $E = +·412$; $G = -·218$, $H = -·482$, $K = -·849$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palomar	Z	2·6	300	i 0 44	0	i 1 42	S_g	—	—	—
La Jolla		2·7	289	e 0 46	+ 1	i 1 37	S_g	i 1 52	SSS	—
Tucson		2·9	87	e 0 44	− 4	i 1 16	− 8	i 0 51	P*	i 2·3
Riverside		3·2	306	e 0 56	P*	i 2 18	SSS	—	—	—
Mount Wilson	Z.	3·8	306	e 1 18	P_g	—	—	—	—	—
Pasadena		3·9	306	i 1 19	P_g	i 2 8	S_g	—	—	—
Haiwee	Z.	5·0	324	e 1 44	P_g	—	—	—	—	—
Tinemaha		6·0	328	e 2 3	P_g	e 4 1	?	—	—	—
Fresno	N.	6·5	318	e 2 25	P_g	e 3 37	S_g	—	—	—
Lick		8·0	312	e 4 58	S_g	—	—	—	—	—
Santa Clara	E.	8·2	312	e 5 2	S_g	—	—	—	—	—
Branner		8·4	312	e 4 54	S*	e 4 54	S_g	—	—	—
Bozeman		13·8	10	—	—	e 5 51	− 3	—	—	e 8·6
Butte		14·0	5	—	—	e 6 7	+ 8	—	—	e 9·2
Columbia		27·9	77	e 9 36	?	—	—	—	—	e 14·9
Mizusawa	E.	80·4	310	—	—	25 4	?	—	—	—

Tucson also gives i = 1m.44s.
Long waves were also recorded at other American stations.

Oct. 14d. Readings also at 4h. (Belgrade, Potsdam, Basle, Stuttgart, Zurich, Bucharest, Triest, Sofia, Ksara, and near Helwan), 5h. (Uccle, De Bilt, and Kew), 7h. (Triest, Zurich, Stuttgart, Potsdam), 8h. (Pasadena, Mount Wilson, Palomar, Tucson, San Fernando, and near Granada (2)), 10h., 13h. (4), 14h. (2), 15h. (6), and 17h. (near Tacubaya), 18h. (Pasadena, Mount Wilson, and Riverside), 19h. (Cape Girardeau), Potsdam, De Bilt, Kew, Stuttgart, Granada, near Angra do Heroismo, and near Almata), 20h. (Potsdam, Granada, and near Angra do Heroismo), 21h. (near Angra do Heroismo), 22h. (near Granada (2), near Focsani, and Bucharest).

Oct. 15d. 14h. 53m. 15s. Epicentre 38°·0N. 29°·5W. (as on 1942 June 15d.).

$A = +·6876$, $B = -·3890$, $C = +·6131$; $\delta = +1$; $h = -1$;
$D = -·492$, $E = -·870$; $G = +·534$, $H = -·302$, $K = -·790$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Angra do Heroismo		1·9	70	i 0 31	− 3	i 0 48	−11	—	—	—
Lisbon		16·0	81	5 45	?	8 41	L	—	—	(8·7)
San Fernando		18·6	90	e 4 19	− 2	—	—	—	—	9·3
Granada		20·5	85	i 4 43k	+ 1	i 8 44	+17	5 3	PP	10·6
Uccle		27·1	50	e 5 38	− 8	e 10 24	0	—	—	e 12·8
Stuttgart		29·8	57	e 6 7	− 4	—	—	—	—	—
Ottawa		34·9	297	e 6 54	− 1	—	—	—	—	17·8
San Juan		37·4	249	e 7 32	+16	e 13 12	+ 7	—	—	e 16·1
Helwan	Z.	50·3	80	e 9 3	+ 3	—	—	e 9 30	?	—
Sverdlovsk		59·5	40	e 10 8	+ 1	18 17	+ 1	—	—	—
Tucson		64·8	293	i 10 44	+ 1	—	—	—	—	—
Tinemaha	Z.	67·6	300	e 11 0	− 1	—	—	—	—	—
Haiwee	Z.	67·8	299	e 11 2	0	—	—	—	—	—
Palomar	Z.	68·5	296	i 11 7	+ 1	—	—	—	—	—
Riverside	Z.	68·6	297	e 11 6	− 1	—	—	—	—	—
Mount Wilson	Z.	68·9	297	i 11 9	0	—	—	—	—	—
Pasadena	Z.	69·0	297	i 11 8	− 1	—	—	—	—	—

Long waves were also recorded at other European stations.

Oct. 15d. Readings also at 1h. (near Angra do Heroismo), 3h. (Huancayo and La Paz), 4h. (Pasadena, Mount Wilson, Riverside, La Jolla, Palomar, Tucson, Granada, and Stuttgart), 5h. (Pasadena, Mount Wilson, Riverside, La Jolla, Palomar, Tinemaha, Haiwee, Tucson, and near Lick), 6h. (near Mizusawa), 7h. (Pasadena, Mount Wilson (2), Riverside, Palomar (2), La Jolla, Huancayo, La Paz, Harvard, Florissant, and near Tucson (2)), 8h. (Harvard, Florissant (2), and near Tucson (2)), 10h. (Riverside, Tucson, and Palomar), 12h. (Mount Wilson, Riverside, Palomar, Tucson, and near Lick), 13h. (near Fresno, Branner, Santa Clara, and Lick (2)), 16h. (near Lick), 20h. (Cape Girardeau and near Algiers), 22h. (near Fresno and Branner), 23h. (near Lick).

Oct. 16d. Readings at 1h. (Pasadena, Palomar, and Tucson), 2h. (near Apia), 3h. (near Branner and Fresno), 5h. (near Lick), 10h. (Tucson and near Fresno), 11h. (Palomar, Tinemaha, Tucson, Apia, La Paz, and near Lick), 14h. (near Apia), 18h. (near Ottawa), 23h. (Mount Wilson, Pasadena, Palomar, Tucson, near Branner, near St. Louis, and near Balboa Heights).

Oct. 17d. 20h. 8m. 24s. Epicentre 42°·4N. 139°·0E. Depth of focus 0·025.

A = −·5590, B = +·4859, C = +·6718; δ = −10; h = −3;
D = +·656, E = +·755; G = −·507, H = +·441, K = −·741.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Mizusawa		3·6	153	1 4	+ 7	1 52	+11
Andijan		48·7	292	e 8 35	+ 8	—	—
Sverdlovsk		50·0	316	i 8 36	− 1	i 15 28	− 3
Tashkent		50·6	293	8 41	0	15 35	− 4
Tinemaha	z.	74·2	55	i 11 18k	+ 1	—	—
Haiwee		75·0	55	i 11 22	0	—	—
Santa Barbara		75·0	57	i 11 23k	+ 1	—	—
Mount Wilson	z.	76·2	56	i 11 28k	− 1	i 21 47	− 8
Pasadena		76·2	56	i 11 28k	− 1	—	—
Riverside	z.	76·8	56	i 11 32k	0	—	—
Palomar	z.	77·5	56	i 11 35k	− 1	—	—
La Jolla	z.	77·6	57	e 11 38	+ 2	—	—
Stuttgart		79·0	329	e 11 43	− 1	—	—
Tucson		81·9	54	i 11 59	0	—	—

Additional readings :—
Palomar iZ = 11m.56s.
Stuttgart e = 12m.41s.
Tucson e = 13m.8s.

Oct. 17d. Readings also at 2h. (Tinemaha, Tucson, La Paz, Huancayo, La Plata, and Rio de Janeiro), 3h. (Tinemaha, Haiwee, Pasadena, Mount Wilson, Tucson, and Palomar), 4h. (La Paz), 6h. (near Berkeley), 12h. (Columbia, Bozeman, Lick, Palomar, Pasadena, Tinemaha, Mount Wilson, Tucson, and near Ferndale), 13h. (College), 14h. (Angro do Heroismo), 19h. (near Apia), 21h. (near St. Louis), 22h. (near Berkeley), 23h. (La Paz).

Oct. 18d. 5h. 24m. 48s. Epicentre 22°·0N. 109°·0W. (as on 1940, May 10d.).

A = −·3022, B = −·8775, C = +·3724; δ = +1; h = +4;
D = −·946, E = +·326; G = −·121, H = −·352, K = −·928.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		10·3	352	i 2 26	− 6	e 4 14	−16	i 2 43	PPP	i 4·9
La Jolla	z.	13·1	328	e 3 27	+17	—	—	—	—	—
Palomar	z.	13·3	330	e 3 10	− 3	—	—	—	—	—
Riverside	z.	14·0	330	e 3 24	+ 2	—	—	—	—	—
Pasadena		14·5	328	i 3 28	0	—	—	—	—	e 5·9
Mount Wilson	z.	14·6	329	e 3 29	− 1	—	—	—	—	—
Haiwee	z.	16·1	334	e 3 49	0	—	—	—	—	—
Tinemaha		17·0	334	i 4 3	+ 2	—	—	i 4 44	PPP	e 9·5
Salt Lake City		18·9	353	e 4 19	− 5	e 7 59	+ 6	—	—	e 9·2
Santa Clara	E.	19·0	328	e 4 28	+ 2	e 7 59	+ 4	—	—	e 9·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Berkeley		19·5	328	e 4 28	− 3	e 8 9	+ 3	e 4 30	PP	e 10·3
Logan		19·8	355	4 31	− 4	—	—	—	—	i 10·3
Ukiah		21·0	328	e 5 22	PPP	e 8 36	− 1	—	—	e 10·0
Lincoln		21·5	28	e 4 6	?	e 8 29	−18	—	—	e 10·7
Cape Girardeau	E.	22·7	43	e 5 8	+ 4	—	—	—	—	e 11·4
Florissant		23·1	40	e 5 11	+ 3	i 9 9	− 7	—	—	i 11·8
St. Louis		23·1	40	i 5 11	+ 3	e 9 2	−14	—	—	i 11·5
Bozeman		23·7	356	e 5 17	+ 3	—	—	—	—	e 12·0
Butte		24·1	356	e 5 14	− 4	e 9 32	− 2	—	—	e 12·7
Chicago		26·7	36	e 8 29	?	e 10 16	− 1	—	—	e 13·5
Columbia		27·3	57	e 5 37	−11	e 10 16	−11	—	—	e 14·7
Seattle		27·7	341	e 6 26	PP	e 11 22	SS	—	—	e 15·5
Victoria		28·9	340	e 10 54	S	(e 10 54)	+ 1	—	—	15·2
Philadelphia		33·8	52	—	—	e 12 0	−10	e 14 27	SS	17·0
Ottawa		35·8	41	e 7 4	+ 1	e 12 30	−11	—	—	17·2
Vermont		37·0	44	—	—	e 12 48	−11	—	—	e 17·9
Sitka		40·4	338	e 17 39	SSS	—	—	—	—	e 25·0
Scoresby Sund		68·5	21	e 31 26	?	—	—	—	—	e 35·5

Additional readings :—
Palomar eZ = 6m.43s.
Riverside eZ = 7m.19s.
Berkeley eE = 5m.12s. ?
Logan i = 9m.56s.
St. Louis iSE = 9m.11s.
Bozeman e = 7m.38s.
Vermont e = 14m.21s.
Sitka e = 21m.36s. and 21m.55s.
Long waves were also recorded at Chihuahua, Lick, Fordham, Harvard, College, Uccle, De Bilt, Kew, and Potsdam.

Oct. 18d. 11h. Central America.
Oaxaca iN = 34m.36s.
Huancayo e = 41m.17s., 43m.43s., and 47m.33s., eL = 53m.6s.
Columbia e = 43m.11s., eS = 47m.11s., eL = 51m.32s.
Tucson e = 43m.42s., 44m.58s., and 51m.48s., eL = 53m.44s.
Palomar iPZ = 44m.25s.
Riverside ePZ = 44m.35s.
Mount Wilson ePZ = 44m.37s.
Pasadena iPZ = 44m.38s.
Haiwee ePZ = 44m.45s.
Tinemaha ePZ = 44m.52s.
Ottawa eZ = 44m.58s., L = 58m.
Cape Girardeau eSE = 47m.34s.
San Juan e = 50m.45s., 52m.47s., 53m.4s., and 55m.56s.
Philadelphia e = 52m.46s. and 54m.49s., eL = 55m.16s.

Oct. 18d. 15h. Undetermined Shock.
Triest e = 24m.0s. and 25m.36s., i = 25m.56s. and 27m.54s.
Belgrade e = 24m.39s., 25m.12s., and 26m.0s., i = 26m.20s. and 26m.41s., e = 27m.38s. and 28m.2s., i = 28m.15s. and 28m.47s.
Stuttgart e = 24m.58s., 25m.7s., 26m.15s., 26m.50s., and 28m.32s.
Zurich eP = 25m.14s., e = 30m.0s., 32m.55s., and 34m.30s.
Chur eP = 25m.14s., e = 34m.1s.
Sofia eP?EN = 25m.25s., eEN = 27m.
Basle eP = 25m.54s., e = 34m.55s. and 40m.45s.
Bucharest e = 27m.48s., eN = 28m.26s. and 28m.52s., LEN = 31m.
Potsdam eEZ = 28m.6s., eN = 29m.35s., iE = eZ = 29m.46s., iN = 29m.49s., eEZ = 31m.26s., eN = 31m.29s., i = 31m.46s., iN = 32m.23s., eNZ = 36m.40s., eE = 36m.44s., iN = 37m.34s.
Jena eN = 28m.28s., e = 29m.0s., 31m.0s., and 35m.54s.
Neuchatel e = 34m.29s.

Oct. 18d. Readings also at 0h. (Basle, Stuttgart, Zurich, Triest, near Neuchatel and Chur, near Andijan, Tashkent, and near Berkeley), 1h. (Neuchatel), 4h. (Stuttgart, Mount Wilson, Palomar, Tucson, and Tinemaha), 5h. (Oaxaca, Buffalo, Bozeman, Tucson, Tinemaha, Mount Wilson, and Palomar), 9h. (near Mizusawa), 10h. (Tinemaha, Pasadena, Mount Wilson, Santa Barbara, Haiwee, Palomar, Riverside, Tucson, and near Mizusawa), 12h. (near Berkeley, Lick, Branner, and Fresno), 13h. (Mount Wilson, Pasadena, Haiwee, Palomar, Tucson, and Stuttgart), 15h. (Triest (2), Belgrade, and Sofia), 16h. (Chur, Basle, Zurich, Stuttgart, Belgrade, and near Triest), 17h. (Triest, Belgrade, and Stuttgart), 18h. (La Paz and near Huancayo), 19h. (Rio de Janeiro, Huancayo, San Juan, Tucson, Riverside, Tinemaha, Mount Wilson, and Pasadena), 21h. (near Andijan), 23h. (near Tananarive).

Oct. 19d. Readings at 0h. (near Berkeley), 8h. (Angra do Heroismo), 10h. (near Granada), 18h. (San Juan), 19h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Palomar, and Tucson), 20h. (Calcutta and near New Delhi).

Oct. 20d. 23h. 21m. 45s. Epicentre 7°·9N. 122°·4E.

$A = -\cdot5308$, $B = +\cdot8364$, $C = +\cdot1366$; $\delta = -3$; $h = +7$;
$D = +\cdot844$, $E = +\cdot536$; $G = -\cdot073$, $H = +\cdot115$, $K = -\cdot991$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taihoku		17·1	357	4 3	+ 1	7 19	+ 7	—	—	—
Naha		18·9	13	4 12	−12	8 17	+24	—	—	—
Miyazaki		25·3	19	5 35	+ 5	8 4	?	—	—	9·8
Kumamoto		26·0	15	5 37	+ 1	10 18	+12	—	—	—
Hukuoka		26·6	15	5 41	− 1	9 24	?	—	—	11·1
Koti		27·5	20	5 47	− 3	9 49	?	—	—	—
Hamada		28·3	17	5 54	− 3	11 44	+61	—	—	—
Zinsen		29·7	6	6 9	− 1	11 2	− 4	—	—	—
Tokyo, Cen. Met. Ob.		31·9	27	7 35	PP	12 51	SS	—	—	16·4
Nagano		32·1	24	6 34	+ 3	—	—	—	—	—
Sendai		34·5	26	6 55	+ 3	—	—	—	—	17·3
Mizusawa		35·3	25	7 0	+ 1	12 37	+ 4	—	—	17·8
Calcutta	N.	35·8	298	i 6 57k	− 6	i 12 36	− 5	i 8 3	PP	—
Mori		37·6	22	e 7 21	+ 3	12 43	−25	—	—	16·4
Sapporo		38·8	22	7 28	0	13 25	− 1	—	—	16·9
Perth		40·1	189	7 45	+ 6	13 40	− 6	9 10	PP	—
Colombo	E.	42·2	272	8 1	+ 5	14 45	+28	—	—	—
Kodaikanal	E.	44·4	278	i 8 15k	+ 1	i 14 59	+10	10 5	PP	21·5
Brisbane		46·0	141	i 8 24	− 3	i 15 8	− 4	i 8 34	pP	—
Irkutsk		46·7	345	8 30	− 2	15 19	− 3	—	—	—
Dehra Dun	N.	47·1	305	e 8 35?	0	i 14 14	?	i 18 10	SS	i 21·0
New Delhi	N.	47·2	302	e 8 41?	+ 5	i 15 30?	+ 1	9 13?	pP	23·5
Bombay		49·3	288	e 8 50	− 3	i 16 1	+ 2	10 56	PP	26·3
Riverview		49·7	149	e 8 56	0	i 16 19	+15	i 11 9	PP	e 22·5
Sydney		49·7	149	e 9 0	+ 4	i 16 21	+17	e 14 27	?	e 22·7
Stalinabad		56·9	311	i 9 46	− 3	i 17 35	− 6	—	—	—
Tchimkent		57·6	316	i 9 58	+ 4	i 17 56	+ 5	—	—	—
Auckland		66·2	137	10 55	+ 3	19 37	− 3	13 55	PP	28·3
Arapuni		67·4	137	11 9	+10	20 27	+32	—	—	28·3
Sverdlovsk		68·2	329	i 10 59	− 5	—	—	—	—	—
Christchurch		68·4	144	11 5	− 1	20 10	+ 3	13 51	PP	33·7
Wellington		68·5	141	11 6	0	20 0	− 8	11 25	PcP	30·3
Apia		68·8	108	i 11 11	+ 3	e 20 25	+14	e 12 45	?	29·8
Honolulu		77·7	70	i 11 58	− 2	i 22 38	PS	i 16 40	PPP	i 31·8
Tananarive		78·4	249	e 12 6	+ 2	e 22 2	+ 2	15 7	PP	35·4
College		82·8	26	e 12 32	+ 5	i 22 55	+10	e 15 31	PP	e 34·7
Ksara		82·8	303	e 12 29	+ 2	e 23 2	+17	23 56	PPS	—
Helwan		87·0	299	12 45	− 3	23 17	[+ 3]	16 54	PP	—
Focsani		88·0	316	e 12 57	+ 4	e 23 33	− 3	—	—	—
Bucharest		89·0	315	e 12 51	− 7	e 23 19	[− 8]	e 16 7	PP	40·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sitka		89·9	32	i 13 10	+ 8	e 23 20	[−12]	e 16 25	PP	—
Upsala		90·5	331	e 13 5	0	23 40	[+ 4]	e 16 32	PP	e 42·3
Sofia		91·3	313	e 13 12	+ 3	e 23 51	[+10]	e 17 15	PP	45·8
Belgrade		92·9	315	e 13 33	+17	e 24 1	[+11]	e 17 17	PP	e 49·3
Copenhagen		94·5	327	e 13 22	− 1	24 1	[+ 2]	17 15	PP	—
Potsdam		95·3	324	i 13 30k	+ 3	i 24 7	[+ 4]	i 17 21	PP	49·3
Prague		95·3	322	e 13 33	+ 6	e 24 3	[0]	e 17 27	PP	41·3
Cheb		96·6	322	e 13 36	+ 3	e 23 58	[−12]	e 17 31	PP	e 48·3
Jena		96·7	323	e 13 38	+ 5	e 24 15	[+ 5]	17 43	PP	45·3
Triest		97·2	318	e 13 37	+ 1	24 5	[− 8]	e 17 16	PP	e 48·2
Scoresby Sund		98·2	348	13 26	−14	e 24 24	[+ 6]	e 17 19	PP	e 40·3
Stuttgart		99·0	322	e 13 37	− 7	e 24 25	[+ 3]	e 17 47	PP	e 48·5
Chur		99·5	320	e 13 45	− 1	e 24 21	[− 4]	e 17 50	PP	—
Victoria		99·7	38	13 58	+11	24 34	[+ 8]	17 58	PP	45·3
De Bilt		99·9	326	i 13 52k	+ 4	i 24 30	[+ 3]	e 17 35	PP	e 48·3
Strasbourg		99·9	322	e 13 55	+ 7	24 38	[+11]	e 17 57	PP	49·3
Zurich		99·9	321	e 13 53	+ 5	e 24 18	[− 9]	e 17 56	PP	—
Basle		100·4	321	e 6 55	?	—	—	e 18 0	PP	—
Seattle		100·7	39	e 16 36	?	e 27 14	PS	e 20 43	PPP	e 49·2
Aberdeen	E.	101·0	333	i 20 0	PPP	i 26 23	PS	i 28 46	?	51·5
Uccle		101·0	325	e 13 51	− 2	i 24 35	[+ 3]	i 18 4	PP	47·3
Neuchatel		101·1	321	e 13 56	+ 3	—	—	e 17 28	PP	—
Ferndale		102·1	46	—	—	e 24 45	[+ 8]	40 15	?	e 48·4
Paris		102·9	324	e 14 2	+ 1	e 24 55	[+14]	e 18 16	PP	49·7
Stonyhurst		103·0	330	18 32	PP	24 49	[+ 8]	33 7	SSP	49·6
Kew		103·2	327	e 14 10a	+ 7	e 24 49	[+ 7]	e 18 16	PP	e 53·3
Ukiah		103·4	47	e 14 18	+14	e 24 46	[+ 3]	e 18 32	PP	47·9
Oxford		103·5	328	i 18 32	PP	i 24 52	[+ 8]	i 33 7	SS	e 49·6
Clermont-Ferrand		104·0	320	e 14 8	+ 2	e 25 0	[+14]	e 33 35	SS	e 48·3
San Francisco		104·5	49	e 18 25	PP	—	—	—	—	e 49·0
Berkeley		104·6	49	e 14 9	0	i 24 9	[−40]	i 18 36	PP	e 49·3
Santa Clara	E.	105·0	49	e 18 28	PP	e 24 33	[−18]	—	—	e 49·3
Lick		105·3	49	e 18 21	PP	—	—	—	—	e 49·4
Butte		107·4	36	e 18 57	PP	e 25 5	[+ 4]	e 34 21	SSP	e 44·5
Santa Barbara	Z.	107·8	51	e 18 9	[−20]	—	—	—	—	—
Tinemaha	Z.	107·8	47	e 14 22	P	—	—	i 18 38	PP	—
Algiers		108·0	312	e 14 27	P	25 2	[− 2]	i 18 53	PP	e 52·3
Bozeman		108·4	36	e 14 6	P	e 25 7	[+ 1]	e 19 0	PP	e 45·8
Pasadena		109·1	50	e 14 23	P	i 25 16	[+ 8]	i 19 5	PP	e 44·6
Mount Wilson	Z.	109·2	50	e 14 24	P	—	—	i 17 57	?	—
Logan		110·0	39	e 18 30	[− 3]	i 25 25	[+13]	i 19 25	PP	e 45·4
Palomar	Z.	110·4	50	e 14 56	P	—	—	e 18 36	PKP	—
Salt Lake City		110·5	41	e 19 6	PP	e 25 19	[+ 5]	e 34 10	SS	e 45·5
Granada		112·5	315	16 4	?	i 25 22	[0]	19 30	PP	56·7
Lisbon		115·4	319	19 40	PP	25 22	[−11]	20 1	pPP	53·3
Tucson		115·5	48	e 14 48	P	e 25 37	[+ 3]	i 19 45	PP	e 47·1
Lincoln		119·6	32	e 20 15	PP	—	—	30 26	PS	e 54·8
Chicago		123·4	26	e 20 31	PP	e 26 26	[+25]	e 30 25	PS	e 51·1
Seven Falls		124·0	10	e 21 21	PP	26 51	[+48]	e 37 31	SS	52·3
Ottawa		124·5	15	19 0	[− 1]	26 21	[+17]	20 47	PP	54·3
Buffalo		125·8	18	i 19 7	[+ 3]	i 32 35	PPS	i 20 56	PP	e 82·5
Cape Girardeau	E.	126·0	30	e 19 13	[+ 9]	—	—	e 21 8	PP	—
Vermont		126·0	14	i 20 55	PP	e 28 19	{+25}	e 31 27	PS	49·8
Halifax		127·4	4	e 21 3	PP	e 37 3	?	—	—	57·3
Pittsburgh	Z.	127·7	21	i 19 8	[+ 1]	—	—	i 19 16	?	—
Harvard		128·2	12	e 19 8	[0]	e 35 5	?	e 21 13	PP	e 54·3
Fordham		129·2	15	i 19 18	[+ 8]	i 31 30	PS	i 38 42	SS	—
Philadelphia		129·7	16	i 21 20	PP	e 31 5	PS	e 37 36	SS	e 54·1
Mobile		131·7	35	i 22 14	PP	i 31 2	PS	—	—	—
Columbia		132·8	26	e 15 31	?	e 39 21	SS	e 21 47	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bermuda		139·4	8	e 19 26	[− 4]	i 27 34	?	e 22 27	PP	e 56·0
Balboa Heights		152·4	52	e 19 15?	[−36]	—	—	—	—	—
San Juan		152·6	17	e 19 55	[+ 4]	i 27 32	[+35]	i 23 36	PP	e 57·0
La Plata	E.	153·1	179	20 12	[+20]	26 51	[− 7]	43 51	SSP	78·2
	N	153·1	179	20 9	[+17]	36 51	PPS	23 51	PP	76·3
	Z.	153·1	179	19 58	[+ 6]	32 45	?	23 51	PP	78·3
Rio de Janeiro		159·7	221	e 20 15	[+14]	e 30 45	{−26}	—	—	e 43·7
Huancayo		162·0	104	e 19 42	[−21]	31 48	{+25}	e 46 13	SSP	e 57·3
La Paz	Z.	166·6	132	20 6	[− 1]	26 58	[−12]	i 25 4	PP	77·3

Additional readings :—
Calcutta iPPPN = 8m.29s., iSSN = 14m.39s., iSSSN = 15m.17s.
Perth SS = 16m.20s.
Kodaikanal SSE = 18m.3s.
Brisbane iP_cPE = 10m.23s., iS_cSN = 18m.46s.
New Delhi N iP = 8m.51s., e = 15m.3s., iPS = 15m.50s., isS = 16m.40s., iSS = 19m.0s., isSS = 19m.54s., iSSS = 21m.24s.
Bombay iP = 8m.54s., iN = 11m.19s., iS = 15m.56s., SSE = 24m.41s.
Riverview iP = 9m.7s., i = 9m.14s., iN = 11m.19s., iE = 11m.24s., iN = 13m.40s. and 14m.34s., iE = 16m.28s. and 18m.46s., iN = 20m.24s. and 21m.6s.
Sydney i = 9m.15s.
Auckland P_cP? = 11m.5s., i = 20m.9s., SS? = 24m.15s.?.
Arapuni S_cS? = 21m.3s., SS? = 25m.15s.
Christchurch SS = 24m.41s., SSS = 28m.3s., Q = 29m.27s.
Wellington iZ = 11m.10s., pPPZ = 13m.0s., sPP?Z = 14m.30s., i = 20m.15s., sPS = 21m.10s., sSS = 25m.15s., Q = 28m.15s.
Honolulu i = 13m.51s. and 21m.14s.
Tananarive PPP = 16m.40s., PS = 22m.29s., SS = 27m.3s., E = 27m.33s., SSS = 30m.8s.
College e = 13m.3s. and 16m.42s., eS = 22m.41s., e = 24m.19s., eSS = 28m.20s.
Helwan iN = 23m.27s., SN = 24m.40s., PPSN = 26m.51s., SSN = 32m.3s.
Focsani ePN = 13m.3s.
Bucharest ePEN = 13m.2s., iZ = 14m.0s., eN = 15m.30s., eSN = 23m.32s., ePSNZ = 24m.2s.
Sitka ePPP = 19m.25s., iS = 24m.9s., e = 26m.11s., eSS = 31m.0s., eSSS = 32m.11s., e = 37m.25s.
Upsala PPE = 16m.43s., eSN = 23m.46s., eSS = 30m.15s.?, eN = 36m.29s.
Sofia eN = 15m.28s., 24m.11s., and 24m.24s., eE = 25m.21s., eEN = 30m.20s.
Belgrade e = 18m.28s., ePS = 25m.45s., e = 30m.35s.
Copenhagen 24m.34s., 26m.4s., 31m.15s.
Potsdam iPE = 13m.34s., eN = 15m.11s., iZ = 15m.18s., i = 17m.49s., iSKSE = 24m.12s., iSN = 24m.49s., iS_cSE = 24m.58s., iE = 26m.0s., iPSZ = 26m.7s., iPSE = 26m.16s., iSSE = 31m.14s., iSSN = 31m.22s., iZ = 31m.59s., iSSSE = 34m.55s., iE = 39m.14s., iZ = 39m.22s.
Prague ePS = 25m.51s., eSS = 31m.9s., e = 38m.15s.?.
Cheb ePPP = 20m.12s., ePPPP = 21m.40s., eN = 25m.13s., ePS = 26m.0s., eSSE = 31m.40s., eSSS = 36m.13s.
Jena ePN = 13m.51s., eS = 24m.59s., e = 26m.15s. and 31m.15s., eE = 36m.15s.
Triest PS = 26m.34s., SS = 31m.15s.?, SSS = 37m.15s.?.
Scoresby Sund ePPP = 19m.31s., e = 23m.24s., ePS = 26m.14s.
Stuttgart eP = 13m.41s., i = 14m.7s., iS = 25m.14s., eSP = 26m.52s. and 27m.2s., ePKKP = 30m.30s., eSS = 32m.10s., eSSS = 36m.25s.
Victoria PPP = 19m.51s., PPS = 27m.27s.
De Bilt iS = 25m.30s., eSS = 32m.15s.?.
Strasbourg ePPP = 20m.15s., eS = 25m.32s., ePPS = 27m.7s., e = 32m.15s., iSS = 32m.43s., eSSS = 36m.58s.
Zurich eS = 25m.23s.
Seattle e = 30m.29s.
Uccle iZ = 18m.30s., iSEN = 25m.34s., iSSE = 32m.32s., iN = 39m.44s.
Paris eS = 26m.5s.
Stonyhurst 18m.49s., 26m.1s.
Kew eNZ = 14m.25s., eEZ = 14m.33s., e = 18m.45s. and 22m.21s., eSKKSZ = 25m.17s., eSN = 25m.57s., ePSEN = 27m.41s., eSS = 33m.0s., eSSS = 37m.15s.?, eQEN = 42·3m.
Ukiah e = 26m.20s., ePS = 27m.30s., e = 31m.28s.
Oxford i = 18m.51s.
Clermont-Ferrand e = 21m.53s., iPPS? = 28m.21s.
Berkeley iPZ = 14m.13s., ePE = 14m.20s., iPKPZ = 17m.1s., ePKPE = 17m.23s., ePKPN = 17m.38s., iN = 19m.34s., iZ = 22m.24s., eSZ = 27m.47s., iZ = 28m.17s. and 46m.33s.
Butte e = 28m.23s.
Tinemaha eZ = 17m.51s.
Algiers i = 19m.25s., ePPP = 21m.25s., i = 25m.35s., eS = 26m.52s., ePS = 28m.22s., i = 28m.45s., PPS = 29m.27s., SS? = 35m.35s., SSS = 38m.15s.
Bozeman e = 18m.4s., 22m.1s., 28m.17s., and 34m.39s.
Pasadena ePKPZ = 18m.13s., iZ = 21m.54s. and 26m.18s., iPSEN = 28m.15s., ePKKPZ = 29m.46s.

Continued on next page.

Logan i = 20m.29s., iPS = 28m.12s., e = 33m.20s., eSSS = 38m.15s.
Palomar ePKKPZ = 29m.53s.
Salt Lake City e = 19m.49s. and 26m.23s., ePS = 28m.35s., e = 38m.13s.
Granada iPKP = 18m.28s., PPP = 22m.3s., S = 27m.14s., PS = 28m.44s., PPS = 29m.58s., iSS = 35m.11s., iSSS = 39m.30s.
Lisbon PPN = 19m.43s., sPP = 20m.15s., E = 21m.19s., PPP?NZ = 21m.31s., E = 22m.42s. PSN = 29m.25s., pPSZ = 29m.32s.?, pPSE = 29m.36s., sPS?E = 30m.1s., SSN = 35m.27s.?, SSE = 35m.50s.
Tucson e = 16m.47s., iPKP = 18m.44s., e = 23m.26s. and 25m.55s., eS = 27m.7s., e = 28m.8s., ePS = 29m.27s., eSS = 35m.57s., i = 43m.37s.
Chicago eS = 28m.12s., e = 33m.22s. and 37m.26s.
Seven Falls e = 34m.4s.
Ottawa PS = 30m.51s., PPS = 32m.45s., SS = 37m.42s., SSS = 43m.39s.
Vermont e = 32m.15s., SS = 37m.52s., e = 40m.33s.
Fordham i = 21m.20s., 22m.36s., 23m.20s., and 34m.0s.
Philadelphia e = 22m.23s. and 25m.26s., i = 34m.13s., e = 40m.45s.
Columbia i = 22m.55s., e = 27m.57s.
Bermuda i = 23m.11s., e = 25m.38s., ePS = 32m.56s., e = 37m.32s. and 41m.41s.
San Juan i = 20m.45s., 32m.40s., and 46m.36s.
La Plata E 20m.51s., PKS = 24m.21s., SKKS? = 29m.9s., SSS = 47m.15s.?, Q? = 62m.3s.
La Plata N 25m.51s., 32m.15s.?, SSS = 47m.15s.?.
Huancayo i = 30m.41s., eSKSP = 35m.5s., e = 38m.26s. and 50m.56s.
La Paz iPKPZ = 20m.15s., iZ = 20m.32s., PPPZ = 28m.18s., iSKKS = 30m.15s., iZ = 32m.6s., SSZ = 44m.38s., iZ = 48m.15s.

Oct. 20d. Readings also at 4h. (near Samarkand), 7h. (Tucson), 8h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, La Jolla, Palomar, Lincoln, Bozeman, and Salt Lake City), 9h. (Pasadena, Mount Wilson, Riverside, Tucson, and Palomar), 12h. (La Paz), 13h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, Palomar, Tucson, Columbia, and Copenhagen), 15h. (Tucson, and La Paz), 18h. (near Berkeley), 20h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, Palomar, and Tucson), 21h. (near Berkeley), 22h. (Mount Wilson, Palomar, Tucson, and near Berkeley).

October 21d. 16h. 22m. 3s. Epicentre 31°·5N. 117°·0W.

Scale VII at Carrizo Gorge. Much damage. Epicentre 33°58′N. 116°00′W. Macroseismic area 35,000 sq. m.

R. R. Bodle.
United States Earthquakes, 1942. Washington 1944, pp. 11-13. Chart p. 8.

$A = -·3878$, $B = -·7611$, $C = +·5199$; $\delta = -4$; $h = +1$;
$D = -·891$, $E = +·454$; $G = -·236$, $H = -·463$, $K = -·854$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Jolla		1·4	351	i 0 31 a	P_g	—	—	—	—	—
Palomar	Z.	1·8	3	i 0 27	− 5	—	—	—	—	—
Riverside		2·5	353	i 0 38 k	− 5	i 0 59	−15	—	—	—
Pasadena		2·8	340	i 0 46	− 1	i 1 18	− 4	—	—	—
Mount Wilson		2·9	342	i 0 46	− 2	i 1 18	− 6	—	—	—
Santa Barbara		3·7	323	i 1 7	P*	i 2 8	S_g	—	—	—
Haiwee		4·7	350	i 1 7	− 7	i 2 10	0	—	—	—
Boulder City		4·8	21	e 1 2	−13	i 1 50	−22	i 1 5	P*	—
Tucson		5·3	80	i 1 17	− 5	i 2 23	− 2	—	—	i 5·0
Fresno	N.	5·7	337	i 2 31	S	(i 2 31)	− 4	i 2 42	S*	i 3·7
Tinemaha		5·7	350	i 1 19	− 9	—	—	—	—	—
Lick		7·0	328	e 1 47	+ 1	i 3 47	S_g	i 1 57	PP	i 4·8
Santa Clara	E.	7·1	326	e 2 0	P*	i 3 42	S*	—	—	e 4·9
Branner		7·3	325	i 1 59	+ 9	i 3 28	+13	—	—	—
Berkeley		7·7	327	e 1 56	0	i 3 21	− 4	e 1 59	PP	—
San Francisco		7·7	326	e 2 6	+10	e 3 48	S*	e 2 26	P_g	e 4·6
Ukiah		9·2	328	e 2 25	+ 9	e 3 55	− 8	—	—	i 4·6
Salt Lake City		10·1	23	e 2 26	− 2	i 4 28	+ 3	—	—	i 4·8
Ferndale		10·8	329	e 2 57	PPP	—	—	e 4 57	SS	e 5·7
Logan		11·0	21	2 33	− 9	4 16	−31	i 5 7	SSS	i 5·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bozeman		14·9	16	e 3 26	− 8	i 6 9	−11	—	—	i 6·9
Butte		14·9	12	e 3 31	− 3	e 6 21	+ 1	e 4 14	PPP	i 7·6
Spokane	E.	16·2	359	e 3 44	− 6	—	—	—	—	i 8·0
Seattle		16·6	347	e 5 55	?	—	—	e 7 16	SS	e 10·9
Victoria		17·7	346	4 8	− 2	7 26	0	—	—	9·6
Lincoln		18·9	55	e 4 17	− 7	e 7 26	−27	—	—	e 9·1
Tacubaya	E.	20·1	123	e 4 52	PP	—	—	—	—	—
Des Moines		21·2	55	i 4 39	−10	e 8 43	+ 2	—	—	i 10·6
Vera Cruz	N.	22·4	118	e 5 2	0	—	—	—	—	—
St. Louis		23·0	65	i 5 5	− 2	i 9 7	− 7	—	—	—
Cape Girardeau	E.	23·4	67	e 5 8	− 3	e 9 25	+ 4	—	—	—
Mobile		24·7	83	i 10 2	S	(i 10 2)	+18	—	—	—
Chicago J.S.A.		25·6	57	e 5 32	0	e 10 6	+ 7	—	—	—
Chicago U.S.C.G.S.		25·6	57	i 5 32	0	e 9 51	− 8	e 6 25	PPP	e 11·3
Columbia		30·3	74	—	—	e 11 8	− 7	—	—	e 15·1
Buffalo		32·2	57	e 6 31	− 1	—	—	e 14 14	SSS	i 15·7
Philadelphia		34·7	64	e 7 41	PP	e 12 12	−12	—	—	i 15·2
Ottawa		34·8	54	6 52	− 2	12 21	− 4	14 42	SS	17·0
Fordham		35·7	62	—	—	e 12 30	− 9	i 15 39	SSS	—
Vermont		36·5	57	—	—	e 12 45	− 6	—	—	e 15·4
Shawinigan Falls		37·0	52	e 7 12	− 1	—	—	—	—	16·0
Harvard		37·5	59	i 7 17	0	e 13 2	− 5	—	—	e 19·0
Honolulu		37·8	264	e 7 27	+ 7	e 13 19	+ 8	—	—	i 17·3
College		38·4	339	e 7 26	+ 1	e 13 18	− 2	e 9 3	PPP	e 16·3
Seven Falls		38·4	52	7 25	0	13 18	− 2	16 51	SSS	20·0
Bermuda		44·0	74	e 8 13	+ 2	e 14 43	0	e 9 57	PP	e 20·6
San Juan		47·6	93	e 8 52	+13	e 15 36	+ 1	e 18 54	SS	—
Fort de France		53·5	94	e 9 30	+ 6	—	—	—	—	—
Huancayo		58·9	130	e 11 27	?	e 18 14	+ 6	—	—	e 25·3
Scoresby Sund		62·3	22	e 10 25	− 1	e 18 50	− 2	—	—	e 25·5
La Paz	Z.	66·9	128	e 11 16	?	21 28	?	—	—	31·0
Aberdeen	N.	76·1	31	e 23 57?	?	—	—	—	—	e 36·3
Kew		80·5	34	—	—	i 22 22	0	i 27 8	SS	e 38·0
Upsala		81·6	21	e 21 57	?	—	—	—	—	e 34·0
De Bilt		82·6	31	i 22 52	S	(i 22 52)	+ 9	—	—	e 34·0
Copenhagen		83·0	25	—	—	22 53	+ 6	—	—	37·0
Uccle		83·1	33	e 12 32	+ 3	i 22 48	0	—	—	e 34·0
Lisbon		83·2	48	11 57?	−32	—	—	—	—	39·2
Paris		83·6	35	e 11 5	?	—	—	—	—	44·0
Clermont-Ferrand		85·9	37	e 12 55	+12	—	—	—	—	e 36·0
Jena		86·2	29	e 12 45	+ 1	—	—	e 24 17	PS	e 39·0
Stuttgart		86·8	32	e 12 50	+ 3	e 23 27	+ 2	e 16 16	PP	e 44·5
Basle		86·9	34	e 12 53	+ 5	—	—	—	—	—
Neuchatel		87·0	34	e 12 53	+ 5	—	—	—	—	—
Cheb		87·2	29	e 14 57?	?	e 23 37	+ 9	—	—	e 43·0
Zurich		87·5	33	e 12 54	+ 3	—	—	—	—	—
Prague		88·1	28	e 24 27	PS	—	—	—	—	e 42·0
Chur		88·3	33	e 12 43	−12	—	—	—	—	e 45·5
Algiers		91·9	44	e 24 57?	PS	—	—	e 33 57	SSS	e 45·0
Sverdlovsk		92·0	2	13 18	+ 5	e 24 16	+ 4	23 53	SKKS	—
Auckland		93·2	228	—	—	24 57	+34	—	—	39·0
Wellington		95·8	225	—	—	25 57?	PS	—	—	39·0
Helwan	Z.	112·0	30	e 19 24	PP	—	—	—	—	—
New Delhi	N.	118·7	345	—	—	e 33 7	SS	—	—	—
Calcutta	N.	121·1	333	e 25 55	SKS	(e 25 55)	[+ 1]	—	—	e 79·1

Additional readings :—
Boulder City i = 1m.10s.
Lick iE = 2m.3s., iSN = 3m.50s.
Berkeley ePN = 2m.3s., iNZ = 2m.10s., iE = 2m.19s., iN = 2m.27s. and 2m.43s., iE = 2m.50s. and 2m.59s., iN = 3m.12s., iSN = 3m.33s.
Logan e = 3m.12s.
Butte e = 5m.20s.
Spokane iE = 4m.46s.
Des Moines i = 10m.1s.
Mobile i = 13m.9s.

Continued on next page.

Philadelphia e=13m.50s.
Ottawa iN=15m.19s.
Fordham e=13m.17s., i=16m.37s.
Harvard iS=13m.6s.
San Juan e=19m.5s.
Huancayo e=22m.41s.
Kew eSSSEN=31m.27s., eQEZ=34·9m.
Jena iN=14m.13s., iE=eN=14m.21s., eN=24m.27s.
Stuttgart iP=12m.59s.
Helwan eZ=20m.34s.
Long waves were also recorded at Tananarive, Guadalajara, San Fernando, Granada, Triest, Stonyhurst, Potsdam, Belgrade, Riverview, and Kodaikanal.

Oct. 21d. Readings also at 5h. (Tucson), 8h. (La Paz, Tucson (2), Palomar, Riverside, Mount Wilson, Santa Barbara, Haiwee, and Tinemaha), 11h. (Palomar, Riverside, Pasadena, Mount Wilson, Tucson, and Tinemaha), 12h. (San Francisco), 13h. (Cheb), 15h. (Triest and Sofia), 17h. (Pittsburgh, Branner, Stuttgart, Neuchatel, Chur, Zurich, and Ksara), 18h. (Colombo), 19h. (Kodaikanal, Calcutta, Helwan, Salt Lake City, Tucson, Santa Clara, near Berkeley, Lick, and Fresno), 20h. (Triest, near Bucharest (2), Sofia, Focsani, and near Mizusawa), 21h. (La Paz and near Fresno), 22h. (near San Francisco).

Oct. 22d. 1h. 50m. 22s. Epicentre 31°·5N. 117°·0W. (as on 21d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Jolla		1·4	351	i 0 41 a	P_g	—	—	—	—	—
Riverside		2·5	353	i 0 44 a	+ 1	—	—	—	—	—
Pasadena		2·8	340	e 0 52	+ 5	i 1 26	+ 4	—	—	—
Mount Wilson		2·9	342	e 0 52	+ 4	i 1 26	+ 2	—	—	—
Santa Barbara		3·7	323	e 1 13	P_g	—	—	—	—	—
Haiwee	Z.	4·7	350	i 1 10	− 4	—	—	—	—	—
Boulder City		4·8	21	e 1 1	−14	i 1 43	−29	—	—	—
Tucson		5·3	80	i 1 20	− 2	i 2 29	+ 4	i 1 34	P*	i 2·0
Fresno	N.	5·7	337	e 1 38	P*	i 2 51	S*	i 1 46	P_g	—
Tinemaha	Z.	5·7	350	e 1 22	− 6	—	—	—	—	—
Lick		7·0	328	e 1 51	+ 5	i 3 51	S_g	i 2 24	P_g	i 4·5
Santa Clara		7·1	326	e 2 13	P*	i 3 51	S_g	—	—	—
Branner		7·3	325	e 2 8	P*	e 4 1	S_g	—	—	—
Berkeley	E.	7·7	327	e 1 56	0	i 3 23	− 2	i 2 32	S_g	e 3·9
	N.	7·7	327	e 1 59	+ 3	i 3 29	+ 4	i 2 32	S_g	i 4·0
	Z.	7·7	327	e 2 10	+14	i 3 22	− 3	e 2 21	S*	i 3·7
San Francisco		7·7	326	e 2 18	P*	e 4 10	S_g	—	—	—
Ukiah		9·2	328	e 2 45	P*	e 4 4	+ 1	e 4 24	?	e 5·0
Salt Lake City		10·1	23	e 2 18	−10	e 4 17	− 8	—	—	i 4·8
Ferndale		10·8	329	e 4 18	?	e 4 47	+ 5	—	—	e 5·3
Logan		11·0	21	i 2 36	− 6	i 4 57	+10	—	—	i 5·1
Bozeman		14·9	16	e 3 25	− 9	e 6 10	−10	—	—	i 7·1
Butte		14·9	12	e 3 34	0	e 6 25	+ 5	—	—	e 7·2
Spokane		16·2	359	e 3 43	− 7	—	—	—	—	i 9·0
Seattle		16·6	347	—	—	e 6 32	−28	—	—	e 9·5
Victoria		17·7	346	—	—	e 7 28	+ 2	—	—	e 9·2
Lincoln		18·9	55	e 5 9	+45	e 8 38	+45	—	—	e 10·2
Tacubaya	N.	20·1	123	4 57	+19	—	—	—	—	—
Des Moines		21·2	55	i 4 47	− 2	e 8 28	−13	—	—	i 10·6
St. Louis		23·0	65	i 5 7	0	e 9 1	−13	—	—	i 11·3
Cape Girardeau	E.	23·4	67	e 5 12	+ 1	e 9 24	+ 3	—	—	—
Mobile		24·7	83	i 9 58	S	(i 9 58)	+14	—	—	(i 12·7)
Chicago		25·6	57	i 5 33	+ 1	e 9 52	− 7	e 6 41	PP	e 12·1
Columbia		30·3	74	—	—	e 11 9	− 6	—	—	e 15·0
Pittsburgh		31·1	62	e 6 30	+ 8	e 11 13	−15	—	—	i 15·4
Philadelphia		34·7	64	—	—	e 12 24	0	—	—	e 13·9
Ottawa		34·8	54	6 58	+ 4	12 20	− 5	—	—	16·6
Fordham		35·7	62	—	—	e 12 30	− 9	—	—	—
Vermont		36·5	57	—	—	e 12 50	− 1	—	—	e 15·0
Harvard		37·5	59	—	—	e 13 18	+11	—	—	e 19·0
Honolulu		37·8	264	—	—	e 12 50	−21	—	—	e 16·8

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
College	38·4	339	e 7 17	− 8	e 13 25	+ 5	—	—	e 16·3
Seven Falls	38·4	52	—	—	e 13 20	0	e 16 14	SS	19·6
San Juan	47·6	93	e 8 51	+12	e 15 40	+ 5	—	—	e 19·4
Huancayo	58·9	130	—	—	e 18 40	+32	e 22 20	SS	e 26·0
Scoresby Sund	62·3	22	—	—	e 20 16	?	—	—	e 31·4
Copenhagen	83·0	25	—	—	22 53	+ 6	—	—	—
Stuttgart	86·8	32	e 12 52	+ 5	—	—	—	—	—
Cheb	87·2	29	—	—	e 23 38?	+10	—	—	e 42·6
Granada	87·6	48	e 12 54a	+ 3	22 39	?	13 30	pP	40·6

Additional readings :—
Boulder City iP =1m.6s., i? =1m.12s.
Lick iN =2m.18s., iE =3m.27s. and 3m.37s., iN =3m.43s.
Berkeley iE =2m.25s., iSN =3m.36s.
Salt Lake City e =3m.2s.
Logan i =2m.45s. and 2m.50s.
Butte e =4m.4s.
Des Moines e =6m.55s.
Mobile readings are given as iP and iS respectively.
Pittsburgh e =8m.33s.
Philadelphia e =12m.12s.
Huancayo e =21m.55s.
Stuttgart i =12m.56s., e =14m.1s.
Granada esP =14m.35s., sS =24m.29s., SS =28m.33s.
Long waves also recorded at Vera Cruz, La Paz, and other European stations.

Oct. 22d. Readings also at 1h. (Cheb, De Bilt, Potsdam, Stuttgart, Helwan, Ksara, Triest, Neuchatel, Focsani, Bucharest, and Sofia), 2h. (Kew, near Berkeley, Branner, Lick, Santa Clara, and Fresno), 3h. (Balboa Heights, Fort de France, San Juan, Huancayo, La Paz, and Tucson), 6h. (near Branner), 8h. (Helwan), 9h. (near Mizusawa), 11h. (Bombay, Calcutta, Colombo, Kodaikanal, and Hyderabad), 12h. (Ksara and Stuttgart), 15h. (Stuttgart and Tacubaya), 16h. (near Fort de France), 17h. (La Paz), 18h. (Tucson, Florissant, Philadelphia, and Fresno), 19h. (near Apia), 22h. (La Paz), 23h. (near Samarkand).

Oct. 23d. Readings at 0h. (Angra do Heroismo, near Almata, and Andijan), 1h. (near Apia), 2h. and 3h. (near Mizusawa), 4h. (Tacubaya and near San Francisco), 5h. (Granada, Kew, and Potsdam), 8h. (near Mizusawa), 13h. (near Stuttgart), 20h. (near St. Louis), 21h. (Tacubaya), 23h. (near Berkeley).

Oct. 24d. Readings at 1h. (near Tchimkent), 3h. (Auckland, Christchurch, Riverview, and Sydney), 4h. (Granada and Kew), 6h. (Mizusawa), 7h. (Samarkand), 15h. (near Granada), 16h. (near Lick and near Ottawa), 23h. (Stuttgart and near Triest).

Oct. 25d. 8h. 34m. 27s. Epicentre 0°·4S. 98°·8E. (as on 1939 Feb. 9d.).

$A = -\cdot1530$, $B = +\cdot9882$, $C = -\cdot0069$; $\delta = 0$; $h = +7$;
$D = +\cdot988$, $E = +\cdot153$; $G = +\cdot001$, $H = -\cdot007$, $K = -1\cdot000$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Colombo	E.	20·2	291	4 40	+ 1	8 27	+ 6	—	—	10·5
Kodaikanal	E.	23·7	298	i 5 23k	+ 9	i 9 38	+11	—	—	12·2
Calcutta	N.	25·0	337	i 5 22a	− 5	i 9 47	− 2	i 10 39	SS	—
Hyderabad		26·7	313	5 41	− 2	10 14	− 3	11 24	SS	13·6
Bombay		31·9	308	e 6 30	+ 1	i 11 37	− 3	e 7 30	PP	i 15·6
New Delhi	N.	35·5	327	i 7 13k?	+13	e 12 42?	+ 6	—	—	—
Andijan		47·5	332	8 39	+ 1	e 15 35	+ 1	—	—	—
Almata		47·7	339	e 8 42	+ 2	—	—	—	—	—
Irkutsk		52·7	4	e 9 21	+ 3	16 46	0	—	—	—
Sverdlovsk		64·8	338	i 10 41	− 2	i 19 17	− 6	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		68·0	306	e 11 4	+ 1	e 20 5	+ 3	—	—	—
Helwan		70·7	301	11 18	− 2	20 53	+19	14 9	PP	—
Potsdam		87·7	322	e 12 56	+ 4	—	—	—	—	e 45·6
Copenhagen		88·3	326	—	—	24 3	+24	23 38	SKS	—
Stuttgart		90·0	319	i 13 2	− 1	—	—	e 16 52	PP	—
College		100·1	23	e 21 52	?	e 27 57	PPS	—	—	e 54·9
Bozeman		127·8	26	e 18 27	[−41]	e 28 42	{+36}	—	—	e 66·8
Tinemaha	z.	130·0	40	e 19 3	[− 9]	—	—	i 22 0	PP	—
Santa Barbara	z.	130·6	43	i 19 16	[+ 3]	—	—	—	—	—
Haiwee	z.	130·7	40	i 19 16	[+ 3]	—	—	e 22 36	PP	—
Mount Wilson	z.	131·8	42	e 19 8	[− 7]	—	—	—	—	—
Pasadena	z.	131·8	42	e 19 6	[− 9]	—	—	i 24 47	PPP	59·2
Riverside	z.	132·0	42	e 19 9	[− 7]	—	—	e 21 42	PP	—
La Jolla		133·2	42	i 19 20	[+ 2]	—	—	e 22 59	PP	—
Ottawa		134·8	354	e 19 23	[+ 2]	—	—	—	—	74·6
Tucson		137·7	39	e 19 19	[− 7]	e 46 55	SSS	e 22 55	PP	e 67·0

Additional readings:—
Bombay eSSE =13m.45s.
Helwan eZ =14m.39s., iN =20m.29s.
Tinemaha iZ =19m.14s., eZ =22m.32s. and 22m.57s.
Haiwee eZ =23m.0s.
Mount Wilson iZ =19m.19s. and 19m.31s., eZ =22m.19s. and 22m.38s., iZ =23m.3s.
Pasadena i =19m.19s., eZ =21m.35s. and 22m.37s., iZ =22m.50s. and 23m.2s.
Riverside iZ =19m.20s., eZ =22m.40s., 22m.55s., and 23m.10s.
Long waves were also recorded at Riverview, Huancayo, Scoresby Sund, and other American and European stations.

Oct. 25d. 22h. 53m. 11s. Epicentre 41°·6N. 142°·0E. (as on 1941 Feb. 9d.).

Scale V at Hakodate, IV Urakawa, Hatinohe, II-III Mori, Morioha, Obihiro. Epicentre 41°·8N. 142°·0E. Seismological Bulletin Cent. Met. Obs. Japan 1942. Tokyo 1950, p. 36, with macroseimic chart.

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

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Hatinohe	1·1	198	0 24 a	+ 2	0 39	0
Aomori	1·2	229	0 27 a	+ 3	0 45	+ 4
Mori	1·2	295	0 24 k	0	0 41	0
Sapporo	1·6	342	0 25	− 5	0 44	− 7
Miyako	1·8	180	0 36	+ 4	0 58	+ 2
Akita	2·4	229	0 47	+ 6	1 20	+ 8
Mizusawa	2·6	195	0 45	+ 1	1 13	− 4
Nemuro	3·2	57	0 14	−38	—	—
Sakata	3·2	211	0 53	+ 1	1 47	S_E
Sendai	3·4	194	0 54	− 1	1 32	− 5
Hukusima	4·0	198	1 5	+ 1	2 4	S*
Aikawa	4·6	220	1 16	+ 4	—	—
Onahama	4·8	192	1 14	− 1	2 1	−11
Mito	5·4	195	1 20	− 4	2 20	− 8
Kakioka	5·5	194	1 22	− 3	2 24	− 6
Tukubasan	5·6	196	1 22	− 5	—	—
Maebasi	5·7	205	1 25	− 3	—	—
Kumagaya	5·8	201	1 27	− 2	2 44	+ 6
Nagano	5·8	213	1 28	− 1	—	—
Tyosi	5·9	191	1 19	−12	2 30	−10
Toyama	6·2	218	1 33	− 2	—	—
Yokohama	6·5	198	1 43	+ 4	3 11	+16
Hunatu	6·6	203	1 40	− 1	—	—
Kohu	6·6	204	1 36	− 5	3 7	+ 9
Misima	6·9	201	1 40	− 5	3 1	− 4
Shizuoka	7·2	204	1 53	+ 4	—	—
Gihu	7·4	215	1 50	− 2	—	—
Hikone	7·8	217	1 56	− 2	—	—

Oct. 25d. Readings also at 2h. (Ottawa, Tucson, San Juan, and near Andijan), 3h. (Mount Wilson, Tinemaha, and Tucson), 5h. (near Tokyo I.U., Togane, Mitaka, and Komaba), 6h. (Pasadena, Mount Wilson, Tinemaha, Haiwee, Tucson, and Apia), 7h. (Pasadena, Mount Wilson, Riverside, Tucson, Haiwee, Tinemaha, Honolulu, Harvard, Columbia, Wellington, Auckland, and Stuttgart), 9h. (near Fort de France), 11h. (San Francisco (2)), 12h. (Pasadena, Mount Wilson, Tinemaha, Tucson, and near Triest), 17h. (near Triest), 18h. (Pasadena, Mount Wilson, and Tucson), 19h. (Tucson).

Oct. 26d. 5h. 29m. 29s. 33°·3N. 132°·1E. (as on 1937 Feb. 14d.).

Intensity V at Uwazima, Oita, Koti ; II-III at Simidu, Hukuoka, and Tadotu.
Epicentre 33°·1N. 132°·1E. Macroseismic radius 200-300km., shallow.
Seismological Bulletin of the Central Meteorological Observatory, Japan for the year 1942, Tokyo 1950, pp. 38-39, macroseismic chart p. 38.

$A = -\cdot5615$, $B = +\cdot6214$, $C = +\cdot5464$; $\delta = -3$; $h = +1$;
$D = +\cdot742$, $E = +\cdot670$; $G = -\cdot366$, $H = +\cdot405$, $K = -\cdot838$.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Matuyama	0·8	45	0 19a	+ 1	0 26	− 5
Simidu	0·9	125	0 20a	0	0 30	− 4
Hirosima	1·1	15	0 22k	0	0 36	− 3
Koti	1·2	78	0 22a	− 2	0 35	− 6
Kumamoto	1·3	248	0 27a	+ 2	0 50	+ 6
Hukuoka	1·4	281	0 29a	+ 2	0 48	+ 2
Miyazaki	1·5	202	0 24	− 4	0 38	−11
Hamada	1·6	359	0 29k	− 1	0 48	− 3
Muroto	1·7	91	0 25a	− 6	0 57	+ 3
Unzendake	1·7	250	0 34	+ 3	0 55	+ 1
Sumoto	2·5	66	0 42	− 1	1 17	+ 3
Wakayama	2·7	70	0 43	− 2	1 3	−16
Kobe	2·9	62	0 47k	− 1	1 25	+ 1
Husan	3·1	306	0 50	− 1	1 27	− 2
Siomisaki	3·1	87	0 46	− 5	—	—
Osaka	3·2	65	0 49	− 3	1 33	+ 1
Toyooka	3·2	44	0 57	P*	1 36	S*
Kyoto	3·5	59	0 54	− 3	1 47	S*
Owase	3·5	76	0 52	− 5	—	—
Taikyu	3·9	313	1 1	− 1	1 44	− 6
Hikone	4·0	58	1 14k	P*	1 57	+ 5
Kameyama	4·0	66	1 0	− 4	1 34	−18
Gihu	4·4	60	1 7	− 3	—	—
Nagoya	4·4	64	1 9k	− 1	1 55	− 7
Omaesaki	5·2	74	1 24	+ 3	2 40	S*
Toyama	5·4	49	(1 23)	− 1	—	—
Shizuoka	5·5	70	1 40	P*	2 46	S*
Wazima	5·6	42	1 37	P*	3 0	S_g
Kohu	5·8	64	1 28	− 1	3 9	S_g
Hunatu	5·9	66	1 30	− 1	2 52	S*
Keizyo	6·0	317	(1 28)	− 4	—	—
Misima	6·0	70	1 20	−12	3 10	S*
Nagano	6·0	54	1 29	− 3	3 21	S_g
Maebasi	6·5	59	1 39	0	—	—
Kumagaya	6·6	62	1 40	− 1	3 32	S_g
Yokohama	6·6	69	2 6	P_g	—	—
Mito	7·5	63	1 53	0	—	—

Toyama and Keizyo readings decreased by 1 minute.

Oct. 26d. 21h. 9m. 13s. Epicentre 46°·2N. 151°·2E. Focus at base of superficial layers.

Intensity V at Kerabuizaki lighthouse ; IV at Gonoe ; II-III at Urahoro.
Epicentre 43°·7N. 153°·5E. Radius of macroseismic area over 300km.
Seismological Bulletin of the Central Meteorological Observatory, Japan, 1942, Tokyo 1950, pp. 37-38, macroseismic chart p. 37.

$A = -\cdot6087$, $B = +\cdot3346$, $C = +\cdot7194$; $\delta = +1$; $h = -4$;
$D = +\cdot482$, $E = +\cdot876$; $G = -\cdot630$, $H = +\cdot347$, $K = -\cdot695$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro	4·9	237	1 57	PPP	2 52	SSS	—	—	—
Sapporo	7·7	249	1 58	+ 5	3 23	+ 3	—	—	—
Mori	8·7	246	2 8a	+ 2	3 52	+ 7	—	—	—
Hatinohe	9·0	235	2 9	− 2	3 40	−12	—	—	—
Aomori	9·3	238	2 14	− 1	3 55	− 4	—	—	—
Miyako	9·4	229	2 15	− 1	—	—	—	—	—
Mizusawa	10·2	230	e 2 25	− 2	4 14	− 8	—	—	—
Akita	10·4	236	2 32	+ 2	4 31	+ 5	—	—	—
Sendai	11·0	227	2 33k	− 5	4 31	−10	—	—	—
Hukusima	11·6	227	2 50	+ 4	4 53	− 3	—	—	—
Onahama	12·0	223	2 53	+ 1	4 50	−15	—	—	—
Mito	12·7	223	3 3	+ 2	—	—	—	—	—
Utunomiya	12·8	225	3 1	− 1	—	—	—	—	—
Kakioka	12·9	224	3 0	− 4	5 18	− 9	—	—	—
Tukubasan	13·0	224	3 1k	− 4	5 18	−11	—	—	—
Tyosi	13·0	220	3 1	− 4	5 21	− 8	—	—	—
Kumagaya	13·4	226	3 13	+ 3	5 31	− 8	—	—	—
Maebasi	13·4	227	3 20	+10	5 33	− 6	—	—	—
Nagano	13·6	230	3 14	+ 1	5 52	+ 8	—	—	—
Wazima	13·8	236	3 21a	+ 5	5 46	− 2	—	—	—
Yokohama	13·9	223	3 12	− 5	6 17	SS	—	—	—
Toyama	14·1	233	3 19a	0	6 17	SS	—	—	—
Hunatu	14·2	226	3 22	+ 1	5 53	− 5	—	—	—
Kohu	14·2	226	3 24	+ 3	6 7	+ 9	—	—	—
Mera	14·2	222	3 24	+ 3	6 28	SSS	—	—	—
Misima	14·4	224	3 26	+ 3	5 58	− 5	—	—	—
Osima	14·5	222	3 26	+ 1	5 53	−12	—	—	—
Shizuoka	14·8	225	3 29	0	6 11	− 1	—	—	—
Omaesaki	15·2	225	4 45	?	7 41	?	—	—	—
Gihu	15·3	230	3 35	0	6 40	SS	—	—	—
Hamamatu	15·4	227	3 12	−24	—	—	—	—	—
Nagoya	15·4	229	3 36	0	6 16	−10	—	—	—
Hatidyozima	15·7	218	3 40	0	6 36	+ 3	—	—	—
Hikone	15·7	231	3 39	− 1	6 39	+ 6	—	—	—
Kameyama	15·9	230	3 43	0	—	—	—	—	—
Kyoto	16·2	232	3 48	+ 1	—	—	—	—	—
Osaka	16·6	231	3 53	+ 1	6 44	−10	—	—	—
Kobe	16·7	232	3 54a	+ 1	6 58	+ 2	—	—	—
Wakayama	17·1	231	4 1	+ 3	—	—	—	—	—
Siomisaki	17·4	228	4 0	− 2	7 17	+ 5	7 20	SSS	—
Hamada	18·4	239	4 13	− 1	7 43	+ 8	—	—	—
Koti	18·4	233	4 13	− 1	7 43	+ 8	—	—	—
Muroto	18·4	231	4 6	− 8	7 37	+ 2	—	—	—
Hirosima	18·5	237	4 51	PPP	—	—	—	—	—
Matuyama	18·7	235	4 19a	+ 1	7 48	+ 6	—	—	—
Simidu	19·4	233	4 28a	+ 2	8 8	+11	—	—	—
Keizyo	19·9	253	4 24	− 7	—	—	—	—	—
Taikyu	19·9	246	4 32a	+ 1	8 18	+10	—	—	—
Husan	20·1	245	3 52	?	7 37	?	—	—	—
Hukuoka	20·2	239	4 37	+ 2	—	—	—	—	—
Zinsen	20·2	254	5 2	PPP	—	—	—	—	—
Kumamoto	20·6	236	4 9a	−30	7 10	?	—	—	—
Miyazaki	20·9	234	4 41	− 1	8 37	+ 9	—	—	—
Unzendake	21·0	238	4 43	0	—	—	—	—	—
Kagosima	21·6	235	4 37	−12	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tomie		21·9	240	4 53	+ 1	8 58	+11	—	—	—
Yakusima		22·5	234	4 59	+ 1	—	—	—	—	—
Nake		24·6	231	5 21	+ 3	9 47	+13	—	—	—
Naha		27·4	232	6 3	+19	—	—	—	—	—
Irkutsk		30·8	299	6 13	− 2	11 47	+32	—	—	—
Arisan		33·3	238	7 18	PP	—	—	—	—	—
Taito		33·7	237	6 43	+ 3	—	—	—	—	—
College		37·4	38	i 7 10	− 2	e 12 52	− 5	e 8 33	PP	e 15·4
Sitka		44·6	48	i 8 14	+ 3	i 14 50	+ 6	e 9 43	PP	e 20·6
Semipatalinsk		45·7	303	e 8 7	−13	—	—	—	—	—
Honolulu		48·1	103	e 8 48	+10	e 15 30	− 4	e 10 19	PP	e 19·6
Almata		51·0	296	e 9 1	0	—	—	—	—	—
Sverdlovsk		53·3	317	i 9 18	0	i 16 44	− 2	—	—	—
Victoria		54·9	53	9 30	0	17 10	+ 3	20 47	SS	25·8
Calcutta	N.	55·5	267	i 9 42a	+ 8	i 17 26	+11	—	—	—
Dehra Dun	N.	57·6	282	e 9 40?	− 9	i 17 35	− 8	—	—	i 30·6
New Delhi	N.	59·3	280	i 10 17k	+16	i 18 16	+11	10 34	pP	27·8
Ukiah		60·4	63	e 10 5	− 3	i 18 22	+ 3	e 12 18	PP	e 25·1
Berkeley		61·8	64	i 10 10	− 8	i 18 5	−32	—	—	—
Branner	E.	62·1	64	e 10 23	+ 3	e 18 44	+ 3	—	—	e 23·8
Santa Clara		62·3	64	i 10 18	− 3	i 18 45	+ 1	—	—	—
Butte		62·4	51	e 10 13	− 9	i 18 48	+ 3	e 12 42	PP	e 25·9
Lick	E.	62·5	64	e 10 22	0	e 18 47	+ 1	—	—	—
Bozeman		63·4	51	i 10 27	− 1	i 18 56	− 1	e 13 13	pPP	e 47·8
•Scoresby Sund		63·5	358	i 10 31	+ 2	i 18 59	0	—	—	e 29·7
Fresno	N.	64·0	64	e 10 28	− 4	e 19 16	+11	—	—	—
Tinemaha	Z.	64·7	62	i 10 38	+ 1	i 19 13	0	e 39 19	P′P′	—
Haiwee		65·5	63	i 10 43	+ 1	i 19 22	− 1	—	—	—
Logan		65·5	53	i 10 43	+ 1	i 19 26	+ 3	e 23 38	SS	e 26·9
Santa Barbara		65·5	65	e 10 43	+ 1	i 19 27	+ 4	—	—	—
Hyderabad		65·7	270	10 42	− 1	19 24	− 2	13 4	PP	32·1
Salt Lake City		66·2	55	i 10 44	− 2	i 19 31	− 1	e 13 13	PP	e 29·1
Mount Wilson		66·7	65	e 10 48a	− 2	e 19 35	− 3	i 39 20	P′P′	—
Pasadena		66·7	65	i 10 48a	− 2	i 19 36	− 2	i 39 19	P′P′	e 26·1
Riverside		67·3	65	e 10 50	− 3	e 19 44	− 1	e 39 11	P′P′	—
Upsala		67·7	337	10 53	− 3	e 19 47	− 3	e 24 10	SS	e 32·8
La Jolla	Z.	68·1	65	i 10 59	+ 1	—	—	—	—	—
Bombay		68·7	275	i 11 3	+ 1	i 20 0	− 2	e 11 18	PcP	e 32·8
Kodaikanal	E.	71·4	265	i 11 25a	+ 6	i 20 41	+ 8	14 5	PP	—
Colombo	E.	72·2	261	11 23	0	20 39	− 3	—	—	40·3
Tucson		72·5	61	e 11 24	− 1	e 20 44	− 2	e 14 7	PP	e 29·3
Copenhagen		72·7	337	i 11 27a	+ 1	20 48	0	21 22	PS	—
Brisbane		73·3	178	i 11 27	− 3	i 20 56	+ 1	i 11 40	PcP	—
Aberdeen	N.	74·6	345	i 17 28	?	i 21 12	+ 2	—	—	e 37·1
Potsdam		75·4	335	i 11 43	+ 1	i 21 19	+ 1	—	—	e 35·8
Focsani		76·1	323	e 12 44	?	—	—	—	—	47·8
Prague		77·1	333	e 11 52?	0	e 21 36	− 1	e 22 0	PS	e 37·8
Jena		77·2	335	i 11 51	− 1	e 21 23	−15	e 15 29	pPP	e 35·8
Cheb		77·7	335	e 11 56	+ 1	e 21 43	− 1	—	—	e 43·8
De Bilt		77·8	339	i 11 55a	− 1	i 21 45	0	e 27 17	sSS	e 35·8
Chicago		78·0	41	i 11 56	− 1	e 21 39	− 8	e 14 54	PP	e 31·7
Bucharest		78·3	323	e 11 56	− 2	e 21 40	−10	e 14 57	PP	38·8
Stonyhurst		78·4	344	—	—	21 43	− 8	22 11	PS	e 38·8
Florissant		79·0	45	i 12 0	− 2	e 21 51	− 6	i 12 10	pP	—
St. Louis		79·2	45	e 12 2	− 1	i 21 57	− 2	i 12 11	pP	—
Uccle		79·2	340	i 12 3a	0	i 21 58	− 1	27 7	SS	36·8
Belgrade		79·5	326	i 12 6	+ 1	e 22 3	0	—	—	e 44·6
Oxford		79·6	342	i 12 8	+ 3	i 22 3	− 1	—	—	e 35·3
Kew		79·7	343	i 12 6a	0	i 22 7	+ 2	i 12 21	PcP	e 38·3
Riverview		79·7	179	e 12 6	0	i 22 7	+ 2	i 22 31	PS	e 39·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sydney		79·7	179	—	—	e 22 2	− 3	—	—	—
Stuttgart		79·8	335	i 12 7a	+ 1	e 22 4	− 2	e 15 22	PP	e 39·5
Ottawa		79·9	31	12 5	− 2	22 1	− 6	14 59	PP	35·8
Shawinigan Falls		79·9	28	12 6	− 1	22 4	− 3	—	—	—
Seven Falls		80·0	27	12 16	+ 8	22 8	0	27 10	SS	35·8
Sofia		80·1	323	i 12 10	+ 2	e 22 9	0	—	—	—
Strasbourg		80·4	336	i 12 11a	+ 1	e 22 9	− 3	—	—	29·8
Cape Girardeau	E.	80·6	45	e 12 10	− 1	e 22 13	− 1	—	—	—
Buffalo		80·8	35	i 12 5	− 7	e 22 5	−11	i 12 27	pP	e 44·9
Triest		81·2	331	i 12 12	− 2	i 22 12	− 8	15 2	PP	e 38·8
Zurich		81·2	335	e 12 15a	+ 1	e 22 18	− 2	—	—	—
Ksara		81·3	310	e 12 18	+ 4	e 22 30	+ 9	—	—	—
Basle		81·4	336	e 12 15	0	e 22 21	− 1	—	—	—
Chur		81·4	335	e 12 16	+ 1	e 22 22	0	—	—	—
Paris		81·5	340	i 12 16	0	i 22 24	+ 1	—	—	39·8
Vermont		81·5	30	i 12 16	0	22 20	− 3	i 12 32	pP	e 34·5
Neuchatel		82·0	336	e 12 19	+ 1	e 22 28	− 1	—	—	—
New Kensington		82·4	37	i 20 29	?	—	—	—	—	—
Pittsburgh		82·4	37	i 12 21	+ 1	i 22 43	+10	i 12 38	pP	—
Harvard		83·8	30	i 12 27	0	i 22 47	0	—	—	e 39·8
Clermont-Ferrand		84·2	338	i 12 31	+ 2	i 22 49	− 2	—	—	e 39·0
Fordham		84·5	32	i 12 30	− 1	i 22 48	− 6	i 12 48	pP	e 42·8
Philadelphia		84·7	34	i 12 30	− 2	i 22 46	−10	e 15 50	PP	e 34·8
Auckland		85·4	161	—	—	23 17	+15	—	—	40·8
Mobile		86·5	48	i 12 40	− 1	i 23 5	− 8	—	—	—
Helwan		86·8	311	i 12 44k	+ 2	23 39	+23	18 20	PPP	—
Columbia		87·3	41	e 12 53	+ 8	e 23 17	− 4	—	—	e 41·2
Wellington		89·6	163	12 54	− 2	23 14	[− 7]	13 5	pP	41·8
Christchurch		91·3	165	23 31	SKS	(23 31)	[0]	33 27	SSS	44·7
Algiers		92·6	335	i 13 12	+ 2	i 24 14	+ 5	e 23 39	SKS	40·8
Lisbon		93·6	345	—	—	23 44	[0]	26 5	PPS	50·3
Granada		93·9	341	i 13 16k	+ 1	i 24 8	−12	13 35	pP	46·4
Bermuda		95·3	30	e 13 21	− 1	i 24 33	+ 1	e 23 50	SKS	37·9
San Juan		107·4	37	e 14 11	P	e 26 11	S	i 18 46	PP	e 40·8
Tananarive		113·0	266	—	—	34 13	SS	e 29 4	PS	—
Huancayo		128·1	64	e 21 9	PP	e 38 51	SS	—	—	e 54·0
La Paz		135·9	60	i 19 19a	[+ 1]	—	—	i 22 1	SKP	65·8
Rio de Janeiro	N.	154·0	31	e 19 12	[−36]	—	—	—	—	—

Additional readings :—
College e =7m.26s. and 8m. 51s.
Sitka e =10m.17s., eSS =18m.7s.
Honolulu e =9m.24s. and 18m.29s.
Victoria eN =19m.15s.
Calcutta iPP =10m.34s., i =18m.53s. and 22m.5s.
New Delhi N P_cP =11m.7s., pPP =12m.25s., ipPPP =14m.19s., iPS =18m.39s., isS = 19m.1s., iSS =21m.59s., isSS =23m.19s., iSSS =25m.18s.
Ukiah ePPP =13m.46s., eSS =22m.26s.
Berkeley ePN =10m.16s.
Butte e =11m.1s., 20m.10s., and 23m.13s.
Bozeman e =10m.54s., 19m.41s., and 22m.55s.
Scoresby Sund e =22m.57s.
Logan i =11m.29s. and 20m.34s.
Hyderabad PSN =19m.35s., S_cSE =20m.20s., SSN =23m.37s
Salt Lake City e =11m.0s., 14m.35s., 20m.58s., eSS =23m.50s., e =27m.4s.
Pasadena iZ =11m.26s.
Upsala eSSSE =27m.47s.?.
Bombay eEN =12m.15s., ePPE =13m.33s., iN =20m.19s., S_cSE =20m.54s., iE = 21m.27s., SSE =25m.28s.
Kodaikanal iSSE =25m.11s.
Tucson i =12m.40s., e =15m.45s., eSS =25m.25s., eSSS =28m.44s.
Brisbane iPSE =21m.12s.
Jena eN =15m.33s.
De Bilt iZ =12m.37s. and 17m.57s.
Chicago ePPP =16m.53s., i =22m.4s., eSS =26m.21s.
Bucharest eN =12m.22s., eSE =22m.5s., ePS =22m.51s.
Florissant esS =22m.8s.
Uccle iZ =12m.50s., eZ =18m.16s.
Kew ePPZ =15m.10s., eEZ =18m.49s., ePS =22m.28s., iPPS =23m.17s., eSSN = 28m.9s., eSSS =31m.50s.

Continued on next page.

Riverview eQE =33m.35s.
Stuttgart eS =22m.19s.
Ottawa SS =27m.47s.
Seven Falls SSS =30m.11s.
Buffalo e =12m.35s.
Vermont e =15m.10s. and 27m.2s.
Pittsburgh i =22m.31s.
Fordham i =23m.26s.
Philadelphia e =13m.55s., 16m.51s., i =23m.10s., eSS =28m.5s., e =32m.12s.
Helwan iZ =13m.2s., SKSN =23m.3s., PSN =24m.40s.
Wellington SKKS =23m.42s., SP?Z =24m.55s., SS =30m.23s., Q =37·8m.
Christchurch iN =24m.0s., SS =29m.9s., Q =38m.21s.
Algiers e =14m.58s., i =24m.36s.
Lisbon E =38m.14s.?.
Granada sP =13m.53s., PP =16m.59s., pPP =17m.23s., PPP =19m.2s., iPPS = 25m.57s., SS =30m.2s., SSS =34m.29s.
Bermuda e =17m.13s., 22m.43s., eS =24m.26s., eSS =30m.58s.
San Juan eSKS =24m.47s., ePS =27m.54s., eSS =33m.32s.
Long waves were recorded at Apia.

Oct. 26d. Readings also at 1h. (near Berkeley, Branner, and Lick), 3h. (near Lick), 6h. (Potsdam, Triest, near Focsani, Bucharest, Sofia, Istanbul, and near Almata), 15h. (Pasadena, Mount Wilson, Riverside, Haiwee, Tinemaha, Palomar, Tucson, Santa Barbara, Copenhagen, and Stuttgart), 22h. (Berkeley and Helwan), 23h. (La Jolla, Riverside, Mount Wilson, Pasadena, Haiwee, Tucson, and Tinemaha).

Oct. 27d. Readings at 7h. (Tashkent), 8h. (Pasadena, Mount Wilson, Tinemaha, Tucson, and Mizusawa), 11h. (Sitka), 12h. (La Plata), 14h. (near Granada), 17h. (Ottawa, Pasadena (2), Mount Wilson (3), Riverside (2), Tinemaha (2), Haiwee, Tucson (3), Tacubaya, Merida, Oaxaca, Guadalajara, and near Mizusawa), 20h. (Calcutta and New Delhi), 21h. (near St. Louis), 22h. (Calcutta, New Delhi, Cheb, Istanbul, De Bilt, and Uccle), 23h. (Stuttgart, Chur, Basle, Zurich, and Kew).

Oct. 28d. 0h. 31m. 49s. Epicentre 39°·0N. 27°·5E. (fore shock of 28d. 2h.).

$A = +\cdot6912$, $B = +\cdot3598$, $C = +\cdot6268$; $\delta = +9$; $h = -1$;
$D = +\cdot462$, $E = -\cdot887$; $G = +\cdot556$, $H = +\cdot289$, $K = -\cdot779$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia	4·9	320	i 1 18	+ 1	i 2 17	+ 2	1 34	P_g	—
Bucharest	5·5	350	1 19	− 6	2 46	S*	1 54	P_g	—
Focsani	6·7	358	e 1 38	− 4	e 3 7	+ 7	e 3 36	S_g	e 3·9
Belgrade	7·8	320	e 2 5	+ 7	e 3 37	+ 9	e 2 50	PP	i 4·2
Ksara	8·5	125	e 2 5	− 2	e 5 8	?	—	—	—
Helwan	9·7	160	e 2 20	− 2	e 4 23	+ 8	4 2	PPP	—
Triest	12·1	308	e 3 4	+ 7	—	—	—	—	i 6·6
Prague	14·4	324	e 3 58?	+31	—	—	—	—	e 7·2
Chur	15·3	307	e 3 39	0	—	—	—	—	—
Zurich	16·1	307	e 3 52$_a$	+ 3	—	—	—	—	—
Stuttgart	16·4	313	e 3 48	− 5	—	—	—	—	—
Basle	16·8	307	e 3 59	+ 1	—	—	—	—	—
Neuchatel	17·0	306	e 4 1	0	—	—	—	—	—
Uccle	20·1	314	e 4 41	+ 3	e 8 23	+ 4	—	—	10·2

Additional readings and note:—
Sofia iS_gEN =2m.47s.
Bucharest ePE =1m.23s., eP*Z =1m.43s., eE =1m.50s., eN =2m.9s., iS* =3m.9s., iS_gN =3m.28s.
Belgrade e =2m.13s. and 3m. 57s.
Helwan eN =5m.29s., SN =8m.21s.
Stuttgart iP =3m.57s.
Long waves were also recorded at Cheb, Potsdam, De Bilt, and Kew.

Oct. 28d. 2h. 22m. 46s. Epicentre 39°·0N. 27°·5E. (as at 0h.).

A = +·6912, B = +·3598, C = +·6268 ; δ = +9 ; h = −1 ;
D = +·462, E = −·887 ; G = +·556, H = +·289, K = −·779.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia		4·9	320	i 1 17	0	i 2 16	+ 1	i 1 34	P_g	—
Bucharest		5·5	350	e 1 20	− 5	i 2 44	S*	e 1 56	P_g	—
Focsani		6·7	358	e 1 41	− 1	e 3 17	S*	—	—	—
Belgrade		7·8	320	e 2 0	+ 2	i 3 32	+ 4	i 2 20	P*	—
Ksara		8·5	125	e 2 3	− 4	e 4 11	S*	—	—	—
Helwan		9·7	160	2 20	− 2	e 4 6	− 9	3 26	PP	e 5·8
Triest		12·1	308	e 2 54	− 3	—	—	—	—	i 6·6
Prague		14·4	324	e 3 26	− 1	e 6 44	+35	—	—	e 7·7
Chur		15·3	307	e 3 39	0	e 6 50	+20	—	—	—
Cheb		15·4	321	—	—	e 6 14?	−18	—	—	i 8·0
Zurich		16·1	307	e 3 49	0	e 7 4	+15	—	—	—
Jena		16·4	322	i 3 58	+ 5	i 7 8	+12	—	—	e 8·5
Stuttgart		16·4	313	e 3 50	− 3	e 7 12	+16	—	—	e 8·6
Potsdam		16·7	328	e 4 26	+29	i 7 14	+11	—	—	8·2
Basle		16·8	307	e 3 58	0	—	—	—	—	e 9·1
Neuchatel		17·0	306	e 4 1	0	—	—	—	—	e 9·3
Strasbourg		17·1	312	i 4 5	+ 3	i 7 22	+10	i 4 20	PP	e 9·3
Clermont-Ferrand		19·2	299	e 4 28	0	—	—	i 5 35	PP	e 11·6
Algiers		19·4	271	i 4 38	+ 8	—	—	i 4 56	PP	13·2
Copenhagen		19·5	335	e 4 27	− 4	—	—	—	—	—
Uccle		20·1	314	e 4 38	0	e 8 20	+ 1	—	—	9·6
De Bilt		20·3	319	i 4 44	+ 4	e 8 30	+ 7	—	—	e 10·2
Paris		20·4	307	e 4 31	−10	—	—	—	—	11·2
Upsala		21·8	346	4 53	− 3	—	—	—	—	e 10·2
Kew		23·0	313	e 5 11	+ 4	e 9 19	+ 5	—	—	e 12·2
Oxford		23·7	313	—	—	e 9 19	− 8	—	—	—
Granada		24·5	276	i 5 24a	+ 2	i 9 47	+ 7	5 52	pP	13·1
Stonyhurst		25·2	317	—	—	i 10 10	+18	—	—	e 13·2
Sverdlovsk		28·1	40	e 6 11	+16	e 10 39	− 1	—	—	—
Lisbon		28·4	382	—	—	11 47	+62	—	—	14·6
New Delhi	N.	42·1	88	e 6 24	?	i 12 34	?	—	—	—
Kodaikanal	E.	52·8	98	e 4 24	?	—	—	—	—	—
Calcutta		53·8	88	—	—	e 16 44	−17	—	—	e 25·0
Ottawa		71·4	314	e 11 22	− 2	—	—	—	—	32·2

Additional readings :—
Sofia iE = 2m.9s., iS_g = 2m.26s.
Bucharest iP* = 1m.38s., iS* = 3m.12s.
Focsani eN = 2m.3s., eE = 2m.20s., iS*E = 3m.47s., iS_g = 4m.7s.
Belgrade i = 2m.6s., 3m.1s., 3m.47s., and 4m.0s., iPSS = 4m.13s.
Helwan eZ = 2m.35s., P_gPN = 4m.44s.
Jena iPZ = 4m.1s., iPN = 4m.8s.
Stuttgart i = 3m.54s. and 3m.58s.
Algiers e = 5m.29s. and 9m.45s.
Uccle iSN = 8m.24s.
Oxford i = 9m.39s.
Granada sP = 6m.8s., sS = 10m.30s., SS = 11m.0s.
Lisbon Z = 13m.50s.?.
Long waves were also recorded at Aberdeen, Scoresby Sund, and Tucson.

Oct. 28d. 2h. 41m. 48s. Epicentre 39°·0N. 27°·5E. (as at 2h. 22m.).

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sofia	4·9	320	1 10	− 7	i 2 25	+10	—	—	—
Bucharest	5·5	350	e 1 22	− 3	i 2 50	S*	i 3 36	S_g	—
Focsani	6·7	358	e 1 54	P*	e 3 17	S*	—	—	—
Belgrade	7·8	320	e 1 56	− 2	e 3 39	+11	—	—	—
Ksara	8·5	125	e 2 9	+ 2	e 4 1	+16	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan	Z.	9·7	160	e 1 26	−56	e 4 33	+18	—	—	e 7·2
Triest		12·1	308	e 2 54	− 3	—	—	—	—	i 6·3
Prague		14·4	324	e 3 28	+ 1	e 6 35	+26	—	—	e 7·2
Chur		15·3	307	e 3 47	+ 8	—	—	—	—	—
Zurich		16·1	307	e 3 50	+ 1	—	—	—	—	—
Stuttgart		16·4	313	e 3 51	− 2	—	—	—	—	—
Neuchatel		17·0	306	e 4 3	+ 2	—	—	—	—	—
Clermont-Ferrand		19·2	299	e 4 29	+ 1	—	—	—	—	—
Copenhagen		19·5	335	e 4 27	− 4	—	—	—	—	—
Uccle	Z.	20·1	314	e 4 38	0	—	—	—	—	—
Calcutta	N.	53·8	88	e 11 8	PP	—	—	—	—	—

Additional readings :—
Sofia iN = 2m.31s. and 2m.37s., iE = 2m.45s.
Bucharest ePE = 1m.26s., eP*Z = 1m.47s., eP*N = 1m.44s., eP$_g$ = 2m.5s., iS* = 3m.16s.
Belgrade e = 2m.3s., i = 2m.30s., 3m.58s., and 4m.12s., iPSS = 4m.19s.
Helwan eZ = 3m.33s.
Long waves were also recorded at Cheb, Potsdam, Strasbourg, and Upsala.

Oct. 28d. 10h. 44m. 39s. Epicentre 15°·0N. 96°·1W.

A = −·1027, B = −·9609, C = +·2572 ; δ = +3 ; h = +6 ;
D = −·994, E = +·106 ; G = −·027, H = −·256, K = −·966.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca	E.	2·1	342	i 0 47	+10	—	—	—	—	—
Vera Cruz	N.	4·2	359	e 1 19	P$_g$	—	—	—	—	—
Puebla	N.	4·5	333	e 1 12	+ 1	—	—	—	—	—
Tacubaya	N.	5·3	326	1 21	− 1	—	—	—	—	—
Merida	Z.	8·5	45	e 2 25	P*	—	—	—	—	—
Chihuahua	Z.	16·4	327	3 45	− 8	—	—	—	—	—
Balboa Heights	N.	17·3	108	e 4 4	0	—	—	—	—	—
Tucson		21·8	326	i 4 55	− 1	e 8 43	− 9	e 5 48	PP	e 10·1
Cape Girardeau	E.	23·0	14	e 5 7	0	e 9 16	+ 2	—	—	—
Columbia		23·3	33	e 5 8	− 2	i 9 26	+ 6	—	—	e 11·6
St. Louis		24·1	11	i 5 18	0	i 9 35	+ 1	i 5 49	PP	—
Florissant		24·2	11	i 5 17	− 2	e 9 34	− 1	—	—	—
Lincoln		25·8	359	i 5 54	+20	e 10 3	+ 1	—	—	e 13·8
La Jolla		26·2	318	e 5 37	− 1	—	—	—	—	—
Riverside	Z.	27·0	319	i 5 44	− 1	—	—	i 9 6	P$_c$P	—
Mount Wilson		27·5	319	i 5 50k	0	—	—	e 8 57	P$_c$P	—
Pasadena		27·6	319	i 5 50k	− 1	e 10 54	+22	i 9 8	P$_c$P	e 13·4
Chicago		27·7	12	i 5 50	− 2	i 10 32	− 1	e 7 9	PP	e 13·4
Haiwee		28·7	322	i 6 1	0	—	—	—	—	—
Santa Barbara	Z.	28·8	317	e 5 58	− 4	—	—	—	—	—
San Juan		28·9	79	i 6 5	+ 2	e 10 54	+ 1	—	—	i 13·5
Georgetown		29·1	32	i 6 4	0	i 10 58	+ 2	—	—	—
Salt Lake City		29·1	337	e 6 4	0	e 10 53	− 3	e 6 44	PP	e 12·5
New Kensington		29·2	26	6 9	+ 4	10 51	− 7	6 45	PP	14·6
Tinemaha		29·5	323	i 6 8	0	—	—	e 9 14	P$_c$P	—
Logan		29·9	340	i 6 13	+ 1	e 11 9	0	e 9 49	P$_c$P	14·4
Fresno	N.	30·2	321	e 6 15	+ 1	—	—	—	—	e 16·4
Philadelphia		30·9	33	i 6 17	− 3	e 11 14	−10	e 7 3	PP	e 12·6
Buffalo		31·5	25	i 6 22	− 4	—	—	—	—	e 18·4
Lick	E.	31·8	320	e 6 29	+ 1	—	—	—	—	e 17·0
Santa Clara		32·0	320	i 6 30	0	e 11 51	+ 9	—	—	e 16·1
Fordham		32·2	33	e 6 35	+ 3	i 11 49	+ 4	—	—	—
Berkeley		32·5	320	i 6 30	− 4	e 11 55	+ 6	—	—	e 16·5
Bozeman		33·1	342	e 6 42	+ 2	e 8 1	PP	—	—	e 16·2
Bermuda		33·4	53	e 6 42	0	e 12 17	+14	—	—	e 13·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		33·8	86	i 6 46	0	e 12 12	+ 2	—	—	—
Huancayo		33·8	142	i 6 52	+ 6	i 12 20	+10	i 8 12	PP	e 14·6
Ukiah		33·8	321	e 6 47	+ 1	e 12 9	− 1	—	—	e 17·0
Butte		33·9	341	e 6 45	− 2	e 12 13	+ 2	e 8 3	PP	e 17·9
Harvard		34·6	33	i 6 51	− 2	e 12 19	− 3	—	—	e 17·4
Ottawa		34·8	26	6 53	− 1	12 25	0	15 9	SSS	18·4
Vermont		35·2	29	e 6 53	− 5	e 12 31	0	—	—	e 17·1
Shawinigan Falls		37·0	27	7 10	− 3	—	—	—	—	21·4
Seven Falls		38·3	28	7 23	− 1	13 18	− 1	8 52	PP	18·4
Seattle		39·1	333	—	—	e 13 43	+12	—	—	e 20·5
Victoria		40·3	333	7 46	+ 6	13 48	− 1	17 15	SSS	19·4
La Paz	z.	41·7	137	7 54	+ 2	i 14 24	+14	—	—	i 20·8
Honolulu		58·7	287	e 9 14	−48	—	—	—	—	e 26·4
College		60·8	338	e 10 16	0	e 18 36	+ 3	e 12 41	PP	e 30·9
Scoresby Sund		70·7	20	e 11 24	+ 4	e 20 35	+ 1	e 28 9	SSS	e 35·2
Oxford		81·3	39	—	—	i 22 32	+ 2	—	—	e 38·4
Kew		82·0	39	i 12 24a	+ 1	e 22 38	+ 1	e 12 32	PcP	e 35·4
Granada		83·0	54	i 12 30k	+ 2	21 46	−61	—	—	—
Paris		84·4	41	e 12 34	− 2	—	—	—	—	41·4
Uccle		85·0	39	e 12 38	0	i 23 7	0	—	—	e 38·4
De Bilt		85·1	37	i 12 37	− 2	i 23 11	+ 3	—	—	e 39·4
Clermont-Ferrand		85·7	44	i 12 43a	+ 1	—	—	—	—	e 44·1
Strasbourg		87·8	40	c 12 54	+ 2	—	—	—	—	—
Neuchatel		87·8	42	e 12 52	0	—	—	—	—	—
Copenhagen		87·8	32	—	—	23 42	+ 8	—	—	—
Basle		88·0	41	e 12 52	− 1	—	—	—	—	—
Stuttgart		88·6	40	i 12 56a	0	e 23 46	+ 4	i 16 23	PP	—
Zurich		88·7	41	e 12 57	0	—	—	—	—	—
Potsdam		89·5	35	e 13 8	+ 8	i 24 10	+20	i 16 31	PP	e 42·4
Cheb		90·0	37	—	—	e 24 3	+ 9	e 16 39	PP	e 45·4
Triest		92·7	41	—	—	e 23 54	[+ 6]	—	—	e 45·3
Belgrade		97·3	40	—	—	e 32 32	SSS	—	—	—
Sverdlovsk		105·9	12	—	—	25 1	[+ 6]	18 40	PP	—
Helwan		112·5	48	e 19 24	PP	—	—	—	—	—
Riverview	E.	117·0	240	—	—	e 29 52	PS	—	—	e 54·0
Tashkent		122·4	12	20 31	PP	e 26 9	[+11]	30 25	PS	—
New Delhi	N.	136·2	7	e 20 22	PP	—	—	—	—	—
Calcutta	N.	142·4	352	c 19 38	[+ 3]	e 23 28	PKS	—	—	—

Additional readings :—
Tucson e =7m.15s.
St. Louis eN =9m.29s.
Salt Lake City e =17m.22s.
Logan iS =11m.29s.
Buffalo e =7m.8s., 8m.2s., 9m.30s., and 14m.14s.
Berkeley ePN =6m.35s.
Bozeman e =7m.27s., i =12m.54s.
Bermuda e =7m.30s.
Huancayo i =7m.35s.
Vermont e =13m.4s.
Seattle e =14m.15s. and 14m.37s.
La Paz iPZ =7m.57s., eSZ? =13m.59s.
College e =22m.51s.
Kew ePSZ =23m.20s.
Stuttgart i =13m.3s., e =24m.3s.
Belgrade e =32m.44s. and 33m.25s.
Helwan iZ =19m.30s., eN =20m.6s., eZ =37m.15s.
Long waves were also recorded at Guadalajara, San Fernando, Stonyhurst, Colombo, and Kodaikanal.

Oct. 28d. Readings also at 0h. (near Berkeley), 5h. (Granada), 7h. (La Paz), 8h. (near Sofia (2), and Istanbul), 9h. (Aberdeen, Sofia, and near Istanbul), 11h. (Sofia and near Istanbul), 15h. (Istanbul, Sofia, Stuttgart, Mount Wilson, Pasadena, Riverside, Tucson, Riverview, and near Apia), 16h. (Jena and near Berkeley), 19h. (Stuttgart, Potsdam, Triest (2), near Istanbul (2), and Sofia (3)), 20h. (La Paz).

Oct. 29d. 21h. 31m. 52s. Epicentre 17°·5N. 146°·0E. Depth of focus 0·015.

$A = -·7912$, $B = +·5336$, $C = +·2989$; $\delta = +7$; $h = +5$;
$D = +·559$, $E = +·829$; $G = -·248$, $H = +·167$, $K = -·954$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hatidyozima		16·5	341	3 47	+ 2	6 42	− 1	—	—	—
Yokohama		18·7	346	4 14	+ 3	7 50	+19	—	—	—
Tokyo Cen. Met. Ob.		18·9	347	e 4 14	+ 1	7 31	− 5	—	—	—
Nagoya		19·3	340	e 4 21	+ 4	7 45	+ 1	—	—	—
Koti		19·5	329	e 4 18	− 1	7 44	− 3	—	—	—
Miyazaki		19·5	321	4 23	+ 4	i 7 48	+ 1	—	—	—
Sendai		21·2	352	4 36	− 1	8 23	+ 3	—	—	—
Hamada		21·3	327	e 4 35	− 3	8 23	+ 2	—	—	—
Hukuoka		21·3	323	e 4 40	+ 2	i 8 20	− 1	5 21	pP	—
Mizusawa	N.	22·0	352	4 44	0	8 31	− 3	—	—	—
Taikyu		23·9	325	e 4 58	− 5	—	—	—	—	—
Mori		25·0	353	e 5 16	+ 3	e 9 41	+16	i 6 2	pP	—
Honolulu		52·9	76	e 11 15	PP	e 16 6	−16	e 12 20	PPP	e 22·4
Calcutta	N.	54·1	286	e 9 19	+ 5	i 16 32	− 7	e 18 4	PS	e 24·5
Semipalatinsk		61·3	320	e 10 4	0	—	—	—	—	—
New Delhi	N.	63·5	294	e 10 33	+14	i 18 43	+ 3	—	—	—
Hyderabad		64·1	282	10 18	− 5	18 33	−14	—	—	—
College		64·2	26	e 10 21	− 2	e 18 37	−12	e 13 16	PP	e 28·8
Colombo	E.	65·2	270	10 29	− 1	18 54	− 7	—	—	—
Andijan		66·5	308	e 10 39	+ 1	19 6	−11	11 33	pP	—
Kodaikanal	E.	66·6	275	e 10 10	−29	i 18 48	−30	—	—	—
Tashkent		68·8	309	i 10 49	− 3	19 32	−12	11 50	pP	—
Bombay	E.	69·0	284	e 10 55	+ 1	i 19 34	−12	e 12 4	pP	—
Sverdlovsk		73·0	326	i 11 14	− 3	i 20 18	−14	i 12 7	pP	—
Branner		81·0	54	e 12 5	+ 3	—	—	—	—	—
Lick	E.	81·4	54	e 12 5	+ 1	—	—	—	—	—
Santa Barbara	E.	83·7	57	e 12 10	− 6	—	—	—	—	—
Tinemaha		84·1	54	i 12 19a	+ 1	e 22 16	−14	i 13 15	pP	i 41·9
Haiwee		84·6	54	i 12 22a	+ 2	e 23 27	+52	i 13 17	pP	—
Pasadena		85·0	56	i 12 23a	+ 1	i 22 24	−15	i 13 17	pP	e 35·4
Mount Wilson		85·1	56	e 12 24	+ 1	e 22 25	−15	—	—	—
Riverside		85·7	56	i 12 26a	0	e 22 27	−18	—	—	—
La Jolla	z.	86·2	57	e 12 30	+ 2	—	—	—	—	—
Logan		87·3	47	e 12 36	+ 3	e 22 38	[− 8]	—	—	—
Tucson		91·5	56	i 12 54	+ 1	e 23 5	[− 7]	e 16 31	PP	e 31·5
Ksara		96·2	307	13 8?	− 7	e 23 28	[−10]	—	—	—
Istanbul		97·5	317	e 24 8?	SKS	(e 24 8?)	[+24]	—	—	—
Potsdam		99·3	333	e 18 14	PP	e 25 14	+29	—	—	e 48·1
Sofia		100·2	320	—	—	e 26 8?	PS	—	—	—
Helwan		101·4	306	13 34	− 4	i 23 48	[−16]	e 18 46	PP	—
Stuttgart		103·7	332	e 13 44	− 4	—	—	e 18 57	PP	—
Ottawa		106·8	29	e 17 34	PKP	e 24 18	[−10]	e 33 8?	SS	48·1
Seven Falls		107·7	25	—	—	e 25 8	?	—	—	48·1
San Juan		132·4	43	e 22 22	PKS	e 34 24	SS	—	—	e 49·8
La Paz	z.	147·4	93	i 19 32a	[+ 6]	—	—	i 20 32	pPKP	73·1

Additional readings :—
Hukuoka PP = 5m.57s., PPP? = 6m.37s., S = 9m.30s., i = 12m.36s., S_cS = 15m.26s.
Honolulu e = 19m.44s.
New Delhi iN = 20m.17s.
College eSS = 22m.59s.
Tashkent sS = 21m.5s.
Bombay iE = 16m.13s., 20m.30s., and 23m.58s., eE = 27m.35s.
Sverdlovsk sS = 21m.50s.
Lick eE = 12m.29s.
Tinemaha iZ = 15m.38s.
Pasadena iN = 24m.1s.
Tucson e = 22m.33s., 23m.28s., and 24m.46s.
Potsdam eZ = 40m.8s.?.
Helwan eZ = 15m.17s. and 17m.38s., eN = 32m.8s., 33m.28s., and 37m.14s.
Stuttgart e = 17m.16s. and 18m.4s.
Long waves also recorded at De Bilt and Triest.

Oct. 29d. Readings also at 4h. (near Andijan), 6h. (near Mizusawa), 15h. (near Tucson and near Fresno), 16h. (near Tucson and near Fresno), 17h. (near Berkeley and Fresno), 19h. (near Berkeley, Lick, and Fresno), 20h. (Huancayo, near La Paz, and near Fresno), 21h. (La Paz and Sapporo).

Oct. 30d. 0h. 18m. 47s. Epicentre 46°·3N. 7°·4E. (as on 1942 July 1d.).

Scale V in district of Enhaut; IV at Unter-Wallis and Simmental; III-IV at Fribourg. Macroseismic radius 25km.
E. Wanner.
"Jahresbericht des Erdbebendienstes der Schweiz im Jahre 1942." p. 2 macroseismic chart appendix fig. 3. Epicentre 46°·4N. 7°·1E.

$A = +·6875$, $B = +·0893$, $C = +·7206$; $\delta = -10$; $h = -4$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Neuchatel	0·7	336	i 0 12	P_g	e 0 19	S_g	—	—
Basle	1·3	6	e 0 25	P_g	i 0 39	S*	—	—
Zurich	1·3	37	e 0 26	P_g	e 0 47	S_g	e 0 29	P_g
Chur	1·6	69	e 0 37	P_g	e 1 0	S_g	—	—
Ravensburg	2·1	45	—	—	e 1 13?	S_g	—	—
Ebingen	2·2	29	—	—	e 1 13	S_g	—	—
Strasbourg	2·3	6	e 0 50	P*	e 1 2	− 7	e 1 10	S*
Stuttgart	2·7	26	e 0 43	− 2	i 1 29	S_g	e 0 52	P_g
Clermont-Ferrand	3·0	260	e 0 55	+ 5	—	—	—	—

Stuttgart gives also i = 1m.0s., eS = 1m.3s.

Oct. 30d. 6h. 17m. 50s. Epicentre 12°·4N. 92°·5E. (as on 1941 Oct. 23d.).

$A = -·0426$, $B = +·9761$, $C = +·2134$; $\delta = +13$; $h = +6$;
$D = +·999$, $E = +·044$; $G = -·009$, $H = +·213$, $K = -·977$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	N.	10·8	339	e 2 46	+ 7	i 4 28	−14	i 5 28	S_g	—
Kodaikanal	E.	14·9	264	e 3 2	−32	e 6 10	−10	—	—	—
Bombay	E.	20·0	292	i 4 40	+ 3	i 8 26	+ 9	4 56	PP	e 11·5
New Delhi	N.	21·5	322	4 54	+ 2	8 41	− 6	—	—	—
Andijan		33·3	332	6 41	0	—	—	—	—	—
Tashkent		35·2	329	6 56	− 2	12 33	+ 2	—	—	—
Sverdlovsk		50·6	338	8 57	− 5	e 16 10	− 7	—	—	—

Additional readings:—
Calcutta iS*N = 5m.6s.
Bombay iE = 8m.35s.
Long waves were also recorded at Ksara.

Oct. 30d. Readings also at 0h. (near Berkeley (2), Branner (2), Lick (2), and Fresno), 1h. (Helwan and Ksara), 5h. (Huancayo and near Fresno), 11h. and 12h. (Tacubaya), 14h. (near St. Louis), 16h. (Stuttgart and Triest), 20h. (Sofia and near Istanbul), 22h. (Cape Girardeau), 23h. (De Bilt, Potsdam, Triest, Sofia, Bucharest, and near Istanbul).

Oct. 31d. 2h. Undetermined shock.

Ksara eP = 58m.0s., SS = 60m.19s.
Helwan PZ = 59m.13s., pPZ = 59m.29s., eZ = 60m.15s. and 60m.55s., eN = 62m.30s., P_cPZ = 63m.2s., SN = 63m.6s., S_cSN = 70m.13s.
Tashkent P = 60m.20s., iS = 64m.0s.
Sofia ePEN = 60m.23s., eEN = 63m.48s., and 66m.
Bucharest eN = 60m.48s., eS?N = 63m.22s., eS?E = 63m.26s., L = 66m.
Andijan eP = 60m.50s.
Sverdlovsk P = 61m.7s., S = 65m.19s.
Basle e = 62m.9s.
New Delhi iN = 63m.9s.
Triest e = 66m.19s.
Cheb e = 67m.
Upsala eN = 67m., eE = 72m.
Potsdam eNZ = 68m.12s., eE = 68m.24s., eLN = 72m.
Long waves were also recorded at Calcutta and De Bilt.

Oct. 31d. Readings also at 1h. (Istanbul and Sofia), 6h. (Triest), 7h. (Riverview), 8h. (near Mizusawa), 9h. (La Paz), 10h. (near Santa Clara, Branner, Lick, and Fresno), 11h. (Riverview, Sofia, and near Lick), 12h. (near Tashkent, near Berkeley, Lick (3), Branner (3), Fresno (3), and Santa Clara), 13h. (near Lick (2), 14h. (Sofia and near Berkeley), 15h. (Huancayo, Ottawa, Harvard, Cape Girardeau, Florissant, Tacubaya, Tucson, Pasadena, Mount Wilson, Riverside, and Tinemaha), 22h. (Pasadena, Mount Wilson, Riverside, Haiwee, Tucson, near Oaxaca, Vera Cruz, and Tacubaya), 23h. (near Tacubaya, near Branner and Lick).

Nov. 1d. Readings at 0h. (near La Paz), 1h. (near Balboa Heights), 4h. (near Johannesburg), 6h. (Tacubaya), 7h. (Sverdlovsk and near Tashkent), 8h. (Riverview and Spokane), 9h. (Riverview and Wellington), 10h. (Riverview, Sverdlovsk, Tashkent, Instanbul, and near Sofia), 11h. and 13h. (near Tashkent), 15h. (near Tashkent, Harvard, Ottawa, Chicago, Lincoln, St. Louis, Florissant, Mount Wilson, Pasadena, Riverside, Tinemaha, Santa Clara, Tucson, near Bozeman, Butte, and Salt Lake City), 17h. (near Istanbul), 18h. (Ottawa, Lincoln, Cape Girardeau, St. Louis, Haiwee, La Jolla, Mount Wilson, Pasadena, Riverside, Tinemaha, Tucson, Ukiah, Seattle, Sitka, Bozeman, Butte, Salt Lake City, near Branner and near Spokane), 19h. (Potsdam, Philadelphia, Harvard, Chicago, near Spokane, and near Mizusawa), 23h. (near Granada (2)).

Nov. 2d. 23h. 59m. 30s. Epicentre 17°·0S. 177°·0W.

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

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		6·0	60	e 1 26	− 6	i 2 28	−15	—	—	—
Auckland		21·1	198	4 23	−25	i 8 28	−11	—	—	10·4
Arapuni		22·0	195	4 30?	−28	9 33?	+37	10 54?	SS	12·2
Wellington		25·2	195	5 23	− 6	9 46	− 6	6 0	PP	12·5
Christchurch		27·9	196	6 24	+30	—	—	12 12	Q	14·0
Riverview	E.	33·1	233	e 7 1a	+21	—	—	—	—	e 14·3
Sydney		33·1	233	—	—	e 12 18	+19	—	—	—
Honolulu		42·5	27	e 10 2	?	e 12 31	?	—	—	i 17·3
Perth		62·0	242	18 50	S	(18 50)	+ 2	—	—	i 31·1
Nagano		68·1	322	e 10 54	−10	—	—	—	—	—
Kobe		68·6	319	10 17	−50	—	—	—	—	—
Koti		68·9	316	e 11 0	− 9	—	—	—	—	—
Miyazaki		69·3	314	11 9	− 2	19 2	−75	—	—	—
Hukuoka		71·0	315	e 10 38	−44	18 23	?	—	—	—
Santa Clara	E.	74·9	42	i 11 54	+10	—	—	e 25 19	SS	e 31·1
Berkeley	Z.	75·0	42	e 11 45	0	—	—	—	—	—
Ukiah		75·1	41	e 12 24	+38	e 21 25	+ 1	e 14 58	PP	e 32·8
La Jolla	Z.	75·6	49	e 11 53	+ 5	—	—	—	—	—
Pasadena		75·6	47	e 11 48	0	e 21 41	+12	e 16 53	PPP	e 30·6
Mount Wilson	Z.	75·7	47	e 11 49	0	—	—	—	—	—
Riverside	Z.	76·1	48	e 11 50	− 1	—	—	—	—	—
Haiwee	Z.	76·8	45	i 12 1	+ 6	—	—	—	—	—
Tinemaha	Z.	77·1	44	i 12 2	+ 5	—	—	—	—	—
Tucson		80·0	51	e 12 12	− 1	e 22 20	+ 3	e 15 20	PP	e 33·0
Sitka		81·9	22	e 20 47	?	e 24 38	?	e 29 45	?	e 33·6
Salt Lake City		83·3	43	e 12 40	+10	e 22 40	−10	e 16 4	PP	e 34·6
College		84·6	12	e 12 36	0	e 22 55	− 8	—	—	e 34·8
Bozeman		86·2	40	e 12 58	+14	e 23 16	− 3	e 24 12	PS	e 35·0
Lincoln		93·9	49	e 13 46	+25	e 23 48	[− 7]	e 25 36	PS	e 48·2
Huancayo		97·4	105	—	—	e 23 45	[−29]	e 35 54	SSS	e 40·1
Calcutta	N.	100·5	291	e 17 23	PP	e 26 58	PS	—	—	—
Chicago		100·7	50	—	—	e 24 14	[−16]	—	—	e 52·2
La Paz		102·4	113	e 18 30	PP	—	—	—	—	48·5
Columbia		104·1	59	e 20 11	PP	e 24 57	[+11]	e 31 4	?	e 42·6
Colombo	E.	104·5	273	e 18 30?	PKP	—	—	—	—	51·3
Kodaikanal	E.	107·7	276	e 17 22	?	e 27 56	PS	33 58	SS	—
Ottawa		109·8	47	e 26 54?	S	e 29 6?	PS	—	—	46·5
Vermont		111·5	48	—	—	e 29 27	PS	e 30 44	PPS	e 45·8
New Delhi	N.	111·6	294	e 13 57	?	i 32 1	?	—	—	—
Harvard		112·6	51	e 21 21	PPP	e 23 27	?	—	—	e 50·5

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Seven Falls	113·2	45	—	—	e 24 54	[−31]	e 29 26	PS	52·5
Bombay	114·0	284	e 13 48	?	—	—	—	—	e 56·5
San Juan	114·5	77	e 18 44	[+ 2]	e 25 27	[− 3]	e 26 36	SKKS	e 49·4
Bermuda	117·5	62	e 20 17	PP	e 27 9	{+12}	—	—	e 52·8
Scoresby Sund	124·4	11	e 21 0	PP	e 27 20	{−23}	e 37 49	SS	e 52·9
Upsala	135·9	350	e 22 46?	PKS	—	—	e 37 54	SS	e 63·5
Aberdeen	139·7	4	i 23 42	PKS	i 28 42	?	i 34 30	PPS	e 65·2
Copenhagen	140·7	353	e 19 34	[+ 2]	22 22	PP	24 1	?	75·5
Stonyhurst	143·0	6	—	—	—	—	47 5	SSS	71·5
Potsdam	143·8	351	i 19 42	[+ 5]	—	—	i 23 27?	PP	e 58·5
De Bilt	144·9	357	e 19 40	[+ 1]	—	—	e 42 5	SS	e 67·5
Jena	145·5	351	e 19 42	[+ 2]	e 22 58	PP	e 23 42	PKS	e 69·5
Kew	145·5	3	i 19 44	[+ 4]	e 41 16	SS	e 23 31?	PP	e 68·5
Prague	145·8	348	e 19 50	[+ 9]	—	—	—	—	—
Ksara	146·1	306	e 19 49?	[+ 8]	e 23 10	PP	—	—	—
Cheb	146·2	351	19 51	[+10]	—	—	—	—	e 67·5
Uccle	146·3	359	e 19 44a	[+ 3]	—	—	—	—	e 67·5
Bucharest	146·5	330	19 43	[+ 1]	—	—	—	—	60·5
Stuttgart	147·9	353	e 19 46	[+ 2]	e 23 6	PP	e 42 12?	SS	e 66·7
Paris	148·3	2	i 20 5	[+20]	—	—	—	—	71·5
Strasbourg	148·3	354	e 19 56	[+11]	—	—	—	—	80·5
Belgrade	148·6	336	e 19 54	[+ 9]	e 23 51	PP	—	—	—
Sofia	149·1	331	e 19 58	[+12]	e 27 54?	PPP	—	—	—
Basle	149·3	355	e 19 50	[+ 4]	—	—	—	—	—
Zurich	149·4	354	e 19 51	[+ 5]	—	—	—	—	—
Chur	149·8	353	e 19 52	[+ 5]	—	—	—	—	—
Neuchatel	149·9	355	e 20 0	[+13]	—	—	—	—	—
Triest	150·1	346	i 20 5	[+17]	—	—	—	—	e 60·5
Helwan	151·1	302	19 51	[+ 2]	42 25	SS	20 20	pPKP	—
Clermont-Ferrand	151·3	0	i 20 0	[+11]	—	—	—	—	60·5
Lisbon	155·9	22	20 11	[+15]	23 45	PP	57 6?	Q	64·7
Granada	159·1	15	i 20 11	[+11]	26 59	[− 5]	i 24 25	PP	75·3
Algiers	160·3	0	e 20 30?	PKP_2	e 26 30?	[−35]	—	—	e 80·5

Additional readings :—
Apia iSE =2m.47s., iS_E =3m.3s.
Auckland i =6m.41s., S? =9m.46s.
Wellington sP?Z =7m.8s., P_cP?Z =8m.13s., sP_cP? =10m.25s., S_cP? =11m.30s.
Riverview iE =7m.11s.
Perth S =25m.50s.
Ukiah e =20m.39s. and 23m.50s.
Riverside iZ =11m.56s.
Tucson i =12m.55s. and 16m.8s., e =22m.57s. and 23m.35s.
Salt Lake City e =13m.24s., 16m.53s., and 23m.20s.
College e =14m.7s. and 23m.52s.
Bozeman e =24m.46s., eSS =28m.43s.
Lincoln e =21m.2s. and 32m.16s.
San Juan e =32m.34s.
Bermuda ePPP =22m.56s., eS? =28m.4s., e =31m.6s.
Scoresby Sund e =29m.6s. and 32m.15s., eSSS =43m.12s.
Upsala P?N =23m.2s., e =56m.30s.?.
Aberdeen iE =50m.2s., eQN =63m.10s.
Stonyhurst e =51m.51s. and 62m.30s.?.
Potsdam iZ =20m.29s., iE =eN =22m.4s., eN =22m.17s., iE =24m.54s., iN =25m.46s.
Jena e =25m.30s.
Kew ePPSZ =36m.11s., eSSSEZ =47m.16s.?.
Ksara e =21m.1s. and 21m.32s.
Uccle iPKPZ =19m.50s.
Stuttgart e =23m.47s.
Strasbourg $ePKP_2$ =20m.17s.
Belgrade e =20m.49s. and 21m.30s.
Helwan PKPZ =23m.3s., pPKPZ =23m.36s., pPPZ =25m.41s., PKSZ =26m.30s., PSE =35m.33s.
Lisbon SKPN =20m.29s.
Granada $iPKP_2$ =20m.47s., sPKP =21m.12s., $sPKP_2$ =21m.37s., sPP =25m.48s., sSKS =28m.49s., SS =43m.3s., SSS =48m.49s., sSSS =50m.33s.
Long waves were also recorded at Brisbane, Tananarive, Butte, and San Fernando.

Nov. 2d. Readings also at 1h. (Bombay, Sverdlovsk, Tashkent, and Helwan), 2h. (Riverview, Calcutta, and Potsdam), 4h. (Bombay, Calcutta, Kodaikanal, New Delhi, Almata, near Tashkent, and Sverdlovsk), 5h. (Potsdam), 6h. (Ferndale), 10h. (near Mizusawa), 13h. (Fresno and near Tucson), 14h. (Triest), 17h. (near Bucharest, Sofia, Triest, Potsdam, Stuttgart, and near Tashkent), 18h. (Granada, Stuttgart, Potsdam, and near Ottawa), 19h. (San Francisco), 20h. (near Bucharest, Potsdam, near St. Louis, Florissant, Mount Wilson, and Riverside), 21h. (Riverside and Tucson), 22h. (Pasadena, Mount Wilson, Riverside, La Jolla, Haiwee, Tinemaha, Palomar, Tucson, Riverview, Brisbane, Stuttgart, and Triest).

Nov. 3d. 13h. 21m. 43s. Epicentre 41°·7N. 144°·9E.

Scale IV at Urakawa and Obihiro, II-III at Sapporo. Epicentre 41°·7N. 144°·9E. Macroseismic radius 200-300km.
Seismological Bulletin of Central Meteorological Observatory Japan for year 1942. Tokyo 1950, p. 40 ; with macroseismic chart.

$A = -\cdot 6126,\ B = +\cdot 4306,\ C = +\cdot 6627\ ;\quad \delta = -13\ ;\quad h = -2\ ;$
$D = +\cdot 575,\ E = +\cdot 818\ ;\quad G = -\cdot 542,\ H = +\cdot 381,\ K = -\cdot 749.$

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Nemuro		1·7	17	0 28	− 3	0 45	− 9	—
Hatinohe		2·8	245	0 46	− 1	1 15	− 7	—
Miyako		3·0	227	0 51	+ 1	1 23	− 4	—
Sapporo		3·0	298	0 44	− 6	1 17	−10	—
Aomori		3·2	254	0 51	− 1	1 28	− 4	—
Mori		3·3	277	0 52$_a$	− 1	1 24	−11	—
Mizusawa	N.	3·9	230	i 1 1	− 1	1 44	− 6	—
Akita		4·1	243	1 26	P_g	1 55	0	—
Sendai		4·6	223	1 11	− 1	2 1	− 6	—
Hukusima		5·2	222	1 49	P_g	2 49	S_g	—
Onahama		5·7	214	1 32	+ 4	2 28	− 7	—
Aikawa		6·3	237	1 36	0	2 45	− 5	—
Mito		6·3	215	1 37	+ 1	2 44	− 6	—
Utunomiya		6·5	219	1 38	− 1	2 50	− 5	—
Kakioka		6·6	216	1 28	−13	1 52	−66	—
Tukubasan		6·6	216	1 45	+ 4	2 50	− 8	—
Tyosi		6·7	209	0 55	−47	—	—	—
Kumagaya		7·0	220	1 48	+ 2	3 1	− 7	—
Maebasi		7·0	223	1 45	− 1	3 8	0	—
Nagano		7·2	228	1 49	0	2 50	−23	—
Tokyo Cen. Met. Obs.		7·2	216	1 27	?	2 5	?	—
Yokohama		7·5	215	2 4	+11	3 14	− 6	—
Kohu		7·8	221	1 59$_a$	+ 1	3 15	−13	—
Toyama		7·8	232	1 55	− 3	—	—	—
Mera		7·9	212	2 12	+13	3 23	− 7	—
Misima		8·1	217	2 9	+ 7	3 29	− 6	—
Shizuoka		8·4	219	2 15	+ 9	3 37	− 6	—
Gihu		8·9	228	2 15	+ 3	4 15	+20	—
Nagoya		9·0	226	2 7	− 6	3 59	+ 1	—
Hikone		9·3	230	2 17	0	4 0	− 5	—
Hatidyozima		9·5	207	3 47	?	—	—	—
Kameyama		9·5	227	2 31	+11	—	—	—
Osaka		10·2	229	2 28	− 3	4 28	+ 1	—
Kobe		10·3	231	2 30	− 2	5 8	S*	—
Koti		12·1	232	2 48	− 9	—	—	—
Hukuoka		14·0	239	2 48	−34	—	—	—
Kumamoto		14·4	236	3 21	− 6	—	—	—
Miyazaki		14·5	232	3 23	− 5	6 10	− 1	—
Kagosima		15·3	233	3 49	+10	—	—	—
Almata		48·9	297	8 53	+ 3	—	—	—
Andijan		53·0	295	e 9 17?	− 4	16 59?	+ 9	—
Sverdlovsk		53·5	318	i 9 18	− 6	16 42	−15	—
Tashkent		54·8	297	9 27	− 7	17 11	− 3	—
Tinemaha	z.	70·9	57	e 11 31	+10	—	—	—
Mount Wilson	z.	72·8	59	e 11 32	0	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Pasadena	z.	72·8	59	i 11 41	+ 9	—	—	—
Riverside	z.	73·4	59	e 11 30	− 6	—	—	—
Potsdam		77·4	332	—	—	e 21 58	+ 9	e 40·3
Tucson		78·7	57	e 12 5	− 1	—	—	—
Helwan	z.	86·1	307	e 12 40	− 4	—	—	—
Clermont-Ferrand		86·5	334	e 12 41	− 5	—	—	e 48·3

Additional readings :—
Mizusawa SE = 1m.41s.
Mount Wilson iZ = 11m.43s.
Pasadena iZ = 12m.15s.
Riverside iZ = 11m.45s.
Helwan eZ = 13m.7s.
Long waves were also recorded at Bozeman, De Bilt, Kew, Cheb, and Upsala.

Nov. 3d. Readings also at 0h. (Sofia), 1h. (Haiwee, Mount Wilson, Tucson, Pasadena, Riverside, and Tinemaha), 3h. (near Fresno), 5h. (near Fresno and Tucson), 10h. (La Paz, Tucson, and Prague), 13h. (near La Paz, Andijan, Almata, and near Tashkent), 16h. (Oaxaca, Haiwee, Mount Wilson, Pasadena, Riverside, Tinemaha, La Jolla, Tucson, La Paz, Huancayo, and La Plata), 20h. (near Lick), 22h. (near Berkeley), 23h. (Huancayo, La Paz, Fort de France, San Juan, Bermuda, Chicago, Tucson, Mount Wilson, and near Balboa Heights).

Nov. 4d. Readings at 0h. (near Granada), 3h. (near La Paz), 4h. (Granada), 9h. (Riverview), 10h. (Balboa Heights and Tashkent), 11h. (Bombay, De Bilt, Uccle, Prague, Potsdam, and Stuttgart), 12h. (Mizusawa), 13h. (Riverview), 14h. (near La Paz), 20h. (Mount Wilson, Tucson, and Pasadena), 21h. (near Cape Girardeau), 23h. (near La Paz).

Nov. 5d. 8h. European shock.

Stuttgart iP = 52m.59s.k, eP_g = 53m.9s., eS*? = 53m.36s., e = 53m.41s., eS? = 53m.51s., eS = 53m.54s., iS_g = 53m.57s., eQ = 54m.8s.
Triest iP = 52m.20s.
Chur eP_g = 52m.45s., eS_g = 53m.16s.
Zurich eP = 52m.55s., eP_g = 53m.2s., eS_g = 53m.42s.
Ravensburg eP_g = 52m.56s., e = 53m.6s. and 53m.22s., eS_g = 53m.26s.
Basle eP = 53m.3s., eS_g = 54m.5s.
Neuchatel eP = 53m.8s.
Strasbourg P_g? = 53m.24s.?, eSN? = 53m.40s., S? = 53m.48s.
Jena eN = 53m.33s. and 53m.51s., eZ = 53m.54s., iSN = 54m.8s. and 54m.12s., eL = 54m.18s.
Potsdam eE = 55m.14s., iN = 55m.17s., eZ = 55m.25s., iN = eE = 55m.28s., LNZ = 56m.

Nov. 5d. 11h. 26m. 45s. Epicentre 18°·7S. 168°·4E. (as on 1942 Jan. 29d.).

A = −·9285, B = +·1906, C = −·3187 ; δ = +1 ; h = +5 ;
D = +·201, E = +·980 ; G = +·312, H = −·064, K = −·948.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		16·6	235	i 3 59	+ 3	i 7 9	+ 9	—	—	—
Auckland		18·9	165	4 25	+ 1	8 0	+ 7	1 4 39	PPP	10·3
Arapuni		20·3	164	—	—	8 57?	SS	—	—	—
Riverview		21·5	223	i 4 58k	+ 6	i 8 52	+ 5	—	—	e 10·6
Sydney		21·5	223	e 4 51	− 1	i 8 51	+ 4	—	—	e 10·6
Wellington		23·2	170	5 4	− 5	9 6	−12	5 15	pP	11·8
Christchurch		25·0	173	5 30	+ 3	9 58	+ 9	10 43	Q	12·7
Pasadena	z.	87·4	53	i 12 48	− 2	—	—	—	—	e 38·0
Mount Wilson	z.	87·5	53	i 12 51	0	—	—	—	—	—
Riverside	z.	87·9	53	e 12 52	− 1	—	—	—	—	—
Palomar	z.	88·0	55	e 12 53	0	—	—	—	—	—
Tinemaha	z.	88·5	50	i 12 57	+ 1	—	—	—	—	—
Tucson		92·3	56	i 13 14	+ 1	—	—	e 17 1	PP	e 36·6
Bozeman		96·8	44	—	—	e 26 37	PS	e 18 38	PP	e 45·4
Tashkent		108·8	309	e 18 34	PP	e 25 35	{−22}	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Copenhagen		138·8	341	23 15	PKS	—	—	—	—	—
Helwan	z.	139·4	295	e 19 29	[0]	—	—	22 29	PP	—
Potsdam		141·2	336	e 19 28	[− 5]	—	—	—	—	e 70·2
Sofia		142·0	317	e 19 45?	[+11]	—	—	—	—	—
Jena		142·9	335	e 19 33	[− 3]	—	—	—	—	—
De Bilt		144·2	343	i 19 37a	[− 1]	—	—	—	—	e 75·2
Stuttgart		145·6	336	e 19 41	[+ 1]	e 41 45?	SS	e 23 5	PP	e 73·2
Uccle		145·6	344	i 19 41a	[+ 1]	—	—	23 3	PP	—
Triest		145·9	329	e 19 43	[+ 2]	—	—	—	—	—
Chur		147·0	335	e 19 40	[− 3]	—	—	—	—	—
Zurich		147·0	336	e 19 42a	[− 1]	—	—	—	—	—
Basle		147·2	337	e 19 45	[+ 2]	—	—	—	—	—
Neuchatel		147·9	337	e 19 44	[0]	—	—	—	—	—
Paris		147·9	344	i 19 48	[+ 4]	—	—	—	—	63·3
Clermont-Ferrand		150·4	340	i 19 55k	[+ 7]	—	—	—	—	e 76·9

Additional readings :—
Auckland i = 4m.51s.
Riverview iEN = 5m.6s., iSE = 8m.55s.
Wellington sP?Z = 5m.35s., iZ = 6m.9s., i = 6m.30s., sS = 9m.35s., SS? = 10m.15s.
Pasadena iZ = 13m.6s.
Riverside iZ = 13m.19s.
Helwan eZ = 22m.43s.
Stuttgart ePSKS? = 33m.15s.?.

Nov. 5d. 11h. 47m. 35s. Epicentre 15°·5N. 91°·7W. (as on 1939 Dec. 12d.).

A = −·0286, B = −·9637, C = +·2656 ; δ = +8 ; h = +6 ;
D = −1·000, E = +·030 ; G = −·008, H = −·265, K = −·964.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Oaxaca	z.	5·1	289	e 1 25	+ 5	—	—	—
Merida	z.	5·8	21	i 2 28	S	(i 2 28)	−10	—
Tacubaya	N.	8·1	300	2 11	+ 9	—	—	—
Mobile		15·4	11	i 3 56	+16	i 6 55	+23	—
Columbia		20·8	26	e 4 54	+ 9	e 8 42	+ 9	e 10·9
Cape Girardeau		21·8	5	e 4 54	− 2	e 8 58	+ 6	—
St. Louis		23·1	3	i 5 8	0	e 9 21	+ 5	e 10·3
Tucson		24·1	318	i 5 18	0	i 10 9	+35	e 13·4
San Juan		24·6	79	e 5 18	− 5	—	—	e 7·9
Philadelphia		28·3	28	—	—	e 10 40	− 3	16·3
Riverside		29·6	314	i 6 6	− 3	—	—	—
Mount Wilson	z.	30·2	314	i 6 13	− 1	—	—	—
Pasadena	z.	30·2	314	i 6 11	− 3	—	—	—
Huancayo		31·8	148	e 6 29	+ 1	e 11 6	−32	—
Tinemaha	z.	31·9	318	i 6 27	− 2	—	—	—
Ottawa		32·7	21	e 6 31	− 5	e 11 51	− 1	17·4

Additional readings :—
Vera Cruz (Δ = 5°·6), eZ = 11h.53m.50s.
Puebla (Δ = 7°·1) iE = 11h.47m.5s.
Cape Girardeau eSN = 9m.6s., eE = 9m.34s.
St. Louis iZ = 5m.16s., and eN = 5m.45s.
Tucson e = 6m.11s. and 6m.22s.
Riverside iZ = 9m.2s.
Mount Wilson iZ = 9m.2s.
Pasadena iZ = 6m.30s. and 9m.2s.
Huancayo e = 10m.8s.
Tinemaha eZ = 9m.5s.
Ottawa e = 12m.25s., eE = 14m.55s.?.
Long waves were also recorded at College and Scoresby Sund.

Nov. 5d. 12h. 42m. 35s. Epicentre 37°·3N. 141°·3E. (as on 1942 July 17d.).

Scale V at Shirakawa ; IV at Onahama, Sendai, Tukubasan, and Kakioka ; II-III at Tishi, Mito, Titibu, and Miyako. Macroseismic radius 200-300km. Epicentre 37°·3N. 141°·5E.
Seismological Bulletin of the Central Meteorological Observatory Japan, for year 1942. Tokyo 1950, with macroseismic chart, pp. 41, 42.

$A = -\cdot6223$, $B = +\cdot4986$, $C = +\cdot6034$; $\delta = -5$; $h = -1$;
$D = +\cdot625$, $E = +\cdot780$; $G = -\cdot471$, $H = +\cdot377$, $K = -\cdot797$.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Onahama		0·5	221	0 13k	− 1	0 22	− 1
Hukusima		0·8	304	0 21	+ 3	0 35	+ 4
Sendai		1·0	342	0 21k	0	0 37	+ 1
Mito		1·1	216	0 23	+ 1	0 36	− 3
Kakioka		1·4	220	0 23k	− 4	0 40	− 6
Tukubasan		1·4	222	0 25	− 2	0 43	− 3
Utunomiya		1·4	237	0 27k	0	0 47	+ 1
Tyosi		1·6	193	0 22	− 8	0 31	−20
Mizusawa	E.	1·8	356	0 33	+ 1	1 0	+ 4
Kumagaya		1·9	233	0 27k	− 7	0 57	− 2
Maebasi		2·0	243	0 35k	0	1 2	0
Tokyo Cen. Met. Obs.		2·0	218	0 33k	− 2	0 56	− 6
Yokohama		2·3	215	0 37	− 3	1 3	− 6
Miyako		2·4	13	0 41	0	1 9	− 3
Aikawa		2·5	287	0 45	+ 2	1 30	S_g
Akita		2·6	339	0 56	P_g	1 22	S*
Mera		2·6	206	0 40	− 4	1 23	S*
Hunatu		2·7	229	0 34	−11	0 58	−21
Kohu		2·8	233	0 46	− 1	1 24	+ 2
Misima		2·9	221	0 49	+ 1	1 22	− 2
Nagano		3·0	256	0 46	− 4	1 20	− 7
Osima		3·0	211	0 45	− 5	1 19	− 8
Hatinohe		3·2	3	0 52	0	1 28	− 4
Shizuoka		3·3	225	0 53	0	1 31	− 4
Toyama		3·3	259	0 56k	+ 3	1 56	+21
Wazima		3·5	272	0 57	0	—	—
Aomori		3·6	353	1 1	+ 3	1 48	+ 6
Omaesaki		3·7	224	1 7	P*	1 57	S*
Hamamatu		3·9	229	1 1	− 1	1 46	− 4
Gihu		4·1	244	1 5a	0	—	—
Nagoya		4·1	240	1 7	+ 2	2 2	+ 7
Hatidyosima		4·4	197	1 6	− 4	1 32	P_g
Hikone		4·5	245	1 27	P_g	2 23	S_g
Kameyama		4·6	239	1 18	+ 6	—	—
Mori		4·8	353	1 21	+ 6	2 25	S*
Kyoto		5·0	245	1 20	+ 2	2 17	− 1
Osaka		5·4	242	1 31	+ 7	2 39	S*
Kobe		5·6	244	1 32	+ 5	2 35	+ 2
Siomisaki		5·9	231	1 21	−10	—	—
Nemuro		6·8	27	1 50	+ 6	—	—
Koti		7·3	242	1 36	−14	—	—

Nov. 5d. Readings also at 1h. (Riverview, Pasadena, Mount Wilson, Tucson, Palomar, Riverside, and near Berkeley), 2h. (Huancayo (2), La Paz, San Juan, and Ottawa), 3h. (Huancayo, La Paz, San Juan, Mount Wilson, Riverside, Palomar, Tinemaha, Tucson, De Bilt, Stuttgart, and Potsdam), 4h. (Philadelphia and Sofia), 6h. (Balboa Heights and San Juan), 7h. (Philadelphia and La Paz), 10h. (Huancayo (2), La Paz (2), Balboa Heights, San Juan, Mount Wilson, Pasadena, Riverside, Tinemaha, and Tucson), 11h. (Bozeman, Potsdam, Stuttgart (2), near Frunse, and Tashkent), 13h. (Triest), 15h. (Bucharest, near Sofia, Helwan, Ksara, Triest, Potsdam, and Stuttgart), 16h. (De Bilt), 18h. (near Branner), 22h. (near Berkeley), 23h. (Bucharest, Sofia, Triest, Potsdam, and near Istanbul).

Nov. 6d. 13h. 31m. 3s. Epicentre 6°·6S. 76°·9W. Depth of focus 0·005.

A = +·2252, B = −·9676, C = −·1142; δ = +1; h = +7;
D = −·974, E = −·227; G = −·026, H = +·111, K = −·993.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		5·6	165	i 1 32	+ 9	i 2 6	−21	i 1 38	pP	i 2·6
La Paz	z.	13·1	140	i 3 9k	+ 4	i 5 32	+ 3	i 3 46	pP	7·0
Balboa Heights		15·7	350	e 3 42	+ 4	—	—	—	—	—
Fort de France		26·3	37	i 5 29	− 2	e 10 12	+15	—	—	—
San Juan		27·0	23	i 5 37	− 1	i 10 3	− 6	i 6 21	pP	i 11·2
La Plata	E.	33·1	151	6 33	+ 1	11 45?	0	7 3?	pP	14·6
	N.	33·1	151	6 32	0	12 39?	SS	6 57?	pP	14·0
Rio de Janciro		36·2	120	e 6 57	− 1	e 12 35	+ 2	—	—	e 16·3
Bermuda		40·5	16	e 7 33	− 1	e 13 33	− 5	e 8 16	pP	e 17·2
Columbia		40·6	354	e 7 36	+ 1	e 13 33	− 7	e 8 18	pP	e 18·5
Cape Girardeau		45·3	347	i 8 11	− 2	e 14 40	− 8	e 17 53	SS	—
Philadelphia		46·6	3	i 8 22	− 1	i 14 59	− 8	i 9 7	pP	e 18·9
Pittsburgh		46·9	357	i 8 27	+ 1	—	—	—	—	—
Harvard		49·1	6	i 8 47	+ 4	i 15 14	−28	i 9 13	pP	e 27·0
Tucson		50·4	322	i 8 54	+ 1	e 15 46	−14	i 9 23	pP	e 20·2
Ottawa		51·8	2	9 2	− 1	16 14	− 5	17 3	PS	25·0
Shawinigan Falls		53·0	4	9 12	0	16 33	− 3	—	—	—
Seven Falls		53·8	6	9 17	− 1	16 47	+ 1	17 38	PS	22·0
La Jolla	z.	54·9	318	i 9 26k	0	—	—	i 10 26	pP	—
Riverside		55·6	319	i 9 32k	+ 1	e 17 9	− 1	i 10 3	pP	—
Mount Wilson		56·2	319	i 9 36k	0	i 17 19	+ 1	i 10 5	pP	—
Pasadena		56·3	319	i 9 37k	+ 1	i 17 20	0	i 10 8	pP	e 24·0
Salt Lake City		57·0	329	e 9 41	0	e 17 27	− 2	e 10 10	pP	e 28·5
Logan		57·7	332	i 9 45	− 1	i 17 38	0	18 18	SS	e 24·5
Tinemaha		58·2	322	i 9 50	0	—	—	e 39 40	P'P'	—
Bozeman		60·3	334	10 3	− 1	18 4	− 8	e 10 32	pP	e 31·4
Butte		61·3	333	e 10 9	− 2	e 18 23	− 2	e 10 40	pP	e 30·8
Victoria		68·3	329	10 54	− 2	19 47	− 4	—	—	—
San Fernando		78·6	51	11 53	− 3	e 21 48	+ 1	—	—	—
Granada		80·8	51	i 12 10	+ 2	i 22 10	0	12 44	pP	39·2
Clermont-Ferrand		87·8	44	i 12 42	− 1	e 23 17	− 2	—	—	—
College		88·0	336	—	—	e 23 16	− 5	e 24 14	PS	e 42·2
Basle		91·1	42	e 12 57	− 2	—	—	—	—	—
Zurich		91·7	43	e 13 1k	− 1	—	—	—	—	—
Stuttgart		92·3	42	e 13 4	0	e 23 59	0	e 13 37	pP	—
Copenhagen		95·0	35	i 13 17k	0	24 45	+22	25 22	PS	—
Potsdam		95·2	38	i 13 18	0	e 24 57?	S_cS	—	—	—
Helwan	z.	109·1	61	e 14 21	P	e 28 15	PPS	e 18 53	PP	—
Tashkent		134·2	36	19 13	[+ 3]	22 45	PKS	19 46	pPKP	—
Andijan		136·3	34	e 19 19	[+ 5]	22 47	PKS	—	—	—

Additional readings :—
La Paz iSZ = 5m.56s.
La Plata PPPZ = 7m.7s., SE = 10m.57s.?, P_cSE = 12m.33s.?.
Bermuda ePP = 9m.28s., e = 10m.17s., esS = 14m.23s.
Columbia ePP = 9m.18s.
Philadelphia iP_cS = 13m.48s., esS = 15m.47s.
Pittsburgh e = 15m.57s., i = 16m.9s.
Harvard i = 9m.27s., iP_cP = 10m.4s., isS? = 15m.36s., e = 17m.2s., eSS = 19m.18s.
Tucson iPP = 10m.57s., ipPP = 11m.22s., e = 16m.23s.
Ottawa SS = 20m.57s.?.
Mount Wilson ePKP,PKPZ = 39m.33s.
Pasadena isPZ = 10m.32s., ePKP,PKPZ = 39m.22s., iZ = 39m.44s.
Salt Lake City ePP = 11m.48s., epPP = 12m.15s., eS_cS = 19m.14s., e = 22m.33s.
Logan iS_cS = 19m.21s., i = 20m.19s.
Bozeman epPP = 12m.43s., esS = 19m.0s., eSS = 22m.3s.
Butte e = 13m.38s. and 21m.43s.
Granada PP = 15m.21s., pPP = 15m.51s., SKKS = 22m.47s., sS = 23m.7s., PPS = 23m.58s., SS = 27m.25s.
Stuttgart esP = 13m.51s., ePP = 16m.39s.?, epS? = 24m.26s., esS = 24m.48s., ePS = 25m.57s., eSS = 30m.9s.
Helwan eZ = 19m.30s., 29m.45s., and 30m.9s.

Nov. 6d. Readings also at 1h. (Potsdam), 4h. (near Andijan), 7h. (Mount Wilson, Tucson, Pasadena, Riverside, and near Mizusawa), 10h. (Potsdam, Pasadena, Tucson, and Riverside), 19h. (near Fresno), 20h. (near Fresno and near Granada), 21h. (Andijan, Tashkent, Sverdlovsk, and Helwan), 22h. (Granada).

Nov. 7d. 7h. 32m. 10s. Epicentre 9°·2S. 123°·0E. (as on 1939 December 17d.).

Depth of focus 0·010.

A = −·5377, B = +·8280, C = −·1589; $\delta = -5$; $h = +7$;
D = +·839, E = +·545; G = +·087, H = +·133, K = −·987.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Perth		23·6	194	5 5	+ 2	9 20	+13	—	—	—
Brisbane	E.	33·7	125	i 6 34	0	—	—	—	—	i 17·5
Riverview		35·7	137	e 7 18	+27	e 12 29	+ 9	—	—	i 16·8
Kôti		43·7	12	e 7 57	0	—	—	—	—	—
Colombo	E.	45·9	289	e 7 50?	−24	—	—	—	—	—
Nagoya		46·1	16	e 8 18	+ 2	14 55	+ 1	—	—	—
Nagano		47·8	16	e 8 30	+ 1	15 10	− 8	—	—	—
Kodaikanal	E.	49·3	293	e 9 2	+21	17 2	?	—	—	—
Sendai		50·1	19	8 49	+ 2	15 51	+ 1	—	—	—
Mizusawa		51·0	18	e 8 52	− 2	15 58	− 4	—	—	—
Hyderabad	E.	51·4	301	—	—	15 58	−10	—	—	—
Auckland		54·2	129	8 50?	−28	16 24	−22	10 1	PcP	26·8
Christchurch		55·0	138	9 24	0	17 3	+ 7	11 25	PP	27·2
Wellington		55·6	134	9 28	0	17 7	+ 3	10 10	pP	25·8
Bombay	E.	56·8	299	i 9 37	+ 1	i 17 16	− 4	10 0	pP	—
New Delhi	N.	58·0	313	e 11 38	PP	e 18 9	PS	—	—	—
Almata		66·9	325	—	—	19 34	+ 6	—	—	—
Andijan		68·1	320	i 10 50	− 1	i 19 44	+ 2	—	—	—
Tashkent		70·4	320	11 7	+ 1	20 12	+ 3	—	—	—
Sverdlovsk		83·2	331	i 12 17	0	i 22 25	− 2	—	—	—
Ksara		92·7	303	e 13 41?	?	e 24 17	+21	—	—	—
Helwan		95·9	299	e 13 19	+ 2	23 48	?	17 31	PP	—
Sitka		104·0	33	—	—	i 24 26	[+ 3]	—	—	e 43·2
Tinemaha	Z.	118·4	54	e 18 43	[+ 6]	—	—	e 29 1	PKKP	—
Pasadena		118·9	56	i 18 41	[+ 3]	i 25 30	[+ 8]	i 19 5	pPKP	e 57·2
Mount Wilson	Z.	119·0	56	i 18 42	[+ 4]	i 25 35	[+12]	i 29 0	PKKP	—
Riverside	Z.	119·6	56	i 18 43	[+ 4]	—	—	e 28 58	PKKP	—
La Jolla	Z.	119·9	57	i 18 44	[+ 4]	—	—	—	—	—
Bozeman		121·3	41	—	—	e 25 37	[+ 6]	e 32 4	PPS	e 59·1
Salt Lake City		122·4	48	e 18 30	[−15]	e 25 40	[+ 5]	—	—	e 57·4
Granada		124·4	309	e 20 10	PP	25 15	[−26]	30 18	PS	68·2
Tucson		125·3	56	i 18 54	[+ 4]	e 25 46	[+ 2]	e 19 44	pPKP	e 44·0
Florissant	Z.	138·0	40	i 22 42	PP	—	—	—	—	—
St. Louis		138·2	40	e 19 28	[+14]	26 24	[+11]	e 22 54	PP	—
Cape Girardeau	N.	139·4	43	e 22 46	PP	—	—	—	—	—
Seven Falls		140·4	14	e 40 50?	SS	—	—	—	—	67·8
Ottawa		140·5	20	e 19 14	[− 4]	—	—	e 22 48	PP	65·8
Pittsburgh	Z.	142·8	29	i 22 56	PP	—	—	—	—	—
Harvard		144·4	17	i 19 27	[+ 2]	—	—	i 22 55	PP	—
Columbia		146·9	38	e 23 29	PP	—	—	—	—	—
Huancayo		152·1	140	e 19 51	[+14]	—	—	e 20 40	pPKP	e 75·5
La Paz	Z.	152·2	158	i 19 45a	[+ 8]	—	—	i 23 49	PP	77·8

Additional readings:—
Riverview eE = 7m.21s.
Mizusawa ePE = 8m.55s.
Auckland S_cS? = 18m.29s.
Christchurch S_cS = 19m.56s., Q = 22m.18s.
Wellington iZ = 9m.35s., sP_cPZ = 11m.32s., sS = 18m.28s., SS? = 21m.36s., Q = 23m.50s.?.
Bombay sPE = 10m.19s., P_cPE = 10m.47s., PPE = 11m.44s., sSE = 17m.52s., iE = 18m.25s., and 20m.13s.
Helwan eZ = 16m.2s., PS?Z = 24m.37s.
Sitka e = 25m.40s. and 34m.6s.
Tinemaha iZ = 18m.58s.

Continued on next page.

Pasadena isPKKPZ = 19m.31s., ePPZ = 20m.13s., eSKPZ = 21m.37s., ipPKS = 22m.9s., iPPPZ = 22m.46s., ipPPPZ = 23m.8s., ipSKSEN = 26m.8s., iPKKPZ = 29m.0s., isPKKPZ = 29m.33s., eSKKPZ = 32m.23s.
Mount Wilson iZ = 19m.5s. and 22m.9s.
Salt Lake City e = 27m.11s. and 31m.7s.
Tucson epPP = 21m.24s., e = 21m.54s. and 22m.24s., i = 24m.21s. and 25m.57s., ePS = 30m.38s.
St. Louis eZ = 19m.34s. and 19m.44s., eEZ = 22m.44s., eE = 23m.11s., 24m.24s., 25m.19s., and 25m.34s.
Ottawa eN = 28m.55s.
Columbia e = 46m.4s.
Huancayo e = 23m.30s., 27m.34s., and 30m.29s.
Long waves were also recorded at Sydney, Potsdam, and De Bilt.

Nov. 7d. 14h. 3m. 53s. Epicentre 36°·4N. 140°·6E. (as on 1941 June 16d.).
Intensity V at Mito, Kakioka, Onahama, Hukusima; IV at Tyosi, Utumomiya, Kumagaya, Yokohama, Tokyo; II-III at Sendai, Mera, Osima, Katuura. Epicentre 36°·6N. 140°·9E. Macroseismic radius 200-300km. Very shallow.
Seismological Bulletin of the Central Meteorological Observatory, Japan for the year 1942, Tokyo 1950, pp. 42-43, macroseismic chart p. 42.

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

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Mito	0·1	261	0 11	+ 3	0 17	+ 4
Kakioka	0·4	244	0 12a	− 1	0 20	− 1
Tukubasan	0·5	246	0 13	− 1	0 23	0
Onahama	0·6	24	0 12a	− 3	0 21	− 5
Utunomiya	0·6	284	0 15	0	0 26	0
Tyosi	0·7	162	0 15	− 2	0 24	− 4
Togane	0·8	193	0 21	+ 3	0 35	+ 4
Kumagaya	1·0	256	0 21k	0	0 36	0
Tokyo Cen. Met. Obs.	1·0	224	0 21k	0	0 36	0
Tokyo Imp. Univ.	1·0	224	0 21	0	0 37	+ 1
Mitaka	1·1	229	0 21	− 1	0 43	+ 4
Kiyosumi	1·3	195	0 21	− 4	0 40	− 4
Maebasi	1·3	270	0 24k	− 1	0 42	− 2
Yokohama	1·3	219	0 25k	0	0 46	+ 2
Hukusima	1·4	356	0 29	+ 2	0 43	− 3
Mera	1·6	203	0 32	+ 2	0 58	S_g
Hunatu	1·8	239	0 27	− 5	0 51	− 5
Kohu	1·8	245	0 33k	+ 1	0 59	+ 3
Misima	1·8	226	0 35a	+ 3	1 2	S_g
Osima	1·9	211	0 34	0	0 59	0
Sendai	1·9	7	0 30a	− 4	0 47	−12
Nagano	2·0	278	0 34	− 1	1 2	0
Aikawa	2·5	311	0 42	− 1	1 24	S_g
Omaesaki	2·7	227	0 49	+ 4	1 19	0
Mizusawa	2·8	9	0 44	− 3	1 16	− 6
Toyama	2·8	276	0 48k	+ 1	1 25	+ 3
Hamamatu	2·9	234	0 39k	− 9	1 29	+ 5
Wazima	3·1	288	0 51	0	1 40	S_g
Nagoya	3·2	247	0 55	+ 3	1 35	+ 3
Gihu	3·3	252	0 55a	+ 2	1 34	− 1
Hatidyozima	3·3	192	0 58	P*	1 34	− 1
Akita	3·4	355	1 0	P*	—	—
Miyako	3·4	18	0 53	− 2	1 31	− 6
Hikone	3·7	253	1 0	0	1 46	+ 1
Kameyama	3·7	247	1 4	+ 4	1 47	+ 2
Hatinohe	4·2	10	1 4	− 3	1 50	− 7
Kyoto	4·2	252	1 9	+ 2	1 51	− 6
Owase	4·3	238	1 9	+ 1	2 19	S_g
Aomori	4·4	1	1 11a	+ 1	2 6	+ 4
Osaka	4·5	249	1 15	+ 4	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Kobe		4·7	250	1 22k	P*	2 12	+ 2
Toyooka		4·8	261	1 17	+ 2	2 18	+ 6
Siomisaki		4·9	235	1 43	P_g	2 49	S_g
Wakayama		5·0	244	1 21	+ 3	2 36	S*
Sumoto		5·1	247	1 9	−11	2 5	−15
Mori		5·7	0	1 28	0	2 34	− 1
Muroto		6·1	241	0 51	?	—	—
Koti		6·4	246	1 39	+ 1	2 55	+ 2
Sapporo		6·7	8	1 35	− 7	3 5	+ 5
Hirosima		7·0	255	1 30	−16	3 34	S*
Hamada		7·1	259	1 50	+ 2	3 17	+ 7
Nemuro		7·9	27	3 8	?	4 28	S_g
Hukuoka		8·8	254	2 13	+ 2	4 20	S*
Kumamoto		8·9	249	2 19	+ 7	4 41	S*
Tashkent		54·3	299	e 9 24	− 6	e 16 57	−10
Sverdlovsk		55·2	319	9 30	− 7	e 17 8	−12
Tinemaha	z.	76·7	55	e 12 4	+ 9	—	—
Mount Wilson	z.	78·5	57	e 12 10	+ 6	—	—
Pasadena	z.	78·5	57	e 12 7	+ 3	—	—
Riverside	z.	79·1	57	e 12 16	+ 8	—	—
Tucson		84·5	54	i 12 32	− 4	—	—

Additional reading :—
Kobe also gives 2m.20s.

Nov. 7d. Readings also at 0h. (Granada and near Algiers), 2h. (near Algiers), 4h. (Mizusawa, Tucson, Riverside, Mount Wilson, Pasadena, and Tinemaha), 5h. (near La Paz), 6h. (near Mizusawa), 8h. (Jena), 12h. (Bombay, New Delhi, Colombo, Helwan, Granada, Potsdam, De Bilt, San Fernando, Cheb, Stuttgart, Kew, and Upsala), 13h. (Harvard), 16h. (near Florissant and near Ottawa), 23h. (Triest and Calcutta).

Nov. 8d. Readings at 0h. (Helwan and Sofia), 4h. (near Mizusawa), 5h. (Mount Wilson, Pasadena, Tucson, and Riverside), 6h. (Mount Wilson, Pasadena, Palomar, Riverside, and near Tucson), 8h. (Ksara, Potsdam, Tashkent, Frunse, Sverdlovsk, and La Paz), 10h. (Ottawa, College, La Jolla, Mount Wilson (2), Pasadena, (2), Riverside (2), Tinemaha (2), Tucson (2), Montezuma, San Juan, near Huancayo, near La Paz, and Rio de Janeiro). 18h. (Calcutta, Frunse, and Tashkent), 21h. (near Huancayo, La Paz (2), San Juan, and near Fort de France).

Nov. 9d. 21h. 55m. 34s. Epicentre 0°·4N. 80°·4W. (as on 1942 July 3d.).

$A = +·1668$, $B = -·9860$, $C = +·0070$; $\delta = +7$; $h = +7$;
$D = -·986$, $E = -·167$; $G = +·001$, $H = -·007$, $K = -1·000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·3	158	e 3 11	− 2	e 5 52	+10	e 3 46	PP	i 6·5
La Paz		20·7	146	e 4 39	− 5	8 41	+10	—	—	12·2
San Juan		22·7	37	e 5 9	+ 5	i 9 38	+29	—	—	e 10·3
Fort de France		23·8	55	e 5 18	+ 3	—	—	—	—	—
Tucson		42·7	322	i 8 0	0	e 11 42	?	—	—	e 22·8
Palomar	z.	47·4	318	i 8 41	+ 3	—	—	—	—	—
Riverside	z.	48·1	318	e 8 43	0	—	—	—	—	—
Mount Wilson	z.	48·7	318	i 8 47	− 1	—	—	—	—	—
Pasadena		48·7	318	i 8 46	− 2	—	—	—	—	—

Nov. 9d. Readings at 0h. (Basle, near Neuchatel, and Zurich), 3h. (Perth, Sverdlovsk, Tucson, Mount Wilson, Pasadena, Riverside, and Tinemaha), 4h. (Bombay, Calcutta, Colombo, Frunse, Sverdlovsk, Helwan, Riverview, Mount Wilson, Pasadena, Palomar, Tucson, Riverside, Tinemaha, and La Paz), 7h. (Huancayo, near La Paz, La Plata, Tucson, Mount Wilson, and Riverside), 8h. (Sofia and near Triest), 10h. (Riverview, Mount Wilson, Pasadena, Riverside, Tucson, Tashkent, Sverdlovsk, and Ksara), 15h. (Triest), 20h. (Tucson and near Fresno), 23h. (Calcutta).

Nov. 10d. 11h. 41m. 25s. Epicentre 49°·4S. 30°·6E.

$A = +\cdot5623$, $B = +\cdot3326$, $C = -\cdot7571$; $\delta = 0$; $h = -5$;
$D = +\cdot509$, $E = -\cdot861$; $G = -\cdot652$, $H = -\cdot385$, $K = -\cdot653$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Johannesburg	E.	23·3	354	i 5 11?	+ 1	i 9 29	+ 9	—	—	10·5
Tananarive		33·3	29	6 43a	+ 2	i 12 10	+ 8	i 7 49	PP	i 14·4
La Plata	E.	63·6	247	i 10 30	− 5	i 19 1	− 7	11 21	PcP	29·4
	Z.	63·6	247	—	—	19 5?	− 3	11 17	PcP	28·6
Perth		63·6	-109	10 35	0	19 10	+ 2	26 33	SSS	—
Colombo	E.	70·6	53	11 19	0	20 48	+15	—	—	28·9
Kodaikanal	E.	72·2	49	i 11 3	−26	i 20 32	−19	25 12	SS	—
Bombay		77·6	41	i 11 59	− 1	21 56	+ 5	15 2	PP	i 36·9
Helwan		78·9	1	i 12 8a	+ 1	21 23	?	14 50	PP	33·8
Hyderabad		78·9	46	12 4	− 3	22 13	+ 8	15 13	PP	38·3
Montezuma		79·0	249	e 12 11	+ 4	i 22 0	− 6	—	—	e 33·0
Christchurch		81·7	153	12 20a	− 2	22 35	+ 1	15 44	PP	38·5
Riverview		81·8	133	i 12 22a	0	i 22 38	+ 3	i 15 17	PP	34·4
Sydney		81·8	133	i 12 20	− 2	i 22 35	0	i 17 59	PPP	33·8
Kaimata		82·2	153	12 25	+ 1	22 35	− 4	—	—	—
Ksara		83·0	4	e 12 32	+ 4	22 59	+12	15 48	PP	46·1
La Paz		83·2	253	i 12 28k	− 1	i 22 48	− 1	i 15 9	PP	37·6
Wellington		84·4	154	12 32	− 4	22 55	− 6	15 45	PP	38·6
New Plymouth		86·2	152	12 52	+ 8	23 10	[+ 1]	—	—	—
Tuai		87·3	155	12 49	− 1	23 12	[− 4]	—	—	—
Arapuni		87·6	153	12 53?	+ 2	23 5?	[−13]	24 11?	PS	39·6
Brisbane		87·9	131	i 12 54	+ 1	i 23 22	[+ 2]	i 24 35	PS	i 39·8
Calcutta		88·0	52	i 12 51	− 2	i 23 25	[+ 4]	i 16 20	PP	e 38·2
New Delhi		88·0	40	e 12 19	?	i 23 5	[−16]	i 16 7	PP	35·6
Auckland		88·4	153	12 56	+ 1	23 25	[+ 2]	24 45	PS	41·6
Algiers		89·2	338	e 13 6	+ 7	i 24 1	+14	i 16 35?	PP	e 35·9
Dehra Dun		89·9	40	i 13 17k	+15	23 48	− 6	—	—	i 38·1
Istanbul		90·1	358	13 26	+23	25 35	PPS	17 3	PP	48·1
Huancayo		91·1	250	e 13 6	− 2	23 25	[−14]	i 16 40	PP	i 39·7
Granada		91·4	333	i 13 9	0	23 50	{− 2}	i 16 51	PP	41·7
San Fernando		91·5	330	i 13 8	− 2	e 24 15	+ 7	—	—	—
Sofia	N.	91·9	354	e 13 17	+ 6	i 23 53	{− 2}	i 16 57	PP	42·6
Bucharest		93·5	357	13 21	+ 2	e 22 2	?	—	—	30·6
Belgrade		94·3	353	e 13 23	0	e 24 44	+12	i 13 36	PcP	e 48·8
Lisbon		94·5	329	13 22	− 1	24 44	+10	13 37	PcP	44·6
Focsani		94·8	357	e 13 35?	+10	e 23 5?	?	—	—	30·6
Marseilles		94·9	341	e 13 29?	+ 4	i 24 47?	+10	i 17 29?	PP	38·6
Triest		95·8	347	e 13 33	+ 4	e 24 35	−10	e 17 33	PP	e 41·6
Tashkent		96·5	28	13 32	0	25 0	+ 9	17 28	PP	—
Chur		97·6	345	e 13 37	− 1	e 23 52	[−23]	e 26 31	PS	—
Clermont-Ferrand		97·8	340	i 13 37	− 1	—	—	i 17 34	PP	e 46·2
Neuchatel		98·2	344	e 13 31	− 9	e 25 10	+ 5	—	—	—
Zurich		98·3	344	e 13 39	− 2	25 15	+ 9	e 17 27	PP	—
Basle		98·6	344	e 13 46	+ 4	26 45	PS	e 17 45	PP	—
Stuttgart		99·5	346	e 13 46	0	25 29	+13	e 17 51	PP	e 49·1
Strasbourg		99·6	345	e 13 41?	− 5	i 24 28	[+ 3]	i 17 55	PP	47·2
Prague		100·1	349	e 13 35?	−14	e 24 5?	[−22]	e 18 1	PP	e 46·6
Hof		100·6	346	e 18 6	PP	27 5	PS	i 32 23	SS	e 43·6
Paris		100·8	340	i 13 54a	+ 2	i 24 30	[− 1]	i 18 2	PP	48·6
Jena		101·3	347	e 13 59	+ 5	i 27 5	PS	i 18 5	PP	e 47·6
Angra do Heroismo		101·5	316	19 1	?	—	—	20 46	PPP	—
Fort de France		102·2	278	e 14 13	+15	e 24 35	[− 2]	—	—	—
Uccle		102·3	342	e 14 0	+ 1	i 27 21	PS	i 18 3	PP	48·6
Potsdam		102·5	348	i 14 2	+ 2	i 25 52	+11	i 18 8	PP	43·6
De Bilt		103·4	344	i 14 7a	+ 3	i 25 47	− 2	i 18 25	PP	e 49·6
Kew		103·9	340	e 14 7a	+ 1	i 24 52?	[+ 6]	e 18 22?	PP	e 52·6
Oxford		104·4	339	i 18 33	PP	—	—	—	—	—
Copenhagen		105·8	349	e 14 15	P	24 56	[+ 2]	18 40	PP	—
Stonyhurst		106·6	340	18 5	PKP	i 33 55	SS	18 47	PP	46·1
San Juan		108·1	277	e 14 28	P	i 25 14	[+10]	i 19 10	PP	i 44·0
Sverdlovsk		108·8	16	14 25	P	26 37	S	18 52	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Upsala		109·4	355	e 14 35?	P	e 25 11	[+ 1]	e 18 35	PKP	51·6
Aberdeen	N.	109·6	341	e 14 8	?	i 26 11	{+ 9}	19 11	PP	54·1
Balboa Heights		109·9	260	e 17 35?	?	—	—	—	—	—
Bermuda		117·0	289	e 18 47	[0]	i 27 40	?	e 20 0	PP	i 47·1
Miyazaki		120·2	76	20 9	PP	29 10	?	23 3	PPP	36·4
Hukuoka		120·7	73	e 19 0	[+ 6]	30 46	PS	i 20 21	PP	e 50·9
Zinsen		120·9	66	e 18 49	[− 6]	—	—	23 0	PPP	e 47·7
Matuyama		122·3	73	e 19 10	[+13]	—	—	—	—	51·9
Koti		122·6	74	e 18 59	[+ 1]	—	—	e 30 25	PS	e 50·4
Halifax		124·4	300	21 3	PP	27 44	{ 0}	31 7	PS	55·6
Kobe		124·4	75	e 19 5	[+ 4]	27 24	{−20}	37 48	SSP	52·8
Scoresby Sund		125·4	340	e 18 33	[−30]	i 25 55	[−12]	i 20 53	PP	e 52·9
Nagoya		125·8	76	e 19 22	[+18]	—	—	—	—	—
Hatidyozima		126·3	78	21 6	PP	—	—	—	—	—
Oaxaca	N.	126·8	253	24 42	?	—	—	—	—	—
Nagano		127·5	74	e 19 25	[+18]	—	—	—	—	—
Harvard		127·7	294	e 16 16	?	—	—	i 19 5	PKP	i 52·7
Tokyo Cen. Met. Ob.		127·9	76	e 19 13	[+ 5]	27 31	?	e 21 30	PP	e 39·1
Fordham		128·1	291	e 15 55	?	—	—	e 19 7	PKP	—
Vera Cruz	Z.	128·1	254	e 19 6	[− 2]	—	—	—	—	—
Columbia		128·4	280	e 19 6	[− 3]	—	—	e 21 7	PP	e 52·0
Philadelphia		128·4	289	e 18 58	[−11]	—	—	21 3	PP	i 52·7
Vermont		129·8	295	e 21 45	PP	i 29 37	?	i 24 32	PPP	i 53·0
Seven Falls		129·9	300	19 14	[+ 2]	29 52	?	21 41	PP	60·6
Tacubaya	N.	130·1	251	e 19 7	[− 5]	—	—	—	—	—
Shawinigan Falls		130·7	298	19 16	[+ 3]	—	—	21 47	PP	54·6
Mizusawa	N.	130·8	74	e 18 55	[−18]	30 21	?	—	—	—
Mobile		130·9	271	e 21 25	PP	—	—	—	—	—
New Kensington		131·5	287	19 35	[+20]	—	—	21 47?	PP	—
Pittsburgh	Z.	131·6	287	e 19 14	[− 1]	—	—	—	—	—
Ottawa		131·8	295	19 13	[− 2]	29 55	?	21 41	PP	53·6
Mori	E.	132·2	70	e 19 31	[+15]	—	—	—	—	—
Buffalo		132·3	290	i 19 17	[+ 1]	i 26 12	[−14]	21 31	PP	—
Manzanillo	N.	133·0	246	e 19 15	[− 3]	—	—	—	—	—
Sapporo		133·2	68	e 11 2	?	22 1	PP	31 51	PS	39·4
Cape Girardeau		135·9	277	e 19 25	[+ 2]	—	—	e 22 3	PP	—
St. Louis		137·1	278	i 19 22	[− 3]	i 28 50	{−14}	e 22 9	PP	—
Chicago		137·2	284	e 19 24	[− 1]	—	—	i 22 36	PP	e 55·1
Florissant	Z.	137·3	278	i 19 21	[− 5]	—	—	i 22 12	PP	—
Chihuahua	Z.	141·2	254	e 19 21	[−12]	—	—	—	—	—
Lincoln		142·5	278	e 19 31	[− 4]	e 29 45	{+ 9}	e 22 41	PP	e 60·7
Tucson		146·6	253	i 19 41	[− 1]	e 28 8	?	e 23 5	PP	e 64·1
Palomar	Z.	151·1	248	e 19 55	[+ 6]	—	—	—	—	—
Honolulu		151·2	163	e 20 2	[+13]	—	—	e 23 45	PP	e 53·9
Riverside	Z.	151·8	247	e 19 49	[− 1]	—	—	—	—	—
Mount Wilson	Z.	152·4	247	i 19 50k	[− 1]	—	—	—	—	—
Pasadena		152·4	247	i 19 50k	[− 1]	i 43 11?	SS	e 36 47?	PPS	i 61·7
Salt Lake City		152·4	266	e 19 53	[+ 2]	—	—	e 23 28	PP	e 61·5
Logan		152·8	270	i 19 53	[+ 1]	e 27 53	?	e 23 41	PP	63·0
Bozeman		154·0	277	e 19 56	[+ 3]	—	—	i 43 20	SS	e 64·9
Tinemaha	Z.	154·4	252	e 19 51	[− 3]	—	—	—	—	—
Butte		155·1	277	e 20 2	[+ 7]	e 28 17	?	i 43 39	SS	e 59·7
Fresno	N.	155·1	250	e 21 56	?	—	—	—	—	e 77·8
Lick	N.	156·6	249	e 20 4	[+ 8]	—	—	—	—	e 78·6
Santa Clara		156·8	249	i 19 58	[+ 1]	53 37	?	—	—	75·5
Branner		157·0	248	e 20 8	[+11]	—	—	—	—	93·6
Berkeley		157·4	249	e 20 3	[+ 5]	—	—	—	—	—
San Francisco		157·4	249	e 20 2	[+ 4]	—	—	e 44 16	SS	—
Ukiah		158·7	250	e 20 3	[+ 4]	e 28 10	PPP	i 45 8	SSP	e 59·0
Ferndale		160·2	253	e 20 7	[+ 6]	—	—	e 23 59	PP	e 65·6
Seattle		162·0	274	e 20 38	?	e 26 54	[−12]	e 38 21	PPS	e 66·3
Victoria		162·9	277	20 2	[− 2]	—	—	24 56	PP	65·6
College		164·5	358	e 20 11	[+ 6]	e 31 23	{−13}	e 24 40	PP	e 63·2
Sitka		168·3	320	e 20 11	[+ 3]	i 31 56	{ 0}	e 24 41	PP	i 58·3

For Notes see next page.

NOTES TO NOVEMBER 10d. 11h. 41m. 25s.

Additional readings :—

Johannesburg iSEN =8m.35s.
Tananarive PN =6m.47s., iEN =6m.50s., N =12m.13s., iSSE =14m.7s.
La Plata E =10m.46s., PPE =12m.53s.?, PPP =14m.35s.?, E =16m.41s.?, and 17m.11s.? SSN =22m.35s.?, SSE =22m.59s.?, SSSZ =25m.41s.?, SSSN =26m.11s.?, SSSE =26m.23s., Z =27m.29s.?
Perth i =20m.40s.
Kodaikanal PP =13m.35s.
Bombay iSE =21m.59s., PSE =22m.52s., SSE =30m.22s.
Helwan PPPN =16m.23s.
Hyderabad PSE =22m.40s., SSE =27m.17s.
Montezuma e =12m.58s., and 26m.33s., eSS =27m.6s., e =30m.19s.
Christchurch SS =27m.31s., Q =33m.59s.
Riverview i =13m.10s., iN =14m.35s., iE =14m.40s., iN =18m.10s., iPSEN =23m.23s., iSSEN =27m.47s., iSSSN =31m.31s., eQN =32m.59s.
Sydney i =13m.5s.
Ksara PS =23m.38s., SS =28m.41s.
La Paz iSN =23m.35s., iZ =25m.6s., SSN =28m.49s.
Wellington SS =28m.30s., SSS? =31m.50s., Q =36m.5s.
Arapuni PP? =17m.5s.?, SS =29m.11s.?, SSS =33m.17s.?, Q? =36m.35s.?
Brisbane iSE =23m.33s., iPSE =24m.38s., iSSN =29m.21s.
Calcutta iPPPN =18m.5s., iSKSN =23m.1s., iPSN =24m.15s., iSSN =29m.15s.
New Delhi pPE =12m.32s., ipPN =12m.37s., pPPE =16m.24s., iPPPN =18m.21s., PPPE =18m.24s., iSKS =22m.50s., SKSE =22m.54s., iSE =23m.12s., isSN =23m.34s., iPS =24m.13s., PPSN =24m.35s., PPSE =24m.38s., i =26m.57s., SS =29m.3s., isSSN =29m.35s., SSSN =32m.25s., SSSE =32m.30s., iN =35m.35s.
Auckland i =17m.35s., SS =29m.28s., Q =34m.35s.?
Algiers PPP? =19m.2s., PPS =25m.15s., e =26m.0s., SSS =33m.44s.
Dehra Dun i =28m.35s.
Istanbul PS =25m.3s., SS =28m.36s.
Huancayo iP =13m.9s., i =15m.47s., e =18m.4s., i =23m.46s. and 25m.25s., iSS =30m.5s., i =34m.27s.
Granada PPP =18m.42s., PS =24m.58s., PPS =25m.29s., SS =29m.48s.
Sofia iEN =25m.35s. and 30m.29s.
Bucharest eE =13m.25s., ePcP?EN =14m.20s., ePPE =15m.43s.
Belgrade iPP =17m.16s., i =17m.32s., 25m.1s., and 30m.59s.
Lisbon PN =13m.25s., 13m.30s., N =13m.32s., Z =13m.45s., N =13m.50s. and 14m.49s., PPN =17m.1s., PPZ =17m.10s., PP =17m.34s., Z =19m.11s., N =19m.18s., SKSN =24m.6s., SZ =24m.47s., SN =24m.54s., PSN =25m.58s., PSZ =26m.21s.?, SSN =31m.3s., ScSScS?E =37m.23s.?, Z =43m.35s.
Marseilles iSS =32m.8s.
Tashkent SKS =24m.12s.
Clermont-Ferrand i =13m.58s.
Zurich eSKS =24m.7s.
Stuttgart ePPP =20m.17s.?, eSKS =23m.55s., iSP =26m.50s., ePPS =28m.13s., eSS =31m.50s., eSS =32m.3s., eSSS =35m.49s., eQ? =43m.5s.
Strasbourg iPPP =20m.19s., eSKKS? =25m.28s., iPS =26m.55s., iSS =32m.6s.
Prague eP? =13m.52s., ePPP =20m.53s., ePS =26m.41s., ePPS =27m.35s., eSS =32m.17s.?, eSSS =36m.35s.
Hof eNW =22m.1s., iSSNE =32m.30s.
Paris ePPP =19m.45s., iPS =26m.45s., iSS =32m.35s.
Jena e =17m.35s., eZ =22m.3s. and 25m.43s., iSS =32m.35s., eZ =37m.35s.
Angra do Heroismo 21m.33s. and 26m.4s.
Uccle ePEN =14m.3s., iEN =18m.15s., iN =22m.27s., iE =23m.29s., iN =23m.39s., iSSN =32m.50s.
Potsdam iN =16m.37s., iE =17m.28s., iPSNW =27m.6s., iSSE =32m.43s.?, iSSPNW =32m.58s., iSSS?NW =36m.14s.
De Bilt eSS =33m.5s.
Kew ePPPEN =20m.38s., eSKKSN =25m.44s.?, iPSEN =27m.22s., iSSEN =33m.20s., eSSSEN =37m.5s?
Copenhagen 17m.37s., 21m.0s., and 26m.20s., PS =27m.55s., PPS =29m.5s., SS =33m.35s.
Stonyhurst i =20m.41s., 26m.25s., 28m.0s., and 34m.55s.
San Juan i =21m.33s. and 22m.31s., iPS =28m.35s., iSS =33m.51s.
Sverdlovsk SKS =25m.1s., PPS =28m.21s.
Upsala ePPN =19m.7s., eN =21m.1s., eE =26m.48s., ePSN =28m.28s., ePSE =28m.35s.?, eSSE =34m.35s.?
Aberdeen iEN =18m.58s., iN =23m.15s., iEN =28m.53s., 34m.25s., and 37m.43s., QE =46m.1s.
Bermuda ePP =20m.10s., e =25m.9s., ePS =29m.35s., e =32m.23s. and 35m.19s., iSS =35m.50s., iPKPPKP =39m.41s., i =43m.39s.
Miyazaki PPP =24m.34s.
Hukuoka PP =22m.25s., e =26m.1s., SKS =29m.40s., SS =37m.20s.
Zinsen PS =29m.57s., SS =36m.1s., eSSS =40m.5s.
Koti eSS =37m.35s., eSSS =41m.37s.
Halifax SKP =22m.35s., S =28m.59s., SS =37m.35s., SSS =42m.8s.
Scoresby Sund iPKP =18m.56s., iPS =30m.53s., i =32m.31s., iSS? =38m.3s., i =42m.34s.

Continued on next page.

Harvard iPP = 21m.9s., i = 21m.24s. and 23m.14s.
Tokyo Cen. Met. Obs. ePPP = 22m.40s., ePS? = 28m.21s., SS = 31m.36s.
Fordham e = 20m.49s., i = 22m.53s.
Columbia e = 19m.36s., 22m.21s., and 29m.56s., iSS? = 38m.22s., eSSS = 42m.34s.
Philadelphia ePKP = 19m.12s., i = 22m.14s. and 29m.28s., eSS = 38m.6s., i = 40m.53s., iSSS = 42m.39s.
Vermont i = 22m.37s. and 31m.20s., iSS = 38m.41s., iSSS = 43m.35s., i = 46m.5s., e = 51m.37s., and 52m.57s.
Seven Falls SKP = 22m.34s., SS = 38m.53s., e = 53m.35s.?
Shawinigan Falls SKP = 22m.47s., PPP = 24m.29s., SS = 38m.29s., SSS = 43m.59s.
Mizusawa ePE = 19m.1s., SE = 30m.37s.
Mobile i = 25m.20s., e = 30m.25s.
New Kensington PPP = 25m.23s.?
Ottawa iZ = 19m.19s., SKP = 22m.41s., PPP = 24m.40s., PS = 31m.59s., PPS = 33m.43s., SS = 39m.17s., SSS = 44m.3s.
Mori iE = 22m.42s.
Buffalo i = 20m.29s., e = 23m.19s. and 29m.23s.
Sapporo SP? = 22m.40s., PS? = 23m.3s., SS? = 27m.30s.
Cape Girardeau eE = 22m.48s., iSKPN = 23m.1s.
St. Louis iSKPE = 22m.59s.
Chicago e = 28m.48s., ePPPS = 34m.22s., e = 36m.53s., eSS = 39m.43s.
Lincoln ePPPS = 35m.21s., e = 40m.37s., eSSS = 46m.12s.
Tucson i = 21m.0s., ePP? = 23m.51s., i = 26m.15s., and 30m.15s., e = 36m.40s., i = 36m.50s. and 39m.18s., eSS = 41m.56s., i = 42m.50s., eSSS = 47m.32s., i = 55m.26s.
Honolulu e = 35m.48s., ePKP, PKP = 42m.30s.
Pasadena iSSSN = 48m.11s.?
Salt Lake City e = 25m.51s., 29m.30s., 32m.36s., and 32m.49s., eSS = 42m.51s., eSSS = 48m.59s., e = 53m.51s.
Logan i = 20m.6s. and 21m.6s., e = 30m.39s., i = 33m.28s., e = 37m.29s., iPKP, PKP? = 40m.40s., iSS = 43m.10s., eSSS = 48m.11s., i = 54m.28s.
Bozeman e = 22m.10s., 25m.2s., 29m.10s., and 33m.55s., eSSS = 49m.17s.
Butte e = 25m.15s., eSKSP = 34m.31s., eSSS = 49m.22s.
Santa Clara eE = 68m.3s.
Branner eSSE = 29m.53s., eE = 53m.35s., eN = 54m.6s.
Berkeley ePN = 20m.8s., ePZ = 20m.17s.
San Francisco eE = 20m.48s.
Ukiah e = 20m.28s. and 23m.10s., ePP = 25m.14s., e = 29m.3s., ePKPPKP = 40m.42s., eSSS = 50m.40s.
Ferndale eE = 20m.15s.
Seattle eSKKKP = 30m.16s., e = 34m.3s., eSS = 44m.12s., e = 51m.9s.
Victoria e = 20m.37s., PKP_2 = 21m.15s., SS = 46m.5s., SSS = 51m.58s.
College e = 20m.37s., 22m.33s., 25m.36s., 27m.56s., and 37m.33s., ePPS = 39m.13s., ePKP,PKP = 44m.27s., eSS = 45m.40s.
Sitka e = 23m.47s., i = 35m.46s., iPKP,PKP = 43m.40s., iSS = 47m.0s., eSSS? = 51m.30s.

Nov. 10d. Readings also at 6h. (near Neuchatel, Basle, Zurich, Chur, and Stuttgart), 7h. (Butte), 13h. and 14h. (Riverside, Tucson, Pasadena, and Mount Wilson), 20h. (Pasadena, Tucson, and Mount Wilson), 21h. (Pasadena, Mount Wilson, and Tinemaha).

Nov. 11d. 2h. 2m. 35s. Epicentre 6°·2S. 75°·3W. (as on 1938 Jan. 16d.).

A = +·2523, B = −·9617, C = −·107[illegible]; δ = +[illegible]; h = +7;
D = −·[illegible] E = −·[illegible]; G = −·[illegible], H = +·[illegible], K = −·99[illegible]

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		5·8	175	i 1 23	− 6	i 2 17	−21	i 1 57	P_g	i 2·7
La Paz	z.	12·4	145	i 2 58k	− 3	i 5 54	SS	—	—	7·6
Fort de France		25·1	35	e 5 25	− 3	—	—	—	—	—
San Juan		26·0	20	e 4 39	−57	e 10 7	+ 1	—	—	e 11·1
Rio de Janeiro	N.	35·1	122	e 15 25	?	—	—	—	—	—
Tucson		51·0	321	i 9 8	+ 2	i 16 31	+ 9	e 10 41	PP	e 27·7
Riverside	z.	56·4	318	i 9 50	+ 5	—	—	—	—	—
Mount Wilson	z.	57·0	318	i 9 51	+ 1	—	—	—	—	—
Pasadena	z.	57·0	318	i 9 52	+ 2	—	—	—	—	—
Tinemaha	z.	58·8	321	e 10 6	+ 4	—	—	—	—	—
Granada		79·4	50	i 12 25	+16	e 24 9	?	—	—	53·9

Additional readings :—
San Juan e = 6m.59s. and 8m.46s.
Tucson e = 15m.30s. and 16m.40s.
Long waves were also recorded at La Plata and De Bilt.

Nov. 11d. 13h. 6m. 10s. Epicentre 11°·0N. 84°·0W.

Pasadena suggests deep focus. The observations are not consistent and it does not seem possible to reconcile them on this hypothesis.

$A = +·1026$, $B = -·9765$, $C = +·1896$; $\delta = +3$; $h = +6$;
$D = -·995$, $E = -·105$; $G = +·020$, $H = -·189$, $K = -·982$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		4·8	114	e 1 1	−14	—	—	—	—	1·8
San Juan		18·8	65	e 4 19	− 4	i 7 56	+ 6	i 4 40	PP	e 9·4
Mobile		20·0	350	i 5 10	+33	i 8 47	+30	—	—	—
Fort de France		22·6	80	e 4 57	− 6	—	—	—	—	—
Columbia		23·1	7	e 5 33	+25	e 9 27	+11	—	—	e 10·9
Huancayo		24·5	160	e 5 1	−21	i 9 16	−24	e 6 5	PP	i 11·4
Cape Girardeau		26·7	352	e 5 45	+ 2	e 10 50	+33	—	—	—
Bermuda		27·7	37	e 5 53	+ 1	e 10 30	− 3	e 6 15	PP	e 12·2
St. Louis		28·1	350	e 5 48	− 7	e 10 17	−23	e 6 51	PP	—
Philadelphia		29·9	14	1 6 34	+22	e 11 15	+ 6	e 7 23	PP	13·4
Chicago		30·8	354	e 6 41	+21	e 10 7	?	—	—	e 12·9
Fordham		31·0	15	e 6 47	+26	e 11 36	+10	e 7 47	PPP	e 14·8
La Paz	z.	31·5	150	6 28	+ 2	11 31	− 3	7 26	PP	14·9
Tucson		32·5	316	i 6 34	0	e 12 27	+38	i 7 50	PP	e 14·5
Ottawa		35·0	10	6 58	+ 2	12 36	+ 8	8 42	PPP	18·8
Palomar	z.	37·4	312	e 7 38	+22	—	—	—	—	—
Seven Falls		37·7	15	—	—	e 13 14	+ 4	—	—	15·8
Riverside	z.	38·1	313	e 7 23	+ 1	—	—	i 9 30	P_cP	—
Mount Wilson	z.	38·7	313	i 7 27	0	e 13 23	− 2	i 9 33	P_cP	—
Pasadena		38·8	313	i 7 28	0	e 12 33	−53	i 9 32	P_cP	e 19·9
Logan		39·1	330	e 7 59	+28	e 13 56	+25	e 9 28	P_cP	—
Tinemaha	z.	40·3	317	e 7 42	+ 2	—	—	i 9 57	P_cP	—
Bozeman		41·6	333	—	—	e 13 2	−66	—	—	e 17·4
Granada		75·8	55	i 11 44	− 6	21 13	−18	—	—	—
Clermont-Ferrand		80·2	46	e 12 8	− 6	—	—	—	—	—
Basle		83·0	43	e 12 20	− 8	—	—	—	—	—
Stuttgart		83·9	42	e 12 26k	− 7	—	—	—	—	—
Potsdam	z.	85·7	38	i 12 36a	− 6	—	—	—	—	—

Additional readings :—
Huancayo e = 5m.26s., i = 9m.46s.
Cape Girardeau eN = 6m.3s.
St. Louis eZ = 5m.59s. and 6m.17s.
Fordham e = 6m.55s.
Tucson i = 6m.56s. and 10m.36s.
Ottawa SSS = 15m.50s?.
Riverside eZ = 7m.40s., iZ = 9m.48s.
Mount Wilson i = 7m.50s., iZ = 9m.50s.
Pasadena iZ = 7m.41s., eEN = 7m.53s., iZ = 9m.51s.
Logan e = 12m.21s.
Tinemaha eZ = 7m.59s.
Stuttgart e = 12m.46s.
Potsdam iZ = 12m.54s.

Nov. 11d. Readings also at 0h. (La Paz), 1h. (Mount Wilson, Tucson, and Pasadena), 6h. (Oaxaca), 8h. (Mount Wilson, Riverside, Tinemaha, and near Sofia), 10h. (Mount Wilson (2), Pasadena (2), Riverside (2), and Tinemaha (2)), 17h. (Pasadena and Tucson), 20h. (Tacubaya), 21h. (near Branner).

Nov. 12d. 4h. 55m. 25s. Epicentre 16°·5N. 94°·4W.

Destructive at Tehuantepec. Scale VIII at Iuchitan (Oaxaca state); VI throughout the states of Oaxaca, Chiapas, and Vera Cruz.
"Catalogo Compendiado de Tremblores," 1941-1944, Instituto de Geologia, Mexico, 1945, p. 38. Epicentre 16° 28′N. 94° 26′W. Depth 100km.

Pasadena :—Epicentre 17°·2N. 94°·2W. Deep focus.

$A = -\cdot0736$, $B = -\cdot9565$, $C = +\cdot2823$; $\delta = 0$; $h = +5$;
$D = -\cdot997$, $E = +\cdot077$; $G = -\cdot022$, $H = -\cdot281$, $K = -\cdot959$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca	N.	2·3	283	i 0 43	P*	—	—	—	—	—
Vera Cruz	N.	3·2	329	i 0 56	P*	—	—	—	—	—
Puebla	N.	4·4	305	i 1 14	+ 4	—	—	—	—	—
Tacubaya	E.	5·4	303	e 1 25	+ 1	—	—	—	—	—
Guadalajara	N.	9·4	297	i 2 21	+ 3	—	—	—	—	—
Mobile		15·2	21	i 3 42	+ 4	i 6 20	− 8	—	—	—
Chihuahua	Z.	16·2	320	i 3 49	− 1	—	—	—	—	—
Balboa Heights		16·3	116	e 3 49	− 3	—	—	—	—	—
Cape Girardeau		21·2	12	e 4 48	− 1	i 8 35	− 6	i 5 8	ipP	—
Columbia		21·2	32	e 4 46	− 3	e 8 35	− 6	e 5 26	PPP	e 10·0
Tucson		21·6	321	i 4 51k	− 3	e 5 47	PPP	i 5 28	PP	i 9·7
St. Louis		22·4	9	i 4 59	− 3	i 8 59	− 5	i 5 14	pP	e 11·3
Florissant		22·5	9	i 4 59	− 3	i 9 3	− 2	i 5 17	pP	e 11·0
Lincoln		24·3	358	e 5 20	0	e 9 30	− 7	—	—	e 10·0
Chicago		25·9	12	e 5 50	+15	i 9 55	− 9	e 6 40	PPP	i 10·4
Palomar	Z.	26·3	316	e 5 36	− 3	—	—	i 5 54	PP	—
Pittsburgh		26·9	25	i 5 59	+14	i 10 39	sS	i 11 0	SS	—
Georgetown		27·0	32	e 6 7	pP	—	—	—	—	—
Riverside	Z.	27·0	316	e 5 42	− 3	i 10 48	sS	—	—	—
San Juan		27·0	82	e 6 9	pP	e 10 49	sS	i 6 58	PPP	e 13·5
Mount Wilson	Z.	27·6	316	e 5 47	− 4	—	—	—	—	—
Pasadena		27·6	316	i 5 48k	− 3	i 10 57	sS	i 6 6	pP	e 13·8
Salt Lake City		28·5	334	e 5 58	− 1	e 10 51	+ 5	e 6 27	PP	e 14·3
Philadelphia		28·7	35	e 6 2	+ 1	e 10 42	− 8	e 6 16	pP	i 11·6
Santa Barbara	Z.	28·9	315	e 5 59	− 4	—	—	—	—	—
Logan		29·3	337	e 6 3	− 3	e 10 58	− 1	i 7 25	PPP	e 12·9
Tinemaha	Z.	29·4	319	i 6 4	− 3	—	—	—	—	—
Buffalo		29·5	24	i 6 23	pP	—	—	e 6 47	PP	e 15·9
Fordham		30·1	33	6 7	− 6	e 10 55	−17	i 12 58	SS	e 14·9
Fresno	N.	30·2	317	i 6 13	− 1	—	—	—	—	—
Bermuda		31·2	55	6 16	− 7	e 11 55	sS	i 7 18	PP	14·6
Lick		31·8	318	e 6 27	− 1	—	—	e 6 43	pP	e 21·2
Santa Clara		32·0	318	i 6 44	pP	e 12 7	sS	—	—	e 15·3
Branner		32·2	318	e 6 29	− 3	—	—	i 7 1	sP	—
Bozeman		32·3	340	i 6 46	+13	e 11 40	− 6	e 7 35	PP	e 15·9
Berkeley		32·5	318	e 6 30	− 4	e 11 53	+ 4	e 6 59	pP	—
Harvard		32·5	33	i 6 52	pP	e 13 0	PP	—	—	e 17·6
San Francisco	N.	32·5	318	e 6 48	+14	e 12 15	+26	e 14 42	SSS	—
Ottawa		32·8	25	6 32	− 5	11 41	−13	13 51	SS	15·6
Butte		33·1	339	e 6 53	+13	e 11 53	− 6	e 7 51	PP	e 17·7
Vermont		33·1	28	e 6 58	+18	e 11 44	−15	i 7 55	PP	14·6
Ukiah		33·8	319	e 7 0	+14	e 12 21	+11	e 8 30	PPP	e 14·5
Huancayo		34·1	146	i 6 48	0	i 12 13	− 1	e 8 1	PP	i 14·8
Shawinigan Falls		35·0	27	6 51	− 5	—	—	—	—	—
Seven Falls		36·2	28	7 1	− 5	12 39	− 8	8 37	PPP	15·6
Seattle		38·6	331	e 7 51	+25	e 13 38	+15	—	—	e 16·3
Victoria		39·8	332	7 49	+13	13 51	+ 9	17 29	SSS	e 21·6
La Paz	Z.	41·8	140	i 7 51k	− 2	i 13 32	?	19 8	PP	i 18·0
Honolulu		59·9	286	—	—	e 17 53	−28	—	—	—
College		60·0	338	e 10 26	+15	e 17 59	−24	e 21 55	SS	e 25·0

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		61·8	147	10 14	− 9	18 34	−12	18 59?	PS	28·0
Rio de Janeiro		63·6	126	e 4 35	?	18 6	−62	—	—	e 28·8
Stonyhurst		78·0	37	—	—	i 21 44	−11	27 0	SS	e 36·6
San Fernando		79·0	56	e 12 9	+ 2	e 22 10	+ 4	—	—	33·6
Kew		79·5	40	e 11 52?	−18	i 22 4	− 7	e 14 52	PP	e 37·6
Granada		80·8	54	i 12 13	− 4	i 22 13	−12	12 39	pP	33·5
Uccle		82·8	40	e 12 24	− 3	i 22 37	− 8	28 13	SS	e 34·6
De Bilt		82·9	38	i 12 26a	− 2	i 22 42	− 4	e 27 35	SS	e 34·6
Clermont-Ferrand		83·5	45	i 12 27	− 4	i 22 46	− 6	i 15 8	PP	e 39·1
Strasbourg		85·6	41	e 12 39k	− 2	e 20 57	?	e 13 5	pP	—
Copenhagen		85·7	33	i 12 39	− 3	23 13	− 1	23 46	PS	34·6
Basle		85·8	42	e 12 38	− 4	e 23 2	[− 4]	—	—	—
Stuttgart		86·4	40	e 12 42a	− 3	e 23 15	− 6	e 23 3	SKS	e 35·6
Upsala		86·4	29	e 22 35?	?	i 23 15	− 6	—	—	e 35·6
Zurich		86·5	42	e 12 42a	− 4	e 23 17	− 5	—	—	—
Jena		87·1	38	i 12 45	− 4	e 23 23	− 5	23 3	SKS	e 34·6
Chur		87·3	42	e 12 43	− 7	e 23 8	[− 7]	—	—	—
Potsdam		87·3	38	i 12 47	− 3	i 23 25	− 4	e 13 21?	pP	e 35·6
Cheb		87·9	38	e 22 35?	?	—	—	—	—	—
Triest		90·5	42	e 12 57	− 8	i 23 30	[− 6]	—	—	—
Sofia		98·0	41	—	—	e 24 7	[−10]	35 17	SSS	—
Wellington		101·3	230	—	—	e 23 35?	[−57]	42 35?	Q	46·6
Christchurch		103·3	228	24 23	SKS	(24 23)	[−19]	27 55	PS	51·0
Sverdlovsk		104·0	13	e 14 21	+15	e 24 11	[−35]	—	—	—
Helwan	Z.	110·3	48	19 3	[+29]	28 29	PS	19 53	pPKP	—
Riverview	E.	119·1	240	e 29 53	PS	—	—	—	—	e 54·7
Tashkent		120·5	14	18 51	[− 3]	25 44	[− 7]	26 23	S_cS	—
New Delhi	N.	134·4	9	e 20 20	?	—	—	—	—	—

Additional readings :—
Cape Girardeau iPN = 4m.52s., iN = 7m.54s., iSE = 8m.39s.
Columbia iS = 8m.49s.
St. Louis isSE = 9m.30s.
Florissant isSE = 9m.27s.
Lincoln e = 7m.50s.
Chicago e = 8m.55s.
Pittsburgh e = 10m.19s., i = 10m.49s.
Georgetown 8m.5s.
Salt Lake City i = 8m.22s.
Philadelphia e = 9m.33s.
Logan i = 6m.19s., e = 9m.23s.
Buffalo i = 7m.21s. and 7m.41s., e = 8m.39s. and 11m.56s., esSS = 13m.39s.
Fordham i = 12m.7s.
Bermuda iS = 12m.1s., e = 12m.35s.
Lick iN = 6m.51s.
Branner ePN = 6m.32s., iE = 6m.47s., 7m.15s., and 7m.27s., eS_cSN = 17m.23s., eS_cSE = 17m.44s.
Bozeman i = 7m.0s., e = 12m.17s.
Berkeley ePN = 6m.41s., eSN = 11m.41s. and 12m.22s.
Ottawa eZ = 6m.51s., i = 6m.59s., e = 7m.43s., eE = 12m.17s.
Butte e = 12m.42s.
Vermont e = 12m.25s.
Ukiah e = 8m.58s.
Huancayo i = 7m.19s. and 13m.52s.
Shawinigan Falls e = 13m.59s.
Seattle e = 14m.31s.
La Paz iZ = 15m.0s., SSZ = 16m.0s.
Honolulu S given as L.
La Plata PN = 10m.20s., Z = 10m.51s., P_cPE = 11m.16s., SN = 18m.41s., SSE = 22m.53s.
Rio de Janeiro iSE = 18m.1s., iSSN = 22m.3s., iSSSE = 25m.15s., iSSSN = 25m.25s.
Kew iS_cSE = 22m.18s., ePS?E = 22m.31s., ePPS?E = 23m.35s., eEZ = 25m.46s., eQ = 33m.35s. ?
Granada P_cP = 12m.30s., sP_cP = 13m.7s., PP = 15m.26s., sPP = 16m.1s,. SKS = 22m.22s., sS = 22m.53s., PS = 23m.18s., SS = 27m.17s.
Clermont-Ferrand i = 12m.41s.
Copenhagen 22m.57s.
Jena iN = 13m.30s., eSN = 23m.20s., eN = 23m.47s. and 23m.57s.
Potsdam isSN = 23m.58s.
Christchurch Q = 45m.46s., SKS given as P, PS given as PP.
Helwan PPPZ = 23m.57s., PPPPZ = 24m.40s.
Tashkent PPS = 26m.58s.
Long waves were also recorded at Sitka.

Nov. 12d. 15h. 26m. 19s. Epicentre 0°·4N. 80°·4W. (as on 9d.).

$A = +\cdot1668$, $B = -\cdot9860$, $C = +\cdot0070$; $\delta = +7$; $h = +7$;
$D = -\cdot986$, $E = -\cdot167$; $G = +\cdot001$, $H = -\cdot007$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		8·5	5	e 2 14	+ 7	—	—	—	—	—
Huancayo		13·3	158	e 3 8	− 5	1 5 41	− 1	e 3 59	PPP	i 6·4
La Paz		20·7	146	4 43	− 1	i 8 47	+16	i 4 50	PP	11·9
San Juan		22·7	37	e 5 6	+ 2	i 9 29	+20	—	—	i 11·8
Fort de France		23·8	55	—	—	e 9 32	+ 4	—	—	—
Montezuma		25·5	155	e 6 53	?	e 11 0	SS	e 11 23	SSS	e 14·5
Tacubaya	N.	26·4	317	e 5 45	+ 5	—	—	—	—	—
Mobile		31·0	348	i 6 29	+ 8	i 11 1	−25	—	—	—
Columbia		33·4	358	e 6 47	+ 5	e 12 4	+ 1	e 7 55	PP	e 14·0
Bermuda		35·0	23	e 6 59	+ 3	e 12 41	+13	i 8 12	PP	e 15·0
Cape Girardeau	N.	37·7	348	e 7 19	0	e 11 13	?	—	—	—
Georgetown		38·4	7	i 7 37	+12	13 27	+ 7	13 42	?	—
Florissant		39·3	348	i 7 31	− 1	i 13 41	+ 7	i 9 12	PP	—
Philadelphia		39·7	8	i 7 37	+ 1	13 42	+ 2	9 11	PP	16·7
New Kensington		40·0	2	e 7 41?	+ 3	e 13 11?	−33	e 9 23?	PP	—
Fordham		40·7	9	i 7 48	+ 4	i 14 7	+12	i 10 32	PPP	e 21·7
La Plata	E.	40·9	152	7 44	− 2	13 59?	+ 1	10 23?	PPP	22·6
	N.	40·9	152	7 44	− 2	13 41?	−17	9 11?	PP	24·2
	Z.	40·9	152	7 45	− 1	—	—	—	—	23·9
Chicago		41·7	352	e 7 53	+ 1	e 14 7	− 3	9 33	PP	e 17·3
Harvard		42·7	11	i 8 6	+ 6	e 14 37	+13	e 14 11	PS	e 17·9
Tucson		42·7	322	i 7 58	− 2	e 14 30	+ 6	i 10 18	PPP	e 17·2
Lincoln		42·9	343	e 7 57	− 5	e 14 23	− 4	e 9 27	PP	18·0
Rio de Janeiro		42·9	126	e 8 3	+ 1	i 14 28	+ 1	—	—	i 22·0
Ottawa		45·0	5	8 20	+ 1	15 13	+15	10 12	PP	22·7
Seven Falls		47·3	10	8 41	+ 4	(15 41?)	+10	—	—	15·7
Palomar	Z.	47·4	318	e 8 36	− 2	—	—	—	—	—
Riverside	Z.	48·1	318	e 8 41	− 2	—	—	—	—	—
Mount Wilson	Z.	48·7	318	i 8 45	− 3	—	—	i 11 3	PP	—
Pasadena		48·7	318	8 45	− 3	e 15 51	+ 1	i 10 47	PP	e 22·7
Salt Lake City		49·3	330	e 8 49	− 4	e 16 2	+ 3	10 47	PP	e 19·9
Logan		50·0	331	e 8 58	0	e 16 10	+ 1	i 10 54	PP	25·5
Santa Barbara		50·0	317	e 8 56	− 2	—	—	—	—	—
Tinemaha		50·5	321	i 9 0	− 2	—	—	i 9 14	?	—
Bozeman		52·5	335	e 9 17	0	e 16 48	+ 5	e 11 22	PP	25·4
Santa Clara		53·1	319	e 9 21	0	e 16 56	+ 5	—	—	e 26·2
Branner	E.	53·3	319	e 9 21	− 2	—	—	—	—	—
Butte		53·5	334	9 26	+ 2	17 12	+15	e 12 55	PPP	e 22·4
Berkeley	E.	53·6	319	e 9 33	+ 8	e 17 2	+ 4	—	—	—
	N.	53·6	319	e 9 26	+ 1	e 17 7	+ 9	—	—	—
	Z.	53·6	319	e 9 21	− 4	e 17 5	+ 7	—	—	—
Ukiah		54·9	321	e 9 56	+21	e 17 3	−13	e 20 45	SS	e 24·0
Seattle		59·4	328	e 10 42	+36	18 14	− 1	14 28	?	e 25·4
Victoria		60·6	329	10 16	+ 1	18 38	+ 8	—	—	29·7
Sitka		71·6	332	e 14 11	PP	e 20 36	− 8	i 25 35	SS	e 36·0
Lisbon	E.	75·2	50	11 54	+ 8	22 11?	PS	—	—	37·4
		75·2	50	11 45	− 1	21 41	+16	—	—	34·9
San Fernando		77·1	53	e 12 16	+19	e 23 29	?	—	—	38·7
Honolulu		78·1	292	e 18 42	?	e 22 23	+27	e 27 36	SS	e 36·3
Granada		79·2	53	i 12 18	+10	i 22 24	+16	12 39	pP	37·1
College		80·2	337	e 12 16	+ 2	e 22 21	+ 2	e 15 17	PP	38·8
Clermont-Ferrand		85·2	45	e 12 42	+ 3	i 23 24	+15	—	?	e 44·7
Uccle		86·3	39	e 12 49	+ 4	23 21	+ 1	—	—	e 39·7
De Bilt		87·0	38	—	—	e 23 41	+14	—	—	e 38·7
Basle		88·3	43	e 12 58	+ 3	—	—	—	—	e 20·5
Zurich		89·0	43	e 13 4a	+ 6	e 24 1	+16	—	—	—
Stuttgart		89·4	41	e 13 1	+ 1	e 24 2	+13	e 41 29	Q	e 42·5
Copenhagen		91·3	34	—	—	24 17	+11	25 3	PS	—
Potsdam		91·8	38	i 13·16	+ 5	i 24 15	+ 4	—	—	e 41·7
Triest		92·6	44	—	—	e 23 41	[− 7]	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Wellington		101·4	227	—	—	e 24 41?	[+ 7]	43 41?	Q		47·7
Helwan		108·6	59	e 18 18	PKP	e 26 53	S	e 19 2	PP		—
Riverview	E.	121·4	229	e 30 41	PS	e 37 11	SS	—	—		e 56·6
New Delhi	N.	144·1	33	e 17 41	?	—	—	—	—		—
Bombay		147·5	53	e 20 1	[+17]	—	—	23 15	PP		e 74·7

Additional readings :—
Huancayo iP = 3m.16s.
Montezuma e = 8m.4s.
Philadelphia e = 8m.13s. and 13m.13s.
La Plata P_cPE = 8m.53s., SSSE = 19m.47s.?.
Tucson i = 8m.50s. and 13m.5s.
Ottawa SS = 18m.53s.
Pasadena iZ = 9m.34s., eSSE = 19m.21s.
Salt Lake City e = 11m.58s. and 18m.51s.
Logan e = 19m.57s.
Bozeman e = 11m.49s. and 20m.30s.
Granada sP_cP = 13m.46s., PP = 15m.25s., sS = 23m.12s., sPS = 24m.29s.
College e = 20m.44s. and 27m.29s.
Clermont-Ferrand i = 12m.48s. and 13m.7s.
Stuttgart iZ = 13m.6s., e = 24m.11s.
Helwan eZ = 28m.48s.
Bombay eEN = 20m.31s.
Long waves were also recorded at Upsala, Colombo, and Tananarive.

Nov. 12d. 16h. 1m. 28s. Epicentre 0°·4N. 80°·4W. (as on 9d.).

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Huancayo		13·3	158	e 3 21	+ 8	—	—	i 7·5
La Paz		20·7	146	i 4 44	0	8 53	SS	—
Cape Girardeau	N.	37·7	349	e 7 21	+ 2	—	—	—
Tucson		42·7	322	i 8 0	0	—	—	—
Riverside	Z.	48·1	318	e 8 41	− 2	—	—	—
Mount Wilson	Z.	48·7	318	e 8 46	− 2	—	—	—
Pasadena		48·7	318	e 8 45	− 3	—	—	—
Santa Barbara	Z.	50·0	317	i 8 58	0	—	—	—
Tinemaha	Z.	50·5	321	i 9 2	0	—	—	—

Huancayo gives also e = 4m.0s., i = 6m.32s.

Nov. 12d. 17h. 59m. 58s. Epicentre 0°·4N. 80°·4W. (as at 15h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·3	158	e 3 11	− 2	e 5 36	− 6	e 5 53	SS	e 7·1
La Paz		20·7	146	4 41	− 3	i 8 41	+10	—	—	13·5
San Juan		22·7	37	e 5 14	+10	e 9 26	+17	—	—	e 11·1
Tucson		42·7	322	i 8 1	+ 1	e 14 14	−10	—	—	e 23·0
Riverside	Z.	48·1	318	i 8 43	0	—	—	—	—	—
Mount Wilson	Z.	48·7	318	e 8 46	− 2	—	—	—	—	—
Pasadena		48·7	318	e 8 46	− 2	—	—	—	—	—
Tinemaha	Z.	50·5	321	e 9 2	0	—	—	—	—	e 21·0

Additional reading :
La Paz iPZ = 4m.46s.
Long waves were also recorded at Rio de Janeiro.

Nov. 12d. 22h. 30m. 11s. Epicentre 0°·4N. 80°·4W. (as at 17h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·3	158	e 3 10	− 3	e 5 40	− 2	—	—	e 7·3
La Paz		20·7	146	4 45	+ 1	i 8 42	+11	—	—	12·5
San Juan		22·7	37	e 5 14	+10	e 9 23	+14	—	—	e 10·9
Cape Girardeau	N.	37·7	349	e 7 19	0	—	—	—	—	—
Tucson		42·7	322	e 8 0	0	e 14 35	+11	e 9 47	PP	e 22·4
Riverside	Z.	48·1	318	i 8 43	0	—	—	—	—	—
Mount Wilson	Z.	48·7	318	i 8 47	− 1	—	—	—	—	—
Pasadena	Z.	48·7	318	i 8 47	− 1	—	—	—	—	e 23·8
Tinemaha	Z.	50·5	321	e 9 1	− 1	—	—	—	—	—

Additional readings :—
Huancayo e =6m.19s.
Long waves were recorded at Rio de Janeiro.

Nov. 12d. Readings also at 0h. (La Paz and near Tucson), 4h. (near Algiers), 5h. (New Kensington, Mount Wilson, and Pasadena), 9h. (Cheb and Paris), 10h. (Mount Wilson, Pasadena, and Riverside), 11h. (Mount Wilson and Pasadena), 12h. (Mount Wilson (2), Pasadena (2), Riverside (2), Tucson, and Tinemaha), 15h. (near La Paz, Mount Wilson, Pasadena, Riverside, Tucson, and Fort de France), 16h. (La Paz), 17h. (near Tucson), 22h. (Fort de France).

Nov. 13d. 0h. 45m. 56s. Epicentre 0°·4N. 80°·4W. (as on 9d.).

Pasadena suggests deep.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·3	158	e 3 2	−11	e 5 42	0	—	—	e 6·4
La Paz	Z.	20·7	146	4 45	+ 1	i 8 43	+12	—	—	13·6
San Juan		22·7	37	e 5 3	− 1	e 9 28	+19	—	—	e 10·1
Tucson		42·7	322	e 8 0	0	—	—	i 9 13	PP	e 22·5
Riverside	Z.	48·1	318	e 8 43	0	—	—	i 10 49	PP	—
Mount Wilson	Z.	48·7	318	i 8 49	+ 1	—	—	i 10 55	PP	—
Pasadena		48·7	318	i 8 48	0	—	—	—	—	—
Tinemaha	Z.	50·5	321	e 9 6	+ 4	—	—	—	—	—

Additional readings :—
Riverside iZ =9m.57s.
Mount Wilson iZ =10m.1s.
Pasadena iNZ =10m.1s.

Nov. 13d. Readings also at 1h. (near Apia), 6h. (Huancayo, La Paz, Tucson (2), Mount Wilson (2), Pasadena, and Riverside), 7h. (Huancayo, La Paz, Mount Wilson, Pasadena, Tucson, Riverside, and Sofia), 8h. (La Paz, Mount Wilson, Tucson, Pasadena, Riverside, Tinemaha, and Huancayo), 9h. (Sofia), 10h. (Mount Wilson (2), Tucson, Pasadena (2), and Tinemaha), 16h. (La Paz, Huancayo, Rio de Janeiro, San Juan), 17h. (near La Paz), 19h. (La Paz), 21h. (near Berkeley, Branner, Lick, San Francisco, and near Mizusawa), 23h. (Tucson, Mount Wilson, Pasadena, Riverside, Santa Barbara, Tinemaha, Copenhagen, Jena, Basle, and Stuttgart).

Nov. 14d. 5h. 21m. 7s. Epicentre 6°·3S. 148°·2E. (as on 1941, Dec. 24d.).

$A = -·8449$, $B = +·5238$, $C = -·1090$; $\delta = +10$; $h = +7$;
$D = +·527$, $E = +·850$; $G = +·093$, $H = -·057$, $K = -·994$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	E.	21·5	170	e 5 4	+12	i 8 53	+ 6	—	—	—
Riverview	E.	27·5	175	—	—	i 10 21	− 9	—	—	e 12·7
Sydney		27·6	175	e 5 23	−28	e 10 41	+ 9	—	—	—
Auckland		38·9	145	8 31	+62	14 41	+73	17 53?	Q	20·4
Perth		39·5	226	—	—	i 13 43	+ 6	i 16 18	SS	i 21·8

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m
Arapuni		40·2	146	7 53?	+13	12 53?	−55	16 53?	S_eS	—
Wellington		42·1	150	7 53	− 2	14 6	−10	8 14	pP	19·9
Tokyo Cen. Met. Ob.		42·5	351	8 0	+ 1	—	—	—	—	—
Kobe		42·6	346	7 58	− 1	13 12	−71	—	—	—
Nagoya		42·6	348	8 1	+ 2	—	—	—	—	—
Christchurch		42·8	154	8 1	0	14 23	− 3	17 52	S_eS	20·2
Nagano		43·8	350	i 8 8	− 1	15 0	+20	—	—	—
Sendai		44·8	353	8 15	− 2	14 47	− 8	—	—	—
Mizusawa	E.	45·7	353	8 21	− 3	—	—	—	—	—
Honolulu		59·6	62	—	—	e 18 7	−10	—	—	e 27·3
Bombay	E.	78·3	291	—	—	e 21 23	−36	—	—	e 38·9
College		85·0	23	e 12 33	− 5	e 24 5	PS	e 16 1	PP	e 34·3
Tashkent		85·9	312	12 40	− 3	23 8	− 8	—	—	—
Sitka		88·1	32	e 13 9	+15	e 23 31	− 6	e 29 38	SS	e 36·0
Ukiah		92·8	51	—	—	e 24 7	−12	e 25 41	PS	e 41·3
Victoria		93·6	42	—	—	—	—	e 26 47	PPS	39·9
Santa Clara	E.	93·7	53	—	—	—	—	e 26 0	PPS	e 43·2
Sverdlovsk		93·9	326	13 35	+14	24 15	−14	17 6	PP	—
Pasadena		96·5	56	i 13 31	− 1	i 24 30	−21	e 17 20	PP	e 42·9
Mount Wilson	Z.	96·6	56	i 13 31	− 2	—	—	—	—	—
Tinemaha	Z.	96·6	53	e 13 33	0	—	—	—	—	—
Riverside	Z.	97·1	56	i 13 35	0	—	—	—	—	—
Logan		101·6	47	—	—	e 27 23	PS	e 30 57	SS	e 47·2
Bozeman		102·0	45	e 18 34	PP	e 24 57	[+20]	e 27 6	PS	e 46·8
Tucson		102·6	58	i 14 1	+ 1	e 25 36	− 6	i 18 7	PP	e 46·6
Lincoln		113·0	48	—	—	e 29 17	PS	e 31 33	PPS	e 55·1
Scoresby Sund		115·6	356	e 16 7	?	e 22 17	PKS	e 29 37	PS	e 57·9
Helwan	Z.	116·4	299	e 19 53	PP	e 22 16	PKS	i 29 20	PS	—
St. Louis		118·4	49	e 23 4	PKS	e 25 43	[− 1]	e 26 23	SKKS	51·1
Potsdam		121·2	330	i 20 39	PP	e 36 53?	SS	—	—	e 57·9
Stuttgart		125·3	328	e 19 5	[+ 2]	e 20 55	PP	—	—	e 60·7
Ottawa		125·6	36	i 19 3	[− 1]	e 30 53	PS	e 32 41	PPS	58·9
Uccle		126·4	333	e 21 5?	PP	e 30 59?	PS	e 38 5?	SS	e 56·9
Seven Falls		127·4	32	—	—	e 30 59	PS	e 38 53?	SS	56·9
Philadelphia		128·7	42	—	—	e 34 4	PPS	—	—	e 58·2
Clermont-Ferrand		130·4	328	e 22 31	PKS	—	—	—	—	e 65·9
La Plata	E.	132·2	149	19 11?	[− 5]	22 35?	PP	—	—	—
Huancayo		133·0	113	e 19 21	[+ 3]	e 39 53	SS	e 21 43	PP	e 54·9
La Paz	Z.	137·5	123	i 19 27s	[+ 1]	—	—	i 22 56	PP	—
Bermuda		139·9	45	—	—	e 39 48	?	—	—	e 59·6
San Juan		144·5	67	e 19 34	[− 4]	—	—	—	—	e 67·0
Rio de Janeiro	N.	148·9	159	e 19 53	[+ 7]	—	—	—	—	—
Fort de France		150·0	71	e 19 43	[− 4]	—	—	—	—	—

Additional readings :—
Auckland i = 10m.36s.
Wellington P_cPZ = 9m.48s., SS = 17m.34s., Q = 17m.53s.?
Christchurch Q = 17m.40s.
Mizusawa P given as S.
College ePPP = 18m.14s.
Sitka ePPS = 24m.59s.
Sverdlovsk SS = 31m.18s.
Pasadena ePSE = 26m.30s.
Mount Wilson iZ = 14m.5s.
Bozeman eSS = 33m.6s., eSSS = 36m.36s.
Tucson i = 19m.18s., e = 31m.23s., eSSS = 37m.9s.
Scoresby Sund e = 29m.45s., eSS = 35m.31s., eSSS = 40m.7s., e = 46m.35s.
Helwan eZ = 20m.59s. and 23m.0s.
St. Louis eE = 27m.24s., eN = 29m.1s.
Ottawa eN = 38m.11s.
Uccle eSSSE = 42m.53s.?
La Plata iPZ = 19m.18s., E = 19m.29s.?, PP?Z = 22m.37s., PPP?N = 22m.58s.
Huancayo i = 22m.44s., e = 25m.44s., 35m.17s., and 45m.8s.
San Juan e = 21m.44s., 28m.33s., 32m.55s., 36m.26s., and 54m.28s.
Long waves were also recorded at Chicago, Harvard, Columbia, Tananarive, and other European stations.

Nov. 14d. 6h. 19m. 6s. Epicentre 0°·4N. 80°·4W. (as on 13d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·3	158	e 3 12	− 1	e 5 39	− 3	i 3 54	PP	e 6·5
La Paz	z.	20·7	146	i 4 43k	− 1	8 45	+14	—	—	13·0
San Juan		22·7	37	e 5 4	0	e 9 25	+16	—	—	e 11·2
Fort de France		23·8	55	e 5 19	+ 4	—	—	—	—	—
Tucson		42·7	322	e 7 56	− 4	—	—	—	—	—
Riverside	z.	48·1	318	e 8 48	+ 5	—	—	—	—	—
Mount Wilson		48·7	318	i 8 46	− 2	—	—	e 9 48	PP	—
Pasadena	z.	48·7	318	e 8 46	− 2	—	—	—	—	—

Nov. 14d. 17h. 58m. 54s. Epicentre 0°·4N. 80°·4W. (as at 6h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		8·5	5	e 2 6	− 1	—	—	—	—	—
Huancayo		13·3	158	i 3 13	0	i 5 38	− 4	—	—	i 6·4
La Paz	z.	20·7	146	4 41	− 3	i 8 34	+ 3	i 8 59	SS	11·9
San Juan		22·7	37	i 5 10	+ 6	e 9 27	+18	—	—	e 10·4
Fort de France		23·8	55	i 5 21	+ 6	e 9 53	+25	5 56	PP	—
St. Louis		39·1	348	i 7 30	− 1	e 13 11	−20	e 16 26	SS	—
Philadelphia		39·7	8	—	—	e 13 20	−20	9 14	PP	—
La Plata	E.	40·9	152	7 46	0	14 28	+30	9 23	PP	20·7
Tucson		42·7	322	e 7 55	− 5	i 14 35	+11	i 9 44	PP	e 21·2
Rio de Janeiro	E.	42·9	126	e 7 6	−56	e 13 37	−50	—	—	e 21·0
Ottawa		45·0	5	e 8 20	+ 1	e 15 6?	+ 8	—	—	22·1
Riverside	z.	48·1	318	e 8 39	− 4	—	—	—	—	—
Mount Wilson	z.	48·7	318	i 8 46	− 2	—	—	—	—	—
Pasadena		48·7	318	i 8 45	− 3	i 15 58	+ 8	e 10 20	PP	i 24·1
Salt Lake City		49·3	330	e 9 2	+ 9	e 16 8	+ 9	—	—	e 23·4
Tinemaha	z.	50·5	321	i 8 59	− 3	—	—	—	—	—
Ukiah		54·9	321	e 13 12	?	e 16 39	−37	—	—	e 27·7
Sitka		71·6	332	e 11 33	+ 8	—	—	e 16 54	PP	e 36·0
Uccle		86·3	39	e 12 54?	+ 9	e 23 33	+13	—	—	e 42·1
Stuttgart		89·4	41	e 13 6	+ 6	e 23 51	+ 2	—	—	—
Tashkent		130·2	29	e 19 14	[+ 2]	e 22 38	PKS	—	—	—

Additional readings :—
Huancayo i = 4m.38s.
La Paz iPZ = 4m.47s.
St. Louis iZ = 7m.36s. and 7m.40s., eN = 9m.3s.
La Plata P_gPN = 9m.42s.?, E = 11m.2s. and 11m.27s.
Tucson i = 7m.59s. and 8m.48s., e = 11m.35s., iSS = 17m.41s.
Pasadena i = 8m.51s.
Salt Lake City e = 14m.18s.
Tinemaha iZ = 9m.8s.
Ukiah e = 18m.12s. and 22m.23s.
Sitka e = 17m.26s.
Long waves were also recorded at Logan, College, and De Bilt.

Nov. 14d. 20h. 56m. 58s. Epicentre 0°·4N. 80°·4W. (as at 17h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·3	158	e 3 12	− 1	e 5 50	+ 8	—	—	i 7·5
La Paz	z.	20·7	146	4 43	− 1	i 8 41	+10	—	—	13·6
San Juan		22·7	37	e 5 12	+ 8	i 9 30	+21	—	—	e 10·9
Fort de France		23·8	55	e 5 26	+11	e 9 58	+30	—	—	—
St. Louis		39·1	348	i 7 32	+ 1	e 13 32	+ 1	e 16 23	SS	—
Tucson		42·7	322	i 8 0	0	e 14 35	+11	e 9 43	PP	e 21·9
Rio de Janeiro		42·9	126	e 13 32	S	(e 13 32)	−55	—	—	e 20·7
Riverside	z.	48·1	318	i 8 42	− 1	—	—	—	—	—
Mount Wilson	z.	48·7	318	i 8 48	0	—	—	—	—	—
Pasadena		48·7	318	i 8 47k	− 1	—	—	—	—	e 24·1
Tinemaha	z.	50·5	321	i 9 1	− 1	—	—	—	—	—

Additional readings :—
La Paz iPZ = 4m.46s.
Tucson i = 8m.46s., e = 12m.23s.
Long waves were also recorded at La Plata.

Nov. 14d. Readings also at 3h. (Mount Wilson, Riverside, Tinemaha, Tucson, Mizusawa, and near Lick), 4h. (Mount Wilson, Pasadena, Tucson, Riverside, and Tinemaha). 6h. (San Fernando), 14h. (Mount Wilson, Pasadena, Riverside, and Tinemaha), 20h. (Balboa Heights), 21h. (Mount Wilson (4), Tucson (4), Pasadena, Riverside (4), La Paz, and near St. Louis).

Nov. 15d. 0h. 46m. 5s. Epicentre 0°·4N. 80°·4W. (as on 14d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		8·5	5	e 1 55?	−12	—	—	—	—	—
Huancayo		13·3	158	e 3 10	− 3	i 5 45	+ 3	i 3 50	PP	i 6·3
La Paz	z.	20·7	146	4 41	− 3	i 8 40	+ 9	—	—	12·6
San Juan		22·7	37	e 5 7	+ 3	i 9 29	+20	—	—	e 11·6
Fort de France		23·8	55	e 5 22	+ 7	e 9 54	+26	—	—	—
Tucson		42·7	322	i 7 59	− 1	e 15 9	PS	i 8 45	PP	e 21·3
Rio de Janeiro	E.	42·9	126	e 13 25	S	(e 13 25)	−62	—	—	e 21·3
Riverside	z.	48·1	318	i 8 50	+ 7	—	—	—	—	—
Mount Wilson	z.	48·7	318	i 8 46	− 2	—	—	—	—	—
Pasadena	z.	48·7	318	i 8 45	− 3	—	—	—	—	e 24·0
Tinemaha	z.	50·5	321	e 9 4	+ 2	—	—	—	—	—

Additional readings :—
La Paz iPZ =4m.44s.
Tucson i =10m.22s.
Long waves were recorded at Salt Lake City.

Nov. 15d. 17h. 1m. 15s. Epicentre 39°·8N. 29°·6E. (as on 1939 Oct. 19d.).

Intensity VII at Bigadic-Sindergi (Bassinégèen). Epicentre 39°·4N. 28°·1E.
Report of the Observatory of Kandilli.

$A = +·6698$, $B = +·3805$, $C = +·6376$; $\delta = -5$; $h = -2$;
$D = +·494$, $E = -·869$; $G = +·554$, $H = +·315$, $K = -·770$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul	1·3	342	0 41	P_g	0 57	+13	1 28	SSS	—
Bucharest	5·3	330	e 1 26	+ 4	i 2 32	+ 7	i 1 39	P*	—
Sofia	5·5	303	i 1 23	− 2	i 2 29	− 1	i 2 47	S*	—
Focsani	6·2	342	e 1 46	P*	e 3 11	S*	3 14	SSS	—
Ksara	7·8	138	e 2 12	P*	e 4 35	S_g	—	—	—
Belgrade	8·4	309	e 2 6	0	i 3 41	− 2	i 2 14	PPP	—
Helwan	10·0	172	2 30	+ 3	6 36	?	3 3	PPP	8·7
Triest	13·0	302	e 3 3	− 6	e 6 3	SSS	—	—	—
Prague	14·8	319	e 3 30	− 2	e 6 31	+13	—	—	e 7·3
Cheb	15·9	316	e 3 49?	+ 2	—	—	—	—	e 8·9
Chur	16·2	302	e 3 45	− 5	—	—	—	—	e 8·5
Jena	16·8	317	e 3 59	+ 1	e 7 8	+ 3	e 7 13	SS	e 8·2
Potsdam	17·0	324	e 4 9?	+ 8	i 7 13	+ 3	e 4 21?	PPP	8·8
Zurich	17·0	303	e 3 56k	− 5	e 7 8	− 2	—	—	—
Stuttgart	17·1	308	e 3 57	− 5	e 7 5	− 7	i 4 4	PP	e 8·2
Basle	17·7	304	e 4 5	− 5	e 7 20	− 6	—	—	—
Neuchatel	17·9	301	e 4 9	− 3	e 7 28	− 2	—	—	—
Strasbourg	17·9	309	i 4 14	+ 2	i 7 36	+ 6	i 4 27	PP	i 9·9
Copenhagen	19·5	331	e 4 34	+ 3	8 13	+ 7	—	—	—
Clermont-Ferrand	20·3	296	i 4 38	− 2	i 8 22	− 1	—	—	e 10·8
De Bilt	20·8	316	i 4 47	+ 2	i 8 35	+ 2	—	—	e 9·8
Uccle	20·8	310	i 4 45	0	i 8 31	− 2	i 8 41	SS	10·8
Algiers	21·0	271	4 46	− 1	e 8 27	−10	5 1	PP	12·8
Paris	21·3	304	i 4 52	+ 2	—	—	—	—	e 11·5
Upsala	21·4	344	4 58	+ 7	e 8 51	+ 6	i 8 59	SS	e 10·8
Kew	23·8	310	e 5 13	− 2	e 9 31	+ 3	—	—	e 11·8
Oxford	24·4	310	e 5 19	− 2	i 9 37	− 2	—	—	i 13·2
Stonyhurst	25·8	315	—	—	e 9 52	−10	—	—	i 14·1
Granada	26·0	276	i 5 33	− 3	i 10 4	− 2	6 5	pP	13·7
San Fernando	E. 28·3	275	e 6 39	PP	13 30	?	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lisbon		29·9	282	—	—	11 6	− 3	12 43	SS	15·1
Tashkent		30·0	73	6 28	+16	10 22	?	—	—	—
Almata		35·2	67	e 7 58	PP	—	—	—	—	—
Semipalatinsk		36·6	55	e 9 15	PPP	—	—	—	—	—
New Delhi	N.	40·5	90	i 9 33k	PP	c 18 25	?	i 10 10	PPP	—

Additional readings :—
Istanbul SSS = 1m.50s.
Bucharest P_g = 1m.53s., iS*NZ = 2m.49s., iS_gE = 3m.3s., iS_gN = 3m.8s.
Sofia iSEN = 2m.19s.
Focsani eE = 1m.51s., eN = 1m.56s., cE = 2m.24s., eN = 2m.43s., eS*?N = 3m.41s., eS_gE = 3m.59s.
Ksara SS = 5m.54s.
Belgrade i = 2m.33s., iPS = 2m.41s., iSSP = 4m.8s.
Helwan iN = 3m.51s., P_cPEN = 5m.21s.
Cheb e = 8m.17s.
Jena iN = 5m.32s.
Potsdam iPPPN = 4m.32s., iEZ = 5m.12s., iSN = 7m.17s.
Stuttgart eS = 7m.11s., eSZ = 7m.17s.
Algiers PPP = 5m.6s., i = 9m.41s.
Stonyhurst i = 10m.15s.
Granada PP = 6m.21s.
San Fernando ePPE = 10m.41s., eSSE = 30m.31s.
Lisbon $S_cS?N$ = 15m.57s.
New Delhi SSN = 23m.50s.
Long waves were also recorded at Aberdeen.

Nov. 15d. 17h. 12m. 1s. Epicentre 36°·4N. 141°·1E. (as on 1938 Sept. 21d.).

Intensity VI at Onahama, Hukusima ; V at Mito, Tyosi, Kakioka, Sendai ; IV at Tokyo, Titibu, Oiwake ; II-III at Kohu, Sapporo.
Epicentre 36°·4N. 141°·2E. Radius of macroseismic area over 300km. Very shallow. Seismological Bulletin of the Central Meteorological Observatory, Japan for the year 1942, Tokyo 1950, pp. 43-45, macroseismic chart p. 43.

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

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mito	0·5	268	0 15k	+ 1	0 24	+ 1	—	—	—
Onahama	0·6	343	0 15k	0	0 24	− 2	—	—	—
Tyosi	0·7	196	0 16k	− 1	0 28	0	—	—	—
Kakioka	0·8	257	0 17k	− 1	0 26	− 5	—	—	—
Tukubasan	0·8	257	0 17k	− 1	0 29	− 2	—	—	—
Utunomiya	1·0	279	0 21k	0	0 42	+ 6	—	—	—
Tokyo Cen. Met. Ob.	1·3	237	0 25k	0	0 42	− 2	—	—	—
Tokyo Imp. Univ.	1·3	237	0 24	− 1	0 44	0	—	—	—
Hukusima	1·4	339	0 26k	− 1	0 51	+ 5	—	—	—
Kumagaya	1·4	260	0 26k	− 1	0 43	− 3	—	—	—
Kiyosumi	1·5	211	0 28	0	0 50	+ 1	—	—	—
Mitaka	1·5	240	0 28	0	0 48	− 1	—	—	—
Yokohama	1·5	231	0 28k	0	0 53	+ 4	—	—	—
Maebasi	1·6	270	0 30k	0	0 58	S_g	—	—	—
Mera	1·8	215	0 33	+ 1	0 55	− 1	—	—	—
Sendai	1·9	355	0 32k	− 2	0 55	− 4	—	—	—
Koyama	2·0	239	0 28	− 7	0 56	− 6	—	—	—
Hunatu	2·1	245	0 39k	P*	1 21	?	—	—	—
Osima	2·1	221	0 34	− 3	0 59	− 5	—	—	—
Kohu	2·2	249	0 42a	P*	—	—	—	—	—
Misima	2·2	234	0 39a	+ 1	1 11	+ 5	—	—	—
Nagano	2·3	277	0 41k	+ 1	1 11	+ 2	—	—	—
Susaki	2·4	225	0 28	−13	0 59	−13	—	—	—
Shizuoka	2·6	237	0 47	+ 3	1 27	S_g	—	—	—
Aikawa	2·8	305	0 59?a	P_g	1 44	S_g	—	—	—
Mizusawa	N. 2·9	0	0 46	− 2	1 21	− 3	—	—	—
Omaesaki	3·0	232	0 54k	+ 4	1 30	+ 3	—	—	—
Hamamatu	3·2	239	1 11k	P_g	2 21	?	—	—	—
Toyama	3·2	275	0 55	+ 3	1 46	S_g	—	—	—
Miyako	3·3	12	0 52	− 1	1 40	+ 5	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Akita		3·4	346	0 59k	P*	1 52	S_g	—	—	—
Hatidyozima		3·4	198	0 56	+ 1	—	—	—	—	—
Nagoya		3·5	250	1 1	P*	1 58	S_g	—	—	—
Wazima		3·5	289	0 59	+ 2	—	—	—	—	—
Gihu		3·7	256	1 0a	0	1 54	S*	—	—	—
Hatinohe		4·1	4	1 3a	− 2	1 55	0	—	—	—
Hikone		4·1	255	1 7a	+ 2	2 10	S*	—	—	—
Kameyama		4·1	249	1 7a	+ 2	2 9	S*	—	—	—
Aomori		4·4	357	1 9	− 1	2 12	S*	—	—	—
Owase		4·6	242	1 17	+ 5	2 26	S*	—	—	—
Osaka		4·9	252	1 17	0	2 17	+ 2	—	—	—
Kobe		5·1	252	1 19a	− 1	2 27	+ 7	2 40	SSS	—
Siomisaki		5·2	238	1 21a	0	2 42	S_g	2 51	?	—
Toyooka		5·2	262	1 15	− 6	2 31	S*	—	—	—
Wakayama		5·3	247	1 19	− 3	2 41	S*	—	—	—
Mori		5·7	356	1 25a	− 3	2 37	+ 2	—	—	—
Muroto		6·4	244	1 47a	P*	—	—	—	—	—
Yonago		6·4	264	1 10	−28	2 29	−24	—	—	—
Sapporo		6·7	1	1 38	− 4	3 6	+ 6	—	—	—
Koti		6·8	248	1 43	− 1	3 17	S*	—	—	—
Matuyama		7·3	252	2 9a	P*	3 48	S*	—	—	—
Hirosima		7·4	257	1 51	− 1	—	—	—	—	—
Hamada		7·5	260	1 53	0	4 3	S_g	—	—	—
Simidu		7·6	244	1 54	− 1	3 27	+ 4	—	—	—
Nemuro		7·7	24	1 53	− 3	3 11	−14	—	—	—
Izuka		9·0	255	2 19a	+ 6	5 0	S_g	—	—	—
Hukuoka		9·2	256	2 18a	+ 2	3 38	−25	—	—	—
Miyazaki		9·2	243	2 17	+ 1	4 16	+13	—	—	—
Kumamoto		9·3	250	2 17a	0	4 13	+ 8	—	—	—
Titizima		9·3	174	1 59	−18	3 43	−22	—	—	—
Unzendake		9·7	251	2 27	+ 5	4 55	S*	—	—	—
Husan		9·8	266	1 35	?	3 58	−19	—	—	—
Kagosima		10·0	244	2 29	+ 2	5 23	?	—	—	—
Taikyu		10·1	271	2 34	+ 6	5 26	?	—	—	—
Yakusima		10·6	239	2 36	0	—	—	—	—	—
Tomie		10·8	253	2 39	0	5 37	SSS	—	—	—
Keizyo		11·4	280	2 49	+ 2	—	—	—	—	—
Zinsen		11·6	280	2 51a	+ 1	5 36	SSS	—	—	—
Nake		12·6	234	3 0	− 3	5 23	− 3	—	—	—
Naha		15·3	232	3 37	− 2	6 43	SS	—	—	—
Miyakozima		17·8	234	4 2	− 9	—	—	—	—	—
Isigakizima		18·9	235	4 19	− 5	—	—	—	—	—
Taihoku		20·2	242	4 35	− 4	8 43	SS	—	—	—
Sintiku		20·8	242	6 15	?	8 15	−18	—	—	—
Taityu		21·4	241	5 3	+12	9 23	SSS	—	—	—
Taito		22·0	237	4 54	− 4	8 32	−24	—	—	—
Calcutta	N.	47·6	269	e 8 40	+ 1	i 15 51	PPS	e 19 11	SS	—
College		49·8	32	e 8 49	− 7	e 15 55	−11	—	—	e 19·9
Dehra Dun	N.	52·2	283	e 8 48?	−27	e 16 23	−16	—	—	i 29·9
Honolulu		54·7	88	e 9 36	+ 3	i 17 8	− 5	e 12 45	PPP	e 22·6
Tashkent		54·7	299	i 9 29	− 4	i 17 28	PS	—	—	—
Sitka		56·9	41	e 9 49	0	i 17 42	0	e 21 26	SS	e 23·9
Hyderabad		58·0	269	e 9 52	− 5	17 54	− 3	12 12	PP	29·5
Bombay		61·8	274	i 10 18	− 5	i 18 41	− 5	12 41	PP	30·0
Colombo		62·9	259	14 29	PPP	23 29	SS	—	—	41·0
Victoria		67·0	46	11 2	+ 5	19 46	− 4	—	—	28·0
Seattle		68·1	47	—	—	e 19 42	−21	—	—	e 41·5
Riverview	E.	70·5	172	—	—	i 20 24	− 8	i 21 19	PPS	e 30·5
Sydney		70·5	172	—	—	i 20 17	−15	—	—	—
Perth		72·0	202	—	—	i 20 52	+ 3	i 25 2	SS	i 30·3
Ukiah		72·0	54	e 11 36	+ 8	e 20 43	− 6	e 25 29	SS	e 29·5
Scoresby Sund		72·7	355	e 12 47	?	e 21 19	+22	—	—	e 37·7
Berkeley	Z.	73·3	56	i 11 29	− 6	—	—	—	—	—
Upsala		73·4	335	e 16 51	?	e 20 59?	− 6	e 25 59?	SS	e 34·0
Santa Clara	E.	73·8	56	e 12 20	?	e 21 7	− 2	—	—	e 33·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Butte		74·6	44	e 11 41	− 2	e 21 13	− 5	e 22 4	PS	e 31·5
Bozeman		75·7	44	e 11 57	+ 8	e 21 21	− 9	e 26 22	SS	e 32·1
Tinemaha	z.	76·4	54	i 11 49	− 4	—	—	—	—	—
Santa Barbara		76·9	57	e 11 50	− 6	—	—	—	—	—
Logan		77·6	46	e 12 3	+ 3	e 21 33	−18	e 27 13	SS	e 32·4
Pasadena		78·1	56	e 11 55	− 7	i 21 49	− 7	i 14 37	PP	e 32·0
Mount Wilson		78·2	56	e 11 54	− 9	e 21 49	− 8	—	—	—
Salt Lake City		78·2	48	e 12 0	− 3	i 21 51	− 6	i 22 38	PS	e 30·7
Copenhagen		78·4	335	e 11 59	− 5	21 50	−10	—	—	—
Riverside	z.	78·8	56	e 11 59	− 7	—	—	—	—	—
Auckland		79·3	153	—	—	22 59	PS	35 59?	Q	40·0
La Jolla		79·5	57	e 12 5	− 5	—	—	—	—	—
Bucharest		80·3	319	—	—	22 35	+15	—	—	41·0
Arapuni		80·7	153	—	—	21 59?	−25	27 59?	SS	40·0
Potsdam		80·7	332	i 12 12k	− 4	—	—	i 22 38	S_cS	e 38·0
Ksara		81·3	306	e 12 20	0	e 22 40	+10	—	—	—
Prague		81·9	329	e 12 29?	+ 6	e 22 34?	− 2	—	—	e 40·0
Jena		82·4	330	e 12 19	− 6	e 22 29	−12	—	—	e 40·0
Cheb		82·7	330	—	—	e 22 59?	+15	—	—	e 43·0
Belgrade		33·0	322	e 12 24	− 4	e 22 44	− 3	i 12 45	P_cP	e 43·5
Wellington		83·2	156	12 34	+ 5	22 37	−12	i 12 50	P_cP	39·0
Tucson		84·2	54	i 12 29	− 5	22 45	−14	e 15 30	PP	e 35·4
Christchurch		84·6	157	22 53	S	(22 53)	−10	35 32	Q	40·0
Stuttgart		85·0	330	i 12 34a	− 4	e 23 8	+ 1	e 28 47?	SS	e 43·2
Uccle		85·2	335	e 12 35	− 4	e 22 56	[− 6]	—	—	e 43·0
Strasbourg		85·8	331	e 12 40	− 2	e 23 7	[+ 1]	—	—	44·0
Kew		86·2	338	e 12 3?	?	i 23 35	+16	e 35 59?	Q	e 40·5
Chur		86·4	331	e 12 40	− 5	e 23 12	[+ 2]	—	—	—
Zurich		86·4	331	e 12 40a	− 5	e 23 33	+12	e 15 56	PP	—
Basle		86·7	330	e 12 42	− 5	e 23 28	+ 4	—	—	—
Helwan		86·8	305	i 12 44k	− 3	23 29	+ 4	16 7	PP	—
Neuchatel		87·4	331	e 12 45	− 5	—	—	—	—	—
Clermont-Ferrand		89·4	332	e 12 58	− 2	—	—	—	—	e 45·0
Chicago		90·2	35	e 16 5	PP	e 23 32	[− 2]	e 29 50	SS	e 41·5
Florissant		91·4	38	i 17 27	?	i 23 35	[− 6]	—	—	e 30·0
St. Louis		91·6	38	e 12 55	−15	e 23 22	[−20]	e 16 41	PP	—
Ottawa		92·1	25	13 7	− 5	24 3	−10	30 23	SS	45·0
Seven Falls		92·1	21	e 16 5	?	i 24 5	− 8	—	—	45·0
Harvard		96·0	23	i 24 44	S	(i 24 44)	− 3	—	—	e 30·0
Fordham		96·7	25	—	—	e 24 7	[− 3]	—	—	—
Philadelphia		97·0	26	—	—	e 23 59	[−13]	e 26 35	PS	e 45·4
Algiers		97·4	327	13 59?	+22	24 27	{− 9}	17 53?	PP	53·0
Granada		99·2	332	i 17 47	PP	—	—	—	—	i 49·9
Columbia		99·7	34	—	—	e 24 32	[+ 6]	e 32 13	SSP	e 46·2
Tananarive		103·7	257	e 23 45	?	e 25 5	{−16}	33 24	SS	e 53·9
Bermuda		107·5	22	—	—	e 37 33	SSS	—	—	e 44·5
San Juan		119·7	30	e 18 11	?	—	—	e 20 12	PP	e 52·4
Fort de France		125·0	26	e 18 55	[− 7]	—	—	—	—	—
Huancayo		139·2	62	e 19 36	[+ 7]	—	—	e 22 25	PP	—
La Paz	z.	147·4	59	i 19 40a	[− 3]	—	—	41 32	SS	70·0

Additional readings :—
Hyderabad PS = 18m.30s., S_cSN = 19m.53s., SSE = 21m.53s.
Bombay iP_cPE = 10m.30s., iEN = 18m.54s., iE = 19m.11s., S_cSE = 19m.57s., SSE = 22m.4s.
Riverview iE = 20m.46s.
Ukiah e = 22m.24s.
Butte e = 25m.40s.
Bozeman e = 13m.28s., i = 21m.43s.
Tinemaha iZ = 12m.1s.
Santa Barbara i = 12m.2s.
Logan iP = 12m.8s., i = 12m.28s., e = 13m.27s., i = 21m.46s.
Pasadena iZ = 12m.0s., i = 12m.12s., eSZ = 21m.45s., iEN = 22m.10s.
Mount Wilson iZ = 11m.59s., i = 12m.8s.
Salt Lake City e = 25m.52s., eSS = 27m.4s.
Copenhagen 12m.14s.
Riverside iZ = 12m.11s.
Auckland SS? = 28m.24s.

Continued on next page.

La Jolla eEN =12m.17s., i =12m.23s.
Arapuni i =34m.29s. ?
Potsdam iS_cSE =22m.43s., iPPS?E =23m.48s.
Jena ePEN =12m.23s., iPNZ =12m.33s., iS =22m.53s.
Cheb e =32m.59s. ?
Belgrade ePP =15m.48s., eS_cS =23m.16s.
Wellington sP_cPZ =13m.11s., iZ =15m.34s., sPPZ =16m.24s., SS =28m.6s.
Tucson i =23m.17s., e =23m.45s. and 26m.51s., eSSS =31m.51s.
Christchurch P_cS? =28m.29s., S_cS =32m.31s.
Stuttgart iP =12m.49s.
Uccle iE =23m.23s., iSS?N =29m.35s.
Kew ePSNZ =24m.27s.
Helwan iZ =12m.56s., eN =13m.15s., eZ =17m.3s.
St. Louis iPZ =13m.6s., iZ =13m.17s., ePPPE =18m.44s., eN =23m.32s., iSKKSE = 23m.59s., iSPN =24m.6s., eN =25m.10s., eSSN =30m.26s.
Ottawa SSS =33m.53s.
Seven Falls e =37m.41s.
Philadelphia eSS =31m.32s.
San Juan e =24m.35s., 29m.34s., and 36m.28s.
Huancayo e =25m.42s. and 34m.49s., eSS? =40m.43s., e =45m.20s.
La Paz iZ =20m.8s.
Long waves were also recorded at Aberdeen, Stonyhurst, De Bilt, Paris, and San Fernando.

Nov. 15d. Readings also at 3h. (La Paz), 5h. (Mount Wilson, Pasadena, Tucson, and Riverside), 9h. (near Balboa Heights), 13h. (near Logan), 14h. (Potsdam and Stuttgart), 16h. (La Paz, Mount Wilson (2), Pasadena, Riverside (2), Tucson (2), near Bucharest, Sofia, and Istanbul), 17h. (near Istanbul, and near Mizusawa (3)), 18h. (Istanbul (2), near Florissant and St. Louis), 19h. (La Plata, Almata, and near Tashkent), 22h. (Mizusawa).

Nov. 16d. 21h. 25m. 58s. Epicentre 36°·3N. 71°·0E. Depth of focus 0·005.
(as on 1942, [illegible].). May 15

Scale VII at Srinagar ; VI at Rawalpindi ; V at Peshawar.
Epicentre 36°·5N. 70°·5E. Hindu-Kouch—deep.
Government of India, Seismological Bulletin, 1942, pp. 62 and 73.

$A = +\cdot2630$, $B = +\cdot7638$, $C = +\cdot5894$; $\delta = -5$; $h = 0$;
$D = +\cdot946$, $E = -\cdot326$; $G = +\cdot192$, $H = +\cdot557$, $K = -\cdot808$.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Stalinabad		2·9	322	i 0 50	+ 5	—	—	—	—	—
Tashkent		5·2	347	1 15	− 2	—	—	—	—	—
Tchimkent		6·1	351	i 1 29	− 1	—	—	—	—	—
Frunse		7·1	22	1 42	− 2	—	—	—	—	—
Dehra Dun	N.	8·4	133	e 1 45?	−17	i 3 16	−20	—	—	—
New Delhi	N.	9·3	144	(i 2 20a)	+ 6	(i 4 5)	+ 7	(2 52)	sP	—
Bombay	E.	17·4	174	i 4 2	+ 2	i 7 17	+ 8	i 4 17	PP	i 9·0
Hyderabad		19·9	159	4 31	+ 2	8 12	+ 8	5 6	PP	10·0
Sverdlovsk		21·7	345	i 4 47	0	8 34	− 4	5 9	sP	—
Kodaikanal	E.	26·6	166	4 12	?	e 8 27?	?	—	—	10·6
Helwan		33·7	270	6 41	+ 4	e 11 52	− 2	7 14	pP	—
Potsdam	Z.	43·2	311	i 7 57	+ 1	i 17 33	SS	i 10 11	PPP	—
Copenhagen		43·6	315	e 7 59	0	—	—	—	—	—
Stuttgart		46·0	306	e 8 18	− 1	e 18 28	SS	e 8 58	pP	—
Chur		46·1	304	e 8 23	+ 4	—	—	—	—	—
Zurich		46·6	304	e 8 22	− 1	e 18 51	SS	—	—	—
Basle		47·3	304	e 8 28	− 1	—	—	e 11 24	PPP	—
Neuchatel		47·8	304	e 8 31	− 2	—	—	—	—	—
Uccle		48·8	310	e 8 40	− 1	e 19 42	SS	—	—	—

Additional readings and note :—
New Delhi readings have been *increased* by 5m.
Bombay eE =4m.27s., iE =7m.31s. and 7m.46s.
Hyderabad SSN =9m.1s.
Sverdlovsk sS =9m.29s.
Helwan eZ =7m.57s. and 8m.32s., PPZ =8m.47s., cZ =9m.54s., SN =14m.14s., iN = 14m.32s.
Potsdam iEZ =10m.27s.
Stuttgart eS =18m.38s. and 18m.42s.
Long waves were also recorded at De Bilt and Granada.

Nov. 16d. Readings also at 0h. (near Ottawa, Shawinigan Falls, and Seven Falls), 1h. (Helwan and Ksara), 3h. and 10h. (near Mizusawa), 11h. (Stuttgart, Belgrade, Bucharest (2), near Sofia (2), and Istanbul (2)), 13h. (Istanbul and near Sofia), 16h. (near Mizusawa), 19h. (near Apia), 21h. and 23h. (near Lick).

Nov. 17d. 10h. South Pacific.

Christchurch P_eS =5m.43s., S_eS =10m.13s., Q =11m.14s., R =13m.14s.
Apia eP =5m.47s., eS =7m.51s.
Wellington P? =6m.10s., S =8m.50s., R? =9·5m.
Riverview i?E =6m.50s., iE =9m.21s., eLN =15·2m.
Auckland S =7m.5s., i =7m.30s., R =9m.15s.
Tuai S? =7m.44s.
Arapuni S? =8m.24s.?, L =10m.
Brisbane iE =8m.57s., eN =9m.20s. and 13m.40s.
Sydney e =9m.30s. and 15m.12s.
Pasadena iPZ =14m.41s.k, iZ =14m.55s., eN =25m.54s.?, eLZ =39·2m.
Riverside iP =14m.43s.k, iZ =14m.56s.
Mount Wilson ePEN =14m.44s.
Palomar iPZ =14m.44s.k, iZ =15m.6s.
Tinemaha iPZ =14m.52s., iZ =15m.6s.
Tucson iP =15m.1s., i =15m.31s., ePPP =20m.25s., eL =41m.30s.
Logan eP? =15m.27s., e =24m.31s., eS =26m.37s., e =29m.34s. and 51m.3s.
La Paz PZ =15m.58s., PPZ =19m.52s., LZ =52m.0s.
Ottawa eZ =21m.3s., L =57m.
Helwan iPKP?Z =22m.18s.k, PKKP?Z =22m.42s., PP?Z =26m.15s., iZ =26m.26s. and 26m.48s.
Stuttgart ePKP? =22m.18s., ePP? =27m.2s., ePPP? =30m.48s., eQ =32m., R =36m.
Ksara e =22m.24s. and 26m.8s.
Granada ePKP =22m.36s., iPP =27m.33s., SS =50m.42s., eL =104·4m.
Honolulu eSS =22m.48s., eL =24m.28s.
Salt Lake City eSKS =26m.8s., e =30m.13s., eL =39m.4s.
Huancayo eS =26m.54s., ePS? =27m.27s., eSS =33m.19s., e =40m.31s., eL =47m.19s.
Bozeman ePS? =27m.57s., eL =40m.15s.
College eS? =28m.8s., eL =54m.18s.
Bombay iE =28m.18s., eE =29m.0s.
Long waves also recorded at Ukiah, Chicago, Philadelphia, La Plata, and other European stations.

Nov. 17d. 23h. 19m. 31s. Epicentre 14°·0S. 73°·0W.

Approximate.

A = +·2838, B = −·9283, C = −·2404; δ = +8; h = +6;
D = −·956, E = −·292; G = −·070, H = +·230, K = −·971.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		3·0	311	e 1 2	P_g	—	—	—	—	i 1·9
La Paz	Z.	5·3	118	i 1 44 a	P_g	i 3 6	S_g	—	—	3·7
La Plata	E.	24·9	150	5 19	− 7	9 54	+ 7	5 59?	PP	12·4
	N.	24·9	150	4 50	−36	9 41	− 6	12 11?	P_eS	13·5
Rio de Janeiro	N.	29·6	112	e 6 29	+20	e 11 29	+25	—	—	e 16·3
Fort de France		30·9	24	e 6 42	+22	—	—	—	—	—
San Juan		32·9	12	e 7 57	PP	e 11 55	− 1	—	—	e 14·9
Bermuda		46·8	9	e 8 45	+12	e 15 48	PS	e 10 40	PP	e 25·0
Columbia		48·3	352	—	—	e 16 9	PS	e 18 46	S_eS	e 27·6
St. Louis		54·8	344	e 9 39	+ 5	e 17 29	+15	e 19 25	S_eS	—
Tucson		58·5	323	i 10 0	0	e 18 42	PS	—	—	e 29·5
Ottawa		59·2	358	10 14	+ 9	18 32	+20	—	—	28·5
Seven Falls		60·9	3	—	—	e 18 54	+20	—	—	28·5
Palomar	Z.	63·0	320	i 10 30	− 1	—	—	—	—	—
Riverside	Z.	63·7	320	i 10 34	− 2	—	—	—	—	—
Mount Wilson	Z.	64·3	320	e 10 38	− 1	—	—	—	—	—
Pasadena		64·3	320	e 10 45	+ 6	e 19 27	+10	—	—	e 31·5
Tinemaha	Z.	66·3	322	i 10 52	0	—	—	—	—	—
Victoria		76·6	328	—	—	e 21 51	+11	—	—	42·5
San Fernando	E.	80·4	49	—	—	22 55	PS	—	—	49·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Granada		82·6	50	—	—	i 23 17	k PS	—	—	44·9
Sitka		87·7	332	—	—	e 23 39	+ 6	—	—	e 30·1
Uccle	E.	92·9	39	—	—	e 24 3	{ 0}	e 31 19	SS	e 46·5
De Bilt	E.	93·8	38	—	—	e 26 19	PPS	—	—	e 47·5

Additional readings :—
La Plata E =11m.11s.?.
Bermuda e =18m.50s.
Columbia e =20m.43s.
Tucson i =11m.1s., e =13m.8s.
Uccle ePPSE =26m.6s.
Long waves were also recorded at Montezuma, Philadelphia, Chicago, Stuttgart, Lisbon, Kew, Aberdeen, Potsdam, and New Delhi.

Nov. 17d. Readings also at 0h. (near Mizusawa), 2h. (near Istanbul), 9h. (Auckland and Christchurch), 16h. (Huancayo), 18h. (near St. Louis), 20h. (Huancayo, La Paz, Mount Wilson, Pasadena, Tucson, Palomar, and Riverside), 23h. (Riverside and Tucson).

Nov. 18d. 12h. 1m. 7s. Epicentre 10°·0N. 38°·0E. Rough.

A = +·7762, B = +·6064, C = +·1725 ; δ = −4 ; h = +7 ;
D = +·616, E = −·788 ; G = +·136, H = +·106 ; K = −·985.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		20·7	344	4 41	− 3	i 8 29	− 2	—	—	10·1
Ksara		23·8	356	e 5 15	0	e 9 26?	− 2	—	—	—
Bombay	E.	34·8	72	i 6 48	− 6	e 12 11	−14	8 5	PP	e 15·9
Hyderabad	E.	39·9	75	e 7 38	+ 1	e 13 38	− 5	9 1	PP	19·1
New Delhi	N.	41·1	58	e 7 58	+ 9	e 13 28	−33	—	—	—
Andijan		43·1	39	e 7 51	−13	e 14 26	− 4	—	—	—
Zurich		44·8	333	e 8 18	+ 1	—	—	—	—	—
Basle		45·4	333	e 8 34	+12	e 12 3	?	—	—	—
Stuttgart		45·5	335	e 8 24	+ 1	e 15 3	− 2	e 9 56	PP	e 24·2
Granada		46·2	313	i 8 36	+ 8	—	—	—	—	23·5
Clermont-Ferrand		46·5	326	i 8 33	+ 2	—	—	—	—	—
Potsdam		46·9	340	e 8 33	− 1	—	—	—	—	e 22·9
Uccle		49·2	333	—	—	e 16 27	+ 4	e 19 28	SS	e 31·0
De Bilt	E.	49·7	335	—	—	—	—	i 20 4	SS	—
Sverdlovsk		49·9	16	e 8 50	− 7	15 52	−15	—	—	—
Tucson		128·5	326	i 19 18	[+ 9]	e 22 35	PKS	i 38 29	P′P′	e 72·0

Additional readings :—
Helwan eZ =5m.27s., 6m.10s., 7m.5s., and 9m.14s.
Hyderabad SSE =16m.13s.
New Delhi readings have been increased by 3 minutes.
Stuttgart eSS =18m.31s.
Tucson i =19m.24s., e =21m.22s.
Long waves were also recorded at Prague, Triest, Paris, Kew, Bermuda, Huancayo, and La Paz.

Nov. 18d. 12h. Origin unknown.

Algiers P? =24m.0s., iPP? =25m.17s., iS? =29m.53s.
Granada iP =25m.24s., iSS? =38m.26s., L =43·7m.
Ksara e =25m.34s., 32m.35s., and 35m.48s.
Helwan iZ =26m.28s., 26m.45s., and 28m.0s., iN =28m.52s., iEN =29m.30s., iE = 29m.45s.
San Fernando SS?EN =27m.10s.
Zurich eP =28m.37s.
Basle eP =28m.41s.
Neuchatel eP =28m.42s.
Potsdam eZ =28m.51s.
Clermont-Ferrand eP =28m.53s., ePP =29m.12s., iS =31m.49s.

Nov. 18d. Readings also at 0h. (Mount Wilson, Riverside, Tucson, and near La Paz (2)), 1h. (near La Paz (2)), 2h. (Palomar, Riverside, Tucson, and near Istanbul), 3h. (Calcutta), 5h. (near Istanbul and Sofia), 6h. (De Bilt), 7h. (De Bilt, Potsdam, Uccle, Kew, Scoresby Sund, Mount Wilson, Pasadena (2), Riverside, Palomar, and Tucson), 11h. (Harvard, Calcutta, Ebingen, near Stuttgart, and Zurich), 12h. (near La Paz), 15h. (Calcutta and Jena), 19h. (near Koyama, Mitaka, Susaki, Titibu, Tokyo Imperial University, and Togane), 20h. (near Berkeley (2), Branner (2), Lick (2), and Fresno), 23h. (near Andijan).

Nov. 19d. 8h. 51m. 55s. Epicentre 0°·6S. 81°·7W.

$A = +\cdot1443$, $B = -\cdot9895$, $C = -\cdot0104$; $\delta = +4$; $h = +7$;
$D = -\cdot990$, $E = -\cdot144$; $G = -\cdot002$, $H = +\cdot010$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights	N.	9·7	13	e 2 5	−17	e 3 55	−20	—	—	—
Huancayo		13·0	151	e 3 10	+ 1	i 5 35	0	i 3 20	PP	i 6·5
La Paz		20·7	141	i 4 43	− 1	i 8 47	+16	i 5 16	PPP	12·7
San Juan		24·3	38	i 5 19	− 1	i 9 37	0	—	—	e 10·9
Montezuma		25·2	151	(e 5 19)	−10	(e 9 53)	+ 1	(e 6 3)	PP	(e 13·7)
Fort de France		25·4	54	i 5 17	−14	e 9 49	− 7	e 5 52	PP	—
Tacubaya	N.	26·3	321	e 5 40	+ 1	—	—	—	—	—
Mobile		31·7	350	e 6 34	+ 7	i 11 34	− 3	—	—	—
Columbia		34·4	2	e 6 52	+ 1	e 12 10	− 9	e 8 17	PP	e 14·1
Bermuda		36·5	25	i 7 9	0	i 12 48	− 3	i 8 25	PP	e 14·7
Cape Girardeau		38·4	351	e 7 26	+ 1	e 13 15	− 5	—	—	—
Georgetown		39·5	7	7 29	− 5	13 32	− 5	i 9 7	PP	—
St. Louis		39·8	350	i 7 31	− 5	i 13 43	+ 1	1 9 12	PP	—
Florissant		40·0	350	i 7 34	− 4	i 13 44	0	i 7 49	pP	—
La Plata		40·7	150	7 45	+ 1	13 59	+ 4	7 55	pP	24·2
Philadelphia		40·8	8	i 7 46	+ 1	i 13 45	−11	i 9 20	PP	i 19·3
Pittsburgh		40·9	3	e 7 38	− 8	i 13 48	−10	i 7 49	pP	—
Fordham		41·9	10	i 7 55	+ 1	i 14 12	− 1	i 9 40	PP	i 21·3
Chicago		42·5	354	e 7 56	− 3	e 14 13	− 9	e 9 29	PP	e 17·3
Tucson		42·7	323	i 7 56	− 4	i 14 10	−14	e 9 37	PP	e 18·4
Lincoln		43·4	345	e 8 13	+ 7	e 14 21	−14	e 9 24	PP	e 17·9
Rio de Janeiro	N.	43·5	123	e 8 3	− 4	i 14 46	+10	—	—	i 21·4
Vermont		45·5	9	e 10 17	PP	15 1	− 4	—	—	18·3
Ottawa		46·1	7	8 19	− 9	15 10	− 4	10 13	PP	22·1
La Jolla		47·2	319	e 8 35	− 1	—	—	—	—	—
Palomar	Z.	47·3	320	e 8 32	− 5	—	—	i 8 50	pP	—
Halifax		47·8	18	8 44	+ 3	15 37	− 1	—	—	26·1
Riverside	Z.	48·0	320	i 8 39	− 4	—	—	i 10 27	PP	—
Seven Falls		48·5	10	e 8 54	+ 8	15 35	−13	19 53	SSS	24·1
Mount Wilson	E.	48·6	320	e 8 48	+ 1	—	—	—	—	—
Pasadena		48·6	320	e 8 43	− 4	e 15 53	+ 4	e 10 8	PP	e 21·6
Salt Lake City		49·5	331	e 8 54	0	e 16 5	+ 3	e 12 2	PPP	e 22·4
Haiwee		49·7	322	e 9 0	+ 4	—	—	—	—	—
Santa Barbara	Z.	49·8	318	e 8 54	− 2	—	—	—	—	—
Logan		50·2	333	e 8 58	− 2	e 16 15	+ 4	e 11 4	PP	e 24·3
Tinemaha	Z.	50·5	322	e 9 0	− 2	—	—	i 10 30	PP	—
Lick	N.	52·8	321	e 9 19	0	—	—	—	—	—
Bozeman		52·9	335	e 9 26	+ 6	e 16 50	+ 2	e 11 16	PP	e 22·9
Santa Clara		53·0	321	i 9 26	+ 5	—	—	—	—	e 26·3
Berkeley		53·5	321	e 9 21	− 3	e 17 4	+ 7	—	—	—
Butte		53·8	335	e 9 30	+ 4	e 17 7	+ 6	e 12 30	PPP	e 26·2
Ukiah		54·8	322	e 8 41	?	e 17 25	+11	e 21 0	SS	e 24·1
Seattle		59·6	330	e 12 13	PP	e 18 14	− 3	e 21 50	SS	e 33·4
Sitka		71·9	333	e 9 36	?	e 20 50	+ 2	e 21 7	PS	e 25·4
Honolulu		77·3	293	—	—	e 21 12	?	e 26 32	SS	e 36·2
San Fernando	E.	78·7	54	—	—	e 22 15	+12	—	—	38·1
College		80·6	337	e 12 20	+ 4	e 22 18	− 5	e 27 21	SS	e 33·3
Scoresby Sund		80·8	17	e 26 1	SS	—	—	—	—	e 38·5
Granada		80·9	53	i 12 14	− 3	i 23 12	PS	12 18	P_eP	41·4
Stonyhurst		84·1	37	e 12 32	− 2	—	—	—	—	42·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oxford		84·5	39	i 12 37	+ 1	22 59	− 3	—	—	—
Kew		85·1	39	i 12 37a	− 2	i 23 9	+ 1	i 15 58	PP	e 40·1
Paris		86·6	42	i 12 49	+ 3	—	—	e 32 56	SSS	41·1
Clermont-Ferrand		86·8	45	e 12 45	− 2	e 23 25	0	i 12 53	P_cP	—
Uccle		88·0	39	e 12 53	0	e 23 25	−11	—	—	e 42·1
De Bilt		88·5	38	i 12 57k	+ 1	e 23 40	− 1	—	—	e 39·1
Basle		89·9	43	e 12 59	− 3	e 23 50	− 4	—	—	—
Zurich		90·6	43	e 13 2	− 3	e 24 2	+ 2	—	—	—
Stuttgart		91·0	41	e 13 8	+ 1	24 7	+ 4	e 16 21	PP	e 46·3
Chur		91·3	43	e 13 6	− 3	e 24 10	+ 4	—	—	—
Copenhagen		92·8	34	—	—	23 14	[−35]	—	—	—
Potsdam		93·4	37	i 13 20a	+ 2	i 24 24	0	i 13 45	pP	e 44·1
Triest		94·3	44	e 12 55	−28	—	—	—	—	—
Prague		94·4	40	e 23 35	SKS	e 23 41	[−17]	—	—	e 41·1
Upsala		95·2	30	e 26 5?	PS	—	—	—	—	e 45·1
Helwan	Z.	110·2	58	e 18 59	[+25]	—	—	e 19 25	PP	—
Sverdlovsk		116·4	21	e 19 56	PP	29 32	PS	30 47	PPS	—
Riverview	E.	119·4	229	e 37 45	?	—	—	—	—	e 61·8
Tashkent		131·7	29	e 19 12	[− 3]	—	—	21 27	PP	—
Almata		133·4	20	19 32	[+13]	—	—	—	—	—
Bombay	E.	149·1	52	i 20 17	[+31]	i 37 10	?	—	—	e 75·1

Additional readings :—
Huancayo i =5m.14s.
La Paz iSZ =8m.51s.
Montezuma e =(6m.41s.), (7m.45s.), and (11m.32s.), all readings have been decreased by 2 minutes.
Fort de France ePPP =6m.6s.
Bermuda e =9m.13s.
Cape Girardeau eN =7m.35s., eE =13m.27s., and 13m.47s.
Georgetown i =7m.36s.
St. Louis eSEN =13m.9s., iEN =16m.17s.
Florissant ipPZ =9m.16s., isSN =16m.31s.
La Plata E =7m.59s., N =8m.4s., PPPE =9m.22s., E =9m.25s., SN =14m.6s., SSSE =17m.17s.?, QN =21m.53s.?, QE =21m.59s.?
Philadelphia i =9m.53s.?, eS =13m.17s., i =16m.43s.
Pittsburgh e =13m.3s.
Fordham eSS =17m.31s.
Tucson i =10m.26s., iSS =17m.45s.
Ottawa SSS =19m.17s.
Palomar iZ =10m.21s.
Riverside iZ =8m.43s.
Pasadena e =8m.47s., iSEN =15m.59s., eSSN =19m.37s.
Salt Lake City e =16m.29s. and 19m.53s.
Logan iP =9m.6s., e =18m.17s., i =20m.16s.
Lick eN =9m.36s.
Bozeman e =12m.34s.
Berkeley iPZ =9m.25s., ePN =9m.29s., ePE =9m.38s.
Butte e =21m.14s.
Ukiah e =9m.17s. and 10m.39s.
Sitka e =13m.8s.
Granada PP =15m.45s., iSKS =22m.30s., iSS =28m.59s., eSSS =32m.53s.
Kew ePPPN =17m.54s.?, iPSE =24m.6s.?, ePPSN =24m.30s., iSSZ =29m.30s.
Paris eSS =29m.43s.
Uccle eSN =23m.29s., i =23m.39s.
Stuttgart eP =13m.11s., ePPP? =18m.23s.?, SKS =23m.57s., ePS =25m.5s. and 25m.25s., eSS =30m.5s.
Potsdam iSKKSE =23m.58s., iSE =24m.27s.
Helwan eZ =19m.56s., 21m.23s., and 28m.50s.
Tashkent i =19m.24s., PP =22m.36s.
Long waves were also recorded at Tananarive and Wellington.

Nov. 19d. 9h. 8m. 49s. Epicentre 0°·6S. 81°·7W. (as at 8h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·0	151	e 4 45	?	—	—	—	—	i 6·3
La Paz		20·7	141	i 4 43	− 1	i 8 41	+10	—	—	12·5
Fort de France		25·4	54	e 5 30	− 1	e 10 2	+ 6	—	—	—
Cape Girardeau		38·4	351	e 7 27	+ 2	e 13 18	− 2	—	—	—
La Plata	N.	40·7	150	7 41	− 3	—	—	—	—	26·7
Tucson		42·7	323	i 8 0	0	e 14 14	−10	i 9 55	PP	e 22·4
Lincoln		43·4	345	e 8 3	− 3	e 14 20	−15	—	—	e 18·1
La Jolla	N.	47·2	319	e 8 37	+ 1	—	—	—	—	—
Palomar	Z.	47·3	320	i 8 37	0	—	—	—	—	—
Riverside	Z.	48·0	320	e 8 43	0	—	—	i 10 4	PP	—
Mount Wilson		48·6	320	e 8 50	+ 3	—	—	—	—	—
Pasadena		48·6	320	i 8 47	0	i 15 45	− 4	i 10 7	PP	i 24·2
Salt Lake City		49·5	331	e 8 55	+ 1	—	—	—	—	—
Santa Barbara		49·8	318	e 8 59	+ 3	—	—	i 10 20	PP	—
Tinemaha	Z.	50·5	322	i 9 2	0	—	—	i 10 19	PP	—
Lick	N.	52·8	321	e 9 21	+ 2	—	—	—	—	—
Berkeley		53·5	321	i 9 25	+ 1	—	—	—	—	—
Granada		80·9	53	i 12 6	−11	i 22 17	− 9	15 7	PP	—
Oxford		84·5	39	—	—	i 22 57	− 5	—	—	—
Clermont-Ferrand		86·8	45	e 12 45	− 2	e 23 24	− 1	—	—	e 27·9
Uccle	Z.	88·0	39	e 12 53	0	e 23 35	− 1	—	—	—
Stuttgart		91·0	41	e 13 4	− 3	e 23 59	− 4	e 23 41	SKS	—
Chur		91·3	43	e 13 6	− 3	—	—	—	—	—
Potsdam		93·4	37	i 13 18	0	i 24 26	+ 2	e 13 42	pP	—
Tashkent		131·7	29	e 19 16?	[+ 1]	—	—	—	—	—
Almata		133·4	20	e 19 29	[+10]	22 52	?	—	—	—
Andijan		133·6	27	e 19 30	[+11]	e 22 51	?	—	—	—

Additional readings :—
La Plata PZ = 7m.46s.
Tucson i = 8m.25s., e = 16m.19s.
Palomar iZ = 8m.58s.
Berkeley ePN = 9m.31s., ePE = 9m.34s.
Granada S = 22m.53s.
Potsdam ipPE = 13m.45s., ipPN = 13m.48s., iSE = 24m.30s.
Long waves were also recorded at Triest and Helwan.

Nov. 19d. 14h. 39m. 56s. Epicentre 0°·6S. 81°·7W. (as at 9h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights	N.	9·7	13	e 2 4	−18	—	—	—	—	—
Huancayo		13·0	151	i 3 16	+ 7	e 5 53	+18	—	—	e 6·4
La Paz	Z.	20·7	141	i 4 48k	+ 4	i 8 47	+16	—	—	12·8
San Juan		24·3	38	e 5 17	− 3	e 9 38	+ 1	—	—	e 10·8
Fort de France		25·4	54	e 5 21	−10	—	—	—	—	—
St. Louis		39·8	350	i 7 35	− 1	e 13 11	−31	i 9 16	PP	—
Philadelphia		40·8	8	7 40	− 5	e 13 38	−18	e 9 15	PP	—
Tucson		42·7	323	i 8 1	+ 1	e 14 8	−16	i 9 46	PP	e 22·0
Rio de Janeiro	N.	43·5	123	e 14 24	S	(e 14 24)	−12	—	—	e 25·6
Ottawa		46·1	7	8 23	− 5	15 10	− 4	10 20	PP	23·1
Palomar	Z.	47·3	320	i 8 41	+ 4	—	—	e 10 35	PP	—
Riverside	Z.	48·0	320	i 8 44	+ 1	—	—	i 12 20	P_cP	—
Seven Falls		48·5	10	—	—	e 15 48	0	—	—	20·1
Pasadena		48·6	320	e 8 49	+ 2	—	—	i 12 28	P_cP	i 24·1
Salt Lake City		49·5	331	e 8 58	+ 4	e 15 44	−18	—	—	e 28·0
Tinemaha	Z.	50·5	322	e 9 4	+ 2	—	—	i 12 39	P_cP	—

Additional readings :—
St. Louis eZ = 9m.4s. and 10m.47s., eN = 17m.22s.
Philadelphia eSS = 16m.37s., e = 17m.28s.
Tucson i = 10m.29s., iS = 14m.52s.
Ottawa SS = 18m.34s.
Palomar eP_cPZ = 12m.14s., iZ = 12m.22s.
Tinemaha eZ = 10m.25s.

Nov. 19d. 16h. 32m. 48s. Epicentre 0°·6S. 81°·7W. (as at 14h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·0	151	e 3 13	+ 4	e 5 30	− 5	—	—	e 6·2
La Paz	z.	20·7	141	i 4 44	0	i 8 38	+ 7	—	—	13·5
San Juan		24·3	38	e 5 20	0	e 9 32	− 5	—	—	e 11·1
Fort de France		25·4	54	e 5 19	−12	—	—	—	—	—
St. Louis		39·8	350	i 7 32	− 4	e 13 22	−20	e 16 25	SS	—
Tucson		42·7	323	i 8 0	0	e 14 49	+25	e 10 16	PPP	e 22·6
Rio de Janeiro		43·5	123	(e 8 12)	+ 5	—	—	—	—	—
Palomar	z.	47·3	320	i 8 37	0	—	—	—	—	—
Riverside	z.	48·0	320	i 8 42	− 1	—	—	—	—	—
Pasadena	z.	48·6	320	i 8 50	+ 3	—	—	—	—	—
Tinemaha	z.	50·5	322	i 9 2	0	—	—	—	—	—

Additional readings :—
St. Louis iZ = 7m.35s.
Rio de Janeiro reading decreased by 10 minutes.

Nov. 19d. Readings also at 2h. (Ksara), 3h. (Tashkent), 9h. (New Delhi, Calcutta, Tucson, Palomar, Riverside, and Pasadena), 10h. (Tucson (3), La Jolla, Palomar (3), Riverside (3), Tinemaha, Pasadena (3), and La Paz), 11h. (Tananarive), 12h. (Tucson), 13h. (Huancayo, La Paz, Tucson, Tinemaha, Palomar, La Jolla, Riverside, and Pasadena), 14h. (Tacubaya), 18h. (De Bilt and Stuttgart).

Nov. 20d. 4h. 4m. 6s. Epicentre 16°·5N. 94°·4W. (as on Nov. 12d.).

Catalogo Compendiado de Tremblores. Serie Sismologica, Mexico D.F. 1945. Epicentre 16° 28′N. 94° 26′W. Pasadena suggests deep.

$A = -\cdot0736$, $B = -\cdot9565$, $C = +\cdot2823$; $\delta = 0$; $h = +5$;
$D = -\cdot997$, $E = +\cdot077$; $G = -\cdot022$, $H = -\cdot281$, $K = -\cdot959$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca	N.	2·3	283	i 0 59	P_g	—	—	—	—	—
Vera Cruz	E.	3·2	329	i 1 10	P_g	—	—	—	—	—
Puebla	N.	4·4	305	—	—	i 2 22	S_g	—	—	—
Tacubaya	E.	5·4	303	e 1 41	P*	—	—	—	—	—
Merida	E.	6·3	45	e 1 58	P_g	—	—	—	—	—
Cape Girardeau	N.	21·2	12	e 4 45	− 4	e 8 38	− 3	i 5 22	PP	—
Tucson		21·6	321	i 4 56	+ 2	—	—	i 10 18	SSS	e 11·6
St. Louis		22·4	9	i 4 59	− 3	e 8 58	− 6	—	—	—
Florissant		22·5	9	i 4 28	−34	i 9 4	− 1	—	—	—
Palomar	Z.	26·3	316	i 5 40	+ 1	—	—	—	—	—
Riverside	Z.	27·0	316	e 5 44	− 1	—	—	—	—	—
Tinemaha	Z.	29·4	319	i 6 6	− 1	—	—	—	—	—
Copenhagen		85·7	33	20 25	?	—	—	—	—	—
Stuttgart		86·4	40	e 12 42	− 3	—	—	—	—	—
Calcutta	N.	141·1	355	i 21 38	PP	i 25 34	[−67]	—	—	—
Bombay	E.	142·6	20	e 21 26	PP	e 23 57	PKS	e 24 17	?	—

Additional readings :—
Cape Girardeau eN = 4m.54s., 5m.7s., and 9m. 14s.
Tucson i = 5m.56s.
Florissant iZ = 4m.48s.
Palomar iZ = 5m.59s. and 6m.9s.
Riverside eZ = 6m.15s., iZ = 6m.19s.
Tinemaha iZ = 6m.36s.
Long waves were also recorded at De Bilt.

Nov. 20d. Readings also at 2h. (near Granada), 4h. (New Delhi, Stuttgart, Tchimkent, near Frunse, Tashkent, Sverdlovsk, and near Tananarive), 6h. (Huancayo), 11h. (near Apia), 14h. (Istanbul), 15h. (Sofia), 16h. (Jena and near La Paz), 21h. (Tashkent, and near Frunse), 23h. (La Paz, Pasadena, Tinemaha, Palomar, and Riverside).

Nov. 21d. 14h. 1m. 41s. Epicentre 40°·6N. 35°·0E.

M. Blumenthal :
Zur Geologie der Landstrechen der Erdbeben von Ende 1942 in Nord-Anatolien und dortselbst ausgefuhrte. Makroseismische Beobachtungen (Osmançik-Erbaa). Epicentre Kargi 40° 33′N. 34° 57′E. M.T.A. Sene 8, Sayi : 1-29 Ankara 1943, pp. 33-46. Resumè in German, pp. 47-58. Isoseismal chart plate II, p. 37.

$A = +\cdot6238$, $B = +\cdot4368$, $C = +\cdot6482$; $\delta = +8$; $h = -2$;
$D = +\cdot574$, $E = -\cdot819$; $G = +\cdot531$, $H = +\cdot372$, $K = -\cdot761$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		4·5	278	1 15	+ 4	2 28	S_g	1 29	P_g	3·1
Ksara		6·8	174	e 1 56	+12	e 3 13	+10	—	—	—
Bucharest		7·6	303	e 1 51	− 4	e 3 21	− 2	i 2 9	P*	—
Focsani		7·6	314	1 55	0	3 27	+ 4	e 3 58	S*	—
Sofia		9·0	287	e 2 24	+11	i 4 12	+14	i 4 48	S*	—
Helwan		11·1	197	2 45	+ 2	4 55	+ 6	8 47	PcP	—
Belgrade		11·5	296	e 2 58	+10	e 4 30	−29	i 6 28	SS	—
Triest		16·3	295	i 3 48	− 4	—	—	—	—	—
Prague		17·2	311	e 4 0?	− 3	e 7 13?	− 1	—	—	e 8·3
Cheb		18·4	309	e 4 19?	+ 1	—	—	—	—	e 9·3
Potsdam		19·1	316	i 4 25	− 2	i 7 36	−21	—	—	9·3
Jena		19·2	311	e 4 19	− 9	e 8 5	+ 6	—	—	e 9·3
Chur		19·4	298	e 4 23	− 7	e 8 3	− 1	—	—	—
Stuttgart		20·0	304	e 4 32a	− 5	i 8 19	+ 2	e 9 0	SS	12·1
Zurich		20·1	299	e 4 34a	− 4	e 9 2	SS	—	—	—
Basle		20·8	300	e 4 41	− 4	e 8 0	−33	—	—	—
Strasbourg		20·9	303	e 4 46	0	—	—	i 5 24	PP	12·3
Neuchatel		21·2	298	e 4 45	− 4	—	—	—	—	—
Copenhagen		21·2	323	e 4 47	− 2	8 49?	+ 8	—	—	12·3
Upsala		22·1	336	4 57	− 2	i 9 6	+ 8	i 9 57	SS	e 11·0
Sverdlovsk		23·3	36	i 5 12	+ 3	i 9 21	+ 3	—	—	—
De Bilt		23·4	311	—	—	e 9 29	+ 8	—	—	e 10·8
Uccle		23·6	307	i 5 18	+ 5	9 26	+ 1	—	—	11·3
Clermont-Ferrand		23·7	293	i 5 12	− 2	i 9 33	+ 6	—	—	e 15·6
Paris		24·4	301	e 5 17	− 4	—	—	—	—	14·3
Algiers		25·2	271	5 30	+ 1	9 18	−34	—	—	—
Tashkent		25·8	77	5 36	+ 2	10 16	+14	—	—	—
Tchimkent		25·9	75	i 5 39	+ 4	—	—	—	—	—
Kew		26·6	307	e 6 29	+47	i 10 19	+ 3	—	—	e 13·3
Oxford		27·2	307	—	—	i 10 32	+ 7	—	—	e 15·2
Frunse		29·4	73	e 6 15	+ 8	—	—	—	—	—
Granada		30·1	277	i 6 5	− 8	(11 13)	+ 1	6 34	pP	15·0
San Fernando	E.	32·3	276	—	—	e 11 32	−14	—	—	e 15·3
Lisbon		33·8	282	6 43	− 3	—	—	—	—	15·4
Bombay	E.	38·9	112	e 6 51	−38	e 13 29	+ 1	e 9 14	PP	19·3
Scoresby Sund		41·4	335	e 10 22	PP	e 16 24	SS	e 10 41	PPP	e 22·3
Calcutta	N.	48·1	95	—	—	e 15 45	+ 3	i 19 36	SS	—
Pasadena	Z.	101·6	337	e 18 8	PP	—	—	—	—	e 57·3
Palomar	Z.	102·0	336	e 18 12	PP	—	—	—	—	—

Additional readings :—
Bucharest ePN = 1m.59s., eSN = 3m.28s. iS* = 3m.49s., iS_gZ = 4m.8s., iS_gEN = 4m.12s.
Focsani eS_gN = 4m.20s.
Sofia iEN = 2m.48s. and 3m.31s.
Helwan eZ = 3m.4s., iZ = 5m.31s., S*E = 5m.45s.
Belgrade e = 4m.5s., iPPS = 6m.7s.
Potsdam iPN = 4m.29s.
Jena ePZ = 4m.29s., eN = 7m.17s.
Stuttgart iP = 4m.38s., eQ = 9m.49s?.
Strasbourg e = 6m.12s.
Granada pPP = 7m.19s., P_cP? = 9m.20s., iS = 10m.22s., sSS = 12m.16s., P_cS = 13m.1s., sP_cS = 14m.17s., true S is given as sS.
Bombay eSS?E = 16m.19s.
Long waves were also recorded at Aberdeen and Stonyhurst.

Nov. 21d. Readings also at 1h. (Stuttgart), Neuchatel, Zurich, and near Basle), 3h. (Huancayo, La Paz, La Jolla, Pasadena, Palomar (2), Riverside (2), Tinemaha (2), Tucson (2), San Francisco, near Berkeley, and Lick), 15h. (Riverview and near Seven Falls), 16h. (near Mizusawa), 19h. (La Paz and Riverview), 20h. (La Paz), 21h. (near Branner and near Frunse), 23h. (near Tashkent).

Nov. 22d. 16h. Pacific.

Christchurch P = 8m.21s., Q = 12m.11s., R = 13m.50s.
Wellington P = 8m.45s., iZ = 10m.0s. and 10m.50s., S = 13m.15s., Q = 15m.?, R = 16m.?
Riverview iPZ = 9m.17s.k, iPPNZ = 10m.1s., iSE = 13m.54s., iN = 13m.59s., iSSE = 14m.45s., iN = 14m.53s.
Auckland e = 10m.12s.?, S? = 14m.30s.?, e = 16m.0s.?, L = 17m.
Brisbane eN = 10m.30s. and 15m.21s.
Sydney e = 13m.54s. and 14m.48s.
Bombay eE = 23m.12s., 30m.30s., and 48m.0s.
Ottawa eZ = 23m.26s., L = 66m.
Granada iPKP = 23m.47s., PKP_2 = 24m.6s., PP = 27m.16s., SS = 46m.42s., eL = 80·5m.
Stuttgart e = 24m.5s. and 68m.30s., eL = 89m.0s.
San Fernando eE = 25m.15s., LE = 81·5m.
Helwan eZ = 25m.30s. and 27m.24s., eE = 28m.27s.
La Paz iZ = 25m.43s., LZ = 49m.
Huancayo e = 30m.7s. and 30m.27s., eL = 44m.32s.
Scoresby Sund e = 40m.7s., eL = 55m.45s. and 93m.17s.
Uccle eN = 43m.?, eEN = 48m.34s.
Long waves were also recorded at Arapuni, La Plata, San Juan, and other European stations.

Nov. 22d. Readings also at 1h. (Kew), 2h. (Tashkent and near Andijan), 3h. (Bombay), 5h. (near Mizusawa), 6h. (Almata and near Tucson), 9h. (Riverview), 15h. (Palomar, Riverside, and Tinemaha), 17h. (near La Paz and Pasadena), 18h. (College).

Nov. 23d. Readings at 0h. (Auckland and Wellington), 7h. (Pasadena, Palomar, Tinemaha, and near Apia), 11h. (Andijan and near Tashkent), 14h. (Perth, Calcutta, New Delhi, Sverdlovsk, Tashkent, near Almata, and Andijan). 15h. (De Bilt and Potsdam), 16h. (Cheb and near Almata), 23h. (near Berkeley).

Nov. 24d. Readings at 0h. (Auckland, Huancayo, La Paz, Tucson, Haiwee, Mount Wilson, Pasadena, Riverside, Tinemaha, San Fernando, Uccle, and near Berkeley), 1h. (De Bilt), 5h. (La Paz), 7h. (near Mizusawa), 8h. (Tashkent and near Tchimkent), 10h. (Haiwee, Pasadena, Riverside, Tinemaha, and Tucson), 11h. (Riverside, Tinemaha, and Tucson), 16h. (near Sofia), 20h. (Fresno), 21h. (Cape Girardeau and near La Paz), 22h. (Balboa Heights), 23h. (near Tananarive).

Nov. 25d. 1h. 18m. 0s. Epicentre 16°·7N. 97°·9W.

Intensity VIII at Cacahuatepec and Ometepec; VII at Jamiltepec; IV at Oaxaca. Epicentre 16° 05′N., 98° 12′W. (Tacubaya).
Instituto de Geologia. Catalogo Compendiado de tremblores, 1941 to 1944, Mexico, 1945, p. 38.

A = −·1317, B = −·9492, C = +·2856; δ = −11; h = +5;
D = −·991, E = +·137; G = −·039, H = −·283, K = −·958.

		△	Az.	P.	O−C.	S.	O−C.		Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.		m.
Oaxaca		1·1	74	i 0 27	+ 5	—	—	—	—		—
Tacubaya	N.	2·9	335	0 52	P*	—	—	—	—		—
Vera Cruz	Z.	3·0	34	e 0 53	P*	—	—	—	—		—
Guadalajara	N.	6·5	308	e 1 37	− 2	—	—	—	—		—
Merida	Z.	8·9	61	e 2 15	+ 3	—	—	—	—		—
Chihuahua	Z.	14·1	329	e 3 25	+ 2	—	—	—	—		—
Mobile		16·5	30	i 3 57	+ 3	i 7 0	+ 2	—	—		—
Tucson		19·4	327	i 4 29	− 1	e 8 12	+ 8	i 4 47	PP		i 9·5
Balboa Heights		19·5	111	e 4 0?	−31	—	—	—	—		—
Cape Girardeau	N.	21·8	18	e 4 57	+ 1	e 9 7	+15	—	—		—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
St. Louis		22·9	~~50~~ 49	i 5 0	− 6	i 9 15	+ 2	i 5 5	pP	14·0
Columbia		23·0	37	e 5 6	− 1	e 9 25	+11	—	—	e 11·5
Florissant		23·0	~~50~~ 49	i 5 6	− 1	i 9 25	+11	i 5 29	PP	e 12·8
Denver		23·8	346	e 5 15	0	e 9 32	+ 4	e 5 39	PP	e 12·8
La Jolla	z.	23·8	318	e 5 13	− 2	—	—	—	—	—
Palomar	z.	23·9	318	i 5 16	0	e 9 47	+17	i 5 52	PP	—
Lincoln		24·1	3	e 5 22	+ 4	e 9 45	+11	—	—	e 13·3
Mount Wilson		25·1	318	i 5 28	0	—	—	—	—	—
Pasadena		25·2	318	i 5 28a	− 1	i 10 8	+16	e 9 5	PcP	e 12·9
Riverside	24.6	~~25·0~~	318	i 5 23	− 9	e 9 57	0	—	—	—
Haiwee		~~26·3~~	322	i 5 38	− 1	—	—	—	—	—
Santa Barbara	z.	26·3	317	e 5 39	0	—	—	—	—	—
Chicago		26·5	16	i 5 41	0	e 10 16	+ 2	e 6 32	PP	e 12·8
Salt Lake City		26·8	338	e 5 39	− 5	e 10 28	+ 9	e 6 47	PP	e 13·7
Tinemaha		27·1	323	i 5 46	0	—	—	—	—	—
Logan		27·7	340	e 5 51	− 1	10 38	+ 5	e 6 45	PP	e 12·0
Pittsburgh		28·3	30	i 5 56	− 1	e 10 52	+ 9	—	—	—
New Kensington		28·5	30	i 5 54?	− 5	i 11 0	+14	—	—	—
Georgetown		28·7	35	i 5 58	− 3	i 10 57	+ 7	—	—	16·0
Lick		29·4	319	e 6 5	− 2	—	—	—	—	e 15·1
Santa Clara		29·6	319	i 6 10	+ 1	e 11 22	+18	—	—	e 14·9
Branner		29·7	319	(e 6 24)	+14	—	—	—	—	—
Berkeley		30·1	319	i 6 13	0	e 11 22	+10	—	—	e 15·0
San Francisco	N.	30·1	319	(e 6 27)	+14	—	—	(e 9 24?)	?	—
San Juan		30·3	82	i 6 12	− 3	e 11 14	− 1	—	—	e 13·3
Philadelphia		30·4	37	e 6 5	−11	11 26	+10	e 7 10	PP	e 12·4
Bozeman		30·9	343	e 6 19	− 1	e 11 31	+ 7	e 7 14	PP	e 16·1
Ukiah		31·4	321	—	—	e 11 36	+ 4	—	—	e 15·4
Butte		31·7	342	e 6 28	+ 1	e 12 19	?	—	—	e 16·7
Fordham		31·8	36	i 6 24	− 4	i 11 49	+11	—	—	—
Bermuda		33·8	56	i 6 42	− 4	e 12 8	− 2	e 8 0	PP	17·1
Ottawa		34·1	28	6 47	− 1	12 25	+11	8 17	PP	18·0
Harvard		34·2	37	i 6 41	− 8	e 12 26	+10	—	—	e 21·0
Vermont		34·6	32	i 6 52	− 1	e 12 32	+10	e 8 18	PP	e 15·5
Saskatoon		36·0	351	7 6	+ 1	12 45	+ 1	15 39	SSS	17·0
Huancayo		36·2	141	i 7 10	+ 4	i 12 47	0	e 8 46	PPP	e 15·4
Shawinigan Falls		36·3	30	7 6	− 1	13 6	+18	—	—	26·0
Seattle		36·8	333	e 7 45	+34	e 12 40	−16	—	—	e 16·7
Seven Falls		37·7	31	7 19	0	13 23	+13	8 57	PP	20·0
Victoria		38·0	333	7 20	− 1	13 19	+ 5	—	—	20·0
La Paz	z.	44·2	137	8 15a	+ 3	14 59	+13	—	—	22·8
Sitka		49·4	335	e 8 49	− 4	e 15 51	− 9	e 10 48	PP	e 25·3
College		58·5	339	e 9 58	− 2	e 18 4	+ 1	—	—	e 30·0
Rio de Janeiro	N.	66·4	125	e 19 41	S	(e 19 41)	− 2	—	—	e 32·5
Scoresby Sund		69·7	21	e 11 1	−13	e 19 57	−25	e 20 58	PS	e 37·2
Oxford		81·1	39	—	—	i 22 44	+16	—	—	e 38·0
San Fernando	E.	81·6	56	e 12 20	− 1	22 46	+13	—	—	42·0
Kew		81·7	39	i 12 23	+ 1	i 22 41	+ 7	i 22 59	ScS	e 39·0
Granada		83·4	54	i 12 29	− 1	22 56	+ 5	—	—	49·0
Paris		84·3	42	i 12 34	− 1	—	—	—	—	48·0
Uccle		84·7	39	i 12 35a	− 2	e 23 2	− 2	15 56	PP	e 41·0
De Bilt		84·8	37	i 12 37a	0	i 23 10	+ 5	e 15 55	PP	e 41·0
Clermont-Ferrand		85·6	44	i 12 40	− 1	e 23 8	− 5	—	—	e 49·4
Stuttgart		88·4	40	e 13 52a	+57	e 23 37	− 3	e 16 20	PP	e 46·8
Potsdam	z.	89·1	35	e 12 56	− 2	e 23 54?	+ 8	e 16 30	PP	e 42·0
Triest		92·6	41	—	—	e 23 33	[−15]	—	—	—
Wellington		98·9	230	—	—	i 24 20	[− 2]	26 33	PS	49·0
Helwan	z.	112·7	47	19 20	PP	—	—	—	—	—
New Delhi		134·7	6	e 21 47	PP	—	—	i 33 51	PPS	—
Calcutta	N.	140·5	351	e 22 32	PP	—	—	—	—	—

Additional readings :—
Tucson i =6m.5s., iS =8m.16s. and 8m.33s.
St. Louis iE =9m.26s., eE =12m.21s., eN =12m.26s.
Florissant iSSN =10m.2s.

Continued on next page.

Denver eN =5m.23s., eSE =9m.37s.
Lincoln e =7m.32s.
Pasadena iS_eSEN =13m.58s.
Chicago i =5m.48s.
Salt Lake City e =6m.6s. and 11m.44s.
Pittsburgh iS =11m.0s.
Branner readings have been decreased by 10 minutes.
San Francisco readings have been decreased by 10 minutes.
Philadelphia e =6m.13s.
Bozeman e =7m.33s.
Bermuda ePP =7m.41s., e =14m.15s.
Ottawa SS =14m.33s.
Harvard e =10m.18s.
Huancayo e =9m.37s.
Victoria e =17m.35s.
Sitka eSS =18m.48s.
Scoresby Sund i =11m.15s.
Kew eSSE =27m.51s.
Uccle iSE =23m.13s., eSSE =28m.6s.
De Bilt eSS =28m.40s.
Stuttgart e =24m.48s.
Helwan iZ =19m.31s., eZ =19m.59s., 21m.16s., 21m.36s., and 37m.12s.
Long waves were also recorded at Stonyhurst, Cheb, Auckland, and Sydney.

Nov. 25d. 8h. 10m. 7s. Epicentre 0°·6S. 81°·7W. (as on 19d.).

A = +·1443, B = −·9895, C = −·0104; δ = +4; h = +7.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		13·0	151	e 3 15	+ 6	e 6 16	SSS	—	—	e 7·4
La Paz		20·7	141	4 41	− 3	—	—	—	—	—
Tucson		42·7	323	i 8 0	0	—	—	—	—	e 13·0
Palomar	z.	47·3	320	i 8 38k	+ 1	—	—	—	—	—
Riverside	z.	48·0	320	i 8 42	− 1	—	—	—	—	—
Mount Wilson	z.	48·6	320	i 8 48k	+ 1	—	—	—	—	—
Pasadena	z.	48·6	320	e 8 47	0	—	—	—	—	—
Tinemaha	z.	50·5	322	e 9 2	0	—	—	—	—	—

Tucson also gives e =12m.2s.

Nov. 25d. Readings also at 0h. (Mizusawa), 3h. (Calcutta, Bombay, New Delhi, and Tashkent), 12h. (Copenhagen), 13h. (Riverview), 22h. (near Mizusawa).

Nov. 26d. 9h. 54m. 23s. Epicentre 14°·9S. 173°·3W. (as on 1941, Oct. 5d.).

A = −·9599, B = −·1128, C = −·2569; δ = +13; h = +6;
D = −·117, E = +·993; G = +·255, H = +·030, K = −·967.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		1·9	54	i 0 31	− 3	i 0 52	− 7	—	—	—
Auckland		24·2	204	—	—	i 9 13	−22	i 10 57	SSS	14·6
Wellington		28·2	199	—	—	e 12 37?	SSS	—	—	15·6
Riverview		37·2	233	—	—	e 15 55?	SSS	—	—	e 20·3
La Jolla	z.	71·6	47	e 11 27	+ 2	—	—	—	—	—
Pasadena		71·7	46	e 11 26	0	—	—	—	—	e 32·8
Mount Wilson	z.	71·8	46	e 11 25	− 1	—	—	—	—	—
Palomar	z.	72·1	47	e 11 29	+ 1	—	—	—	—	—
Riverside	z.	72·1	46	e 11 29	+ 1	—	—	—	—	—
Tinemaha	z.	73·2	43	e 11 37	+ 2	—	—	—	—	—
Tucson		76·0	51	i 11 52	+ 1	—	—	—	—	e 35·4
Stuttgart		146·3	356	e 19 44	[+ 2]	—	—	—	—	—

Additional readings:—
Auckland Q =11m.37s.?
Tucson i =13m.4s., e =19m.52s.
Long waves were also recorded at Huancayo.

Nov. 26h. 14h. 27m. 32s. Epicentre 45°·8N. 149°·8E. Depth of focus 0·010.

Intensity V at Nemuro; IV at Urakawa, Hatinohe, Mizusawa; II-III at Aomori, Morioka, Hukusima, Onahama, and Mito. Epicentre 44°·8N. 150°·2E.
Macroseismic radius greater than 300km. Depth of focus 120km.
Seismological Bulletin of the Central Meteorological Observatory, Japan 1942, Tokyo 1950, pp. 45-46, macroseismic chart p. 45.

$A = -\cdot6046$, $B = +\cdot3519$, $C = +\cdot7146$; $\delta = +3$; $h = -4$;
$D = +\cdot503$, $E = +\cdot864$; $G = -\cdot618$, $H = +\cdot359$, $K = -\cdot700$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		3·9	233	0 58	− 1	1 40	− 4	—	—	—
Sapporo		6·6	249	1 41	+ 5	2 55	+ 5	—	—	—
Mori		7·6	245	1 45	− 5	3 14	− 1	—	—	—
Hatinohe		8·0	232	1 52	− 3	3 12	−13	—	—	—
Aomori		8·3	236	1 59	0	3 24	− 8	—	—	—
Miyako		8·4	226	1 54	− 6	3 20	−14	—	—	—
Mizusawa	E.	9·2	227	2 10	− 1	3 45	− 9	—	—	—
Akita		9·4	233	2 16	+ 2	3 53	− 6	—	—	—
Sendai		10·0	225	2 17	− 5	4 5	− 8	—	—	—
Hukusima		10·7	224	2 17	−15	4 8	−22	—	—	—
Onahama		11·1	220	2 30	− 7	4 25	−15	—	—	—
Aikawa		11·6	232	2 41	− 3	4 48	− 4	—	—	—
Mito		11·8	220	2 44	− 2	4 46	−10	—	—	—
Utunomiya		11·9	223	2 42	− 6	4 52	− 7	—	—	—
Kakioka		12·0	221	2 45	− 4	4 45	−16	—	—	—
Tukubasan		12·1	221	2 45	− 5	4 46	−18	—	—	—
Tyosi		12·1	217	2 58	+ 8	5 0	− 4	—	—	—
Kumagaya		12·4	223	2 50	− 4	4 57	−14	—	—	—
Maebasi		12·4	224	2 52	− 2	5 2	− 9	—	—	—
Nagano		12·6	228	2 54	− 3	5 9	− 6	—	—	—
Tokyo Cen. Met. Ob.		12·6	220	3 5k	+ 8	5 3	−12	—	—	—
Wazima		12·8	234	3 1	+ 1	5 0	−20	—	—	—
Yokohama		12·9	220	3 7	+ 6	5 15	− 7	—	—	—
Toyama		13·1	231	3 4	+ 1	5 20	− 7	—	—	—
Hunatu		13·1	223	2 42	−21	5 0	−27	—	—	—
Kohu		13·2	223	2 45	−20	5 23	− 7	—	—	—
Mera		13·3	218	2 59	− 7	4 57	?	—	—	—
Misima		13·5	222	3 7	− 2	5 22	−15	—	—	—
Osima		13·6	219	3 9	− 1	5 26	−13	—	—	—
Shizuoka		13·9	223	3 9	− 5	5 37	− 9	—	—	—
Omaesaki		14·2	222	(3 21)	+ 3	(6 8)	+15	—	—	—
Hamamatu		14·4	224	3 20	0	6 26	+28	—	—	—
Nagoya		14·4	227	3 20	0	5 57	− 1	—	—	—
Hikone		14·7	229	3 22k	− 2	5 58	− 7	—	—	—
Hatidyozima		14·8	215	3 34	+ 9	5 51	−16	—	—	—
Kameyama		14·9	228	3 25	− 2	6 26	+16	—	—	—
Kyoto		15·2	230	3 28	− 2	6 6	−10	—	—	—
Toyooka		15·3	233	3 30	− 2	6 23	+ 4	—	—	—
Osaka		15·5	229	3 32	− 2	5 35	?	—	—	—
Kobe		15·7	230	3 36k	− 1	6 36	+ 8	—	—	—
Owase		15·7	226	3 43	+ 6	—	—	—	—	—
Sumoto		16·1	230	3 43	+ 1	6 50	+13	—	—	—
Siomisaki		16·4	226	3 45k	− 1	6 53	+ 9	—	—	—
Hamada		17·3	237	3 56	− 1	7 12	+ 8	—	—	—
Muroto		17·4	229	3 54k	− 4	7 10	+ 4	—	—	—
Koti		17·5	232	3 57	− 2	5 18	?	—	—	—
Matuyama		17·7	233	4 0	− 2	7 4	− 9	—	—	—
Taikyu		18·8	246	4 18	+ 4	7 16	−21	—	—	—
Keizyo		18·9	253	4 19k	+ 4	7 47	+ 8	—	—	—
Izuka		19·0	237	4 17k	+ 1	7 48	+ 7	—	—	—
Hukuoka		19·2	237	4 22	+ 3	7 54	+ 9	—	—	—
Zinsen		19·2	254	4 20a	+ 1	7 54	+ 9	—	—	—
Kumamoto		19·6	235	4 26k	+ 3	8 1	+ 7	—	—	—
Titizima		19·6	200	4 20	− 3	7 52	− 2	—	—	—
Miyazaki		19·8	231	4 31	+ 6	8 11	+13	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Unzendake		19·9	236	4 36	+10	8 15	+15	—	—	—
Kagosima		20·6	233	4 34k	+ 1	8 23	+10	—	—	—
Tomie		20·9	239	4 36	0	8 29	+10	—	—	—
Yakusima		21·5	232	4 45	+ 3	—	—	—	—	—
Nake		23·6	230	5 4	+ 1	—	—	—	—	—
Naha		26·4	231	5 30	+ 1	9 57	+ 3	—	—	—
Taihoku		30·7	228	6 14	+ 6	11 48	?	—	—	—
Taityu		31·9	238	6 39	+21	8 55	?	—	—	—
Arisan		32·3	237	6 27	+ 5	—	—	—	—	—
Taito		32·7	236	6 26	+ 1	—	—	—	—	—
College		38·3	38	e 7 16	+ 4	e 13 4	+ 5	e 7 46	pP	15·8
Sitka		45·6	48	i 8 17	+ 5	i 14 56	+ 9	i 8 53	pP	e 19·1
Honolulu		49·0	101	i 8 45	+ 6	e 15 49	+15	e 11 11	PPP	e 20·4
Almata		50·3	296	8 51	+ 2	—	—	—	—	—
Sverdlovsk		53·0	317	i 9 9	0	i 16 28	− 1	—	—	—
Andijan		54·5	295	e 9 20	0	e 16 51	+ 1	—	—	—
Calcutta	N.	54·5	267	i 9 26k	+ 6	i 16 55	+ 5	e 10 28	pP	—
Victoria		56·0	54	9 32	+ 1	17 14	+ 4	23 10	SSS	26·5
Tashkent		56·2	297	i 9 30	− 2	17 13	+ 1	—	—	—
Dehra Dun		56·7	281	e 9 43	+ 7	e 17 21	+ 2	—	—	e 31·0
New Delhi		58·4	280	i 9 51a	+ 3	i 17 37	− 4	10 2	pP	—
Ukiah		61·5	63	e 10 10	+ 1	e 18 25	+ 4	e 10 58	pP	e 25·6
Saskatoon		62·5	43	10 35	+19	18 40	+ 6	22 40	SS	28·5
Berkeley		62·8	64	e 10 10	− 8	e 18 44	+ 7	—	—	e 26·0
San Francisco		62·8	64	e 10 18	0	—	—	—	—	—
Branner	E.	63·2	64	i 10 18	− 2	i 18 53	+11	—	—	—
Santa Clara		63·3	64	i 10 31	+10	—	—	—	—	—
Butte		63·4	50	e 10 24	+ 2	e 18 51	+ 6	e 19 50	PPS	e 25·7
Lick		63·6	64	e 10 23	0	e 18 47	0	—	—	—
Scoresby Sund		63·9	357	e 10 27	+ 2	i 18 54	+ 3	e 10 53	pP	e 26·6
Hyderabad		64·1	270	10 31	+ 5	19 1	+ 8	12 56	PP	31·2
Bozeman		64·4	50	i 10 31	+ 3	i 18 58	+ 1	e 11 14	pP	e 27·0
Fresno	N.	65·1	64	e 10 34	+ 2	—	—	—	—	—
Tinemaha		65·8	62	i 10 36	− 1	e 19 20	+ 6	i 11 9	pP	—
Haiwee		66·6	62	i 10 41a	− 1	i 19 29	+ 5	e 39 13	P′P′	—
Logan		66·6	53	i 10 41	− 1	e 19 20	− 4	i 11 20	pP	27·7
Santa Barbara		66·6	65	e 10 42	0	e 19 32	+ 8	—	—	—
Salt Lake City		67·2	54	i 10 47	+ 1	e 19 32	+ 1	i 11 21	pP	e 29·6
Bombay	N.	67·7	275	i 10 52	+ 3	i 19 38	+ 1	e 11 24	pP	e 32·0
Pasadena		67·7	64	i 10 48a	− 1	i 19 39	+ 2	i 11 12	pP	e 27·2
Upsala		67·7	337	—	—	19 34	− 3	i 20 34	PS	31·5
Mount Wilson	Z.	67·8	64	i 10 48	− 2	—	—	i 11 18	pP	—
Baku		68·3	307	11 2	+ 9	19 50	+ 6	—	—	—
Riverside		68·3	64	i 10 51a	− 2	—	—	i 11 23	pP	—
Palomar	Z.	69·1	64	i 10 57	− 1	—	—	e 38 36	P′P′	e 39·1
La Jolla	N.	69·2	65	e 11 1	+ 3	—	—	—	—	—
Kodaikanal	E.	70·4	265	e 10 50	−16	i 19 58	−11	—	—	—
Copenhagen		72·7	337	i 11 18	− 1	20 36	+ 1	16 14	PPP	—
Brisbane		73·0	177	e 11 48	+27	e 20 41	+ 2	—	—	—
Tucson		73·6	61	i 11 23	− 1	e 20 47	+ 2	i 14 10	PP	e 29·7
Aberdeen	E.	74·7	345	—	—	i 20 56	− 2	e 29 56	SSS	e 41·5
Lincoln		75·3	47	e 11 31	− 3	i 21 2	− 2	e 12 1	pP	e 31·6
Potsdam		75·4	335	i 11 34k	− 1	i 21 4	− 1	i 12 5	pP	e 30·9
Focsani	N.	75·8	323	11 42	+ 5	—	—	—	—	37·5
Prague		77·0	332	e 11 37	− 7	e 21 18	− 5	—	—	37·5
Jena		77·1	334	i 11 43	− 1	e 21 38	+14	—	—	e 35·5
Bucharest		77·3	322	11 46	0	21 26	0	14 34	PP	35·7
Cheb		77·6	334	—	—	e 21 28	− 1	—	—	e 37·5
De Bilt		77·8	338	i 11 48a	0	i 21 33	+ 2	—	—	e 35·5
Stonyhurst		78·0	344	—	—	i 21 33	− 1	i 22 22	PS	i 32·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Chicago		78·9	41	e 11 53	− 1	e 21 41	− 2	e 12 26	pP	e 33·3
Uccle		79·2	339	i 11 55a	− 1	i 21 43	− 3	—	—	35·5
Riverview		79·3	178	e 12 23	+27	i 21 56	+ 9	i 13 1	pP	e 34·1
Sydney		79·3	178	i 11 55	− 1	—	—	e 22 40	PS	—
Kew		79·7	342	i 12 2k	+ 3	21 48	− 4	i 12 31?	pP	e 35·5
Oxford		79·7	343	e 11 50	− 9	i 21 46	− 6	—	—	e 34·5
Stuttgart		79·7	335	i 11 58a	− 1	i 21 49	− 3	e 12 38	pP	e 44·3
Sofia	N.	79·8	323	e 12 0	+ 1	e 21 56	+ 3	—	—	41·5
Florissant		80·0	44	i 12 0	0	i 21 56	+ 1	i 12 32	pP	—
St. Louis		80·2	44	i 12 0	− 1	e 21 58	+ 1	i 12 29	pP	—
Strasbourg		80·3	336	i 12 2	0	i 22 10	+12	—	—	40·5
Ottawa		80·7	31	12 2	− 2	22 0	− 2	—	—	35·5
Shawinigan Falls		80·7	28	12 5	+ 1	22 7	+ 5	—	—	—
Ksara		80·8	309	e 12 7	+ 3	e 22 9	+ 6	e 23 12	PS	—
Seven Falls		80·8	27	12 5	+ 1	22 0	− 3	e 31 9	SSS	35·5
Triest		81·0	330	e 12 11	+ 5	e 22 1	− 4	—	—	—
Zurich		81·2	335	i 12 6a	0	e 22 6	− 1	—	—	—
Basle		81·3	335	e 12 6a	− 1	e 22 18	+10	—	—	—
Chur		81·3	334	e 12 7	0	e 22 12	+ 4	—	—	—
Paris		81·5	339	i 12 7	− 1	i 22 11	+ 1	—	—	38·5
Cape Girardeau	N.	81·6	45	e 12 6	− 3	e 22 11	0	i 12 26	pP	—
Neuchatel		82·0	335	e 12 10	− 1	e 22 22	+ 7	—	—	—
Pittsburgh		83·3	36	i 12 17	0	i 22 30	+ 2	i 12 49	pP	—
Clermont-Ferrand		84·2	337	i 12 22	0	e 22 37	0	e 27 55	SS	e 38·5
Auckland		85·3	160	12 58	+31	22 48	0	23 38	S_cS	39·5
Fordham		85·3	32	e 12 25	− 2	i 22 45	− 3	i 23 50	PS	e 42·5
Philadelphia		85·6	34	i 12 28	− 1	i 22 42	− 9	—	—	e 37·5
Helwan		86·3	310	12 32	0	22 46	−12	12 58	pP	—
Arapuni		86·7	160	11 34?	?	23 10?	+ 8	24 4	S_cS	—
Columbia		88·2	40	e 12 42	+ 1	e 23 24	+ 8	e 24 6	sS	e 35·4
Wellington		89·5	162	12 51	+ 4	22 58	[− 9]	13 14	pP	40·5
Christchurch		91·2	164	13 26	+31	23 16	[− 1]	23 58	S_cS	—
Lisbon		93·8	344	—	—	25 38	PS	—	—	37·5
Granada		94·0	339	13 8	0	24 4	− 3	16 28	PP	e 41·5
San Fernando		95·3	341	e 13 11	− 3	23 32	[− 7]	—	—	49·5
Bermuda		96·1	30	e 16 59	PP	e 23 47	[+ 3]	e 31 9	SS	e 39·3
San Juan		108·3	37	—	—	e 24 42	[0]	e 27 59	PS	e 44·1
Tananarive		111·8	266	e 19 27	PP	—	—	34 54	SS	37·1
Huancayo		129·1	64	e 19 1	[+ 4]	e 31 39	PS	e 21 19	PP	e 53·8
La Paz		136·9	59	i 19 17k	[+ 5]	i 22 38	SKP	i 22 0	PP	66·2

Additional readings :—
Omaesaki readings decreased by 1 minute.
College ePP =8m.52s., ePPP =9m.38s., e =13m.43s., epS =14m.2s.
Sitka i =8m.44s., iP_cP =9m.59s., e =12m.28s., eS_cS =17m.41s., e =18m.36s.
Calcutta isS =18m.50s., iSS =21m.50s.
New Delhi ePE =9m.55s., iPE =9m.59s., PPN =12m.2s., isSN =17m.44s., isSE = 17m.49s., iN =18m.26s., S_cSN =19m.20s., SKSN =19m.29s.
Ukiah ePP =12m.45s., e =13m.37s., esS =19m.45s., eSS =22m.28s.
Saskatoon SSS =25m.28s.?
Berkeley ePEN =10m.18s., eSZ =18m.48s.
SanFrancisco eEN =10m.23s.
Santa Clara ePSE =22m.24s., eSSE =27m.10s.
Butte ePP =11m.3s.
Lick eSE =18m.50s.
Hyderabad S_cSN =20m.23s., SSN =23m.13s.
Bozeman ePP =12m.50s., iS =19m.2s., e =19m.42s. and 20m.56s., eSS =23m.34s.
Tinemaha ePKP,PKPZ =39m.7s.
Logan i =10m.45s., iPP =13m.15s., e =19m.53s., i =20m.18s., isS =20m.34s., eSS = 23m.38s.
Salt Lake City iS =19m.40s., isS =20m.38s., e =23m.42s.
Bombay iN =11m.7s., ePPN =13m.5s., iN =20m.24s. and 20m.44s., eSSN =24m.41s.
Pasadena i =10m.52s., iN =20m.39s., eSSE =24m.9s., ePKP,PKPZ =39m.13s.
Upsala eSSSE =27m.20s.
Mount Wilson ePKP,PKPZ =39m.15s.
Riverside ePKP,PKPZ =39m.10s.
Copenhagen 21m.17s.
Tucson i =17m.42s., 18m.54s., and 21m.38s., e =29m.26s.

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Potsdam ePN =11m.38s., iN =15m.21s., iZ =16m.49s., iE =16m.52s., eSZ =21m.7s., isSZ =21m.37s., isSE =21m.41s., iN =30m.28s., eZ =30m.41s.
Focsani ePE =11m.45s.
Prague eE =34m.22s.?, eN =35m.58s.?
Jena iPN =11m.48s. and 11m.51s.
Bucharest eN =11m.54s., ePSN = iPSE =21m.56s.
Chicago ePP =14m.59s., e =18m.18s., esS =22m.31s., e =25m.29s.
Uccle iZ =11m.58s.
Riverview iPNZ =12m.27s.a, iSE =21m.59s., iN =22m.13s., iZ =22m.30s., iE = 22m.40s., iNZ =22m.54s.
Kew i =13m.56s., ePP =15m.4s., eN =18m.50s., iS_cSEN =22m.13s., ePPSEN = 22m.40s., iE =24m.38s., eSSS =30m.20s.?
Oxford e =12m.16s.
Stuttgart iP =12m.1s., esP =13m.6s., ePP =15m.1s., epPP? =15m.48s., eSP = 22m.14s., esS =22m.47s., esS =22m.51s., eQ =36m.28s.?
Sofia iN =22m.16s.
Florissant iSE =22m.11s., isSE =23m.15s.
St. Louis iZ =12m.16s., eE =12m.42s., ePPN =15m.6s., epPPEN =15m.48s., eE = 21m.49s., iN =21m.53s. and 22m.12s., eSE =22m.26s., eE =22m.58s., esSEN = 23m.18s., iSSE =28m.1s., ePKP,PKPE =37m.8s.
Seven Falls PS =22m.47s.
Cape Girardeau iPN =12m.9s., iN =12m.13s.
Clermont-Ferrand i =12m.34s., e =34m.18s.
Fordham iP =12m.29s., i =13m.28s.
Helwan eZ =13m.46s., eNZ =15m.8s., PPZ =15m.56s., sSEN =23m.31s., SPE = 23m.43s., iEN =24m.46s., iN =25m.58s.
Columbia e =15m.54s., ePP =16m.15s., eSKS =23m.1s., eSS =28m.49s.
Wellington S_cS? =23m.8s., i =23m.33s., sS? =23m.40s., sSS =28m.54s., Q? =37m.28s.?
Christchurch sS? =24m.41s.
Bermuda eSKS =23m.11s., e =24m.38s., eSS =25m.18s., e =31m.42s.
San Juan e =25m.27s., eSS =33m.44s.
Tananarive N =24m.21s.
Huancayo e =22m.18s., 23m.6s., 27m.57s., and 32m.35s., eSS =38m.40s., esSS = 39m.56s.
La Paz iZ =23m.31s., PPS =34m.19s.

Nov. 26d. Readings also at 3h. (Huancayo), 10h. (near Apia), 11h. (La Paz), 12h. (near Apia), 13h. (Mount Wilson, Tucson, and Palomar), 16h. (near St. Louis), 20h. (Mizusawa), 21h. (Mount Wilson, Pasadena, Palomar, Tucson, Riverside, Haiwee, and Tinemaha).

Nov. 27d. 10h. Undetermined shock.

Seattle e =55m.36s., eL =57m.23s.
Ukiah e =56m.27s., eL =57m.38s.
Ferndale eE =56m.52s., eN =57m.20s., eE =58m.14s.
Tinemaha ePZ =57m.46s.
Haiwee ePNZ =58m.10s.
Pasadena iPZ =58m.11s., eEN =60m.30s.?
Mount Wilson ePZ =58m.12s.
Riverside ePZ =58m.18s.
Salt Lake City eP =58m.22s., eL =62m.3s.
Logan eP =58m.24s., eL =62m.0s.
Palomar ePZ =58m.31s.
Tucson iP =59m.29s., e =62m.48s., eL =63m.31s.
Bozeman e =60m.18s., eL =61m.35s.
Long waves were also recorded at Santa Clara.

Nov. 27d. Readings also at 0h. (Helwan and Ksara), 1h. (near Tashkent, Andijan, Almata, and near Istanbul), 2h. (Helwan, Ksara, and near Johannesburg), 3h. (La Paz, Calcutta, Algiers, Kew, Stuttgart, San Fernando, and Granada), 5h. (Riverview), 10h. (near Andijan (2) and Tashkent), 14h. (near Ottawa, near Andijan, and Tashkent), 17h. (La Paz), 18h. (Pasadena, Mount Wilson, Palomar, Tinemaha, Tucson, Bermuda, San Juan, San Fernando, De Bilt, near Uccle, and Stuttgart), 20h. (Oaxaca), 21h. (La Paz and near Tashkent), 23h. (Helwan).

Nov. 28d. 10h. 38m. 44s. Epicentre 7°·4N. 35°·6W.

$A = +·8064$, $B = -·5773$, $C = +·1280$; $\delta = -6$; $h = +7$;
$D = -·582$, $E = -·813$; $G = +·104$, $H = -·075$, $K = -·992$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		26·1	288	i 5 35	− 2	i 10 11	+ 4	6 11	PP	e 12·9
San Juan		31·6	294	e 6 21	− 5	i 11 34	− 1	i 7 29	PP	i 13·3
Bermuda		36·8	318	i 7 11	0	i 12 58	+ 2	i 8 34	PP	i 15·5
Lisbon		39·3	33	i 7 32k	0	13 34	0	i 9 0	PP	16·3
San Fernando		39·4	39	i 7 32	− 1	13 38	+ 3	i 8 51	PP	19·3
La Paz	z.	40·0	233	i 7 37a	− 1	i 13 42	− 2	i 9 4	PP	19·1
Granada		41·5	40	i 7 52	+ 2	i 14 10	+ 3	8 51	pP	19·3
Balboa Heights		43·5	276	e 8 12	+ 5	—	—	—	—	—
Huancayo		44·0	245	i 8 10	− 1	i 14 38	− 5	i 9 56	PP	i 19·9
Montezuma		45·0	227	e 10 54	PPP	e 17 28	SS	—	—	e 24·6
Algiers		45·7	45	i 8 28	+ 4	i 15 9	+ 1	10 8	PP	21·9
La Plata	E.	47·1	206	8 32	− 3	15 26?	− 2	10 28?	PP	23·3
Fordham		47·6	322	e 8 37	− 2	i 15 34	− 1	i 19 48	SS	—
Vermont		49·3	325	i 9 1	+ 8	i 15 52	− 7	e 15 23	PS	i 21·1
Columbia		49·5	309	e 8 55	+ 1	i 16 2	0	e 10 55	PP	e 20·8
Seven Falls		49·7	330	8 55	− 1	16 2	− 2	19 46	SS	23·3
Shawinigan Falls		50·4	329	8 58	− 3	16 13	− 1	19 52	SS	28·3
Clermont-Ferrand		50·7	35	i 9 3	0	e 16 20	+ 2	i 11 18	PP	—
Ottawa		51·3	325	9 7	− 1	16 23	− 3	11 18	PP	24·3
New Kensington		51·3	318	e 8 46?	−22	i 16 28	+ 2	—	—	—
Pittsburgh		51·4	318	9 9	0	e 16 25	− 3	—	—	—
Paris		52·3	32	i 9 15	0	i 16 38	− 2	—	—	22·3
Oxford		52·5	27	i 9 13	− 4	i 16 39	− 4	—	—	e 20·3
Kew		52·7	27	i 9 16a	− 2	i 16 48	+ 2	e 11 45?	PP	e 23·8
Stonyhurst		53·5	24	i 9 23	− 1	i 17 0	+ 3	i 17 31	PPS	23·8
Neuchatel		53·6	36	e 9 24	− 1	e 17 1	+ 3	—	—	—
Mobile		54·2	303	i 9 39	+10	i 17 13	+ 7	i 10 11	?	—
Basle		54·3	35	e 9 28	− 2	e 17 9	+ 2	—	—	—
Uccle		54·5	30	i 9 28a	− 4	i 17 4	− 6	11 13	PP	23·3
Zurich		54·7	35	e 9 32a	− 1	—	—	e 12 43	PPP	—
Strasbourg		54·9	34	i 9 34	− 1	i 17 18?	+ 2	e 11 39	PP	24·8
Chur		55·0	36	e 9 33	− 2	e 17 15	− 2	—	—	—
De Bilt		55·7	30	i 9 39	− 1	i 17 29	+ 3	i 11 54	PP	e 23·8
Stuttgart		55·8	35	i 9 38a	− 3	e 17 20	− 8	i 11 59	PP	e 25·8
Aberdeen	E.	56·1	22	i 17 37	S	(i 17 37)	+ 5	i 22 50	SSS	25·4
Triest		57·0	40	i 9 57	+ 7	i 17 53	+10	—	—	e 26·3
Cape Girardeau	N.	57·1	310	e 9 48	− 2	e 18 0	+15	—	—	—
Chicago		57·2	316	e 9 49	− 2	i 17 47	+ 1	e 11 53	PP	e 23·4
St. Louis		58·0	312	i 9 55	− 2	i 17 56	− 1	i 24 37	SSS	—
Florissant		58·2	312	i 9 57	− 1	i 17 56	− 3	—	—	i 27·9
Cheb		58·3	35	e 9 55?	− 4	e 17 1	−60	12 14	PP	26·3
Jena		58·3	34	i 9 56	− 3	i 18 0	− 1	e 12 2	PP	e 24·3
Prague		59·4	35	i 10 3k	− 3	18 16	+ 1	e 12 34?	PP	e 24·3
Potsdam		59·8	33	i 10 7a	− 2	i 18 21	+ 1	i 21 52	SS	26·3
Belgrade		61·0	43	i 10 18	0	e 18 57	PS	i 12 33	SS	e 34·6
Copenhagen		61·3	29	e 10 17	− 3	18 34	− 5	25 8	SSS	27·3
Des Moines		61·4	314	i 10 22	+ 2	e 25 31	SSS	e 15 34	?	28·8
Sofia		62·4	46	e 10 26	− 1	e 18 56	+ 3	e 14 30	PPP	30·2
Lincoln		63·4	313	i 10 31	− 3	i 18 59	− 7	e 23 14	SS	e 28·8
Scoresby Sund		63·6	5	e 10 36	+ 1	i 19 9	+ 1	i 13 23	PP	e 26·4
Bucharest		64·8	44	10 41	− 2	19 16	− 7	i 23 4	SS	31·3
Upsala		65·8	27	i 10 45	− 4	i 19 31	− 4	23 40	SS	e 30·9
Focsani		65·9	44	e 11 1	+11	—	—	—	—	32·3
Helwan		66·4	62	i 10 52k	− 1	i 19 40	− 3	13 18	PP	—
Ksara		70·5	57	e 11 20	+ 2	e 20 39	+ 7	e 14 4	PP	—
Saskatoon		72·6	323	11 35	+ 4	20 54	− 2	25 16?	SS	31·3
Tucson		73·6	302	i 11 35	− 2	i 21 2	− 5	i 14 48	PP	e 29·5
Bozeman		74·6	316	e 11 44	+ 1	e 21 13	− 5	e 14 31	PP	e 31·9
Logan		74·8	313	i 11 41	− 3	i 21 20	0	i 25 56	SS	30·7
Salt Lake City		74·8	311	e 11 47	+ 3	i 21 18	− 2	e 14 20	PP	e 30·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Butte		75·7	316	e 11 53	+ 4	e 21 28	− 2	e 15 0	PP	e 32·7
Palomar	Z.	78·7	303	i 12 5k	− 1	—	—	—	—	—
Riverside		79·1	304	e 12 7k	− 1	—	—	—	—	—
Haiwee		79·5	306	e 12 10	0	e 22 15	+ 4	—	—	—
Tinemaha		79·7	307	e 12 10k	− 1	i 22 3	−10	—	—	—
Mount Wilson	Z.	79·7	304	i 12 10	− 1	—	—	—	—	—
Pasadena		79·8	304	i 12 9	− 3	22 14	0	—	—	e 33·9
Santa Barbara	Z.	81·0	304	i 12 15	− 3	—	—	—	—	—
Baku		81·8	51	13 22	+60	—	—	—	—	—
Lick		82·4	308	e 12 28	+ 3	22 43	+ 2	—	—	—
Santa Clara		82·7	308	i 12 29	+ 2	e 22 44	0	e 23 36	PS	e 39·6
Branner	E.	82·8	308	i 12 29	+ 2	e 22 45	0	—	—	—
	N.	82·8	308	i 12 33	+ 6	e 22 54	+ 9	—	—	—
Berkeley		82·9	308	e 11 31	−57	e 22 59	+13	—	—	—
San Francisco	N.	83·0	308	—	—	22 42	− 5	—	—	—
Victoria		83·1	318	12 30	+ 1	22 49	+ 1	—	—	36·3
Ukiah		83·5	309	e 12 33	+ 2	e 22 41	−11	e 15 45	PP	e 34·9
Ferndale	E.	83·9	311	—	—	e 23 4	+ 8	—	—	e 41·3
Tananarive		85·9	110	e 12 47	+ 4	23 4	[− 3]	15 57	PP	40·6
Sverdlovsk		87·3	34	12 51	+ 1	22 24	−65	—	—	—
Sitka		89·0	328	e 12 50	− 8	e 23 27	[0]	e 16 36	PP	e 37·9
College		92·5	337	e 14 23	?	e 24 15	− 2	e 16 26	PP	e 38·7
Tchimkent		96·1	46	13 31	0	—	—	—	—	—
Tashkent		96·2	47	i 13 31	0	26 12	PS	17 14	PP	—
Stalinabad		96·5	50	13 11	−21	—	—	—	—	—
Bombay		104·8	68	e 14 16	+ 6	i 24 34	[−16]	i 18 31	PP	i 50·3
New Delhi	N.	106·1	57	e 18 2	PP	i 26 20	+ 9	e 21 2	PPP	—
Dehra Dun		106·2	55	e 28 56?	PPS	e 39 15	?	—	—	e 52·6
Hyderabad		110·4	68	e 18 30	[− 4]	e 28 37	PS	34 45	SS	49·1
Colombo	E.	114·1	80	e 21 16?	?	—	—	—	—	—
Honolulu		116·5	298	e 24 45	?	e 30 43	PPS	e 36 4	SS	e 47·7
Calcutta	N.	117·6	60	e 20 6	PP	i 29 48	PS	e 34 58	?	e 44·4
Christchurch		136·3	209	22 11	PP	34 30	PPS	41 13	SS	64·3
Wellington		136·8	213	19 33	[+ 8]	28 56	{− 6}	40 46?	SS	66·3
Arapuni		138·4	217	e 22 16?	PP	34 58?	PPS	41 34?	SS	66·3
Auckland		139·7	218	23 21	PKS	29 31	{+12}	41 31	SSP	66·3
Perth		143·9	137	—	—	i 29 53	{+ 9}	i 47 29	SSS	—
Sydney		152·9	191	—	—	e 43 4	SS	—	—	—
Riverview		153·0	191	i 19 53a	[+ 1]	i 43 24	SS	i 34 9	PS	e 63·5

Additional readings :—
Fort de France PPP = 6m.25s., SS = 11m.7s.
San Juan iP = 6m.30s.
Bermuda e = 7m.59s., i = 8m.42s. and 12m.41s.
La Paz iZ = 9m.28s., S_cS = 17m.59s.
Granada P_cP = 9m.31s., pPP = 9m.59s., sS = 15m.36s., S_cS = 17m.11s.
Huancayo i = 10m.39s., iSS? = 17m.43s.
Montezuma e = 11m.40s. and 16m.6s.
Algiers i = 8m.54s. and 9m.14s., PPP = 10m.44s., SS = 17m.49s., SSS = 19m.12s.
La Plata E = 8m.46s., PPPZ = 10m.47s., E = 12m.40s.? and 15m.4s.?, SZ = 15m.16s.?, N = 16m.4s., PS?E = 16m.46s.?, Z = 17m.4s.?, SSE = 18m.52s.?, SSN = 18m.58s.?, SSSE = 19m.58s.?, QE = 21m.7s., QN = 21m.10s.
Fordham iP = 8m.40s., i = 18m.43s.
Vermont e = 9m.57s., i = 18m.3s. and 18m.21s.
Seven Falls SSS = 21m.4s.
Shawinigan Falls SSS = 21m.34s.
Clermont-Ferrand eSS = 21m.32s.
Ottawa e = 18m.36s., SS = 20m.0s., SSS = 21m.46s.
Pittsburgh iZ = 9m.32s., iS = 16m.29s.
Kew iEZ = 9m.25s., eP ePEZ = 10m.27s., ePPPEZ = 12m.21s., eP_cSE = 14m.9s.?, iEZ = 16m.37s., eS_cSE = 18m.56s., eSSEZ = 20m.34s.
Stonyhurst i = 17m.24s., SS = 20m.41s., SSS = 22m.23s.
Uccle PPPZ = 12m.36s., iSN = 17m.7s., iPSE = 19m.10s., SSN = 20m.39s.
Strasbourg i = 11m.58s., iPPP? = 12m.56s., i = 21m.5s.
De Bilt eSS = 21m.16s.?
Stuttgart iP_cP = 10m.36s., e = 11m.23s., iPPP = 12m.56s. and 13m.12s., S_cS = 19m.39s., eSS = 20m.42s., eQ = 24m.16s.
Chicago iSS = 21m.33s.
St. Louis iEN = 19m.49s., iE = 20m.37s.

Continued on next page.

Cheb e = 11m.7s., 13m.35s., and 20m.6s.
Prague ePPP = 13m.46s.?, eSS = 22m.4s.?
Potsdam iPN = 10m.10s.
Belgrade i = 10m.38s., eSS = 22m.57s.
Sofia SSEN = 22m.16s.?
Lincoln e = 12m.31s.
Scoresby Sund i = 12m.0s. and 23m.30s.
Bucharest ePN = 10m.45s., eSE = 19m.25s., iS_cS?N = 20m.12s., iS_cSE = 20m.19s., eSS?N = 23m.32s.
Upsala eN = 22m.52s., eSSS = 26m.16s.?
Helwan eE = 10m.58s. and 12m.44s., PSN = 20m.10s., iN = 20m.28s.
Saskatoon SSS = 29m.16s.?
Tucson i = 12m.32s. and 15m.56s., e = 22m.10s. and 25m.30s.
Bozeman e = 16m.36s. and 26m.3s.
Logan e = 13m.36s., i = 15m.15s., e = 21m.8s. and 23m.45s., i = 25m.4s.
Salt Lake City e = 13m.49s., i = 22m.6s., eSS = 26m.12s.
Butte e = 16m.14s. and 25m.39s.
Lick eSN = 22m.46s.
Berkeley ePN = 12m.57s.
Ukiah e = 16m.56s., 23m.49s., 27m.47s., and 32m.22s.
Tananarive SEN = 23m.23s., PS = 24m.18s., SS = 29m.13s., Q = 36m.56s.
Sitka e = 24m.48s., and 29m.26s., eSS = 33m.10s., e = 36m.7s.
College e = 25m.30s., eSS = 30m.23s.
Bombay eE = 19m.1s., iE = 25m.31s., ePSN = iPSE = 27m.43s., iPPSEN = 28m.39s., iE = 29m.40s., iSSEN = 33m.24s., eSSS?E = 37m.41s., iQ = 43m.16s.
New Delhi eE = 23m.24s., PSN = 27m.44s., PPSN = 28m.54s., iSSEN = 33m.47s., iSSSN = 37m.33s., iN = 40m.58s.
Hyderabad PSE = 29m.4s.
Christchurch S_cS = 29m.12s., PPS = 35m.27s., SSS = 46m.35s., Q = 56m.9s.
Wellington i = 22m.9s., PKS = 23m.28s., i = 27m.27s. and 31m.47s., SKSP? = 32m.16s., PPS? = 34m.36s., SSS = 45m.46s.?, Q? = 57m.16s.?
Arapuni e = 27m.52s.,? SSS = 46m.16s.?, Q = 55m.16s.?
Auckland i = 26m.54s., SKPS? = 32m.54s., SSS = 46m.26s., Q = 57m.16s.?
Riverview eN = 19m.59s.

Nov. 28d. Readings also at 11h. (Triest (2)), 14h. (La Paz), 15h. (Pasadena, Tucson, Mount Wilson, Riverside, Palomar, and Tinemaha), 21h. (near Cape Girardeau).

Nov. 29d. Readings at 1h. (near La Paz (2)), 12h. (near Granada), 13h. (near Tashkent), 14h. (near Balboa Heights), 17h. (near Mizusawa), 23h. (La Paz).

Nov. 30d. 0h. 47m. 49s. Epicentre 28°·0S. 63°·5W. Depth of focus 0·070.
(as on 1939 Jan. 24d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Montezuma		7·2	317	e 1 53	+ 4	i 3 27	+12	e 2 9	PPP	—
La Plata		8·4	147	i 2 24	PPP	i 4 9	SSS	—	—	—
La Paz	z.	12·2	338	i 2 43a	+ 1	i 4 37	−15	—	—	i 4·9
Huancayo		19·4	324	e 3 57	+ 2	i 7 1	− 3	i 4 59	pP	i 7·7
Fort de France		42·5	5	e 7 8	− 6	e 12 39	−22	e 8 49	PP	e 23·5
San Juan		46·2	358	—	—	i 13 48	− 5	i 16 32	sS	e 19·0
Bermuda		60·1	359	e 9 20	− 2	i 18 15	PS	e 9 55	P_cP	e 24·2
Columbia		63·9	345	—	—	e 17 30	−14	e 18 42	S_cS	e 25·2
Cape Girardeau	E.	69·4	339	e 10 17	− 3	e 18 31	−18	—	—	—
St. Louis		70·8	339	i 10 26	− 3	e 18 49	−16	—	—	—
Ottawa		73·9	352	10 45	− 2	19 29	−10	—	—	—
Tucson		74·9	320	i 10 53	+ 1	i 19 41	− 9	i 12 55	pP	e 31·4
Seven Falls		75·1	356	10 53	− 1	19 40	−12	—	—	—
Palomar	z.	79·2	318	i 11 17	+ 1	e 20 32	− 3	i 13 30	pP	—
Riverside		80·0	317	e 11 21	+ 1	e 20 37	− 7	e 13 26	pP	—
Mount Wilson		80·6	317	i 11 23k	0	i 20 43	− 7	e 13 20	pP	e 40·8
Pasadena		80·6	317	i 11 24k	+ 1	e 20 43	− 7	i 13 28	pP	—
Haiwee		81·8	319	e 11 30k	+ 1	i 20 55	− 7	i 13 34	pP	—
Salt Lake City		81·8	326	e 11 36	+ 7	i 20 55	− 7	—	—	—
Santa Barbara		81·8	316	e 11 30	+ 1	e 20 54	− 8	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Logan		82·5	327	e 11 33	0	i 20 59	−10	—	—	—
Tinemaha		82·7	319	i 11 34k	0	e 21 3	− 8	i 13 39	pP	e 41·2
San Fernando	E.	83·8	44	e 11 38	− 1	e 21 6	−16	e 14 59	PP	—
Granada		85·8	45	i 11 48	− 1	i 21 34	− 7	12 12	PcP	33·2
Clermont-Ferrand		95·0	41	e 12 32	0	e 22 18	[− 2]	—	—	—
Oxford		96·3	35	—	—	i 22 17	[−11]	—	—	—
Uccle		98·6	37	e 12 45	− 3	i 22 33	[− 6]	—	—	—
De Bilt		99·7	36	i 17 5	PP	e 26 31	PS	—	—	—
Stuttgart		100·1	41	e 12 54k	− 1	e 22 41	[− 5]	17 6	PP	—
Triest		101·3	45	e 17 11	PP	i 22 55	[+ 3]	—	—	—
Potsdam		104·1	38	e 17 35	PP	e 23 2	[− 4]	—	—	—
Helwan		107·2	66	13 32	P	e 23 11	[− 6]	17 59	PP	—
Tashkent		139·4	59	i 18 24	[− 9]	i 21 19	PP	—	—	—
Tchimkent		139·6	57	i 21 22	PP	—	—	—	—	—

Additional readings :—
Montezuma e =3m.10s.
La Plata E =2m.47s.?, iSZ =4m.13s.
Huancayo iP =4m.5s.
Fort de France e =16m.12s.
Bermuda e =11m.32s., 16m.37s., and 16m.45s., esS =19m.47s., eSS =20m.56s., e = 22m.11s.
Tucson i =10m.57s., e =13m.37s., iPP =13m.52s., e =19m.49s., i =20m.18s., e = 22m.24s.
Palomar iZ =11m.21s., isPZ =14m.24s., ePKP, PKPZ =38m.13s.
Riverside iZ =11m.25s.
Mount Wilson iZ =13m.31s.
Pasadena i =11m.28s., esPZ =14m.37s.
Haiwee iNZ =11m.34s., ePKP, PKPZ =38m.7s.
Santa Barbara iNZ =11m.33s.
Logan i =11m.37s. and 22m.42s.
Tinemaha iEZ =11m.38s., ePKP, PKPZ =38m.2s., iZ =40m.39s.
Granada ePP =15m.3s., SS =28m.6s.
Clermont-Ferrand i =12m.36s.
De Bilt ePP =19m.51s.
Stuttgart eP =12m.57s., ePP =17m.2s., eSS? =26m.36s., ePS? =27m.26s.
Helwan eZ =17m.44s. and 19m.52s., PPP?Z =20m.26s., eE =27m.11s., PPS?N = 28m.29s.

Nov. 30d. Readings also at 1h. (La Paz), 5h. (Riverview, Santa Barbara, Pasadena, Mount Wilson, Tucson, Haiwee, Tinemaha, Riverside, and Palomar), 8h. (near Sofia), 10h. (near Sofia and near Branner), 16h. (near Mizusawa), 18h. (Istanbul, Ksara, and near Mizusawa), 20h. (near St. Louis), 22h. and 23h. (near Berkeley).

Dec. 1d. Readings at 2h. (Huancayo, La Paz, Tucson, Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, and Tinemaha), 7h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, and Mizusawa), 8h. (Sofia), 10h. (Stuttgart), 21h. (Granada, Helwan, Stuttgart, and La Paz), 23h. (Bombay).

Dec. 2d. 0h. 13m. 56s. Epicentre 40°·9S. 175°·8E. (as on 1942 Aug. 1d.).

Scale VI-VII in south part of North Island, N.Z.
C. R. Hayes.
"Earthquakes in New Zealand during year 1942." New Zealand Journal of Science and Technology, Vol. XXIV, No. 4 B., p. 193B. Wellington 1944, chart p. 191B. Epicentre 41°·1S. 175°·7E.

$A = -·7560$, $B = +·0555$, $C = -·6522$; $\delta = -2$; $h = -2$;
$D = +·073$, $E = +·997$; $G = +·650$, $H = -·048$, $K = -·758$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverview		20·8	282	i 4 48k	+ 3	i 8 41	+ 8	i 9 7	SS	e 9·7
Sydney		20·8	282	e 4 46	+ 1	i 8 34	+ 1	—	—	e 10·1
Brisbane		23·0	299	i 5 3	− 4	i 9 14	0	—	—	—
Huancayo		96·0	113	e 13 42	+12	e 24 27	−20	e 26 28	PS	e 45·0
Pasadena	z.	96·3	50	i 13 55	+23	—	—	e 17 36	PP	e 45·1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mount Wilson	z.	96·4	50	e 13 32	0	—	—	e 17 29	PP	—
Riverside	z.	96·6	50	e 13 32	− 1	—	—	e 17 44	PP	—
Tinemaha	z.	98·3	48	e 17 41	PP	—	—	—	—	—
Tucson		99·3	56	e 13 46	+ 1	e 25 46	{+57}	—	—	e 46·8
Bozeman		108·1	46	—	—	e 38 46	SSS	—	—	e 69·3
Tashkent		126·3	296	e 18 58	[− 7]	—	—	—	—	—
Ottawa		129·2	60	e 19 9	[− 1]	—	—	—	—	69·1
Baku		139·5	288	e 20 4	[+34]	e 29 16	{− 2}	—	—	—
Ksara		147·6	269	e 19 44	[0]	—	—	—	—	—
Helwan	z.	149·2	260	i 19 46k	[0]	—	—	23 25	PP	—
Potsdam		163·5	320	e 20 4	[0]	—	—	e 24 58	PP	e 86·1
Stuttgart		167·7	314	e 20 6	[− 2]	—	—	e 35 22	PS	—
Granada		176·3	188	20 18k	[+ 6]	32 26	{− 7}	i 25 42	PP	e 88·3

Additional readings :—
Riverview i = 4m.58s., iP_cP?Z = 8m.46s.
Brisbane iSE = 9m.17s.
Huancayo e = 32m.2s.
Tucson eSS = 30m.31s.
Ksara e = 21m.23s.
Helwan PKP_2Z = 19m.58s., iZ = 20m.10s.
Granada $ePKP_2$ = 21m.51s., SKSP = 37m.8s., SS = 46m.48s.
Long waves were also recorded at Bombay, La Paz, and other European stations.

Dec. 2d. 19h. 4m. 19s. Epicentre 40°·6N. 35°·0E. (as on Nov. 21d.).

M. Blumenthal :
" Zur Geologie der Landstrecken der Erdbeben von Ende 1942 in Nord-Anatolien und dortselbst augeführte Makroseismische Beobachtungen (Osmançik-Erbaa)."
M.T.A. Sene 8. Sayi 1/29, pp. 33-46. Summary in German pp. 47, 48. Isoseismal chart plate II, p. 37. Ankara 1943. Epicentre as adopted.

$$A = +\cdot6238,\ B = +\cdot4368,\ C = +\cdot6482;\quad \delta = +8;\quad \lambda = -2;$$
$$D = +\cdot574,\ E = -\cdot819;\quad G = +\cdot531,\ H = +\cdot372,\ K = -\cdot761.$$

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		4·5	278	2 1	S	(2 1)	− 4	2 15	S*	3·8
Ksara		6·8	174	e 1 55	+11	e 3 13	+10	3 57	SS	—
Bucharest		7·6	303	1 51	− 4	3 27	+ 4	2 40	P_g	—
Focsani		7·6	314	e 1 53	− 2	e 3 21	− 2	e 2 31	P_g	—
Sofia		9·0	287	e 2 23	+10	i 4 20	+22	i 2 48	P*	i 5·0
Helwan		11·1	197	i 2 46	+ 3	5 3	+14	5 23	SS	—
Baku		11·3	86	i 2 55	+ 9	i 5 16	+22	—	—	—
Belgrade		11·5	296	e 2 53	+ 5	—	—	—	—	e 5·4
Triest		16·3	295	i 3 51	− 1	i 7 6	+13	—	—	e 9·3
Prague		17·2	311	i 4 3k	0	i 7 22	+ 8	—	—	e 8·7
Cheb		18·4	309	e 4 18	0	e 7 50	+ 9	—	—	e 9·7
Potsdam		19·1	316	i 4 24	− 3	i 8 1	+ 4	i 8 53	SSS	11·7
	z.	19·1	316	i 4 21k	− 6	i 8 6	+ 9	i 8 53	SSS	12·7
Jena		19·2	311	i 4 28	0	i 8 7	+ 8	i 5 2	PP	e 9·7
Chur		19·4	298	e 4 29	− 1	e 8 7	+ 3	—	—	—
Stuttgart		20·0	304	i 4 35k	− 2	i 8 17	0	i 5 9	PP	10·7
Zurich		20·1	299	e 4 36k	− 2	e 8 31	+12	—	—	—
Basle		20·8	300	e 4 44	− 1	—	—	—	—	—
Strasbourg		20·9	303	i 4 48	+ 2	e 8 35	0	—	—	e 12·3
Copenhagen		21·2	323	e 4 47k	− 2	8 39	− 2	—	—	—
Upsala		22·1	336	i 4 55	− 4	8 49	− 9	i 5 15	PP	e 11·2
De Bilt		23·4	311	i 5 10	− 1	i 9 26	+ 5	—	—	e 11·2
Uccle		23·6	307	e 5 10	− 3	9 26	+ 1	—	—	10·7
Clermont-Ferrand		23·7	293	i 5 16k	+ 2	e 9 33	+ 6	—	—	13·4
Paris		24·4	301	e 5 32	+11	e 9 59	+20	—	—	13·7
Algiers		25·2	271	i 5 38	+ 9	e 9 41?	−11	e 10 41	SS	12·7
Tashkent		25·8	77	i 5 35	+ 1	i 10 19	+17	—	—	—
Kew		26·6	307	e 5 35	− 7	e 10 31	+15	—	—	e 14·7
Stonyhurst		28·3	311	—	—	e 10 41?	− 2	—	—	e 14·7
Aberdeen		29·0	318	—	—	i 13 26	?	—	—	e 17·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Granada		30·1	277	i 6 20k	+ 7	i 11 7	− 5	6 37	pP	i 16·9
New Delhi	N.	36·4	96	7 11	+ 3	12 51	+ 1	e 8 23	PP	—
Bombay		38·9	112	e 7 55	+26	e 13 41	+13	—	—	e 19·7
Scoresby Sund		41·4	335	e 7 11	−39	e 13 39	−26	e 17 24	SSS	e 21·8
Hyderabad	E.	43·9	109	—	—	14 50	+ 8	—	—	—
Calcutta	N.	48·1	95	—	—	e 15 47	+ 5	e 19 37	SS	—
Tinemaha	Z.	98·9	338	e 13 44	+ 1	—	—	—	—	—
Haiwee	Z.	99·7	338	e 13 48	+ 1	—	—	—	—	—
Tucson		100·9	331	e 14 53	+61	—	—	—	—	—
Mount Wilson	Z.	101·5	337	e 14 0	+ 5	—	—	e 18 27	PP	—
Pasadena	Z.	101·6	337	e 14 0	+ 4	—	—	e 18 18	PP	e 61·7

Additional readings :—
Istanbul S_g = 3m.12s.
Bucharest eEN = 1m.59s., iZ = 2m.2s., eSE = 3m.36s., S*NZ = 3m.59s., S*E = 4m.7s., S_gZ = 4m.23s.
Focsani eN = 2m.48s. and 3m.14s., eSN = 3m.29s., iE = 3m.55s., iS_gN = 4m.22s., iSgE = 4m.27s.
Helwan eN = 4m.8s.
Belgrade e = 4m.1s.
Potsdam iSE = 8m.9s.
Jena iEZ = 5m.10s.
Stuttgart e = 8m.6s., eQ = 9m.17s.
Strasbourg i = 6m.15s. and 6m.42s.
Upsala PPPE = 5m.29s., iN = 6m.17s., i = 9m.7s., SS = 9m.26s., iSSSN = 9m.54s.
Algiers e = 5m.10s.
Granada iPP = 7m.16s., sPP = 7m.40s., P_cP = 9m.22s., iSN = 11m.10s., sS = 11m.43s., iSS = 12m.11s.
New Delhi eN = 8m.43s., sSN = 13m.1s.
Long waves were also recorded at Colombo and San Fernando.

Dec. 2d. Readings also at 16h. (Mount Wilson, Pasadena, Riverside, Tucson, Brisbane, and Riverview), 17h. (Mount Wilson, Riverside, Tinemaha, and Tucson), 18h. (Tucson), 23h. (near Tashkent).

Dec. 3d. 1h. 13m. 0s. Epicentre 10°·3N. 126°·0E. (as on 1942 March 12d.).

A = −·5784, B = +·7962, C = +·1776; δ = +2; h = +6;
D = +·809, E = +·588; G = −·104, H = +·144, K = −·984.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Miyazaki		22·1	13	e 4 58	− 1	9 2	+ 4	—	—	—
Kumamoto		22·8	11	5 6	+ 1	—	—	—	—	—
Kobe		25·7	17	4 39	−54	—	—	—	—	—
Nagoya		26·7	20	5 6	−37	—	—	—	—	—
Colombo	E.	45·7	269	8 30	+ 6	15 14	+ 6	—	—	23·2
New Delhi	N.	49·1	298	9 5	+14	16 1	+ 5	—	—	—
Riverview	Z.	50·0	152	i 8 53	− 5	—	—	—	—	e 19·9
Sydney		50·0	152	e 12 30	?	—	—	—	—	—
Bombay		52·0	285	i 9 9	− 4	i 16 30	− 6	i 11 9	PP	e 27·0
Tashkent		58·4	313	i 9 54	− 6	17 58	− 4	—	—	—
Wellington		68·2	143	—	—	20 0?	− 4	—	—	34·0
Christchurch		68·3	146	19 57	S	(19 57)	− 9	31 38	Q	35·3
Baku		72·8	310	e 12 0	+28	20 54	− 4	—	—	—
Ksara		84·4	303	e 12 36	0	e 23 34	PS	—	—	—
Helwan		88·9	300	12 52	− 6	23 36	[+10]	16 24	PP	—
Bucharest		89·8	316	—	—	23 42	−11	—	—	—
Potsdam		95·4	326	e 13 23	− 5	—	—	—	—	e 47·0
Stuttgart		99·2	323	e 13 41	− 4	e 25 36	+22	—	—	e 51·7
Ebingen		99·6	322	e 20 27	PPP	—	—	—	—	—
Uccle		101·0	327	—	—	e 24 48	[+16]	e 27 12	PS	e 49·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha	z.	103·6	49	e 18 26	PP	—	—	e 29 53	?	—
Haiwee	z.	104·2	49	e 14 5	− 2	—	—	—	—	—
Mount Wilson	z.	104·9	50	e 14 9	− 1	—	—	e 18 28	PP	—
Pasadena	z.	104·9	50	e 14 8	− 2	—	—	e 18 46	PP	e 46·0
Riverside	z.	105·5	50	—	—	—	—	e 29 46	?	—
Tucson		111·3	49	e 18 35	[− 1]	—	—	i 29 28	PPS	—
Granada		113·2	318	—	—	—	—	e 29 5	PS	e 59·9
Huancayo		159·0	97	e 20 45	PKP_3	e 31 7	{0}	e 45 16	SSP	e 75·2

Additional readings :—
Bombay iE = 16m.49s., eSSE = 20m.25s.
Helwan eZ = 16m.3s.
Mount Wilson eZ = 15m.13s.
Pasadena eZ = 17m.15s.
Tucson e = 19m.12s.
Long waves were also recorded at De Bilt, Kew, Upsala, and La Paz.

Dec. 3d. 9h. 44m. 42s. Epicentre 39°·7N. 119°·3W.

Scale VI at Fernley Fallon, Reno (Nevada). Macroseismic area 24,000 square miles.
R. R. Bodle : " United States Earthquakes, 1942." Washington, 1944, p. 14., map p. 8, Epicentre as adopted.

A = −·3776, B = −·6728, C = +·6362 ; δ = −1 ; h = −2 ;
D = −·872, E = +·489 ; G = −·311, H = −·555, K = −·772.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha		2·7	162	0 43	− 2	i 1 45	S_g	i 0 49	P*	—
Berkeley	E.	3·0	232	e 1 1	P_g	i 1 28	+ 1	—	—	—
	N.	3·0	232	e 0 50	0	e 1 35	S*	—	—	—
Lick	N.	3·0	218	0 46	− 4	—	—	i 0 54	P*	—
Fresno	N.	3·0	187	i 0 49	− 1	i 1 10	−17	—	—	—
Santa Clara		3·1	221	e 1 16	P_g	i 1 46	S_g	—	—	i 1·9
San Francisco		3·1	232	e 0 52	+ 1	i 1 29	0	i 1 10	P_g	—
Ukiah		3·1	259	e 1 2	P_g	i 1 49	S_g	—	—	i 2·1
Branner		3·2	225	e 0 55	+ 3	i 1 30	− 2	i 1 15	P_g	—
Haiwee	z.	3·7	164	i 1 5	P*	—	—	—	—	—
Ferndale		3·9	285	e 1 30	P_g	i 2 33	?	—	—	—
Santa Barbara		5·2	184	i 1 42	P_g	i 2 37	S*	—	—	—
Mount Wilson		5·5	170	i 1 25	0	i 3 4	S_g	—	—	—
Pasadena		5·6	171	i 1 25	− 2	i 2 57	S*	i 1 47	P_g	—
Salt Lake City		5·8	77	e 1 48	P*	e 3 8	S_g	—	—	i 3·4
Riverside		5·9	164	e 1 30	− 1	i 3 13	S_g	—	—	—
Logan		6·0	67	e 2 0	P_g	i 2 47	+ 4	—	—	i 2·8
Butte		8·0	36	e 2 48	P_g	i 4 36	S_g	—	—	i 5·0
Tucson		10·1	135	e 2 22	− 6	e 4 6	−19	—	—	i 5·3
Cape Girardeau	E.	23·4	85	e 5 33	+22	—	—	—	—	—

Additional readings :—
Berkeley iE = 1m.10s., iN = 1m.16s., iSEN = 1m.45s.
Lick iN = 1m.8s.
San Francisco iEN = 1m.13s., iSEN = 1m.49s.
Ukiah e = 1m.13s.
Salt Lake City e = 2m.15s., i = 3m.12s.
Logan e = 2m.10s., i = 2m.13s., 2m.20s., and 2m.28s.
Seattle (△ = 8°·2), e = 9h.43m.50s. and 9h.45m.36s.
Tucson e = 2m.47s. and 3m.41s.
Long waves were also recorded at Chicago and Bozeman.

Dec. 3d. Readings also at 2h. (Ravensburg, near Ebingen, Stuttgart, Basle, Chur, Zurich, and Neuchatel), 3h. (Stuttgart (2), Haiwee, and Tinemaha), 6h. (Stuttgart, Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, and Tucson), 10h. (near Balboa Heights, near Berkeley, Lick, and Fresno), 11h. (near Berkeley and Lick), 14h. (near Berkeley, Fresno, Lick, and near Tashkent), 16h. (Tashkent), 19h. (Prague).

Dec. 4d. 15h. 25m. 17s. Epicentre 6°·1S. 150°·5E. (as on 1942 Jan. 7d.).

$A = -\cdot8655$, $B = +\cdot4897$, $C = -\cdot1055$; $\delta = +3$; $h = +7$;
$D = +\cdot492$, $E = +\cdot870$; $G = +\cdot092$, $H = -\cdot052$, $K = -\cdot994$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	E.	21·4	174	e 5 2	+11	i 8 56	+11	i 5 21	PP	—
	N.	21·4	174	i 4 54	+ 3	i 8 59	+14	i 10 19	?	11·2
Riverview		27·6	178	i 6 7k	+16	i 10 43	+11	i 11 1	SS	e 14·3
Sydney		27·6	178	—	—	e 10 59	+27	—	—	e 14·2
Auckland		37·8	147	8 51	PP	13 23	+12	—	—	16·7
Apia		37·9	103	—	—	e 15 34	SS	—	—	—
Arapuni		39·2	148	—	—	13 43?	+11	—	—	19·7
Wellington		41·2	152	—	—	13 43?	−19	17 29	SSS	20·2
Perth		41·3	227	—	—	i 14 25	+21	i 17 38	SSS	—
Miyazaki		41·9	336	(8 14)	+20	8 14	P	—	—	13·7
Hukuoka		43·8	336	8 13	+ 4	—	—	—	—	—
Nagano		44·1	346	e 8 12	0	—	—	—	—	—
Sendai		45·0	350	18 54	SSS	—	—	—	—	—
Honolulu		57·5	60	e 11 48	PP	e 18 32	PPS	e 19 46	?	24·2
Calcutta	N.	67·1	297	—	—	e 20 33	PPS	e 27 58	SSS	—
New Delhi	N.	78·4	301	13 9	?	e 22 16	+16	—	—	—
Bombay		80·4	290	12 19	+ 4	22 25	+ 4	23 1	PS	36·7
Almata		82·3	315	e 11 52	?	—	—	—	—	—
College		83·9	32	e 22 31	S	(e 22 31)	−25	e 23 23	PS	e 36·6
Andijan		85·0	312	e 12 38	0	e 23 0	[− 1]	—	—	—
Sitka		86·7	32	e 12 59	+12	e 23 6	[− 6]	—	—	e 35·3
Tashkent		87·4	312	i 12 51	+ 1	23 28	− 2	23 12	SKS	—
Ukiah		90·9	51	e 13 5	− 2	e 23 46	[+ 8]	—	—	e 40·6
Berkeley		91·5	52	—	—	e 23 54	[+12]	e 24 24	PS	e 41·7
Santa Clara		91·7	53	i 12 4	?	e 25 21	PS	—	—	e 41·4
Victoria		92·0	42	—	—	e 23 55	[+11]	—	—	37·7
Santa Barbara	z.	93·2	56	e 13 12	− 5	—	—	—	—	—
Pasadena		94·5	56	i 13 15	− 8	e 25 29	PS	—	—	e 38·6
Mount Wilson	z.	94·6	56	i 13 15	− 9	—	—	—	—	—
Tinemaha	z.	94·6	54	e 13 16	− 8	—	—	—	—	—
Haiwee	z.	94·8	54	e 13 16	− 9	—	—	—	—	—
Sverdlovsk		95·0	326	e 13 27	+ 1	23 57	[− 4]	26 8	PS	—
Riverside	z.	95·1	56	i 13 15	−11	—	—	—	—	—
Palomar	z.	95·5	57	i 13 21	− 7	—	—	—	—	—
Salt Lake City		99·7	49	—	—	e 25 13	− 5	—	—	e 44·8
Bozeman		100·2	45	—	—	e 24 41	[+13]	—	—	e 46·0
Tucson		100·6	58	i 13 52	+ 1	e 27 0	PS	e 18 0	PP	e 44·9
Baku		102·0	310	18 32	PP	—	—	—	—	—
Scoresby Sund		115·5	358	—	—	e 29 22	PS	—	—	e 56·3
Upsala		115·6	335	—	—	e 35 43?	SS	—	—	e 57·7
Helwan	z.	118·2	300	20 14	PP	—	—	21 46	?	—
Bucharest		118·4	318	—	—	e 27 43?	{+40}	—	—	—
Copenhagen		120·4	334	30 7	PS	37 1	SSP	41 25	SSS	56·7
Ottawa		124·0	37	e 18 57	[− 4]	—	—	—	—	57·7
Aberdeen		124·7	342	e 20 43?	PP	—	—	—	—	e 55·7
Triest		125·3	324	—	—	e 25 43	[−24]	—	—	e 60·7
Vermont		126·0	38	—	—	e 37 51	SS	—	—	58·7
Stuttgart		126·4	329	e 19 4	[− 1]	27 49	{− 7}	e 20 59	PP	e 61·2
Uccle		127·3	333	e 21 14	PP	e 22 31	SKP	e 32 44	PPS	e 63·7
Huancayo		131·0	111	e 21 23	PP	e 29 0	{+34}	e 38 57	SS	e 54·0
Clermont-Ferrand		131·4	329	e 23 27	PPP	—	—	—	—	e 64·7
La Paz		135·7	121	e 19 22	[0]	22 56	SKP	22 16	PP	63·7
Bermuda		138·0	47	—	—	e 38 47	?	—	—	64·8
Granada		141·1	326	i 17 57k	P	30 7	{+39}	23 11	PKS	68·8
San Juan		142·3	67	e 19 28	[− 7]	e 23 23	SKP	e 41 27	SS	e 61·9
Fort de France		147·7	72	e 19 43	[− 1]	—	—	—	—	—

Additional readings :—
Bombay SSE = 27m.34s.
Stuttgart eSKP = 22m.3s., ePPP = 23m.43s., ePS = 31m.1s., ePPS = 32m.43s., eSS = 38m.13s., eSSS = 43m.31s.

Continued on next page.

Uccle eSSN = 39m.5s.
Huancayo i = 22m.43s.
Granada iPKP = 19m.40s., PP = 23m.27s., SKSP = 33m.55s., SS = 44m.7s., SSP = 45m.25s., SSS = 48m.57s.
San Juan e = 20m.30s. and 27m.54s.
Long waves were also recorded at other European and American stations.

Dec. 4d. Readings also at 5h. (Guadalajara), 6h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, Palomar, Tucson, near Mizusawa, Mitaka, Titibu, Kiyosumi, Tokyo Imp. University, and Koyama,) 11h. (Auckland), 12h. (Riverview), 13h. (Mount Wilson, Riverside, Tinemaha, Palomar, and Tucson), 20h. (La Paz).

Dec. 5d. 14h. 28m. 24s. Epicentre 59°·2N. 153°·8W. (as on 1938 Dec. 30d.).

$A = -\cdot4617$, $B = -\cdot2272$, $C = +\cdot8574$; $\delta = -8$; $h = -9$;
$D = -\cdot442$, $E = +\cdot897$; $G = -\cdot769$, $H = -\cdot379$, $K = -\cdot515$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		6·3	23	i 1 37	+ 1	i 2 38	−12	i 3 8	SSS	i 4·0
Sitka		10·0	94	i 2 18	− 9	—	—	—	—	e 3·2
Victoria		20·8	107	4 43	− 2	i 8 33	0	—	—	10·6
Seattle		21·8	107	e 4 16	?	—	—	—	—	e 7·8
Saskatoon		27·0	84	5 58	+13	10 30	+ 8	—	—	14·6
Butte		27·8	100	e 6 0	+ 7	e 10 47	+12	e 6 35	PP	e 13·2
Ukiah		27·9	122	e 6 10	+16	e 10 53	+16	(e 11 42)	SS	e 11·7
Bozeman		28·8	98	e 6 10	+ 8	i 10 39	−12	e 6 55	PP	e 12·4
Berkeley		29·4	122	e 6 1	− 6	e 10 55	− 6	—	—	—
Santa Clara		30·0	122	i 6 12	0	e 10 51	−19	(e 12 53)	SS	e 12·9
Lick		30·1	122	e 6 11	− 2	e 11 6	− 6	—	—	—
Fresno	N.	31·4	120	e 6 23	− 2	—	—	—	—	—
Tinemaha		31·8	118	i 6 27a	− 1	e 11 35	− 3	i 7 0	PP	—
Salt Lake City		32·0	105	e 6 36	+ 6	e 11 29	−13	e 7 30	PP	e 15·7
Haiwee		32·7	117	i 6 34a	− 2	—	—	—	—	—
Santa Barbara		33·4	121	i 6 40	− 2	—	—	—	—	—
Mount Wilson		34·3	120	i 6 47a	− 3	e 12 11	− 6	—	—	—
Pasadena		34·3	120	i 6 47a	− 3	i 12 11	− 6	(e 14 24)	SS	e 14·4
Riverside		34·8	120	i 6 52a	− 2	e 12 16	− 9	—	—	—
Palomar	Z.	35·6	118	i 6 58a	− 3	—	—	—	—	—
Honolulu		38·0	185	e 8 24	PP	e 13 13	− 1	(e 15 51)	SS	e 15·9
Tucson		39·2	114	i 7 29	− 2	i 13 23	− 9	e 9 1	PP	e 16·3
Lincoln		39·6	89	e 7 48	+13	e 13 27	−11	(e 16 21)	SS	e 16·4
Chicago		43·5	83	e 8 7	0	i 14 24	−12	e 9 48	PP	e 21·3
Cape Girardeau		45·9	88	e 8 24	− 2	e 14 53	−18	e 18 10	SS	—
Scoresby Sund		46·2	21	i 8 30	+ 2	i 15 5	−10	e 10 23	PP	e 18·0
Ottawa		46·9	70	8 29	− 5	15 11	−14	18 54	SS	21·6
Shawinigan Falls		47·5	67	e 8 34	− 4	—	—	—	—	24·6
Seven Falls		48·0	66	e 8 47	+ 4	15 27	−14	e 18 50	SS	21·6
Pittsburgh		48·4	77	i 8 42	− 4	e 19 29	SS	—	—	—
Vermont		48·8	69	—	—	i 15 42	−10	e 19 19	SS	22·3
Harvard		51·1	70	i 9 6	0	—	—	(e 19 36)	SS	e 19·6
Fordham		51·2	73	i 9 20	+13	i 16 13	−12	e 20 15	SS	e 23·8
Philadelphia		51·2	75	e 9 43	?	i 16 14	−11	(e 20 12)	SS	e 20·2
Columbia		52·8	84	e 9 26	+ 7	e 16 35	−12	(e 20 41)	SS	e 20·7
Sverdlovsk		61·1	340	10 18	0	i 18 32	− 5	—	—	—
Upsala		61·1	5	i 10 17	− 1	e 18 21	−16	e 25 36?	SSS	e 28·6
Bermuda		62·4	72	e 10 57	+30	e 18 41	−12	—	—	e 24·9
Copenhagen		64·9	8	i 10 43k	0	19 18	− 6	—	—	—
Oxford		67·2	18	—	—	i 19 45	− 7	—	—	—
Kew		67·6	17	i 11 2k	+ 1	i 19 50	− 7	i 11 26	P_cP	e 28·1
De Bilt		67·8	14	i 11 0	− 2	i 19 55	− 5	—	—	e 32·6
Potsdam		68·3	8	i 11 6k	+ 1	e 19 56	−10	i 11 32	P_cP	e 26·6
Uccle		68·9	15	i 11 9k	0	i 20 5	− 8	24 24	SS	e 33·6
Jena		69·6	8	e 11 11	− 2	e 20 11	−10	e 11 45	P_cP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Paris		70·6	16	i 11 20	+ 1	i 20 29	− 4	—	—	e 34·6
Prague		70·7	7	i 11 17a	− 3	i 20 25	− 9	e 21 0	PS	—
Stuttgart		71·5	12	i 11 24a	0	i 20 37	− 6	e 11 45	P_cP	e 36·6
Basle		72·5	12	e 11 30	0	—	—	—	—	—
Zurich		72·8	12	e 11 25	− 7	e 21 15	+17	—	—	—
Neuchatel		73·0	13	e 11 34	+ 1	e 21 0	0	—	—	—
San Juan		73·2	82	e 14 12	PP	e 20 47	−15	—	—	e 29·2
Andijan		73·3	326	e 11 34	− 1	21 3	− 1	—	—	—
Chur		73·4	11	e 12 31	?	—	—	—	—	—
Clermont-Ferrand		73·7	16	e 11 38	0	e 21 0	− 8	—	—	e 33·2
Tashkent		73·7	328	i 11 38	0	i 21 4	− 4	—	—	—
Triest		75·0	9	e 11 36	− 9	i 21 4	−19	—	—	—
Bucharest	N.	76·8	0	e 12 17	+22	e 21 33	− 9	e 21 52	PS	32·6
Sofia		78·4	2	e 12 5	+ 1	e 21 53	− 7	—	—	—
Baku		78·8	342	e 12 15	+ 9	i 22 3	− 1	—	—	—
Granada		80·8	25	i 12 18a	+ 1	i 22 21	− 4	i 12 37	P_cP	i 34·3
San Fernando		81·0	26	e 12 21	+ 3	22 21	− 6	—	—	e 34·1
New Delhi		82·9	315	i 12 32a	+ 4	i 22 43	− 3	—	—	—
Ksara		87·0	352	e 12 50?	+ 2	e 23 47	+20	—	—	—
Helwan		91·2	355	i 13 10a	+ 2	24 4	− 1	16 48	PP	—
Hyderabad	E.	92·6	310	—	—	23 44	[− 4]	—	—	—
Bombay		93·4	317	e 13 9	− 9	i 24 25	+ 1	17 2	PP	e 43·6
Huancayo		94·4	106	e 13 54	+31	e 23 50	[− 8]	e 25 49	PS	e 31·3
Auckland		99·2	205	i 25 53	?	—	—	—	—	—
Colombo	E.	101·6	305	e 21 36?	?	—	—	—	—	—
Riverview	N.	103·3	224	e 25 24	SKKS	(e 25 24)	{+ 6}	e 33 7	SSP	e 43·5
Christchurch		106·1	204	27 54	PS	—	—	46 23	Q	49·9

Additional readings :—
Seattle e = 6m.20s.
Ukiah e = 9m.58s.
Berkeley ePE = 6m.18s., eSE = 11m.6s., eEN = 11m.32s.
Tinemaha eZ = 12m.54s.
Salt Lake City e = 10m.51s.
Haiwee iZ = 9m.21s., eZ = 12m.57s.
Mount Wilson iZ = 13m.3s.
Pasadena iZ = 7m.16s., eZ = 13m.3s.
Chicago e = 17m.33s.
Cape Girardeau ePPN = 9m.27s.
Pittsburgh iS = 19m.37s.
Vermont e = 19m.19s.
Upsala SE = 18m.28s., eN = 19m.58s., eSSS?N = 23m.36s.?
Copenhagen 20m.32s.
Kew iPPZ = 13m.34s., iPPS = 20m.15s., iSSEN = 24m.0s., iE = 26m.3s., eSSSNZ = 27m.0s.
Potsdam iPPZ = 13m.40s., iSEN = 19m.59s., iSZ = 20m.6s., eSSN = 24m.18s.
Jena iPE = 11m.16s.
Stuttgart ePcP = 11m.50s., ePP = 14m.4s., ePPP = 15m.50s., ePS = 21m.6s. and 21m.15s., eSS = 25m.10s.
Basle e = 15m.8s.
Granada sP = 12m.57s., iPP = 15m.23s., pPP = 15m.52s., sS = 23m.10s., PS = 23m.28s. sPS = 23m.43s., iSS = 27m.36s., sSS = 28m.33s.
San Fernando SS?E = 25m.56s.
Helwan eZ = 13m.39s. and 14m.9s., iZ = 14m.57s., SKSN = 23m.31s., PSZ = 25m.6s.
Bombay iSKKSEN = 23m.51s., eN = 25m.36s., iSSE = 30m.46s., eE = 37m.36s.
Riverview iN = 25m.58s.

Dec. 5d. Readings also at 1h. (Chur, Zurich, Basle, Neuchatel, Stuttgart, Triest, Potsdam, and Granada), 3h. (near Andijan), 4h. (near Mizusawa), 5h. (Ksara, La Plata, Tucson, Palomar, Riverside, Pasadena, Mount Wilson, Haiwee, and Tinemaha), 10h. (Granada), 14h. (near Mizusawa), 15h. (near Ferndale (2)), 18h. (near Fresno, Lick, Branner, Berkeley, and San Francisco), 21h. (Seven Falls, and near Ottawa and Shawinigan Falls).

Dec. 6d. Readings at 0h. (near Andijan), 2h. (near Almata), 4h. (near Berkeley), 7h. (Granada), 14h. (Auckland, Christchurch, and Wellington), 15h. (Perth, Riverview, Sydney, Tucson, Mount Wilson, Pasadena, and Tinemaha), 16h. (Huancayo, La Paz, near Lick, Berkeley, and Fresno), 17h. (San Fernando), 20h. (near Ravensburg, Stuttgart, Chur, Basle, Neuchatel, and Zurich).

Dec. 7d. Readings at 0h. (Calcutta, near Berkeley, and Lick), 2h. (Calcutta, Tucson, Palomar, and Tinemaha), 3h. (Sofia), 6h. (Calcutta), 7h. (Sofia), 12h. (near La Paz), 19h. (Mount Wilson, Palomar, Riverside, Tucson, Tinemaha, and Oaxaca), 21h. (Sofia), 22h. (Baku and Tashkent), 23h. (Calcutta).

Dec. 8d. Readings at 0h. (La Paz and Calcutta), 1h. (Haiwee, Mount Wilson, Palomar, Tucson, and Tinemaha), 6h. (near Bucharest and Sofia), 11h. (Haiwee, Mount Wilson. Pasadena, Palomar, Riverside, Tinemaha, Tucson, and near Mizusawa), 13h. (Sofia and Stuttgart), 17h. (near Berkeley), 18h. (near Andijan and Tashkent), 22h. (Dehra Dun and near New Delhi), 23h. (Bombay, Calcutta, and Tashkent).

Dec. 9d. 22h. 18m. 59s. Epicentre 53°·6N. 166°·6W. (as on 1941 May 1d.).

$A = -\cdot5798$, $B = -\cdot1381$, $C = +\cdot8030$; $\delta = +5$; $h = -7$;
$D = -\cdot232$, $E = +\cdot973$; $G = -\cdot781$, $H = -\cdot186$, $K = -\cdot596$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
College		14·7	33	i 3 33	+ 2	i 6 16	0	i 4 0		PPP	e 7·4
Sitka		18·0	66	i 4 10	− 3	i 7 25	− 7	i 5 4		PPP	i 8·6
Victoria		27·3	84	5 47	− 1	10 27	0	6 25		PP	14·0
Seattle		28·3	85	e 1 47	?	—	—	5 17		?	e 6·6
Ferndale		31·2	97	e 6 33	+10	e 11 29	0	—		—	e 14·5
Ukiah		32·7	98	e 6 39	+ 3	i 11 51	+ 1	e 7 44		PP	e 14·6
Honolulu		32·9	164	e 7 8	PP	e 12 14	+18	—		—	e 14·5
San Francisco		34·0	98	e 6 46	− 2	e 12 9	− 4	e 6 54		?	—
Berkeley	E.	34·1	98	e 6 55	+ 7	e 12 13	− 1	—		—	e 15·7
	N.	34·1	98	e 6 47	− 1	e 12 8	− 6	—		—	e 15·2
	Z.	34·1	98	i 6 43	− 5	—	—	—		—	e 15·7
Santa Clara		34·6	100	e 6 55	+ 2	i 12 20	− 2	—		—	e 16·0
Lick		34·8	98	e 6 53	− 1	e 12 24	− 1	—		—	—
Butte		34·9	79	e 6 53	− 2	e 12 21	− 6	e 8 5		PP	e 14·8
Saskatoon		35·3	68	7 5	+ 6	12 26	− 7	—		—	15·0
Bozeman		36·0	79	e 7 4	− 1	i 12 37	− 7	e 8 21		PP	e 15·2
Fresno	N.	36·3	98	e 7 5	− 2	e 12 48	0	—		—	—
Tinemaha		37·0	96	i 7 13k	0	i 12 54	− 5	i 7 21		?	—
Haiwee		37·8	97	i 7 19	− 1	e 13 8	− 3	9 37		PPP	—
Logan		37·8	83	i 7 19	− 1	e 13 3	− 8	i 8 46		PP	16·1
Salt Lake City		38·4	87	e 7 24	− 1	e 13 12	− 8	e 8 51		PP	e 16·3
Pasadena		39·0	100	i 7 28k	− 2	i 13 26	− 3	i 17 34		ScS	e 16·3
Mount Wilson		39·1	100	i 7 29k	− 2	e 13 25	− 6	e 17 34		ScS	—
Riverside		39·6	100	i 7 33k	− 2	i 13 35	− 3	i 7 41		?	—
Palomar	Z.	40·4	100	i 7 41k	0	e 13 49	− 1	i 7 50		?	—
La Jolla		40·5	100	e 7 42	0	e 13 51	− 1	i 7 52		?	—
Tucson		44·7	95	i 8 14	− 2	e 14 46	− 8	i 9 57		PP	e 18·2
Lincoln		47·3	75	e 8 37	0	e 15 20	−11	e 10 58		PPP	e 19·0
Chicago		51·7	69	e 9 17	+ 6	i 16 23	− 9	e 19 55		SS	e 24·1
St. Louis		52·5	74	i 9 13	− 4	e 16 32	−11	—		—	—
Cape Girardeau	E.	53·8	75	e 9 23	− 3	e 16 50	−11	i 9 32		?	—
Ottawa		55·7	59	9 37	− 3	17 17	− 9	11 43		PP	27·0
Shawinigan Falls		56·4	56	9 42	− 3	17 19	−17	11 49		PP	28·0
Pittsburgh		56·9	66	i 9 53	+ 4	i 17 22	−20	—		—	—
Seven Falls		56·9	55	9 45	− 4	17 31	−11	21 19		SS	27·0
Vermont		57·6	58	e 17 25	PS	i 17 43	− 8	e 21 26		SS	e 24·0
Fordham		59·2	60	10 6	+ 1	18 10	− 2	—		—	—
Georgetown		59·6	65	e 10 4	− 4	e 18 4	−13	—		—	28·0
Harvard		59·9	58	i 10 29	+19	i 18 13	− 8	—		—	e 30·0
Philadelphia		59·9	63	e 13 47	PPP	18 10	−11	e 22 7		SS	28·5
Columbia		61·0	72	e 10 21	+ 3	e 18 23	−12	e 14 1		PPP	e 29·4
Halifax		62·2	52	—	—	e 18 40	−11	—		—	e 32·1
Sverdlovsk		63·4	334	10 34	0	19 5	− 1	—		—	—
Upsala		66·8	359	—	—	e 20 46	+58	e 24 1?		SS	e 32·0
Almata		69·2	316	e 11 12	+ 2	—	—	—		—	—
Bermuda		71·1	62	e 11 28	+ 6	i 20 31	− 7	e 25 17		SS	e 29·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		73·2	318	11 37	+ 2	e 21 22	+20	—	—	—
Tashkent		74·0	321	i 11 40	+ 1	i 21 11	0	—	—	—
Uccle		75·7	8	e 11 49	0	e 21 25	− 5	i 11 56	?	e 33·0
Jena		75·8	1	i 11 45	− 5	e 15 7	?	—	—	—
Stuttgart		77·9	3	e 12 1	0	e 21 41	−13	e 15 7	PP	e 38·0
Basle		79·1	5	e 12 9	+ 1	—	—	—	—	—
Zurich		79·3	4	12 8k	− 1	—	—	—	—	—
Neuchatel		79·6	5	e 12 10	0	—	—	—	—	—
Chur		79·9	3	e 12 12	0	—	—	—	—	—
Calcutta	N.	80·6	295	e 12 12	− 4	i 22 13	−10	e 30 43	SSS	e 38·2
Clermont-Ferrand		80·6	9	i 12 16a	0	—	—	—	—	e 41·0
Baku		81·2	334	12 21	+ 2	e 22 33	+ 4	—	—	—
New Delhi	N.	81·3	306	i 12 20a	0	i 22 25	− 5	—	—	—
San Juan		81·4	71	e 12 16	− 4	i 22 26	− 5	e 15 30	PP	e 32·7
Lisbon		86·0	18	e 12 46k	+ 3	23 13	− 4	—	—	42·2
Fort de France		87·2	69	e 12 41	− 8	e 23 3	[−12]	—	—	—
Granada		88·4	15	i 13 1a	+ 6	i 23 14	[− 9]	13 18	pP	44·9
San Fernando	E.	88·7	16	—	—	e 23 34	− 9	—	—	45·0
Hyderabad	E.	90·0	300	23 31	SKS	(23 31)	[− 2]	—	—	—
Bombay		91·6	305	e 13 14	+ 4	i 24 6	− 3	e 23 43	SKS	e 43·0
Riverview		94·4	214	i 25 2	PS	i 24 15	−18	27 24	?	e 43·6
Helwan		95·4	345	e 13 28	0	24 1	[− 2]	17 31	PP	—
Colombo	E.	98·1	293	—	—	e 24 1?	[−16]	—	—	—
Huancayo		100·3	96	e 17 58	PP	i 24 22	[− 6]	e 32 17	SS	e 43·4
La Paz		108·1	93	e 18 17	PP	i 28 21	PS	—	—	53·0

Additional readings :—
College i = 4m.5s.
Sitka i = 8m.16s.
Berkeley eEN = 11m.10s.
Butte e = 8m.44s.
Haiwee i = 7m.29s.
Logan i = 7m.38s. and 9m.57s.
Salt Lake City e = 9m.24s.
Pasadena i = 7m.37s., eSEZ = 13m.22s.
Mount Wilson iEZ = 7m.38s.
Palomar iZ = 13m.29s.
Tucson i = 9m.12s., ePPP = 10m.44s.
Chicago i = 18m.56s.
St. Louis iPZ = 9m.21s., eSE = 16m.24s.
Ottawa i = 9m.45s., SS = 21m.1s.
Vermont e = 19m.39s.
Philadelphia e = 19m.35s.
Columbia e = 20m.4s. and 22m.47s.
Upsala eSSS?E = 28m.31s.
Bermuda e = 21m.44s.
Jena iPEN = 11m.49s., iPZ = 11m.52s., eSEN = 15m.13s.
San Juan iP = 12m.29s., e = 27m.28s.
Lisbon iPZ = 12m.52s., E = 23m.6s.
Granada P_gP = 13m.7s., PP = 16m.12s., pPP = 16m.37s., sS = 23m.54s., sPS = 26m.51s., SS = 29m.9s.
Bombay PSE = 25m.1s.
Riverview iN = 24m.18s.
Helwan iZ = 13m.37s., PPPZ = 19m.52s.
Long waves were also recorded at Scoresby Sund, Wellington, Kew, De Bilt, and Cheb.

Dec. 9d. Readings also at 2h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, Palomar, Tucson, Calcutta, New Delhi, Bombay, Riverview, and Stuttgart), 3h. (Kew, De Bilt, and Potsdam), 6h. (Tashkent, Bombay, New Delhi, Calcutta, Upsala, Uccle, Potsdam, and De Bilt), 7h. (Kew), 10h. (Branner), 12h. (near La Paz, near Bucharest, and Sofia), 13h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Tucson, and Palomar), 14h. (Ksara), 15h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, Tucson, and Palomar, 18h. (Pasadena, Mount Wilson, Tinemaha, Palomar, Tucson, La Paz, and Huancayo). 23h. (Stuttgart, Mount Wilson, Tinemaha, Haiwee, Riverside, Palomar, Tucson, and Cape Girardeau).

Dec. 10d. Readings at 2h. (Tucson), 6h. (La Paz), 7h. (Tucson, Mount Wilson, Pasadena, and Palomar), 8h. (Haiwee, Mount Wilson, Pasadena, Palomar, Tinemaha (2), Tucson, Tashkent, and near Frunse), 12h. (near Tashkent (2)), 21h. (Tucson, Mount Wilson, Palomar, Riverside, and Tinemaha).

Dec. 11d. 2h. 39m. 11s. Epicentre 40°·6N. 35°·0E. (as on 2d.).

Epicentre: Vallée du Hamamözü, 20km. SSE of Osmaniçk: 40°·7N. 34°·8E.
M. Blumenthal:
Zur Geologie der handstrecken der Erdbeben von Ende 1942 in Nord-Anatolien und dortselbst ausgeführte macroseismische Beobachtungen (Osmaniçk-Erbaa).
M.T.A. Sene 8, Sayi 1/29 1 Ankara 1943, p. 33-46, summary in German p. 47-48, plate II, p. 37.

$A = +\cdot6238$, $B = +\cdot4368$, $C = +\cdot6482$; $\delta = +8$; $h = -2$;
$D = +\cdot574$, $E = -\cdot819$; $G = +\cdot531$, $H = +\cdot372$, $K = -\cdot761$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		4·5	278	1 52	P_g	3 26	?	2 12	S*	—
Ksara		6·8	174	e 1 49	+ 5	e 3 6	+ 3	3 49	SSS	—
Bucharest		7·6	303	e 1 50	− 5	e 3 13	−10	2 30	P_g	—
Focsani		7·6	314	e 1 54	− 1	e 3 15	− 8	2 14	P*	—
Sofia		9·0	287	e 2 15	+ 2	i 3 59	+ 1	i 4 12	SS	i 4·5
Helwan		11·1	197	i 2 41k	− 2	4 55	+ 6	e 3 1	PPP	—
Baku		11·3	86	i 2 56	+10	i 5 12	+18	—	—	—
Belgrade		11·5	296	e 2 42	− 6	i 5 19	+20	e 3 16	PPP	6·4
Prague		17·2	311	4 5a	+ 2	e 7 22	+ 8	—	—	e 8·8
Cheb		18·4	309	e 4 14	− 4	e 7 49	+ 8	—	—	e 9·8
Potsdam		19·1	316	i 4 24	− 3	i 7 58	+ 1	i 8 1	SS	11·8
Jena		19·2	311	i 4 25k	− 3	e 8 1	+ 2	e 8 37	SSS	e 9·8
Chur		19·4	298	e 4 25	− 5	e 8 5	+ 1	—	—	—
Stuttgart		20·0	304	e 4 31	− 6	i 8 20	+ 3	i 5 13	PPP	10·3
Zurich		20·1	299	e 4 33k	− 5	e 8 21	+ 2	—	—	—
Basle		20·8	300	e 4 39	− 6	e 8 37	+ 4	—	—	—
Strasbourg		20·9	303	i 4 43	− 3	i 8 52	+17	i 5 39	PPP	e 13·7
Copenhagen		21·2	323	i 4 46	− 3	8 41	0	8 59	SS	—
Neuchatel		21·2	298	e 4 45	− 4	e 8 44	+ 3	—	—	—
Marseilles		22·1	287	e 4 39	−20	i 8 13	?	—	—	10·8
Upsala		22·1	336	e 4 57	− 2	e 8 51	− 7	—	—	e 10·6
Sverdlovsk		23·2	36	i 5 18	+ 9	i 9 21	+ 3	—	—	—
De Bilt		23·4	311	i 5 11k	0	i 9 26	+ 5	—	—	e 11·3
Uccle		23·6	307	i 5 13a	0	9 25	0	i 5 36	PP	11·8
Clermont-Ferrand		23·7	229	i 5 15	+ 1	i 9 35	+ 8	i 5 23	PP	—
Paris		24·4	301	e 5 21	0	e 9 53	+14	—	—	13·8
Algiers		25·2	271	e 5 29	0	10 2	+10	—	—	e 12·5
Tashkent		25·8	77	i 5 34	0	10 6	+ 4	—	—	—
Kew		26·6	307	i 5 59a	+17	i 10 21	+ 5	i 6 32	PP	e 12·3
Oxford		27·2	307	—	—	i 10 22	− 3	—	—	—
Stonyhurst		28·3	311	—	—	i 10 42	− 1	—	—	15·5
Aberdeen		29·0	318	—	—	e 10 29	−25	—	—	—
Granada		30·1	277	i 6 14k	+ 1	10 44	−28	6 38	pP	12·7
San Fernando		32·3	276	e 6 31	− 2	e 11 31	−15	—	—	14·8
Lisbon		33·8	282	—	—	12 12	+ 2	—	—	19·8
Dehra Dun	N.	36·2	93	—	—	e 13 52?	?	—	—	e 25·6
New Delhi	N.	36·4	96	i 7 10k	+ 2	i 12 48	− 2	8 35	PP	—
Bombay		38·9	112	e 7 29	0	e 13 34	+ 6	e 9 4	PP	e 19·3
Calcutta	N.	48·1	95	e 14 44	?	i 19 52	SSS	i 15 39	PS	e 23·4
Kodaikanal	E.	48·1	117	e 16 26	PPS	—	—	—	—	—
Tananarive		60·3	167	e 29 35	Q	—	—	—	—	e 31·8
Seven Falls		70·6	316	11 16	− 3	20 38	+ 5	—	—	33·8
Harvard		74·0	312	e 11 40	+ 1	e 21 16	+ 5	—	—	e 37·8
Ottawa		74·3	317	11 41	0	21 13	− 2	26 7	SS	e 32·8
Bermuda		76·3	301	—	—	e 21 39	+ 2	—	—	e 37·9
Fordham		76·4	313	e 11 52	− 1	e 21 42	+ 4	—	—	e 34·8
Philadelphia		77·7	313	—	—	e 21 55	+ 3	—	—	e 34·8
Saskatoon		81·8	337	—	—	e 22 38	+ 3	—	—	38·8
Chicago		82·9	321	—	—	e 22 48	+ 2	e 23 34	PS	59·8
San Juan		86·3	291	e 15 8	?	e 23 12	{− 2}	—	—	e 45·2
Bozeman		88·9	337	e 23 47	SKKS	e 23 52	+ 8	e 30 20	SSS	e 41·1
Victoria		89·2	346	—	—	e 23 54	+ 7	—	—	e 50·8
Logan		92·7	336	e 14 1	?	e 24 34	+16	e 26 6	PPS	e 46·2
Salt Lake City		93·6	336	e 23 48	SKS	(e 23 48)	[− 6]	—	—	e 45·0
Tinemaha	z.	98·9	338	e 13 45	+ 2	—	—	e 30 40	PKKP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Haiwee	z.	99·7	338	e 13 48	+ 1	—	—	e 30 37 PKKP	—
Tucson		100·9	331	i 13 54	+ 2	—	—	i 18 16 PP	e 58·0
Mount Wilson	z.	101·5	337	e 13 57	+ 2	—	—	i 30 28 PKKP	—
Riverside	z.	101·5	337	e 13 56	+ 1	—	—	—	—
Pasadena		101·6	337	e 13 55	− 1	—	—	i 30 27 PKKP	e 46·1
Palomar	z.	102·0	336	e 13 59	+ 2	—	—	e 30 26 PKKP	—

Additional readings :—
Istanbul SS =4m.7s.
Bucharest ePN =1m.54s., iZ =1m.59s., iEN =2m.3s., eSN =3m.16s., S*N =3m.34s., S*E =3m.44s., S_gE =4m.6s.
Focsani eS* =3m.46s., iS_g =4m.6s.
Helwan iEN =5m.25s., P_cPNZ =8m.41s.
Belgrade i =5m.24s. and 5m.39s., iSS =6m.10s., i =6m.20s.
Cheb e =5m.11s.
Chur i =4m.29s.
Stuttgart iP =4m.35s.k, eQ =9m.49s.
Strasbourg i =5m.55s.
Marseilles eS =8m.1s.
Uccle eSE =9m.19s., iN =10m.4s.
Granada PP =7m.2s., P_cP =9m.14s., sS =11m.14s., SS =12m.8s., pP_cS =14m.11s., S_cS =15m.59s.
San Fernando eSS?E =12m.34s.
Lisbon N =15m.25s.
Dehra Dun e =19m.50s.
New Delhi SSN =14m.45s.
Bombay SSEN =16m.17s.
San Juan e =19m.5s. and 26m.21s.
Bozeman e =35m.11s.
Victoria e =41m.19s.
Mount Wilson eZ =17m.55s.
Pasadena eZ =18m.7s.
Long waves were also recorded at Butte, Huancayo, Ukiah, and Riverview.

Dec. 11d. Readings also at 3h. (La Paz (2), Huancayo, San Juan (2), Palomar (2), Riverside (2), Mount Wilson (2), Pasadena (2), Tinemaha (2), Tucson (2), and Haiwee), 6h. (Tinemaha, Haiwee, Mount Wilson, Tucson, and Pasadena), 7h. (Tucson, Palomar, Riverside, Mount Wilson, Pasadena, Haiwee, and Tinemaha), 8h. (Tucson, Palomar, Riverside, Mount Wilson, Pasadena, Tinemaha, Sale Lake City (2), Logan, and Triest), 11h. (Logan, Tinemaha, Palomar, Mount Wilson, Tucson, and Pasadena), 21h. (Riverview).

Dec. 12d. Readings at 2h. (near Mizusawa), 5h. (Haiwee, Mount Wilson (2), Pasadena, Palomar (2), Riverside (2), Tinemaha, and Tucson (2)), 13h. (Calcutta, Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Logan, and Salt Lake City), 14h. (Bozeman, Butte, Chicago, and Lincoln), 17h. (Riverview).

Dec. 13d. 8h. 42m. 36s. Epicentre 53°·0N. 152°·5E. Depth of focus 0·060.

A = −·5361, B = +·2791, C = +·7967 ; δ = +3 ; h = −6 ;
D = +·462, E = +·887 ; G = −·707, H = +·368, K = −·604.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Mizusawa		15·9	214	3 27	+ 4	6 8	+ 1	— —	—
College		31·7	45	e 5 51	+ 2	e 10 26	− 2	— —	e 13·2
Sitka		39·6	54	e 10 4	?	i 12 26	− 2	i 11 7 ?	e 17·7
Sverdlovsk		49·1	313	8 11	+ 1	14 39	− 3	— —	—
Andijan		53·4	291	e 8 40	− 1	—	—	— —	—
Tashkent		54·7	294	8 51	+ 1	—	—	— —	—
Tinemaha		61·0	66	i 9 33a	0	e 17 15	− 3	11 19 pP	—
Haiwee		61·9	67	i 9 38	− 1	e 17 23	− 7	e 11 24 pP	—
Mount Wilson		63·2	68	i 9 47	− 1	e 17 40	− 5	i 11 33 pP	—
Pasadena		63·2	68	i 9 45a	− 3	i 17 41	− 4	i 11 32 pP	—
Riverside		63·8	68	e 9 50a	− 2	e 17 45	− 8	e 11 37 pP	—
Palomar	z.	64·5	68	i 9 55a	− 1	e 17 57	− 4	i 11 43 pP	—
Baku		65·6	305	e 10 9	+ 6	i 18 11	− 3	— —	—
Tucson		68·7	64	i 10 21	− 1	i 18 51	0	i 12 10 pP	e 37·5
Bombay		69·0	274	e 10 24	0	i 18 39	−16	e 13 1 pP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Harvard		77·6	32	i 11 11	− 2	—	—	—	—	—
Helwan		82·9	311	11 41	0	e 21 17	− 7	16 40	PPP	—
Bermuda		89·0	31	—	—	e 25 36	sS	—	—	e 44·9

Additional readings :—
Tinemaha iZ = 10m.20s. and 13m.21s., ePKP,PKPZ = 38m.41s.
Haiwee eZ = 12m.2s.
Mount Wilson eZ = 12m.22s., ePKP,PKPZ = 38m.36s.
Pasadena iZ = 12m.11s., iPKP,PKPZ = 38m.36s.
Riverside eZ = 12m.19s.
Palomar eZ = 11m.53s.
Tucson e = 11m.46s., i = 15m.18s.
Bombay eE = 14m.54s. and 17m.39s., iE = 19m.24s., eE = 23m.32s.
Helwan PKP?Z = 15m.3s.

Dec. 13d. 19h. 12m. 44s. Epicentre 0°·5N. 126°·5E. (as on 1938 Mar. 5d.).

$A = -\cdot5948$, $B = +\cdot8039$, $C = +\cdot0087$; $\delta = +12$; $h = +7$;
$D = +\cdot804$, $E = +\cdot595$; $G = -\cdot005$, $H = +\cdot007$, $K = -1\cdot000$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taito		22·7	348	5 5	+ 1	—	—	—	—	—
Naha		25·6	2	5 32	0	10 2	+ 3	—	—	—
Miyazaki		31·6	10	6 26	0	11 34	− 1	—	—	—
Hukuoka		33·1	6	6 40	0	12 0	+ 1	—	—	—
Koti		33·5	11	e 6 43	0	—	—	—	—	—
Perth		33·8	196	8 11	PP	14 51	SSS	18 46	L	18·8
Osaka		35·0	13	6 12	−44	—	—	—	—	—
Nagoya		35·8	16	e 7 3	0	—	—	—	—	—
Zinsen		36·8	359	e 7 11	0	12 52	− 4	—	—	—
Nagano		37·6	15	e 7 17	− 1	—	—	—	—	—
Brisbane	N.	37·7	139	6 51	−28	i 12 56	−14	i 8 49	PP	e 20·8
Sendai		39·8	18	e 7 41	+ 5	—	—	—	—	—
Mizusawa	E.	40·7	18	(7 46)	+ 2	7 46	P	—	—	—
Riverview		41·3	149	i 7 50	+ 1	e 13 53	−11	i 9 41	PPP	e 23·2
Sydney		41·3	149	e 9 52	PPP	—	—	—	—	e 19·3
Calcutta	N.	43·1	304	e 8 8	+ 4	i 14 21	− 9	i 16 1	sS	—
Colombo	E.	46·9	279	e 8 46	+12	15 26	+ 1	—	—	24·8
New Delhi	N.	54·7	306	e 9 33	0	i 17 5	− 8	17 14	PS	e 19·2
Bombay		55·7	293	e 9 31	− 9	i 17 16	−10	i 17 40	PS	e 26·3
Auckland		58·1	135	—	—	i 18 9	+11	—	—	26·3
Arapuni		59·3	137	—	—	e 18 16?	+ 2	—	—	30·3
Wellington		60·3	140	4 44	?	i 18 41	+15	14 16	PPP	34·3
Almata		61·3	322	e 10 19	− 1	—	—	—	—	—
Andijan		63·2	317	e 10 28	− 4	19 1	− 2	—	—	—
Tashkent		65·6	317	i 10 45	− 3	19 29	− 4	—	—	—
Sverdlovsk		76·6	330	i 11 53	− 1	21 31	− 9	—	—	—
Baku		79·8	311	12 12	0	22 12	− 2	—	—	—
Ksara		90·2	304	e 13 5	+ 1	e 24 0	+ 4	—	—	—
Helwan		94·2	300	e 13 19	− 3	23 55	[− 2]	17 22	PP	—
Victoria		102·8	39	—	—	e 37 46	SSS	—	—	51·3
Branner		106·5	50	i 19 19	PP	—	—	—	—	—
Stuttgart		107·3	321	e 18 45	PP	—	—	—	—	e 63·8
Tinemaha	Z.	109·6	50	e 19 3	PP	—	—	—	—	—
Pasadena	Z.	110·5	53	e 14 36	?	—	—	18 35	PKP	e 50·9
Mount Wilson	Z.	110·6	53	e 18 32	[− 2]	—	—	—	—	—
Palomar	Z.	111·7	53	e 19 13	PP	—	—	—	—	—
Tucson		116·9	52	e 18 47	[0]	29 47	PS	22 52	PPP	e 56·5
Seven Falls		130·2	15	e 22 34	?	—	—	—	—	66·3
Ottawa	Z.	130·3	20	e 19 13	[+ 1]	—	—	—	—	70·3
Huancayo		155·5	119	e 20 18	[+23]	e 30 53	{+ 4}	e 44 4	SS	53·9
La Paz	Z.	158·5	139	i 20 0	[+ 1]	—	—	—	—	80·3

For Notes see next page.

NOTES TO DECEMBER 13d. 19h. 12m. 44s.

Additional readings :—
Riverview eN =8m.2s., eE =14m.18s., eQ?N =19m.46s.
Calcutta eSSN =17m.51s.
Bombay iE =13m.11s., eSSE =21m.41s.
Wellington PPZ =5m.24s., SKKS =11m.46s., SS =20m.1s., Q? =28·3m. phases wrongly identified.
Helwan eZ =16m.59s., SKKSE =24m.30s., PSZ =26m.13s.
Tucson e =31m.58s.
Huancayo e =31m.44s. and 51m.46s.
Long waves were also recorded at Fordham, Bozeman, Kodaikanal, and other European stations.

Dec. 13d. Readings also at 0h. (Helwan and Ksara), 4h. (New Delhi, near Almata, Andijan, and Tashkent), 5h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, Palomar, Tucson, and near Mizusawa), 9h. (Stuttgart, near Basle, Zurich, Chur, and Neuchatel), 12h. (Helwan and Ksara), 14h. (near Tashkent and Andijan), 21h. (La Paz), 22h. (near Andijan).

Dec. 14d. Readings at 0h. (Sofia), 2h. (near Andijan), 3h. (Sofia and Tucson (2)), 11h. (near Berkeley, Branner, and Lick), 12h. (San Francisco, near Berkeley, Branner, Fresno, and Lick), 14h. (Huancayo, San Juan, Fort de France, Bermuda, Tucson, Mount Wilson, Pasadena, Palomar, Riverside, and Tinemaha), 15h. (Huancayo, Tucson, and Pasadena), 16h. (Riverview, Tucson, Palomar, Riverside, and Tinemaha), 17h. (Auckland), 22h. (near St. Louis), 23h. (Ksara).

Dec. 15d. 9h. 9m. 5s. Epicentre 0°·6S. 81°·7W. (as on Nov. 25d.).

$A = +\cdot1443$, $B = -\cdot9895$, $C = -\cdot0104$; $\delta = +4$; $h = +7$;
$D = -\cdot990$, $E = -\cdot144$; $G = -\cdot002$, $H = +\cdot010$, $K = -1\cdot000$.

		Δ	Az.	P.	O−C.	S.	O−C.		Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Balboa Heights		9·7	13	e 2 15	− 7	—	—	—	—	—
Huancayo		13·0	151	i 3 11	+ 2	e 5 42	+ 7	—	—	i 6·7
La Paz		20·7	141	4 43	− 1	i 8 42	+11	—	—	12·2
San Juan		24·3	38	i 5 11	− 9	e 9 5	−32	i 5 42	PP	i 10·0
Montezuma		25·2	151	e 5 42	+13	e 10 15	+23	—	—	e 10·8
Fort de France		25·4	54	e 5 23	− 8	e 9 52	− 4	5 56	PP	—
Columbia		34·4	2	e 6 45	− 6	e 12 16	− 3	—	—	e 14·2
Bermuda		36·5	25	e 8 18	PP	e 14 47	SS	—	—	e 18·5
Cape Girardeau	N.	38·4	351	e 7 17	− 8	—	—	—	—	—
St. Louis	Z.	39·8	350	i 7 30	− 6	—	—	—	—	—
La Plata	E.	40·7	150	7 43	− 1	14 1	+ 6	19 1	Q	22·4
	N.	40·7	150	7 55	+11	13 49	− 6	—	—	23·8
Fordham		41·9	10	e 8 3	+ 9	e 15 11	+58	—	—	e 20·9
Chicago		42·5	354	e 8 2	+ 3	e 14 15	− 7	e 17 25	SS	e 20·3
Tucson		42·7	323	i 7 58	− 2	e 14 25	+ 1	i 9 48	PP	e 19·7
Rio de Janeiro	N.	43·5	123	e 8 12	+ 5	i 14 43	+ 7	—	—	i 22·3
Ottawa		46·1	7	e 8 19	− 9	(14 55?)	−19	—	—	14·9
Palomar	Z.	47·3	320	i 8 36	− 1	—	—	—	—	—
Riverside	Z.	48·0	320	e 8 41	− 2	—	—	—	—	—
Seven Falls		48·5	10	e 8 45	− 1	e 14 55?	−53	—	—	25·9
Mount Wilson		48·6	320	i 8 46	− 1	—	—	—	—	—
Pasadena		48·6	320	i 8 46	− 1	e 15 54	+ 5	—	—	e 21·6
Salt Lake City		49·5	331	e 8 58	+ 4	e 16 22	+20	—	—	e 19·0
Haiwee	Z.	49·7	322	i 9 4	+ 8	—	—	—	—	—
Logan		50·2	333	i 9 3	+ 3	e 16 16	+ 5	e 11 15	PP	e 24·5
Tinemaha	Z.	50·5	322	e 8 59	− 3	—	—	—	—	—
Bozeman		52·9	335	e 9 20	0	e 16 49	+ 1	e 12 19	PPP	e 23·3
Santa Clara		53·0	321	e 9 23	+ 2	e 17 5	+15	—	—	e 26·4
Berkeley		53·5	321	e 9 31	+ 7	e 17 7	+10	—	—	—
Butte		53·8	335	—	—	e 17 16	+15	—	—	e 30·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ukiah		54·8	322	e 9 48	+14	e 17 18	+ 4	e 20 13	SS	e 26·3
Victoria		60·8	330	—	—	e 18 41	+ 8	—	—	29·9
Sitka		71·9	333	e 11 23	− 4	e 20 29	−19	e 25 29	SS	e 36·0
Riverview		119·4	229	—	—	e 30 25	PS	e 37 22	SS	e 57·0
Tananarive		127·0	113	—	—	—	—	45 45	?	e 66·0
New Delhi	N.	145·6	32	e 19 59	[+19]	—	—	—	—	—
Bombay		149·1	52	e 19 55?	[+ 9]	—	—	e 24 20	PP	e 76·9

Additional readings :—
Huancayo i = 4m.12s. and 4m.37s., iS = 6m.1s.
La Paz iSEZ = 8m.45s
San Juan iS = 9m.32s.
Fort de France PPP = 6m.9s.
Columbia e = 11m.8s.
St. Louis iZ = 7m.41s.
Tucson i = 8m.4s., e = 10m.26s.
Palomar iZ = 8m.44s.
Riverside iZ = 8m.47s.
Mount Wilson iNZ = 8m.52s., iZ = 8m.58s.
Pasadena i = 8m.52s.
Salt Lake City e = 11m.30s. and 13m.26s.
Logan i = 9m.22s. e = 20m.13s.
Tinemaha i = 9m.6s., iZ = 9m.12s.
Bozeman e = 20m.38s.
Sitka i = 22m.16s.
Riverview eEN = 30m.36s.
Long waves were also recorded at Philadelphia, College, Honolulu, Wellington, De Bilt, Cheb, and Potsdam.

Dec. 15d. Readings also at 3h. (Auckland, Wellington, and Riverview), 8h. (Baku, Tashkent, Basle, Chur, Neuchatel, Zurich, Stuttgart, De Bilt, Uccle, Potsdam, Kew, Upsala, Huancayo, and Lick), 9h. (Riverview, La Paz, Tucson, Mount Wilson, Pasadena, Palomar, Riverside, and Tinemaha), 10h. (Basle, Chur, Zurich, Neuchatel, Stuttgart, Cheb, Algiers, Sofia, Helwan, Ksara, Colombo, and New Delhi), 13h. (near St. Louis), 14h. (La Paz, Huancayo, Mount Wilson, Pasadena, Palomar, Riverside, and Tinemaha), 15h. (Mount Wilson and Tucson), 16h. (Mount Wilson, Tucson, and Riverside), 20h. (Riverside, Tucson, and Tinemaha), 22h. (Bucharest and Sofia), 23h. (Stuttgart, De Bilt, Cheb, Helwan, Ksara, Baku, Sverdlovsk, and Tashkent).

Dec. 16d. 2h. 44m. 46s. Epicentre 0°·4N. 80°·4W. (as on Nov. 15d.).

$A = +·1668$, $B = -·9860$, $C = +·0070$; $\delta = +7$; $h = +7$.

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Huancayo		13·3	158	e 3 11	− 2	i 5 48	+ 6	i 6·8
La Paz	Z.	20·7	146	i 4 43	− 1	i 8 35	+ 4	12·6
San Juan		22·7	37	e 5 8	+ 4	e 9 28	+19	e 10·6
Fort de France		23·8	55	e 5 20	+ 5	e 9 46	+18	—
Tucson		42·7	322	e 7 59	− 1	—	—	e 22·5
Palomar	Z.	47·4	318	e 8 35	− 3	—	—	—
Riverside	Z.	48·1	318	i 8 42	− 1	—	—	—
Mount Wilson		48·7	318	i 8 47	− 1	—	—	—
Pasadena		48·7	318	e 8 47	− 1	—	—	e 24·4
Haiwee	Z.	49·8	320	e 9 1	+ 5	—	—	—
Tinemaha		50·5	321	e 9 1	− 1	—	—	—

Additonal readings :—
Huancayo i = 6m.18s.
La Paz iZ = 4m.48s.
San Juan iS = 9m.44s.
Tucson e = 9m.46s.
Pasadena eZ = 9m.33s.

Dec. 16d. Readings also at 0h. (near Tashkent), 2h. (Haiwee, Mount Wilson, Pasadena, Tucson, and Tinemaha), 3h. (Tacubaya), 4h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, and Tucson), 8h. (near Granada), 9h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Riverview, Wellington, Auckland, and near Apia), 12h. (La Paz), 13h. (near Ferndale and near La Paz), 18h. (La Paz, Huancayo, Mount Wilson, Palomar, Riverside, Tucson, and Tinemaha), 21h. (La Paz), 23h. (Bucharest and Sofia).

Dec. 17d. 1h. Pacific shock.

Christchurch P =13m.22s., S =16m.7s., Q =16m.11s., R =17m.16s., P_cP =18m.36s.
Riverview iPNZ =13m.34s.a, iE =13m.52s., iNZ =13m.56s., iSE =17m.46s., iN = 17m.57s., SSEN =18m.13s., iLN =18m.59s.
Brisbane iPN =13m.36s., iSE =18m.32s., iSN =18m.36s.
Wellington P =13m.45s.k, PP?Z =14m.23s., iZ =15m.38s. and 15m.50s., S =18m.10s., Q? =18m.27s., R =20m.
Sydney e =14m.0s., i =17m.36s.
Auckland P? =14m.48s., S =19m.13s., i =20m.30s., Q =21m., R =22m.
Arapuni S =18m.30s., L =21m.30s.
Perth i =20m.25s. and 23m.40s.
Mount Wilson ePKKPZ =27m.38s.
Tinemaha ePKKPZ =27m.39s.
Huancayo e =36m.15s. and 42m.6s., eL =52m.16s.
Bombay eE =36m.37s., eL =50m.
New Delhi eN =38m.1s.
Tananarive eE =40m.37s., LE =48m.4s.
Long waves were also recorded at Tucson, Pasadena, and La Paz.

Dec. 17d. 15h. 7m. 41s. Epicentre 38°·6N. 119°·5W. (as on 1939 Jan 11d.).

Scale V at Markleeville and Topaz. Epicentre 38° 44′N. 119° 41′W. Repetitions at 19h. 59m., 20h. 3m., and 21h. 46m.
R. R. Bodle: "United States Earthquakes, 1942." Washington, 1944, p. 14.

A = −·3858, B = −·6819, C = +·6213; δ = −16; h = −1;
D = −·870, E = +·492; G = −·306, H = −·541, K = −·784.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha		1·8	147	i 0 34	+ 2	i 1 5	+ 9	i 0 38	P_g	—
Lick		2·2	233	e 0 37	− 1	i 1 3	− 3	—	—	—
Berkeley		2·3	251	i 0 36	− 4	e 1 5	− 4	—	—	—
Santa Clara		2·3	237	i 0 39	− 1	i 1 10	+ 1	—	—	—
Branner	E.	2·4	241	i 0 40	− 1	i 1 13	+ 1	—	—	—
San Francisco		2·5	250	e 0 39	− 4	i 1 18	+ 4	i 0 50	P_g	—
Haiwee		2·8	154	i 0 50	+ 3	i 1 33	S_g	—	—	—
Ukiah		2·9	280	e 0 47	− 1	e 1 19	− 5	—	—	i 1·8
Ferndale		4·2	302	e 1 21	P_g	e 2 11	S*	—	—	—
Mount Wilson	Z.	4·5	164	e 1 13	+ 2	—	—	—	—	—
Pasadena		4·5	164	i 1 15	+ 4	e 2 17	S*	—	—	—
Riverside	Z.	4·9	158	e 1 17	0	i 2 34	S*	—	—	—
Salt Lake City		6·3	67	e 2 0	P_g	i 3 15	S*	—	—	i 3·4
Logan		6·6	59	e 1 47	+ 6	i 3 1	+ 3	i 2 12	P_g	i 3·5
Butte		9·0	32	e 2 45	P*	e 4 33	S*	—	—	e 5·0
Seattle		9·3	348	e 3 15	?	e 3 23	?	—	—	e 4·4
Tucson		9·5	129	i 2 24	+ 4	i 4 0	−10	—	—	i 5·0
Chicago		24·5	72	—	—	e 8 27	−73	—	—	e 12·6

Additional readings:—
Branner iE =1m.50s. and 2m.21s.
Ferndale eN =2m.5s.
Salt Lake City i =3m.20s.
Logan i =2m.1s., e =3m.17s.
Tucson i =3m.8s., 4m.39s., and 4m.53s.
Long waves were also recorded at Bozeman and Lincoln.

Three repetitions referred to above:—

I Lick ePEN =19h.59m.43s., iSEN =20h.0m.11s.
Berkeley iPZ =19h.59m.43s., iSN =20h.0m.12s.
San Francisco ePE =19h.59m.46s., eSE =20h.0m.16s.

II Fresno (△ =1°·9) iPN =20h.3m.40s., iSN =20h.4m.6s.
Lick ePEN =20h.3m.41s., iSE =20h.4m.9s.
Berkeley iPZ =20h.3m.42s., eSE =20h.4m.10s.
San Francisco ePE =20h.3m.47s., eSE =20h.4m.16s.

III Fresno ePN =21h.46m.52s., iN =21h.48m.16s.
Lick ePEN =21h.46m.55s., eEN =21h.47m.21s., iSEN =21h.47m.24s.
Berkeley iPZ =21h.46m.56s., iSN =21h.47m.25s.

Dec. 17d. Readings also at 0h. (near Almata), 2h. (Riverview, Sydney, and near Mizusawa), 6h. (Riverview), 10h. (near Andijan), 12h. (La Paz), 15h. (near Lick and near Fresno), 18h. (Andijan), 20h. (Riverview, New Delhi, Tucson, Mizusawa, Zurich, Haiwee, Riverside, Tinemaha, near Fresno, and near Apia), 21h. (Bombay, Calcutta, Jena, Stuttgart, Potsdam, Cheb, Uccle, Upsala, Kew, La Paz, Auckland, Palomar, Riverside, Tinemaha, Tucson, near Fresno, and Lick), 22h. (La Paz, Stuttgart, Ksara and near Andijan).

Dec. 18d. Readings at 0h. (near Fresno, Berkeley, Branner, Lick, and San Francisco), 2h. (near Basle, Neuchatel, Zurich, and Stuttgart), 9h. (near Lick), 10h. (Kodaikanal), 17h. (Riverview), 19h. (Tinemaha, Tucson, and near La Paz), 21h. (Auckland, Tuai, Wellington, Riverview, Huancayo, La Paz (2), Mount Wilson, Tucson, Pasadena, Palomar, Riverside, and Tinemaha).

Dec. 19d. 9h. 21m. 7s. Epicentre 35°·9N. 72°·5E.

$A = +·2441$, $B = +·7743$, $C = +·5838$; $\delta = -5$; $h = 0$;
$D = +·954$, $E = -·301$; $G = +·176$, $H = +·557$, $K = -·812$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tchimkent		6·8	341	i 1 41	− 3	i 3 1	− 2	—	—	—
Frunse		7·2	13	1 47	− 2	—	—	—	—	—
New Delhi		8·3	150	2 1	− 3	e 3 30	−10	e 4 38	S_g	—
Bombay		16·9	179	e 4 3	+ 4	i 7 23	+16	e 4 27	PPP	e 10·6
Hyderabad		19·1	164	4 26	− 1	7 59	+ 2	—	—	9·9
Sverdlovsk		22·4	342	e 5 3	+ 1	9 0	− 4	—	—	—
Kodaikanal	E.	26·0	170	—	—	11 13	SS	—	—	e 13·6
Stuttgart		47·2	306	e 8 36	0	—	—	—	—	—

Additional readings:—
New Delhi eE = 2m.23s., P*N = 2m.35s., P_gN = 2m.53s., S*N = 4m.18s.
Bombay iEN = 9m.7s., eE = 9m.53s.

Dec. 19d. 23h. 10m. 30s. Epicentre 31°·5N. 142°·4E. (as on 1940 June 12d.).

Pasadena suggests epicentre 31°·5N. 142°·5E. and depth 75km.

$A = -·6768$, $B = +·5212$, $C = +·5199$; $\delta = 0$; $h = +1$;
$D = +·610$, $E = +·792$; $G = -·412$, $H = +·317$, $K = -·854$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		7·7	353	e 1 54	− 2	4 18	S_g	—	—	—
Calcutta	N.	48·6	274	e 9 56	?	e 15 34	−15	e 11 26	PPP	e 28·6
College		53·4	31	e 9 44	+20	e 16 46	− 9	e 20 48	SS	e 26·9
Frunse		53·9	303	e 9 37	+10	—	—	—	—	—
Honolulu		53·9	86	—	—	(e 17 5)	+ 3	(e 17 34)	PPS	(e 27·4)
New Delhi		55·8	285	e 9 48	+ 7	i 17 19	− 9	e 12 2	PP	i 28·2
Tchimkent		57·6	303	e 9 39	−15	—	—	—	—	—
Tashkent		58·1	302	9 48	−10	17 46	−12	—	—	—
Hyderabad	E.	59·1	272	9 56	− 8	18 5	− 6	21 56	SS	28·5
Brisbane	N.	59·5	170	e 9 45	−22	i 18 28	+12	22 47	SS	—
Sverdlovsk		59·9	321	e 10 6	− 4	18 4	−17	—	—	—
Sitka		60·0	39	—	—	e 18 20	− 3	e 18 40	PS	e 29·8
Colombo	E.	63·0	261	19 5	S	(19 5)	+ 4	—	—	35·5
Kodaikanal	E.	63·4	267	e 11 15	?	—	—	e 19 52	PPS	—
Riverview		65·5	173	e 10 55	+ 8	i 19 44	+12	i 11 27	PcP	—
Perth		67·8	204	11 44	?	20 0	0	13 51	PP	30·0
Victoria		69·7	45	—	—	e 20 33	+11	—	—	47·5
Baku		72·1	307	11 27	− 1	20 50	0	—	—	—
Ukiah		74·0	54	e 14 48	PP	e 21 20	+ 9	e 29 44	SSS	e 31·7
Auckland		74·5	154	i 20 40	?	21 30	+13	—	—	35·5
Berkeley		75·2	55	e 11 57	+11	e 21 38	+13	—	—	—
Branner	E.	75·5	55	e 11 49	+ 1	e 21 36	+ 8	—	—	e 36·2
Santa Clara		75·7	55	i 12 10	+21	e 21 41	+11	—	—	e 30·9
Arapuni		75·8	154	—	—	21 30	− 1	—	—	e 38·5
Saskatoon		77·2	37	—	—	21 48	+ 1	—	—	39·5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Upsala	E.	78·3	336	e 12 25	+22	e 21 49	−10	e 26 30?	SS	e 37·5
	N.	78·3	336	e 12 21	+18	e 21 57	− 2	e 29 30?	SSS	—
Wellington		78·3	156	12 26	+23	22 0	+ 1	—	—	36·5
Tinemaha	Z.	78·4	54	e 12 1	− 3	—	—	—	—	—
Bozeman		78·5	44	—	—	e 22 2	+ 1	—	—	e 38·9
Santa Barbara	Z.	78·7	57	e 12 7	+ 1	—	—	—	—	—
Haiwee	Z.	79·1	54	e 12 6	− 2	—	—	—	—	—
Christchurch		79·6	158	12 20	+10	22 22	+10	i 15 33	PP	41·8
Mount Wilson	Z.	80·0	57	i 12 13	0	—	—	—	—	—
Pasadena		80·0	57	e 12 14	+ 1	e 22 13	− 4	—	—	e 33·5
Riverside	Z.	80·6	57	e 12 15	− 1	—	—	—	—	—
Salt Lake City		80·7	48	e 12 19	+ 3	e 22 39	+15	—	—	e 30·7
Palomar	Z.	81·3	57	e 12 19	− 1	—	—	—	—	—
Copenhagen		83·2	335	e 12 35	+ 6	22 36	−13	—	—	—
Bucharest		84·8	320	e 12 47	+10	23 0	− 5	e 15 44	PP	—
Ksara		85·1	307	e 12 50	+11	e 23 1	[0]	—	—	—
Potsdam		85·5	332	i 13 1k	+20	i 23 15	+ 3	—	—	44·5
Tucson		86·1	54	e 12 45	+ 1	e 23 28	+10	—	—	e 39·6
Prague		86·6	330	e 13 41	?	e 23 10	[− 1]	—	—	e 40·5
Aberdeen	N.	86·7	342	i 23 30	S	(i 23 30)	+ 6	—	—	44·6
Jena		87·2	331	e 13 0	+11	23 10	[− 5]	e 23 24	SKKS	e 39·5
Sofia		87·4	320	e 13 20	+30	e 23 27	− 3	e 23 14	SKS	—
Belgrade		87·5	322	—	—	e 23 26	− 5	—	—	e 53·0
Cheb		87·5	331	e 14 30?	?	e 23 30?	− 1	—	—	e 46·5
De Bilt		88·7	336	—	—	e 23 40	− 3	—	—	e 41·5
Stonyhurst		89·7	340	—	—	24 0	+ 8	—	—	e 42·5
Stuttgart		89·8	332	e 12 57	− 5	e 23 54	+ 1	e 16 37	PP	e 44·5
Uccle		90·1	336	e 13 18	+15	e 24 0	+ 5	—	—	e 44·5
Helwan		90·5	306	e 13 13	+ 8	24 36	?	13 43	sP	—
Kew		91·1	338	—	—	i 24 20	+16	e 30 7	SS	e 45·5
Chur		91·2	330	e 13 32	+24	—	—	—	—	—
Zurich		91·2	331	e 13 17	+ 9	e 24 6	+ 1	—	—	—
Basle		91·5	331	e 13 16	+ 6	e 23 46	[+ 5]	—	—	—
Ottawa		96·0	26	e 13 30	0	—	—	—	—	53·5
Tananarive		103·6	257	—	—	24 55	[+11]	—	—	50·1
Granada		104·6	333	e 18 32k	PKP	i 28 48	PPS	—	—	52·1
Bermuda		111·5	25	e 27 16	?	—	—	e 39 37	SSS	e 64·4
San Juan		123·3	33	—	—	e 28 22	?	—	—	e 65·1
Huancayo		140·2	70	e 19 49	[+18]	—	—	e 22 38	PP	e 65·8
La Paz	Z.	148·5	68	i 19 53a	[+ 8]	—	—	—	—	71·5
Rio de Janeiro	N.	170·1	32	e 25 26	PP	—	—	—	—	—

Additional readings :—
Mizusawa SN =4m.25s.
Calcutta e =18m.57s.
Honolulu e =(19m.50s.) and (21m.41s.). Readings increased by 10 minutes.
New Delhi i =10m.31s., eE =18m.7s., iN =18m.37s.
Sitka e =25m.30s.
Riverview iZ =12m.53s., eN =19m.26s.
Victoria e =32m.30s.
Ukiah e =21m.11s.
Berkeley ePE =12m.7s., PN =12m.11s.
Arapuni e =31m.30s.?.
Saskatoon e =32m.30s.?.
Wellington iZ =12m.29s., 12m.55s., and 13m.20s., i =24m.1s.
Christchurch PS =23m.15s., Q =33m.30s.
Mount Wilson iZ =12m.35s.
Pasadena iEN =12m.34s., iZ =12m.47s.
Copenhagen i =12m.49s., S =22m.47s.
Bucharest eE =12m.58s., PSE =23m.35s.
Potsdam iZ =16m.54s.
Tucson i =13m.30s., e =14m.48s., i =22m.39s.
Aberdeen iSN =34m.26s.
Jena eN =26m.18s.
De Bilt e =34m.0s.
Stonyhurst 36m.27s.
Stuttgart eP =13m.14s., ePP =16m.44s.
Helwan eZ =14m.42s. and 16m.45s. pPPZ =17m.45s., SKSEN =23m.36s., sSN = 25m.22s.

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Tananarive PS =29m.14s.
Granada SS =45m.9s.
Bermuda e =33m.23s.
San Juan eSS =36m.11s., e =60m.57s.
Huancayo e =23m.49s. and 35m.39s.
Long waves were also recorded at La Plata and other American and European stations.

December 19d. Readings also at 0h. (Neuchatel, Tuai, Wellington, Auckland, Arapuni, Riverview, and near Fresno (2), Berkeley, Lick (2), and Branner), 1h. (Tinemaha, Haiwee, Palomar, Mount Wilson, and Pasadena), 3h. (near Granada), 4h. (near Balboa Heights), 5h. (Auckland), 6h. (La Paz, La Plata, Tucson, Riverside, Mount Wilson, Haiwee, Tinemaha, and Mizusawa), 10h. (Wellington, Auckland, Tucson, Pasadena, Mount Wilson, Riverside, Palomar, Haiwee, and Tinemaha), 11h. (Sydney), 15h. (near Mizusawa), 19h. (near Balboa Heights), 20h. (Lick near Sofia, Belgrade, and Bucharest), 22h. (Pasadena, Mount Wilson, Riverside, Palomar, and Lick), 23h. (near Branner),

December 20d. 14h. 3m. 3s. Epicentre 40°·7N. 36°·6E.

Epicentre between Tepekisla and Zilhor, 10km. E. of Erbaa.
M. Blumenthal.
Zur Geologie der Landstrecken der Erdbeben von Ende 1942 in Norde-Anatolien und dortselbst ausgeführte makroseismische Beobachtungen (Erbaa-Niksar).
M.T.A. Sene 8, Sayi 1/29 Ankara 1943, p. 33-46 summary in German p. 47-58, three tectonic maps, one detailed isoseismic map, plate III. p. 38.
Intensity IX at Erbaa.
Epicentre 40° 41′N. 36° 36′E., observations of Kandilli Observatory.

$A = +\cdot6104$, $B = +\cdot4533$, $C = +\cdot6495$; $\delta = -8$; $h = -2$;
$D = +\cdot596$, $E = -\cdot803$; $G = +\cdot521$, $H = +\cdot387$, $K = -\cdot760$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul		5·8	276	2 11	P_g	2 31	− 7	3 46	S_g	—
Ksara		6·9	185	e 3 50	S_g	5 12	L	—	—	(5·2)
Focsani		8·5	309	e 2 6	− 1	i 3 55	+10	—	—	i 5·1
Bucharest		8·6	299	i 2 6	− 3	i 3 55	+ 7	4 18	S*	5·0
Sofia		10·1	286	e 2 35	+ 7	4 24	− 1	4 57	SSS	5·8
Helwan		11·6	203	2 47	− 3	5 15	+14	2 54	PP	—
Belgrade		12·6	294	e 2 6	?	i 5 11	−15	i 3 22	PP	i 7·5
Moscow		15·1	4	3 32	− 4	i 6 11	−14	—	—	—
Prague		18·1	310	4 10k	− 4	7 39	+ 4	—	—	e 9·0
Cheb		19·4	309	i 4 29	− 1	i 8 6	+ 2	i 4 46	PP	e 10·3
Potsdam		19·9	315	i 4 32k	− 4	i 8 21	+ 6	—	—	10·0
Jena		20·1	310	e 4 40	+ 2	i 8 23	+ 4	i 4 53	PP	e 9·8
	z.	20·1	310	e 4 37	− 1	i 8 31	+12	i 4 46	PP	e 10·4
Chur		20·4	297	e 4 38	− 3	e 8 29	+ 4	—	—	—
Stuttgart		21·0	304	e 4 43	− 4	i 8 37	0	i 4 51	PP	e 9·8
Zurich		21·2	299	e 4 45	− 4	e 8 39	− 2	—	—	—
Basle		21·8	299	e 4 55	− 1	e 8 45	− 7	—	—	—
Copenhagen		21·8	323	i 4 54	− 2	8 59	+ 7	—	—	—
Strasbourg		21·9	303	i 4 57	0	i 8 49	− 5	i 5 18	PP	e 9·9
Neuchatel		22·2	298	e 5 1	+ 1	e 9 3	+ 3	—	—	—
Sverdlovsk		22·4	36	i 5 4	+ 2	i 9 0	− 4	—	—	—
Upsala		22·5	335	5 1	− 1	i 9 6	+ 1	—	—	—
Marseilles		23·3	288	i 5 9	− 1	i 8 54	−26	—	—	11·3
De Bilt		24·3	312	i 5 21k	+ 1	i 9 42	+ 5	—	—	e 11·5
Uccle		24·5	308	e 5 21k	− 1	i 9 45	+ 5	i 5 50	PP	12·0
Clermont-Ferrand		24·8	294	e 5 27	+ 2	i 10 33	SS	—	—	15·0
Paris		25·4	301	e 5 30	− 1	i 9 58	+ 2	—	—	15·0
Algiers		26·4	273	i 5 45	+ 5	i 10 20	+ 8	i 5 52	PP	11·8
Andijan		27·0	79	5 48	+ 3	—	—	—	—	—
Kew		27·5	307	i 6 0k	+10	i 10 41	+11	i 6 42	PP	—
Oxford		28·1	307	i 6 5	+10	i 10 47	+ 7	—	—	—
Frunse		28·3	73	6 35	PP	—	—	—	—	—
Stonyhurst		29·2	311	i 6 17	+12	i 11 7	+ 9	7 19	PPP	15·2
Aberdeen		29·8	318	i 6 56	PP	i 11 41	?	—	—	16·0
Granada		31·3	277	i 6 24k	0	i 11 36	+ 5	7 21	PP	14·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Fernando	E.	33·5	277	i 6 41	− 2	11 57	− 8	—	—	15·0
Dehra Dun	N.	35·0	93	e 6 28	−28	e 12 7	−21	—	—	e 19·0
Lisbon		35·0	283	i 6 58k	+ 2	12 29	+ 1	8 13	PP	16·6
New Delhi		35·2	97	i 6 59k	+ 1	12 31	0	e 8 14	PP	16·6
Bombay		37·8	114	i 7 20	0	i 13 0	−11	i 8 42	PP	i 18·0
Scoresby Sund		41·8	335	i 8 1	+ 8	i 14 16	+ 5	i 9 32	PP	i 17·4
Hyderabad		42·8	110	7 59	− 2	14 26	0	9 44	PP	20·8
Calcutta	N.	46·9	96	i 8 31a	− 3	i 15 20	− 5	i 10 10	PP	—
Kodaikanal	E.	47·1	118	i 4 23	?	—	—	i 10 58	PPP	—
Colombo	E.	51·2	119	9 13	+ 6	16 24	− 1	—	—	—
Tananarive		60·2	168	e 10 20	+ 8	18 38	+13	10 50	P_eP	28·7
Zinsen		66·8	60	10 58	+ 2	19 50	+ 2	—	—	—
Seven Falls		71·4	317	11 26	+ 2	20 57	+15	28 53	SSS	34·0
Hukuoka		71·6	62	i 11 28	+ 3	i 20 48	+ 4	e 14 6	PP	34·1
Hamada		71·9	59	e 20 57	S	(e 20 57)	+ 9	—	—	—
Kumamoto		72·3	62	11 32	+ 3	20 45	− 7	—	—	—
Sapporo		72·5	48	e 21 2	S	(e 21 2)	+ 8	(28 35)	SSS	28·6
Mori	N.	72·7	49	e 11 32	0	21 4	+ 7	—	—	40·2
Shawinigan Falls		72·8	317	11 33	+ 1	21 9	+11	—	—	35·0
Miyazaki		73·3	63	11 32	− 3	21 6	+ 2	—	—	36·2
Naha		74·2	69	11 54	+14	—	—	—	—	—
Osaka		74·4	58	11 45	+ 3	22 33	PPS	—	—	—
College		74·7	3	e 11 36	− 7	21 24	+ 5	e 14 36	PP	31·0
Nagano		74·7	55	11 43	0	—	—	—	—	—
Harvard		74·8	313	i 11 45	+ 1	—	—	—	—	—
Mizusawa		74·9	51	11 48	+ 4	21 25	+ 3	—	—	—
Nagoya		74·9	56	11 27	−17	—	—	—	—	—
Ottawa		75·1	318	11 48	+ 2	21 29	+ 5	—	—	34·0
Sendai		75·4	52	e 11 19	−28	22 11	PPS	—	—	36·6
Fordham		77·2	313	i 11 57	0	e 21 51	+ 4	—	—	e 32·0
Bermuda		77·3	301	e 11 52	− 6	e 22 6	+18	e 23 13	PS	e 32·4
Philadelphia		78·5	313	—	—	e 22 21	+20	e 27 27	SS	e 35·0
Sitka		81·9	356	i 12 34	+11	e 22 50	+14	—	—	e 32·0
Saskatoon		82·2	338	e 12 9	−15	22 44	+ 5	—	—	38·0
Chicago		83·6	322	e 12 32	+ 1	e 22 58	+ 5	e 24 8	PPS	e 39·9
Columbia		86·1	312	e 12 49	+ 5	e 23 9	[+ 1]	e 24 17	PS	e 37·6
St. Louis		87·3	321	i 12 54	+ 4	e 23 22	{ 0}	—	—	—
San Juan		87·4	292	e 13 8	+18	e 23 24	{+ 1}	e 29 18	SS	e 35·3
Cape Girardeau	N.	88·0	319	e 12 57	+ 4	e 23 43	+ 7	—	—	—
Lincoln		88·4	325	e 12 51	− 4	e 23 22	[− 1]	e 23 56	S	e 41·2
Bozeman		89·3	338	e 13 6	+ 7	e 24 1	+13	e 16 45	PP	39·2
Butte		89·4	339	e 13 59	+59	e 23 39	{+ 2}	e 24 46	PS	e 42·4
Victoria		89·4	347	—	—	e 24 15	+26	—	—	40·0
Seattle		90·1	346	—	—	e 11 12	?	—	—	e 36·6
Logan		93·1	336	e 13 22	+ 5	e 24 39	+17	e 17 9	PP	e 37·6
Salt Lake City		94·0	335	e 18 2	?	e 23 58	[+ 2]	i 25 48	PS	e 44·5
Rio de Janeiro	N.	97·3	246	i 17 32	PP	i 28 16	?	—	—	i 43·8
Ukiah		98·4	344	e 18 14	?	e 24 14	[− 5]	e 26 48	PS	e 38·8
Tinemaha		99·2	339	i 13 48	+ 3	—	—	—	—	—
Berkeley		99·4	342	e 17 59	PP	e 32 13	SSP	—	—	—
Branner		99·9	342	e 26 59	PS	—	—	—	—	e 47·0
Santa Clara		99·9	342	e 17 54	PP	—	—	e 32 15	P_cSS_cP	e47·5
Haiwee	Z.	100·1	338	e 13 52	+ 3	—	—	—	—	—
Tucson		101·4	331	i 13 56	+ 1	e 24 28	[− 6]	i 18 1	PP	e 42·8
Mount Wilson	Z.	101·9	338	i 14 3	+ 6	e 24 35	[− 1]	i 18 6	PP	—
Pasadena		102·0	338	13 53	− 4	e 24 33	[− 4]	i 18 8	PP	e 48·0
Palomar	Z.	102·4	335	e 14 3	+ 4	e 24 52	[+14]	i 18 22	PP	—
Perth		102·8	120	24 52	SKS	(24 52)	[+12]	32 57	SS	45·5
La Paz		111·4	266	e 19 20	PP	30 4	PPS	29 14	PS	56·0
Huancayo		114·4	275	e 20 0	PP	e 27 22	?	e 26 17	SKKS	e 48·7

Continued on next page.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Plata	114·8	245	29 21	PS	36 15	?	30 40	PPS	56·9
Honolulu	116·4	14	e 28 4	?	—	—	e 36 7	SSP	e 47·8
Riverview	128·5	104	e 21 23	PP	i 26 26	[+10]	e 53 27	Q	59·1
Sydney	128·6	104	—	—	—	—	e 41 9	?	e 58·0
Auckland	147·4	95	21 32	?	—	—	62 57?	Q	69·0
Christchurch	147·5	109	19 50	[+ 7]	27 15	[+25]	32 47	SKSP	70·1
Arapuni	148·4	98	35 57	PPS	—	—	—	—	72·0
Wellington	148·6	104	19 51 a	[+ 6]	—	—	36 47	PPS	71·0
Tuai	149·8	99	i 20 2	[+15]	—	—	—	—	—

Additional readings :—
Bucharest iZ = 3m.16s., iE = 4m.45s.
Helwan eN = 3m.51s. and 4m.53s., iN = 5m.5s.
Belgrade i = 3m.44s., 6m.6s., and 6m.30s.
Cheb i = 8m.13s.
Potsdam iSNZ = 8m.25s.
Jena iPEN = 4m.45s., iPN = 4m.48s., iN = 5m.52s.
Stuttgart iP = 4m.47s., i = 6m.38s.
Copenhagen 6m.27s. and 8m.45s.
Strasbourg i = 5m.58s. and 6m.43s.
Upsala SE = 9m.1s.?.
Marseilles i = 4m.38s., e = 8m.40s.
Uccle iZ = 5m.25s., iEZ = 5m.30s., iSE = 9m.48s., iSZ = 9m.55s., iSSN = 10m.53s.
Clermont-Ferrand e = 12m.8s.
Kew iE = 6m.26s., iP$_c$PEN = 9m.25s.
Stonyhurst 7m.59s., SS = 12m.30s., SSS = 12m.47s.
Granada pPP = 7m.34s., PPP = 7m.42s., isS = 11m.49s., Q = 12m.3s., P$_c$S = 13m.8s., pP$_c$S = 13m.29s.
Lisbon PE = 7m.3s., iSN = 12m.35s., E = 13m.55s., Z = 13m.59s., iN = 15m.17s., E = 15m.25s.
New Delhi iPE = 7m.8s., ipPPN = 8m.21s., eE = 12m.39s., iSE = 12m.47s., isSE = 12m.56s., iSSSE = 15m.3s., isSSSN = 15m.16s.
Bombay iN = 8m.2s., eP$_c$PE = 9m.57s., iSS = 15m.17s., iEN = 16m.6s.
Scoresby Sund i = 9m.44s.
Hyderabad P$_c$PE = 10m.4s., SSE = 17m.5s., S$_c$SE = 17m.56s.
Calcutta iPPPN = 10m.50s., iSSN = 18m.22s., iSSSN = 19m.33s.
Kodaikanal ?E = 14m.31s.
Tananarive PP = 11m.44s., PS = 18m.46s., SS = 22m.17s.
Hukuoka PPP = 15m.33s., PS = 21m.18s., SS = 25m.29s., SSS = 28m.24s.
Sapporo eS = 23m.41s.
College e = 22m.6s., eSS = 26m.11s., e = 28m.46s., and 29m.42s.
Mizusawa SN = 21m.28s.
Bermuda eSS = 26m.57s., e = 30m.42s.
Philadelphia eSSS = 30m.37s.
Sitka e = 27m.15s.
Chicago iS = 23m.4s., e = 27m.36s. and 32m.18s.
San Juan e = 14m.26s. and 26m.49s.
Lincoln e = 34m.17s.
Bozeman e = 24m.21s., eSS = 24m.54s., e = 29m.48s., eSSS = 33m.55s.
Butte e = 29m.3s.
Logan eSKS = 24m.3s., PS = 25m.39s., eSS = 30m.40s., eSSS = 33m.57s.
Salt Lake City e = 26m.51s., eSS = 31m.1s.
Ukiah eSS = 32m.8s.
Tinemaha eZ = 14m.20s.
Berkeley eE = 18m.17s., eN = 32m.51s.
Santa Clara ePSE = 29m.39s.
Tucson i = 16m.21s., 19m.53s., and 24m.21s., ePS = 27m.2s., iSS = 32m.43s., e = 37m.7s.
Pasadena iPZ = 14m.1s., iZ = 17m.14s., ePSEN = 27m.18s., ePKKPZ = 30m.4s., eSSN = 32m.39s.
La Paz iPZ = 19m.25s., SKKS = 30m.51s., PPS = 34m.8s.
Huancayo ePS = 29m.14s., e = 32m.18s., eSS = 35m.56s.
La Plata PN = 29m.27s., PPE = 30m.45s., PSE = 39m.57s., PSN = 40m.3s., PPS?E = 43m.9s., SSSN = 52m.57s.?, SSSE = 53m.51s.
Honolulu e = 42m.47s.
Riverview iEZ = 22m.40s., eSSS?E = 42m.21s.
Auckland PPS? = 37m.32s., SS = 43m.32s., e = 51m.57s.?.
Christchurch PPS = 36m.57s., SSS = 47m.55s., Q = 61m.48s.
Wellington iZ = 20m.28s., sPKP?Z = 20m.42s., 20m.57s., SS = 42m.27s., SSS = 46m.57s.?, e = 54m.57s.?. Q = 62m.
Tuai i = 20m.26s.
Long waves were also recorded at Tokyo and Lick.

Dec. 20d. Readings also at 0h. (Lick, Tinemaha, Haiwee, Pasadena, Palomar, Riverside, Tucson, and Tananarive), 3h. (Pasadena, Mount Wilson, Palomar, Haiwee, Tinemaha, Tucson, and Stuttgart), 4h. (Tinemaha, Haiwee, Mount Wilson, Riverside, Palomar, Pasadena, Tucson, and near Fresno, Berkeley, Lick, Branner, and San Francisco), 5h. (near Branner, Fresno, Lick, Berkeley, San Francisco, and Santa Clara), 7h. (Clermont-Ferrand), 11h. (Riverview, near Lick, Fresno, Berkeley, Branner, and San Francisco), 15h. (Tinemaha, Haiwee, Pasadena, Mount Wilson, Palomar, Cape Girardeau, Tucson, San Juan, and near Balboa Heights), 16h. (College).

Dec. 21d. 13h. Undetermined shock. Probably deep focus.
Mizusawa PE = 1m.43s., S = 3m.27s.
Tashkent P = 8m.7s., S = 15m.7s.
Tinemaha iPZ = 9m.33s.a, iZ = 9m.59s., eSN = 17m.42s.
Haiwee iPZ = 9m.38s.a, iZ = 9m.45s., eSN = 17m.58s.
Pasadena iP = 9m.45s.a, iEZ = 11m.35s., iSN = 18m.13s.
Mount Wilson iP = 9m.45s.a, iNZ = 11m.35s.
Palomar iPZ = 9m.54s.a.
Tucson iP = 10m.19s., i = 19m.27s.
Stuttgart i = 10m.34s.
Helwan eZ = 11m.9s., iZ = 12m.45s., eEN = 20m.46s.
Calcutta eN = 12m.1s., iS?N = 15m.21s.
Sverdlovsk iS = 14m.20s.
Bombay iEN = 17m.39s., e = 18m.34s.

Dec. 21d. 21h. 21m. 30s. Epicentre 14°·0N. 52°·0E. (as on 1941 July 17d.).

$A = +\cdot5976$, $B = +\cdot7649$, $C = +\cdot2404$; $\delta = -1$; $h = +5$;
$D = +\cdot788$, $E = -\cdot616$; $G = +\cdot148$, $H = +\cdot189$, $K = -\cdot971$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Bombay		20·6	73	i 4 42	− 1	i 8 46	+17	e 5 16 PP	e 11·5
Ksara		24·6	325	e 5 19	− 4	—	—	e 10 13 SS	e 13·3
Helwan	Z.	24·8	313	5 15	−10	9 30	−16	5 42 PP	—
Kodaikanal	E.	25·2	94	e 5 50	+21	i 10 46	SS	—	—
Baku		26·3	356	e 5 44	+ 5	10 24	+13	—	—
New Delhi	N.	27·5	54	e 5 52	+ 2	11 1	+31	—	—
Colombo	E.	28·3	102	e 5 30?	−27	—	—	—	—
Tashkent		31·2	26	6 20	− 3	11 14	−15	—	—
Andijan		32·0	30	6 25	− 5	—	—	—	—
Calcutta	N.	35·5	71	—	—	i 12 58	+22	—	—
Sverdlovsk		43·4	7	—	—	e 14 46	+11	—	—
Stuttgart		49·4	324	e 15 6	?	e 15 20	−40	—	—
Tinemaha	Z.	128·4	351	i 15 27	P	—	—	—	—
Haiwee	Z.	129·2	350	e 15 32	P	—	—	—	—
Mount Wilson	Z.	131·1	349	i 15 36	P	—	—	—	—
Tucson		131·2	341	e 20 0	[+46]	—	—	—	—
Pasadena	Z.	131·2	349	e 15 33	P	—	—	—	—
Riverside	Z.	131·2	349	e 15 39	P	—	—	—	—
Palomar	Z.	131·7	347	e 15 42	P	—	—	—	—

Bombay also gives iE = 5m.48s., eEN = 9m.54s.

Dec. 21d. Readings also at 1h. (near Granada), 5h. (Pasadena, Mount Wilson, Haiwee, and Riverview), 7h. (near Granada), 8h. (La Paz), 10h. (near Balboa Heights (2)), 15h. (Calcutta, Bombay, and near New Delhi), 16h. (Pasadena, Riverside, Tinemaha, Palomar, Tucson, Oaxaca, and Balboa Heights), 18h. (near Mizusawa, and near St. Louis), 20h. (Stuttgart, Huancayo, near Branner and near St. Louis), 21h. (Mizusawa).

Dec. 22d. 4h. 14m. 39s. Epicentre 16°·6S. 174°·0W. (as on 1942 April 3d.).

Helwan suggests depth =100km.

A = −·9536, B = −·1002, C = −·2839; δ = −1; h = +5;
D = −·105, E = +·995; G = +·282, H = +·030, K = −·959.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		3·5	38	i 0 52	− 5	e 1 44	+ 4	—	—	—
Auckland		22·4	205	6 26	+84	10 36	+92	6 51	PP	12·8
Arapuni		23·2	200	—	—	9 21	+ 3	10 39	Q	—
Wellington		26·4	199	—	—	8 46	−86	—	—	12·4
Christchurch		29·2	199	6 7	+ 2	10 38	−20	11 32	Q	13·4
Brisbane	E.	32·3	245	e 6 47	+14	i 11 34	−12	—	—	—
	N.	32·3	245	e 5 57	−36	i 11 40	− 6	e 13 59	SS	—
Riverview		35·7	234	e 7 1	− 1	i 12 36	− 3	i 8 29	PP	e 16·6
Sydney		35·7	234	e 8 9	+67	e 12 33	− 6	—	—	e 16·6
Honolulu		40·9	24	e 7 39	− 7	e 13 53	− 5	e 8 35	PP	i 16·6
Santa Clara		72·6	41	e 11 35	+ 4	e 21 33	ScS	—	—	e 31·0
Berkeley		72·8	41	e 11 32	0	e 21 4	+ 6	—	—	—
Ukiah		73·0	40	e 13 0	+87	e 21 7	+ 7	e 25 48	SS	e 29·9
Pasadena		73·3	46	i 11 35	0	e 20 56	− 8	e 14 11	PP	e 29·8
Mount Wilson	z.	73·4	46	e 11 37	+ 1	—	—	—	—	—
Palomar	z.	73·7	48	e 11 38	0	—	—	—	—	—
Riverside	z.	73·7	46	i 11 38	0	—	—	—	—	—
Haiwee		74·5	44	e 11 44	+ 2	—	—	—	—	—
Tinemaha		74·9	44	e 11 45	+ 1	—	—	—	—	—
Tucson		77·5	51	i 12 1	+ 2	e 22 6	+16	e 14 27	PP	35·5
Sitka		80·5	21	e 13 1	+46	e 22 19	− 3	e 17 14	PPP	e 32·9
Salt Lake City		81·1	44	e 12 24	+ 6	e 22 34	+ 6	—	—	e 34·2
Logan		81·6	42	e 12 26	+ 5	e 22 39	+ 6	—	—	e 34·0
Butte		83·3	39	e 18 41	?	e 22 48	− 2	—	—	e 35·8
College		83·6	11	e 12 31	0	e 22 45	− 8	e 15·36	PP	e 34·6
Bozeman		84·1	40	e 12 36	+ 2	e 22 54	− 4	e 28 55	SS	e 35·4
Lincoln		91·5	49	e 12 36	−34	e 22 40	?	—	—	e 46·3
Huancayo		94·7	104	—	—	e 24 22	{+ 6}	e 31 34	SS	e 38·2
Chicago		98·2	49	—	—	e 24 50	{+ 9}	—	—	e 47·7
La Paz	z.	99·9	110	e 13 21	−27	—	—	—	—	53·4
Calcutta	N.	103·1	290	—	—	e 25 38	{+21}	—	—	—
Colombo	E.	107·4	272	e 15 21?	P	—	—	—	—	—
Ottawa		107·4	46	—	—	e 25 39	{− 8}	e 28 51	PPS	47·4
Vermont		109·1	42	—	—	—	—	e 34 29	SS	e 45·1
Seven Falls		110·9	45	—	—	e 28 51	PS	e 35 3	SS	53·4
San Juan		111·6	76	e 21 14	PPP	e 26 2	{−14}	e 30 32	PPS	e 49·5
Bombay	E.	116·7	283	e 20 21	PP	—	—	e 22 39	PPP	e 55·4
Cheb		146·2	354	—	—	e 38 21?	?	—	—	e 71·4
Stuttgart		147·8	356	e 19 46	[+ 2]	—	—	—	—	e 76·6
Ksara		148·1	308	e 19 52	[+ 8]	—	—	e 33 41	PS	—
Helwan	z.	153·3	305	19 59	[+ 7]	23 5	PKS	20 27	pPKP	—
Granada		157·8	20	20 34k	[+36]	31 34	{+33}	24 21	PP	e 83·4

Additional readings :—
Auckland i =11m.31s.
Riverview iEZ =7m.20s., i =8m.58s., iZ =9m.38s., iN =10m.4s., iZ =10m.7s., iE = 12m.22s., and 12m.42s., iSS?N =15m.31s.
Berkeley eE =30m.12s., eN =30m.21s.
Pasadena iEN =21m.9s.
Tucson e =24m.27s., iSS =27m.1s.
Sitka e =22m.59s., eSS =27m.36s.
Logan e =12m.38s.
College e =29m.36s.
Bozeman e =19m.47s. and 27m.42s.
Huancayo e =25m.9s.
Ottawa e =34m.21s.
Stuttgart e =20m.21s. and 21m.11s.
Ksara e =20m.8s. and 22m.6s.
Helwan iZ =20m.59s. and 24m.34s.
Granada sSS =44m.46s.
Long waves were also recorded at Kodaikanal and other American and European stations.

Dec. 22d. 6h. 24m. 54s. Epicentre 7°·5N. 80°·1W. (as on 1941 Nov. 22d.).

A = +·1705, B = −·9768, C = +·1297 ; δ = +3 ; h = +7 ;
D = −·985, E = −·172 ; G = +·022, H = −·128, K = −·992.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		1·6	20	i 0 27	− 3	i 0 50	− 1	—	—	—
San Juan		17·4	50	i 4 0	− 6	i 7 19	0	i 4 28	PP	e 8·1
Huancayo		20·0	168	i 4 36	− 1	i 8 24	+ 7	i 5 52	PP	e 10·2
La Paz	z.	26·6	153	5 37	− 5	i 11 1	+45	—	—	15·1
Bermuda		28·6	28	—	—	e 11 38	+50	—	—	e 15·2
Chicago		34·8	349	e 8 16	PP	—	—	(e 14 37)	SS	e 14·6
Harvard		35·7	11	i 6 3	?	—	—	—	—	—
Vermont		37·3	7	—	—	e 12 29	−35	—	—	—
Tucson		37·7	316	i 7 21	+ 2	i 13 28	+18	i 9 14	PPP	e 15·6
Ottawa		37·9	6	7 21	+ 1	13 18	+ 5	—	—	19·1
Seven Falls		40·3	10	e 6 36	?	—	—	—	—	20·1
Palomar	z.	42·6	313	e 8 3	+ 4	—	—	—	—	—
Riverside	z.	43·3	313	e 8 7	+ 2	—	—	—	—	—
Mount Wilson	z.	43·9	313	e 8 12	+ 2	—	—	—	—	—
Pasadena		44·0	313	i 8 12	+ 1	—	—	—	—	e 20·6
Haiwee	z.	44·8	316	e 8 20	+ 3	—	—	—	—	—
Tinemaha	z.	45·5	316	e 8 25	+ 2	—	—	—	—	—
Bozeman		46·5	331	e 10 13	PP	e 14 47	−32	—	—	e 19·7
Granada		74·8	53	11 43$_a$	− 1	—	—	14 26	PP	—
Stuttgart		84·0	42	e 12 32	− 1	—	—	—	—	e 45·1
Cheb		85·9	40	—	—	e 24 6?	PS	—	—	e 42·1

Additional readings :—
Chicago e = 9m.9s.
Tucson i = 11m.22s.
Long waves were also recorded at Philadelphia and Uccle.

Dec. 22d. Readings also at 0h. (Haiwee, Tucson, Mount Wilson, Pasadena, Palomar, Riverside, and Tinemaha), 5h. (near Fresno and Lick), 6h. (near Berkeley, Branner, Lick, Fresno, and San Francisco), 7h. (near Balboa Heights), 8h. (near Balboa Heights and near Tashkent), 9h. (near Balboa Heights), 10h. (near Tashkent, and near Balboa Heights), 11h. (near Mizusawa), 13h. (Auckland, Tucson, Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, and Tinemaha), 15h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, and Stuttgart), 16h. (Riverview, Sydney, Calcutta, Tashkent, Kôbe, Nagano, Sendai, Zinsen, La Paz, Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, and near Mizusawa (2)), 18h. (near Florissant), 20h. (near Tashkent), 23h. (Mizusawa and near Lick).

Dec. 23d. 1h. 12m. 48s. Epicentre 7°·5N. 80°·1W. (as on 22d.).

		Δ	Az.	P.	P−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights	E.	1·6	20	e 0 26	− 4	i 0 39	−12	—	—	—
San Juan		17·4	50	e 4 2	− 4	i 7 25	+ 6	—	—	e 8·5
Huancayo		20·0	168	e 4 41	+ 4	i 8 23	− 6	i 5 0	PP	i 9·6
La Paz	z.	26·6	153	e 5 34	− 8	10 58	+42	—	—	15·2
Philadelphia		32·8	8	—	—	e 11 53	+ 2	e 13 48	SS	e 15·2
Fordham		33·7	8	—	—	e 13 3	+55	—	—	—
Chicago		34·8	349	e 9 17	?	e 13 25	+60	—	—	e 14·9
Tucson		37·7	316	e 7 20	+ 1	e 13 9	− 1	e 9 22	PPP	e 21·0
Ottawa		37·9	6	7 24	+ 4	13 16	+ 3	16 12	SSS	23·2
Seven Falls		40·3	10	—	—	e 13 38	−11	—	—	24·2
Palomar	z.	42·6	313	i 8 1	+ 2	—	—	—	—	—
Mount Wilson	z.	43·9	313	e 8 12	+ 2	—	—	—	—	—
Pasadena	z.	44·0	313	e 8 12	+ 1	—	—	—	—	e 20·2
Tinemaha		45·5	316	e 8 24	+ 1	—	—	—	—	—
Bozeman		46·5	331	e 8 36	+ 5	e 15 25	+ 6	—	—	e 21·5
Stuttgart		84·0	42	e 12 36	+ 3	—	—	—	—	—

Tucson gives also e = 10m.21s.
Long waves were also recorded at Sitka, Bermuda, and other European stations.

Dec. 23d. 5h. 21m. 18s. Epicentre 16°·6S. 174°·0W. (as on 22d.).

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Apia		3·5	38	i 1 2$_3$	+ 5	i 1 33	− 7	—
Pasadena		73·3	46	i 11 34$_k$	− 1	—	—	—
Mount Wilson	z.	73·4	46	i 11 35$_k$	− 1	—	—	—
Palomar	z.	73·7	48	i 11 37$_k$	− 1	—	—	—
Riverside	z.	73·7	46	i 11 37	− 1	—	—	—
Haiwee	z.	74·5	44	e 11 41	− 1	—	—	—
Tinemaha	z.	74·9	44	i 11 42	− 2	—	—	—
Tucson		77·5	51	i 11 59	0	—	—	e 20·0
Stuttgart		147·8	356	e 19 48	[+ 4]	—	—	—

Additional readings :—
Pasadena eZ = 12m.12s.
Mount Wilson eZ = 12m.7s.
Palomar iZ = 12m.14s.
Riverside eZ = 12m.10s.
Haiwee iZ = 12m.12s.
Tinemaha eZ = 12m.21s.
Tucson i = 14m.34s.

Dec. 23d. 13h. 58m. 44s. Epicentre 4°·5S. 152°·7E. (as on 1941 Feb. 9d.).

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

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·9	178	i 4 57	− 9	i 9 4	− 9	—	—	—
Riverview		29·2	183	e 6 5	0	i 10 36	−22	i 6 45	PP	e 14·4
Sydney		29·2	183	—	—	e 10 46	−12	e 11 46	SS	e 13·8
Auckland		38·2	150	6 46?	−37	13 3	−14	17 1	SS	17·3
Arapuni		39·4	152	—	—	13 16	−19	—	—	19·3
Wellington		41·6	155	7 13	−38	13 55	−13	9 54	PP	20·3
Tokyo Cen. Met. Ob.		41·8	344	e 10 3	PP	—	—	—	—	—
Koti		42·0	336	8 2	+ 8	—	—	—	—	—
Christchurch		42·7	159	(8 1)	+ 1	(14 16)	− 8	(9 55)	PP	19·9
Nagano		43·1	343	e 8 8	+ 4	—	—	—	—	—
Sendai		43·9	348	i 8 15	+ 5	—	—	—	—	—
Perth		44·0	227	—	—	i 14 21	−22	i 17 28	SS	—
Zinsen		48·3	332	e 8 44	− 1	—	—	—	—	—
Calcutta	N.	68·3	296	—	—	e 20 57	+51	e 15 31	PPP	—
Hyderabad	E.	76·4	289	e 11 48	− 5	e 21 24	−14	—	—	37·4
New Delhi	N.	79·5	300	—	—	i 23 2	+51	e 17 42	PP	—
College		81·6	22	—	—	e 22 35	+ 2	e 23 55	PPS	e 35·6
Bombay		81·9	289	12 16	− 7	22 23	−13	15 10	PP	36·3
Sitka		84·1	32	—	—	i 23 4	+ 6	—	—	e 39·1
Victoria	E.	89·8	41	—	—	e 23 34	[+ 2]	—	—	42·3
Pasadena		91·8	56	i 13 16$_a$	+ 5	e 25 34	PS	e 16 54	PP	e 38·8
Tinemaha	z.	91·8	53	i 13 17$_a$	+ 6	—	—	—	—	—
Mount Wilson		91·9	56	i 13 17$_a$	+ 6	—	—	—	—	—
Haiwee	z.	92·1	54	i 13 16$_a$	+ 4	—	—	—	—	—
Riverside		92·4	56	i 13 19$_a$	+ 5	—	—	—	—	—
Palomar	z.	92·8	57	i 13 21	+ 5	—	—	—	—	—
Salt Lake City		97·0	49	—	—	e 24 41	−14	—	—	e 46·7
Bozeman		97·6	44	e 14 30	+52	e 24 42	−18	—	—	e 45·7
Tucson		97·8	58	e 13 43	+ 5	—	—	e 17 41	PP	e 44·9
Scoresby Sund		114·0	356	—	—	e 26 10	[+42]	e 27 48	S	e 56·1
Helwan	z.	119·3	301	i 20 28	PP	e 22 49	PKS	—	—	—
Ottawa		121·4	37	e 18 56	[+ 1]	e 36 52	SS	—	—	51·3
Seven Falls		123·4	33	e 19 1	[+ 2]	—	—	—	—	53·3
Cheb		123·6	331	e 28 6	SKKS	(e 28 6)	(+28)	e 37 32	SS	e 61·3
Fordham		124·8	41	e 19 5	[+ 3]	—	—	e 38 4	SS	e 54·3
Stuttgart		126·1	330	e 19 4	[0]	—	—	—	—	e 62·7
Uccle		126·8	335	e 19 6	[0]	e 31 28	PS	e 38 28	SS	e 61·3
Basle		127·7	330	e 19 9	[+ 1]	—	—	—	—	—
Huancayo		129·5	109	e 19 30	[+19]	i 22 46	PKS	e 38 52	SS	e 54·4
Fort de France		145·2	71	e 19 42	[+ 2]	—	—	—	—	—

For Notes see next page.

NOTES TO DECEMBER 23d. 13h. 58m. 44s.

Additional readings :—
Brisbane iPE =5m.3s.
Riverview iZ =6m.16s. and 6m.52s., PPPN =7m.3s., iSN =10m.42s., iZ =11m.9s., SSEN =11m.42s.
Auckland i =7m.41s., P_cP? =9m.16s.
Wellington PP? =8m.50s., SS? =16m.21s.
Christchurch Q =16m.41s., SSS =17m.48s., P has been increased by 6m., PP is given as S and S as SS.
New Delhi iN =27m.7s.
Bombay eE =23m.16s., SSE =27m.31s.
Bozeman e =21m.57s. and 26m.36s.
Tucson e =17m.59s. and 30m.22s.
Scoresby Sund iPS =30m.59s.
Long waves were also recorded at Tananarive, San Juan, and other American and European stations.

Dec. 23d. Readings also at 0h. (Mount Wilson, Pasadena, Palomar, Tinemaha, Tucson, and near Balboa Heights), 1h. (Rio de Janeiro and near Balboa Heights), 3h. (near Balboa Heights (2)), 4h. (Sofia and near Lick (2)), 5h. (Bombay, Calcutta, New Delhi, and Stuttgart), 7h. (Tucson and near Mizusawa), 8h. (near Mizusawa), 10h. (Riverview), 13h. (La Paz), 14h. and 18h. (near Mizusawa).

Dec. 24d. Readings at 6h. (near Mizusawa), 7h. (Tucson, Riverside, and Tinemaha), 9h. (Tucson, La Jolla, Mount Wilson, Pasadena, Riverside, Tinemaha, Lincoln, and Salt Lake City), 10h. (Bozeman, Huancayo, and La Paz), 15h. (Copenhagen, Tashkent, and near Andijan), 16h. (Copenhagen), 17h. (Almata and near Andijan), 18h. (Mount Wilson, Tinemaha, and Tucson), 23h. (Copenhagen, Clermont-Ferrand, Stuttgart, Helwan, Ksara, Belgrade, Sofia, near Istanbul, Bucharest, and Focsani).

Dec. 25d. Readings at 5h. (Mizusawa), 7h. (near Basle, Chur, Zurich, Stuttgart, near Andijan, and Tashkent), 8h. (Haiwee, Mount Wilson, Tinemaha, Huancayo, La Plata, and near La Paz), 13h. (Huancayo, La Paz, La Plata, San Juan, Tucson, and near Granada), 21h. (2) and 22h. (near La Paz).

Dec. 26d. 12h. 31m. 48s. Epicentre 9°·5N. 75°·3W.

"Mapa Sismico y tectonico de Columbia." Banco de la Republica, Bol. grafico 7, Feb. 1947. Epicentre 8°·5N. 75°·5W. San Marcos—violent—suggested depth : 500 km.

A = +·2503, B = −·9542, C = +·1640 ; δ = +4 ; h = +7 ;
D = −·967, E = −·254 ; G = +·042, H = −·159, K = −·986.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		4·3	261	e 1 4	− 4	e 1 47	−13	—	—	—
San Juan		12·5	44	e 3 1	− 1	i 5 13	−10	e 6 11	SSS	i 6·3
Fort de France		14·8	68	e 3 23	− 9	i 6 31	SS	3 36	PP	e 7·8
Huancayo		21·4	181	i 4 53	+ 2	i 8 44	− 1	e 5 38	PPP	i 10·0
Bermuda		24·8	22	i 5 26	+ 1	i 9 50	+ 4	i 10 30	SSS	e 11·3
Columbia		24·9	349	e 5 28	+ 2	e 9 59	+12	e 6 12	PPP	e 12·3
La Paz		26·8	164	i 5 40k	− 4	i 10 8	−11	i 11 38	SS	13·2
Georgetown		29·3	358	i 6 8	+ 2	i 12 21	SS	—	—	—
Philadelphia		30·3	3	i 6 16	+ 1	e 11 22	+ 7	e 7 25	PP	i 15·1
Cape Girardeau	N.	30·5	339	i 6 17	0	e 11 16	− 2	—	—	—
Fordham		31·2	4	i 6 25	+ 2	e 11 37	+ 8	—	—	—
St. Louis		32·0	339	i 6 29	− 1	i 11 38	− 4	—	—	—
Florissant		32·2	339	i 6 30	− 2	e 11 41	− 4	—	—	—
Harvard		33·0	7	i 6 38	− 1	e 11 56	− 1	e 14 38	SSS	16·2
Chicago		33·9	344	e 6 46	− 1	e 12 8	− 3	e 7 46	PP	e 14·2
Des Moines		35·8	337	e 8 38	PPP	e 12 40	− 1	—	—	e 15·1
Ottawa		35·8	0	7 3	0	12 48	+ 7	8 14	PP	17·2
Lincoln		36·5	334	e 7 13	+ 4	—	—	e 8 49	PPP	e 15·3
Seven Falls		37·7	6	7 20	+ 1	13 12	+ 2	8 41	PP	16·2
Tucson		39·9	311	i 7 36	− 1	e 14 6	PPS	i 9 12	PP	e 16·8
Salt Lake City		44·9	321	e 8 16	− 2	e 14 55	− 1	e 15 18	PPS	e 18·6
Palomar	Z.	45·0	309	i 8 24a	+ 5	e 15 3	+ 5	—	—	—
Rio de Janeiro	N.	45·0	135	i 8 31	+12	i 15 3	+ 5	—	—	i 22·7
La Jolla		45·1	308	e 8 19	− 1	—	—	—	—	—
Logan		45·4	324	i 8 21	− 1	e 14 51	−13	i 10 31	PPP	18·6

Continued on next page.

		Δ	Az.	P.	P−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside	Z.	45·6	309	i 8 23	− 1	—	—	—	—	—
Mount Wilson		46·2	310	i 8 28	0	—	—	—	—	—
Pasadena		46·3	310	i 8 28	− 1	e 15 15	− 1	e 10 17	PP	e 17·2
Haiwee		46·9	312	e 8 32	− 2	—	—	e 18 34	SS	—
La Plata	E.	47·1	161	8 36	+ 1	15 9	−19	10 54	PPP	—
	N.	47·1	161	8 31	− 4	15 11	−17	10 24	PP	—
	Z.	47·1	161	8 29	− 6	—	—	—	—	26·5
Bozeman		47·3	327	e 8 36	− 1	i 15 49	+18	i 10 50	PPP	e 22·8
Tinemaha		47·5	313	i 8 38	0	—	—	i 10 9	PP	—
Butte		48·3	327	e 8 58	+13	e 15 44	− 1	e 16 5	PPS	e 20·9
Saskatoon		49·6	336	—	—	e 16 0	− 3	—	—	27·2
Santa Clara	E.	50·3	312	e 16 25	S	(e 16 25)	+12	—	—	e 29·3
Berkeley		50·7	312	e 9 13	+10	e 16 29	+11	—	—	i 24·0
Ukiah		51·9	313	e 9 40	+28	e 16 39	+ 4	e 11 24	PP	e 21·5
Victoria		55·9	324	e 10 5	+23	e 17 24	− 5	—	—	28·2
San Fernando		67·6	55	e 11 2	+ 1	—	—	e 20 20	PS	—
Granada		69·8	54	i 11 15k	+ 1	i 20 45	PS	11 25	pP	32·4
College		74·0	336	—	—	e 21 28	+17	e 21 48	PS	e 35·3
Paris		74·9	43	i 16 57	?	—	—	—	—	—
Clermont-Ferrand		75·2	46	i 11 33	−13	i 21 30	+ 5	—	—	e 38·2
Uccle		76·2	41	e 11 51	− 1	i 21 34	− 2	26 48	SS	33·2
De Bilt		76·7	39	e 11 56	+ 1	i 21 42	+ 1	—	—	e 36·7
Neuchatel		77·8	44	e 12 0	− 1	—	—	—	—	—
Basle		78·3	43	e 12 3	0	—	—	—	—	—
Zurich		78·9	43	e 12 7	0	—	—	—	—	—
Stuttgart		79·3	42	e 12 9	0	e 22 8	− 1	e 27 15	SS	39·7
Chur		79·6	44	e 12 11	+ 1	—	—	—	—	—
Copenhagen		81·0	35	e 12 19	+ 1	22 27	0	—	—	—
Cheb		81·3	41	—	—	e 22 12?	−18	e 28 12?	SS	e 40·2
Potsdam		81·6	39	e 12 22	+ 1	i 22 32	− 1	i 12 34	P_eP	e 33·2
Prague		82·6	41	e 12 35?	+ 9	e 22 45?	+ 2	—	—	e 39·2
Upsala		83·3	31	e 19 12?	?	e 22 59	+ 9	23 12?	PS	e 33·2
Helwan		99·5	58	e 18 3	PP	i 19 56	PPP	e 32 6	SS	—
Christchurch		112·5	227	i 37 21	?	—	—	—	—	e 53·4
Riverview		131·0	233	i 22 34	?	—	—	e 31 48	PS	e 63·3
Calcutta	N.	144·4	27	e 30 59	?	—	—	—	—	—

Additional readings :—
Port-au-Prince (A = 9°·5, Az = 18°), iP = 12h. 31m. 27s., iS = 12h. 33m. 34s.
Fort de France PPP = 3m.39s.
La Paz iZ = 5m.52s. and 12m.34s.
Philadelphia e = 6m.55s. and 10m.52s., i = 12m.52s.
Cape Girardeau eN = 11m.41s.
Harvard i = 6m.49s., e = 12m.8s.
Des Moines i = 13m.7s.
Ottawa SS = 15m.24s.
Lincoln e = 11m.58s.
Tucson i = 8m.12s., e = 13m.40s. and 14m.54s.
Salt Lake City e = 8m.33s.
Palomar iZ = 8m.36s.
Logan i = 8m.36s. and 9m.24s., e = 15m.31s.
Pasadena iEZ = 8m.40s., iE = 15m.28s.
Haiwee iZ = 10m.6s.
La Plata Z = 8m.47s., E = 14m.36s.
Bozeman e = 19m.11s.
Tinemaha iZ = 8m.50s., eEN = 10m.51s.
Butte e = 9m.42s.
Saskatoon e = 22m.18s.
Berkeley eE = 17m.58s.
Ukiah e = 17m.37s.
Granada P_eP = 11m.32s., PP = 14m.12s.
College eSS = 26m.15s.
Clermont-Ferrand i = 11m.42s. and 12m.2s.
De Bilt iP = 12m.7s., eN = 32m.42s.
Stuttgart eP = 12m.20s., eQ = 34m.24s.
Copenhagen iP = 12m.30s.
Cheb e = 36m.12s.?.
Potsdam iS_eS = 22m.56s., iPPSEN = 23m.45s.
Helwan eZ = 18m.27s. and 20m.33s.
Christchurch e = 48m.9s.
Riverview eE = 22m.50s.
Long waves were also recorded at Scoresby Sund, Kew, and Stonyhurst.

Dec. 26d. Readings also at 2h. (La Paz), 4h. (near Mizusawa), 12h. (Stuttgart).

Dec. 27d. 16h. 39m. 55s. Epicentre 31°·6N. 141°·7E.

A = −·6696, B = +·5289, C = +·5214 ; δ = −4 ; h = +1 ;
D = +·620, E = +·785 ; G = −·409, H = +·323, K = −·853.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		7·5	357	e 1 55	+ 2	3 19	− 1	—	—	—
Calcutta		48·0	273	e 8 40	− 3	e 16 2	+21	e 10 34	PP	e 24·7
College		53·6	29	—	—	e 16 59	+ 1	e 17 13	PS	e 22·2
Honolulu		54·5	84	—	—	e 17 6	− 4	—	—	e 25·4
New Delhi	N.	55·2	285	e 9 30	− 7	i 17 19	− 1	—	—	—
Hyderabad	E.	58·5	271	9 57	− 3	18 11	+ 8	12 10	PP	29·1
Sverdlovsk		59·4	321	i 10 7	+ 1	18 17	+ 2	—	—	—
Colombo	E.	62·5	259	e 14 5?	PPP	—	—	—	—	—
Bombay		62·7	276	i 10 27	− 2	19 3	+ 6	i 19 27	PPS	—
Kodaikanal	E.	62·8	265	e 11 5	?	—	—	—	—	—
Riverview		65·7	171	e 10 52	+ 4	i 19 33	− 1	—	—	e 33·9
Ukiah		74·4	53	—	—	e 21 16	0	e 25 35	SS	e 32·6
Auckland		74·8	152	—	—	21 18	− 2	—	—	37·1
Santa Clara	E.	76·1	54	—	—	e 21 42	+ 7	—	—	e 48·8
Scoresby Sund		77·5	354	e 12 8	+ 9	i 21 56	+ 6	e 15 8	PP	e 45·8
Upsala	N.	77·9	334	—	—	e 21 49	− 5	—	—	e 40·1
Wellington		78·7	155	12 0	− 6	22 2	− 1	12 13	PcP	36·1
Bozeman		78·8	42	—	—	e 22 1	− 3	—	—	e 40·5
Tinemaha		78·8	53	i 12 7	+ 1	—	—	—	—	—
Haiwee	Z.	79·5	53	i 12 10	0	—	—	—	—	—
Christchurch		79·9	157	12 13	+ 1	22 23	+ 7	27 31	SS	38·5
Mount Wilson	Z.	80·4	55	i 12 14	− 1	—	—	—	—	—
Pasadena		80·4	55	i 12 14	− 1	i 22 20	− 1	—	—	e 36·1
Logan		80·5	45	e 12 15	0	e 22 23	+ 1	e 28 5	SS	e 50·5
Riverside	Z.	81·0	55	e 12 18	0	—	—	—	—	—
Palomar	Z.	81·7	55	i 12 22	0	—	—	—	—	—
Copenhagen		82·9	333	e 12 39	+11	22 50	+ 4	—	—	43·1
Bucharest		84·3	319	e 23 57	PS	—	—	—	—	—
Ksara		84·5	306	e 12 37	+ 1	e 23 11	+ 9	—	—	—
Potsdam		85·1	331	i 12 40k	+ 1	i 23 7	− 1	—	—	e 45·1
Prague		86·2	328	e 13 11k	+27	e 23 14	{ 0}	—	—	—
Tucson		86·6	53	i 12 47	+ 1	e 23 10	[− 1]	—	—	e 42·5
Jena		86·8	330	e 12 53	+ 6	e 23 26	+ 1	—	—	e 41·1
Sofia		86·9	319	—	—	e 23 5?	[− 8]	—	—	—
Cheb		87·1	330	e 12 43	− 6	e 23 34	+ 6	e 29 28	SS	e 47·1
Stonyhurst		89·4	339	—	—	i 23 56	+ 7	—	—	e 42·1
Stuttgart		89·4	330	e 13 0	0	i 23 53	+ 4	e 16 40	PP	e 47·1
Uccle		89·7	334	e 13 10	+ 9	e 23 33	[+ 2]	—	—	e 44·1
Helwan		89·9	305	13 3	+ 1	23 35	[+ 3]	e 16 35	PP	—
Kew		90·8	337	e 24 40	S	(e 24 40)	+38	—	—	e 49·1
Oxford		90·8	338	—	—	24 2	0	—	—	e 45·1
Basle		91·1	330	e 13 8	0	—	—	—	—	—
Ottawa		96·2	26	e 8 20	?	—	—	e 31 23	SS	49·1
Seven Falls		96·3	21	—	—	e 24 53	+ 4	—	—	49·1
Granada		104·3	331	i 18 41s	PP	25 7	{−18}	—	—	e 55·9
Huancayo		140·8	68	e 23 36	?	—	—	—	—	e 71·4
La Paz	Z.	149·0	67	19 55	[+ 9]	—	—	—	—	72·1

Additional readings :—
Calcutta ePPPN = 11m.28s., eN = 15m.0s., iSS = 19m.30s.
Hyderabad PSE = 18m.33s., SSE = 22m.14s.
Bombay eE = 19m.34s. and 21m.52s., SSE = 23m.10s.
Riverview iE = 19m.29s.
Ukiah eSS = 26m.27s.
Santa Clara eE = 37m.8s.
Scoresby Sund i = 24m.0s.
Upsala eE = 21m.53s.
Wellington iZ = 12m.30s., PPZ = 15m.0s., iZ = 15m.53s. and 16m.25s.

Continued on next page.

Bozeman e =26m.29s.
Christchurch Q =34m.23s.
Logan e =21m.23s.
Potsdam iZ =13m.1s., iSN =23m.11s.
Tucson e =21m.31s. and 22m.12s.
Jena ePN =12m.57s.
Cheb e =40m.12s.
Stuttgart eSKS =23m.35s.
Helwan PP?Z =17m.33s.
Kew eSSS?E =43m.35s.
Long waves were also recorded at Aberdeen, De Bilt, Paris, Clermont-Ferrand, Chur, Zurich, San Fernando, and Philadelphia.

Dec. 27d. Readings also at 5h. (near Kiyosumi, Tokyo Imp. Univ., Titibu, and Mizusawa), 7h. (near Belgrade), 11h. and 13h. (La Paz), 16h. (College, Tinemaha, Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, and Tucson), 20h. (Tucson), 21h. (Pasadena, Haiwee, Riverside, Mount Wilson, and Tinemaha), 23h. (near Fresno, Lick, Branner, and Berkeley).

Dec. 28d. Readings at 1h. (near Mizusawa), 3h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, and near Apia), 9h. (Wellington), 11h. (La Paz, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, and Tucson), 17h. (La Paz, Haiwee, Palomar, Tinemaha, Tucson, and Calcutta).

Dec. 29d. 3h. 42m. 16s. Epicentre 43°·4N. 17°·2E.

$A = +\cdot6963$, $B = +\cdot2155$, $C = +\cdot6846$; $\delta = -5$; $h = -3$;
$D = +\cdot296$, $E = -\cdot955$; $G = +\cdot654$, $H = +\cdot202$, $K = -\cdot729$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade		2·7	59	i 0 48	+ 3	i 1 28	S*	i 0 56	P_g	—
Sofia		4·6	99	1 15	+ 3	i 2 22	S*	i 1 24	P*	i 2·6
Chur		6·4	305	e 1 41	+ 3	—	—	—	—	e 5·0
Bucharest		6·4	79	e 1 43	+ 5	2 49	− 4	e 2 5	P_g	i 3·6
Ravensburg		6·9	312	e 1 44	− 1	i 3 22	S*	e 2 9	P*	i 3·9
Prague		7·0	344	1 49k	+ 3	e 3 45	S_g	—	—	—
Zurich		7·2	305	e 1 51	+ 2	e 3 12	− 1	e 3 31	S*	—
Cheb		7·4	336	e 1 56	+ 4	e 3 21	+ 3	—	—	e 4·2
Ebingen		7·5	312	e 1 54	+ 1	e 3 22	+ 2	e 2 32	P_g	i 4·2
Stuttgart		7·7	216	i 1 57a	+ 1	i 3 18	− 7	i 2 33	P_g	4·4
Basle		7·9	305	e 2 0	+ 1	e 3 30	0	e 3 50	S*	—
Neuchatel		8·0	300	e 2 2	+ 2	e 3 52	S*	—	—	—
Strasbourg		8·3	312	i 2 8	+ 4	i 3 40	0	e 2 13	PP	—
Jena		8·5	335	i 2 8k	+ 1	i 3 40	− 5	—	—	i 4·1
Marseilles		8·6	273	e 1 57	−12	4 49	S_g	2 35	PPP	—
Istanbul		9·1	102	3 30	?	—	—	—	—	5·2
Clermont-Ferrand		10·3	288	i 2 21	−11	—	—	—	—	—
Paris		11·5	303	e 2 44?	− 4	—	—	—	—	—
Uccle		11·5	315	2 48	0	i 5 24	SS	i 5 30	SSS	i 5·9
Copenhagen		12·7	347	i 3 3	− 2	5 32	+ 4	—	—	—
Kew		14·3	310	i 3 29a	+ 3	e 6 24	SS	i 6 31	SSS	6·7
Oxford		15·0	310	—	—	i 6 40	+17	—	—	7·7
Upsala		16·5	2	3 51	− 3	e 6 55	− 3	i 7 12	SS	e 8·5
Stonyhurst		16·6	316	i 7 17	S	(i 7 17)	+17	i 7 43	SSS	9·4
Granada		17·0	256	i 4 8a	+ 7	i 7 27	+17	4 22	PP	9·0
Ksara		17·4	120	e 4 9	+ 3	e 7 32	+13	—	—	—
Helwan	Z.	17·7	138	4 5	− 5	7 35	+ 9	e 7 56	SSS	—
Aberdeen		18·4	325	i 6 58	?	i 8 54	?	i 7 28	S	9·4
San Fernando		19·2	257	e 4 26	− 2	8 5	+ 6	8 53	SSS	10·2
Lisbon		20·4	268	4 40	− 1	i 8 36	+11	—	—	10·2
Scoresby Sund		33·4	337	—	—	e 12 57	+54	e 14 32	SSS	i 16·1
Seven Falls		58·9	307	e 10 3	0	—	—	—	—	27·7
Calcutta	N.	61·4	85	—	—	e 18 43	+ 3	—	—	—
Ottawa		62·6	308	e 10 28	0	—	—	—	—	28·7
Fordham		64·2	302	i 10 40	+ 1	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
St. Louis	z.	75·2	310	i 11 53	+ 7	—	—	—	—	—
Tinemaha		90·2	326	e 13 6	+ 2	—	—	—	—	—
Haiwee	z.	90·9	325	e 13 9	+ 2	—	—	e 16 42	PP	—
Tucson		91·0	318	i 13 9	+ 2	e 25 0	PS	e 16 40	PP	e 51·2
Riverside	z.	92·5	324	e 13 16	+ 2	—	—	—	—	—
Mount Wilson	z.	92·6	324	e 13 17	+ 2	—	—	e 16 55	PP	—
Pasadena		92·7	324	i 13 17	+ 2	—	—	e 16 57	PP	e 44·7
Palomar	z.	92·9	322	e 13 18	+ 2	—	—	e 16 38	PP	—

Additional readings :—
Belgrade iPPP = 1m.16s., iPPS = 1m.22s.
Bucharest eN = 1m.54s., iZ = 2m.20s., iN = 2m.23s., S* = 3m.16s.
Ravensburg eP_g = 2m.14s., e = 2m.52s., i = 3m.40s.
Ebingen e = 2m.57s. and 3m.34s., i = 3m.46s.
Stuttgart iP* = 2m.2s., e = 3m.1s., i = 4m.16s.
Strasbourg e = 2m.45s., iS = 3m.26s.
Jena iN = 2m.25s., iZ = 2m.32s., iSEN = 3m.44s.
Stonyhurst iS = 8m.55s., SS = 9m.3s., SSS = 9m.23s. Phases wrongly identified.
Granada PPP = 4m.31s.
Helwan PPPZ = 4m.23s., eZ_i = 5m.32s.
Lisbon i = 4m.44s.
Tucson i = 15m.25s., e = 19m.19s.
Long waves were also recorded at De Bilt, Sitka, Chicago, Bozeman, and Butte.

Dec. 29d. Readings also at 3h. (Belgrade, Stuttgart, and La Paz), 4h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, Palomar, La Jolla, and Tucson, also Stuttgart, Clermont-Ferrand, Helwan, Basle, Neuchatel, Chur, and Zurich), 6h. (Pasadena (2), Mount Wilson (2), Riverside, Tinemaha (2), Haiwee (2), Palomar, Tucson (2), Huancayo, near Mizusawa, near Balboa Heights, and near Basle, Neuchatel), 7h. (Mount Wilson, Tinemaha, Haiwee, Neuchatel, Chur, Zurich (2), Basle, Helwan, Stuttgart (2), Ksara, Sofia, Cheb, and La Plata), 11h. (Pasadena, Mount Wilson, Riverside, Palomar, Tinemaha, Tucson, and Riverview), 14h. (near Mizusawa (2)), 15h. (near Neuchatel), 16h. (near Lick), 18h. (near Berkeley, Branner, Lick, Fresno, Santa Clara, and San Francisco), 23h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Haiwee, Palomar, Tucson, La Paz, Huancayo, Helwan, Auckland, Wellington, Christchurch, and Riverview).

Dec. 30d. 14h. 59m. 39s. Epicentre 40°·9N. 15°·9E.

A = +·7290, B = +·2077, C = +·6522 ; δ = −5 ; h = −2 ;
D = +·274, E = −·962 ; G = +·627, H = +·179, K = −·758.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Belgrade	5·1	39	e 1 12	− 8	i 1 53	−27	i 1 40	P_g	—
Sofia	5·8	70	e 1 35	+ 6	e 2 51	S*	—	—	—
Chur	7·5	325	e 1 59	+ 6	—	—	—	—	—
Ravensburg	8·2	329	e 2 35	P_g	e 3 41	+ 3	e 4 11	S*	—
Zurich	8·3	323	e 2 8	+ 4	e 3 47	+ 7	e 3 58	S*	—
Basle	8·9	321	e 2 12	0	e 3 51	− 4	—	—	—
Neuchatel	8·9	317	e 2 15	+ 3	e 4 4	+ 9	—	—	—
Stuttgart	9·2	331	i 2 14	− 2	e 4 32	S*	e 2 51	P_g	4·8
Jena	10·4	345	i 2 25	− 9	—	—	—	—	e 4·0

Additional readings :—
Belgrade iPP = 1m.18s.
Ravensburg e = 3m.6s., iS_g = 4m.14s.
Stuttgart eS_g = 4m.35s. and 4m.38s.
Long waves were also recorded at Cheb and Potsdam.

Dec. 30d. Readings also at 4h. (Riverview and near Lick), 8h. (Haiwee, Palomar, Tucson, and Tinemaha), 10h. (near Tashkent and Tchimkent), 12h. (Ksara), 21h. (New Delhi), 22h. (near Berkeley).

Dec. 31d. 12h. 3m. 41s. Epicentre 18°·0N. 47°·0W.

A = +·6491, B = −·6960, C = +·3071 ; δ = +6 ; h = +5 ;
D = −·731, E = −·682 : G = +·209, H = −·225. K = −·952.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France		14·0	259	e 3 20	− 2	—	—	—	—	—
San Juan		18·2	275	i 4 11	− 5	i 7 25	−12	i 4 42	PPP	i 8·3
Bermuda		21·4	315	i 5 3	+12	i 8 47	+ 2	i 5 53	PPP	e 10·1
Fordham		32·4	321	i 6 32	− 2	i 10 49	−59	—	—	—
Philadelphia		32·7	319	e 7 15	PP	i 11 44	− 8	—	—	i 13·4
Columbia		34·3	305	e 6 49	− 1	e 12 11	− 6	—	—	e 14·5
Vermont		34·3	326	e 6 55	+ 5	e 12 7	−10	i 7 53	PP	14·5
Seven Falls		35·0	332	6 55	− 1	12 32	+ 4	8 2	PP	—
Shawinigan Falls		35·5	329	6 59	− 1	12 34	− 2	—	—	17·3
Pittsburgh		36·1	315	i 7 4	− 1	e 12 36	− 9	—	—	—
Ottawa		36·3	326	7 6	− 1	12 54	+ 6	8 19	PP	—
Lisbon		38·3	49	7 28	+ 4	13 32	+13	—	—	17·7
Mobile		39·3	297	—	—	i 13 39	+ 5	16 35	SS	—
La Paz	Z.	40·1	212	i 7 44	+ 5	i 13 58	+12	i 9 22	PP	20·6
San Fernando	E.	40·3	55	e 7 39	− 1	13 56	+ 7	—	—	19·8
Rio de Janeiro	N.	40·8	175	i 7 5	−40	e 13 1	−55	—	—	e 16·3
Huancayo		40·9	225	e 7 47	+ 1	i 13 59	+ 1	e 9 16	PP	i 16·8
Chicago		41·9	314	e 7 53	− 1	e 14 9	− 4	—	—	e 17·2
Granada		42·5	54	i 8 5s	+ 6	i 14 29	+ 7	9 49	PP	19·7
St. Louis		42·8	308	i 8 0	− 1	i 14 22	− 4	—	—	i 17·8
Florissant		42·9	308	i 8 1	− 1	i 14 26	− 1	—	—	e 17·8
Lincoln		48·1	310	e 8 36	− 7	e 15 34	− 8	e 10 13	PP	e 21·9
Oxford		49·2	36	—	—	i 15 56	− 2	—	—	e 20·8
Clermont-Ferrand		49·7	45	i 8 57	+ 1	i 16 12	+ 8	—	—	e 23·6
Paris		50·3	41	i 9 3	+ 3	—	—	e 11 1	PP	e 24·3
Aberdeen		51·3	29	—	—	i 14 42	?	i 16 44	PPS	24·1
Uccle		52·1	39	i 9 14k	0	e 16 36	− 2	i 20 18	SS	22·3
De Bilt		53·0	38	i 9 22k	+ 1	i 16 54	+ 4	e 11 27	PP	24·8
Strasbourg		53·5	42	e 9 23	− 1	i 17 10	+13	e 20 54	SS	26·3
La Plata	E.	53·6	192	9 49	+24	17 2	+ 4	20 19	SS	26·4
	N.	53·6	192	9 30	+ 5	16 55	− 3	20 43	SS	26·4
	Z.	53·6	192	9 29	+ 4	—	—	—	—	32·3
Stuttgart		54·5	42	e 9 31k	− 1	e 17 12	+ 2	e 11 24	PP	—
Scoresby Sund		54·6	10	i 9 35	+ 3	i 17 14	+ 3	i 20 54	SS	e 22·9
Jena		56·5	40	e 9 44	− 2	e 17 37	0	—	—	e 26·8
Cheb		56·8	41	e 9 47	− 1	e 17 48	+ 7	—	—	e 27·3
Triest		57·0	47	i 9 53	+ 3	i 17 39	− 4	—	—	e 26·3
Potsdam		57·7	39	(e 9 19?)	−36	—	—	—	—	e 9·3
Prague		58·1	41	9 58	0	e 17 57	− 1	—	—	e 26·3
Copenhagen		58·2	34	i 9 59k	+ 1	18 4	+ 5	—	—	—
Tucson		58·8	297	i 9 59	− 3	e 18 10	+ 3	e 12 26	PP	e 27·6
Bozeman		59·3	314	e 10 47	+41	i 18 25	+11	e 22 9	SS	e 27·9
Salt Lake City		59·5	307	e 10 11	+ 4	e 18 18	+ 2	e 19 58	ScS	e 24·4
Logan		59·6	310	10 6	− 2	i 18 18	+ 1	e 12 18	PP	e 26·1
Butte		60·4	314	e 11 25	+72	e 18 37	+ 9	e 20 2	ScS	e 28·2
Upsala	N.	61·9	31	—	—	e 18 44	− 3	e 20 16	ScS	—
Sofia		63·7	50	e 10 39	+ 3	e 19 18	+ 8	—	—	32·3
Palomar	Z.	63·8	299	i 10 36	0	—	—	e 39 33	P'P'	—
La Jolla	E.	64·1	298	e 10 39	+ 1	—	—	—	—	—
Riverside	Z.	64·1	300	e 10 43	+ 5	—	—	—	—	—
Haiwee		64·4	302	i 10 41	+ 1	—	—	—	—	—
Tinemaha	Z.	64·6	303	i 10 40s	− 1	—	—	e 39 7	P'P'	—
Mount Wilson	Z.	64·7	300	e 10 39	− 3	—	—	e 39 28	P'P'	—
Pasadena		64·8	300	e 10 41	− 2	i 19 24	+ 1	e 39 30	P'P'	e 26·4
Bucharest		65·6	48	e 12 19?	?	—	—	—	—	34·3
Santa Barbara	Z.	66·0	300	e 10 51	+ 1	—	—	—	—	—
Seattle		67·1	316	—	—	e 18 11	?	e 26 23	SSS	e 33·7

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Clara		67·5	304	i 11 7	+ 7	e 20 59	+63	—	—	e 33·9
Berkeley		67·7	304	e 11 1	0	e 20 4	+ 6	—	—	—
Victoria		67·8	316	10 55	− 7	19 56	− 4	—	—	32·3
Ukiah		68·3	306	e 11 7	+ 2	e 20 9	+ 3	e 21 9	S_cS	e 31·9
Helwan		71·4	64	i 11 25a	+ 1	20 37	− 5	14 1	PP	—
Sitka		74·1	326	e 11 53	+13	i 21 14	+ 2	e 14 13	PP	e 34·8
College		78·4	335	e 12 5	+ 1	i 21 57	− 3	e 27 13	SS	e 36·8
Sverdlovsk		84·4	32	12 38	+ 2	22 58	− 3	—	—	—
Tashkent		96·6	44	13 37	+ 4	24 16	[+ 6]	—	—	—
New Delhi	N.	108·9	50	e 18 53	PP	i 25 13	[+ 5]	—	—	—
Bombay	E.	110·4	63	i 19 19	PP	e 26 19?	{+11}	e 21 43	PPP	e 53·3
Calcutta	N.	120·6	50	e 19 26	[+32]	—	—	—	—	—
Wellington		137·5	229	e 19 19?	[− 7]	23 21	PKS	—	—	e 70·3
Riverview		157·4	222	i 20 4a	[+ 6]	—	—	—	—	e 76·1

Additional readings :—
San Juan e = 6m.51s., and 7m.42s.
Bermuda i = 9m.9s.
Philadelphia i = 7m.29s., e = 11m.21s.
Vermont iS = 12m.21s., i = 13m.33s.
Seven Falls SS = 14m.43s.
Pittsburgh iS = 12m.45s.
Ottawa SS = 15m.7s., SSS = 15m.49s.
Lisbon 7m.31s. and 9m.1s., N = 11m.31s.
Huancayo e = 9m.41s.
Chicago e = 8m.40s., iS = 14m.15s.
Paris e = 15m.11s. and 18m.43s.
Aberdeen Q = 22m.18s.
Uccle iSN = 16m.39s., eN = 18m.50s.
De Bilt eSS = 20m.29s., eEN = 21m.49s.
La Plata P_cP?N = 9m.50s., S_cSE = 19m.13s., SSE = 20m.19s.
Stuttgart eP_cP = 10m.30s., eS_cS = 19m.22s., eSS = 21m.7s.
Scoresby Sund iS_cS = 19m.35s.
Jena ePN = 9m.48s., eSN = 17m.40s.
Tucson iP_cP = 10m.54s., iPPP = 13m.31s., cSS = 22m.21s., e = 24m.13s.
Bozeman e = 11m.52s. and 19m.22s.
Logan eS_cS = 19m.49s.
Butte e = 19m.46s.
Palomar iZ = 10m.55s. and 11m.22s.
Tinemaha iZ = 10m.58s.
Pasadena iZ = 10m.55s. and 11m.20s.
Berkeley eSN = 20m.13s.
Ukiah e = 27m.23s.
Helwan iZ = 15m.45s., PSN = 21m.9s.
Sitka e = 21m.57s. and 25m.57s.
College e = 12m.58s. and 22m.26s., eSSS = 31m.11s.
Bombay iE = 27m.4s., eE = 28m.19s.
Long waves were also recorded at Des Moines, Auckland, and Colombo.

Dec. 31d. 19h. 14m. 3s. Epicentre 18°·0N. 47°·0W. (as at 12h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		18·2	275	i 4 14	− 2	e 7 35	− 2	e 5 9	PPP	e 8·2
Bermuda		21·4	315	e 5 0	+ 9	—	—	—	—	e 9·3
Philadelphia		32·7	319	—	—	e 11 47	− 5	—	—	e 13·4
Seven Falls		35·0	332	e 6 51	− 5	—	—	—	—	14·0
Ottawa		36·3	326	e 7 7	0	—	—	—	—	15·0
La Paz	Z.	40·1	212	7 40	+ 1	13 53	+ 7	—	—	20·7
Huancayo		40·9	175	e 7 46	0	i 13 58	0	(e 16 46)	SS	e 16·8
Chicago		41·9	314	—	—	e 13 49	−24	(e 16 11)	SS	e 16·2
St. Louis		42·8	308	i 8 3	+ 2	i 14 9	−17	(i 17 43)	SS	i 17·7
Florissant	N.	42·9	308	—	—	i 14 28	+ 1	i 17 46	SS	—
Uccle		52·1	39	e 9 49	+35	e 16 35	− 3	—	—	e 22·0
Stuttgart		54·5	42	e 9 32	0	—	—	—	—	—
Cheb		56·8	41	—	—	e 15 57?	?	—	—	—
Tucson		58·8	297	i 10 4	+ 2	e 17 49	−18	i 12 31	PP	e 26·9
Palomar	Z.	63·8	299	i 10 36	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverside	Z.	64·1	300	e 10 38	0	—	—	—	—	—
Tinemaha	Z.	64·6	303	e 10 40	− 1	—	—	—	—	—
Mount Wilson	Z.	64·7	300	e 10 37	− 5	—	—	—	—	—
Pasadena	Z.	64·8	300	e 10 41	− 2	—	—	—	—	e 26·0
Helwan	Z.	71·4	64	e 11 25	+ 1	—	—	—	—	—

Additional readings :—
Huancayo e = 10m.2s., i = 14m.46s.
Tucson e = 12m.55s., i = 16m.11s.
Helwan iZ = 11m.33s., eZ = 13m.53s.
Long waves were also recorded at La Plata, Logan, Butte, Sitka, De Bilt, Kew, and Riverview.

Dec. 31d. Readings also at 1h. (near Istanbul), 2h. (Haiwee (2). Mount Wilson (2), Pasadena (2). Palomar (2), Tucson (2), and Tinemaha (2)), 4h. (Stonyhurst), 11h. (Copenhagen (2)), 17h. (San Francisco), 18h. (Brisbane), 19h. (Arapuni, Christchurch, Wellington, Riverview, Sydney, Mount Wilson, Palomar, Riverside, and Tinemaha), 20h. (Triest), 21h. (Helwan and Ksara).

The scanned images of the bulletins of the International Seismological Summary (ISS) have been obtained thanks to funding provided by the US National Science Foundation through grant EAR-9725140 (Villaseñor et al., 1997) and collected by SGA Storia Geofisica Ambiente (Bologna) on behalf of the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of the EUROSEISMOS project.

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

Villaseñor, A., and E.R. Engdahl, *A digital hypocenter catalog for the International Seismological Summary,* Seism. Res. Lett., vol. 76, no. 5, pp. 554-559, 2005.

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