

Original 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 have been scanned and collected by SGA Storia Geofisica Ambiente (Bologna) thanks to funding provided by the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of the EUROSEISMOS project.

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The International Seismological Summary for 1921 January, February, March.

FORMERLY THE BULLETIN OF THE
BRITISH ASSOCIATION SEISMOLOGY COMMITTEE.

The present number opens the fourth year of the Summary in its international form. The work of identifying the epicentres and times has been largely that of Mr. J. S. Hughes, B.A., of New College, Oxford, whose salary has been provided partly by the generosity of Dr. J. E. Crombie, of Dyce, Aberdeen, and partly by the Board of Scientific and Industrial Research, but in the present number considerable volunteer help was given by the Rev. Joseph Lynch, S.J., of Fordham University, New York, which is here gratefully acknowledged. The careful and orderly arrangement of readings from the various (and by this time numerous) observatories has been the work of Miss E. F. Bellamy. Much of the routine calculation was done by the late Mr. S. Dolman, who died nearly a year ago, and has not yet been replaced.

Those who were associated with this work before it had developed into the present International Summary will learn with deep regret of the death of Mr. Howard Burgess, who helped Professor Milne, at first with the printing of results (for he was a printer on his own account in Newport, Isle of Wight, of which Milne's home, Shide, was a suburb), and later in all details of the work; which he also carried on, under comparatively slight superintendence from West Bromwich and Oxford, for some years after Milne's death, until war conditions made continuance impossible. Before he left Newport he had become associated with the Isle of Wight County Press, and took with him the seismological printing. It will be seen from the imprints that this arrangement still continues to our satisfaction. The funds for printing are provided by the International Union of Geodesy and Geophysics.

The work started by Milne was transferred to Oxford, when Mrs. Milne returned to Japan in 1919, and the house and observatory were consequently sold. At the moment of writing they are apparently again in the market.

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The present number of the Summary deals with 61 epicentres, 31 of which are new and 30 are repetitions from old epicentres. There are five cases of abnormal focus, all in March :

Date.	Epicentre.	Focus.
d. h.		
Mar. 4 12	29°0N. 139°0E.	+·060
Mar. 6 7	26·5N. 109·0W.	-·020
Mar. 23 22	5·5S. 130·0E.	+·060 ?
Mar. 24 1	5·5S. 130·0E.	+·060 ?
Mar. 30 15	7·6S. 128·3E.	+·040

The sign + means below normal, - above. The unit is the earth's radius.

Attention may also be called to the small Japanese shock on Jan. 9d. 18h. It seems possible that it reached La Paz in the form of [P], though intermediate readings fail, except L for De Bilt. If so the large residual (-61s.) indicates a very deep focus, which there are no other means of checking. Other cases have been noticed where [P] waves seem to be received near the antipodes of the epicentre, though not much is noticed at intermediate stations. The point seems worthy of special attention.

At the Madrid meeting of the International Union it was suggested that "where possible it should be noted whether a wave was condensational or dilatational, by adding the letter C or D to the readings" (see *Intro. to Summary for 1920 July, Aug., Sept.*, p. 101). But such cases are apparently rare: None were found in the readings of De Bilt, Strasbourg, and Uccle for the months treated below. Enquiry is being made as to a possible misunderstanding.

The name of the Observatory at Vieques was changed in August 1920 to Porto Rico Observatory; and this change has been followed in the Summary.

H. H. TURNER.

University Observatory, Oxford.
1925 March 25.

P.S.—A few days after sending the above to press a letter was received from Mr. Jodo Horikawa from Hakodate, dated Feb. 17, giving the news that his aunt, Mrs. Milne, died at Hakodate on Jan. 30, after a long illness.

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1921 JANUARY, FEBRUARY, & MARCH.

Jan. 1d. 10h. 59m. 13s. Epicentre 45°0N. 16°0E. (as on 1920 July 30d.).

$$A = +.680, B = +.195, C = +.707.$$

	Δ	P.	O-C.	S.	O-C.	L.	M.
	o	m. s.	s.	m. s.	s.	m.	m.
Padova	2.9	0 49	+ 4	1 26	+ 6	—	2.1
Florence	3.6	0 54	- 2	—	—	—	1.1
Rocca di Papa	4.0	2 17	?L	—	—	(2.3)	2.8
Zurich	5.6	e 1 40	+13	—	—	—	—

Zurich gives also eV = +1m.35s. and iE = +1m.57s.

Jan. 1d. Readings also at 0h. (San Fernando and Taihoku), 5h. (Vienna and Algiers), 7h. (near Oaxaca), 8h. (Victoria and near Tacubaya (2)), 11h. and 18h. (Apia), 13h. (near Tacubaya), 20h. (La Paz), 22h. (Helwan).

1921. Jan. 2d. 7h. 6m. 20s. Epicentre 43°5N. 153°0E.

(As on 1915 June 27d.).

$$A = -.646, B = +.329, C = +.688; \quad D = +.454, E = +.891; \\ G = -.613, H = +.312, K = -.725.$$

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	o	o	m. s.	s.	m. s.	s.	m.	m.
Ootomari	7.9	297	1 58	- 2	—	—	2.8	3.8
Hakodate	9.2	263	2 16	- 3	(3 41)	-27	3.7	4.9
Mizusawa	9.9	248	2 18	-11	3 49	-37	—	—
	9.9	248	—	—	3 53	-33	—	—
Mito	11.9	237	2 52	- 6	(4 40)	-37	4.7	6.9
Tokyo	12.9	237	2 50	-22	3 50	-112	5.0	6.9
Nagoya	14.9	241	3 30	- 8	(6 15)	-15	6.2	6.9
Osaka	16.2	243	4 48	+53	—	—	7.8	8.9
Kobe	16.4	243	3 48	- 9	6 49	-15	8.1	—
Taihoku	31.6	244	—	—	—	—	12.1	—
Manila	39.8	233	e 5 42	-131	9 53	-250	11.6	11.7
Victoria	55.4	53	-0 12	?	6 41	?	17.0	29.8
Simla	59.5	286	—	—	18 46	+29	—	—
Batavia	64.8	233	e 10 40	- 4	i 19 17	- 6	—	—
Hamburg	77.9	339	i 12 6	0	e 22 31	+32	e 44.7	—
Edinburgh	78.6	347	—	—	—	—	—	—
Esksdalemuir	79.1	346	—	—	e 22 19	+ 6	39.3	49.7
Stonyhurst	80.5	346	22 28	35	(22 28)	- 1	—	51.7
De Bilt	80.4	341	12 56	+35	22 19	- 9	40.7	45.1
Ann Arbor	80.2	39	25 46	—	—	—	—	—
Vienna	80.6	333	i 12 21	-?	—	—	—	—
Toronto	81.1	35	—	—	e 22 31	+ 1	—	51.7
Uccle	81.8	341	12 27	- 2	e 25 22	+166	49.0	58.0
Ottawa	81.1	32	—	—	e 25 19	-25	e 40.7	48.5
Oxford	82.2	344	—	—	e 22 40	+ 4	e 44.9	—
Kew	82.3	344	—	—	i 22 38	-10	i 49.8	—
Strasbourg	83.0	338	11 32	-64	e 21 57	-60	e 43.7	51.7
Paris	84.2	341	e 12 42	- 1	e 23 1	- 9	45.7	51.6
Resançon	84.7	338	12 44	- 2	—	—	42.7	—
Padova	84.8	385	12 40	- 7	15.50,	1PR ₁	—	17.7
Harvard	85.5	31	—	—	—	—	45.3	—
Washington	85.9	37	—	—	e 23 20	- 9	—	—
Georgetown	85.9	37	—	—	e 23 23	- 6	—	—
Florence	86.3	333	12 55	0	—	—	—	52.6
Moncalieri	86.4	336	e 11 56	-59	(22 54)	-40	22.9	57.2
Rocca di Papa	87.6	331	i 12 52	-11	23 40	- 8	e 50.5	56.0
Pompeii	87.7	330	12 58	- 5	23 28	-21	—	—
Tortosa	91.4	340	13 17	- 6	—	—	e 45.7	53.5
Algiers	95.2	336	e 13 32	-12	e 24 58	-10	—	—
San Fernando	97.8	343	8 40	?	—	—	—	61.7
La Paz	136.0	65	i 19 38	[+ 6]	31 56	?	64.7	68.1

For Notes see next page.

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NOTES TO JAN. 2d. 7h. 6m. 20s.

Additional readings: Hakodate gives also MN = +3.8m. Tokyo MN = +7.6m. Osaka MN = +8.6m. Kobe LN = +7.3m. Eskdalemuir e = +27m.28s., L = +49.3m. De Bilt LN = +43.7m., MN = +45.8m. Epicentre 43° 2N. 148° 5E. Ann Arbor PN = +26m.10s. Vienna iPEN = +12m.20s. Toronto L = +54.4m. and +57.3m. Uccle SR₁N = +28m.34s. Ottawa eE? = +32m.40s., eE = +39m.0s. Strasbourg i = +11m.33s. Harvard L = +53.4m. San Fernando MN = +60.2m. La Paz i = +22m.28s. (iPR₁), T₀ = 7h.11m.26s.

Jan. 2d. Readings also at 1h. (La Paz), 2h. (La Paz and San Fernando), 4h. (Manila), 5h. (Zi-ka-wei), 9h. (Stonyhurst), 13h. (Manila and Taihoku), 16h. (Helwan).

Jan. 3d. 20h. 54m. 36s. Epicentre 22° 0S. 174° 0E. (as on 1918 June 5d.).

A = -092, B = +097, C = -0375; D = +104, E = +994;
G = +373, H = -039, K = -927.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Wellington	19.9	178	e 4 36	- 4	—	—	—	6.4
Sydney	23.2	235	e 5 24	+ 5	9 42	+13	12.0	13.9
Riverview	23.2	235	e 5 44	+25	10 9	+40	e 11.9	13.7
Melbourne	29.5	231	11 0	?S	(11 0)	-26	15.3	17.4
Adelaide	33.5	239	—	—	—	—	18.1	21.7
Perth	52.2	246	18 24	?	—	—	—	—
Victoria	89.9	36	45 45	?L	—	—	(45.8)	49.5
Toronto	116.8	50	—	—	—	—	e 49.8	50.5
San Fernando	121.3	0	25 24	PR ₁ ?	—	—	—	—
Vienna	148.2	330	e 19 43	[-10]	—	—	—	—
De Bilt	148.7	347	—	—	—	—	e 86.4	89.5
Uccle	150.2	347	—	—	—	—	83.4	90.4

Additional readings: Riverview gives eP = +5m.46s., eS = +10m.14s., MN = +13.3m., MZ = +13.9m. Melbourne S = +14m.6s. De Bilt MN = +89.6m. Apia gives a reading at 21hrs. only.

Jan. 3d. Readings also at 0h. (La Paz), 2h. (La Paz (2)), 3h. (La Paz and San Fernando), 5h. (La Paz), 6h. (La Paz and Athens), 7h. (San Fernando), 9h. (La Paz), 12h. (Apia and near Tokyo), 13h. (La Paz and Tokyo), 17h., 20h., and 21h. (La Paz), 22h. (Lick, Helwan, Osaka, and Kodaikanal).

Jan. 4d. Readings at 6h. (San Fernando and La Paz), 7h. (Batavia, Melbourne, and Riverview), 8h. (Helwan), 11h. (Taihoku), 14h. (La Paz and De Bilt), 19h. (Rio Tinto), 21h. (Algiers), 22h. (Taihoku).

Jan. 5d. Readings at 1h. (Lick), 3h. (near Tacubaya and Oaxaca), 7h. and 12h. (La Paz), 16h. (Wellington and near Tacubaya), 17h. (La Paz), 18h. (Lick), 19h. (La Paz and Taihoku), 22h. (Taihoku and Zi-ka-wei), 23h. (De Bilt, Helwan, Strasbourg, La Paz, Uccle, and Tortosa).

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1921. Jan. 6d. 11h. 59m. 56s. Epicentre 7°0S. 148°0E.

(as on 1920 Aug. 25d.).

A = -·842, B = +·526, C = -·122; D = +·530, E = +·848;
G = +·103, H = -·065, K = -·992.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview	27·0	174	e 6 24	+26	e 11 7	+26	e 13·1	16·5
Sydney	27·0	174	8 52	+174	13 28	+167	16·0	16·9
Adelaide	29·3	196	11 28	?S	(11 28)	+ 6	18·1	21·3
Melbourne	30·9	185	13 4	?SR ₁	17 28	?L	18·9	23·6
Manila	34·4	309	e 7 4	- 4	—	—	—	—
Perth	39·0	226	—	—	13 55	+ 3	25·4	—
Batavia	40·9	269	e 8 15	+13	—	—	27·8	—
Wellington	41·8	149	e 10 16	PR ₁ ?	e 14 22	-10	e 23·1	27·1
Zi-ka-wel	45·9	328	e 8 33	+ 6	e 15 15	-12	—	—
Mizusawa	E. 46·6	353	8 38	- 6	e 15 25	-11	—	—
	N. 46·6	353	8 19	-25	15 17	-19	—	—
Mauritius	87·7	250	—	—	—	—	—	48·2
Victoria	94·4	42	—	—	—	—	—	48·8
Helwan	116·5	299	31 4	?	57 4	?	58·6	—
Chicago	119·9	45	30 14	?	40 14	?	—	—
Vienna	122·0	324	—	—	—	—	e 63·6	71·1
Hamburg	122·5	332	—	—	—	—	e 61·1	—
Toronto	124·8	40	—	—	—	—	66·6	77·3
De Bilt	E. 125·6	331	e 31 10	?	e 49 58	?	e 63·1	73·4
	N. 125·6	331	e 32 58	?	—	—	e 64·0	74·2
Eskdalemuir	126·5	340	—	—	—	—	68·6	—
Strasbourg	126·6	328	—	—	e 65 16	?L	e 70·1	—
Uccle	126·8	330	—	—	e 31 4	+85	61·1	75·1
Rocca di Papa	127·4	319	19 4	?	28 4	-99	—	—
Kew	128·4	335	—	—	—	—	—	84·0
Besançon	128·5	327	62 10	?L	—	—	(62·2)	74·1
Moncalleri	128·8	325	e 2 2	?	—	—	67·7	77·2?
Paris	129·0	330	—	—	—	—	e 74·1	75·1
Tortosa	135·5	323	—	—	—	—	e 73·0	81·3
La Paz	137·2	124	19 44	[+10]	1 23 34	?	67·1	94·4

Additional readings: Riverview gives PS = +11m.23s. and +12m.39s. MNZ = +18·4m. Adelaide S = +14m.28s. Wellington e = +17m.52s. and +20m.52s. Toronto eL = +69·8m. and +76·0m. Rocca di Papa = +74·5m. Moncalleri increased by 1h. for L and M. Paris MN = +77·1m.

Jan. 6d. 23h. 9m. 45s. Epicentre 38°0N. 107°0E.

A = -·230, B = +·753, C = +·616; D = +·956, E = +·292;
G = -·180, H = +·588, K = -·788.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Zi-ka-wel	13·7	116	e 3 28	+ 6	—	—	—	—
Taihoku	17·8	133	—	—	—	—	e 9·1	—
Calcutta	E. 22·3	231	4 57	-12	—	—	8·0	—
	N. 22·3	231	5 9	0	—	—	8·2	—
Simla	25·4	263	—	—	e 8 27	-104	—	12·0
Manila	26·5	148	—	—	9 15	-77	—	—
Kodaikanal	38·4	231	20 15	?L	—	—	(20·2)	—
Batavia	44·2	180	—	—	—	—	e 20·9	24·0
Helwan	61·6	285	35 15	?L	—	—	(35·2)	—
Hamburg	64·0	320	—	—	—	—	e 33·2	—
De Bilt	E. 67·2	320	—	—	—	—	e 36·2	38·7
	N. 67·2	320	—	—	—	—	e 33·2	37·4
Strasbourg	67·8	315	—	—	—	—	e 36·3	—
Uccle	68·3	319	—	—	—	—	e 35·2	—
Eskdalemuir	69·4	325	—	—	—	—	39·2	—
Besançon	69·5	315	—	—	—	—	37·2	—
Moncalleri	69·8	311	—	—	—	—	36·6	—
Storrhurst	69·9	322	e 41 27	?L	—	—	(41·4)	—
Kew	70·3	321	—	—	—	—	—	43·2
Tortosa	76·5	312	—	—	—	—	e 39·2	41·9

Additional readings: Helwan gives also PN = +34m.15s. Moncalleri e = 23h.1m.25s.

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Jan. 6d. Readings also at 2h. (Kodaikanal), 3h. (Seychelles), 4h. (Manila and Kodaikanal (2)), 10h. (near Tacubaya), 13h. (La Paz), 16h. (Apia), 19h. (Rio Tinto), 20h. (Taihoku), 21h. (Apia).

1921. Jan. 7d. 1h. 0m. 36s. Epicentre 30°2S. 177°7W.

(as on 1918 Aug. 5d.).

A = -864, B = -035, C = -503; D = -040, E = +999;
G = +503, H = +020, K = -864.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Wellington	12.7	206	e 4 0	+51	i 6 0	+23	e 7.0	7.9
Riverview	26.6	254	e 5 42	-12	e 10 35	+2	e 12.5	14.9
Sydney	26.6	254	5 48	-6	10 24	-9	13.2	15.0
Melbourne	31.7	246	—	—	8 24	-219	16.7	18.9
Adelaide	36.9	256	12 48	?S	(12 48)	-34	18.6	22.9
Perth	56.0	250	—	—	16 44	-50	—	—
Manila	74.1	298	e 11 40	-3	—	—	12.6	—
Batavia	74.3	272	i 11 40	-4	i 21 7	-11	34.7	42.4
Berkeley	85.4	41	—	—	—	—	e 45.4	—
Victoria	92.4	33	—	—	(24 3)	-36	24.0	46.7
La Paz	97.7	114	13 50	-8	24 47	-46	46.4	49.8
Kodaikanal	107.9	272	55 0	?L	—	—	64.3	68.4
Chicago	109.6	53	—	—	—	—	68.4	—
Toronto	115.9	53	—	—	—	—	58.8	68.7
Eskdalemuir	154.6	7	—	—	—	—	53.4	—
Helwan	154.9	275	40 24	?SR ₁	—	—	—	—
Stonyhurst	156.0	7	e 80 54	?L ₁	—	—	(e 80.9)	93.4
Hamburg	156.2	349	e 19 56	[-7]	—	—	e 76.4	—
De Bilt	158.0	353	—	—	—	—	76.4	96.2
Kew	158.6	5	—	—	—	—	—	118.4
Vienna	159.1	333	i 20 0	[-7]	—	—	—	—
Uccle	159.3	355	e 21 1	[+54]	—	—	e 78.4	—
Strasbourg	161.2	349	20 2	[-7]	e 24 45	?PR ₁	e 27.4	—
Moncalieri	164.6	345	e 9 27	—	—	—	37.7	—
Rocca di Papa	165.7	327	i 20 10	[-2]	—	—	—	—
Tortosa	169.3	5	20 13	[-1]	—	—	e 80.4	92.6
Rio Tinto	169.4	42	96 24	?L	—	—	(96.4)	112.4
Granada	171.5	33	20 17	[+2]	30 4	?	—	—
Algiers	173.4	358	20 13	[-3]	e 26 40	?	—	—

Additional readings: Riverview MN = +13.6m., MZ = +14.8m. Melbourne SR₁ = +12m.18s. Adelaide S = +15m.54s. Batavia iN = +12m.24s., i = +14m.38s., i = +21m.51s. Toronto eL = +65.7m. and +75.0m. La Paz i = +18m.0s., T₀ = 1h.0m.37s. Helwan PN = +46m.24s. De Bilt e = +50m.18s., MN = +82.4m. Granada i = +22m.21s. and +25m.33s. Apia gives a reading at 1h. only.

1921. Jan. 7d. 2h. 51m. 11s. Epicentre 53°0S. 140°0E.

A = -461, B = +387, C = -799; D = +643, E = +786;
G = +612, H = -514, K = -602.

(Epicentre 48°0S. 134°0E. of 1919 Mar. 4d. was tried. It satisfied Sydney, Riverview, Christchurch, and Manila fairly well, but was wide of the mark in all other cases, particularly in the case of Adelaide, Perth, and Batavia).

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Melbourne	15.6	14	—	—	—	—	7.4	8.3
Adelaide	18.1	356	4 49	+31	6 43	-59	6.9	8.2
Sydney	20.7	27	4 43	-6	8 19	-19	10.1	11.1
Riverview	20.7	27	i 4 38	-11	e 8 23	-15	e 8.8	11.9
Christchurch	23.4	79	5 49	+28	10 13	+40	11.8	12.5
Wellington	26.0	77	e 5 49	+1	i 10 37	+15	e 12.8	16.3
Perth	27.3	311	6 21	+20	10 21	-25	11.8	—
Batavia	54.0	318	i 9 39	+6	—	—	—	20.9
Apia	54.6	63	—	—	—	—	8.8	—
Manila	69.6	340	e 10 49	-26	—	—	17.3	—
Cape Town	79.4	226	20 56	?S	(20 56)	-80	—	49.1
Kodaikanal	82.5	298	22 55	?S	(22 55)	+3	35.2	45.0

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Zi-ka-wei	85.8	344	e 19 50	?PR ₁	e 23 6	-22	—	—
Simla	100.3	309	—	—	—	—	e 47.4	50.0
La Paz	106.4	152	19 50	?PR ₁	31 2	?	e 53.8	73.6
Victoria	130.0	60	38 53	?	—	—	e 48.7	67.4
Athens	134.4	273	—	—	—	—	—	9.3
Rocca di Papa	143.5	274	e 19 49	[+ 3]	—	—	e 78.8	81.8
Padova	146.1	279	20 5	[+15]	—	—	—	—
Algiers	146.1	259	19 56	[+ 6]	—	—	—	77.8
Chicago	146.6	90	—	—	—	—	e 76.8	—
Moncalleri	148.3	275	e 10 17	?	—	—	—	20.9
Barcelona	149.7	266	—	—	—	—	e 82.6	—
Strasbourg	150.1	281	e 20 5	[+ 9]	—	—	—	—
Tortosa	150.2	263	20 14	[+18]	—	—	e 75.8	92.7
Hamburg	150.5	292	e 20 9	[+12]	—	—	e 82.8	—
San Fernando	151.2	252	—	—	—	—	—	82.7
Rio Tinto	152.4	250	78 49	?L	—	—	(78.8)	95.8
Toronto	152.6	94	—	—	—	—	—	80.3
De Bilt	153.0	287	—	—	—	—	e 76.8	92.0
Uccle	153.0	284	e 20 13	[+13]	—	—	e 74.8	—
Paris	153.3	279	—	—	—	—	e 83.8	91.8
Kew	155.9	283	—	—	—	—	—	98.8
Ottawa	155.7	94	—	—	—	—	e 78.3	—
Stonyhurst	157.9	285	e 50 1	?	—	—	—	99.3
Eskdalemuir	158.6	291	—	—	—	—	e 76.8	—
Edinburgh	158.6	293	—	—	—	—	—	95.8

Additional readings and notes : Riverview gives P = +4m.34s., MN = +12.4m., MZ = +10.5m. Epicentre 13°0S. 151°0E. T₀ = 2h.50m.59s. Batavia i = +14m.46s. and +20m.10s. La Paz i = +25m.38s. Eskdalemuir L = +94.8m. Toronto L = +46.3m., eL = +89.6m., +109.9m., and +119.9m. Ottawa LE = +99.8m., +107.3m., and +114.8m. Paris MN = +93.8m. De Bilt eL = +43.4m., MN = +100.6m.

Jan. 7d. 9h. 42m. 25s. Epicentre 38°0N. 107°0E. (as on Jan. 6d.).

A = -230, B = +753, C = +616; D = +956, E = +292;
G = -180, H = +588, K = -788.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Zi-ka-wei	E.	13.7	116	e 3 19	-3	e 6 8	+ 7	—
Taihoku		17.8	133	—	—	—	—	e 8.6
Calcutta	E.	22.3	231	4 29	-40	8 29	-42	12.6
	N.	22.3	231	4 29	-40	8 35	-36	13.4
Osaka		23.1	90	5 22	+ 4	—	—	—
Tokyo		26.2	85	10 29	?S	(10 29)	+ 3	e 16.3
Manila		26.5	148	e 6 1	+ 8	10 23	- 9	e 14.8
Batavia		44.2	180	—	—	—	—	e 23.3
Konigsberg	E.	57.8	317	—	—	25 42	?	33.4
	N.	57.8	317	—	—	e 23 22	?SR ₁	e 30.8
Helwan	E.	61.6	285	37 35	?L	—	—	(37.6)
Vienna		63.0	312	10 28	- 4	—	—	e 28.1
Hamburg	E.	64.0	320	—	—	—	—	e 31.6
De Bilt		67.2	320	—	—	—	—	e 36.7
Strasbourg		67.8	315	e 36 20	?L	39 28	?	41.4
Uccle		68.3	319	—	—	—	—	e 36.6
Rocca di Papa		68.5	307	e 10 43	-25	—	—	e 39.6
Edinburgh		69.0	325	—	—	—	—	—
Eskdalemuir		69.4	325	—	—	39 22	?	43.6
Moncalleri		69.8	311	9 36	-100	32 27	?L	33.7
Stonyhurst		69.9	322	e 39 47	?L	—	—	(e 39.8)
Kew		70.3	321	—	—	—	—	46.1

Additional readings : Tokyo gives also eS = +13m.58s. Manila MN = +16.7m. Helwan PN = +30m.3s. Hamburg MN = +38.7m. De Bilt eN = +40m.20s., eE = +41m.18s., MN = +43.9m.

Jan. 7d. Readings also at 7h. and 8h. (Colombo), 10h. (Taihoku), 11h. (near Tacubaya), 17h. (Apia, Wellington, Riverview, and near Batavia), 18h. (San Fernando and near Osaka), 19h. (Helwan, near Tokyo, and near Mizusawa), 21h. (Lack), 23h. (La Paz).

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Jan. 8d. 6h. 35m. 27s. Epicentre 14°5N. 94°0W.

A = -068, B = -966, C = +250 ; D = -998, E = +070 :
G = -017, H = -249, K = -968.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Tacubaya	7.0	315	2 26	—	—	—	3.9	4.6
Chicago	27.9	10	6 9	+ 2	10 51	- 6	13.3	—
Georgetown	28.6	28	e 5 19	-55	11 17	+ 7	e 15.0	—
Washington	28.6	28	6 15	+ 1	11 27	+17	—	—
Ann Arbor	29.2	16	7 21	+61	11 39	+19	16.3	17.6
E. N.	29.2	16	7 9	+49	—	—	16.1	—
Ithaca	31.8	26	e 7 11	+26	12 26	+21	19.3	—
Harvard	34.2	30	—	—	—	—	14.3	—
Ottawa	34.5	23	7 8	- 1	12 50	+ 2	e 16.0	—
La Paz	40.2	140	e 7 59	+ 2	14 8	- 2	19.8	21.0
Uccle	84.0	39	—	—	—	—	e 39.5	—
De Bilt	84.1	38	—	—	e 24 33	+84	e 39.6	42.4
Taihoku	127.4	318	—	—	—	—	e 75.6	—

Additional readings: Georgetown gives eSN = +10m.50s. Ithaca eN = +8m.19s., e = +14m.33s. Harvard LE = -20s. Ottawa PR₁ = +8m.15s., PR₂ = +8m.25s., L = +17.6m., T₀ = 6h.35m.23s.

Jan. 8d. Readings also at 2h. (Barcelona and Rocca di Papa), 12h. and 13h. (La Paz), 15h. (La Paz, Helwan, and San Fernando), 16h. (De Bilt), 17h. (Lick), 21h. (Tokio and San Fernando).

1921. Jan. 9d. 12h. 55m. 0s. Epicentre 14°0S. 74°5W.

(as on 1916 Oct. 3d.).

A = +259, B = -935, C = -242 ; D = -964, E = -267 :
G = -065, H = +233, K = -970.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
La Paz	6.6	112	11 45	+ 4	3 0	0	3.8	4.0
Balboa Hts.	E. 23.5	347	5 12	-11	9 24	-11	12.2	9.5
N. 23.5	347	5 8	-15	9 16	-19	12.0	9.7	
N. 23.5	347	5 13	-10	9 25	-10	11.9	9.9	
Washington	53.0	357	9 16	-10	—	—	—	—
Georgetown	E. 53.0	357	9 21	- 5	16 42	-14	e 23.4	—
N. 53.0	357	9 17	- 9	16 41	-15	—	—	
Ithaca	56.5	358	—	—	17 23	-17	34.5	—
Harvard	56.5	3	—	—	—	—	33.0	—
Chicago	57.0	348	9 40	-12	17 28	-18	27.3	—
Ann Arbor	E. 57.0	352	—	—	17 12	-34	27.8	—
Toronto	57.8	356	—	—	1 18 12	+16	30.3	35.0
Ottawa	59.4	359	10 2	- 6	18 4	-12	28.7	—
Victoria	75.9	329	—	—	—	—	21.6	43.3
Coimbra	E. 81.7	44	—	—	27 46	+ ?SR ₁	39.0	45.9
N. 81.7	44	14 26	+117	25 30	—	—	36.5	—
San Fernando	81.7	49	21 30	?	—	—	45.0	54.0
Rio Tinto	81.9	48	28 0	?SR ₁	—	—	—	61.0
Cape Town	84.6	124	23 12	?S	(23 12)	- 3	(42.0)	45.2
Tortosa	88.2	47	—	—	23 17	-37	36.0	51.4
Algiers	88.8	52	—	—	e 16 0	PR ₁ ?	47.5	57.0
Honolulu	89.2	292	—	—	e 25 42	+97	41.6	48.7
Barcelona	89.5	47	—	—	—	—	e 40.3	52.0
Oxford	90.8	37	—	—	1 23 40	-42	38.5	50.3
Stonyhurst	91.1	34	e 44 30	?L	—	—	(44.5)	52.5
Eskdalemuir	91.2	33	—	—	22 11	?	38.3	—
Kew	91.4	37	—	—	23 0	?	—	54.0
Edinburgh	91.5	32	—	—	—	—	47.0	51.5
Paris	92.2	40	—	—	e 23 45	-52	44.0	49.0

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Uccle	94.0	40	e 13 17	-21	e 23 50	-66	e 40.0	47.0
De Bilt	94.8	37	—	—	24 4	-60	45.0	50.2
Strasbourg	95.4	41	e 13 17	-28	—	—	48.0	—
Wellington	95.6	226	—	—	e 24 30	-42	e 49.4	73.0
Rocca di Papa	97.2	49	e 13 25	-30	—	—	56.1	64.1
Hamburg	98.1	37	13 0	-61	—	—	49.0	—
Vienna	101.0	42	e 17 48	PR ₁ ?	—	—	52.5	59.5
Konigsberg	104.3	37	—	—	—	—	53.6	—
Helwan	110.5	63	25 30	?S	(25 30)	-123	—	—
Riverview	115.2	221	—	—	—	—	e 57.3	61.7
Melbourne	116.3	214	—	—	—	—	e 62.0	65.0

Additional readings: La Paz i = +2m.15s., T₀ = 12h.55m.13s. Epicentre 13°-08. 72°-5W. Ann Arbor SN = +17m.6s. Toronto e = +25m.0s., eL = +32.5m. and +44.4m. Oxford eS = +23m.3s. Chicago L = +27.8m. Ottawa PR₁E? = +12m.34s., PR₂N? = +13m.25s., SR₁E? = +24m.14s., LE = +36.0m. and +40.0m. De Bilt eN = +24m.37s., LN = +43.0m., MN = +49.4m. Wellington e = +33m.34s., +41m.42s., +58m.30s., and +71m.18s. Helwan PN = +29m.6s. Riverview MN = +60.4m.

Jan. 9d. 13h. 54m. 50s. Epicentre 22°-5S. 173°-5W. (as on 1913 June 26d.).

A = -.918, B = -.104, C = -.383; D = -.113, E = +.994;
G = +.381, H = +.043, K = -.924.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Apa	8.9	11	2 10	-5	3 22	-39	5.0	5.3
Riverview	33.0	242	e 6 50	-6	e 12 10	-14	e 16.0	18.5
Sydney	33.0	242	12 58	?S	(12 58)	+34	17.7	18.8
Melbourne	38.6	237	—	—	—	—	19.7	23.2
Adelaide	43.4	242	—	—	—	—	—	26.8
Perth	62.5	244	2 33	?	—	—	—	—
Batavia	78.3	273	12 15	+6	22 2	-2	—	—
Taihoku	79.0	303	—	—	35 10	?	—	—
La Paz	97.2	111	22 18	?	—	—	48.2	51.8
Chicago	101.9	49	36 15?	?	44 10	?	e 51.5	—
Toronto	108.1	49	—	—	—	—	e 60.3	63.5
Ottawa	111.1	48	—	—	—	—	60.8	—
Kodaikanal	111.5	270	17 4	PR ₁	—	—	23.9	31.1
Cape Town	122.4	192	75 21	?L	—	—	(75.4)	—
Hamburg	149.1	356	e 19 55	[+ 1]	—	—	—	—
De Bilt	150.4	1	—	—	—	—	e 86.2	90.7
Uccle	151.7	3	e 20 7	[+ 9]	—	—	—	88.2
Vienna	153.1	345	e 19 10	[-50]	—	—	—	—
Paris	153.5	6	—	—	—	—	e 88.2	94.2
Strasbourg	153.9	358	e 20 1	[0]	—	—	—	—
Moncalieri	157.5	2	e 7 28	?	23 59	PR ₁	38.4	56.6
Marseilles	159.2	3	—	—	—	—	48.2	—
Rocca di Papa	160.1	347	1 20 13	[+ 5]	—	—	—	21.2
Tortosa	161.0	14	—	—	—	—	e 89.2	114.5

Additional readings: Riverview gives PR₁ = +8m.2s., MN = +17.5m. Ottawa LE = +68.7m. and +72.2m. Chicago L = +55.0m. De Bilt MN = +90.2m.

Jan. 9d. 18h. 55m. 50s. Epicentre 40°-0N. 136°-5E.

A = -.556, B = +.527, C = +.643; D = +.688, E = +.725;
G = -.466, H = +.442, K = -.766.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa E.	3.6	103	0 57	+ 1	1 43	+ 4	—	—
N.	3.6	103	1 0	+ 4	1 47	+ 8	—	—
Tokyo	5.0	149	1 15	- 2	—	—	1.7	—
Osaka	5.4	190	1 22	- 1	—	—	2.7	3.9
Kobe	5.4	192	1 23	0	2 18	-10	2.7	3.1
Zi-ka-wei	15.1	239	e 4 0	+20	—	—	e 9.3	—
De Bilt	78.7	332	—	—	—	—	e 47.2	—
La Paz	148.2	50	18 52	[-61]	—	—	—	—

Additional readings: Osaka MN = +3.0m. Kobe North readings for P, S, and L when diminished by 96s become the same as for east. Also MN = +3.0m.

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Jan. 9d. Readings also at 3h., 4h., 15h. (2), 16h., 17h. (2), and 18h. (La Paz), 19h. (La Paz and Colombo), 20h., 21h., and 22h. (La Paz), 23h. (La Paz (2) and Oaxaca).

Jan. 10d. Readings at 0h. (Paris), 1h. (La Paz), 3h. (La Paz), 4h. (La Paz and Perth), 7h. (2), 8h., 9h., 11h., and 15h. (La Paz), 20h. (La Paz and San Fernando).

Jan. 11d. Readings at 9h. (La Paz), 10h. (Melbourne), 17h. and 18h. (La Paz), 20h. (Batavia), 22h. (La Paz).

Jan. 12d. 14h. 53m. 10s. Epicentre 33°-5N. 131°-9E. (Suggested by the Meteorological Observatory, Japan).

$$A = -.557, B = +.621, C = +.552.$$

	Δ	P.	O-C.	S.	O-C.	L.	M.
	°	m. s.	s.	m. s.	s.	m.	m.
Matsuyama	0.8	10 26	+14	—	—	1 0.6	0.8
Kobe E.	2.9	0 50	+ 5	—	—	—	—
Osaka	3.2	0 41	- 9	(1 29)	+ 1	1.5	2.3
Gifu	4.5	1 12	+ 2	(2 2)	- 2	2.0	—

No additional readings.

Jan. 12d. Readings also at 0h. (La Paz), 1h. (Helwan), 2h. (Batavia), 9h. and 15h. (La Paz), 18h. (San Fernando), 21h. (Taihoku), 22h. (near Tacubaya), 23h. (La Paz).

Jan. 13d. Readings at 0h. (near Taihoku), 5h. (La Paz), 10h. (Melbourne), 11h. (San Fernando), 17h. (Vienna and near Padova (2) and Florence (2)), 19h. (La Paz, Apia, and Rio Tinto), 20h. (near Florence and Padova), 21h. (Zi-ka-wei, La Paz, and Taihoku), 22h. (De Bilt, Manila, and Helwan), 23h. (Florence).

Jan. 14d. Readings at 0h. (Colombo and near Padova and Florence), 2h. (La Paz), 3h. (Florence), 4h. (Taihoku (2) and La Paz), 6h. (San Fernando and La Paz), 7h. (La Paz, Manila, De Bilt, and near Zi-ka-wei, Taihoku, Osaka, and Tokyo), 9h. (Riverview and Florence), 18h. (Apia), 19h. (Honolulu), 20h. (La Paz and San Fernando).

Jan. 15d. Readings at 1h. (San Fernando), 7h. (near Tacubaya), 10h. (Vienna), 12h. (Melbourne, Riverview, and near Athens), 13h. (Toronto, Victoria, and Helwan), 15h. (Georgetown), 20h. (San Fernando), 23h. (Azores).

Jan. 16d. 23h. 55m. 48s. Epicentre 38°-8N. 32°-9E. (as on 1920 Feb. 26d.).

$$A = +.654, B = +.423, C = +.627; \quad D = +.543, E = -.840; \\ G = +.526, H = +.340, K = -.779.$$

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Athens	7.2	266	1 51	+ 2	e 2 55	-20	3.1	3.9
Helwan	9.1	189	5 12	?L	—	—	(5.2)	—
Belgrade	11.0	307	2 43	- 1	—	—	—	—
Pompeii	14.2	283	5 59	?S	(5 59)	-14	—	—
Vienna	15.2	314	i 3 47	+ 5	—	—	e 8.0	10.5
Rocca di Papa	15.6	287	i 3 50	+ 3	—	—	e 9.8	—
Padova	16.9	300	4 12	+ 8	9 13	?L	(9.2)	10.3
Moncalieri	19.6	296	4 38	+ 2	8 47	+32	11.4	13.8
Strasbourg	20.5	306	e 4 45	- 2	—	—	—	—
De Bilt	23.3	314	—	—	—	—	e 13.2	—
Uccle	23.3	310	e 5 19	- 1	e 9 24	- 7	—	—
San Fernando	30.8	278	10 12	?S	(10 12)	-96	—	—

Athens gives MN = +3.7m.

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Jan. 16d. Readings also at 0h. (Hamburg and San Fernando), 2h. (Taihoku), 4h. (La Paz (2)), 9h. (Victoria and Riverview), 10h. (Batavia), 13h. (Manila, Batavia, Helwan, and Taihoku), 16h. (La Paz), 21h. (Helwan).

Jan. 17d. Readings at 4h. (Wellington), 5h. (Apia), 6h. (Lick), 7h. (San Fernando), 13h. (La Paz), 14h. (Rio Tinto and La Paz), 17h. (La Paz), 20h. (San Fernando and Budapest), 22h. (Wellington).

Jan. 18d. Readings at 2h. and 3h. (La Paz), 4h. (Helwan), 6h. (San Fernando), 12h. (near Athens), 14h. (San Fernando), 19h. (Helwan).

Jan. 19d. 14h. 57m. 18s. Epicentre 45°·0N. 152°·1E. (as on 1918 Sept. 14d.).

A = -·625, B = +·331, C = +·707; D = +·468, E = +·884;
G = -·625, H = +·331, K = -·707.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari	6·7	294	1 49	+ 7	—	—	3·6	4·3
Mizusawa	10·0	238	2 37	+ 7	4 30	+ 1	—	—
Osaka	16·4	237	4 34	+37	—	—	—	11·1
Zi-ka-wei	27·6	251	e 6 2	- 2	e 10 42	-10	—	—
Manila	40·2	231	e 7 54	- 3	—	—	—	—
Victoria	55·1	54	—	—	16 10?	-72	24·5?	40·9
Konigsberg	72·1	333	—	—	—	—	40·4	46·2
Budapest	78·8	330	—	—	—	—	e 40·7	51·7
De Bilt	E. 78·8	340	—	—	—	—	e 42·7	50·8
Stonyhurst	78·8	345	e 18 42	?	—	—	—	53·7
Riverview	78·9	181	e 22 17	?S (e 22 17)	+ 6	e 41·1	e 41·1	46·3
Uccle	80·2	340	—	—	—	—	e 35·7	—
Toronto	80·2	35	—	—	—	—	1 33·3	34·8
Ottawa	E. 80·2	32	—	—	e 21 53	-32	47·2	—
Oxford	80·6	344	—	—	—	—	—	53·3
Strasbourg	81·4	337	e 12 5	-22	—	—	e 46·5	—
Paris	82·5	340	—	—	—	—	e 44·7	49·7
Harvard	84·5	31	—	—	—	—	50·7	—
Florence	84·6	332	20 42?	?	—	—	—	62·7
Helwan	87·8	312	22 42	?S (22 42)	-68	—	—	—
Wellington	88·6	164	—	—	—	—	e 44·5	—
Tortosa	90·5	339	—	—	—	—	e 47·7	—
Rio Tinto	95·0	343	44 42	?L	—	—	(44·7)	82·7
San Fernando	96·3	343	24 0	?S (24 0)	-79	—	—	65·7
La Paz	135·9	63	19 18	[-14]	—	—	—	—
Cape Town	143·1	271	22 54	?PR ₁	—	—	—	—

Additional readings: Mizusawa gives also PN = +2m.44s. Konigsberg LN = +40·9m. De Bilt eLN = +41·7m. MN = +53·6m. Riverview eS = +29m.57s. Toronto eL = +43·6m., eL = +54·2m. Helwan PN = +20m.42s. La Paz i = +23m.12s. (?PR₁). Eskdalemuir gives 15h. only.

Jan. 19d. Readings also at 0h. and 1h. (Wellington), 2h. (Apia), 4h. (Manila), 7h. (San Fernando), 14h. (Granada and Moncalieri), 15h. (Kodaikanal), 18h. (Stonyhurst, De Bilt, Mizusawa, Ootomari, and Wellington), 20h. (Colombo).

Jan. 20d. 2h. 2m. 24s. Epicentre 7°·0N. 82°·5W. (as on 1919 Sept. 27d.).

A = +·130, B = -·984, C = +·122; D = -·991, E = -·131;
G = +·016, H = -·121, K = -·992.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Balboa Hts.	3·5	55	1 22	+27	2 8	+31	2·6	2·8
Oaxaca	17·2	307	3 47	-20	7 19	- 3	8·2	9·2
Taoubaya	20·4	309	4 51	+ 5	9 3	+31	10·7?	12·2
La Paz	27·4	149	i 6 8	+ 6	i 11 0	+12	14·4	17·3
Georgetown	32·3	8	e 8 20	?PR ₁	—	—	—	17·9
Washington	32·3	8	5 45	-66	e 10 59	-74	18·3	—
Chicago	35·1	353	8 37	+83	15 30	?SR ₁	23·3	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Ann Arbor E.	35.3	359	7 12	- 4	12 36	-24	16.9	—
Ithaca	35.8	359	—	—	—	—	e 19.6	—
Toronto	36.7	4	3 48	?	10 36	?PR ₁	e 17.3	21.7
Ottawa	38.8	7	9 28	?PR ₁	13 41	- 8	e 16.2	—
Victoria	53.2	330	—	—	—	—	29.9	35.3
Honolulu	74.1	291	—	—	e 22 12	+57	e 35.3	41.3
San Fernando	74.8	54	24 36	?SR ₁	—	—	—	—
Stonyhurst	78.5	38	e 27 36	?SR ₁	—	—	—	—
Uccle	82.6	40	e 23 0	?S	(e 23 0)	+ 7	e 38.6	40.6
De Bilt	83.0	40	—	—	—	—	e 39.6	43.1
Helwan	106.8	56	66 36	?L	—	—	(66.6)	—

Additional readings: Balboa Heights PN = +1m.20s., MN = +3.4m.
 Georgetown ePN = +8m.18s., LN = +19.3m. Ann Arbor PN = +7m.0s.
 Toronto e = +15m.42s., eL = +19.8m. Ottawa EE = +20.2m. Helwan PN = +65m.36s.

Jan. 20d. Readings also at 1h. (Honolulu, Riverview, Apia, and Wellington), 2h. (San Fernando), 3h. (Helwan), 9h. (Taihoku), 12h. (Helwan), 18h. (Apia), 20h. (near Tacubaya), 22h. (Helwan), 23h. (La Paz).

Jan. 21d. Readings at 2h. and 3h. (Helwan), 6h. (La Paz), 15h. (Taihoku and near Athens), 17h. (La Paz), 21h. (San Fernando and Batavia).

Jan. 22d. Readings at 0h. (Taihoku), 1h. (Algiers), 7h. (Apia and Taihoku), 9h. (La Paz), 10h. (Algiers and La Paz), 11h. (Algiers), 12h. (Barcelona and near Tortosa and Granada), 13h. (Azores and La Paz), 18h. (Helwan), 22h. (San Fernando), 23h. (La Paz).

Jan. 23d. 16h. 18m. 57s. Epicentre 2°-0N. 20°-5W.

A = +.936, B = -.350, C = +.035; D = -.350, E = -.937;
 G = +.033, H = -.012, K = -.999.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
San Fernando E.	36.9	20	12 3	?S	(12 3)	-79	—	14.0
N.	36.9	20	13 3	?S	(13 3)	-19	—	15.0
La Paz	50.5	246	9 9	- 1	—	—	25.2	26.5
Uccle	53.1	20	—	—	e 16 57	0	e 27.0	—
De Bilt	54.5	20	—	—	—	—	e 28.0	31.0
Helwan	56.4	55	17 3	?S	(17 3)	-36	—	—

No additional readings.

Jan. 23d. Readings also at 2h. (La Paz), 3h. (Helwan, La Paz, and Apia), 5h. (Algiers), 9h. (Rocca di Papa and near Athens), 12h., 15h. and 18h. (Wellington), 20h. (La Paz), 21h. (Wellington), 22h. (San Fernando), 23h. (Wellington).

Jan. 24d. 11h. 16m. 36s. Epicentre 12°-2S. 118°-0E.

A = -.459, B = +.863, C = -.211; D = +.883, B = +.470;
 G = +.099, H = -.187, K = -.977.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia	12.5	297	3 6	0	15 32	0	16.4	7.3
Manila	26.9	6	e 5 57	0	—	—	—	—
Kodaikanal	46.1	297	9 48	+67	—	—	14.4	16.0
Wellington	57.2	133	—	—	—	—	e 45.0	—
Helwan	93.2	300	31 24	?	—	—	—	—
La Paz	150.7	168	20 29	[+32]	—	—	—	—

Additional readings: Batavia gives also i = +7m.0s. Helwan PN = +34m.24s.

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Jan. 24d. Readings also at 0h. (Wellington), 1h. (Helwan), 3h. (Wellington and La Paz), 10h. (Zi-ka-wei), 16h. (Colombo), 19h. (La Paz), 22h. (San Fernando), 23h. (Mizusawa).

Jan. 25d. 10h. 27m. 55s. Epicentre 41°-9N. 142°-1E. (suggested by Meteorological Observatory, Japan).

$$A = -.587, B = +.457, C = +.688.$$

	Δ	P.	O-C.	S.	O-C.	L.	M.
	°	m. s.	s.	m. s.	s.	m.	m.
Hakodate	1-0	e 0 15	- 0	—	—	0-5	0-7
Sapporo	1-3	0 23	+ 3	(0 40)	+ 4	0-7	—
Mizusawa	E. 2-9	0 37	- 8	1 13	- 2	—	—
Mito	5-7	1 12	-16	(2 21)	-15	2-4	—
Tokyo	6-5	1 22	-17	—	—	e 1-9	1-9

Additional readings: Hakodate gives also MN = +0.6m. Mizusawa PN = +0m.38s.

Jan. 25d. Readings also at 1h. (Taihoku), 3h. (near Tokyo), 8h. (San Fernando), 13h. (near Kobe), 16h. and 18h. (near Tacubaya), 19h. and 21h. (La Paz), 22h. (Marseilles).

Jan. 26d. 17h. 55m. 8s. Epicentre 4°-0N. 97°-0E. (as on 1916 July 27d.).

$$A = -.112, B = +.990, C = +.070; \quad D = +.993, E = +.122; \\ G = -.009, H = +.070, K = -.998.$$

	Δ	Az.	P.	O-C.	S.	O-C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Batavia	14-1	136	1 3 17	-10	—	—	e 8-9
Manila	25-8	65	e 5 40	- 6	—	—	—
Zi-ka-wei	35-6	37	e 9 44	?PR ₁	e 13 8	+ 4	—
La Paz	160-8	224	20 15	[+ 6]	—	—	—

Batavia gives also iS = M = +4m.42s.

Jan. 26d. Readings also at 3h. (Helwan and near Athens), 4h. (San Fernando), 10h. (Fordham and near Manila), 13h. (2) and 14h. (La Paz), 23h. (San Fernando).

Jan. 27d. 11h. 30m. 9s. Epicentre 36°-0N. 28°-0E. (as on 1919 Aug. 24d.).

$$A = +.714, B = +.380, C = +.588; \quad D = +.470, E = -.883; \\ G = +.519, H = +.276, K = -.809.$$

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Athens	3-9	302	1 15	+14	1 54	+ 7	2-0	2-1
Helwan	6-7	154	3 51	?L	—	—	(3-8)	—
Belgrade	10-5	329	2 14	-23	—	—	—	—
Pompeii	E. 11-6	298	3 43	+50	4 13	-56	—	—
Budapest	13-2	333	—	—	—	—	e 7-4	10-4
Rocca di Papa	13-2	301	7 3	?L	—	—	(7-0)	7-8
Padova	15-4	312	—	—	—	—	—	11-0
Konigsberg	19-5	347	—	—	—	—	11-8	12-8
Besançon	19-8	312	—	—	8 10	- 9	—	12-8
Algiers	20-0	280	e 4 41	0	—	—	—	—
Hamburg	21-6	330	—	—	—	—	e 10-8	13-8
Uccle	22-5	318	—	—	e 9 8	- 7	—	—
De Bilt	22-8	322	—	—	e 9 18	- 3	e 12-4	15-6

Additional readings and notes: Helwan gives also PN = +7m.51s. Budapest readings have been increased by 30m. De Bilt MN = +12-9m.

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Jan. 27d. Readings also at 0h. (Batavia), 1h. (Apia), 5h. (La Paz), 9h. (near Tacubaya), 12h. (Fordham), 14h. (Granada, La Paz, San Fernando, Uccle, De Bilt, Algiers and Helwan), 17h. (near Mizusawa), 18h. (La Paz, near Athens, and near Mizusawa), 22h. (San Fernando, near Chur, and Zurich), 23h. (near Tacubaya).

Jan. 28d. Readings at 4h. (La Paz), 8h. (San Fernando), 10h. (Helwan), 15h. (Melbourne and Helwan), 23h. (La Paz and San Fernando).

Jan. 29d. Readings at 4h. (Wellington), 20h. (San Fernando and La Paz), 21h. (Helwan and De Bilt), 22h. (near Padova and Florence).

Jan. 30d. 18h. 58m. 38s. Epicentre 0°-5S. 93°-0W.

$$A = -.052, B = -.999, C = -.009; \quad D = -.999, E = +.052; \\ G = .000, H = +.009, K = -1.000.$$

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Oaxaca	E.	17.9	349	5 8	+52	8 42	+64	9.6	10.4
Tacubaya	E.	20.8	343	4 47	-4	8 34	-6	9.6	10.1
La Paz		29.2	124	e 6 20	0	11 20	0	14.4	16.1
Victoria		55.5	336	9 46?	+ 3	—	—	—	28.4
De Bilt	E.	95.4	38	—	—	—	—	e 45.4	—

De Bilt gives also eLN = +48.4m.

Jan. 30d. Readings also at 0h. and 4h. (Helwan), 5h. (Wellington (2)), 7h. (Manila and Batavia), 10h. (Manila, Batavia, and near Tokyo), 14h. (La Paz, Toronto, and Riverview), 18h. (Nagasaki), 20h. (La Paz and near Tacubaya).

Jan. 31d. Readings at 0h. (Malabar, Batavia, and Toronto), 9h. (Batavia), 20h. (Rocca di Papa), 21h. (La Paz), 23h. (Lick).

Feb. 1d. Readings at 0h. (Tokyo), 3h. (Hokoto, Taihoku, and Zi-ka-wei), 7h. (La Paz and near Pompeii and Rocca di Papa), 8h. (Helwan), 11h. (La Paz), 13h. (near Padova), 14h. (La Paz), 19h. (Taihoku).

Feb. 2d. Readings at 1h. (Lick (3) and Taihoku), 2h., 3h., and 4h. (La Paz), 8h. (Apia), 15h. (Algiers and near Tacubaya).

Feb. 3d. Readings at 0h. (Lick), 10h. (Rocca di Papa), 12h. (Lick and near Tacubaya), 13h. (Lick), 15h. (Algiers and near Tacubaya), 17h. (Rocca di Papa), 19h. (Batavia, Colombo, De Bilt, Helwan, Manila, Taihoku, and Uccle), 20h. (Zi-ka-wei).

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1921. Feb. 4d. 8h. 22m. 35s. Epicentre 16°5N. 89°5W.

A = +.009, B = -.959, E = +.284; D = -1.000, E = -.009;
G = +.002, H = -.284, K = -.959.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		m. s.	o.	m. s.	m. s.	m. s.	s.	m.	m.
Oaxaca		7.0	276	1 31	-15	—	—	2.1	2.2
Tacubaya	E.	9.7	289	1 46	-40	—	—	3.1	3.7
Balboa Heights	N.	12.2	127	3 7	+ 5	5 55	+31	9.9	4.3
	E.	12.2	127	3 8	+ 6	6 12	+ 48	9.8	10.1
	N.	12.2	127	3 5	+ 3	4 35	-49	8.6	9.3
	E.	12.2	127	3 6	+ 4	5 52	+28	9.3	9.6
	N.	12.2	127	3 6	+ 4	5 52	+28	9.3	9.6
Port au Prince		16.5	80	i 5 35	?	(7 1)	- 6	7.0	10.4
Mazatlan	E.	17.3	296	1 12	?	3 52	?P	5.3	6.5
St. Louis	E.	22.2	358	i 5 31	+24	9 13	+ 4	9.6	—
	N.	22.2	358	i 5 7	0	9 7	- 2	—	—
Porto Rico	E.	23.0	82	5 45	+28	9 55	+30	12.1	13.8
	N.	23.0	82	—	—	—	—	12.2	12.6
Cheltenham	E.	24.8	24	e 5 37	+ 1	i 10 45	+46	14.5	16.4
	N.	24.8	24	e 5 39	+ 3	e 10 46	+47	e 15.3	15.8
Georgetown	E.	24.8	23	5 46	+10	11 3	+64	—	15.8
	N.	24.8	23	5 42	+ 6	11 16	+77	—	17.9
Washington	E.	24.8	23	4 45	-51	9 58	- 1	13.2	15.8
Tucson	E.	24.9	313	5 8	-29	i 9 19	-42	10.9	12.6
	N.	24.9	313	5 9	-28	—	—	12.1	13.1
Chicago		25.3	3	2 30	?	9 59	-10	18.5	10.4
Ann Arbor	E.	26.3	10	6 13	+22	11 13	+45	13.8	18.2
	N.	26.3	10	6 7	+16	11 1	+33	13.8	22.4
Ithaca		28.3	20	e 6 15	+ 4	e 11 43	+39	14.9	—
Toronto		28.4	15	i 6 49	+37	i 12 13	+67	i 17.2	19.5
Harvard	E.	30.3	27	e 6 28	- 3	12 4	+25	e 14.0	21.4
	N.	30.3	27	i 6 25	- 6	11 37	- 2	14.4	—
Ottawa		31.1	21	6 36	- 3	11 48	- 5	e 14.8	19.6
Northfield		31.1	25	6 37	- 2	11 50	- 3	15.2	22.4
Lick	E.	35.1	314	e 7 2	-12	e 11 54	-63	e 16.0	21.0
	N.	35.1	314	e 6 59	-15	e 11 53	-64	e 16.2	17.0
Halifax		35.6	32	7 44	+26	13 50	+46	e 13.4	24.4
Berkeley	E.	35.9	315	e 7 44	+23	e 13 5	- 4	e 17.4	19.4
	N.	35.9	315	e 8 6	+45	e 13 5	- 4	e 17.4	18.9
	V.	35.9	315	e 7 44	+23	e 13 7	- 2	e 17.4	—
La Paz		39.2	147	i 7 45	- 3	i 13 49	- 5	18.8	20.6
Victoria		42.2	328	7 47	-25	13 11	-87	21.6	25.5
	Z.	42.2	328	7 51	-21	13 35	-63	17.2	27.6
Azores		59.4	56	15 43	?	—	—	—	19.7
Colmbra	E.	72.7	52	10 51	-43	19 47	-71	34.9	37.5
	N.	72.7	52	—	—	i 20 22	-36	31.6	37.1
Eskdalemuir		74.3	37	11 47	+ 3	21 48	+30	—	48.1
Edinburgh		74.4	37	11 51	+ 6	21 29	+10	36.4	47.5
Rio Tinto		74.4	55	16 25	?	—	—	—	49.4
Dyce	E.	74.8	35	i 11 33	-15	21 18	- 6	30.4	41.6
	N.	74.8	35	i 11 33	-15	21 33	+ 9	30.4	41.1
Stonyhurst		75.0	39	i 12 13	+24	21 49	+23	37.2	48.3
San Fernando		75.0	57	12 13	+24	22 1	+35	36.7	52.4
Oxford		76.0	40	i 12 5	+10	21 55	+18	37.6	44.4
Kew		76.7	40	18 25	?	—	—	—	50.4
Granada		76.9	55	i 12 1	+ 1	i 22 28	+40	—	—
Paris		79.0	43	e 12 25	+12	i 22 23	+11	34.4	43.4
Tortosa		79.3	50	12 31	+16	22 34	+19	34.7	—
Ucele		79.7	40	i 12 22	+ 5	i 22 31	+11	34.4	42.5
De Bilt		79.8	39	12 26	+ 8	22 36	+15	39.0	42.9
Barcelona		80.4	50	e 12 33	+12	—	—	e 35.3	43.4
Besançon		81.6	44	12 36	+ 8	22 26	-16	39.4	—
Marselles	E.	82.2	47	e 12 55	+24	23 8	+20	e 38.4	44.8
Algiers		82.2	54	12 41	+10	22 53	+ 5	33.4	43.9
Hamburg		82.3	37	e 12 40	+ 8	i 22 55	+ 6	e 40.0	41.4
Strasbourg		82.4	42	12 35	+ 3	i 22 51	+ 1	e 37.0	46.5
Zurich		83.2	44	e 12 37	0	e 23 1	+ 2	—	55.1
Moncalieri		83.4	45	12 43	+ 5	22 46	-15	36.4	46.6
Padova		86.0	44	13 3	+10	23 24	- 6	40.2	49.9
Florence		86.1	46	12 25	-29	22 25	-66	—	—
Konigsberg	E.	87.5	33	13 6	+ 4	i 23 22	-25	43.2	—
	N.	87.5	33	13 4	+ 2	i 23 22	-25	e 37.5	—
	Z.	87.5	33	i 13 1	- 1	23 27	-20	42.7	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Pola	87.5	44	e 12 46	-16	i 23 17	-30	e 37.9	54.7
Rocca di Papa	87.8	48	i 13 10	+ 6	i 23 28	-22	e 37.1	48.1
Vienna	87.9	40	i 13 4	0	i 24 28	+37	e 43.9	50.9
Pompei	E. 89.4	48	13 27	+15	23 42	-25	—	47.4
Budapest	89.8	39	e 13 45	+30	e 18 25	?PR ₁	e 49.4	52.4
Lemberg	91.7	37	e 13 19	- 6	e 23 43	-49	e 46.6	58.6
Athens	E. 96.9	47	e 13 38	-16	i 24 21	-64	e 44.4	55.7
Wellington	105.0	230	e 14 1	-33	24 37	-125	e 47.2	—
Helwan	E. 106.6	51	19 1	?PR ₁	—	—	—	75.7
	N. 106.6	51	21 25	?	—	—	—	77.4
Cape Town	113.8	120	20 3	?PR ₁	36 2	?SR ₁	—	61.6
Sydney	123.2	240	19 55	?PR ₁	25 37	-216	30.4	31.0
Riverview	123.2	240	—	—	e 30 11	+58	e 54.8	56.2
Zi-ka-wei	123.8	328	e 20 53	?PR ₁	—	—	—	—
Melbourne	128.0	234	—	—	31 31	+104	58.2	69.9
Taihoku	128.6	322	e 36 25	?	—	—	e 77.4	—
Simla	130.7	15	21 25	?PR ₁	41 7	?SR ₁	65.1	68.1
Adelaide	133.5	236	—	—	21 13	?PR ₁	31.2	42.7
Manila	136.7	315	22 15	?PR ₁	37 10	?	73.8	74.6
Bombay	141.6	26	19 42	[0]	—	—	—	—
Kodaikanal	150.0	27	28 1	?	—	—	36.4	37.8
Perth	152.4	232	18 55	?	—	—	—	—
Colombo	154.3	25	36 25	?	—	—	43.4	44.4
Batavia	161.1	301	20 4	[- 5]	—	—	e 81.4	—

Additional readings and notes: Oaxaca reading has been increased by 5m. Port au Prince gives S = +5m.57s. Mazatlan readings are given as at 9h. Porto Rico PR₁ = +6m.25s., SR₁E = +11m.0s., SR₁N = +10m.50s. Cheltenham PR₁ = +5m.59s., SR₁E = +11m.54s. Washington MN = +14.8m. Tucson PR₁ = +5m.33s., SR₁N = +9m.47s. Toronto iS? = +13m.7s., iL = +18.7m., eL = +31.8m. Harvard iE = +6m.49s., iN = +6m.55s., +7m.47s., +12m.33s., and +13m.9s., T₀ = 8h.22m.13s. Ottawa LE = +40.4m. and +52.4m., T₀ = 8h.22m.37s. Halifax PR₁ = +8m.57s., L = +37.4m., T₀ = 8h.22m.36s. Berkeley PV = +8m.7s., PE = +8m.8s., T₀ = 8h.23m.34s. La Paz i = +14m.48s. and +17m.9s., LE = +19.1m., T₀ = 8h.22m.40s. Edinburgh PR₁ = +15m.43s. San Fernando MN = +43.5m. Granada gives its readings as on 5d. Uccle i = +23m.24s., MN = +50.0m. Epicentre 15°N. 90°W. De Bilt PR₁E = +15m.43s., MN = +43.9m. Hamburg MN = +53.7m. Strasbourg MN = +47.6m., MZ = +49.7m. Moncalieri MN = +47.2m. Konigsberg PR₁ = +16m.38s., SR₁ = +30m.0s., eLE = +38.2m. Pola MN = +48.6m. Vienna iSN = +24m.34s., iE = +24m.56s. and +29m.7s., MZ = +49.9m. Athens ePN = +13m.14s. Wellington e = +22m.35s., = +24m.37s., +27m.19s., and +32m.25s. Riverview ePR₁ = +19m.59s., eSR₁ = +30m.59s., and +36m.35s., L Rep. = +113.9m. Melbourne ePR₁ = +20m.37s. Manila e = +19m.42s.?[P], O-C = +9s., PN = +22m.49s., MN = +75.6m. Batavia i = +11m.11s., +27m.21s., +34m.15s., and +37m.48s., eL = +43.4m. and +106.4m.

Feb. 4d. Readings also at 1h. (Zi-ka-wei), 3h. (Taihoku), 8h. (Riverview), 9h. (Kodaikanal and La Paz), 10h. (Taihoku), 13h. (Batavia), 16h. (Wellington), 18h. (Apia), 19h. (near Tacubaya (3)), 21h. (La Paz and near Tacubaya).

Feb. 5d. Readings at 3h. (Balboa Heights, Apia, and near Tacubaya), 4h. (Oaxaca), 5h. (near Tokyo, near Oaxaca, and Tacubaya (2)), 7h. (La Paz), 8h. (Batavia and Manila), 9h. (La Paz and De Bilt), 12h. (La Paz and near Tacubaya), 13h. (2) and 15h. (near Tacubaya), 18h. (near Tokyo).

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Feb. 6d. 4h. 27m. 24s. Epicentre 48°-6N. 159°-4E. (as on 1914 Feb. 7d.).

A = -·619, B = +·233, C = +·750; D = +·352, E = +·936;
G = -·702, H = +·264, K = -·661.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	m. s.	m. s.	s.	m. s.	s.	m.	m.
Ootomari	11·3	268	2 46	- 3	(4 53)	- 9	4·9	—
Hakodate	14·8	249	e 3 49	+13	—	—	—	—
Tokyo	19·4	235	e 4 57	+23	—	—	e 8·8	10·3
Zi-ka-wei	33·4	250	e 7 43	+43	e 13 5	+35	—	—
Taihoku	37·7	243	—	—	—	—	e 18·6	—
Manila	46·3	235	e 9 47	+65	—	—	—	—
Victoria	48·9	59	15 57	?S	(15 57)	- 8	—	33·2
Konigsberg	71·0	336	—	—	—	—	40·4	46·8
Chicago	72·1	46	21 6	?S	(21 6)	+15	37·6	—
Ann Arbor	73·5	42	—	—	—	—	54·7	—
Toronto	74·3	40	—	—	—	—	140·6	50·3
Ottawa	74·4	36	—	—	—	—	e 39·2	—
Edinburgh	74·5	350	—	—	—	—	—	69·6
Hamburg	74·6	341	e 11 48	+ 2	—	—	e 41·6	50·0
Eskdalemuir	75·1	350	21 27	?S	(21 27)	0	38·6	52·6
Stonyhurst	76·5	349	e 21 0	?S	(e 21 0)	-43	—	45·1
De Bilt	E. 76·9	344	—	—	—	—	e 40·6	50·5
	N. 76·9	344	e 14 6	?PR ₁	—	—	e 42·6	52·0
Kodaikanal	77·0	271	22 6	?S	(22 6)	+17	—	—
Budapest	77·9	333	e 13 30	+84	—	—	e 42·6	51·6
Vienna	78·0	336	i 12 8	+ 1	e 22 48	+48	e 42·6	51·6
Oxford	78·3	348	—	—	—	—	46·9	54·6
Uccle	78·4	345	e 12 11	+ 2	e 21 54	-11	e 35·6	51·1
Kew	78·5	348	—	—	—	—	—	54·6
Harvard	78·8	35	—	—	42 36	? e 50·2	—	—
Georgetown	79·2	40	—	—	—	—	52·2	—
Strasbourg	79·8	340	e 12 27	+ 9	—	—	e 43·6	—
Paris	80·6	345	—	—	—	—	e 47·6	54·6
Moncalieri	83·2	340	e 12 54	+17	—	—	32·2	54·8
Florence	83·4	337	27 16	?SR ₁	—	—	—	54·6
Pompeii	E. 85·4	334	13 39	+49	—	—	54·6	—
Helwan	88·8	317	23 36	?S	(23 36)	-25	—	—
Coimbra	90·6	350	—	—	—	—	e 55·6	—
La Paz	129·9	65	19 40	[+22]	—	—	23·0	23·3

Additional readings: Konigsberg gives also LN = +44·2m. Chicago S? = +29m.16s., L = +92·1m. Ann Arbor (Wiechert), LE = +54·6m. Toronto eL = +48·2m. Ottawa L = +43·6m. and +52·1m. Hamburg MN = +48·7m. Eskdalemuir L = +43·6m. Uccle SR₁ = +27m.54s. Harvard e = +45m.28s. and +47m.29s. Georgetown LN = +51·9m. Paris MN = +52·6m. Pompeii readings have been corrected by -1h.

Feb. 6d. Readings also at 1h. (La Paz), 7h. (Kodaikanal), 21h. (Harvard), 22h. (Taihoku).

Feb. 7d. Readings at 14h. (near Rocca di Papa), 17h. (Taihoku and La Paz), 18h. (Taihoku and Zi-ka-wei), 21h. (Apta).

Feb. 8d. Readings at 2h. (Taihoku and near Tokyo), 4h. (near Colima), 7h. (near Taubaya), 9h. (Taihoku and Wellington), 10h. (Wellington), 13h. (Zi-ka-wei and Taihoku), 14h. (Strasbourg), 17h. (Taihoku), 18h. (near Taubaya).

Feb. 9d. Readings at 13h. (Manila), 15h. (near Tokyo), 18h. (Apta and La Paz), 20h. (De Bilt and Helwan), 23h. (Taihoku).

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Feb. 10d. 19h. 42m. 16s. Epicentre 3°-0S. 177°-5E.

A = -.998, B = +.044, C = -.052; D = +.044, E = +.999;
G = +.052, H = -.002, K = -.999.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Apia	15.2	136	3 50	+ 8	6 20	-17	—	—
Wellington	38.4	183	—	—	e 13 44	0	15.4	16.7
Riverview	39.4	217	e 7 44	- 6	e 13 48	- 9	16.2	19.4
Sydney	39.4	217	9 8	?PR ₁	13 56	- 1	16.9	20.1
Christchurch	40.8	185	11 44	?PR ₁	16 32	?SR ₁	19.2	22.5
Melbourne	45.8	218	—	—	e 15 44	+19	22.5	24.8
Adelaide	48.2	224	16 2	?S	(16 2)	+ 6	21.3	27.9
Manila	58.7	290	e 13 29	?PR ₁	—	—	—	—
Perth	64.5	236	—	—	—	—	28.2	—
Batavia	70.4	267	e 13 48	?PR ₁	—	—	—	—
Victoria	72.5	37	—	—	—	—	—	43.7
Chicago	95.6	48	—	—	—	—	e 54.7	—
Ottawa	103.8	44	—	—	—	—	e 56.7	—
La Paz	112.4	110	20 49	?PR ₁	—	—	51.7	60.1
Eskdalemuir	127.7	0	—	—	—	—	75.7	—
Stonyhurst	129.1	1	e 43 44	?SR ₁	—	—	(e 73.7)	86.7
De Bilt	E. 130.5	8	—	—	—	—	e 77.7	90.2
N. 130.5	8	—	—	—	—	—	e 69.7	85.0
Oxford	131.2	2	—	—	—	—	—	89.4
Vienna	131.9	18	21 51	?PR ₁	—	—	—	—
Strasbourg	133.6	11	e 21 55	?PR ₁	—	—	—	—
Paris	133.9	4	e 22 0	?PR ₁	—	—	—	—
Helwan	138.2	47	45 44	?SR ₁	—	—	—	—
Coimbra	142.4	353	—	—	74 0	?L	82.7	—

Additional readings: Apia gives also +5m.32s. Epicentre 26°-0S. 176°-0W.,
T₀ = 19h.43m.0s. Riverview PS = +14m.22s., MN = +17.3m., MZ =
+20.6m. Christchurch SR₁ = +17m.26s. Adelaide S = +20m.2s.
(?SR₁). Ottawa eLE = +61.7m. Stonyhurst gives eL as eP of a later
shock.

Feb. 10d. 23h. 53m. 35s. Epicentre 17°-6N. 148°-1E.

A = -.809, B = +.504, C = +.302; D = +.528, E = +.849;
G = -.257, H = +.160, K = -.953.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Tokyo	19.5	339	4 35	0	e 5 25	?	7.5	9.6
Mito	20.0	342	4 39	- 2	(8 15)	- 8	8.2	—
Osaka	20.5	329	4 46	- 1	(8 7)	-27	8.1	9.2
Kobe	20.6	328	4 54	+ 6	(8 39)	+ 3	8.6	8.8
Mizusawa	E. 22.4	345	5 6	- 4	9 6	- 7	—	—
N. 22.4	345	5 4	- 6	8 51	-22	—	—	—
Hakodate	25.0	347	6 2	+24	—	—	—	6.8
Taihoku	26.1	291	e 5 53	+ 4	(9 50)	-34	9.8	—
Manila	26.2	267	e 5 50	0	(11 4)	+38	11.1	11.8
Jinsen	N. 27.5	321	e 5 51	-12	10 12	-38	—	16.1
Zi-ka-wei	27.7	304	e 6 5	0	10 27	-27	—	—
Batavia	47.1	243	e 8 17	-31	—	—	—	—
Riverview	51.5	177	e 9 18	+ 1	e 16 41	+ 3	22.5	24.4
Adelaide	53.3	190	16 49	?S	(16 49)	-11	24.4	35.6
Perth	58.4	214	—	—	17 55	- 9	—	—
Victoria	76.0	44	22 5	?S	(22 5)	+28	35.8	41.3
Konigsberg	N. 95.1	334	—	—	—	—	52.5	—
Hamburg	100.3	336	e 18 0	?PR ₁	—	—	e 52.4	—
Budapest	100.5	328	—	—	—	—	e 52.4	55.4
Vienna	101.3	330	e 18 23	?PR ₁	—	—	e 52.4	62.4
Chicago	101.5	39	—	—	—	—	e 49.9	—
Edinburgh	102.6	343	—	—	—	—	51.4	62.2
Helwan	102.8	307	27 25	?S	(27 25)	+63	—	—
Eskdalemuir	103.2	343	24 39	?S	(24 39)	-107	43.9	62.4
De Bilt	103.3	337	—	—	e 27 25	+58	e 47.4	54.9
Ann Arbor	103.5	36	—	—	—	—	54.4	—
Stonyhurst	104.3	341	25 55	?S	(25 55)	-41	—	72.9
Toronto	104.7	33	—	—	e 25 37	-62	55.6	89.1
Ottawa	105.6	29	—	—	e 25 13	-95	55.9	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Kew	105.7	340	—	—	—	—	—	65.4
Oxford	105.7	340	—	—	—	—	50.6	58.1
Paris	106.8	337	—	—	—	—	e 54.4	57.4
Uccle	104.6	337	—	—	—	—	e 53.4	—
Rocca di Papa	107.8	326	e 19 43	?PR ₁	32 49	?SR ₁	e 54.1	61.1
Washington	109.5	35	—	—	—	—	e 58.4	—
Harvard	110.0	29	—	—	39 4	?	e 53.6	—
Coimbra	118.2	339	—	—	—	—	e 59.7	—
Rio Tinto	119.8	336	63 25	?L	—	—	(63.4)	82.4
La Paz	145.4	92	20 0	(+11)	34 45	?	70.4	72.0

Additional readings and notes: Tokyo gives also MN = +12.0m. Osaka MN = +10.4m. Hakodate MN = +10.9m. Batavia i = +8m.57s. and +11m.10s. Riverview PS = +17m.26s., MN = +26.3m., MZ = +29.6m., T₀ = 23h.53m.43s. Adelaide PR₁ = +19m.31s., S = +22m.13s. Victoria S = +27m.59s. Königsberg LN = +58.2m. Chicago L = +53.9m. and +61.9m. Helwan PN = +34m.25s. Eskdalemuir S = +33m.3s. De Bilt e = +33m.7s., MN = +66.0m. Ann Arbor LN = +54.5m. Stonyhurst S = +32m.55s. Toronto, e = +31m.1s., eL = +63.6m., iL = +82.2m. Ottawa eE = +34m.8s., e? = +39m.38s., eLE = +50.4m., LE = +63.9m. Washington L = +65.4m. Harvard L = +64.0m. La Paz iPN = +20m.4s., T₀ = 23h.53m.28s.

Feb. 10d. Readings also at 2h. (Vienna), 4h. (near Zurich, Vienna, Florence, and Padova), 5h. (La Paz), 6h. (Taihoku and near Tokyo), 7h. (near Mizusawa), 15h. (Toronto), 18h. (Stonyhurst), 20h. (La Paz).

Feb. 11d. 22h. 39m. 36s. Epicentre 9°·5N. 84°·0W. (as on 1918 June 22d.).

A = +.103, B = -.981, C = +.165; D = -.995, E = -.105;
G = +.017, H = -.164, K = -.986.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Balboa Hts.	E.	4.4	96	1 16	+ 8	—	2.3	2.5
	N.	4.4	96	1 18	+10	—	2.1	2.4
	E.	4.4	96	1 27	+19	—	2.6	2.7
	N.	4.4	96	1 19	+11	—	2.2	2.3
Tacubaya	E.	17.7	305	4 27	+14	7 8	-25	—
Georgetown		30.0	11	—	—	—	17.9	—
La Paz		30.4	149	6 15	-17	11 35	- 6	15.3
Chicago		32.4	355	—	—	—	e 14.9	—
Ann Arbor	E.	32.8	0	—	—	—	—	17.7
Harvard	E.	34.8	17	—	—	12 50	- 2	19.5
Ottawa	E.	36.6	10	—	—	e 13 17	- 1	e 17.4
De Bilt		82.0	38	—	—	—	e 41.4	—

Additional readings: Ann Arbor gives also LN = +18.2m. Harvard eE = +16m.12s., LE = +22.9m., T₀ = 22h.37m.22s. Ottawa LE = +19.4m. and +21.4m. De Bilt eLN = +43.4m.

Feb. 11d. Readings also at 17h. (Toronto), 20h. (Manila),

Feb. 12d. Readings at 0h. (Strasbourg), 2h. (Manila), 4h. (Tacubaya (3)), 6h. (Helwan, La Paz, Manila, De Bilt, and Edinburgh), 14h. (near Tacubaya), 21h. (near Tokyo).

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Feb. 13d. 20h. 57m. 6s. Epicentre 39°-0S. 17°-0W. (as on 1919 April 16d.).

A = +.743, B = -.227, C = -.629; D = -.292, E = -.956;
G = -.602, H = +.184, K = -.777.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Cape Town	28.8	91	10 37	?S	(10 37)	-36	—	14.2
La Paz	49.7	282	9 2	-3	16 17	+2	25.9	30.7
Helwan	82.2	42	39 54	?L	—	—	(39.9)	—
Uccle	91.8	13	—	—	—	—	—	49.9
De Bilt	N. 93.1	16	—	—	—	—	e 49.9	54.8
Colombo	99.6	90	57 54	?L	—	—	(57.9)	59.9
Kodaikanal	99.8	86	54 24	?L	—	—	(54.4)	—

De Bilt gives also eLE = +64.9m.

Feb. 13d. Readings also at 5h. (Helwan), 6h. (La Paz), 8h. (near Algiers (2)), 12h. (La Paz, Batavia, and Manila), 13h. (Helwan and Uccle), 16h. (Taihoku and Zi-ka-wei), 21h. (La Paz), 22h. and 23h. (near Tokyo).

Feb. 14d. 1h. 0m. 47s. Epicentre 5°-0N. 132°-8E.

A = -.677, B = +.731, C = +.087; D = +.734, E = +.679;
G = -.059, H = +.064, K = -.996.

The epicentre 6°-0N. 132°-5E. of 1914 Oct. 23d. was at first tried but found 1° too far north; the above position was deduced from the residuals.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Manila	15.1	310	e 2 59	-41	6 35	+ 1	7.8	8.6
Taihoku	22.8	333	e 5 7	-8	—	?	e 15.2	—
Batavia	28.2	247	e 4 53	-77	8 50	?	—	—
Zi-ka-wei	28.3	339	e 5 49	-22	e 10 13	-51	—	—
Osaka	29.8	4	e 7 19	+53	—	—	—	14.2
Tokyo	31.3	11	e 7 31	+50	(e 11 58)	+ 2	e 12.0	12.1
Mizusawa	35.0	11	e 7 19	+ 6	12 57	+ 2	—	—
Hakodate	37.4	10	e 7 37	+ 4	13 29	- 1	—	—
Riverview	42.5	156	e 8 12	- 3	i 14 42	0	e 23.0	24.2
Sydney	42.5	156	10 25	—	15 13	+31	18.4	18.6
Melbourne	44.3	186	—	—	i 15 7	+ 1	e 23.6	25.3
Colombo	52.7	275	15 13	?S	(15 13)	-99	—	30.2
Kodaikanal	55.1	280	16 25	?S	(16 25)	-57	—	—
Victoria	95.3	40	—	—	—	—	49.2	—
Helwan	97.4	300	23 13	?S	(23 13)	-137	—	—
Hamburg	104.5	329	—	—	—	—	e 51.2	—
De Bilt	N. 107.8	329	—	—	e 25 58	-70	e 53.9	55.9
Rocca di Papa	108.3	317	19 37	?PR ₁	e 24 43	-145	e 52.5	58.6
Uccle	108.9	328	—	—	e 24 43	-155	e 54.4	57.2
Edinburgh	109.2	335	—	—	—	—	-155	e 49.2
Stonyhurst	110.3	331	1 34 43	?SR ₁	—	—	51.2	—
Paris	111.0	326	—	—	e 24 59	-158	55.2	57.2
Oxford	111.1	330	—	—	—	—	42.9	63.9
Barcelona	111.4	320	—	—	—	—	e 57.6	—
Strasbourg	116.4	323	e 21 13	?PR ₁	—	—	54.4	56.3
Tortosa	116.7	320	—	—	—	—	e 59.2	61.6
Chicago	120.5	33	—	—	37 38	?SR ₁	60.2	—
Ann Arbor	122.2	30	—	—	—	—	48.0	—
Coimbra	122.5	324	30 33	?	—	—	e 59.7	—
Toronto	123.4	26	—	—	—	—	e 59.7	—
Ottawa	123.5	21	—	—	—	—	53.2	—
La Paz	156.5	121	20 8	[+ 4]	30 18	?	44.8	46.0

Additional readings: Manila gives also MN = +8.0m. Osaka MN = +15.6m. Mizusawa PN = +7m.18s. Riverview iS = +14m.45s., eSR₁ = +17m.51s., i = +18m.3s., MN = +27.4m., T = 1h.0m.39s. Melbourne iSR₁ = +18m.49s. Victoria e = +47m.43s., L = +55.3m. Helwan PN = +22m.13s. Ann Arbor LN = +47.8m. Coimbra eE = +41m.11s. Toronto e = +53m.13s., eL? = +74.7m. Ottawa LE = +57.2m. and +64.2m.

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Feb. 14d. 3h. 0m. 30s. Epicentre 36°-0N. 139°-0E. (as on 1920 Sept. 7d.).

A = -611, B = +531, C = +588.

		Δ	P.	O-C.	S.	O-C.	L.	M.
		°	m s.	s.	m. s.	s.	m.	m.
Tokyo		0.8	0 9	- 3	—	—	0.4	0.4
Mito		1.3	0 23	+ 3	—	—	0.7	0.8
Nagoya		1.9	0 21	- 8	—	—	0.7	1.1
Osaka		3.2	0 57	+ 7	—	—	1.7	2.6
Kobe		3.4	0 45	- 8	(1 34)	0	1.6	1.8
Mizusawa	E.	3.5	1 1	+ 6	1 47	+10	—	—
	N.	3.5	0 59	+ 4	1 50	+13	—	—
Nagasaki		8.2	4 10	?L	—	—	(4.2)	—
Zi-ka-wei		15.4	e 3 40	- 4	—	—	—	—
De Bilt		83.2	—	—	—	—	e 45.5	—
Eskdalemuir		83.2	—	—	—	—	59.5	—
La Paz		149.0	i 19 51	[- 3]	—	—	—	—

Additional readings: Mito readings have been increased by 1m. Nagoya gives also LN = +0.8m. Osaka MN = +1.8m. Kobe MN = +1.9m.

Feb. 14d. Readings also at 4h. (near Colima), 8h. (near Tokyo), 11h. (Taihoku, Manila, and Lick), 12h. (De Bilt), 15h. (near Tacubaya (7)), 16h. (Rio Tinto), 17h. (La Paz).

Feb. 15d. Readings at 0h. (La Paz), 1h. (Helwan), 5h. (Taihoku), 6h. (La Paz), 10h. (Manila), 12h., 17h., and 18h. (near Tokyo), 20h. (Apia), 23h. (Algiers).

Feb. 16d. Readings at 3h. (La Paz), 6h. (Helwan), 9h. (Manila), 10h. (La Paz and Riverview), 12h. (Apia), 13h. and 16h. (La Paz).

Feb. 17d. Readings at 2h. (Simla, Dehra Dun, Calcutta, and Konigsberg), 3h. (De Bilt), 4h. (Helwan), 6h. (La Paz), 7h. (Helwan), 11h. (near Tokyo), 18h. (Apia), 19h. (La Paz), 21h. (near Algiers), 23h. (Denver).

Feb. 18d. Readings at 3h. (Adelaide and near Tokyo), 4h. (Riverview), 5h. (Melbourne and Uccle), 7h. (La Paz), 8h. (Riverview), 12h. (De Bilt, Helwan, Rocca di Papa, and near Athens), 20h. (Rio Tinto).

Feb. 19d. 14h. 33m. 44s. Epicentre 1°-4S. 133°-0E. (suggested by Batavia).

A = -682, B = +731, C = -024; D = +731, E = +682;
G = +017, H = -018, K = -1000.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Manila		19.9	324	e 4 37	- 3	(8 17)	- 4	8.3	—
Batavia		26.5	259	5 52	- 1	1 10 36	+ 4	e 18.6	—
Taihoku		28.6	338	e 6 12	- 2	e 10 28	-42	11.5	12.4
Adelaide		34.0	173	6 46	-19	12 40	0	16.4	20.7
Zi-ka-wei		34.4	345	e 6 52	-16	e 12 10	-36	e 14.5	17.4
Perth		34.6	205	4 49	?	12 32	-17	—	—
Fukuoka		35.0	358	e 7 5	- 8	(12 46)	- 9	12.8	15.0
Osaka		36.1	4	7 53	+30	—	—	—	16.8
Riverview		36.6	154	17 24	- 3	1 13 15	- 3	e 17.7	24.7
Tokyo		37.6	10	e 8 59	?PR ₁	—	—	—	—
Melbourne		38.0	166	—	—	1 14 10	+32	21.3	22.9
Mito		38.4	10	7 31	-10	13 9	-35	18.4	—
Jinsen		39.4	353	e 5 2	?	8 49	?PR ₁	—	13.5
Otomari		48.8	10	10 57	?PR ₁	(15 59)	- 5	16.0	—
Calcutta	E.	49.7	304	8 16	-49	15 16	-59	15.3	—
	N.	49.7	304	8 10	-55	15 10	-65	15.2	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Colombo	53.7	280	22 16	1SR ₁	—	—	—	—
Wellington	54.8	142	e 13 16	1PR ₁	(17 16)	-3	17.3	32.0
Kodaikanal	57.5	283	17 46	1S	(17 46)	-7	39.4	40.9
Victoria	100.0	41	24 19	1S	32 27	1SR ₁	e 49.0?	54.6
Helwan	100.8	300	18 16	1PR ₁	(26 16)	+13	—	—
Konigsberg	103.9	327	—	—	—	—	e 55.6	—
Vienna	108.4	321	e 18 4	1PR ₁	—	—	—	39.3
Cape Town	109.4	232	25 46	1S	(25 46)	-97	—	—
Hamburg	110.0	329	e 19 9	1PR ₁	—	—	e 53.3	63.3
Rocca di Papa	113.1	315	19 28	1PR ₁	30 24	?	e 58.6	—
De Bilt	113.4	329	—	—	—	—	e 60.2	60.5
Strasbourg	113.6	322	e 19 31	1PR ₁	—	—	e 59.3	—
Uccle	114.4	327	e 19 41	1PR ₁	e 29 40	+95	—	62.3
Edinburgh	115.1	333	e 30 40	?	39 28	?	54.3	59.4
Besançon	115.2	322	19 46	1PR ₁	—	—	61.3	—
Eskdalemuir	115.5	333	18 30	[- 9]	—	—	42.3	58.3
Stonyhurst	116.0	331	18 46	[+ 5]	—	—	—	75.6
Paris	116.4	326	—	—	e 29 37	+76	58.3	63.3
Kew	116.5	330	—	—	—	—	—	77.3
Oxford	116.8	330	e 20 6	1PR ₁	—	—	53.7	64.3
Tortosa	121.8	319	20 36	1PR ₁	—	—	e 62.3	67.4
Chicago	125.6	37	27 50	1S	37 50	?	54.9	—
Ann Arbor	127.5	34	—	—	—	—	82.0	—
San Fernando	128.6	318	21 28	1PR ₁	—	—	—	71.8
Toronto	128.9	30	—	—	—	—	77.2	90.8
Ottawa	129.2	25	—	—	e 37 53	?	63.3	—
Harvard	133.6	23	—	—	—	—	e 68.0	—
La Paz	152.5	131	i 20 10	[+10]	34 47	?	76.8	81.1

Additional readings and notes: Batavia i = +7m.31s. Epicentre 1°48. 133°0E., as adopted. Adelaide PR₁ = +8m.43s., SR₁ = +14m.10s. Perth readings have been corrected by +2h. Osaka MN = +18.6m. Riverview iS = +13m.27s., and +14m.51s., iSR₁ = +16m.3s., SR₁ = +16m.42s., MNZ = +24.5m. Melbourne SR₁ = +16m.22s. Wellington e = +19m.16s., +23m.58s., and +29m.16s. Helwan readings are given as PE and PN respectively. Konigsberg eLN = +56.8m. Hamburg MN = +59.3m., MZ = +72.3m. De Bilt ePR₁ = +19m.46s., MN = +60.7m. Uccle PR₁ = +21m.58s. Eskdalemuir e = +20m.21s. and +27m.42s. Ann Arbor LN = +81.8m. San Fernando MN = +76.8m. Toronto eL = +83.1m. Ottawa eL = +44.3m. and +77.3m. Harvard L = +71.7m. and +73.9m.

1921. Feb. 19d. 18h. 14m. 30s. Epicentre 3°0S. 139°0E.

A = -.754, B = +.655, C = -.052; D = +.656, E = -.755;
G = +.039, H = -.034, K = -.999.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Manila	25.1	315	e 6 0	+21	(10 33)	+28	10.6	—
Adelaide	32.0	181	6 9	-38	12 6	-2	16.5	21.3
Batavia	32.2	264	e 6 52	+2	1 12 31	+20	e 18.9	—
Taihoku	32.7	331	e 6 39	-15	e 11 40	-39	14.3	14.5
Riverview	32.9	162	16 46	-10	e 12 9	-13	e 15.9	20.0
Sydney	32.9	162	6 48	-8	12 24	+2	17.8	20.5
Melbourne	35.2	172	—	—	e 13 48	+50	—	—
Perth	36.4	215	7 19	-5	13 2	-11	20.5	22.5
Osaka	37.8	356	6 24	-72	—	—	—	20.2
Kobe	37.8	356	e 7 18	-18	e 12 39	-56	17.6	17.6
Zi-ka-wei	38.1	339	e 7 20	-19	e 13 4	-35	e 17.0	18.9
Tokyo	38.7	0	6 48	-56	6 59	?	7.1	7.1
Mito	39.4	1	7 26	-24	13 27	-30	17.1	18.1
Jinsen	42.1	345	7 51	-21	e 12 4	-152	—	17.5
Mizusawa	E. 42.2	5	7 56	-16	14 7	-31	—	—
	N. 42.2	5	7 48	-24	14 3	-35	—	—
Ootomari	49.7	5	9 24	+19	(10 17)	+2	16.3	—
Apia	49.8	105	9 5	-1	16 42	+26	29.4	29.7
Wellington	50.0	145	e 9 12	+5	e 15 54	-25	i 28.1	32.0
Christchurch	50.3	149	24 54	?L	30 18	?	32.6	37.4
Calcutta	E. 55.6	300	9 0	-43	—	—	16.6	—
	N. 55.6	300	8 54	-49	—	—	16.5	—
Colombo	59.9	280	18 30	1S	(18 30)	+8	35.5	37.0

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
			m. s.	s.	m. s.	s.	m.	m.
Kodaikanal	62.7	284	10 48	+18			22.9	38.8
Victoria	97.3	42	24 8	?S (24 8)		-81	40.8?	53.2
Berkeley	E. 98.6	52			e 24 29	-73	e 44.6	
Lemberg	108.2	322	e 17 54	[-21]	e 27 54	+42	e 60.8	68.0
Tucson	N. 108.5	56					e 57.3	
Konigsberg	108.5	327	26 2	?S (26 2)		-73	e 53.7	
Budapest	112.0	321	i 19 25	?PR ₁	e 30 38	+172	e 63.5	71.5
Cape Town	113.1	230						64.1
Vienna	113.4	322	18 56	[+24]	29 22	+85	e 61.5	76.5
Hamburg	114.5	329	e 19 30	?PR ₁	e 29 12	+66	e 55.5	65.5
Padova	117.4	320	20 0	?PR ₁	28 28	-1		
Pompeii	117.5	314	20 30	?PR ₁				
Dyce	117.7	337			e 29 54	+82	60.5	
De Bilt	117.8	329					e 57.5	62.4
Rocca di Papa	118.4	316	e 19 6	[+18]				72.8
Strasbourg	118.4	325	e 20 1	?PR ₁	28 14	-23		74.5
Uccle	118.9	328	20 15	?PR ₁	30 5	+84	e 57.5	68.8
Edinburgh	119.0	336	e 30 10	?S (e 30 10)		+88	56.5	70.3
Eskdalemuir	119.5	336	e 20 30	?PR ₁	i 30 13	+87	e 56.5	
Stonyhurst	120.2	333	e 20 48	?PR ₁	31 0	+129	62.0	77.5
Kew	120.8	331	29 30	?S (29 30)		+35		80.5
Paris	121.0	327	e 20 29	?PR ₁			60.5	73.5
Oxford	121.1	331	20 29	?PR ₁			55.6	74.3
Chicago	123.1	40	21 0	?PR ₁	30 15	+62	52.5	
Ann Arbor	125.3	37					37.4	
Barcelona	125.5	320	e 20 50	?PR ₁			e 63.0	76.7
Tortosa	126.8	321	20 52	?PR ₁			e 60.5	71.2
Toronto	127.0	33					e 70.5	80.9
Algiers	127.3	315	e 21 6	?PR ₁			49.5	79.0
Ottawa	127.8	29	e 21 14	?PR ₁			e 56.5	
Ithaca	129.4	32					66.0	
Georgetown	E. 131.3	37	e 19 30	[+ 8]	i 22 55	?PR ₁	65.8	
Washington	131.3	37					55.5	
Granada	131.6	319	i 22 48	?PR ₁	e 35 22		e 58.5	
Harvard	E. 132.3	29	e 22 56	?PR ₁			e 55.0	80.0
Coimbra	E. 132.5	325	22 37	?PR ₁	34 59		e 59.5	83.1
San Fernando	N. 132.5	325	22 48	?PR ₁				84.0
La Paz	133.7	320	21 12	?PR ₁				76.2
	146.8	128	i 19 59	[+ 8]	34 3		? 73.5	

Additional readings and notes: Adelaide gives also PR₁ = +6m.45s., PR₂ = +8m.3s., SR₁ = +13m.48s., Batavia I = +9m.1s., +10m.2s., +10m.38s., and +14m.52s. Epicentre 1°6S. 141°0E. Riverview iP = +6m.44s., iS = +12m.13s., PS = +12m.32s., MZ = +21.5m., MN = +23.3m., T₀ = 18h.14m.21s. Osaka MN = +17.8m. Perth readings are given two hours early, and have been corrected as for the earthquake at 14h. Kobe MN = +19.9m. Zi-ka-wei PR₁E = +8m.57s., PR₁N = +9m.0s., PS = +13m.27s., MN = +20.1m. Apia MN = +30.6m. Wellington iSR₁ = +21m.0s. Victoria S = +31m.30s., iL = +44.8m. Konigsberg PN = +34m.17s., PN? = +43m.17s., eLN = +61.3m. and +65.7m. Vienna iE = +19m.42s. De Bilt ePR₁ = +20m.8s., MN = +74.0m. Rocca di Papa eP = +20m.18s. Strasbourg MN = +74.9m. (readings are increased by 1h.). Uccle MN = +72.2m. Edinburgh S = +40m.15s. Eskdalemuir L = +61.5m. Paris e = +23m.2s. and +32m.52s. Ann Arbor long waves at +60.5m. and +71.1m. Toronto L = +38.4m., eL = +43.1m., L = +57.0m., eL = +75.3m., L? = +135.6m. Ottawa i = +22m.27s., e = +26m.16s., and +28m.9s., eE = +30m.30s. and +41m.30s., eL = +56.5m., L = +76.5m. and +70.5m. Granada gives its readings as on 20d. Harvard iE = +41m.34s., I = +61.5m., and +61.9m., T₀ = 18h.24m.20s. Coimbra eN = +42m.0s. San Fernando MN = +86.0m.

Feb. 19d. Readings also at 0h. (Manila), 3h. (La Paz), 7h. (near Tacubaya), 8h. (near Tacubaya (8)), 9h. (Wellington), 12h. (Capetown), 15h. (La Paz), 16h. (Taihoku and Uccle), 17h. (Florence and La Paz), 20h. (La Paz and Uccle), 21h. (near Tokyo), 23h. (near Tacubaya (2)).

Feb. 20d. Readings at 3h. and 4h. (La Paz), 5h. (Helwan), 13h. (Taihoku and La Paz), 16h. (near Paris, Strasbourg, Uccle, and De Bilt), 17h. (La Paz (2) and Apia).

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Feb. 21d. 2h. 0m. 22s. Epicentre 25°·0N. 70°·7E.

A = +·300, B = +·855, C = +·423; D = +·944, E = -·331;
G = +·140, H = +·399, K = -·906.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Bombay	6·4	161	1 38	0	2 55	0	e 3·4	3·8
Simla	8·4	42	3 26	?S	(3 26)	-21	—	5·2
Dehra Dun	8·4	49	—	—	—	—	3·6	—
Kodaikanal	16·1	155	—	—	—	—	7·6	10·1
Calcutta	16·3	95	7 2	?S	(7 2)	0	8·7	—
Colombo	20·1	153	—	—	—	—	10·6	11·6
Helwan	N. 35·1	286	16 38	?L	—	—	(16·6)	—
Hamburg	52·9	320	—	—	e 18 38	+103	—	33·6
De Bilt	E. 55·6	318	—	—	—	—	e 35·6	37·4
	N. 55·6	318	—	—	—	—	e 32·6	36·3
Uccle	56·1	316	—	—	—	—	e 33·6	—
Kew	59·0	317	—	—	—	—	—	40·6
Edinburgh	60·6	322	—	—	—	—	—	36·6
Eskdalemuir	60·6	322	—	—	—	—	—	35·6

Helwan gives also PE = +14m.38s.

Feb. 21d. 11h. 40m. 0s. Epicentre 46°·0N. 130°·0W. (as on 1920 Jan. 2d.).

A = -·447, B = -·532, C = +·719; D = -·766, E = +·643;
G = -·462, H = -·552, K = -·695.

	Δ	Az.	P.	O-C.	L.	M.
	°	°	m. s.	s.	m.	m.
Victoria	5·2	59	1 21	+1	2·6	3·2
Chicago	30 5	82	15 10	?L	(15·2)	—
Ann Arbor	E. 33·0	79	—	—	20·1	—
Toronto	35·3	75	—	—	18·6	—
Ottawa	37·1	71	—	—	1 18·8	—
Ithaca	37·8	76	—	—	e 19·4	—
Georgetown	39·0	81	—	—	e 22·4	—
Washington	39·0	81	19 3	?L	(19·0)	—
Eskdalemuir	69·2	29	—	—	35·0	—
Stonyhurst	70·7	30	36 30	?L	(36·5)	—
De Bilt	E. 74·7	27	—	—	e 35·7	43·3
	N. 74·7	27	—	—	e 36·5	38·4

Additional readings: Ann Arbor gives also LN = +19·9m. and LE (Wieschert) = +20·0m. Georgetown eE? = +15m.0s.

Feb. 21d. 15h. 56m. 30s. Epicentre 52°·0N. 125°·0W.

A = -·353, B = -·504, C = +·788; D = -·819, E = +·574;
G = -·452, H = -·646, K = -·616.

This determination can only be regarded as rough.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Victoria	3·8	163	1 45	?	4 23	?	8·2	12·1
Sitka	N. 7·8	315	—	—	e 3 20	-11	—	6·0
Berkeley	E. 14·3	171	e 3 18	-12	e 5 53	-22	—	8·4
Lick	E. 14·8	169	e 3 27	-9	—	—	—	—
Denver	18·5	124	—	—	—	—	6·5	12·5
Tucson	22·3	147	5 8	-1	—	—	14·2	14·8
Chicago	27·0	97	—	—	19 18	-83	—	17·3
Ann Arbor	E. 29·2	93	10 12	?	—	—	17·8	20·3
	N. 29·2	93	10 30	?	—	—	17·7	20·8
	E. 29·2	93	10 18	?	15 12	?L	18·0	20·2
Toronto	31·2	88	—	—	e 11 30	-24	1 19·2	19·9
Ottawa	32·5	82	—	—	e 12 15	-1	—	17·5
Ithaca	33·6	88	—	—	13 1	+37	19·0	—
Northfield	35·0	82	e 10 0	?	—	—	—	—
Georgetown	35·3	93	—	—	e 14 30	+90	e 23·4	24·3
Washington	35·3	93	—	—	e 12 48	-12	—	—
Harvard	36·9	84	e 7 24	-5	i 13 40	+18	18·6	21·5

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Edinburgh	61.9	34	—	—	—	—	e 31.5	39.2
Eskdalemuir	62.4	34	—	—	—	—	e 31.5	—
Stonyhurst	63.8	36	27 42	?L	32 0	?L	36.5	36.8
Oxford	65.9	36	—	—	—	—	—	40.1
Kew	66.5	35	—	—	—	—	—	41.5
De Bilt	67.8	30	—	—	—	—	e 30.5	43.3
Hamburg	67.9	27	—	—	—	—	e 37.5	45.5
Uccle	68.7	31	—	—	e 25 30	?SR ₁	e 34.5	—
Paris	69.7	35	—	—	e 30 30	?	39.5	42.5
Strasbourg	71.7	30	e 10 14	-74	21 26	+40	43.5	—
Moncalieri	74.8	33	e 9 57	-111	21 46	+22	41.9	48.6
Tortosa	75.4	40	—	—	—	—	e 43.5	52.2
Florence	77.0	30	38 0	?L	—	—	(38.0)	50.5
Rocca di Papa	79.3	30	e 3 54	?	e 22 54	+39	e 46.4	52.4
La Paz	84.3	127	12 47	+ 3	—	—	—	—
Helwan	96.6	20	24 30	?S	(24 30)	-52	(41.5)	—

Additional readings and notes : Victoria gives also $i = +5m.48s.$, $L = +10.8m.$, All the observations have been increased by 10m., but even now do not fit.
 Berkeley eP?N = +3m.12s. Lick ePN = +3m.26s. Ithaca eE = +15m.34s., L = +39.1m. Georgetown SEN? = +20m.30s. Harvard e = +8m.44s., L = +14m.24s., and +14m.58s., L = +20.5m. and +43.8m.
 Eskdalemuir L = +38.5m. De Bilt MN = +44.0m. Paris MN = +44.5m. Helwan gives its two readings as PN and PE respectively.

Feb. 21d. 19h. 23m. 24s. Epicentre 46°-0N. 130°-0W. (as at 11h.).

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Victoria	5.2	59	1 16	- 4	—	—	—	2.8
Berkeley	9.9	142	—	—	—	—	e 6.6	—
Chicago	30.5	82	—	—	e 11 56	+13	—	19.8
Ann Arbor	33.0	79	—	—	—	—	—	21.1
Toronto	35.3	75	—	—	17 30	?L	i 21.9	22.2
Ottawa	37.1	71	—	—	—	—	e 19.4	19.7
Ithaca	37.8	76	—	—	—	—	e 20.0	—
Georgetown	39.0	81	—	—	—	—	e 20.9	—
Washington	39.0	81	—	—	—	—	e 19.9	—
Northfield	39.7	71	—	—	—	—	e 20.1	—
Harvard	E. 41.4	75	—	—	21 48	?L	(21.8)	25.3
Edinburgh	68.8	30	—	—	—	—	—	39.6
Stonyhurst	70.7	30	35 0	?L	—	—	(35.0)	39.6
De Bilt	E. 74.7	27	—	—	—	—	e 34.6	40.1
	N. 74.7	27	—	—	—	—	e 35.6	43.3
Hamburg	74.8	24	—	—	—	—	e 42.6	—
Uccle	75.5	28	—	—	—	—	e 33.6	—
Moncalieri	81.7	29	—	—	e 38 15	?L	43.4	—

Additional readings : Ann Arbor gives also MN = +20.8m. Ithaca e = +23m.17s. Georgetown iE = +21m.51s.

Feb. 21d. Readings also at 3h. (La Paz), 13h. (Florence and Stonyhurst), 14h (Victoria, Stonyhurst, and Chicago), 15h. (Stonyhurst (2) and Toronto), 16h. (Victoria, Toronto, Northfield, Georgetown, Washington, and De Bilt), 17h. (Stonyhurst), 21h. (Helwan), 23h. (near Mizusawa).

Feb. 22d. Readings at 4h. and 5h. (Helwan), 8h. (near La Paz (2)), 10h. (Apia, near Rocca di Papa, and near Mizusawa), 16h. (La Paz), 23h. (Helwan), 23h. (Apia).

Feb. 23d. Readings at 1h. (Helwan), 3h. (Taihoku and near Tacubaya), 4h. (Manila and La Paz), 5h. (La Paz), 10h. (near Tacubaya (2)), 20h. (Apia), 22h. (La Paz).

Feb. 24d. Readings at 1h. (Apia), 8h. (near Tokyo), 13h. (Apia), 16h. (La Paz, Manila, and near Rocca di Papa and Pompeii), 17h. (Riverview), 21h. (near Tokyo), 22h. (Helwan and Apia).

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Feb. 25d. Readings at 1h. (Helwan), 11h. (near Tokyo), 12h. (Taihoku), 15h. (near Mizusawa and Tokyo), 23h. (near Mizusawa).

Feb. 26d. Readings at 5h. (Batavia), 10h. (La Paz), 12h. (near Tokyo), 13h. (Batavia), 15h. (Taihoku).

1921. Feb. 27d. 18h. 23m. 28s. Epicentre 19°0S. 173°0W.

A = -0.939, B = -0.115, C = -0.326; D = -0.122, E = +0.993;
G = +0.323, H = +0.040, K = -0.946.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Apia	5.3	13	1 23	+ 1	2 24	+ 1	—	3.0
Wellington	24.6	202	15 32	- 2	19 50	- 5	12.1	14.2
Christchurch	27.3	203	6 20	+19	10 56	+10	12.5	16.5
Riverview	35.1	237	17 3	-11	12 31	-26	e 14.8	18.7
Sydney	35.1	237	7 8	- 6	12 50	- 7	e 18.1	19.9
Honolulu	42.9	21	e 8 9	- 8	—	—	e 18.5	18.7
E.	42.9	21	e 8 3	-14	e 13 57	-50	e 19.2	23.8
N.	45.5	240	8 29	- 8	15 8	-13	e 21.2	28.1
Adelaide	64.5	244	10 6	-36	19 14	- 5	e 32.7	—
Mito	70.7	323	11 26	+ 5	20 38	+ 4	e 29.2	31.7
Tokyo	70.7	322	11 24	+ 3	20 41	+ 7	—	22.8
Mizusawa	72.2	326	11 32	+ 1	20 54	+ 2	—	—
Osaka	72.7	319	11 40	+ 6	21 4	+ 6	e 30.2	35.5
Kobe	72.9	319	11 32	- 3	20 53	- 8	e 30.5	35.4
Manila	73.2	293	e 11 36	- 1	21 7	+ 3	e 37.7	38.1
Hakodate	74.3	327	e 11 37	- 7	—	—	—	12.9
Lick	E. 74.3	40	e 11 46	+ 2	e 21 21	+ 3	e 34.5	—
N.	74.3	40	e 11 45	+ 1	e 21 18	0	e 34.6	—
V.	75.3	315	e 11 49	- 2	—	—	—	—
Nagasaki	76.8	331	11 56	- 4	(21 36)	-11	e 21.6	40.2
Ootomari	77.4	305	e 12 7	+ 4	(21 57)	+ 4	e 33.1	38.7
Taihoku	77.5	60	e 12 17	+13	20 38	+73	e 25.1	30.3
Mazatlan	E. 77.5	50	12 7	- 3	22 1	- 5	e 35.7	—
E.	78.5	50	e 12 11	+ 1	—	—	e 40.1	—
N.	78.5	50	e 12 14	+ 3	122 7	- 1	e 32.1	45.1
Batavia	78.7	269	12 14	+ 2	e 22 30	+ 1	—	39.8
Zi-ka-wei	80.5	310	e 12 20	- 2	111 39	+ P	e 37.2	40.2
Victoria	80.7	30	(11 39)	-44	111 39	+ 1	e 37.2	40.2
Tacubaya	E. 81.9	66	12 29	- 1	22 41	- 4	e 37.5	44.9
Oaxaca	E. 83.2	69	12 34	- 3	22 58	- 1	e 38.0	42.6
Denver	86.4	46	22 32	?S	(22 32)	-62	e 39.5	52.5
Balboa Heights	96.2	84	24 32	?S	(24 32)	-46	—	—
St. Louis	N. 96.4	53	—	—	(24 56)	-24	e 41.2	—
La Paz	98.0	112	13 51	- 9	124 27	-69	e 41.5	48.0
Chicago	99.2	49	13 44	-22	24 19	-89	42.0	—
Calcutta	E. 104.8	290	17 2	+149	25 2	-98	—	—
N.	104.8	290	17 26	+173	26 8	-32	—	—
Toronto	105.5	49	—	—	18 20	?PR ₁	e 54.2	61.2
Georgetown	E. 106.3	53	e 17 43	+182	26 16	-39	e 37.1	55.2
N.	106.3	53	e 17 43	+182	26 21	-34	e 37.7	58.3
Washington	106.3	53	13 19	-82	24 15	-160	e 43.7	—
Ithaca	107.3	50	e 16 35	?PR ₁	28 9	+65	e 46.0	—
Colombo	108.4	272	13 32	-78	18 32	?PR ₁	e 59.5	82.5
Ottawa	108.4	47	18 29	[+12]	28 28	+74	e 44.4	—
Northfield	110.4	48	—	—	e 28 32	+60	e 53.5	—
Harvard	E. 111.3	50	e 19 10	?PR ₁	28 51	+71	e 51.7	67.5
Kodakkanal	E. 111.6	274	18 50	[+23]	—	—	e 53.7	76.8
Vieques	E. 111.9	78	—	—	—	—	e 55.4	56.9
N.	111.9	78	—	—	e 54 32	?	e 57.7	58.2
Dehra Dun	115.4	296	22 32	?	—	—	—	—
Sirma	116.2	297	20 56	?PR ₁	—	—	e 63.4	64.1
Bombay	118.1	282	20 34	?PR ₁	e 30 19	?	e 57.8	70.2
Cape Town	125.9	192	21 10	?PR ₁	38 27	?SR ₁	e 64.9	71.4
Dyce	141.2	9	20 3	[+22]	40 51	?SR ₁	e 68.8	78.2
Edinburgh	142.3	11	26 22	?S	41 20	?SR ₁	—	41.5
Konigsberg	142.7	348	23 19	?PR ₁	—	—	e 67.8	73.6
Bskdalemuir	142.9	11	19 42	[- 3]	30 12	?	e 43.5	—
Stonyhurst	144.5	12	1 19 50	[+ 3]	29 26	?	e 51.5	115.0
Hamburg	145.3	358	19 43	[- 6]	—	?	e 66.5	88.8
Azores	146.0	49	19 8	[-42]	—	—	—	96.8
Lemberg	E. 146.3	340	e 19 48	[- 2]	e 33 20	?	e 63.3	85.3
De Bilt	E. 146.5	2	e 19 51	[0]	—	—	e 78.5	110.6
N.	146.5	2	1 19 50	[0]	—	—	e 81.5	83.6

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Oxford	146.6	11	i 19 51	[0]	42 10	?SR ₁	73.5	104.5
Kew	147.1	10	14 32	?				95.5
Uccle	148.1	4	19 49	[- 4]	e 29 55	?		83.1
Vienna	149.8	347	e 19 52	[- 4]	e 30 44	?	e 56.5	82.5
Budapest	149.9	344	i 20 29	[+33]	e 29 31	?	e 45.0	81.5
Paris	150.0	6	i 20 1	[+5]	e 33 44	?	e 62.5	84.5
Strasbourg	150.4	359	19 52	[- 4]	30 40	?	e 48.5	91.4
Zurich	151.6	358	e 19 54	[- 4]				
Besançon	151.8	2	19 59	[0]	30 56	?	e 76.5	
Padova	153.3	352	19 56	[- 4]	28 3	?	e 56.1	89.6
Pola	153.5	349	e 19 41	[-19]			e 83.7	90.6
Moncalieri	154.0	359	19 57	[- 4]	30 42	?	e 43.7	113.1
Coimbra	155.0	29	19 32	[-30]	30 12	?	e 48.9	90.7
Florence	155.0	353	19 54	[- 8]	23 44	?PR ₁		91.5
	155.0	353	19 52	[-10]	24 2	?PR ₁		63.5
Helwan	E. 155.4	301	20 26	[+24]				121.3
N.	155.4	301	20 32	[+30]				115.2
Marseilles	155.7	3	e 20 9	[+6]	e 34 24	?	e 43.5	94.3
Athens	E. 156.1	326	e 19 26	[-37]	31 8	?	e 55.5	70.0
N.	156.1	326	e 20 13	[+10]	31 4	?		93.0
Rocca di Papa	156.7	349	i 20 8	[+ 4]			e 42.3	90.8
Barcelona	E. 157.2	9	e 20 1	[- 4]			e 64.4	85.8
N.	157.2	9					e 43.3	83.9
Pompeii	E. 157.3	345	20 7	[+ 2]	30 32	?	e 46.5	91.5
Tortosa	157.5	13	20 1	[- 4]	32 49	?	e 58.7	91.6
San Fernando	159.1	31	19 14	[-53]			e 80.6	122.5
Granada	159.6	25	i 20 9	[+ 1]	e 32 21	?		
Algiers	161.9	10	19 57	[-12]	30.19		e 46.5	104.0

Additional readings and notes: Apia gives also +1m.50s., MV = +8.5m., T₀ = 18h.23m.26s. Epicentre 18° 05'. 175° 0'W. Wellington SR₁ = +10m.32s., SR₂ = +11m.44s. Christchurch readings have been increased by 1h. Riverview iP = +7m.15s. and +8m.42s., PS = +12m.43s., MZ = +18.6m., MN = +19.1m., T₀ = 18h.23m.36s. Epicentre 27° 5'S., 171° 0'W. Honolulu iE = +14m.29s., iN = +14m.28s. Adelaide PR₁ = +10m.17s., PR₂ = +11m.8s., SR₁ = +18m.35s. Tokyo MN = +22.7m. Mizusawa PN = +11m.31s. Osaka MN = +35.9m. All readings given as 19 hrs. Manila PR₁N = +14m.16s., PR₁E = +14m.57s., PR₂N = +16m.51s., PR₂E = +17m.42s., SR₁N = +25m.4s., SR₁E = +25m.45s., SR₂E = +28m.52s., SR₂N = +29m.13s., MN = +37.8m. Kobe MN = +43.2m. Victoria P? = +3m.19s., iL = +22.0m., i = +27m.55s., and +30m.55s. Lick e?E = +30m.31s., e?N = +30m.34s., T₀ = 18h.23m.38s. Nagasaki gives its reading for 26d. Taihoku P is given as an earlier shock, and the adopted S is given as P the recorded S = 27m.8s. Mazatlan gives its readings for 28d. Tucson ePR₁E = +15m.3s. Batavia iP = +12m.16s. Zi-ka-wei SR₁E = +27m.36s., SR₁N = +28m.18s., MN = +39.0m. Denver S = +28m.32s. St. Louis gives both its readings as LN. La Paz iPV = +13m.56s., PR₁N = +17m.44s., and +19m.46s., SR₁ = +30m.38s. and +34m.35s., LN = +44.3m., MN = +48.4m., L rep. = +134.7m., T₀ = 18h.24m.40s. Chicago PR₁ = +17m.52s., L = +41.5m. Toronto S? = +19m.20s., SR₁? = +24m.56s., e = +27m.8s., i = +30m.14s., iSR₁ = +34m.20s., eL = +47.7m., iL = +55.1m. Georgetown ePZ = +17m.43s., SR₁ = +33m.58s., LZ = +51.6m. Washington PR₁ = +17m.43s., L = +53.5m. Ithaca eN = +25m.32s., iE = +34m.11s. Colombo alternative S = +34m.32s., L = +73.5m. Ottawa SR₁ = +34m.10s., SR₂? = +37m.51s., LE = +53.5m., L = +62.6m., T₀ = 18h.29m.56s. Northfield L = +57.5m. Harvard e = +19m.40s., iE = +29m.0s., SR₁ = +35m.33s., LN? = +45.1m., LE = +54.4m., T₀ = 18h.30m.55s. Kodai-kanal L = +29.1m., M = +39.3m. These readings are given for 28d. Dehra Dun readings for this shock are given in G.M.T. instead of local time 5h.30m. E., as is usual. Dyce PR₁N = +22m.51s., PR₁E = +22m.53s., PR₂N = +32m.51s., iN = +35m.28s., MN = +79.6m. Konigsberg LN = +70.2m., LE = +75.9m., and +80.4m. and +86.3m. Eskdalemuir i = +22m.48s., SR₁ = +34m.41s. Stonyhurst S = +41m.56s. alternative. Hamburg i = +29m.38s., e = +41m.32s., MN = +69.5m., MZ = +74.5m. De Bilt iN = +23m.15s. (?PR₁). Uccle iP = +19m.55s., PR₁ = +23m.21s., e = +42m.32s. Vienna iPZ = +19m.56s. and +20m.1s. Budapest i = +35m.28s. Paris PR₁ = +24m.0s., MN = +100.5m. Strasbourg MN = +90.6m., MV = +111.4m. Pola MN = +100.7m., L has been increased by 1h. Moncalieri MN = +108.3m. Coimbra PR₁N = +23m.52s., PR₁E = +24m.46s., eLE = +63.5m., eLN = +65.5m., T₀ = 18h.30m.17s. Epicentre 39° 20' N. 145° 30' E. Athens eE = +20m.20s., i = +20m.82s., +20m.59s., and +21m.41s., PR₁ = +24m.12s., eSR₁N = +37m.28s., eSR₁E = +37m.53s., e = +39m.3s., and +44m.47s. Barcelona PR₁? = +24m.18s. San Fernando MN = +101.5m. Algiers MN = +77.5m.

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Feb. 27d. Readings also at 0h. (Apia), 2h. (La Paz), 8h. (Manila), 20h. (Taihoku), 21h. (La Paz).

Feb. 28d. Readings at 2h. (Apia and near Tacubaya), 3h. (Manila), 9h. (Taihoku and near Tokyo), 11h. (Helwan), 13h. (La Paz), 15h. (Riverview), 16h. (Lick and Helwan and near Tacubaya (2)), 21h. (Lick).

Mar. 1d. 6h. 36m. 52s. Epicentre $0^{\circ}0.135^{\circ}0E$. (as on 1919 Nov. 23d.).

$A = -.707, B = +.707, C = .000; \quad D = +.707, E = +.707;$
 $G = .000, H = .000, K = -1.000.$

Very doubtful. The Riverview L and M suggest that the epicentre is much nearer Riverview so that the reading $+7m.50s.$ really belongs to S. But this is inconsistent with the readings for Manila and Batavia, unless we assume a very deep focus, which is not supported by the La Paz observation.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Manila	20.1	317	e 4 28	-14	—	—	—	—
Taihoku	23.2	334	—	—	—	—	14.7	—
Batavia	23.8	257	e 6 2	-14	—	—	i 14.2	—
Osaka	34.7	1	7 10	—	—	—	—	22.4
Adelaide	35.1	175	—	—	(11 38?)	-79	11.6?	15.3
Riverview	37.1	159	(e 7 50)	+19	e 7 50	?P	e 10.6	14.0
Wellington	54.7	144	e 11 38	?PR ₁	e 15 20	?	e 20.3	—
Victoria	57.8	41	—	—	—	—	40.6	44.1
Hamburg	109.9	329	—	—	—	—	e 65.1	—
De Bilt	E. 113.2	329	—	—	e 38 29	?	e 55.1	67.3
N.	113.2	329	—	—	—	—	e 57.1	69.2
Rocca di Papa	113.5	317	—	—	—	—	e 69.9	73.5
Uccle	114.3	323	—	—	—	—	e 54.1	80.1
Chicago	123.3	37	—	—	—	—	e 54.6	—
Toronto	126.7	30	—	—	—	—	61.2	72.6
La Paz	151.8	127	20 8 [+ 9]	—	—	—	—	—

Additional readings and notes: Batavia gives $i = +6m.12s.$ Osaka readings are corrected by $+10m.$ Riverview $eP? = +4m.26s., MN = +17.9m.$ Chicago L = $+58.4m.$

Mar. 1d. Readings also at 2h. (La Paz and near Tokyo and Mizusawa), 4h. (Helwan), 10h. (near Oaxaca), 13h. (Helwan), 14h. (Pompeii), 19h. (near Batavia), 21h. (Manila), 22h. (near La Paz).

Mar. 2d. Readings at 6h. and 8h. (La Paz), 11h. (La Paz), 12h. (Wellington and near Batavia), 15h. (Tacubaya), 17h. (La Paz and Tacubaya).

1921. Mar. 3d. 3h. 2m. 15s. Epicentre $38^{\circ}0N. 141^{\circ}5E.$

$A = -.617, B = +.490, C = +.616; \quad D = +.622, E = +.733;$
 $G = -.482, H = +.383, K = -.788.$

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa	E. 1.2	345	0 31	+13	0 50	+17	—	—
N.	1.2	345	0 32	+14	1 3	+30	—	—
Mito	1.8	206	0 38	+10	—	—	1.0	1.6
Tokyo	2.8	211	0 42	-2	(1 8)	-9	1.1	—
Hakodate	3.8	352	1 14	+15	—	—	2.0	3.5
Osaka	E. 5.9	238	1 37	+6	—	—	3.2	4.3
Kobe	E. 6.2	239	1 36	+1	2 13	-36	3.1	4.6
N.	6.2	239	1 36	+1	2 24	-25	3.1	4.0
Ootomari	8.7	5	1 57	-15	(3 53)	-3	3.9	6.5
Zi-ka-wel	17.9	254	4 16	0	e 7 39	+1	—	12.2
Taihoku	21.3	239	—	—	e 9 1	+11	—	—
Manila	29.7	223	e 6 8	-17	—	—	13.3	13.4

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		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		m. s.	m. s.	m. s.	s.	m. s.	s.	m.	m.
Calcutta	E.	47.8	269	8 15	-38	17 3	+72	28.6	—
	N.	47.8	269	8 15	-38	16 57	+66	—	—
Batavia		54.7	225	8 45	-52	1 18 31	+74	34.8	—
Kodaikanal		63.4	265	40 21	?	—	—	43.2	46.2
Colombo		63.6	260	39 45	?L	—	—	(39.8)	46.8
Victoria		65.6	44	—	—	(20 20)	+48	20.3	38.5
Riverview		72.4	171	e 12 0	+28	1 20 43	-12	e 31.6	42.6
Konigsberg		74.3	330	11 44	0	22 27	+69	e 38.6	—
Melbourne		75.9	177	—	—	1 22 9	+33	e 39.4	44.8
Lemberg		76.4	324	—	—	—	—	e 35.8	49.0
Hamburg		79.4	333	i 12 14	-1	—	—	e 41.8	44.8
Budapest		80.3	325	e 13 55	+94	e 17 3	?PR ₁	e 43.2	45.8
Vienna	Z.	81.0	328	i 12 24	-1	—	—	—	53.0
Edinburgh		81.4	341	—	—	—	—	40.8	52.8
De Bilt	E.	82.2	334	—	—	e 22 33	-15	e 37.8	47.5
	N.	82.2	334	—	—	e 22 41	-7	e 39.8	52.0
Stonyhurst		83.0	339	e 17 3	?PR ₁	23 15	+18	43.2	54.8
Uccle		83.6	334	12 36	-4	22 56	-9	e 37.8	53.4
Strasbourg		84.2	331	12 39	-4	e 23 3	-7	e 41.8	49.0
Kew		84.5	338	—	—	—	—	—	53.8
Pola		84.6	326	e 12 27	-19	e 23 15	0	e 43.9	53.8
Wellington		84.9	355	e 17 51	?PR ₁	e 23 27	+9	e 44.2	—
Padova		85.1	328	e 12 43	-6	23 19	-1	—	50.9
Paris		85.9	335	i 12 48	-5	1 23 34	+5	44.8	53.8
Helwan		86.0	307	15 45	?	—	—	—	—
Besançon		86.0	332	12 53?	?	0 23 16	-14	46.8	—
Florence		86.6	327	11 15?	?	—	—	—	49.2
Moncalieri		87.2	330	12 20	-40	22 34	-69	e 41.0	52.2
Pompeii	E.	87.5	323	12 45	-17	22 45	-62	56.8	—
Rocca di Papa		87.6	325	i 13 57	+54	1 23 45	-3	e 48.2	59.6
Chicago		88.5	33	23 45	?S	(23 45)	-13	44.8	—
Ottawa		90.1	24	—	—	1 23 56	-19	e 43.2	—
Toronto		90.3	27	—	—	—	—	46.2	—
Barcelona		92.4	330	—	—	e 24 11	-28	e 50.4	59.7
Tortosa		93.4	332	—	—	—	—	e 44.8	61.5
Harvard		94.3	25	—	—	(e 30 20)	?	52.4	—
Algiers		95.9	328	e 12 42	-66	23 5	-130	e 40.8	53.2
Coimbra		97.0	338	—	—	38 45	?	52.6	—
Granada		98.2	333	17 52	?PR ₁	e 28 54	—	—	—
San Fernando		99.8	335	—	—	—	—	55.2	63.2
La Paz		146.2	59	i 19 51	[+]	e 33 59	?	71.2	72.1

Additional readings: Hakodate gives also MN = +3.4m. Osaka MN = +3.5m. Zi-ka-wei PME = +4m.5s. ?PR₁. Manila MN = +14.9m. Batavia i = +9m.34s., +10m.42s., +12m.32s., +16m.14s., and +17m.8s. Riverview iS = +20m.49s., PS = +21m.37s., MZ = +34.0m., MN = +42.0m. Konigsberg eLE = +38.7m., +46.9m., and +48.8m. Lemberg +48m.9s. Hamburg MN = +51.0m., MZ = +53.0m. Budapest e = +24m.21s. Uccle SR₁ = +29m.11s., MN = +52.2m. Strasbourg PS = +23m.27s. Pola MN = +53.9m. Wellington e = +24m.27s. and +29m.51s. Padova SR₁ = +23m.36s. Paris MN = +50.8m. Helwan PN = +16m.45s. Moncalieri MN = +55.9m. Rocca di Papa eP = +14m.33s. Chicago PR₁? = 29m.30s., S? = +32m.10s., L = +49.8m. Ottawa LE = +52.8m. Harvard L = +59.8m. All readings are given as on 2d. Toronto i = +28m.39s. and +35m.45s., L = +54.2m.

Mar. 3d. 8h. 20m. 40s. Epicentre 6°5S. 107°5E.

A = -299, B = +948, C = -113; D = +954, E = +301;
G = +034, H = -108, K = -994.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	m. s.	m. s.	m. s.	s.	m. s.	s.	m.	m.
Batavia	0.7	295	10 45	+34	—	—	—	1.3
Manila	25.0	32	15 38	0	—	—	10.5	11.2
Perth	26.6	164	5 49	-5	10 39	+6	12.5	—
Colombo	30.7	297	5 20	-75	—	—	9.3	11.3
Kodaikanal	34.3	300	13 14	?S	(13 14)	+30	15.0	23.5
Taihoku	34.4	23	e 7 20	+12	—	—	—	—
Calcutta	34.6	329	6 2	-68	13 44	+55	19.4	24.4
Zi-ka-wei	40.0	19	17 52	-3	14 2	-5	—	25.0
Adelaide	40.3	139	(7 56)	-1	(13 59)	-12	24.2	28.6

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Melbourne	46.2	139	e 8 44	+ 3	i 15 32	+ 1	e 24.0	32.2
Simla	47.5	324	—	—	e 15 26	-22	—	29.9
Riverview	48.7	130	e 8 56	- 2	i 16 9	+ 7	e 25.5	31.6
Sydney	E. 48.7	130	8 32	-26	18 56	?SR ₁	31.3	31.9
Osaka	48.9	29	8 38	-21	(16 13)	+ 8	16.2	18.5
Tokyo	51.9	32	e 7 2	-137	—	—	—	—
Mizusawa	E. 55.2	31	9 46	+ 6	17 26	+ 2	—	—
	N. 55.2	31	9 45	+ 5	17 31	+ 7	—	—
Wellington	68.8	132	e 14 2	?PR ₁	e 20 26	+14	40.5	43.3
Helwan	81.4	304	12 32	+ 5	—	—	—	—
Cape Town	85.6	236	—	—	—	—	—	100.4
Pompeii	E. 96.5	311	23 50	?S	(23 50)	-91	—	—
Rocca di Papa	98.0	312	e 21 50	?	—	—	e 57.6	67.0
Moncalieri	101.4	316	e 23 5	?S	(e 23 5)	-184	e 52.8	—
De Bilt	E. 102.7	323	—	—	e 25 14	-67	e 56.3	58.1
	N. 102.7	323	—	—	e 25 20	-61	e 55.3	63.1
Uccle	103.3	321	—	—	—	—	—	57.3
Paris	104.7	320	—	—	—	—	e 57.3	67.3
Algiers	105.4	309	e 18 16	?PR ₁	27 20	+34	61.8	—
Stonyhurst	106.9	325	e 29 2	?S	37 20	?	65.0	76.8
Edinburgh	106.9	327	—	—	—	—	—	63.3
Coimbra	113.8	312	—	—	—	—	e 62.3	—
Victoria	120.0	35	—	—	—	—	60.0	79.2
Ottawa	141.0	2	—	—	i 41 5	?SR ₁	e 62.8	—
Chicago	142.2	17	41 13	?SR ₁	—	—	e 63.7	—
Toronto	142.3	6	—	—	—	—	82.4	87.2
Harvard	E. 144.1	359	—	—	i 41 36	?SR ₁	e 65.7	77.8
Georgetown	147.3	5	—	—	e 41 4	?SR ₁	—	—
La Paz	156.6	191	i 20 5	[+ 1]	34 37	? SR ₁	75.3	78.8

Additional readings: Manila gives also MN = +11.0m. Calcutta LN = +19.5m. other phases being same in both components. Zi-ka-wei MN = +27.6m. Adelaide gives P as S and S as SR₁, also P = 8h.17m.21s., SR₁ = +17m.20s., SR₂ = +21m.20s. Melbourne SR₁ = +19m.14s. Riverview PS = +16m.32s. Wellington e = +37m.56s. Helwan PN = +19m.56s. Moncalieri S? = +40m.37s. Paris MN = +59.3m. Ottawa L = +74.3m. and +85.3m. Georgetown eN = +40m.53s. Harvard L = +70.5m. and +93.7m.

Mar. 3d. Readings also at 3h. (near Tokyo), 4h. (near Tacubaya), 7h. (Zi-ka-wei), 8h. (Taihoku), 20h. (Wellington), 21h. (Helwan).

Mar. 4d. 12h. 50m. 58s. Epicentre 29°-0N. 139°-0E.

A = -660, B = +574, C = +485; D = +656, E = +755;
G = -366, H = +318, K = -875.

A depth of focus 0.060 is assumed.

	Corr. for Focus	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Osaka	+0.2	6.4	333	1 38	- 3	(2 48)	-12	2.8	3.8
Kobe	+0.1	6.5	332	1 36	- 5	(2 56)	- 4	2.9	3.5
Tokyo	+0.1	6.7	5	1 38	- 6	2 12	-53	2.9	2.9
Mizusawa	-0.7	10.3	9	2 16	- 8	4 4	-14	—	—
Zi-ka-wei	-1.6	15.3	283	e 3 13	- 9	—	—	—	—
Taihoku	-1.7	16.0	290	e 3 31	+ 1	—	—	—	—
Manila	-2.7	22.0	233	e 4 22	-11	8 20	+12	9.8	10.8
Batavia	-5.2	46.8	226	7 51	-17	13 59	-30	—	—
Helwan	E. -7.5	89.4	304	22 2	?S	(22 2)	-43	—	—
La Paz	—	152.1	80	19 7	[-52]	—	—	—	—

Additional readings: Osaka gives also MN = +3.6m. Kobe MN = +3.2m. Mizusawa SN = +4m.3s. Taihoku e = +5m.12s. Manila MN = +10.1m. Helwan PN = +21m.2s.

Mar. 4d. Readings also at 0h. (Zi-ka-wei), 1h. (near Tokyo and Mizusawa), 5h. (near Padova, Florence, and Rocca di Papa), 11h. (La Paz), 14h. (Nagasaki), 20h. (Rocca di Papa), 21h. (La Paz).

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Mar. 5d. 6h. 24m. 8s. Epicentre 7°0N. 94°0E. (as on 1915 Aug. 12d.).

A = -069, B = +990, C = +122; D = +998, E = +070;
G = -009, H = +122, K = -993.

Very rough determination.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Colombo	14.1	268	6 52	?	7 40	?L	8.9	10.5
Calcutta	N. 16.4	341	3 58	+ 1	8 34	+90	13.3	16.3
Kodaikanal	16.7	283	—	—	—	—	8.4	11.5
Batavia	18.3	135	e 4 27	+ 6	—	—	—	11.3
Manila	27.5	72	e 6 8	+ 5	11 24	+34	14.5	16.1
Simla	28.8	329	e 6 10	- 6	—	—	—	16.1
Taihoku	31.9	50	—	—	e 11 52	-15	—	21.2
Zi-ka-wei	35.2	43	e 7 2	-13	e 12 30	-28	e 15.7	20.2
Perth	44.2	153	10 32	?PR ₁	—	—	—	—
Kobe	E. 46.8	48	e 18 47	?SR ₁	—	—	27.4	—
	N. 46.8	48	17 21	?SR ₁	—	—	26.0	—
Osaka	47.0	48	8 59	+12	—	—	—	33.0
Melbourne	65.2	137	—	—	e 29 52	?	e 35.2	41.4
Riverview	67.7	130	—	—	e 30 16	?	e 35.0	44.0
Sydney	E. 67.7	130	—	—	36 16	?L	40.9	44.4
Vienna	76.5	320	11 54	- 4	—	—	—	51.9
Rocca di Papa	78.9	311	e 12 6	- 6	—	—	e 51.3	—
Moncalieri	82.5	315	e 20 38	—	—	—	39.2	—
De Bilt	83.8	323	—	—	e 23 16	+ 9	e 40.9	55.1
Uccle	84.3	322	—	—	e 27 52	?SR ₁	e 43.9	—
Kew	87.2	322	—	—	—	—	—	64.9
Wellington	87.8	132	—	—	—	—	e 42.2	—
Stonyhurst	88.1	324	24 22	?S	(24 22)	+29	—	59.9
Rio Tinto	93.9	310	53 52	?L	—	—	(53.9)	64.9
Victoria	115.6	25	—	—	—	—	68.9	81.7
Ottawa	126.8	350	—	—	e 42 43	?SR ₁	60.4	—
Toronto	129.0	353	—	—	—	—	65.2	—
Chicago	131.2	—	—	—	—	—	1 64.5	—
La Paz	160.2	240	20 18	[+10]	34 37	?	84.4	95.5

Additional readings: Calcutta gives also PE = +4m.4s. Manila MN = +17.5m. Zi-ka-wei MN = +20.4m. Perth gives its reading as on 4d. Osaka MN = +33.9m. Melbourne SR₁ = +32m.52s. Riverview e? = +25m.10s., MN = +38.5m. MZ = +44.4m. Rocca di Papa L = +20.3m. De Bilt MN = +47.1m. Eskdalemuir ($\Delta = 88^\circ.2$, Az. = 326°) gives just 7h. to 8h. Ottawa eLE = +54.6m., L = +75.9m. Toronto eL = +67.6m.

Mar. 5d. Readings also at 0h. (Manila), 1h. (Lick), 5h. (Wellington), 8h. (Perth), 19h. (Helwan), 20h. (Wellington), 22h. (near Tacubaya), 23h. (La Paz and near Tacubaya).

1921. Mar. 6d. 7h. 24m. 50s. Epicentre 26°5N. 109°0W.

A = -291, B = -846, C = +446; D = -946, E = +326;
G = -145, H = -422, K = -895.

A height of focus has been assumed, 0.020.

	Corr. for Focus	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.	
Mazatlan	E. -0.1	4.0	143	—	—	(2 54)	+87	2.9	4.4
Tucson	N. 0.0	6.0	345	—	—	—	—	e 3.1	3.8
	N. 0.0	6.0	345	—	—	e 3 23	?	e 3.7	5.2
Tacubaya	E. +0.3	11.4	126	3 15	+20	5 55	+43	6.5	8.8
Oaxaca	E. +0.5	14.7	127	3 51	+9	6 51	+14	8.0	9.2
Lick	E. +0.5	15.2	319	e 3 50	+2	—	—	e 7.1	10.3
	N. +0.5	15.2	319	e 3 54	+6	—	—	e 7.2	10.4
Berkeley	E. +0.6	18.0	319	e 3 58	-2	e 7 13	+4	e 8.2	10.1
	N. +0.6	18.0	319	e 3 55	-5	e 7 14	+5	e 8.1	10.5
	V. +0.6	18.0	319	e 3 58	-2	e 7 13	+4	e 8.2	11.7
St. Louis	+0.8	19.8	48	e 4 4	-44	8 10	-26	10.6	11.2
Chicago	+1.0	23.2	44	5 38	+8	10 0	+12	12.1	15.9

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	Corr. for Focus	Δ	Az.	P.		O-C.		S.		O-C.		L.		M.	
				m.	s.	m.	s.	m.	s.	m.	s.	m.	s.	m.	s.
Victoria		+1.1	24.8	337	9	15	?S	(9	15)	-61		12.9	18.1		
	z.	+1.1	24.8	337	5	40	-5					14.2	18.7		
Ann Arbor		+1.2	28.0	48				10	52	+7		15.1	18.7		
		+1.2	28.0	48				10	46	+1		15.1	18.9		
Georgetown	E.	+1.4	29.4	57	e 6	34	-2	e 11	56	+8	e	17.0	19.6		
	N.	+1.4	29.4	57				e 11	46	-2	e	17.0	19.4		
Washington		+1.4	29.4	57	6	6	-30	11	13	-35	e	15.7			
Toronto		+1.4	29.4	47	6	48	+10	11	40	-8	i	16.8	17.5		
Cheltenham	E.	+1.4	29.5	57	e 16	25	?L				(e	16.4)	19.8		
	N.	+1.4	29.5	57	e 16	20	?L				(e	16.3)	19.2		
Ithaca		+1.4	30.9	49				e 11	46	-27	e	16.7			
Fordham	E.	+1.5	32.3	53	11	58	?S	(11	58)	-40		20.9			
Ottawa		+1.5	32.5	46	7	1	-4	12	33	-7	e	16.7	21.5		
Northfield		+1.6	34.1	48							e	16.7			
Harvard	E.	+1.6	34.6	51	7	18	-6	13	5	-8	e	18.2	22.8		
Honolulu	E.	+1.9	44.8	276							e	20.0	24.0		
	N.	+1.9	44.8	276							e	18.7	23.0		
La Paz		+2.4	58.5	133	10	22	+4	e 18	28	-7		28.2	31.7		
Edinburgh		+2.6	76.5	33								41.2	43.8		
Eskdalemuir		+2.6	78.8	33								36.2	41.0		
Stonyhurst		+2.7	77.9	36	e 22	40	?S	(e 22	40)	+10			47.7		
Kew		+2.7	80.2	37									49.2		
De Bilt	E.	+2.7	82.7	33				23	25	+2	e	38.2	50.2		
	N.	+2.7	82.7	33				23	20	-3			54.1		
Rio Tinto		+2.7	83.0	50	40	10	?L					(40.2)	49.2		
Uccle		+2.7	83.0	36	e 12	49	-3	e 23	17	-10	e	37.2	52.7		
Paris		+2.7	83.1	38				e 23	11	-17	e	41.2	45.2		
San Fernando		+2.7	83.9	51								40.9	50.2		
Hamburg		+2.7	84.2	30								e	41.2	52.9	
Besançon		+2.7	88.0	37									45.2		
Strasbourg		+2.7	86.1	36								e	37.2	50.9	
Tortosa		+2.7	86.2	44								e	41.2	45.0	
Barcelona		+2.7	86.9	43								e	43.0		
Konigsberg		+2.8	87.9	26								e	48.8		
Moncalieri		+2.8	88.2	38	e 24	17	?S	(e 24	17)	-7		44.3	53.9		
Algiers		+2.8	90.1	46				e 24.	4	-40		47.2	53.5		
Vienna		+2.8	90.7	31								e	38.2	54.2	
Florence		+2.8	90.9	38	35	10	?						47.2		
Budapest		+2.8	92.6	30								e	45.2	64.2	
Manila			116.4	304								e	57.2		
Perth			140.8	250									57.3		

Additional readings: Ann Arbor gives (Bosch-Omori) MN = +16.5m. (Wiechert) LN = +14.7m. Toronto iL = +18.8m. and eL = +38.9m. Cheltenham iN = +16m.50s., eE = +18m.42s. Ithaca L = +17.6m. Ottawa MN = +20.0m., L = +25.2m., I₁ (rep.) = 9h.2m., T₀ = 7h.24m.52s. Harvard LE = +19.4m. and +40.4m., T₀ = 7h.24m.52s. La Paz MN = +39.6m., T₀ = 7h.25m.20s. Uccle MN = +49.7m. Paris e = +35m.10s. MN = +42.2m. San Fernando MN = +46.7m. Hamburg MN = +52.0m., MZ = +56.9m. Strasbourg MN = +46.4m. Konigsberg eLN = +51.0m. and +53.0m., LE = +53.3m., LN = +53.5m., and +57.5m. Moncalieri S₁ = +34m.7s., MN = +52.8m.

Mar. 6d. Readings also at 1h. (near Osaka, Mizusawa (2), and Tokyo), 4h. (near Osaka), 6h. (Wellington), 7h. (Riverview), 9h. (La Paz and near Tacubaya and Oaxaca), 19h. (Denver), 20h. (La Paz and Helwan), 23h. (Wellington).

Mar. 7d. Readings at 5h. (La Paz), 14h. (La Paz and near Tokyo).

Mar. 8d. Readings at 3h. (La Paz), 4h. (Barcelona), 5h. (Algiers), 7h. (Denver), 10h. (Marseilles), 11h. (Tahoku), 16h., 17h., and 18h. (La Paz).

Mar. 9d. Readings at 9h. (La Paz), 11h. (Helwan), 14h. (La Paz), 15h. (Helwan), 16h. (Tokyo and Osaka), 17h. (Rio Tinto), 20h. (La Paz), 22h. (Batavia).

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Mar. 10d. 20h. 5m. 8s. Epicentre 11°0S. 160°0E.

A = -0.922, B = +0.336, C = -0.191; D = +0.342, E = +0.940;
G = +0.179, H = -0.065, K = -0.982.

Very doubtful.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview		24.2	198	e 5 33	+ 3	e 9 53	+ 5	e 12.7	15.9
Sydney	E.	24.2	198	9 58	?S	(9 58)	+10	14.0	15.1
Melbourne		30.0	205	—	—	—	—	e 13.7	—
Adelaide		30.8	218	6 28	- 8	11 34	-14	14.5	21.5
Wellington		33.0	160	e 12 16	?S	(e 12 16)	- 8	17.8	18.7
Perth		45.7	237	6 20	?	11 38	?	18.0	—
Honolulu	E.	52.4	51	—	—	—	—	e 26.8	28.9
	N.	52.4	51	—	—	—	—	e 22.7	28.5
Batavia		52.7	272	i 9 4	-20	i 16 11	-41	—	—
Victoria		89.6	40	—	—	—	—	43.0	47.5
Toronto		119.6	43	—	—	e 39 10	?SR ₁	68.6	—
Ottawa		121.6	41	—	—	—	e	59.9	—
La Paz		125.0	119	19 27	[+21]	—	—	—	—
Helwan	E.	128.8	301	32 52	?	—	—	—	—
De Bilt		134.2	340	—	—	—	—	e 66.9	—
Uccle		135.5	340	—	—	—	—	e 59.9	—
Algiers		146.9	326	e 20 33	?PR ₁	—	—	—	21.5

Additional readings: Riverview gives also iS = +9m.57s., PS = +10m.17s., MN = +14.2m., MZ = +16.6m. Sydney S = +12m.40s. All these readings are given at 21h. Adelaide SR₁ = +12m.52s. Batavia i = +12m.18s. Toronto L = +94.7m. Ottawa L = +74.9m. and +84.9m. Helwan PN = +36m.52s.

Mar. 10d. Readings also at 19h. (Stonyhurst), 20h. (Manila and Adelaide), 22h. (Lick).

Mar. 11d. Readings at 9h. (near Mizusawa), 16h. (Manila), 17h. (De Bilt and Uccle), 19h. (Manila, La Paz, and Riverview), 20h. (Helwan), 21h. (near Mizusawa), 22h. (Manila), 23h. (Wellington and near Apia).

Mar. 12d. 10h. 30m. 24s. Epicentre 7°0N. 82°5W. (as on 1921 Jan. 20d.).

A = +0.130, B = -0.984, C = +0.122; D = -0.991, E = -0.131;
G = +0.016, H = -0.121, K = -0.992.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Balboa Hts.	E.	3.5	55	0 59	+ 4	—	—	2.0	3.4
	N.	3.5	55	0 58	+ 3	—	—	2.0	3.6
Oaxaca	E.	17.2	307	4 34	+27	8 12	+50	9.4	9.9
Tacubaya	E.	20.4	309	4 59	+13	9 8	+36	10.8	12.4
La Paz		27.4	149	5 59	- 3	10 43	- 5	13.6	15.4
Georgetown		32.3	8	—	—	12 0	-13	e 15.9	—
Chicago		35.1	353	7 4	-10	12 24	-33	15.9	—
Ann Arbor	E.	35.3	359	—	—	13 54	+54	19.8	—
	N.	35.3	359	—	—	14 6	+66	19.9	—
Ithaca		35.8	7	—	—	e 8 6	?PR ₁	e 16.5	—
Toronto		36.7	4	—	—	13 48	+28	e 17.3	22.1
Harvard	E.	36.8	14	—	—	—	—	e 15.6	—
Ottawa		38.8	7	7 1	-43	13 34	-15	e 19.6	—
Victoria		53.2	330	28 24	?L	—	—	31.4	32.8
Rio Tinto		74.5	52	36 36	?L	—	—	(36.6)	60.6
Eskdalemuir		78.1	35	—	—	—	—	36.1	—
Kew		79.7	39	—	—	—	—	—	56.6
Tortosa		80.2	49	—	—	—	—	e 33.6	38.6
Paris		81.5	42	—	—	—	—	e 38.6	—
Uccle		82.6	40	—	—	—	—	e 34.6	42.6
De Bilt	E.	83.0	40	—	—	e 28 36	?SR ₄	e 38.6	47.4
	N.	83.0	40	—	—	—	—	e 34.6	37.3
Rocca di Papa		89.2	48	24 6	?S	(24 6)	+ 1	34.6	—
Helwan		106.8	56	28 36	?S	(28 36)	+97	(51.6)	—

Additional readings: Georgetown gives also L = +17.7m. Harvard PR₁E? = 10h.4m.30s., S?E = 10h.30m.42s., iE = +2m.4s., L = +18.3m. Ottawa LE = +21.6m. and +27.6m., T₁ = 10h.29m.8s., Ann Arbor (Wiechert), LN = +19.6m. Toronto iL = +20.1m. Victoria iL = +34.7m. Eskdalemuir LN = +33.1m.

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Mar. 12d. Readings also at 2h. (Helwan and near Berkeley and Lick), 6h. (La Paz and Taihoku), 8h. (La Paz and Helwan), 15h. (near Osaka), 17h. (near Taihoku).

Mar. 13d. Readings at 0h. (Manila and near La Paz), 1h. (La Paz (2)), 2h. (Batavia and Manila), 5h. (near Tacubaya), 15h. (near Mizusawa), 16h. (La Paz), 21h. (La Paz).

Mar. 14d. Readings at 17h. (near Tokyo), 18h. (Lick), 23h. (La Paz and Manila).

Mar. 15d. 4h. 31m. 40s. Epicentre 33°·2N. 138°·0E. (as on 1920 Dec. 27d.).

$$A = -.622, B = +.560, C = +.548.$$

	Δ	P.	O-C.	S.	O-C.	L.	M.
	°	m. s.	s.	m. s.	s.	m.	m.
Osaka	2·6	0 50	+ 9	—	—	—	1·7
Kobe	E. 2·8	0 48	+ 4	—	—	2·2	2·8
	N. 2·8	0 47	+ 3	—	—	2·2	2·5
Tokyo	2·8	0 49	+ 5	(1 5)	-12	1·1	2·5
Mizusawa	E. 6·4	1 32	- 6	2 43	-12	—	—
	N. 6·4	1 44	+ 6	2 56	+ 1	—	—

Osaka gives also MN = +2·5m.

Mar. 15d. Readings also at 0h. (Wellington), 2h. and 3h. (La Paz), 4h. (Helwan), 5h. (Tokyo and Wellington), 9h. (near Oaxaca and Tacubaya), 14h. (Batavia and Helwan), 16h. (La Paz), 20h. (La Paz, Calcutta, Hamburg, Rocca di Papa, Stonyhurst, and De-Bilt), 21h. (Manila), 22h. (Melbourne, Wellington, Riverview, Sydney, and Christchurch).

Mar. 16d. 11h. 36m. 40s. Epicentre 13°·0S. 138°·0E.

$$A = -.724, B = +.652, C = -.225; \quad D = +.669, E = +.743; \\ G = +.167, H = -.151, K = -.974.$$

Compare 13°·0S. 136°·0E. as on 1918 Mar. 10d. and Dec. 28d.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	m. s.	m. s.	s.	m. s.	s.	m.	m.
Riverview	24·0	152	e 5 20	- 8	e 9 30	- 14	e 12·0	13·7
Melbourne	25·6	167	—	—	10 2	-12	13·1	19·3
Batavia	31·4	279	e 7 27	+45	—	—	i 14·1	—
Manila	32·3	328	e 6 48	- 3	—	—	—	—
Wellington	42·7	137	—	—	e 12 2	?	—	20·3
Victoria	105·4	40	—	—	—	—	—	47·3
Chicago	131·2	43	—	—	—	—	63·3	—
Ann Arbor	E. 133·6	40	—	—	—	—	58·0	—
Toronto	135·7	37	—	—	—	—	e 69·2	72·4
Ottawa	136·8	31	—	—	e 39 20	?	e 58·3	—
La Paz	140·8	137	18 4	[-97]	i 21 31	1PR ₁	—	—

Additional readings: Riverview gives also MN = +13·1m., MZ = +13·9m. Chicago eL = +53·3m. Ann Arbor DN = +58·3m. Ottawa LE = +68·3m.

Mar. 16d. Readings also at 13h. (Helwan), 14h. (La Paz and Taihoku), 16h. (La Paz), 17h. and 19h. (Taihoku).

Mar. 17d. Readings at 2h. and 4h. (La Paz), 6h. (Riverview, Wellington, and La Paz), 9h. (Helwan and La Paz), 10h. (Nagasaki), 14h. (near Florence and Padova), 20h. (La Paz and near Christchurch).

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Mar. 18d. Readings at 1h. (Tacubaya), 12h. (Tacubaya and Oaxaca), 16h. and 18h. (near La Paz), 19h. (Taihoku), 23h. (near Tokyo).

Mar. 19d. 8h. 19m. 45s. Epicentre 24°·0N. 116°·5E. (as on 1919 Oct. 31d.).

A = -·408, B = +·817, C = +·407; D = +·895, E = +·446;
G = -·181, H = +·364, K = -·914.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Hokoto		2·8	100	0 36	- 8	—	—	1·0	2·4
Taihoku		4·7	76	(1 24)	+11	—	—	1·4	3·9
Zi-ka-wei		8·4	30	e 2 10	+ 3	e 4 6	+19	—	—
Manila		10·3	155	e 2 35	+ 1	—	—	—	—
Kobe		19·4	52	e 2 2	?	—	—	11·7	17·6
Osaka		19·6	53	5 24	+48	8 36	+21	11·0	15·6
Mizusawa	E.	25·7	48	5 35	-10	9 57	-19	—	—
	N.	25·7	48	5 38	- 7	10 6	-10	—	—
Calcutta	E.	25·9	272	10 3	?S	(10 3)	-17	14·8	—
	N.	25·9	272	10 9	?S	(10 9)	-11	15·0	—
Batavia		31·7	199	—	—	—	e 19·5	21·2	—
Colombo		39·1	250	17 15	?L	—	—	25·2	26·2
Kodaikanal		39·7	256	12 57	?S	(12 57)	-65	23·0	25·4
Hamburg		80·0	325	—	—	—	e 42·2	45·0	—
De Bilt		83·3	325	—	—	—	e 43·2	47·3	—
Strasbourg		83·7	321	—	—	—	e 45·2	—	—
Rocca di Papa		83·8	313	e 12 39	- 2	—	e 52·0	53·4	—
Uccle		84·4	324	—	—	—	e 42·2	47·7	—
Edinburgh		85·2	330	—	—	—	—	49·2	—
Besançon		85·3	320	—	—	—	—	47·2	—
Moncalleri		85·5	318	—	—	e 39 34	?L	48·2	—
Eskdalemuir		85·6	330	—	—	—	—	42·2	51·8
Stonyhurst		86·1	329	e 42 15	?L	—	e (42·2)	55·2	—
Paris		86·5	323	—	—	—	e 46·2	48·2	—
Kew		86·5	326	—	—	—	—	52·2	—
Oxford		86·8	326	—	—	—	—	46·8	54·4
Algiers		92·7	313	—	—	—	e 47·2	61·6	—
Rio Tinto		98·3	319	57 15	?L	—	—	(57·2)	62·2

Additional readings: Taihoku gives also e = +15s. Kobe MN = +12·0m.
Osaka MN = +14·0m. Batavia e = +9m.58s.

Mar. 19d. Readings also at 1h. and 2h. (La Paz), 11h. (Taihoku, Zi-ka-wei, and near Tokyo), 18h. (La Paz), 20h. (Rocca di Papa).

Mar. 20d. Readings at 2h. (near Rocca di Papa), 3h. and 4h. (Vera Cruz), 12h. (near Tokyo), 19h. (Pompei and Rocca di Papa), 20h. (near Tokyo), 21h. (Helwan), 22h. (Manila, Sydney, and Riverview).

Mar. 21d. 4h. 6m. 15s. (I) } Epicentre 3°·2N. 82°·7W.
6h. 41m. 10s. (II) }

A = +·127, B = -·990, C = +·056; D = -·992, E = -·127;
G = +·007, H = -·055, K = -·998.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
I Balboa Hts.	E.	6·5	28	3 11	?S	(3 11)	+14	3·7	4·5
I	N.	6·5	28	3 8	?S	(3 8)	+11	4·8	5·3
I La Paz		24·4	144	15 31	- 1	19 50	- 2	12·6	16·2
II		24·4	144	15 32	0	19 52	0	12·7	17·7
I Georgetown	N.	36·1	9	e 7 59	+36	(e 13 9)	- 2	e 13·2	—
I Chicago		38·8	355	8 58	?PR ₁	13 53	+ 4	e 16·8	—
II		38·8	355	8 55	?PR ₁	13 50	+ 1	16·7	—
I Ann Arbor		39·1	0	—	—	—	—	18·6	—
I Ithaca		39·6	9	e 7 52	+ 1	e 13 52	- 8	20·1	—
I Toronto		40·5	4	—	—	—	e 18·0	30·2	—
II		40·5	4	—	—	—	—	18·0	—
I Ottawa	E.	43·0	9	—	—	1 14 44	- 4	20·8	—
II		43·0	9	—	—	1 14 45	- 3	e 18·0	—

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	*M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
I Victoria	57.0	330	—	—	—	—	—	33.2
I Eskdalemuir	81.4	34	—	—	23 45	+66	—	—
I Oxford	82.2	38	e 13 25	+54	—	—	e 42.0	54.2
I Uccle	85.6	39	e 12 55	+ 4	23 14	-12	e 39.8	—
I De Bilt	E. 86.1	38	—	—	e 23 33	+ 2	e 42.8	48.0
II	86.1	38	—	—	—	—	e 43.8	—
I Vienna	Z. 93.8	41	10 30	?	—	—	—	—
I Helwan	E. 108.9	57	20 45	?PR ₁	—	—	—	—
I Riverview	121.4	232	—	—	e 64 21	?L	e 70.6	72.5
I Kodaikanal	156.1	56	91 45	?L	—	—	(91.8)	—
I Colombo	159.8	60	—	—	—	—	—	98.8

Additional readings: Chicago (I) L = +24.8m. Ann Arbor (I) gives also
 LN = +18.2m. Ithaca (I) e = +17m.57s. Toronto (I) L = +15.2m.,
 eL = +27.0m. Ottawa (I) eLE = +18.0m., LE = +27.8m.

Mar. 21d. Readings also at 6h. (Manila), 21h. (Lick).

Mar. 22d. 11h. 54m. 27s. Epicentre 38°-8S. 146°-0W.

A = -.646, B = -.436, C = -.627; D = -.559, E = +.829;
 G = +.520, H = +.350, K = -.779.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Wellington	29.3	254	e 15 33	?L	—	—	17.0	17.6
Apia	33.8	313	—	—	12 39	+ 1	17.4	20.4
Riverview	49.9	259	e 8 59	- 7	e 16 23	+ 5	e 21.3	26.3
Sydney	E. 49.9	259	19 33	?SR ₁	24 15	?L	26.2	27.6
Melbourne	52.9	251	—	—	e 16 45?	-10	22.4	31.8
Adelaide	58.7	251	19 6	?S	(19 6)	+59	25.8	34.6
Victoria	89.5	15	—	—	—	—	—	57.0
Manila	101.5	280	—	—	e 24 33	-97	—	—
Toronto	102.0	41	—	—	—	—	73.6	85.2
De Bilt	156.0	47	—	—	—	—	e 101.6	—
Uccle	156.0	50	—	—	—	—	e 95.6	—
Helwan	170.8	165	44 33	?SR ₁	—	—	—	—

Additional readings: Apia gives also MN = +32.2m. Riverview MN =
 +26.0m.; it is difficult to account for the discrepancy between the readings
 given at Riverview and Sydney for this earthquake. Adelaide S =
 +23m.18s. De Bilt eLN = +99.6m.

Mar. 22d. Readings also at 13h. and 23h. (La Paz).

FIRST SOLUTION (See Note at end).

Mar. 23d. 22h. 44m. 6s. Epicentre 8°-0S. 127°-5E. (as on 1920 Mar. 3d.).

A = -.603, B = +.786, C = -.139; D = +.793, E = +.609;
 G = +.085, H = -.110, K = -.990.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia	20.6	274	e 5 13	+25	e 9 37	+61	e 16.9	11.0
Manila	23.5	344	e 5 26	+ 3	(9 28)	- 7	9.5	9.6
Adelaide	28.8	161	e 6 18	+ 2	e 11 18	+ 5	16.0	47.0
Taihoku	33.5	350	—	—	e 10 34	-118	—	—
Melbourne	33.7	156	e 6 0	-62	e 12 12	-24	17.6	20.1
Riverview	33.8	142	e 7 10	+ 7	e 14 10	+92	e 17.6	19.6
Sydney	E. 33.9	142	8 12	+68	12 36	- 3	18.4	19.1
Mizusawa	E. 48.8	15	8 46	-13	15 12	-52	—	—
	N. 48.8	15	9 2	+ 3	15 17	-47	—	—
Calcutta	E. 49.0	310	9 30	+30	(18 18)	+132	18.3	—
	N. 49.0	310	9 42	+42	(17 54)	+108	17.9	—

Continued on next page. *

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Colombo	49.8	286	10 54	+108	20 54	?	29.4	36.9
Kodaikanal	53.1	290	12 54	?PR ₁	—	—	29.9	36.0
Wellington	53.4	137	e 3 24	?	—	—	—	32.4
Helwan	99.4	300	18 54	?PR ₁	—	—	—	—
Victoria	108.9	41	—	—	—	—	40.7?	55.9
De Bilt	115.8	322	—	—	e 35 54	?SR ₁	e 55.9	61.5
Moncalieri	116.6	316	—	—	—	—	e 59.9	—
Uccle	116.7	321	—	—	e 27 54	-30	e 53.9	60.9
Stonyhurst	119.2	325	e 17 54	+135	—	—	—	78.9
Tortosa	122.8	313	—	—	—	—	e 59.9	65.1
Chicago	134.2	37	—	—	(e 39 41)	?SR ₁	77.9	—
La Paz	151.0	148	20 13	[+16]	34 34	?	76.4	85.6

Additional readings: Manila gives MN = +9.8m. Adelaide iS = +12m.12s., SR₁ = +14m.24s., SR₂ = +15m.0s., SR₃ = +15m.18s. Riverview MN = +13.7m., MZ = +23.6m. De Bilt MN = +77.1m. Epicentre 7°.1S. 128° .8E. Chicago SR₁ is given as eL.

NOTE: This solution was the best that could be attained, after some work, from the consideration of the above material alone. But the following shock for which an independent solution gives another epicentre, has much in common with this, as direct comparison shows. On combining the two the mean residuals suggested that the epicentre should be nearer Australia, and also nearer Manila in an approximately opposite azimuth (which indicates deep focus); further that it should be more to the East. Now there is an epicentre 5°.5S. 130°.0E., for which on 1920 May 10 the observations suggested a deep focus, viz. 0.060. This depth seems rather large for the present observations, but it was decided to give, as alternative, a solution with the same epicentre and depth of focus as below.

SECOND SOLUTION.

Mar. 23d. 22h. 44m. 50s. Epicentre 5°.5S. 130°.0E. (as on 1920 May 10d.).

$$A = -.640, B = +.763, C = -.096.$$

Depth of focus 0.060.

	Corr. for Focus	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Manila	-2.7	22.0	336	e 4 42	-9	8 44	+36	8.8	8.9
Batavia	-2.8	23.0	287	e 4 29	-14	e 8 53	+26	e 16.2	10.3
Adelaide	-3.8	30.5	166	e 5 34	-21	e 10 34	-1	15.2	46.3
Taihoku	-4.0	31.6	347	—	—	e 9 50	-62	—	—
Riverview	-4.2	34.5	148	e 6 26	-5	e 13 26	?SR ₁	e 16.9	18.9
Sydney	-4.2	34.5	148	7 28	?PR ₁	11 52	+13	17.7	18.4
Melbourne	-4.2	35.1	160	e 5 16	-81	e 11 28	-22	16.9	19.4
Mizusawa	-5.2	45.8	13	8 2	+2	14 28	+13	—	—
	-5.2	45.8	13	8 18	+18	14 33	+18	—	—
Calcutta	-5.5	49.9	308	8 46	+20	—	—	17.6	—
	-5.5	49.5	308	8 53	+32	—	—	17.2	—
Colombo	-5.6	51.6	282	10 10	?PR ₁	20 10	?	28.7	36.2
Kodaikanal	-5.9	54.7	286	12 10	?	—	—	29.2	35.3
Helwan	-7.8	100.2	300	18 10	?PR ₁	—	—	—	—
Victoria	—	105.1	41	—	—	—	—	40.0?	55.2
De Bilt	—	115.1	325	—	—	e 35 10	?	e 55.2	60.7
Uccle	—	116.1	324	—	—	e 27 10	?	e 53.2	60.2
Moncalieri	—	118.3	319	—	—	—	—	e 59.2	—
Stonyhurst	—	118.3	330	e 17 10	[-98]	—	—	—	78.2
Tortosa	—	122.8	316	—	—	—	—	e 59.2	64.3
Chicago	—	130.7	37	—	—	(e 38 57)	?SR ₁	77.2	—
La Paz	—	151.6	141	19 29	[-29]	33 50	?	75.7	84.9

Additional readings: Manila gives MN = +9.0m. Adelaide iS = +11m.28s. (SR₁), SR₂ = +13m.40s., SR₃ = +14m.16s., SR₄ = +14m.34s. Riverview MN = +18.0m., MZ = +22.8m. De Bilt MN = +76.4m. Epicentre 7°.1S, 128°.8E. Chicago gives eL which is taken above as SR₁.

Mar. 23d. Readings also at 1h. (La Paz), 2h. (Helwan and near Batavia), 11h. (La Paz), 12h. (Helwan), 13h. (Riverview and Melbourne), 15h. (Helwan), 20h. (San Fernando), 23h. (La Paz).

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FIRST SOLUTION (See Note at end).

Mar. 24d. 1h. 25m. 12s. Epicentre 6°·5S. 131°·5E.

A = -·658, B = +·744, C = -·113; D = +·749, E = +·663;
G = +·075, H = -·085, K = -·994.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Manila	23·5	334	e 5 33	+10	(9 39)	+ 4	9·6	9·8
Batavia	24·5	289	e 5 32	- 1	i 9 52	- 2	e 15·8	-
Adelaide	29·2	168	-	-	i 12 24	+64	16·2	17·4
Sydney	32·9	149	8 18	?PR ₁	12 54	+32	18·8	20·3
Riverview	32·9	149	e 7 5	+ 9	e 14 5	?SR ₁	e 17·9	25·4
Taihoku	33·0	345	-	-	e 12 3	-21	-	-
Melbourne	33·6	160	-	-	e 11 54	-40	17·8	20·2
Osaka	41·3	5	8 18	+13	(14 33)	+ 8	14·6	16·6
Nagano	43·6	7	i 8 27	+ 4	i 15 6	+10	-	-
Wellington	51·8	139	-	-	e 17 48	+67	e 21·5	32·8
Colombo	53·2	284	16 48	?S	(16 48)	-11	30·8	37·8
Kodaikanal	56·4	289	25 36	?L	-	-	29·9	32·8
Victoria	104·9	40	-	-	-	-	-	57·7
Uccle	117·8	325	-	-	-	-	e 59·8	-
De Bilt	116·8	326	-	-	-	-	e 56·8	61·6
Moncalieri	118·1	318	-	-	-	-	e 69·1	-
Stonyhurst	119·8	330	-	-	-	-	-	68·8
Chicago	130·6	37	-	-	-	-	e 65·8	-
La Paz	149·8	140	i 20 40	[+44]	-	-	77·3	-

Additional readings: Manila gives MN = +9·9m. Adelaide SR₁ = +14m.36s.
SR₂ = +15m.24s. SR₃ = +15m.39s. Riverview MN = +22·6m. MZ =
+22·1m. Melbourne PR₁ = +7m.36s., SR₁ = +14m.42s. De Bilt
MN = +75·5m. Epicentre 6°·9S. 130°·5E.

NOTE: The above solution represents the best that could be done from the study of the above material alone. But as already stated in the note to the previous earthquake, direct comparison suggested that the two might be from the same focus; and on combining them, further discussion suggested similarity with the conditions of 1920 May 10: viz., a focus 0·060 radius below normal, and a position 5°·5S. 130°·0E. for the epicentre. The following solution is therefore given with these elements, though the depth 0·060 is perhaps excessive for the present shock:—

SECOND SOLUTION.

Mar. 24d. 1h. 26m. 0s. Epicentre 5°·5S. 130°·0E. (as on Mar. 23d.).

A = -·640, B = +·763, C = -·096.

A focal depth 0·060 below normal is assumed as on 1920 May 10.

	Corr. for Focus	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Manila	-2·7	22·0	336	e 4 45	+12	-	-	8·8	9·0
Batavia	-2·8	23·0	287	e 4 44	+ 1	i 9 4	+37	e 15·0	-
Adelaide	-3·8	30·5	166	-	-	i 11 36	+61	15·4	16·6
Taihoku	-4·0	31·6	347	-	-	e 11 15	+23	-	-
Riverview	-4·2	34·5	148	e 6 17	-14	e 13 17	?SR ₁	e 17·1	24·6
Sydney	-4·2	34·5	148	7 30	?PR ₁	12 6	+27	18·0	19·5
Melbourne	-4·2	35·1	160	-	-	e 11 6	-44	17·0	19·4
Osaka	-4·7	40·4	7	7 30	+11	(13 45)	+39	13·8	15·8
Nagano	-4·9	42·9	10	i 7 39	+ 1	i 14 18	+40	-	-
Colombo	-5·6	51·6	282	16 0	?S	(16 0)	+32	30·0	37·0
Kodaikanal	-5·9	54·7	286	24 48	?L	-	-	29·1	32·0
Victoria	-	105·1	41	-	-	-	-	-	56·9
De Bilt	-	115·1	325	-	-	-	-	e 56·0	60·8
Uccle	-	116·1	324	-	-	-	-	e 59·0	-
Moncalieri	-	116·3	319	-	-	-	-	e 68·3	-
Stonyhurst	-	118·3	330	-	-	-	-	-	68·0
Chicago	-	130·7	37	-	-	-	-	e 65·0	-
La Paz	-	151·6	141	i 19 52	[- 6]	-	-	76·5	-

Additional readings: Manila gives MN = +9·1m. Adelaide SR₁ = +13m.48s.
SR₂ = +14m.36s., SR₃ = +14m.51s. Riverview MN = +21·8m. MZ =
+21·3m. Melbourne PR₁ = +6m.48s., SR₁ = +13m.54s. De Bilt
MN = +74·7m. Epicentre 6°·9S. 130°·5E.

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Mar. 24d. 9h. 17m. 7s. Epicentre 30°2S. 177°7W. (as on 1921 Jan. 7d.).

A = -864, B = -035, C = -503; D = -040, E = +999;
G = +503, H = +020, K = -864.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Wellington	12.7	206	e 3 41	+32	—	—	i 6.6	7.9
Apia	17.2	20	4 5	-2	—	—	8.4	9.1
Sydney	E. 26.6	254	5 41	-13	9 11	-82	13.1	15.2
Riverview	26.6	254	e 5 50	-4	e 10 50	+17	e 13.1	15.6
Melbourne	31.7	246	e 6 5	-39	e 11 5	-58	14.5	21.3
Adelaide	36.9	256	e 8 53	+84	e 13 11	-11	20.1	24.1
Manila	74.1	298	e 11 53	+10	—	—	—	—
Batavia	74.3	272	e 12 4	+20	—	—	e 42.3	54.1
Taihoku	80.3	307	—	—	—	—	e 38.7	—
Berkeley	85.4	41	—	—	—	—	e 41.9	—
Victoria	92.4	33	—	—	—	—	—	48.7
La Paz	97.7	114	e 13 46	-12	i 24 19	-74	51.3	52.9
Colombo	104.3	270	32 53	?SR ₁	57 53	?L	65.9	77.9
Kodaikanal	107.9	272	57 59	?L	—	—	63.6	68.3
Chicago	109.6	53	—	—	e 24 53	-151	56.2	—
Ann Arbor	E. 112.5	51	—	—	(28 11)	+21	69.0	—
	N. 112.5	51	—	—	(28 5)	+15	68.9	—
Toronto	115.9	53	—	—	—	e 65.4	—	67.7
Georgetown	116.1	58	—	—	—	—	69.1	—
Ithaca	117.5	54	—	—	—	e 65.7	—	—
Ottawa	118.9	52	—	—	e 25 43	-178	e 66.4	—
Helwan	154.9	275	22 53	?PR ₁	—	—	—	—
Stonyhurst	156.0	7	e 64 23	?L	—	—	(e 64.4)	98.9
De Bilt	158.0	353	—	—	e 44 53	?SR ₁	e 88.9	89.8
Kew	158.6	5	—	—	—	—	—	106.9
Uccle	159.3	355	—	—	e 36 53	?	e 83.9	—
Moncalieri	164.6	345	—	—	—	?	e 94.0	—
Rocca di Papa	165.7	327	—	—	i 28 14	?	e 93.4	—
Tortosa	169.3	5	—	—	—	?	e 88.9	101.1
Rio Tinto	169.4	42	90 53	?L	—	—	(90.9)	109.9
San Fernando	170.5	46	—	—	—	—	91.7	100.9

Additional readings and notes: Riverview gives also PR₁ = +6m.49s., MZ = +15.3m., MN = +16.2m. Melbourne PR₁ = +7m.17s. Adelaide readings are all given as "e" simply. Also e = +17m.29s. La Paz iPV = +13m.53s., SN = +26m.18s., LE = +52.1m., T₀ = 9h.15m.32s. Ann Arbor readings are all given as L. Toronto e? = +50m.35s., e = +60m.41s., eL = +72.5m. and +75.3m. Ottawa eE = +30m.3s. and +52m.49s., eL = +36.3m. Stonyhurst P has been increased by 1h. De Bilt MN = +115.6m. Uccle e = +52m.29s. Rocca di Papa eN = +28m.41s. San Fernando MN = +99.4m.

1921. Mar. 24d. 14h. 41m. 40s. Epicentre 50°5N. 159°0E.

A = -594, B = +228, C = +772; D = +358, E = +934.;
G = -720, H = +276, K = -636.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari	11.4	257	2 43	-7	(4 58)	-6	5.0	6.6
Hakodate	15.3	242	e 4 2	+19	—	—	—	4.6
Mizusawa	E. 17.0	235	4 14	+9	7 24	+6	—	—
	N. 17.0	235	4 13	+8	7 22	+4	—	—
Mito	19.4	230	4 44	+10	(8 17)	+7	8.3	—
Tokyo	20.3	230	5 20?	+35	7 27	-62	9.4	9.9
Osaka	23.3	236	5 21	+1	(9 35)	+4	9.6	11.9
Kobe	23.4	237	5 20	-1	(9 33)	0	9.8	10.5
Nagasaki	27.8	242	e 6 5	-1	(10 40)	-15	10.7	—
Zi-ka-wei	33.8	252	e 6 56	-7	e 12 14	-24	e 16.1	19.1
Taihoku	38.8	243	—	—	e 13 23	-26	—	—
Honolulu	E. 44.4	113	—	—	i 18 56	?SR ₁	21.3	25.0
	N. 44.4	113	—	—	i 15 12	+5	21.2	24.8
Manila	47.2	235	e 8 49	+1	—	—	—	—
Victoria	48.2	60	(9 26)	+31	(15 49)	-7	15.8	21.7
Berkeley	55.1	70	—	—	e 17 20	-2	—	—
Lick	55.9	70	—	—	—	—	e 23.3	—

Continued on next page.

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		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Calcutta	E.	60.7	273	10 14	- 3	(18 32)	0	18.5	—
	N.	60.7	273	10 20	+ 3	(18 38)	+ 6	18.6	—
Konigsberg	E.	69.1	337	17 59	?	19 13	-62	33.5	—
	N.	69.1	337	18 3	?	—	—	31.5	—
Chicago		71.0	46	12 20	+57	20 40	+ 2	32.3	—
Dyce	N.	71.2	349	—	—	i 21 20	+40	36.3	—
St. Louis	E.	72.2	49	e 11 44	+13	20 56	+ 4	35.3	—
Batavia		72.2	237	e 11 34	+ 3	—	—	e 36.6	—
Ann Arbor	E.	72.3	42	—	—	21 8	+14	37.4	—
	N.	72.3	42	—	—	21 20	+26	37.9	—
Lemberg		72.5	332	e 12 20	+47	—	—	e 35.8	46.4
Edinburgh		72.6	349	—	—	—	—	31.3	44.8
Hamburg		72.8	343	e 11 34	- 1	—	—	e 34.3	41.8
Toronto		73.0	40	—	—	21 2	0	35.9	45.2
Ottawa		73.1	36	11 41	+ 4	21 3	0	e 35.3	—
De Bilt	E.	75.0	344	—	—	—	—	e 33.3	45.7
	N.	75.0	344	11 42	- 7	21 24	- 2	e 36.3	51.8
Ithaca		75.3	38	e 11 44	- 7	e 21 22	- 7	e 38.3	—
Budapest		76.1	335	e 11 22	-34	e 23 30	+112	—	46.3
Vienna		76.2	337	i 11 50	- 6	—	—	38.3	44.4
Uccle		76.4	345	11 56	- 1	21 36	- 6	34.3	47.6
Oxford		76.4	348	—	—	i 21 59	+17	32.0	48.4
Kew		76.5	348	31 20	?L	—	—	(31.3)	53.3
Kodaikanal		76.8	273	23 2	?S	(23 2)	+75	46.6	63.1
Harvard	E.	77.4	35	—	—	e 20 49	-64	e 38.5	43.9
Colombo		77.8	269	23 20?	?S	(23 20?)	+82	51.3	54.3
Strasbourg		77.9	341	12 7	+ 1	e 17 36	?PR ₁	22.3	45.4
Washington		78.0	40	11 9	-58	21 4	-56	36.9	—
Georgetown	E.	78.0	40	12 9	+ 2	22 2	+ 2	38.5	—
	N.	78.0	40	12 10	+ 3	22 2	+ 2	40.8	—
Paris		78.7	346	i 12 11	0	i 23 7	- 1	42.3	46.3
Zurich		78.9	340	e 12 14	+ 2	—	—	e 43.3	—
Pola		79.6	338	e 21 41	?S	(e 21 41)	-38	e 35.8	51.2
Besançon		79.6	343	12 15	- 2	17 11?	?PR ₁	43.3	—
Padova		80.0	339	12 40	+21	23 0	+37	—	55.1
Moncalieri		81.4	341	12 34	+ 7	19 24	?PR ₁	28.0	53.0
Florence		81.6	337	8 20?	?	—	—	—	30.8
Rocca di Papa		83.2	337	e 12 35	- 2	22 51	- 8	e 44.8	56.6
Athens	E.	83.3	326	e 12 32	- 6	—	—	e 42.0	48.6
	N.	83.3	326	e 12 29	- 9	22 40	-20	—	48.2
Marseilles		83.4	342	e 12 37	- 1	e 17 23	?PR ₁	22.3	46.7
Pompeii		83.6	334	12 20	-20	22 20	-45	46.3	54.3
Riverview		84.7	187	e 12 25	-21	e 23 5	-11	e 40.1	41.8
Barcelona	E.	85.9	344	13 8	+15	23 21	- 8	38.8	53.6
	N.	85.9	344	—	—	—	—	28.9	52.7
Tortosa		86.8	346	12 48	-10	23 11	-28	36.9	57.8
Helwan	E.	87.3	318	13 38	+37	—	—	—	60.3
Coimbra	E.	88.7	351	12 54	-15	23 38	-22	e 37.5	55.1
	N.	88.7	351	e 12 44	-25	—	—	e 37.7	59.2
Melbourne		89.2	192	e 13 26	+15	e 23 38	-27	e 40.6	59.3
Algiers		90.2	341	e 12 53	-24	23 33	-43	37.3	50.8
Río Tinto		90.8	349	27 20	?S	(27 20)	+178	—	68.3
Granada		91.0	347	i 13 29	+ 8	43 43	?L	(43.7)	—
San Fernando		92.1	349	—	—	23 2	-94	—	58.5
La Paz		129.3	66	i 19 27	[+10]	33 35	?	63.8	68.4

Additional readings and notes : Ootomari gives also MN = +5.8m. Tokyo MN = +10.8m. Osaka MN = +10.4m. Kobe S is given as LN, also MN = +9.7m. Batavia e = +14m.43s., i = +20m.42s. Konigsberg PNE = 14h.21m.25s., PZ = +17m.9s., eLEN = +21.0m., LZ = +43.5m. Chicago L = +34.8m. St. Louis L = +39.3m. Dyce LE = +32.3m. Hamburg MZ = +42.2m., MN = +48.6m. Toronto S = +23m.8s.?, eL = +39.5m., eL = +46.4m., iL = +44.2m. Ottawa PR,NE = +16m.36s., SR,E = +26m.28s., L = +39.3m., +49.3m., and +52.3m., T₀ = 14h.41m.58s. Eskdalemuir ($\Delta = 73^\circ 2'$) gives just 15h. to 17h. De Bilt eE = +21m.44s., eSR₁ = +26m.15s. Ithaca e = +29m.56s. Budapest e = +13m.32s. Vienna eLE = +34.6m., eLNZ = +38.6m., MNZ = +48.4m. Uccle SR₁ = +27m.4s., MN = +50.4m. Harvard iE = +21m.53s. and +26m.59s., iLE = +42.4m., T₀ = 14h.44m.57s. Colombo P = +35m.20s., S = +47m.20s. Strasbourg MN = +48.2m., MZ = +52.0m. Georgetown eLE = +35.7m. Pola MN = +51.4m. Padova PR₁ = +16m.48s., Moncalieri MN = +55.9m. Rocca di Papa i = +12m.41s., L = +37.8m. Riverview eS = +23m.29s., SR₁ = +29m.23s., e = +35m.25s. Coimbra LN = +43.3m., LE = +50.7m. Melbourne SR₁ = +29m.26s. Granada gives its readings as on 25d. San Fernando MN = +59.3m. La Paz LN = +66.3m., T₀ = 14h.42m.8s.

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Mar. 24d. Readings also at 0h. (Zi-ka-wet), 2h. (La Paz and Manila), 3h. (Tortosa, La Paz, and Riverview), 5h. (La Paz and Harvard), 6h., 10h., and 11h. (La Paz), 17h. (Nagasaki and Wellington), 18h. (near Sapporo), 19h. (Manila), 22h. (La Paz), 23h. (Fordham and La Paz).

Mar. 25d. 0h. 32m. 50s. Epicentre 33°·6N. 111°·4W.

A = -·304, B = -·776, C = +·553 ; D = -·931, E = +·365 ;
G = -·202, H = -·515, K = -·833.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Tucson	E.	1·4	161	e 0 25	+ 4	—	—	e 1·0	e 1·8
	N.	1·4	161	(—)	—	e 0 38	- 1	e 1·1	e 1·5
Denver		8·0	38	(2 10)	+ 9	—	—	2·2	4·2
Lick		9·2	297	—	—	e 3 19	-49	—	—
Berkeley		9·8	298	—	—	—	—	e 4·2	9·4
Victoria		17·3	333	7 25	?S	(7 25)	0	9·4	12·8
St. Louis		17·8	68	—	—	—	—	i 10·8	13·6
Tacubaya	E.	17·8	140	3 50	-25	7 44	+ 8	9·3?	10·7
Vera Cruz	E.	19·8	133	4 45	+ 6	—	—	11·3	11·5
Chicago		20·4	59	—	—	e 9 6	+34	i 11·2	—
Ann Arbor		23·4	60	—	—	—	—	16·7	—
Toronto		26·7	58	—	—	—	—	13·3	19·5
Georgetown		28·0	69	—	—	—	—	e 15·8	—
Washington		28·0	69	—	—	—	—	e 14·6	—
Cheltenham		28·2	69	i 16 3	?L	—	—	e 16·7	16·5
Ithaca		28·7	62	—	—	e 11 10	- 2	e 16·0	—
Ottawa		29·6	56	—	—	e 11 26	- 1	e 17·2	—
Northfield		31·6	58	—	—	—	—	e 17·8	—
Harvard	E.	32·6	60	e 18 23	?L	1 18 40	?	32·2	—
	N.	32·6	60	e 18 11	?L	1 18 35	?	e 31·9	—
Coimbra		77·7	49	24 57	?SR ₁	30 56	—	e 38·7	—
De Bilt		78·0	33	—	—	—	—	e 38·2	48·8
Uccle		78·5	35	—	—	—	—	e 37·2	—
Paris		78·8	39	—	—	—	—	44·2	—
Rio Tinto		80·2	50	43 10	?L	—	—	(43·2)	57·2
Tortosa		82·8	44	—	—	—	—	e 38·2	43·9
Helwan		107·4	32	55 10	?L	—	—	(55·2)	—

Additional readings : Denver gives also MN = +2·7m. Lick eE = +3m.35s.
Berkeley e?N = +4m.6s., e?V = +4m.12s. Victoria MV = +12·2m.
St. Louis ePE = 0h.30m.30s., MN = +11·2m. Vera Cruz readings increased
by 19m. Toronto eL = +16·5m. Georgetown eLEN = +17·6m.
Cheltenham MN = +16·8m. Ithaca e = +14m.10s. Ottawa i =
+16m.48s., L = +20·9m. Harvard LN = +34·8m., LE = +35·1m., T,
= 0h.31m.26s. De Bilt MN = +42·3m.

Mar. 25d. Readings also at 3h. (2) and 4h. (near Tacubaya), 20h. (Taihoku), 22h. (Chicago, Georgetown, and Ottawa), 23h. (near Tokyo).

Mar. 26d. Readings at 0h. (Melbourne, Riverview, and near Nagasaki), 1h. (Apia), 2h. (Riverview, Melbourne, and Kodaikanal), 3h. (Helwan), 13h. (Riverview and Melbourne), 14h. (Helwan), 22h. (La Paz and near Porto Rico and Port au Prince).

Mar. 27d. Readings at 12h. (La Paz), 21h. (near Tokyo).

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1921. Mar. 28d. 7h. 49m. 20s. Epicentre 14°5N. 86°0W.

(as on 1919 June 29d.).

A = +.068, B = -.966, C = +.250; D = -.998, E = -.070;
G = +.017, H = -.250, K = -.968.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Balboa Heights	E.	8.3	130	2 20	+14	4 2	+17	5.5	6.8
	N.	8.3	130	2 14	+ 8	3 54	+ 9	5.4	5.5
Oaxaca	E.	10.7	285	2 48	+ 8	(4 42)	- 6	4.7	5.2
Vera Cruz	E.	10.8	297	3 3	+22	—	—	6.0	8.6
Puebla	N.	12.6	293	4 23	+76	—	—	7.2	7.5
Tacubaya	N.	13.6	293	3 14	- 7	6 2	+ 4	6.8	6.9
Porto Rico	E.	20.0	77	14 55	+14	18 57	+34	e 10.7	13.2
	N.	20.0	77	4 55	+14	—	—	e 11.4	16.2
Mazatlan	E.	21.2	298	4 53	- 2	9 8	+20	11.9	12.9
St. Louis	E.	24.4	352	15 37	+ 5	10 4	+12	14.1	11.1
	N.	24.4	352	—	—	10 10	+13	—	15.3
Cheltenham	E.	25.6	17	15 45	+ 1	11 35	+21	13.8	17.2
	N.	25.6	17	e 5 28	-16	i 10 29	+15	13.3	16.2
Georgetown	E.	25.7	16	15 50	+ 5	i 11 36	+80	—	12.9
	N.	25.7	16	15 50	+ 5	i 11 35	+79	—	11.6
Washington		25.7	16	4 50	-55	9 36	?	14.2	—
Chicago		27.3	357	5 59	- 2	11 47	+61	—	—
Ann Arbor	E.	27.9	4	6 10	+ 3	11 10	+13	13.4	14.3
Fordham	E.	28.4	20	6 16	+ 4	11 22	+16	—	19.5
Tucson	E.	28.8	312	e 6 8	- 8	10 50	-23	e 16.8	18.9
	N.	28.8	312	—	—	e 10 46	-27	e 15.8	16.7
Ithaca		29.1	14	6 7	-12	i 11 15	- 4	e 14.6	—
Toronto		29.7	10	6 22	- 3	11 58	+29	16.5	18.8
Harvard	E.	30.7	21	i 6 37	+ 2	i 11 52	+ 6	16.0	18.5
	N.	30.7	21	6 35	0	i 11 51	+ 5	15.9	18.8
Northfield		31.8	20	e 7 26	+41	12 40	+35	16.7	—
Ottawa		32.1	12	6 45	- 3	12 9	- 1	e 17.2	—
La Paz		35.6	151	6 50	-28	i 12 21	-43	16.2	21.0
Lick		39.0	315	e 7 38	- 8	e 13 33	-19	—	—
Berkeley	E.	39.7	315	e 7 39	-13	e 13 41	-21	e 18.8	24.8
	N.	39.7	315	e 7 43	- 9	e 13 44	-18	e 19.3	—
Saskatoon		40.7	344	e 8 26	+25	i 14 49	+32	e 22.1	—
Victoria		45.7	326	8 12	-26	14 35	-49	22.4	32.3
	Z.	45.7	326	8 26	-12	15 24	0	25.4	29.4
Azores		57.8	54	—	—	—	—	—	44.9
Honolulu	E.	68.4	288	i 11 1	- 6	i 19 56	-11	31.6	32.0
	N.	68.4	288	11 13	+ 6	i 20 2	- 5	—	20.3
Coimbra		71.3	51	i 11 34	+ 9	i 20 57	+15	31.1	36.8
Rio Tinto		72.9	55	31 40	1L	—	—	(31.7)	42.7
San Fernando		73.3	56	11 11	-27	20 22	-44	37.9	44.9
Edinburgh		74.0	35	11 50	+ 8	i 21 23	+ 9	35.7	38.5
Stonyhurst		74.6	38	i 11 46	0	21 22	+ 1	e 36.2?	47.9
Dyce	E.	74.6	33	—	—	21 28	+ 7	30.5	36.7
	N.	74.6	33	—	—	21 28	+ 7	33.6	35.9
Granada		75.3	54	i 12 3	+12	i 21 48	+19	—	—
Oxford		75.4	41	11 54	+ 3	21 43	+13	35.1	41.2
Kew		76.1	40	11 40	-16	—	—	—	60.7
Tortosa		78.0	50	12 11	+ 4	22 10	+10	e 35.7	—
Paris		78.2	42	i 12 10	+ 2	i 22 9	+ 7	36.7	38.7
Uccle		79.0	40	i 12 15	+ 2	i 22 18	+ 6	33.7	43.1
Barcelona		79.1	50	12 13	- 1	i 22 19	+ 6	33.8	39.4
De Bilt		79.3	39	12 19	+ 4	12 22	+ 7	e 38.7	39.7
Algiers		80.7	54	12 25	+ 2	22 37	+ 6	38.7	40.7
Besançon		80.8	44	12 25	+ 1	22 38	+ 5	38.7	—
Marseille		81.2	48	e 12 45	+19	22 45	+ 8	e 36.7	44.4
Strasbourg		81.6	42	12 30	+ 2	22 44	+ 2	e 36.7	45.4
Hamburg		81.9	37	e 12 28	- 2	e 22 38	- 7	e 37.7	42.4
Moncalieri		82.4	45	12 23	- 9	i 22 52	+ 2	30.2	44.7
Zurich		82.5	44	e 12 33	0	22 51	- 1	—	—
Milan		83.2	43	13 55	?	—	—	40.7	—
Florence		85.1	45	11 58	-51	23 17	- 3	33.9	42.5
		85.1	45	12 50	+ 1	23 20	0	29.7	43.7
Padova		85.1	43	13 4	+15	23 24	+ 4	—	45.7
Pola		86.6	45	e 12 53	- 4	e 23 14	-23	e 40.2	46.7
Rocca di Papa		86.7	47	13 19	+22	1 23 19	-19	—	43.0
		86.7	47	i 13 19	+22	1 23 13	-25	e 41.3	—
Vienna		87.2	40	12 46	-14	1 23 18	-25	e 42.1	48.8
Pompeii	E.	88.3	48	12 55	-12	22 55	-60	34.7	45.7

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Apia	89.5	258	12 53	-20	23 28	-41	40.9	—
Lemberg	81.3	38	12 58	-25	1 23 43	-44	e 41.9	49.9
Athens	E. 85.9	48	e 13 58	+10	i 24 2	-73	e 46.5	53.0
	N. 85.9	48	e 14 16	+28	—	—	—	54.4
Ootomari		327	24 56	?S	(24 56)	-105	59.6	62.6
Helwan	E. 105.1	53	14 40	+5	19 4	?PR ₁	—	62.2
	N. 105.1	53	16 34	?	—	—	—	62.6
Wellington	106.4	230	e 14 16	-25	i 24 40	-136	e 48.0	50.7
Sydney	E. 125.1	239	20 22	?PR ₁	(26 4)	-203	57.4	62.9
Riverview	125.1	239	e 17 1	+55	e 30 29	+62	e 54.9	58.8
Zi-ka-wei	127.3	330	e 22 22	?PR ₁	—	?	—	80.1
Melbourne	129.4	232	e 19 22?	[+5]	e 31 40	?	e 57.9	66.6
Simla	131.6	20	e 22 22	?PR ₁	—	?	65.4	71.4
Taihoku	132.3	325	—	—	e 33 34	?	—	83.4
Adelaide	135.1	235	e 21 40	?PR ₁	—	?	62.4	78.2
Manila	140.6	316	e 19 40	[0]	—	—	64.4	—
Bombay	140.6	32	80 45	?L	—	—	(80.8)	—
Calcutta	142.6	8	19 46	[+ 2]	—	—	—	—
Mauritius	E. 145.1	105	—	—	—	?	—	75.7
Kodaikanal	E. 150.3	34	22 58	?PR ₁	(38 52)	?	83.8	122.9
Colombo	154.4	34	23 40	?PR ₁	44 40?	?SR ₁	90.7?	114.7
Batavia	164.9	302	e 20 21	[+ 9]	—	—	80.0	99.0

Additional readings and notes : Oaxaca gives its readings as at 6h. Puebla readings are given on 27d. and diminished by 5m. Porto Rico gives also PR₁N = +5m.32s., SR₁N = +9m.57s. Vera Cruz readings diminished by 39m. Cheltenham iE = +5m.45s. Georgetown iEN = +6m.40s. Ann Arbor (Wiechert) LE = +13.9m., LN = +13.5m., ME = +14.2m. Tucson e = +7m.8s., iE = +12m.5s. Toronto eP = +7m.58s., i = +10m.40s. and +14m.16s., eL = +73.1m. Harvard iN = +7m.51s., iE = +7m.54s. and +9m.29s., LNE = +15.7m., iNE = +15m.47s., T₀ = 7h.49m.15s. Ottawa SR₁? = +14m.17s., T₀ = 7h.49m.17s. La Paz iPN = +6m.52s., MN = +21.8m., L (rep.) = 10h.36m.0s., T₀ = 7h.49m.12s. Lick ePN = +7m.36s., T₀ = 7h.49m.25s. Berkeley e'E = +17m.6s., e'N = +17m.11s. Saskatoon i = +10m.17s., iE = +18m.12s., iN = +18m.17s., eN = +20m.21s. Honolulu SR₁N = +27m.51s. Coimbra MN = +35.5m., T₀ = 7h.49m.30s. Edinburgh PR₁ = +15m.3s., SR₁ = +30m.28s. Oxford PR₁ = +14m.51s. Paris MN = +40.7m. Ucele PR = +15m.56s., SR₁ = +27m.5s. Barcelona SN = +22m.52s., PS = +23m.26s., SR₁ = +28m.24s., MN = +38.5m. De Bilt MN = +39.3m. Strasbourg PR₁ = +15m.59s., MZ = +45.3m., MN = +45.5m. Hamburg PS = +23m.46s., MZ = +40.7m., MN = +47.8m. Moncalieri MN = +44.6m. Padova PR₁ = +17m.0s., SR₁ = +23m.42s. Pola MN = +45.5m. Rocca di Papa eP = +11m.19s. Vienna PZ = +12m.56s., iE = +15m.41s., PR₁Z₁ = +16m.36s., iZ = +16m.55s., iE = +17m.1s. and +24m.47s. Apia PR₁ = +17m.28s., SR₁ = +31m.40s. Athens PR₁E = +17m.16s., SR₁ = +26m.34s., T₀ = 7h.51m.12s. Ootomari gives L and M as for a separate shock, for which P = +53m.58s. Wellington ePR₁ = +18m.22s. Sydney gives L and M as for a separate shock for which S = +49m.40s. Riverview PS = +31m.17s., eSR₁ = +37m.48s. and +38m.33s., MN = +57.9m., MZ = +58.5m., L (rep.) = +112.0m., readings all given as on 29d. Zi-ka-wei MN = +77.8m. Melbourne PR₁ = +26m.40s., eSR₁ = +38m.22s., iSR₁ = +39m.28s. Simla MN = +70.6m. All these readings are given one hour too late. Adelaide iP = +22m.40s., e = +28m.34s., +32m.16s., +39m.58s., +44m.40s., and +47m.28s. Calcutta FN = +19m.52s. Mauritius MN = +72.7m. Colombo L = +112.7m. Batavia i = +25m.6s. and +31m.21s., L = +54.4m.

Mar. 23d. Readings also at 1h. (La Paz), 6h. (Christchurch), 9h. (Sydney), 12h. (Lick and Manila), 16h. and 17h. (2) (near Manila), 19h. (Rio Tinto and Manila), 20h. (Manila), 21h. (Lick and La Paz).

Mar. 29d. 22h. 11m. 45s. Epicentre 46° 5N. 151° 5E. (as on 1920 June 10d.).

A = -603, B = +328, C = +725; D = +477, E = +879;
G = -638, H = +346, K = -688.

	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari	6.0	274	2 53	?S	(2 53)	+9	4.6	5.7
Hakodate	9.1	242	e 2 19	+1	—	—	e 4.4	5.0
Mizusawa	E. 10.6	229	e 2 22	-16	7 3	?	—	—
	N. 10.6	229	e 2 26	-12	7 6	?	—	—
Tokyo	14.0	223	e 2 21	-65	—	—	e 7.7	—
Osaka	16.9	232	4 7	+ 3	7 34	+18	9.8	10.6

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		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
				m. s.	s.	m. s.	s.	m.	m.
Kobe	E.	17.1	232	e 2 52	-74	—	—	9.0	9.5
	N.	17.1	232	2 51	-75	—	—	9.1	—
Zi-ka-wei		27.7	247	e 5 54	-11	e 10 24	-30	—	19.3
Taihoku		32.1	241	—	—	e 12 15	+ 5	—	—
Manila		40.8	230	e 9 38	+97	—	—	—	—
Honolulu	E.	47.7	103	—	—	15 27	-23	e 24.0	26.4
Victoria		54.5	53	—	—	—	—	—	36.9
Batavia		65.9	233	e 9 51	-59	e 19 23	-13	—	—
Kodakanal		71.7	270	49 3	†L	—	—	(49.0)	—
Tucson		71.8	62	e 12 24	+56	—	—	—	—
Colombo		72.4	266	50 15	†L	—	—	(50.2)	54.2
Lemberg		73.4	327	—	—	e 20 51	-16	42.8	50.0
Hamburg		74.7	337	e 11 45	- 2	—	—	e 40.2	44.4
Chicago		77.3	40	—	—	—	—	45.2	—
Stonyhurst		77.3	346	e 22 3	†S (e 22 3)	—	+11	—	51.2
Budapest		77.3	330	e 11 51	-12	—	—	e 44.2	46.2
De Bilt	E.	77.3	340	—	—	22 3	+11	e 41.2	44.1
	N.	77.3	340	—	—	—	—	e 42.2	51.6
Vienna		77.5	331	i 12 2	- 2	e 24 33	††	e 45.2	56.4
Ann Arbor		78.6	38	—	—	—	—	e 37.4	—
Uccle		78.6	340	e 12 8	- 3	e 22 9	+ 2	e 37.2	47.2
Ottawa	E.	79.1	31	—	—	e 22 11	- 2	e 37.2	—
Kew		79.1	345	—	—	—	—	—	59.2
Toronto		79.2	35	—	—	—	—	e 44.8	51.4
Strasbourg		79.9	337	—	—	—	—	e 45.2	—
Riverview		80.3	181	e 10 9	†	e 22 9	-18	e 45.0	51.6
Paris		80.9	341	—	—	—	—	e 44.2	47.2
Florence		83.1	334	—	—	—	—	—	34.2
Moncalieri		83.1	336	—	—	e 23 51	+53	46.7	49.8
Harvard	E.	83.4	30	—	—	44 53	†L	e 51.2	—
Rocca di Papa		84.5	330	e 12 45	0	e 23 9	- 5	e 49.0	58.2
Pompeii		84.7	323	—	—	—	—	54.2	—
Helwan	E.	86.5	311	22 15	†S (22 15)	—	-81	—	—
Tortosa		88.9	340	—	—	—	—	e 48.2	52.6
Vera Cruz		90.5	60	—	—	—	—	29.2	—
Algiers		92.0	336	—	—	—	—	e 45.2	57.8
Rio Tinto		93.5	344	56 15	†L	—	—	(56.2)	60.2
La Paz		135.6	61	23 11	†PR ₁	—	—	—	—

Additional readings: Ootomari gives also MN = +6.6m. Osaka MN = +11.2m. Zi-ka-wei MN = +19.1m. Honolulu LN = +21.6m. Batavia e = +14m.38s. Tucson ePN = +12m.30s. Lemberg gives its reading as 28d. Hamburg MN = +44.0m., MZ = +51.2m. Ann Arbor LN = +37.6m. Ottawa e†E = +31m.0s. and 4 other L's. Toronto eL = +50.8m., L† = +70.2m. and +81.2m. Riverview MN = +46.4m. Moncalieri S† = +38m.5s. Harvard L = +52.5m.

Mar. 29d. Readings also at 1h. (Lick), 3h. and 5h. (Wellington), 10h. (Taihoku), 15h. (near La Paz), 16h. (La Paz and near Tokyo), 17h. (Helwan and Batavia), 23h. (near Tacubaya and Oaxaca).

Mar. 30d. 10h. 26m. 30s. Epicentre 22°2N. 93°2E. (as on 1920 Aug. 15d.).

A = -052, B = +924, C = +378; D = +998, E = +056; G = -021, H = +377, K = -926.

Very rough.

		Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
				m. s.	s.	m. s.	s.	m.	m.
Calcutta	E.	4.5	275	0 42	-28	—	—	1.4	4.4
Simla		16.8	306	e 4 12	+10	7 0	-13	—	—
Kodakanal		19.3	234	5 48	+75	—	—	11.7	20.7
Bombay		19.4	264	3 48	-46	7 17	-53	8.5	—
Colombo		20.0	222	8 30	†S (8 30)	—	+ 7	13.0	14.5
Taihoku		26.1	78	—	—	—	—	e 15.6	—
Zi-ka-wei		26.6	64	e 5 56	+ 2	e 10 48	+15	—	18.0
Manila		27.4	101	e 6 8	+ 6	—	—	—	—
Batavia		31.4	155	e 6 31	-11	—	—	—	13.7
Helwan		55.5	292	17 30	†S (17 30)	—	+ 2	—	—
Lemberg		59.9	318	—	—	—	—	e 26.0	42.6
Vienna		65.0	317	i 10 30	-15	—	—	—	46.7
Hamburg		68.3	323	—	—	—	—	e 27.5	49.5

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.
	m. s.	m. s.	m. s.	s.	m. s.	s.	m.	m.
De Bilt	71.5	320	—	—	e 29 30	?	e 39.5	42.3
Uccle	72.2	320	—	—	—	—	e 35.5	42.5
Kew	74.9	321	—	—	—	—	—	36.5
Stonyhurst	75.4	321	e 30 30	?L	—	—	(e 30.5)	54.5
Eskdalemuir	75.4	325	—	—	—	—	39.5	43.5
Oxford	75.4	321	—	—	—	—	—	50.7
Wellington	98.5	132	e 52 48	?L	e 58 48	?	(52.8)	—
La Paz	161.5	285	20 5	[-4]	—	—	76.5	104.0

Additional readings and notes: Colombo gives also S = +11m.30s. De Bilt eLN = +36.5m. Eskdalemuir MN = +44.5m.

1921. Mar. 30d. 15h. 2m. 10s. Epicentre 7°-6S. 128°-3E.

(suggested by Batavia).

A = -614, B = +778, C = -132; D = +785, E = +620;
G = +082, H = -104, K = -991.

A depth of focus 0.040 is assumed.

	Corr. for Focus	Δ	Az.	P.	O-C.	S.	O-C.	L.	M.	
		m. s.	m. s.	m. s.	s.	m. s.	s.	m.	m.	
Batavia	-1.7	21.3	272	4 35	-1	e 8 18	+3	—	9.0	
Manila	-1.9	23.3	342	e 4 58	0	8 9	-44	9.2	9.2	
Perth	-2.3	27.0	204	6 21	+46	(9 26)	-31	9.4	—	
Adelaide	-2.5	29.0	162	—	—	i 10 32	0	12.0	18.8	
Taihoku	-2.9	33.3	350	e 7 24	+52	(11 22)	-19	11.4	—	
Riverview	-2.9	33.7	143	e 6 38	+2	i 11 46	-2	e 12.8	21.6	
Sydney	-2.9	33.7	143	e 6 38	+2	i 11 38	-10	18.8	21.9	
Melbourne	-2.9	33.8	154	e 6 44	+7	i 12 2	+12	13.3	21.7	
Zi-ka-wei	-3.3	39.3	353	e 7 20	-2	e 12 40	-30	e 18.3	20.0	
Kobe	-3.5	42.8	9	7 43	-6	13 52	-4	17.5	18.4	
	N.	-3.5	42.8	9	7 43	-6	13 53	-3	17.2	17.8
	E.	-3.5	42.8	9	7 55	+6	14 4	+8	—	18.2
Osaka	-3.6	44.6	13	7 46	-17	14 15	-6	—	—	
Tokyo	-3.6	45.1	359	8 0	-7	12 19	-129	—	18.3	
Jinsen	-3.9	48.2	13	8 26	-2	15 11	+5	—	—	
Mizusawa	-4.0	49.4	310	8 50	+14	—	—	21.2	—	
Calcutta	-4.0	50.4	285	(8 50)	+7	8 50	?P	15.8	22.3	
Colombo	-4.0	50.6	12	e 8 8	-36	—	—	—	—	
Hakodate	-4.2	53.2	138	e 9 14	+14	i 10 14	+8	28.8	31.8	
Wellington	-4.3	53.7	290	8 38	-25	—	—	19.3	42.0	
Kodaikanal	-4.6	59.1	100	9 58	+22	17 56	+41	32.8	—	
Apia	-4.6	60.7	299	10 2	+15	—	—	—	—	
Bombay	-5.1	77.8	66	e 11 49	+15	i 21 27	+29	e 35.8	38.3	
Honolulu	-5.7	99.8	300	—	—	—	—	—	61.0	
Helwan	-5.8	105.0	320	—	—	e 27 32	+104	—	28.5	
Lemberg	—	107.8	40	—	—	19 5	?PR ₁	28.9	57.0	
Victoria	—	108.5	319	—	—	—	—	e 28.8	—	
Budapest	—	110.2	320	i 18 41	?PR ₁	28 28	+58	e 54.8	58.8	
Vienna	—	112.6	326	—	—	—	—	e 42.8	58.7	
Hamburg	—	114.0	313	e 19 24	?PR ₁	(e 29 16)	+74	—	—	
Rocca di Papa	—	114.6	316	—	—	—	—	—	58.8	
Florence	—	115.9	325	e 19 45	?PR ₁	e 29 17	+60	e 58.8	61.2	
De Bilt	—	116.7	317	17 30	?	26 47	-97	47.1	—	
Moncalieri	—	116.9	323	—	—	130 40	?SR ₁	—	63.1	
Uccle	—	117.3	333	—	—	—	—	59.8	—	
Dyce	—	118.5	331	—	—	—	—	—	62.1	
Edinburgh	—	118.8	322	—	—	e 28 50?	+10	59.8	62.8	
Paris	—	119.2	329	—	—	—	—	—	65.3	
Stonyhurst	—	119.6	327	—	—	i 29 37	+51	e 36.4	62.8	
Oxford	—	121.7	315	—	—	—	—	e 59.8	—	
Barcelona	—	122.5	310	e 19 43	?PR ₁	—	—	e 49.8	79.3	
Algiers	—	123.1	315	—	—	—	—	e 49.8	65.8	
Tortosa	—	127.4	312	19 7	[-5]	27 10	-153	—	—	
Granada	—	129.5	318	22 20	?PR ₁	33 11	?	e 45.8	69.7	
Colmbra	—	133.4	35	21 15	?PR ₁	28 5	?	e 38.8	—	
Chicago	—	136.6	28	—	—	—	—	e 77.1	82.4	
Toronto	—	138.9	22	i 19 11	[-23]	e 31 44	?	71.8	—	
Ottawa	—	138.9	28	—	—	—	—	98.8	—	
Ithaca	—	141.2	21	—	—	—	—	57.8	—	
Harvard	—	141.3	30	e 19 21	[-21]	22 59	?PR ₁	—	—	
Georgetown	E.N.	141.3	30	e 21 17	?PR ₁	—	—	—	—	
Washington	—	150.9	146	19 40	[-17]	34 3	?	74.8	78.2	
La Paz	—	—	—	—	—	—	—	—	—	

For Notes see next page.

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NOTES TO MAR. 30d. 15h. 2m. 10s.

Additional readings: Manila gives also MN = +9.4m. Riverview IS = +1m.56s., PS = +12m.14s., MN = +21.9m. Zi-ka-wei MN = +20.8m. Oba MN = +17.6m. Mizusawa PN = +8m.27s. Colombo P = +2.50s. Wellington e = +14m.2s., i = +17m.2s., +19m.38s., and +1m.32s. Honolulu SN = +22m.9s. Hamburg MN = +58.9m., MZ = +17.5m. De Bilt MN = +60.9m. Epicentre 7° 6'S. 128° 3'E. Paris i = +64.8m. Toronto eL = +80.4m. and +100.6m. Ottawa PR, EV = +1m.50s., eSV = +33m.54s., eLE? = +57.8m., LE = +62.8m. and +83m., L (rep.) = +117.8m.

Mar. 30 15h. 5m. 30s. Epicentre 41° 0'N. 23° 0'E.

I = +.695, B = +.295, C = +.656; D = +.391, E = -.920; G = +.604, H = +.256, K = -.755.

	Δ	Az.	P.		O-C.		S.		O-C.		L.	M.	
			m.	s.	s.	m.	s.	s.	m.				
Athens	3.1	170	1	43	?	12	38	?	e	3.0	3.7		
Bari	6.4	271	1	48	+10	2	37	-18	e	3.0	4.5		
Bombay	7.1	338	i	2	+18				e	5.1	5.7		
De Bilt	7.7	303	e	1	38	-19	(e 2 59)	-30	e	3.0	3.5		
Dehra Dun	7.8	279	i	2	2	+4	13	20	-11	4.2			
Dehra Dun	8.6	329	i	2	20	+10	13	17	-36	14.4	5.7		
Dehra Dun	8.9	4	e	4	0	?	(e 4 0)	-1					
Dehra Dun	9.1	292	2	30	+12	4	45	?L	(4.8)				
Dehra Dun	9.2	302	2	30	+11	4	37	?L	(4.6)				
Dehra Dun	11.0	299	3	7	+23	4	25	-29			6.8		
Dehra Dun	11.8	295	2	59	+3	5	22	+8	6.4	8.0			
Dehra Dun	12.1	307	e	3	0	i	5	0	-21				
Dehra Dun	13.0	146	7	12	?L				(7.2)				
Dehra Dun	13.1	310	e	3	16	+2	e	5	56	+10	e	6.4	7.2
Dehra Dun	13.7	303	3	20	-2	6	42?	?L	(6.7?)	9.5			
Dehra Dun	13.9	354	i	3	41	+16							
Dehra Dun	15.3	330	e	3	48	+5							
Dehra Dun	15.7	278								i	8.4	10.3	
Dehra Dun	16.0	261	i	3	57	+5	e	5	2	?	e	7.8	10.5
Dehra Dun	16.2	314	e	3	53	-2	6	49	-6	8.5	10.2		
Dehra Dun	16.4	306	e	4	6	+9	e	7	40	+36	7.6	8.7	
Dehra Dun	16.5	318								8.5	8.5		
Dehra Dun	16.9	277								8.3	10.2		
Dehra Dun	19.1	311								8.9	10.8		
Dehra Dun	19.8	311	4	8	-31	18	15	-4	9.7	12.5			
Dehra Dun	20.9	268	5	14	+22	7	40	-62		11.0			
Dehra Dun	21.3	316	i	11	24	?L			(i 11.4)				
Dehra Dun	22.4	319					(9 30)	+17	9.5				
Dehra Dun	22.6	320							11.5				
Dehra Dun	23.8	268	5	6	-12							13.2	
Dehra Dun	23.8	279	5	31	+5	9	35	-5	e	13.2			
Dehra Dun	44.2	85	e	7	0	-87	e	15	0	-5		23.1	
Dehra Dun	70.4	312	e	12	54	+95	i	18	6	?PR ₁	e	29.4	30.9

Additional readings: Athens gives also PE = +2m.1s., PN = +2m.3s., iSN = +4.4s., MN = +3.5m., T₀ = 15h.6m.5s. Padova PR₁ = +3m.50s. and +1.10s., SR₁ = +4m.54s. Moncalieri MN = +7.8m. Strasbourg MN = +1m. Konigsberg ePZ = +7m.13s. Hamburg MN = +9.5m. Bologna MN = +11.6m. De Bilt MN = +9.2m. San Fernando MN = +14.3m. Toronto i = +23m.54s., eL = +46.4m.

Mar. 30 Readings also at 9h. (Simla), 17h. (Lick and Taihoku), 22h. (near Taihoku).

Mar. 30 Readings at 4h. (Taihoku), 6h. (near La Paz), 7h. (near Mizusawa), 10h. (Barcelona and Dehra Dun), 11h. (Mizusawa), 13h. (La Paz (2)), 17h. (La Paz), 19h. (Apia).

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Belated Readings.

The following readings arrived too late to be entered in their places in the Bulletins:—

BELGRADE 44°49'N. 20°27'E.										
Date.	Epicentre.		Δ	P.	O-C.	S.	O-C.	L.	M.	
d. h.	°	'	°	m. s.	s.	m. s.	s.	m.	m.	
Jan. 18	23	38°2N.	32°9E.	11·0	2 43	- 1	5 8	+14	—	6·4
Jan. 27	11	36°0N.	28°0E.	10·5	2 14	-23	5 16	+33	5·8	6·0
Feb. 4	8	16°5N.	89°5E.	91·8	e 12 33	-53	e 22 27	-126	e 27·5	47·0
Mar. 24	14	50°5N.	159°0E.	79·3	e 12 5	-10	e 18 1	? PR ₁	39·8	49·0
Mar. 28	7	14°5N.	86°0W.	91·1	i 12 38	-44	i 23 42	-43	e 40·8	47·0
Mar. 30	15	41°0N.	23°0E.	4·2	1 27	+22	2 14	+19	—	2·6
MOSTAR 43°21'N. 17°49'E.										
Mar. 30	15	41°0N.	23°0E.	4·5	i 1 10	0	i 1 54	-10	—	2·8
SARAJEVO 43°52'N. 18°26'E.										
Mar. 30	15	41°0N.	23°0E.	4·8	i 1 16	+ 2	e 1 56	-15	—	2·0

Additional Readings.

JANUARY.

30d. 0h. (Belgrade), 7d. 0h. (Belgrade), 8d. 2h. (Mostar and Sarajevo), 15d. 10h. (Belgrade and Sarajevo), 22d. 9h. and 12h. (Belgrade), 30d. 13h. (Belgrade).

FEBRUARY.

1d. 22h. (Sarajevo), 6d. 5h. (Belgrade), 6d. 20h. (Mostar), 8d. 20h. (Belgrade), 9d. 0h. (Belgrade), 10d. 15h. (Belgrade), 17d. 23h. (Mostar), 9d. 20h. (2) and 21h. (Belgrade), 21d. 14h. and 18h. (Belgrade), 22d. 20h. (Belgrade), 25d. 17h. and 18h. (Belgrade), 26d. 13h., 14h., 16h., and 18h. (Belgrade), 27d. 20h. (Belgrade), 28d. 15h. and 17h. (Belgrade).

MARCH.

5d. 16h. (Belgrade), 11d. 22h. (Mostar), 12d. 1h. (Mostar), 20d. 19h. (Sarajevo), 21d. 7h. (Mostar and Sarajevo).

The following additional earthquake is suggested by the belated readings:—

Jan. 8d. 2h. 0m. 30s.	Epicentre	Δ	P.	O-C.	S.	O-C.	M.
		°	m. s.	s.	m. s.	s.	m.
Rocca di Papa		2·9	0 42	- 3	—	—	2·8
Mostar		3·5	0 57	+ 2	1 33	- 4	2·1
Sarajevo		3·7	1 0	+ 2	1 36	- 6	1·9

Observatories are urgently requested to send to Oxford as soon as possible readings for the years 1921 & 1922, so that the lists may be made complete without the need for these supplements.

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It has been suggested that it may be convenient to give here the

International Code for Transmission of Seismic Telegrams.

Four groups of five figures are used . . . thus :—

- ddaap phhmm ssddd D,D,DDD.
 dd = day of the month
 aa = azimuth.
 pp = nature of the phases P and S.
 hh = hour
 mm = minutes } in Greenwich mean time for the commencement
 ss = seconds } of the seismogram (P).
 ddd = S - P in seconds.
 D,D, = \bar{P} - P , , for near shocks.
 DDD = distance in kilometres of near shocks.
 D,D,DDD = , , , , distant shocks.

Explanations.

- aa azimuths. These figures X 10 = degrees from North through East (figures used are 1 to 36). If the azimuth is uncertain to 180°, then 50 is added to the figures in the telegram = 51 to 86. If the estimate of the azimuth is uncertain and one cannot indicate nearer than 45°, each 45° from North through East is indicated by the figures 91 to 98.
 99 means not yet determined.
 00 , estimate of azimuth impossible.

pp nature of P and S.

First figure refers to P (1 to 4 used).

- 1 = 1P; very clear.
- 2 = P and \bar{P} both clear.
- 3 = P; clear but without impetus.
- 4 = eP; badly defined.

The second figure refers to S (5 to 8 are used).

- 5 = iS, S sharp impetus and very clear.
- 6 = clear.
- 7 = badly defined.
- 8 = S uncertain.

The figure 9 in either place means lost in time mark.

Example. 20991 50051 33393 04830

= 20th of the month, azimuth not yet determined, 1P iS. P commencing 0hrs. 51m. 33sec. after midnight. S - P = 393 seconds. Distance 4830 kilometres.