The International Seismological Summary for 1921 July, August, September.

FORMERLY THE BULLETIN OF THE BRITISH ASSOCIATION SEISMOLOGY COMMITTEE.

The present number of the Summary deals with 62 epicentres, 26 of which are new and 36 repetitions from old epicentres. The corresponding figures for former periods are :

	New	Old
1913-1920 March	597	550
1920 April—June	27	48
July—Sept.	31	49
Nov.—Dec.	27	42
1921 Jan.—Mar.	31	30
Apr.—June	29	36
July—Sept.	26	36

These figures thus show great steadiness. Certain periodicities which undoubtedly exist apply therefore, not to the earth as a whole, but to localities. Of this there is ample confirmation, as will appear from special investigations now in hand.

There are only two cases of presumed abnormal focal depth :

July 15d. 18h. 2°·1N. 127°·8E. Depth +·030
Sept. 20d. 20h. 1°·5S. 109°·3E. Depth +·050 ?

In the case of July 15 the evidence from antipodal stations is not strong, and on 1920 Jan. 26 there is no evidence of abnormal depth for this focus, though it must be admitted that the observations were few. The evidence on Sept. 20 is slighter still ; but the cases are worthy of notice along with others.

On Sept. 19d. 23h. a solution is printed which suits the stations near the epicentre, but gives large *positive* residuals for [P] at antipodal stations : for which at present no explanation is offered.

Acknowledgment should be made of the valuable help afforded by the *Seismological Bulletin of the Central Meteorological Observatory of Japan*, from which many readings have been obtained which were not communicated by the individual observatories, *e.g.* Akita, Gihu, Hakodate, Hukuoka, Kagosima, Kyoto, Maebasi, Matuyama, Mito, Nagano, Niigata, Numadu, Tukubasan, Tyosi, and Zinsen. But it would be more helpful still if we could have these readings direct.

Those observers who have not already communicated their readings for 1921 and 1922 are urgently requested to send them without delay to the University Observatory, Oxford.

H. H. TURNER.

University Observatory, Oxford,
1925 July 31.

1921 JULY, AUGUST, & SEPTEMBER.

July 1d. Readings at 5h. (near Tacubaya), 11h. (Vienna and near Belgrade, Mostar, and Sarajevo), 12h. (near Oaxaca and Tacubaya), 17h. (near Nagasaki), 19h. (near Mizusawa).

July 2d. Readings at 1h. (Manila and near Batavia), 8h. (Manila (2)), 14h. (near Mizusawa), 19h. (near Rocca di Papa), 21h. (near Osaka).

July 3d. 5h. 2m. 40s. Epicentre 16°·5S. 180°·0 (as on 1919 Oct. 19d.).

A = −·959, B = ·000, C = −·284; D = ·000, E = +1·000; G = +·284, H = ·000, K = −·959.

(Evidence conflicting; perhaps at 27°·0S. 172°·0W., as on 1918 Jan. 13d.)

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Apia		8·4	73	e 2 24	+17	—	—	3·8	5·8
Christchurch		27·8	191	—	—	10 56	+ 1	16·7	20·8
Riverview		31·2	230	e 6 50	+10	(e 12 56)	+62	e 12·9	15·3
Melbourne		37·4	229	7 32	− 1	12 26	−64	e 16·1	20·8
Honolulu	E.	43·5	31	14 30	?S	(14 30)	−25	18·6	20·0
	N.	43·5	31	—	—	—	—	18·8	21·1
Manila		66·1	295	e 11 20	+28	—	—	—	—
Victoria		82·1	35	—	—	—	—	37·8	41·7
Toronto		108·9	48	—	—	—	—	60·0	60·7
Edinburgh		140·5	2	—	—	—	—	73·3	—
De Bilt	E.	144·2	354	—	—	e 41 19	?SR_1	e 70·3	85·4
Uccle		145·5	356	e 19 20	[−29]	—	—	e 59·3	85·3
Strasbourg		147·3	349	e 19 25	[−27]	—	—	—	—

Additional readings: Apia gives also LN = +3·9m. Algiers (Δ = 159°·5, Az. = 353°·0) gives simply 5h. De Bilt MN = +87·4m.

July 3d. 14h. 52m. 50s. Epicentre 29°·0N. 130°·0E.

A = −·562, B = +·670, C = +·485; D = +·766, E = +·643; G = −·312, H = +·371, K = −·875.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Nagasaki		3·7	358	1 40	?S	(1 40)	− 2	2·8	—
Osaka		7·3	38	—	—	3 9	− 9	—	13·4
Zi-ka-wei	Z.	7·7	289	1 57	0	3 27	− 2	—	5·3
Taihoku		8·5	244	e 1 53	−16	(1 23)	−27	3·4	—
Manila		16·7	212	e 3 59	− 2	—	—	6·7	6·7
Budapest		81·9	321	—	—	—	—	e 47·2	—
Hamburg		82·5	329	i 12 36	+ 3	e 22 58	+ 6	e 51·2	54·2
Vienna		82·6	323	i 12 35	+ 1	e 23 4	+11	e 42·2	53·2
Helwan		82·7	300	23 10	?S	(23 10)	+16	(52·2)	—
De Bilt		85·6	329	12 55	+ 4	23 25	− 1	e 46·2	56·4
Edinburgh		86·2	336	—	—	—	—	46·2	—
Eskdalemuir	N.	86·7	336	—	—	e 23 22	−16	46·2	56·9
Uccle		86·9	329	e 12 56	− 2	e 23 35	− 5	e 42·2	—
Strasbourg		86·9	325	e 12 55	− 3	—	—	e 47·2	56·2
Oxford		88·6	331	—	—	—	—	46·3	59·9
Rocca di Papa		88·6	319	i 9 19	?	—	—	e 56·2	66·2
Paris		89·2	329	—	—	e 22 37	−88	50·2	59·2
Moncalieri		89·3	323	—	—	22 16	−110	50·1	—
Coimbra		101·0	329	e 13 46	−29	e 25 14	−51	e 55·2	—
Rio Tinto		101·9	326	59 10	?L	—	—	(59·2)	66·2

Additional readings: Osaka gives also MN = +12·7m. Zi-ka-wei P = +1m.55s., MN = +4·8m., ME = +5·0m. Hamburg e = +46m.10s. Helwan gives its readings as PE and PN.

July 3d. Readings also at 2h. (Helwan), 4h. (near Kobe and near Mizusawa), 9h. (La Paz), 10h. (Sydney), 11h. (Pompeii), 14h. (near Batavia), 16h. (Pompeii), 19h. (Rio Tinto), 22h. (La Paz and Moncalieri).

July 4d. 14h. 18m. 0s. Epicentre 25°·0N. 141°·5E. (as on 1919 April 27d.).

A = −·709, B = +·564, C = +·423; D = +·622, E = +·783;
G = −·331, H = +·263, K = −·906.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Tyosi	10·7	357	2 39	− 1	(4 25)	−23	4·4	4·6
Osaka	11·0	333	2 56	+12	(4 58)	+ 4	5·0	5·4
Kobe	11·1	332	2 44	− 2	(4 43)	−14	4·7	4·8
Mito	11·4	356	2 42	− 8	(4 22)	−42	4·4	5·0
Nagasaki	12·8	310	3 13	+ 3	(5 28)	−11	5·5	5·6
Hukuoka	12·9	313	3 3	− 9	(5 12)	−30	5·2	5·6
Hakodate	16·8	358	3 30	−32	5 30	−103	—	—
Taihoku	18·1	274	4 12	− 6	(7 23)	−19	7·4	—
Zi-ka-wei	18·7	294	e 4 20	− 5	e 7 38	−17	—	—
Manila	21·9	246	e 4 55	− 9	7 58	−65	8·8	9·4
Riverview	59·6	171	e 10 3	− 6	i 18 4	−14	e 27·1	31·5
Adelaide	60·0	183	—	—	i 18 12	−11	e 29·2	32·1

Additional readings: Hukuoka gives also MN = +5·7m. Zi-ka-wei gives also eSN = +7m.41s., PSE = +7m.46s., PSN = +7m.54s. Riverview iS = +18m.11s., MN = +30·0m. Adelaide e = +25m.6s. and +26m.42s.

July 4d. 14h. 18m. 0s. Epicentre 29°·0N. 130°·0E. (as on July 3d.).

A = −·562, B = +·670, C = +·485; D = +·766, E = +·643;
G = −·312, H = +·371, K = −·875.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa	E.	13·7	39	3 20	− 2	5 58	− 3	—	—
	N.	13·7	39	3 21	− 1	6 4	+ 3	—	—
Ootomari		20·3	26	4 48	+ 3	(8 32)	+ 3	8·5	8·8
Batavia		41·7	217	i 7 59	−10	i 14 27	− 4	—	—
Simla		45·3	286	—	—	e 16 54	+95	—	—
Honolulu		64·7	79	—	—	22 11	?SR_1	29·8	32·1
Lemberg		77·6	320	e 13 6	+61	—	—	—	23·1
Victoria		78·7	40	—	—	(20 4)	−124	20·1	22·5
Budapest		81·9	321	e 12 30	0	e 22 58	+13	e 38·0	49·0
Belgrade		82·3	318	23 12	?S	(23 12)	+23	—	—
Hamburg		82·5	329	e 16 36	?PR_1	i 23 13	+21	e 47·2	48·0
Vienna		82·6	323	13 32	+58	i 23 20	+27	e 49·0	58·0
Helwan	E.	82·7	300	24 0	?S	(24 0)	+66	—	—
De Bilt	E.	85·6	329	e 12 56	+ 5	i 23 32	+ 6	e 49·0	54·4
	N.	85·6	329	e 13 2	+11	—	—	—	52·6
Pola		86·0	320	e 23 37	?S	(e 23 37)	+ 7	e 49·0	51·3
Edinburgh		86·2	336	—	—	i 23 27	− 5	—	50·0
Eskdalemuir		86·7	336	13 17	+20	23 32	− 6	44·0	52·6
Padova		86·8	322	23 55	?S	(23 55)	+16	—	—
Strasbourg		86·9	325	e 13 26	+28	e 23 39	− 1	e 49·0	55·8
Uccle		86·9	329	—	—	23 37	− 3	e 45·0	51·0
Stonyhurst		87·5	333	e 23 18	?S	(e 23 18)	−29	—	—
Pompeii	E.	88·1	317	24 0	?S	(24 0)	+ 7	—	—
Oxford		88·6	331	—	—	i 23 42	−17	50·7	54·7
Rocca di Papa		88·6	319	—	—	23 54	− 5	—	—
Besançon		88·7	325	—	—	23 49	−11	—	—
Paris		89·2	329	—	—	e 23 51	−14	51·0	53·0
Moncalieri		89·3	323	e 21 52	?	i 23 52	−14	39·6	—
Tortosa		95·9	324	24 20	?S	(24 20)	−55	e 56·0	58·3
Algiers		97·5	320	—	—	i 24 32	−59	58·0	—
Coimbra		101·0	329	e 12 5	−130	e 27 0	+55	e 45·8	—
Chicago		101·2	27	i 23 51	?S	31 15	?SR_1	40·2	—
Rio Tinto		101·9	326	57 0	?L	—	—	(57·0)	66·0
Ottawa		102·0	18	—	—	e 26 48	+33	41·0	—
Georgetown		107·6	21	e 17 45	?	23 37	?	—	—
La Paz		159·2	57	19 51	[−16]	i 30 9	?	—	—

For Notes see next page.

NOTES TO JULY 4d. 14h. 18m. 0s.

Additional readings: Ootomari gives also MN = +8·6m. Batavia i = +9m.47s. Honolulu PR_1 = +7m.16s., iN = +9m.12s., MN = +23·4m. Belgrade eP = +25m.45s., eSR_1 = +28m.1s. Helwan PN = +25m.0s. De Bilt PR_1 = +17m.2s. Eskdalemuir PR_1 = +17m.7s., SR_1 = +30m.35s. Padova +24m.2s. and +25m.50s. Strasbourg MN = +55·5m. Uccle ePR_1 = +17m.6s. Rocca di Papa e = +21m.42s. Paris MN = +58·0m. Moncalieri S is given as simply i, also S = +31m.57s. Algiers e = +18m.36s. and +33m.20s. Coimbra SN = +24m.47s. Chicago i = +24m.49s., PR_1 = +26m.15s. Ottawa i = +24m.11s. and +24m.48s., eLE = +37·0m. Georgetown SN = +23m.36s.

July 4d. Readings also at 9h. (Toronto), 12h. (Vienna and Budapest), 14h. (Mizusawa), 23h. (La Paz).

July 5d. 17h. 8m. 10s. Epicentre 42°·4N. 11°·1E. (as on 1917 July 8d.).

A = +·725, B = +·142, C = +·674.

		Δ	P.	O−C.	S.	O−C.	L.	M.
		°	m. s.	s.	m. s.	s.	m.	m.
Rocca di Papa		1·3	e 0 38	+18	e 0 56	+20	(e 0·9)	2·3
Florence		1·4	1 10	?L	—	—	(1·2)	1·3
Padova		3·1	0 55	+ 6	1 25	− 1	—	2·0
Pola		3·2	—	—	e 1 25	− 3	e 1·8	2·4
Moncalieri		3·5	e 0 57	+ 2	1 29	− 8	—	2·1
Zurich	E.	5·3	e 1 14	− 8	i 2 5	−20	—	2·2
	N.	5·3	e 1 29	+ 7	i 2 4	−21	—	2·2
Besançon		6·1	2 10?	+37	2 39	− 7	—	—
Strasbourg		6·6	e 1 44	+ 3	e 2 46	−14	—	—
Vienna		6·9	e 2 38	+53	—	—	—	3·7
Paris		8·8	—	—	—	—	e 4·2	5·8
De Bilt		10·5	—	—	e 4 50	+ 7	—	6·5
Hamburg		11·2	—	—	—	—	e 5·6	5·9

Additional readings Florence gives others sets of P and M. Padova +0m.59s., +1m.6s. Pola MN = +2m.0s. Zurich eE = +1m.18s., eV = +1m.20s. De Bilt MN = +6·4m.

July 5d. Readings also at 1h. (Manila), 5h. (La Paz), 10h. (Perth), 11h. (Helwan), 12h. (Rocca di Papa and Riverview), 13h. (Tortosa), 15h. (La Paz), 16h. (Helwan), 19h. (Manila), 20h. (Riverview).

July 6d. Readings at 3h. (near Osaka and Mizusawa), 5h. (La Paz), 12h. (near Tokyo and near Osaka and Kobe).

July 7d. 10h. 33m. 7s. Epicentre 47°·0S. 78°·0W.

A = +·142, B = −·667, C = −·731; D = −·978, E = −·208;
G = −·152, H = +·715, K = −·682.

This origin is very doubtful. No doubt the following shock obliterated the Australian records.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
La Paz	31·6	18	i 6 43	0	i 12 0	− 1	16·4	20·9
Wellington	70·6	230	—	—	e 21 5	+32	e 27·7	29·9
Chicago	89·1	354	—	—	e 23 58	− 6	e 39·0	—
Ottawa	92·4	2	—	—	e 24 0	−39	e 37·9	—
Rio Tinto	106·0	50	51 53	?L	—	—	(51·9)	66·9
Algiers	110·7	58	e 19 57	?PR_1	—	—	e 56·9	66·4
Paris	118·4	47	e 20 12	?PR_1	e 32 19	?SR_1	54·9	77·9
Moncalieri	118·7	53	—	—	e 29 59	+79	57·3	—
Kew	118·8	43	—	—	—	—	—	73·9
Besançon	119·2	50	—	—	—	—	71·9	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Stonyhurst	119·4	41	e 54 53	?L	—	—	(e 54·9)	67·9
Rocca di Papa	119·5	59	e 16 8	+28	—	—	e 35·0	49·7
Eskdalemuir	120·0	38	e 20 18	?PR_1	e 30 12	+83	52·9	66·0
Edinburgh	120·4	38	e 22 53	?	—	—	—	66·9
Uccle	120·6	46	e 20 17	?PR_1	e 30 17	+83	e 50·9	64·9
Strasbourg	121·0	50	e 20 24	?PR_1	e 32 10	?	e 54·9	69·9
De Bilt	121·8	45	e 20 37	?PR_1	e 30 20	+77	e 59·9	64·0
Hamburg	125·0	45	e 20 56	?PR_1	—	—	e 61·9	79·9
Budapest	126·6	55	—	—	—	—	50·9	—
Kodaikanal	137·8	142	70 17	?L	—	—	(70·3)	—
Manila	144·0	213	e 19 53	[+ 6]	—	—	29·6	—

Additional readings: Chicago gives also L = +67·9m. Ottawa LE = +53·9m., +78·4m., and +89·4m. Eskdalemuir eN = +35m.43s. Uccle MN = +67·9m. De Bilt ePR_1 = +26m.7s., MN = +73·5m.

July 7d. 10h. 45m. 50s. Epicentre 12°·2S. 164°·7E.

A = −·943, B = +·258, C = −·211; D = +·264, E = +·965; G = +·204, H = −·056, K = −·977.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview	24·9	207	e 5 37	0	e 10 1	0	e 13·0	15·5
Melbourne	31·1	211	6 46	+ 7	11 58	+ 5	15·0	21·7
Adelaide	32·8	222	e 6 46	− 9	e 12 10	−11	e 15·2	22·9
Batavia	57·3	270	e 9 54	0	e 13 38	?PR_1	—	—
Victoria	87·0	39	—	—	—	—	40·8	45·2
Toronto	117·0	46	—	—	—	—	52·3	—
Helwan E.	133·4	300	21 10	?PR_1	—	—	—	—
Vienna	135·3	330	e 19 10	[−21]	—	—	—	87·5

Additional readings: Riverview eS = +10m.25s., MN = +16·0m., MZ = +18·6m. Adelaide e = +19m. 40s. Toronto L? = +47·9m.

July 7d. Readings also at 1h. (near Mizusawa), 5h. (Sydney), 8h. (Helwan), 9h. (near Tokyo), 11h. (Christchurch and Honolulu, possibly connected with one of the above shocks, but given as independent shocks), 12h. (Rio Tinto and La Paz), 16h. (2) and 17h. (Taihoku), 20h. (Manila), 23h. (Wellington).

July 8d. 10h. 48m. 48s. Epicentre 20°·0N. 78°·0W.

A = +·195, B = −·919, C = +·342; D = −·978, E = −·208; G = +·071, H = −·335, K = −·940.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Kingston	2·4	151	—	—	—	—	1·2	—
Georgetown	18·9	2	e 7 12	?S	9 35	?L	e 12·2	—
Washington	18·9	2	—	—	e 7 42	−18	12·2	—
Ithaca	22·5	3	—	—	e 9 24	+ 9	14·6	—
Chicago	23·2	342	5 19	0	9 29	0	11·9	—
Ottawa	25·4	4	e 5 39	− 3	e 10 2	− 9	e 13·8	—
La Paz	37·8	164	7 32	− 4	16 22	?	26·2	—
De Bilt E.	70·2	40	—	—	—	—	e 35·2	45·6
N.	70·2	40	—	—	—	—	e 30·2	33·2
Helwan	95·7	55	63 12	?L	—	—	(63·2)	—

Additional readings: Georgetown gives also eLN? = +12·3m. Ithaca e = +13m.18s. Ottawa L = +14·7m.

July 8d. Readings also at 1h. (La Paz (2)), 2h. (Helwan), 3h. (Rio Tinto), 6h. (near La Paz), 13h. (Kodaikanal, La Paz (2), Riverview, Melbourne, Manila, and near Batavia), 14h. (Manila, Helwan, and De Bilt), 19h. (Manila and near Taihoku), 20h. (De Bilt), 21h. (Melbourne), 23h. (Hokoto and near Algiers (2)).

July 9d. Readings at 0h. (Wellington), 7h. (Kingston, Chicago, Tacubaya, Georgetown, Washington, and Ottawa), 16h. (Manila), 20h. and 21h. (2) (near Batavia).

July 10d. Readings at 0h. (Melbourne), 1h. (Riverview, Manila, and Adelaide), 2h. (Chicago, Honolulu, La Paz, Uccle, De Bilt, and Ottawa), 3h. (Helwan, Paris, and Rio Tinto), 7h. (Honolulu), 13h. (Nagasaki), 14h. (Helwan), 15h. (Nagasaki), 17h. (La Paz), 18h. (Helwan and La Paz (3)), 19h. (La Paz), 21h. (3) and 22h. (La Paz).

July 11d. Readings at 6h. (Manila), 16h. (Stonyhurst), 18h. (near Mizusawa), 20h. (near Tokyo and near Mizusawa).

July 12d. Readings at 3h. (Manila), 5h. (La Paz), 10h. (Manila), 13h. (Stonyhurst, Manila, Colombo, and Zi-ka-wei), 14h. (Helwan), 17h. (near Tokyo), 20h. (Ottawa, Berkeley, Chicago, Georgetown, and Tucson).

July 13d. 10h. 16m. 24s. Epicentre 34°·0S. 8°·0W.

$A = +\cdot821$, $B = -\cdot115$, $C = -\cdot559$; $D = -\cdot139$, $E = -\cdot990$; $G = -\cdot554$, $H = +\cdot078$, $K = -\cdot829$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Cape Town		21·9	97	11 43	?L	—	—	(11·7)	20·9
La Paz		56·3	273	9 47	− 1	16 6	−92	21·4	31·0
Rio Tinto		71·7	1	25 36	?SR_1	—	—	—	38·6
Algiers		72·1	10	—	—	—	—	36·6	—
Helwan	E.	73·9	36	—	—	21 36	+23	—	—
Coimbra	E.	74·2	0	14 49	?PR_1	25 7	?SR_1	34·8	—
Rocca di Papa		78·1	16	i 12 8	0	—	—	e 38·7	42·4
Paris		83·4	7	—	—	e 20 36	−145	40·6	42·6
Strasbourg		83·7	11	e 12 42	+ 2	—	—	—	—
Vienna		85·1	16	e 12 50	+ 1	—	—	e 44·6	49·6
Uccle		85·5	9	e 12 36	−15	e 23 30	+ 5	e 35·6	—
Kew		85·7	5	—	—	—	—	—	44·6
De Bilt		86·9	9	e 15 18	?PR_1	e 23 25	−15	e 36·6	43·7
Hamburg		89·0	10	e 13 12	+ 2	e 24 6	+ 3	e 44·6	—
Eskdalemuir		89·4	3	e 13 1	−11	e 23 55	−12	38·6	—
Edinburgh		90·0	3	—	—	23 36	−38	—	—
Ottawa		100·2	320	—	—	e 25 36	−22	e 40·1	—
Toronto		101·3	317	—	—	—	—	e 55·3	—
Melbourne		103·9	160	—	—	—	—	—	59·7
Chicago		105·2	311	26 36	?S	(26 36)	− 8	61·6	—
Victoria		130·8	308	—	—	—	—	68·5	73·9
Honolulu	E.	150·8	252	—	—	—	—	e 67·6	—

Additional readings: Helwan gives also PN = +19m.36s. Rocca di Papa iPN = +12m.30s. Paris MN = +47·6m. Uccle SR_1 = +29m.6s. De Bilt eSR_1 = +29m.19s., MN = +47·6m. Hamburg eL = +45·6m. Eskdalemuir eN = +29m.41s. Toronto L = +66·2m. and +81·7m. Chicago S = +32m.16s., eL = +41·6m. Honolulu eN = +73·6m.

July 13d. Readings also at 0h. (Wellington), 2h. (Kodaikanal, Colombo, and Helwan), 5h. (Helwan), 13h. (Toronto, Melbourne, Chicago, Victoria, Manila, Honolulu, Zi-ka-wei, Batavia, and Riverview), 14h. (Manila and De Bilt), 15h. (Eskdalemuir), 17h. (La Paz), 18h. (Helwan), 21h. (La Paz and Manila).

July 14d. Readings at 7h. (near Nagasaki).

July 15d. 18h. 6m. 12s. Epicentre 2°·1N. 127°·8E. (as on 1920 Jan. 26d.).

$A = -\cdot612$, $B = +\cdot790$, $C = +\cdot037$; $D = +\cdot790$, $E = +\cdot613$; $G = -\cdot022$, $H = +\cdot029$, $K = -\cdot999$.

A depth of focus 0·030 has been assumed.

		Corr. for Focus	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	°	m. s.	s.	m. s.	s.	m.	m.
Manila		−0·7	14·2	332	i 3 26	+ 6	5 28	−28	6·0	7·4
Batavia		−1·4	22·5	248	4 51	− 3	i 8 44	− 2	—	8·9
Taihoku		−1·5	23·7	346	5 11	+ 4	(9 17)	+ 8	9·3	—
Zi-ka-wei		−2·0	29·7	349	6 0	− 5	e 10 49	− 5	—	—
Osaka		−2·2	33·3	11	6 41	+ 2	—	—	—	13·1
Tokyo		−2·3	35·3	16	e 7 3	+ 7	—	—	—	16·4
Mito		−2·3	36·2	17	7 25	+21	(12 19)	−20	12·3	—
Adelaide		−2·4	38·4	165	—	—	e 13 30	+20	e 15·8	23·6
Mizusawa	E.	−2·5	39·0	16	7 22	− 4	13 13	− 4	—	—
	N.	−2·5	39·0	16	7 24	− 2	13 4	−13	—	—
Hakodate		−2·6	41·3	14	6 53	−51	13 12	−36	—	13·8
Riverview		−2·6	42·1	150	i 7 42	− 9	e 14 17	+18	e 22·6	27·4
Melbourne		−2·7	43·0	160	9 6	+69	14 6	− 5	16·8	26·0
Simla		−3·4	55·8	309	e 6 30	−172	—	—	—	—
Honolulu		−3·9	74·5	69	—	—	i 21 12	+39	39·6	42·5
Helwan	N.	−4·3	94·5	300	23 48	?S	(23 48)	−28	—	—
Belgrade		−4·4	100·6	316	e 17 43	?PR_1	i 24 4	−74	28·1	—
Vienna	Z.	−4·4	102·4	321	e 17 6	?	i 24 19	−77	—	—
Hamburg		−4·5	104·3	327	e 18 12	?PR_1	i 24 28	−86	e 52·8	—
Pompeii	E.	−4·5	105·9	314	18 37	?PR_1	24 27	−102	—	—
Padova		−4·5	106·2	319	e 18 26	?PR_1	24 10	−122	—	—
Rocca di Papa		−4·5	106·9	315	—	—	e 25 30	−49	—	26·5
Strasbourg		−4·6	107·6	322	e 17 42	?	—	—	e 56·8	62·8
De Bilt		−4·6	107·6	326	—	—	i 24 43	−101	e 32·8	61·3
Uccle		−4·6	108·6	325	e 18 49	?PR_1	e 27 54	+81	e 52·8	—
Moncalieri		−4·6	109·1	320	18 50	?PR_1	28 1	+83	59·9	—
Edinburgh		−4·6	109·7	333	18 58	?PR_1	24 48	−115	—	28·8
Eskdalemuir	N.	−4·6	110·1	333	e 19 2	?PR_1	i 28 8	+81	51·8	—
Stonyhurst		−4·6	110·5	330	18 48	?PR_1	—	—	—	29·8
Oxford		−4·6	111·1	329	—	—	i 27 54	+57	—	—
Algiers		−4·7	115·7	313	e 17 33	[−67]	25 12	−145	31·3	—
Rio Tinto		—	122·0	318	29 48	?S	—	—	—	31·8
La Paz		—	158·8	134	19 57	[−10]	—	—	—	—

Additional readings: Manila gives also MN = +6·4m. Batavia i = +6m.5s. Zi-ka-wei PSN = +13m.37s. Osaka MN = +14·8m. Tokyo MN = +17·9m. Riverview i = +9m.30s., eSR_1 = +17m.30s., and +17m.49s. MN = +29·1m. Honolulu eE = +36m.21s. Helwan PE = +21m.48s. Vienna iPZ = +17m.54s. Hamburg iPZ = +18m.18s. Padova +20m.10s., +24m.16s., and +25m.16s. Rocca di Papa eE = +17m.36s., eN = +17m.42s., eE = +18m.18s., e = +18m.48s. De Bilt ePR_1 = +18m.41s., MN = +59·5m. Uccle i = +24m.45s. Eskdalemuir iN = +24m.52s. and +25m.49s. Oxford i = +24m.28s.

July 15d. Readings also at 1h. (Rocca di Papa and La Paz), 2h. (Helwan), 5h. (near Manila), 6h. (Uccle, De Bilt, Hamburg, Zi-ka-wei, and Batavia), 10h. (Batavia), 11h. (Manila), 14h. (La Paz), 16h. (Manila and Paris), 18h. (Taihoku), 23h. (near Manila).

July 16d. Readings at 6h. (Taihoku), 10h. (Helwan), 15h. (Stonyhurst (2)).

July 17d. Readings at 5h. (La Paz), 10h. (Tokyo and near Mizusawa), 17h. (Nagasaki), 18h. (Tortosa), 20h. (near Batavia), 21h. (La Paz, De Bilt, and near Batavia).

July 18d. 17h. 3m. 0s. Epicentre 23°·0N. 121°·7E. (as on 1919 Dec. 20d.).

A = −·484, B = +·783, C = +·391; D = +·851, E = +·526; G = −·205, H = +·332, K = −·921.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Taihoku		1·9	359	0 45	+16	(0 45)	− 8	1·1	1·2
Hokoto		2·1	284	0 23	−10	(0 40)	−18	0·7	0·8
Zi-ka-wei		8·2	358	e 2 4	0	e 3 44	+ 2	—	4·5
Manila		8·4	185	—	—	—	—	e 4·5	—
Tokyo		19·9	47	e 4 25	−15	—	—	—	—
Helwan		79·2	298	37 0	?L	—	—	(37·0)	—
Vienna		82·6	320	19 0	?PR_1	—	—	—	—
Hamburg		83·6	326	—	—	—	—	e 44·0	45·8
De Bilt	E.	86·8	326	—	—	23 32	− 7	e 44·0	48·2
	N.	86·8	326	—	—	23 40	+ 1	e 43·0	48·2
Strasbourg		87·4	321	—	—	—	—	e 47·0	49·2
Uccle		88·0	325	e 23 36	?S	(e 23 36)	−16	e 44·0	48·2
Edinburgh		88·4	331	30 0	?SR_1	—	—	—	50·0
Eskdalemuir		88·8	331	—	—	e 23 56	− 5	43·0	49·4
Besançon		89·2	321	—	—	—	—	49·0	—
Stonyhurst		89·4	330	e 30 0	?SR_1	—	—	—	53·0
Kew		89·9	328	45 0	?L	—	—	(45·0)	56·0
Paris		90·1	325	—	—	—	—	e 53·0	53·0
Oxford		90·2	328	—	—	—	—	44·5	51·6
Tortosa		96·0	319	—	—	—	—	e 51·0	55·3
Algiers		96·9	315	—	—	—	—	e 50·0	57·5
Coimbra		101·7	323	—	—	e 31 0	?SR_1	e 50·0	—

Additional readings: Zi-ka-wei gives also MN = +4·6m. Helwan PN = +43m.0s. Vienna gives its reading as on 19d. Strasbourg MN = +49·3m. Uccle eS = +31m.54s. (?SR_1). Eskdalemuir MN = +48·2m.

July 18d. Readings also at 0h. and 1h. (near Batavia), 2h. (Taihoku), 4h. (La Paz), 6h. (Rio Tinto and Helwan), 11h. (Manila and Batavia), 14h. (Strasbourg), 17h. (Taihoku).

July 19d. Readings at 1h. (Taihoku and La Paz), 2h. (Batavia), 3h. and 5h. (near Nagasaki), 8h. (Taihoku), 10h. and 15h. (La Paz), 18h. (Taihoku), 20h. (La Paz).

July 20d. 5h. 25m. 35s. Epicentre 70°·0N. 11°·0W. (see 1919 Feb. 15d. 2h. note).

A = +·336, B = −·065, C = +·940; D = −·191, E = −·982; G = +·922, H = −·179, K = −·342.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Edinburgh	14·5	162	—	—	—	—	—	8·4
Eskdalemuir	15·1	163	—	—	—	—	7·4	—
Hamburg	19·0	139	e 4 22	− 7	—	—	e 11·0	—
Kew	19·2	159	—	—	—	—	—	28·4
De Bilt	19·4	149	4 42	+ 8	8 19	+ 9	e 10·4	13·0
Uccle	20·5	151	e 4 46	− 1	e 8 38	+ 4	e 10·4	—
Strasbourg	23·2	147	5 12	− 7	—	—	—	—

De Bilt gives also MN = +12·5m.

July 20d. Readings also at 1h. (Colombo), 4h. (near Mizusawa), 9h. (La Paz), 11h. (Taihoku), 12h. (La Paz), 14h. (near Sarajevo), 16h. (Taihoku (2)), 17h. (Melbourne), 18h. (Strasbourg).

July 21d. 0h. 16m. 12s. Epicentre 13°·0N. 123°·0E. (as on 1919 April 27d.).

A = −·531, B = +·817, C = +·225; D = +·839, E = +·545; G = −·123, H = +·189, K = −·974.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Manila		2·6	309	e 0 52	+11	—	—	1·7	2·0
Zi-ka-wei		18·2	356	e 3 57	−22	—	—	—	—
Helwan		85·0	300	23 48	?S	(23 48)	+29	—	—
Hamburg		92·6	327	—	—	—	—	e 50·8	—
De Bilt	E.	95·9	328	—	—	e 23 54	−81	e 51·8	62·5
	N.	95·9	328	—	—	—	—	e 50·8	58·5
Uccle		96·9	326	—	—	—	—	e 48·8	—
Eskdalemuir		98·2	332	—	—	—	—	47·8	—

Additional readings: Helwan PN = +58m.48s.

July 21d. Readings also at 10h. (Hamburg and De Bilt), 14h. (near Sarajevo), 17h. (La Paz), 20h. (Chicago and near Berkeley and Lick), 23h. (near Lick and near Tacubaya, Puebla, and Vera Cruz).

July 22d. Readings at 6h. and 7h. (near Zurich), 8h. (Helwan, Colombo, and near Tokyo and Mizusawa), 14h. (Melbourne), 15h. (near La Paz), 17h. (La Paz, near Mostar, and near Taihoku), 18h. (Melbourne), 19h. (De Bilt, Rocca di Papa, Helwan, Strasbourg, and near Athens).

July 23d. Readings at 5h. (Manila and near Mizusawa), 6h. and 7h. (near Padova), 8h. (Honolulu, Melbourne, and Christchurch), 9h. (Helwan and Simla), 14h. (Melbourne), 15h. (Taihoku), 20h. (La Paz), 22h. (Pola).

July 24d. 19h. 20m. 0s. Epicentre 39°·0N. 27°·0E. (as on 1918 June 19d.).

A = +·692, B = +·353, C = +·629; D = +·454, E = −·891; G = +·561, H = +·286, K = −·777.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Athens		2·8	248	0 45	+1	(1 14)	−3	1·2	1·5
Belgrade	N.	7·6	322	e 1 33	−22	2 53	−38	3·8	4·1
Helwan		9·8	158	9 0	?	—	—	—	—
Pompeii	E.	9·8	284	4 0	?S	(4 0)	−23	—	—
Lemberg		11·0	350	—	—	—	—	e 6·2	7·3
Rocca di Papa		11·2	289	2 49	+2	4 48	−11	(5·5)	—
Vienna		12·0	324	e 6 12	?L	—	—	(e 6·2)	7·6
Strasbourg		16·8	311	e 4 3	+1	—	—	e 9·0	10·6
Hamburg		18·6	327	—	—	—	—	e 9·0	13·2
Uccle		19·8	314	—	—	—	—	e 10·0	11·5
De Bilt		20·0	318	—	—	e 8 26	+3	e 10·0	11·4
Eskdalemuir		25·9	319	—	—	—	—	14·0	—

Additional readings: Athens gives also P = +49s. Belgrade eP = +2m.13s., ME = +3·1m. Zante (Δ = 6·7) gives just 19h.50m. Helwan PN = +7m.0s. Rocca di Papa gives L as SE, also L = +12·8m. and +14·5m. De Bilt MN = +11·5m.

July 24d. Readings also at 4h. (near Rocca di Papa), 8h. (La Paz), 9h. (Helwan), 13h. (La Paz), 18h. (Budapest), 19h. (Eskdalemuir, Zi-ka-wei, and near Manila), 20h. (De Bilt, Uccle, Hamburg, and near Athens), 21h. (Ottawa, Zi-ka-wei, and near Manila), 22h. (Eskdalemuir, De Bilt, Uccle, and Hamburg).

July 25d. 1h. 40m. 35s. Epicentre 24°·0N. 123°·0E. (as on 1920 Mar. 13d.).

A = −·498, B = +·766, C = +·407; D = +·839, E = +·545; G = −·224, H = +·341, K = −·913.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
						—	0·9	1·0
Taihoku	1·7	308	0 33	+ 7	—	—	3·1	—
Hokoto	3·2	262	2 41	+111	(2 41)	+73	—	4·5
Zi-ka-wei	7·3	349	e 1 52	+ 1	e 3 34	+16	—	—
Manila	9·6	192	—	—	e 3 7	−71	7·6	—
Helwan	79·7	298	52 25	?L	—	—	(52·4)	—
Hamburg	83·4	327	—	—	—	—	e 44·4	53·4
De Bilt	86·7	327	—	—	e 23 27	−11	e 44·4	55·0
Strasbourg	87·4	323	—	—	—	—	e 35·9	54·4
Uccle	87·8	326	—	—	—	—	e 43·4	57·4
Rocca di Papa	88·0	316	e 12 55	−10	—	—	e 55·0	—
Edinburgh	88·0	333	—	—	—	—	—	56·4
Eskdalemuir	88·4	333	—	—	—	—	44·4	57·1
Paris	90·0	326	—	—	—	—	57·4	—
Rio Tinto	102·2	321	61 25	?L	—	—	(61·4)	65·4

Additional readings: Zi-ka-wei gives also MN = +4·3m. Helwan PN = +50m.25s. De Bilt MN = +56·3m. Uccle MN = +48·4m. Rocca di Papa iPN = +12m.51s.

July 25d. 19h. 27m. 14s. Epicentre 24°·0N. 123°·0E. (as at 1h.).

A = −·498, B = +·766, C = +·407; D = +·839, E = +·545; G = −·224, H = +·341, K = −·913.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
							—	0·9	0·9
Taihoku		1·7	308	0 29	+ 3	—	—	1·1	1·4
Hokoto		3·2	262	0 47	− 3	—	—	—	5·0
Zi-ka-wei		7·3	349	e 1 51	0	e 3 19	+ 1	5·8	10·0
Manila		9·6	192	e 2 24	0	5 6	?L	—	14·6
Osaka		15·2	43	4 38	+56	—	—	—	—
Tokyo		18·6	47	—	—	e 7 32	−21	—	7·8
Batavia		34·1	209	e 6 31	−35	—	—	(28·3)	—
Kodaikanal		45·5	261	28 16	?L	—	—	e 40·6	44·7
Lemberg		77·4	320	—	—	—	—	—	—
Helwan	E.	79·7	298	19 46	?	—	—	32·8	—
Vienna		82·6	321	—	—	—	—	e 42·8	45·5
Hamburg		83·4	327	e 13 46	+68	—	—	—	—
Padova		86·6	320	60 7	?	—	—	—	—
De Bilt	E.	86·7	327	—	—	e 25 27	?	e 45·8	48·1
	N.	86·7	327	—	—	e 21 44	?	e 43·8	47·9
Dyce		86·7	334	—	—	—	—	32·8	—
Strasbourg		87·4	323	—	—	—	—	e 46·8	49·0
Uccle		87·8	326	—	—	e 20 46	?	e 42·8	47·9
Rocca di Papa		88·0	316	i 13 2	− 3	e 22 20	−92	e 53·1	—
Edinburgh		88·0	333	—	—	—	—	46·8	49·8
Eskdalemuir		88·4	333	13 6	− 1	24 6	+10	42·8	47·9
Stonyhurst		89·1	330	e 20 4	?	—	—	—	51·8
Besançon		89·1	323	—	—	—	—	47·8	—
Kew		89·6	329	35 46	?L	—	—	(35·8)	55·8
Paris		90·0	326	—	—	—	—	47·8	49·8
Oxford		90·0	329	—	—	—	—	45·5	54·2
Tortosa		96·1	320	—	—	—	—	e 46·8	55·1
Algiers		97·0	316	—	—	—	—	—	57·3
Coimbra		101·6	324	e 21 46	?	e 34 46	?SR_1	52·1	—
Ottawa		108·5	13	—	—	e 34 28	?SR_1	e 49·8	—
Ann Arbor		109·2	20	—	—	—	—	30·5	—
Toronto		109·3	15	—	—	—	—	i 50·7	—

Additional readings and notes: Hokoto readings increased by 1m. Zi-ka-wei gives also MN = +4·6m. Manila MN = +8·1m. Osaka MN = +16·0m. Tokyo reading is given as at 18h. Dehra Dun (Δ = 40°·3) gives just 19h.26m. Helwan PN = +16m.46s. Hamburg MN = +45·8m., MZ = +49·8m. Padova PR_1 = +61m.55s.; these readings appear to be given in G.M.T. instead of Central European time. Strasbourg MN = +52·0m. Rocca di Papa iPE = +13m.22s. Paris MN = +51·8m. Ottawa e = +30m.16s. Ann Arbor LN = +30·3m. Toronto L = +32·0m.

July 25d. Readings also at 1h. (Taihoku (2)), 5h. (near Lick and Berkeley), 6h. (San Fernando), 10h. (near Florence), 14h. (Stonyhurst and La Paz), 16h. (Stonyhurst and near Batavia), 18h. (Hamburg), 19h. (Toronto, Ann Arbor, and Ottawa), 20h. (Taihoku and near Batavia), 21h. (De Bilt, Colombo, Dehra Dun, Hamburg, Simla, and Stonyhurst), 22h. (Taihoku and near Tokyo and Mizusawa), 23h. (near Batavia).

July 26d. 10h. 37m. 6s. Epicentre 46°·0N. 152°·5E. (as on 1920 July 18d.).

$A = -\cdot616$, $B = +\cdot321$, $C = +\cdot719$; $D = +\cdot462$, $E = +\cdot887$; $G = -\cdot638$, $H = +\cdot332$, $K = -\cdot695$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa	E.	10·8	235	3 0	+19	4 52	+ 2	—	—
Tokyo		14·1	227	—	—	e 6 2	− 8	—	—
Zi-ka-wei		28·1	250	e 6 5	− 4	e 11 7	+ 6	—	—
Honolulu		47·0	105	15 32	?S	(15 32)	− 9	24·4	25·6
Hamburg		75·4	335	—	—	—	—	e 35·9	46·9
De Bilt	E.	78·0	340	—	—	—	—	e 43·9	45·4
	N.	78·0	340	—	—	—	—	e 41·9	52·7
Uccle		79·4	340	—	—	—	—	e 40·9	—
Rocca di Papa		85·2	331	i 12 48	− 1	—	—	e 55·2	64·2
Helwan		87·3	309	50 54	?L	—	—	(50·9)	—
Rio Tinto		94·1	344	52 54	?L	—	—	(52·9)	61·9

Additional readings: Mizusawa gives also SN = +4m.55s. Honolulu eN = +22m.15s., MN = +24·9m. Rocca di Papa iPN = +12m.52s.

July 26d. Readings also at 6h. (near Tokyo), 7h. (near La Paz), 8h. (Helwan, Belgrade, and near Athens), 14h. (Simla), 15h. (2) and 23h. (La Paz).

July 27d. Readings at 9h. (near Tokyo), 11h. (Cape Town), 17h. (near Tokyo and Mizusawa), 19h. (Tacubaya), 20h. (near Tokyo), 23h. (Taihoku).

July 28d. Readings at 4h. and 13h. (Tacubaya), 14h. (Algiers and near Tokyo), 17h. (Cape Town), 19h. (La Paz).

July 29d. 0h. 28m. 50s. Epicentre 15°·0S. 172°·0W. (as on 1921 May 3d. epicentre and time given by Apia).

$A = -\cdot956$, $B = -\cdot134$, $C = -\cdot259$; $D = -\cdot139$, $E = +\cdot990$; $G = +\cdot256$, $H = +\cdot036$, $K = -\cdot966$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Apia		1·2	11	i 0 20	+ 2	—	—	—	7·2
Christchurch		31·4	201	—	—	10 52	−66	16·1	18·0
Riverview		38·1	233	e 8 21	+42	—	—	e 15·4	18·1
Honolulu	E.	38·8	23	13 37	?S	(13 37)	−12	17·7	18·3
	N.	38·8	23	—	—	—	—	17·1	18·7
Melbourne		44·2	231	—	—	e 13 22	?	—	25·4
Adelaide		48·4	237	—	—	e 15 28	−31	e 21·3	28·8
Berkeley		70·5	40	—	—	—	—	e 33·5	—
Manila		72·5	291	e 11 10	−23	—	—	—	—
Victoria		76·7	31	21 59	?S	(21 59)	+14	32·8	38·2
Chicago		95·9	50	23 53	?S	(23 53)	−82	e 45·2	—
Toronto		102·2	48	—	—	—	—	e 57·9	62·0
Colombo		109·3	273	41 10	?L	—	—	(41·2)	94·2
Edinburgh		138·3	10	—	—	—	—	69·2	76·2
Eskdalemuir		138·8	10	—	—	—	—	65·2	76·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Stonyhurst		140·3	11	e 69 10	?L	—	—	(e 69·2)	80·2
Hamburg		141·4	359	e 22 28	?PR$_1$	—	—	e 70·2	75·2
Oxford		142·5	11	—	—	—	—	—	76·5
De Bilt	E.	142·9	3	—	—	—	—	e 69·2	83·5
	N.	142·9	3	—	—	—	—	e 66·2	73·6
Kew		143·0	11	—	—	—	—	—	83·2
Vienna		146·1	350	i 19 30	[−20]	—	—	—	20·7
Strasbourg		146·5	0	19 31	[−20]	—	—	—	—
Belgrade		148·4	343	e 18 39	[−74]	—	—	—	—
Moncalieri		150·0	1	e 20 15	[+19]	33 43	?	60·3	87·4
Coimbra		151·0	26	—	—	e 49 10	?	e 77·2	—
Rocca di Papa		153·0	352	i 19 41	[−19]	—	—	—	20·4
Tortosa		153·4	13	—	—	—	—	e 71·2	78·2
Helwan	E.	153·9	309	35 10	?	—	—	—	—

Additional readings: Apia gives MN = +4·2m., MV = +0·7m., also the T$_e$ and origin adopted. Christchurch PR$_1$? = +6m.28s., SR$_1$ = +13m.28s. Riverview e(P?) = +8m.42s., MN = +20·3m. Honolulu S = +16m.12s. Victoria S? = +26m.25s. Chicago S? = +31m.40s. Toronto e? = +35m.28s., i = +49m.10s., e = +53m.28s., i = +55m.10s., eL = +69·7m. and +78·7m. Eskdalemuir MN = +72·1m. Hamburg MN = +78·2m., MZ = +84·2m. De Bilt ePR$_1$N = +23m.22s. Belgrade eP = +20m.34s., eSR$_1$ = +21m.59s. (?PR$_1$). Helwan PN = +41m.10s.

July 29d. Readings also at 2h. (Manila and Batavia), 3h. (Zi-ka-wei), 5h. (La Paz), 7h. (near Athens), 11h. (Uccle), 14h. (near La Paz), 15h. (Manila, Zi-ka-wei, Helwan, and near Taihoku and Hokoto; these do not fit the origin of July 25d. very accurately), 21h. (near Taihoku).

July 30d. Readings at 8h. (Melbourne), 9h. (near Tokyo), 10h. and 12h. (La Paz), 13h. (Tortosa), 15h. (Colombo), 16h. (Manila), 19h. (Taihoku), 21h. (near Rocca di Papa and Pompeii).

July 31d. 9h. 50m. 42s. Epicentre 15°·7S. 167°·3E. (as on 1920 July 6d.).

A = −·939, B = +·212, C = −·271; D = +·220, E = +·975; G = +·264, H = −·059, K = −·963.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Apia		20·3	87	i 4 59	+14	8 46	+17	10·8	—
Riverview		23·4	216	e 5 28	+ 7	e 9 43	+10	e 10·9	13·4
Sydney		23·4	216	4 24	−57	10 0	+27	13·1	14·3
Wellington		26·4	167	e 10 18	?S	(e 10 18)	−12	e 12·1	15·3
Christchurch		28·2	172	5 24	−46	10 12	−51	13·8	17·4
Melbourne		29·7	217	—	—	11 12	−17	14·1	17·5
Adelaide		32·1	229	i 6 54	+ 6	i 11 54	−16	e 14·3	22·9
Perth		49·3	240	9 18	+16	—	—	—	—
Honolulu		50·3	44	i 16 6	?S	(i 16 6)	−17	22·5	25·7
Manila		54·9	301	e 9 34	− 4	—	—	—	—
Batavia		59·9	272	10 14	+ 3	i 18 23	+ 1	e 33·2	—
Zi-ka-wei		64·1	319	e 10 33	− 6	—	—	—	—
Berkeley	E.	84·9	48	—	—	—	—	e 38·6	40·6
	V.	84·9	48	—	—	—	—	e 39·2	41·9
Victoria		88·7	38	18 19	?PR$_1$	24 43	+43	37·0	45·4
Colombo		89·5	276	54 18	?	—	—	60·3	62·3
Chicago		111·6	50	—	—	e 28 41	+59	e 51·3	—
Toronto		117·6	47	—	—	—	—	61·9	72·3
Ottawa	E.	120·0	45	—	—	e 30 18	+89	64·8	—
Cape Town		122·1	210	67 54	?L	—	—	(67·9)	—
Helwan	E.	137·3	297	22 0	?PR$_1$	—	—	—	202·2
Hamburg		138·2	340	e 19 46	[+10]	—	—	e 70·3	74·3
Eskdalemuir	N.	139·7	351	e 22 11	?SR$_1$	e 40 41	?SR$_1$	68·3	—
De Bilt	E.	140·9	341	e 19 53	[+12]	e 23 17	?PR$_1$	e 72·3	74·3
	N.	140·9	341	—	—	—	—	e 73·3	81·9

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Stonyhurst	141·0	350	e 70 18	?L	—	—	(e 70·3)	95·3
Bidston	141·6	350	—	—	—	—	72·8	83·3
Uccle	142·3	341	e 22 42	?PR$_1$	e 32 30	?	—	79·3
Strasbourg	143·1	336	e 19 35	[−10]	e 22 41	?PR$_1$	76·3	—
Paris	144·6	344	e 19 32	[−16]	22 56	?PR$_1$	73·3	81·3
Pompeii E.	145·6	322	19 18	[−31]	—	—	—	—
Moncalieri	146·0	335	19 37	[−13]	31 42	?	50·5	—
Rocca di Papa	146·0	325	19 42	[− 8]	—	—	e 77·5	82·2
Tortosa	152·4	338	20 1	[+ 2]	—	—	—	—
Algiers	154·7	329	e 20 20	[+18]	—	—	e 77·3	102·3
Coimbra E.	155·2	352	19 47	[−15]	—	—	74·3	—
Granada	157·1	341	i 20 16	[+11]	(44 42)	?SR$_1$	e 44·7	—
Rio Tinto	157·3	347	80 18	?L	—	—	(80·3)	102·3
San Fernando	158·5	346	—	—	—	—	86·3	114·3

Additional readings and notes: Apia readings are given one hour late. Riverview readings are given one hour late, also eS = +10m.0s. and +10m.17s., MN = +12·8m., MZ = +14·2m. Melbourne SR$_1$ = +12m.12s. Adelaide e = +17m.0s. and +18m.18s. Honolulu SE = +20m.18s., SN = +18m.36s., MN = +25·1m. Batavia i = +13m.33s. and +14m.3s. Berkeley eLN = +39·8m. Chicago L = +54·3m. Toronto e = +31m.48s. and +42m.12s., eL = +65·9m. Ottawa e?E = +37m.18s. Helwan PN = +22m.18s. Coimbra PN = +20m.24s., eL = +51·3m. San Fernando MN = +115·3m.

July 31d. Readings also at 9h. (Manila), 10h. (Berkeley), 11h. (Melbourne and Chicago), 12h. (Florence and Manila), 14h. (Florence and Rocca di Papa), 22h. (Paris), 23h. (Strasbourg and near Honolulu and near Apia).

Aug. 1d. Readings at 0h. (Uccle, De Bilt, and Stonyhurst), 1h. (Helwan and Vera Cruz), 4h. (Vera Cruz), 6h. (La Paz and Paris), 9h. (Helwan), 10h. (Vienna), 12h. (Melbourne), 13h. (Helwan), 17h. (Vienna, Batavia, and near Tokyo), 18h. (Helwan), 20h. (Taihoku).

Aug. 2d. 3h. 17m. 40s. Epicentre 39°·0N. 27°·0E. (as on July 24d.).

A = +·692, B = +·353, C = +·629.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Athens	2·8	248	e 0 45	+ 1	i 1 13	− 4	1·3	1·5
Belgrade	7·6	322	e 1 45	−10	(i 3 18)	− 8	(i 4·4)	5·1
Rocca di Papa	11·2	289	e 1 50	−57	—	—	—	5·0
Vienna	12·0	324	—	—	—	—	e 6·5	—
De Bilt	20·0	318	—	—	—	—	e 10·3	—

Additional readings and notes: Athens gives also iPE = +50s. Belgrade iP = +3m.18s., iSR$_1$ = +4m.23s., taken as S and L. Rocca di Papa eN = +1m.56s., i = +3m. 55s.

Aug. 2d. Readings also at 2h. (Zante), 6h. (near Batavia), 7h. (Wellington), 11h. (La Paz and Apia), 12h. (Helwan), 13h. and 14h. (2) (La Paz), 15h. (Melbourne), 19h. (2) and 20h. (La Paz), 23h. (Simla).

Aug. 3d. Readings at 0h. (De Bilt), 10h. (Taihoku), 12h. (Melbourne), 16h. (Rocca di Papa and near Belgrade and Sarajevo), 22h. (Manila).

Aug. 4d. Readings at 6h. (Taihoku and near Zurich), 19h. (near Colima), 23h. (Batavia).

Aug. 5d. 1h. 23m. 36s. Epicentre 48°·0S. 17°·0W.

A = +·640, B = −·196, C = −·743; D = −·292, E = −·956; G = −·711, H = +·217, K = −·669.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
La Paz		52·1	289	i 9 22	+ 1	i 16 48	+ 3	25·9	30·3
Helwan	N.	89·1	40	24 24	?S	(24 24)	+20	—	—
Melbourne		92·8	167	—	—	—	—	—	42·9
Rocca di Papa		93·5	22	—	—	e 24 48	− 3	e 57·1	—
Paris		98·2	13	—	—	e 57 24	?	60·4	62·4
Uccle		100·5	14	—	—	e 28 48	?	e 52·4	57·4
Kodaikanal		100·6	86	56 0	?L	—	—	(56·0)	—
De Bilt	E.	101·8	15	—	—	e 35 5	?SR_1	e 49·4	61·1
	N.	101·8	15	—	—	e 29 11	?	e 50·4	63·1

Additional readings: Helwan gives also PE = +26m.24s. Uccle e = +34m.52s.

Aug. 5d. Readings also at 0h. and 2h. (La Paz), 3h. (Wellington), 5h. (Lemberg), 6h., 7h., 9h., and 11h. (La Paz), 12h. (Manila), 14h. (La Paz and Wellington), 15h. (Melbourne), 18h. (Algiers), 19h. (Helwan and Algiers), 23h. (near Tortosa).

Aug. 6d. Readings at 2h. (De Bilt and Helwan), 13h. (near Sarajevo), 22h. (near Tokyo), 23h. (near La Paz).

Aug. 7d. Readings at 6h. (Georgetown), 13h. (near Tokyo), 14h. (La Paz), 15h. (Manila), 23h. (Melbourne).

Aug. 8d. Readings at 0h. (near La Paz), 3h. (Apia), 4h., 6h., 7h., 9h., and 14h (La Paz), 15h. (Taihoku).

Aug. 9d. 10h. 38m. 0s. Epicentre 43°·0N. 146°·0E.

A = −·606, B = +·409, C = +·682; D = +·559, E = +·829; G = −·565, H = +·382, K = −·731.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Hakodate		4·1	253	1 18	+14	—	—	2·1	2·4
Ootomari		4·3	328	1 7	0	—	—	—	—
Mizusawa	E.	5·3	225	1 30	+ 8	2 29	+ 4	—	—
Akita		5·5	236	1 29	+ 4	—	—	2·8	—
Niigata		7·5	228	2 0	+ 6	2 52	−32	3·8	4·6
Mito		7·8	214	2 6	+ 8	(3 28)	− 3	3·5	—
Tokyo		8·8	216	i 2 8	− 5	2 59	−59	3·7	5·1
Osaka		11·7	228	3 27	+32	(5 22)	+10	5·4	8·6
Zi-ka-wei		22·7	247	e 5 10	− 3	e 9 18	− 1	—	16·3
Manila		35·6	224	e 7 32	+14	—	—	—	—
Honolulu	E.	51·0	96	—	—	—	—	23·3	25·4
	N.	51·0	96	—	—	—	—	23·4	25·5
Hamburg		76·3	334	i 11 58	+ 1	i 21 38	− ·3	e 45·0	49·0
Eskdalemuir		78·2	343	e 12 7	− 1	e 22 2	0	40·0	—
Vienna		78·6	329	i 12 10	− 1	e 21 18	−49	—	49·0
De Bilt		79·0	336	e 12 9	− 4	e 22 7	− 5	e 39·0	43·0
Uccle		80·4	336	e 12 19	− 2	e 22 21	− 7	e 39·0	43·0
Kew		81·1	340	—	—	—	—	—	90·0
Strasbourg		81·4	334	e 12 23	− 4	—	—	e 43·0	55·0
Paris		82·7	337	e 12 36	+ 2	e 22 49	− 5	46·0	—
Rocca di Papa		85·4	327	i 12 45	− 5	i 23 26	+ 3	e 45·2	—
Helwan	E.	85·7	308	24 0	?S	(24 0)	+33	—	—
La Paz		140·7	56	19 34	[− 6]	—	—	—	—

Additional readings: Hakodate gives also MN = +3·1m. Niigata MN = +4·8m. Tokyo MN = +6·5m. Osaka MN = +10·4m. De Bilt MN = +50·2m. Epicentre 41°·5N. 144°·2E. Rocca di Papa iSN = +23m.20s. Helwan PN = +25m.0s.

Aug. 9d. Readings also at 4h. (near Nagasaki and Osaka), 6h. and 7h. (near Nagasaki), 8h. (near Mizusawa), 14h. (Paris), 18h. (Helwan), 22h. (near Colima).

Aug. 10d. 14h. 10m. 30s. Epicentre 41°·0N. 21°·5E. (as on 1920 Sept. 14d.).

$A = +\cdot702$, $B = +\cdot277$, $C = +\cdot656$; $D = +\cdot366$, $E = -\cdot930$; $G = +\cdot610$, $H = +\cdot240$, $K = -\cdot755$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Athens	E.	3·3	150	e 1 22	+30	2 23	+52	2·6	3·2
	N.	3·3	150	i 1 20	+28	2 23	+52	2·6	3·3
Mostar		3·6	312	i 0 42	−14	i 1 20	−19	—	1·7
Sarajevo		3·7	322	i 0 50	− 8	1 37	−5	—	2·8
Belgrade		3·9	349	i 0 42	−19	i 1 26	−21	—	1·6
Sinj		4·5	308	0 54	−16	1 50	−14	—	3·0
Pompeii	E.	5·3	270	1 39	+17	2 44	+19	(2·7)	3·7
Rocca di Papa		6·7	280	i 1 48	+ 6	i 2 56	− 6	i 3·6	4·6
Budapest		6·7	346	i 1 14	−28	e 2 13	−49	e 3·0	3·7
Pola		6·8	307	e 1 52	+ 8	—	—	e 3·6	4·3
Florence		8·1	294	2 5	+ 2	—	—	—	5·5
Vienna		8·1	335	i 1 53	−10	—	—	3·5	5·0
Padova		8·3	306	2 4	− 2	4 27	+42	—	4·5
Lemberg		9·0	10	e 2 10	− 6	e 4 18	+15	—	4·8
Milan		10·0	301	3 39	+69	4 57	+28	—	6·1
Zurich		11·2	309	e 2 39	− 8	i 5 25	+26	—	—
Marseilles		12·1	287	2 2	−58	(e 5 30)	+ 9	e 5·5	6·4
Strasbourg		12·3	312	e 2 54	− 9	e 5 48	+22	—	7·7
Besançon		12·7	305	3 5	− 4	6 0	+23	6·5	—
Helwan		13·7	141	2 30	−52	—	—	(8·5)	—
Barcelona		14·6	278	e 3 35	+ 1	—	—	e 8·1	10·2
Hamburg		14·8	332	i 3 27	− 9	e 6 6	−21	e 8·2	11·1
	Z.	14·8	332	i 3 26	−10	e 6 5	−22	e 8·2	10·2
Algiers		14·9	260	e 3 45	+ 7	e 6 39	+ 9	8·5	11·0
Uccle		15·4	316	e 3 37	− 7	e 6 39	− 2	e 7·6	9·5
Paris		15·6	307	e 3 45	− 2	e 6 47	+ 1	8·0	8·5
De Bilt		15·8	320	3 43	− 6	6 38	−12	8·5	11·5
Tortosa		15·8	276	3 53	+ 4	—	—	7·5	10·3
Kew		18·2	312	—	—	—	—	—	11·5
Oxford		19·0	312	i 4 0	−29	i 7 30	−32	9·5	11·8
Granada		19·8	267	4 58	+19	8 39	+20	—	—
Stonyhurst		20·5	317	4 48	+ 1	8 42	+ 8	10·0	14·5
Bidston		20·6	315	—	—	8 21	−15	10·4	11·5
Eskdalemuir		21·7	320	4 48	−13	8 36	−23	11·5	—
Edinburgh		21·9	321	i 5 0	− 4	i 8 46	−17	11·8	14·2
Dyce	E.	22·2	325	4 59	− 8	8 57	−12	—	—
Coimbra	E.	22·7	278	5 10	− 3	9 2	−17	13·5	14·4
	N.	22·7	278	5 10	− 3	e 9 21	+ 2	13·4	13·8

Additional readings and notes: Belgrade gives also iPE = +51s. and iPN = +50s. Rocca di Papa MN = +4·0m. Pola MN = +3·7m. Vienna LZ = +3·6m., MZ = +5·5m. Padova +5m.30s. and +9m.53s. Zurich iP = +2m.43s. Strasbourg MN = +7·2m., MZ = +7·3m. Helwan gives its readings as PN and PE respectively. Hamburg MN = +10·3m. Granada gives its readings as 11d. De Bilt MN = +10·5m. Dyce SN = +8m.52s.

Aug. 10d. Readings also at 3h. (Helwan), 4h. (near Sarajevo), 5h. (Manila and near Mizusawa), 12h. (near La Paz), 14h. (Rocca di Papa, Padova, and Belgrade), 17h. (Helwan, Sarajevo, and La Paz).

Aug. 11d. 17h. 34m. 20s. Epicentre 41°·0N. 21°·5E. (as on Aug. 10d.).

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Mostar		3·6	312	0 50	− 6	1 16	−23	—	1·4
Belgrade		3·9	349	i 0 54	− 7	i 1 44	− 3	—	1·8
Pompeii	E.	5·3	270	1 40	+18	—	—	—	—
Rocca di Papa		6·7	280	e 1 28	−14	—	—	—	—
Pola		6·8	307	e 1 45	+ 1	—	—	e 3·2	3·4
Padova		8·3	306	1 40	−26	3 59	+14	—	7·0
Strasbourg		12·3	312	—	—	—	—	5·7	—

Additional readings: Rocca di Papa eN = +1m.34s., PR_1E = +2m.28s., PR_1N = +2m.34s.

Aug. 11d. Readings also at 11h. (near Port au Prince), 12h. (Chicago, La Paz, and near Mizusawa).

Aug. 12d. Readings at 3h. (2) and 6h. (Wellington), 23h. (Algiers).

Aug. 13d. 12h. 54m. 10s. Epicentre 9°·2S. 123°·5E. (suggested by Batavia).
A = −·545, B = +·823, C = −·160; D = +·834, E = +·552; G = +·088, H = −·133, K = −·987.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia	16·8	279	i 4 18	+16	7 15	+ 2	—	8·8
Perth	23·8	196	(5 50)	+24	9 42	+ 2	14·0	—
Manila	24·0	354	e 5 30	+ 2	9 0	−44	10·2	10·3
Adelaide	29·2	154	e 6 20	0	e 12 2	+42	e 15·6	19·4
Melbourne	34·5	150	7 14	+ 5	12 56	+ 8	19·0	22·2
Riverview	35·3	140	e 7 5	−11	e 12 40	−20	e 16·6	21·7
Sydney	35·3	140	6 20	−56	13 2	+ 2	19·6	24·3
Colombo	46·4	288	21 50	?	—	—	30·8	31·8
Kodaikanal E.	49·8	291	29 26	?L	—	—	32·9	34·5
Helwan	96·5	299	17 50	?PR_1	(27 50)	+149	—	—
Hamburg	111·2	324	e 19 30	?PR_1	e 28 50	+71	e 53·8	—
De Bilt	114·5	322	—	—	e 29 30	+84	e 61·8	65·5
Uccle	115·3	321	e 29 50	?S	(e 29 50)	+98	e 60·8	63·8
Edinburgh	117·6	329	—	—	29 50	+79	—	—
Eskdalemuir	117·9	329	e 20 16	?PR_1	e 29 49	+76	45·8	—
La Paz	151·8	156	20 16	[+17]	—	—	—	—

Additional readings: Perth gives also P = +3m.16s., PR_1 has been taken as P Manila MN = +10·8m. Adelaide e = +14m.20s. Riverview PS = +13m.1s., MN = +19·7m., MZ = +25·1m. Helwan readings are given as PE and PN respectively. De Bilt ePR_1E = +19m.58s., MN = +63·1m.

Aug. 13d. Readings also at 3h. (Riverview), 19h. (Helwan).

1921. Aug. 14d. 13h. 15m. 18s. Epicentre 15°·5N. 39°·0E.

A = +·749, B = +·606, C = +·267; D = +·629, E = −·777; G = +·208, H = +·168, K = −·964.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Helwan E.	16·0	335	4 0	+ 8	8 6	?L	(8·1)	9·1
N.	16·0	335	5 54	+122	10 42	?L	(10·7)	11·8
Bombay	32·5	79	e 7 56	+63	e 12 27	+11	—	—
Belgrade	33·2	336	i 6 13	−45	e 11 50	−37	e 16·9	26·8
Rocca di Papa	34·7	325	i 7 11	0	i 12 53	+ 2	—	—
Budapest	36·0	337	6 42?	−40	e 12 38	−32	e 16·7	24·7
Pola	36·2	330	e 13 10	?S	(e 13 10)	− 3	e 21·2	26·9
Florence	36·8	327	5 2	−146	—	—	—	19·7
Padova	37·5	329	7 4	−30	—	—	—	—
Vienna	37·6	335	7 35	0	13 35	+ 3	e 20·7	31·1
Kodaikanal	37·8	93	13 12	?S	(13 12)	−23	19·8	21·6
Simla	38·2	59	13 6	?S	(13 6)	−35	—	23·2
Algiers	38·3	311	7 44	+ 4	13 46	+ 4	18·7	20·7
Colombo	40·9	98	13 42	?S	(13 42)	−38	—	21·7
Barcelona	41·0	319	e 7 59	− 4	—	—	e 20·4	24·2
Besançon	41·8	325	8 12	+ 3	14 35	+ 3	17·7	—
Strasbourg	41·8	330	8 8	− 1	e 14 29	− 3	e 17·7	31·4
Tortosa	41·8	316	8 9	0	14 33	+ 1	17·4	29·1
Granada	43·4	309	8 28	+ 7	14 54	0	—	—
Hamburg	44·3	335	i 8 28	0	e 15 10	+ 4	e 22·3	28·2
Paris	44·7	325	e 8 34	+ 3	i 15 19	+ 8	18·7	16·7
Uccle	44·9	330	e 8 33	+ 1	15 15	+ 1	e 21·7	30·1
San Fernando	45·2	307	9 42	+68	19 30	?SR_1	26·7	27·9
De Bilt	45·4	332	8 38	+ 2	15 19	− 1	e 21·7	32·4
Rio Tinto	45·8	309	17 42	?S	(17 42)	+137	—	31·7
Kew	47·6	328	19 42	?L	—	—	(19·7)	32·7
Coimbra E.	47·9	311	8 24	−29	15 32	−21	e 23·7	27·1
N.	47·9	311	8 24	−29	15 54	+ 1	22·7	30·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Oxford		48·3	327	8 59	+ 3	19 54	?SR_1	25·2	41·8
Stonyhurst		50·1	329	e 11 12	?PR_1	16 30	+10	30·2	32·2
Bidston		50·1	329	9 14	+ 6	i 16 32	+12	24·1	36·4
Eskdalemuir		51·2	330	e 9 28	+14	e 16 48	+14	24·7	30·9
Edinburgh		51·5	330	9 22	+ 5	16 48	+10	28·7	31·7
Cape Town		53·1	201	19 46	?	26 36	?L	28·0	28·8
Batavia		70·6	103	—	—	i 20 48	+15	—	21·7
Manila		78·3	78	—	—	e 23 2	+58	—	—
Ottawa	E.	95·4	320	—	—	e 24 20	−50	e 46·7	—
Toronto		98·4	320	—	—	59 0	?	e 62·5	—
Ann Arbor		101·9	320	—	—	—	—	—	46·4
Chicago		104·5	321	—	—	—	—	e 57·7	—
La Paz		110·4	259	e 19 45	?PR_1	32 16	?SR_1	56·7	77·1
Victoria		114·2	348	—	—	—	—	68·5	—
Riverview		116·8	121	—	—	e 51 36	?	e 57·1	61·4

Additional readings: Barcelona ? = +16m.0s. Strasbourg MN = +27·5m.
Hamburg SR_1 = +18m.32s., MZ = +34·7m. Uccle SR_1 = +18m.28s.
De Bilt SR_1 = +18m.47s., MN = +29·7m. Eskdalemuir iZ = +9m.24s.,
SR_1? = +20m.19s. Toronto eL = +71·9m. Ann Arbor LE = +46·2m.
Victoria eL = +82·2m.

Aug. 14d. Readings also at 5h. (near Nagasaki), 9h. (La Paz and Coimbra), 10h. (Uccle, De Bilt, and Helwan), 12h. (La Paz), 13h. (near Mizusawa), 16h. (Riverview and Adelaide), 21h. (La Paz).

Aug. 15d. 14h. 10m. 45s. Epicentre 18°·0S. 167°·0E. (as on 1920 Sept. 21d.).

A = −·927, B = +·214, C = −·309; D = +·225, E = +·974;
G = +·301, H = −·070, K = −·951.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Sydney	21·3	219	8 51	?S	(8 51)	+ 1	12·4	13·7
Riverview	21·3	219	—	—	—	—	e 10·2	16·5
Melbourne	27·7	220	e 5 51	−14	e 10 27	−27	e 13·4	19·8
Adelaide	30·4	231	—	—	—	—	e 19·2	23·4
Kodaikanal	92·8	280	(12 57)	−34	—	—	—	—
Chicago	113·2	50	—	—	—	—	e 57·2	—
Helwan	138·0	295	33 15	?S	—	—	(54·2)	—
De Bilt	143·1	342	—	—	—	—	e 86·2	—
Stonyhurst	143·2	350	78 45	?L	—	—	(78·8)	—

Additional readings: Riverview gives also MN = +14·5m., MZ = +17·1m.
Chicago L = +63·2m. Kodaikanal increased by 10min.

Aug. 15d. Readings also at 1h. (near Tacubaya and Vera Cruz), 4h. (Vera Cruz), 5h. (near Oaxaca and Tacubaya), 6h. (Apia), 7h. (Zi-ka-wei), 8h. (near Sarajevo and Belgrade), 11h. (Manila), 13h. (near Tokyo), 22h. (Mizusawa).

Aug. 16d. 5h. 18m. 36s. Epicentre 36°·0N. 141°·0E. (as on 1919 July 9d.).

A = −·629, B = +·509, C = +·588; D = +·629, E = +·777;
G = −·457, H = +·370, K = −·809.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Tokyo		1·1	253	i 0 23	+ 6	e 1 14	+43	1·8	5·4
Mizusawa	E.	3·1	1	0 57	+ 8	1 40	+14	—	—
	N.	3·1	1	0 56	+ 7	1 36	+10	—	—
Osaka		4·7	256	1 11	− 2	—	—	—	4·4
Kobe	N.	5·0	256	e 1 16	− 1	i 2 8	− 9	e 2·7	—
Zi-ka-wei		17·0	259	e 3 58	− 7	—	—	—	—
Hamburg		81·0	334	—	—	—	—	e 35·4	44·4
Eskdalemuir		83·7	342	—	—	—	—	41·4	—
De Bilt		83·9	335	—	—	—	—	e 45·4	56·0
Uccle		85·2	335	—	—	—	—	e 45·4	—
Helwan	E.	86·8	306	29 24	?	—	—	—	—
Tortosa		95·1	332	—	—	—	—	e 53·4	57·4

Additional readings and notes: Tokyo gives an alternative iP = +24s., MN = +3·1m. Osaka MN = +4·2m. Kobe readings increased by 6min.
De Bilt MN = +54·6m. Helwan PN = +58m.24s.

Aug. 16d. Readings also at 4h. (near Mizusawa), 6h. (Batavia), 7h. (Apia, Batavia, Riverview, Helwan, and La Paz), 11h. (Wellington), 12h. (Vera Cruz), 14h. (near Tokyo and Mizusawa), 18h. (Ann Arbor and Ottawa), 22h. (near Tokyo and Mizusawa).

Aug. 17d. Readings at 1h. (near Mizusawa), 4h. (Taihoku), 6h. (Manila and Wellington), 7h. (Mizusawa), 8h. (Oaxaca and Tacubaya), 10h. and 20h. (La Paz), 21h. (Rocca di Papa), 23h. (La Paz, Victoria, Helwan, Honolulu, Tacubaya, Ottawa, and Vera Cruz).

Aug. 18d. Readings at 0h. (Chicago, Helwan, Riverview, and De Bilt), 1h. (De Bilt), 2h. (La Paz), 8h. (near Rocca di Papa), 21h. (La Paz).

Aug. 19d. 8h. 33m. 35s. Epicentre 34°·5N. 77°·5W.

A = +·178, B = −·805, C = +·566; D = −·976, E = −·216; G = +·123, H = −·553, K = −·824.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Cheltenham	N.	4·3	7	e 4 35	?	—	—	5·2	5·8
Georgetown	E.	4·5	4	e 1 5	− 5	—	—	e 5·2	—
	N.	4·5	4	e 1 25	+15	—	—	e 5·4	—
Washington		4·5	4	2 43	?S	(2 43)	+39	4·2	—
Ithaca		8·0	1	—	—	—	—	e 6·7	—
Ann Arbor		9·2	330	—	—	—	—	5·9	—
Toronto		9·3	351	—	—	—	—	e 7·7	8·4
Chicago		10·8	315	2 38	− 3	4 45	− 5	5·6	—
Ottawa	E.	11·0	7	e 3 44	+60	—	—	e 6·9	—
De Bilt		59·3	45	—	—	—	—	e 32·4	—

Additional readings: Cheltenham gives also LE = +5·5m. Ann Arbor LN = +5·6m.

Aug. 19d. Readings also at 0h. (Helwan), 15h. (Tortosa and near Mizusawa), 19h. (La Paz), 22h. (Taihoku).

Aug. 20d. Readings at 5h. (near Batavia), 6h. (Helwan), 10h. (Perth), 13h. (Manila), 20h. (Apia).

Aug. 21d. 1h. 9m. 16s. Epicentre 26°·0N. 50°·0W.

A = +·578, B = −·689, C = +·438; D = −·766, E = −·643; G = +·282, H = −·336, K = −·899.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Ottawa	E.	28·3	320	—	—	e 12 32	+88	e 16·7	—
Chicago		34·6	309	—	—	—	—	e 13·7	—
Stonyhurst		44·7	40	e 20 44	?L	—	—	(e 20·7)	—
Edinburgh		45·0	37	—	—	14 44	−31	—	24·7
La Paz		46·0	205	i 8 41	+ 1	—	—	—	—
Uccle		47·9	45	e 8 52	− 1	e 15 50	− 3	e 20·7	—
De Bilt		48·6	42	—	—	e 16 4	+ 3	e 21·7	25·5
Strasbourg		49·8	49	e 9 5	− 1	—	—	—	—
Helwan	N.	70·5	67	36 44	?L	—	—	(36·7)	—

Additional readings: Ann Arbor (Δ = 32°·0) gives L waves at about 1h.8m.18s. Chicago L = +20·7m. De Bilt e = +20m.56s., MN = +24·5m. Helwan PE = +40m.44s.

Aug. 21d. Readings also at 4h. (Budapest and near Tokyo), 7h. (near Mizusawa), 11h. (Melbourne and Riverview), 12h. (Helwan and Manila), 20h. (Christchurch), 21h. (Manila, Apia, and near Tokyo).

Aug. 22d. 4h. 5m. 0s. Epicentre 36°·0N. 141°·0E (as on Aug. 16d.).

A = −·629, B = +·509, C = +·588; D = +·629, E = +·777; G = −·457, H = +·370, K = −·809.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa	E.	3·1	1	0 58	+ 9	1 41	+15	—	—
Osaka		4·7	256	1 36	+23	—	—	3·3	4·2
Kobe		5·0	256	i 1 16	− 1	i 2 29	+12	3·5	4·7
Nagasaki	N.	9·8	254	e 1 21	−66	—	—	—	—
Ootomari		10·7	6	5 15	?S	(5 15)	+27	8·3	9·4
Zi-ka-wei		17·0	259	e 3 51	−14	—	—	—	13·2
Taihoku		20·0	242	e 5 0	+19	—	—	—	—
Manila		27·9	225	e 7 0	+53	—	—	—	—
Honolulu		54·5	89	—	—	—	—	24·8	25·0
Hamburg		81·0	334	—	—	e 22 0	−35	e 45·0	50·9
Vienna		82·4	327	e 12 0	−32	—	—	—	49·5
Edinburgh		83·3	341	—	—	—	—	43·0	59·0
Eskdalemuir		83·7	342	—	—	e 23 8	+ 2	44·0	58·0
De Bilt		83·9	335	—	—	e 22 56	−12	e 45·0	51·3
Uccle		85·2	335	—	—	e 23 0	−21	e 45·0	56·0
Bidston		85·3	339	—	—	23 21	− 1	—	57·0
Kew		86·2	338	—	—	—	—	—	58·0
Helwan	N.	86·8	306	23 0	?S	(23 0)	−39	—	—
Paris		87·5	335	—	—	e 23 31	−16	47·0	56·0
Florence		88·1	326	49 0	?L	—	—	(49·0)	53·0
Rocca di Papa		89·0	324	—	—	—	—	e 49·1	54·9
Rio Tinto		100·4	334	62 0	?L	—	—	(62·0)	66·0
La Paz		147·6	60	19 47	[− 5]	—	—	—	—

Additional readings and notes: Mizusawa gives also PN = +56s. Osaka MN = +5·8m. Kobe MN = +3·6m. Nagasaki ePE = +1m.27s. Zi-ka-wei MN = +12·9m. Honolulu LN = +24·7m. Hamburg MN = +51·3m., MZ = +52·8m. De Bilt MN = +56·9m. Helwan PE = +25m.0s.

Aug. 22d. Readings also at 0h. (near Tacubaya), 2h. (near Mizusawa), 5h. (Taihoku), 10h. (near Mizusawa), 13h. (Hamburg, De Bilt, Eskdalemuir, Uccle, Batavia, and near Manila), 14h. (De Bilt), 17h. (near Osaka, Tokyo, and Mizusawa), 21h. (De Bilt), 22h. (Taihoku).

Aug. 23d. 5h. 11m. 50s. Epicentre 56°·8N. 33°·6W. (as on 1920 Feb. 7d.).

A = +·456, B = −·303, C = +·837; D = −·553, E = −·833; G = +·697, H = −·463, K = −·548.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Edinburgh	16·7	80	4 10	+ 9	—	—	8·2	12·2
Eskdalemuir	16·9	82	e 4 4	0	e 7 17	+ 1	8·2	10·4
Bidston	17·6	88	4 10	− 2	7 40	+ 9	9·2	13·2
Stonyhurst	17·8	86	e 4 10	− 5	—	—	—	10·7
Oxford	19·3	91	i 4 37	+ 4	—	—	9·3	10·9
Kew	20·0	88	—	—	—	—	—	11·2
De Bilt	22·7	85	5 13	0	9 22	+ 3	11·4	13·7
Uccle	22·9	89	e 5 15	− 1	e 9 27	+ 4	e 11·1	—
Paris	22·9	95	e 5 10?	− 6	9 30	+ 7	12·4	13·2
Coimbra	23·3	125	5 26	+ 6	9 44	+13	11·2	12·1
Hamburg	24·7	79	e 5 30	− 5	e 9 46	−11	e 14·3	17·2
Strasbourg	25·9	91	e 5 34	−13	—	—	—	—
Vienna	30·8	82	e 5 10?	?	(e 11 34)	−14	e 11·6	18·6
Rocca di Papa	32·9	95	i 6 52	− 4	11 40	−42	e 20·5	—
La Paz	78·8	213	13 11	+59	—	—	—	—

Additional readings: Eskdalemuir gives also eN = iZ = +4m.5s. De Bilt MN = +13·9m. Hamburg MN = +16·3m. Vienna eS?? = +9m.10s.

1921. Aug. 23d. 20h. 17m. 16s. Epicentre 67°·5N. 18°·6W.

(as on 1913 July 26d.).

A = +·363, B = −·122, C = +·924; D = −·319, E = −·948; G = +·876, H = −·295, K = −·383.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Dyce N.	12·7	136	e 3 6	− 3	i 5 36	− 1	6·0	6·9
Edinburgh	13·6	141	3 21	0	5 45	−13	—	8·5
Eskdalemuir N.	14·1	142	i 3 26	− 1	i 6 11	+ 1	6·7	7·7
Stonyhurst	15·7	143	e 4 2	+14	(i 6 56)	+ 8	i 6·9	9·7
Bidston	15·9	144	—	—	6 49	− 4	—	16·2
West Bromwich	17·0	143	4 5	0	7 14	− 4	—	—
Oxford	17·8	143	i 4 16	+ 1	7 38	+ 2	8·7?	10·9
Kew	18·4	142	7 44	?S	(7 44)	− 5	—	9·7
Cowes (I.W.)	18·8	144	4 20	− 7	7 50	− 8	—	—
De Bilt	19·2	131	4 35	+ 4	i 8 15	+ 9	8·6	11·3
Hamburg	19·5	122	e 4 40	+ 5	e 8 11	− 2	e 10·2	14·0
	19·5	122	—	—	i 8 19	+ 6	e 11·0	14·4
Uccle	20·2	134	4 43	0	i 8 26	− 1	i 9·4	10·9
Paris	21·5	140	e 4 55	− 4	i 8 51	− 4	10·7	11·7
Strasbourg	23·1	131	5 17	− 1	i 9 32	+ 5	e 10·7	13·7
Besançon	23·9	136	5 27	0	9 47	+ 5	12·7	—
Zurich	24·4	131	e 5 32	0	i 9 58	+ 6	—	—
Vienna	26·1	120	5 48	− 1	i 10 24	0	e 12·8	15·9
Padova	27·2	129	—	—	—	—	14·7	15·5
Marseilles	27·4	140	e 6 7	+ 5	e 10 44	− 4	e 13·7	16·3
Budapest	27·7	117	—	—	e 10 0	−54	e 13·5	15·7
Lemberg	27·8	109	e 6 20	+14	e 10 50	− 5	—	12·4
Coimbra	27·9	163	5 47	−20	10 46	−11	14·4	16·1
Pola	28·3	127	e 11 1	?S	(e 11 1)	− 3	e 14·7	17·2
Barcelona	28·4	146	—	—	(e 10 34)	−32	e 10·6	16·2
Florence	28·5	131	7 44	+91	—	—	—	16·2
Tortosa	28·6	149	6 8	− 6	10 54	−16	14·3	16·7
Rio Tinto	30·5	161	12 44	?S	(12 44)	+61	—	19·7
Belgrade	30·5	119	i 6 30	− 3	(11 40)	− 3	e 15·2	—
Rocca di Papa	30·8	130	i 6 32	− 4	e 11 32	−16	e 15·7	23·0
Granada	31·5	157	i 6 34	− 9	i 11 49	−11	—	—
San Fernando	31·8	161	6 39	− 6	11 56	− 9	17·2	19·2
Pompeii E.	32·3	133	6 44	− 7	—	—	17·7	—
Algiers	33·1	146	e 6 48	− 9	12 6	−20	15·7	18·2
Northfield	36·4	259	—	—	—	—	e 19·7	—
Ottawa	36·5	262	7 24	− 2	13 6	−11	19·7	—
Athens	37·8	119	—	—	e 13 21	−14	—	—
Toronto	39·4	263	7 2	−48	12 26	−91	i 16·8	23·8
Ithaca	39·4	260	—	—	e 14 2	+ 5	e 20·7	—
Tiflis	42·1	95	e 12 44	?	—	—	—	—
Ann Arbor	42·2	268	7 32	−40	14 38	0	17·6	—
Georgetown N.	42·6	259	8 13	− 2	14 44	+ 1	e 21·0	—
Washington	42·6	259	7 48	−27	14 4	−39	e 19·7	—
Cheltenham N.	42·7	259	—	—	—	—	24·2	25·0
Chicago	44·1	271	8 14	−13	14 22	−41	18·2	26·7
Sitka E.	47·0	319	—	—	—	—	25·3	26·3
Helwan E.	47·6	116	16 44	?S	(16 44)	+55	—	—
St. Louis	47·9	270	—	—	—	—	25·3	28·9
Victoria	51·3	305	—	—	17 16	+41	i 24·8	28·8
Berkeley E.	60·3	299	—	—	e 19 4	+37	31·1	36·7
Tucson E.	61·3	285	—	—	—	—	25·7	34·3
Simla	63·6	73	33 14	?L	—	—	(33·2)	38·1
Zi-ka-wei	76·8	34	e 13 40	+100	—	—	—	—
Kodaikanal	82·8	81	44 2	?L	—	—	53·0	55·3
Honolulu	86·3	323	23 49	?S	(23 49)	+16	43·6	47·0
La Paz	91·4	227	e 9 5	?	10 32	?	42·7	59·3
Manila	92·8	40	—	—	e 23 44	−59	—	59·7

Additional readings: De Bilt gives also MN = +11·0m. Hamburg MZ = +13·3m. Uccle MN = +12·4m. Epicentre 65°·6N. 22°·1W. Paris MN = +10·7m. Strasbourg eL = +11·7m., MZ = +15·5m. Marseilles MN = +15·1m. Pola MN = +16·6m. Belgrade gives S as SR_1. Rocca di Papa iPN = +6m.26s. San Fernando MN = +18·2m. Ottawa PR_2 = +8m.48s., SN = +13m.8s., T_0 = 20h.17m.29s. Athens records S as e and gives S = +23m.29s. Toronto iL = +21·9m., eL = +41·1m. Georgetown LE = +22·7m., LN = +23·2m. Washington L = +24·7m. Cheltenham eE = +25m.19s., eN = +19m.49s. Chicago PR_1 = +10m.8s. Helwan PN = +14m.44s. St. Louis eL = +19·7m. Victoria L = +20·9m., eL = +42·7m. Berkeley LV = +34·7m. Honolulu SE = +31m.42s., SR_1E = +36m.11s., MN = +49·7m. La Paz P = +9m.27s. Melbourne (Δ = 148°·9) gives simply 21h.

Aug. 23d. Readings also at 1h. (La Paz), 10h. (La Paz, Helwan, De Bilt, Zi-ka-wei, Batavia, Manila, Hamburg, Riverview, and Melbourne), 11h. (Manila and near Tokyo), 13h. (Colombo and Kodaikanal), 14h. and 15h. (Helwan), 18h. (Apia), 19h. (Tiflis), 22h. (Pompeii and near Rocca di Papa), 23h. (Uccle).

Aug. 24d. Readings at 3h. (near Manila), 4h. (near Vera Cruz), 10h. (Taihoku and near Mizusawa and Tokyo), 11h. (Honolulu (2)), 14h. (Chicago), 15h. (La Paz), 16h. (De Bilt and Helwan), 17h. (Mazatlan), 19h. (Zi-ka-wei), 20h. (Manila, Zi-ka-wei, and Riverview), 21h. (Apia), 23h (near Osaka, Nagasaki, and Zi-ka-wei).

Aug. 25d. Readings at 0h. (near La Paz and near Tokyo), 2h. (Chicago, Ottawa, near Tacubaya, and near Tokyo), 3h. (Manila and near Oaxaca and Tacubaya), 4h. (Chicago and Ottawa), 9h. (Taihoku and Zi-ka-wei), 13h. (Taihoku, Zi-ka-wei, Manila, and De Bilt).

Aug. 26d. Readings at 0h. (near Oaxaca), 1h. (near Colima), 5h. (Zi-ka-wei), 11h. (Manila), 15h. (Colombo), 17h. (Batavia), 18h. (near Tokyo).

Aug. 27d. Readings at 1h. (La Paz), 2h. (Helwan), 4h. (Nagasaki), 7h. (La Paz), 8h. (near Ottawa), 10h. (La Paz), 20h. (Uccle, Zi-ka-wei, and near Sapporo, Hakodate, Mito, Tyosi, and Tokyo).

Aug. 28d. Readings at 5h. (near Rocca di Papa (2)), 8h. (La Paz), 9h. (Helwan), 10h. (Pompeii and near Rocca di Papa (3)), 11h. (near Sapporo, Mizusawa, Hakodate, Tyosi, and Tokyo), 12h. (near Rocca di Papa), 16h. and 18h. (2) (La Paz), 19h. (Helwan, De Bilt, and Uccle), 20h. (La Paz, De Bilt, and Uccle), 21h. (Helwan).

Aug. 29d. 19h. 4m. 10s. Epicentre 40°·0N. 92°·0W.

$A = -\cdot027$, $B = -\cdot766$, $C = +\cdot643$; $D = -\cdot999$, $E = +\cdot035$; $G = -\cdot022$, $H = -\cdot642$, $K = -\cdot766$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Chicago		3·8	62	1 2	+ 3	1 37	− 7	1·7	—
Ann Arbor		6·7	67	—	—	—	—	3·5	—
Georgetown		11·6	91	—	—	e 5 5	− 4	—	—
Washington		11·6	91	—	—	e 4 50	−19	—	—
Ottawa		13·1	60	e 1 37	?	—	—	e 6·5	—
Tucson	E.	17·0	249	4 2	− 3	—	—	4·9	5·4
Honolulu	E.	58·4	272	e 10 9	+ 8	—	—	—	—

Additional readings and notes: Ottawa gives also L = +6·8m. Tucson readings have been increased by 12min. Honolulu eN = +9m.30s.

Aug. 29d. Readings also at 2h. (near La Paz), 7h. (near Athens), 8h. (Helwan and La Paz), 9h. (De Bilt), 11h. and 14h. (La Paz), 15h. (Helwan, La Paz Manila, and near Hokoto and Taihoku), 22h. (near Tokyo).

Aug. 30d. Readings at 10h. (near Tokyo), 13h. (La Paz), 16h. (Manila), 19h. (La Paz and Taihoku), 22h. (Nagasaki), 23h. (Osaka and Zi-ka-wei).

Aug. 31d. 21h. 3m. 0s. Epicentre 40°·0N. 136°·5E (as on 1921 Jan. 9d.).

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

A very doubtful epicentre. Possibly two shocks.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Osaka	5·4	190	1 20	− 3	(2 30)	+ 2	2·5	3·1
Nagasaki	9·0	218	6 25	?L	—	—	(6·4)	—
Zi-ka-wei Z.	15·1	239	4 15	+35	e 6 15	−19	—	7·6
Hamburg	75·8	331	e 28 0	?	—	—	i 36·0	—
Vienna	77·1	325	—	—	—	—	e 30·0	30·5
Edinburgh	78·2	340	—	—	—	—	33·0	—
De Bilt	78·7	332	—	—	—	—	e 31·0	34·2
Eskdalemuir	78·7	340	—	—	—	—	31·0	—
Stonyhurst	79·7	337	e 36 30	?L	—	— (e	36·5)	—
Uccle	80·0	332	—	—	e 24 36	+133	e 30·0	—
Bidston	80·3	337	—	—	—	—	34·4	37·3
Strasbourg	80·6	329	—	—	—	—	e 33·0	—
Kew	81·1	336	—	—	—	—	—	41·0
Helwan E.	81·6	303	32 0	?	—	—	—	—
Paris	82·4	333	—	—	—	—	e 34·0	37·0
Rocca di Papa	83·7	323	—	—	—	—	e 33·5	41·5

Additional readings: Hamburg gives also iN = +31m.30s. and +32m.0s. De Bilt MN = +34·0m. Helwan PN = +27m.0s.

Aug. 31d. Readings also at 8h. (Manila), 13h. (near Tokyo), 20h. (near Tokyo and Mizusawa), 22h. (near Tokyo and Mizusawa).

Sept. 1d. Readings at 0h. (near Lick), 6h. (near Tokyo), 10h. (Hamburg, Helwan, Kodaikanal, Edinburgh, Eskdalemuir, Uccle, and De Bilt), 12h. (Simla), 15h. (Oxford, Kew, Hamburg, Edinburgh, Eskdalemuir, De Bilt, Uccle, and Helwan), 17h. (near Nagasaki), 21h. and 22h. (Taihoku).

Sept. 2d. 9h. 41m. 20s. Epicentre 42°·4N. 21°·4E. (suggested by Belgrade).

A = +·688, B = +·269, C = +·674; D = +·365, E = −·931; G = +·628, H = +·246, K = −·738.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Belgrade	2·5	344	e 0 34	− 5	1 37	?L	(1·6)	2·0
Sarajevo	2·6	304	e 0 48	+ 7	1 30	?L	(1·5)	1·6
Rocca di Papa	6·4	262	e 1 31	− 7	—	—	—	2·9
Padova	7·5	297	3 56	?L	—	—	(3·9)	—
Strasbourg	11·3	308	—	—	—	—	e 6·1	—
Paris	14·6	303	—	—	e 0 16	?	4·7	17·7
De Bilt	14·6	317	—	—	—	—	e 8·1	—

Additional readings: Belgrade gives iP = +40s. Sarajevo P = +59s. Rocca di Papa eN = +1m.34s. Padova PR_1 = +6m.3s.

Sept. 2d. Readings also at 0h. (La Paz and Adelaide), 1h. (La Paz), 5h. (Kodaikanal), 9h. (Paris), 12h. (Dehra Dun), 18h. (near Apia), 23h. (Algiers).

Sept. 3d. 8h. 57m. 50s. Epicentre 32°·5N. 143°·0E.

A = −·673, B = +·508, C = +·537; D = +·602, E = +·799; G = −·429, H = +·323, K = −·843.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Tokyo	4·1	320	i 0 59	− 5	i 1 14	−39	1·8	3·0
Osaka	6·6	291	1 41	0	—	—	3·7	5·8
Kobe	6·8	291	1 39	− 5	2 53	−12	3·9	7·2
Mizusawa E.	6·8	348	1 45	+ 1	2 53	−12	—	—
N.	6·8	348	1 42	− 2	3 0	− 5	—	—
Nagasaki	11·0	275	2 57	+13	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari		14·2	359	6 53	?S	(6 53)	+40	10·1	—
Zi-ka-wei		18·3	272	e 4 16	− 5	e 7 49	+ 2	—	—
Taihoku		20·1	254	e 5 38	+56	—	—	—	—
Manila		26·8	233	e 6 10	+14	—	—	—	—
Honolulu	E.	53·1	87	17 21	?S	(17 21)	+24	25·2	25·7
	N.	53·1	87	17 41	?S	(17 41)	+44	—	25·4
Hamburg		84·8	334	e 13 10	+23	e 23 10	− 7	e 45·2	51·2
Budapest		85·5	326	—	—	—	—	e 42·2	—
Edinburgh		87·0	342	—	—	i 23 34	− 7	—	—
Eskdalemuir		87·5	342	e 12 58	− 4	e 23 40	− 7	43·7	—
De Bilt		87·7	335	—	—	23 33	−16	e 46·2	52·7
Uccle		89·0	335	—	—	e 23 31	−32	e 45·2	—
Bidston		89·2	340	—	—	—	—	47·2	59·2
Strasbourg		89·6	331	—	—	e 23 35	−35	51·2	62·2
Helwan	N.	90·2	306	24 10	?S	(24 10)	− 6	—	—
Rocca di Papa		92·8	325	e 13 22	− 9	e 17 4	?PR_1	e 49·6	—
Coimbra		102·6	338	—	—	e 24 10	−130	e 55·2	—
La Paz		147·7	66	20 7	[+15]	—	—	—	—

Additional readings and notes: Tokyo S has been increased by 1min. Osaka gives also MN = +5·7m. Kobe MN = +7·4m. Honolulu SN = +22m.36s. Hamburg MN = +56·2m. De Bilt MN = +56·1m. Helwan PE = +29m.10s. Rocca di Papa e = +6m.34s.

Sept. 3d. Readings also at 0h. (Manila), 1h. (Kodaikanal and De Bilt), 19h. (La Paz), 20h. (Florence), 21h. (near Mizusawa).

Sept. 4d. Readings at 0h. (Manila), 3h. and 7h. (La Paz), 23h. (Honolulu).

Sept. 5d. 17h. 54m. 53s. Epicentre 22°·0N. 123°·5E. (as on 1920 Dec. 17d.).

A = −·512, B = +·773, C = +·375; D = +·834, E = +·552; G = −·207, H = +·312, K = −·927.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Taihoku	3·5	330	0 39	−16	—	—	1·1	1·2
Hokoto	4·0	293	1 0	− 2	—	—	1·3	1·3
Manila	7·8	198	e 2 7	+ 9	—	—	—	—
Zi-ka-wei	9·4	348	e 2 20	− 2	e 4 10	− 3	—	4·5
De Bilt	88·6	328	—	—	e 23 15	−44	e 47·1	49·4
Uccle	89·7	327	—	—	—	—	e 47·1	—

De Bilt gives also MN = +49·6m.

1921. Sept. 5d. 19h. 56m. 54s. Epicentre 47°·3N. 151°·5E.

A = −·596, B = +·324, C = +·735; D = +·477, E = +·879; G = −·646, H = +·351, K = −·678.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari		6·0	267	2 45	?S	(2 45)	+ 1	4·0	4·8
Mizusawa	E.	11·1	226	2 44	− 2	5 59	+62	—	—
	N.	11·1	226	2 43	− 3	5 53	+56	—	—
Tokyo		14·5	221	i 3 9	−27	(6 32)	+12	6·5	7·7
Osaka		17·4	230	4 11	+ 1	7 46	+19	9·4	10·9
Kobe	N.	17·6	230	i 4 7	− 5	i 8 37	+66	10·8	11·3
Nagasaki		21·9	236	e 5 4	0	(9 9)	+ 6	9·2	15·4
Zi-ka-wei		28·0	246	e 5 59	− 9	10 47	−12	e 13·5	16·2
Taihoku		32·5	237	11 58	?S	(11 58)	−18	17·8	20·2
Manila		41·4	229	e 7 51	−15	(14 6)	−21	14·1	14·8
Sitka	E.	43·6	50	—	—	—	—	e 27·4	31·8
Honolulu	E.	48·0	104	5 4	?	i 15 42	−12	32·5	36·4
	N.	48·0	104	—	—	—	—	32·9	33·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Victoria		54·1	55	—	—	16 22	−48	20·8	31·8
Simla		57·5	282	e 16 12	?S	(e 16 12)	−101	31·6	35·1
Berkeley		60·9	65	i 10 20	+ 2	e 18 27	− 8	28·4	29·9
Lick	E.	61·7	65	—	—	—	—	e 28·0	—
Batavia		66·4	230	e 10 50	− 4	i 19 42	0	e 37·1	—
Bombay		68·7	276	38 5	?L	—	—	(38·1)	—
Tiflis		69·9	310	——	—	e 21 6	+41	—	—
Kodaikanal		71·7	268	21 18	?S	(21 18)	+32	39·3	48·2
Colombo		72·5	263	30 6	?	38 6	?L	(38·1)	56·1
Lemberg		72·8	327	e 11 48	+13	—	—	e 36·2	49·7
Dyce		73·2	347	i 11 56	+19	i 21 28	+24	39·1	44·3
Hamburg		74·0	338	e 11 45	+ 3	e 21 21	+ 7	e 35·3	42·8
Edinburgh		74·7	347	(11 41)	− 6	i 21 24	+ 2	35·1	44·9
Eskdalemuir		75·2	347	e 12 6	+16	i 21 11	−17	33·1	43·1
Stonyhurst		76·4	345	e 16 48	?PR_1	21 48	+ 6	31·1	53·1
De Bilt	E.	76·5	340	11 59	+ 1	21 45	+ 2	e 40·1	44·6
	N.	76·5	340	—	—	—	—	e 41·1	44·8
Budapest		76·6	330	e 11 47	−12	21 41	− 3	37·1	39·1
Chicago		76·7	41	11 51	− 8	22 26	+41	35·8	—
Vienna		76·8	332	12 0	0	e 21 6	−41	e 37·1	46·6
Uccle		77·9	340	e 12 8	+ 2	e 21 54	− 5	e 34·1	45·4
Ann Arbor		78·2	38	—	—	—	—	e 46·5	—
Oxford		78·3	345	11 46?	−23	i 22 1	− 3	31·4	47·5
Belgrade		78·4	327	e 12 5	− 4	e 22 5	0	e 26·8	50·4
Ottawa		78·5	31	—	—	e 21 59	− 7	40·5	—
Toronto		78·6	35	—	—	—	—	37·7	54·0
Strasbourg		79·1	337	i 12 14	0	e 22 31	+18	e 38·1	47·2
Zurich		80·0	336	e 12 20	+ 1	—	—	e 39·1	—
Paris		80·2	341	i 12 22	+ 2	i 22 21	− 4	36·1	46·1
Northfield		80·6	30	—	—	—	—	e 42·1	—
Pola		80·6	332	e 12 26	+ 3	e 22 38	+ 8	e 40·6	49·4
Besançon		80·8	338	12 24?	0	22 42	+ 9	39·1	—
Riverview		81·1	180	e 12 46	+20	e 22 31	− 5	34·3	35·1
Sydney		81·1	180	22 18	?S	(22 18)	−18	42·3	44·6
Moncalieri		82·4	336	12 28	− 4	22 34	−16	38·5	49·6
Georgetown		83·5	37	—	—	22 56	− 7	45·7	—
Washington		83·5	37	12 33	− 6	22 55	− 8	41·8	—
Cheltenham	N.	83·8	37	—	—	—	—	39·4	61·6
Rocca di Papa		83·8	330	12 42	+ 1	22 44	−23	e 41·3	55·1
Pompeii	E.	84·0	329	13 6	+24	—	—	44·1	—
Marseilles		84·6	337	e 12 56	+10	—	—	e 33·1	—
Melbourne		85·3	185	—	—	e 23 0	−22	35·4	43·7
Helwan	E.	86·0	312	14 48	?	—	—	—	57·5
	N.	86·0	312	14 18	?	—	—	—	60·6
Barcelona		87·2	338	—	—	23 22	−21	e 40·2	50·4
Tortosa		88·2	339	12 55	−11	23 24	−30	40·6	53·8
Coimbra		90·8	346	e 13 21	+ 1	23 47	−35	e 39·1	59·4
Algiers		91·3	335	e 11 22	−121	—	—	e 37·1	51·1
San Fernando		93·9	343	—	—	—	—	54·3	58·3
La Paz		135·2	60	19 29	[− 1]	29 2	?	73·4	81·3
Cape Town		142·5	274	80 29	?L	—	—	(80·5)	—

Additional readings: Ootomari gives also MN = +4·2m. Tokyo S = +4m.16s. Osaka MN = +11·1m. Zi-ka-wei MN = +17·5m. Taihoku S = +15m.7s. Manila S = +12m.6s., MN = +16·1m. Sitka eE = +31m.22s. Honolulu iPR_1 = +8m.42s., PR_2N = +10m.36s., PSN = +16m.24s., SR_1E = +22m.9s., SR_1N = +21m.51s. Simla MN = +31·9m. Berkeley eN = +27m.27s., eLV = +29·4m. Batavia iE = +20m.35s. Hamburg SR_2 = +29m.48s., MZ = +46·4m., MN = +53·4m. Edinburgh gives its P as a preliminary reading. Stonyhurst P = +26m.54s. Uccle e = +18m.6s., MN = +45·6m. Ann Arbor LE = +39·7m. and 51·0m.; also for Weichert LE = +51·2m., LN = +45·9m. Ottawa e?E = +17m.38s., e?N = +26m.47s., e = N = +28m.19s., eL?E = +31·6m. Toronto e = +30m.30s., iL = +43·3m., eL = +45·4m., iL = +53·7m. Strasbourg SR_1 = +27m.16s., e = +35m.35s., MN = +48·5m. Paris MN = +56·1m. Northfield L = +48·1m. Pola M = +50·5m. Riverview eS = +23m.4s. MN = +43·9m. Moncalieri MN = +52·7m. Georgetown eLE? = +38·2m., LN = +50·2m., LE = +51·4m. Washington L = +58·4m. Barcelona SR_2 = +35m.43s. Coimbra MN = +58·4m., T_0 = 19h.57m.46s. San Fernando MN = +58·8m.

Sept. 5d. Readings also at 0h. (De Bilt and Uccle), 7h. (La Paz), 12h. (near Mizusawa, Sapporo, and Hakodate), 15h. (Taihoku), 19h. (Edinburgh), 22h. (Berkeley), 23h. (near Mostar, Sarajevo, and Belgrade).

Sept. 6d. Readings at 2h. (Wellington), 4h. (Zi-ka-wei, Wellington (2), Taihoku, De Bilt, Uccle, and Riverview), 5h. (Helwan), 9h. (near Tokyo and Mizusawa), 11h. (near Mizusawa), 12h. (near Batavia), 13h. (Wellington).

Sept. 7d. 22h. 28m. 50s. Epicentre 33°·8N. 140°·5E. (as on 1920 July 20d.).

A = −·641, B = +·528, C = +·556; D = +·636, E = +·772; G = −·429, H = +·354, K = −·831.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Tokyo		2·0	342	i 0 29	− 2	0 55	0	1·2	1·3
Osaka		4·3	284	1 10	+ 3	—	—	—	1·7
Mizusawa	E.	5·3	5	1 16	− 6	2 26	+ 1	—	—

Additional readings: Osaka gives also MN = +1·5m. Mizusawa SN = +2m.27s.

Sept. 7d. Readings also at 9h. (Apia), 13h. (near Tokyo), 19h. (La Paz), 21h. (Algiers, Helwan, De Bilt, Uccle).

Sept. 8d. 19h. 23m. 45s. Epicentre 33°·6N. 116°·4W. (as on 1919 Oct. 1d.).

A = −·370, B = −·746, C = +·553; D = −·896, E = +·445; G = −·246, H = −·496, K = −·833.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Point Loma		1·1	219	0 15	− 2	—	—	—	—
Tucson	E.	4·8	104	0 55	−19	1 32	−39	1·8	2·0
	N.	4·8	104	1 4	−10	—	—	—	2·2
Lick	E.	5·5	310	1 40	+15	3 5	+34	3·5	3·9
Victoria		15·7	343	—	—	—	—	8·2	9·7
St. Louis		21·6	69	—	—	—	—	i 11·2	—
Chicago		24·0	62	2 40	?	7 0	?	12·5	—
Ann Arbor	E.	27·0	62	—	—	—	—	16·8	—
Georgetown	N.	31·9	69	—	—	—	—	e 15·6	—
Washington		31·9	69	e 5 35	−71	—	—	—	—
Ithaca		32·3	62	—	—	—	—	e 16·8	—
Ottawa		33·1	57	—	—	—	—	i 17·2	—
Honolulu		38·7	263	—	—	—	—	e 16·7	20·8
Edinburgh		74·1	32	—	—	—	—	—	42·2
Eskdalemuir		74·4	33	—	—	e 24 15	+176	38·2	—
De Bilt		80·3	32	—	—	e 17 44	?SR_1	e 39·2	46·8
Uccle		80·8	33	—	—	—	—	e 41·2	—

Additional readings and notes: Point Loma reading has been reduced by 30min. Lick eN = +2m.19s. St. Louis L = +13·2m. Ann Arbor LN = +17·0m. Ithaca e = +17m.45s. and +19m.50s. Ottawa i = +17m.23s., iN = +17m.41s., and +18m.17s., eLE = +20·0m., LE = 21·2m. Honolulu eN = +17m.18s., MN = +18·2m.

Sept. 8d. Readings also at 3h. (near Cape Town), 11h. (Tiflis), 18h. (near Tokyo and Zi-ka-wei), 19h. (near Nagasaki—possibly given one hour late).

Sept. 9d. 12h. 22m. 44s. Epicentre 42°·5N. 3°·0E.

A = +·736, B = +·039, C = +·676.

	Δ	P.	O−C.	L.	M.
	°	m. s.	s.	m.	m.
Barcelona	1·3	0 18	− 2	0·5	1·0
Marseilles	1·9	0 32	+ 3	—	—
Tortosa	2·5	0 38	− 1	1·5	2·0
Strasbourg	6·9	—	—	e 3·6	—
De Bilt	9·7	—	—	e 6·2	—

No additional readings.

Sept. 9d. Readings also at 2h. (near Mizusawa), 8h. (Helwan), 9h. (near Mizusawa), 23h. (Vienna and Tiflis).

Sept. 10d. Readings at 1h. (Manila (2)), 5h. (Marseilles), 10h. (Manila), 11h. and 15h. (Nagasaki), 16h. (Oaxaca), 23h. (Colima and Mazatlan).

1921. Sept. 11d. 4h. 1m. 30s. Epicentre 11°·5S. 112°·0E.

A = −·367, B = +·909, C = −·199; D = +·927, E = +·375; G = +·075, H = −·185, K = −·980.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia		7·3	316	i 1 46	− 5	3 8	−10	—	—
Manila		27·6	19	e 6 13	+ 9	11 39	+47	15·5	—
Hokoto		35·8	12	7 56	+36	—	—	8·3	—
Colombo		36·9	299	6 30	−59	—	—	—	26·5
Taihoku		37·7	16	e 7 30	− 6	13 29	− 5	19·9	22·7
Melbourne		39·5	138	7 18	−33	13 24	−35	18·7	22·0
Kodaikanal		40·6	303	(7 30)	−30	—	—	7·5	26·2
Calcutta	E.	41·2	328	7 54	−11	13 42	−42	17·5	—
Riverview		42·1	130	e 8 5	− 7	i 14 30	− 6	e 17·7	26·0
Sydney		42·1	130	8 12	0	14 30	− 6	21·5	28·5
Zi-ka-wei		43·6	14	e 8 12	−11	e 13 46	−70	17·6	26·8
Nagasaki		47·4	21	8 40	−10	15 31	−15	19·3	33·2
Hukuoka		48·4	22	9 58	+62	15 20	−39	22·6	28·6
Bombay		49·1	310	8 46	−15	16 5	− 2	—	—
Zinsen		50·8	16	6 4	−188	13 14	−195	20·2	29·2
Osaka		51·2	26	9 18	+ 4	16 21	−13	23·3	30·7
Tokyo		54·0	30	i 9 33	0	15 53	−76	23·0	25·5
Simla		54·1	324	8 30	−64	16 30	−40	23·5	—
Mito		54·9	31	9 32	− 6	17 2	−18	23·5	32·2
Mizusawa	E.	57·4	29	9 56	+ 1	17 43	− 8	—	—
Hakodate		59·4	26	e 10 14	+ 6	(18 27)	+11	18·4	18·9
Wellington		62·1	132	10 48	+22	19 24	+35	31·9	41·6
Ootomari		64·3	24	10 40	0	(19 11)	− 6	19·2	40·8
Apia		74·2	102	e 11 53	+10	21 42	+26	41·6	44·5
Tiflis		81·3	316	15 0	?PR_1	25 36	?	—	43·5
Cape Town		86·5	237	12 53	− 3	23 33	− 3	—	23·9
Helwan	E.	87·8	302	12 48	−16	—	—	—	61·6
	N.	87·8	302	11 42	−82	—	—	—	60·0
Honolulu	E.	94·6	70	13 33	− 8	24 30	−32	44·4	49·3
	N.	94·6	70	13 38	− 3	24 54	− 8	38·3	41·8
Athens		95·7	308	13 9	−38	i 25 0	−13	e 43·5	53·7
Lemberg		97·4	320	e 13 42	−14	e 24 18	−72	e 54·3	66·2
Belgrade		99·2	315	i 13 56	−10	(24 23)	−85	41·2	61·1
Budapest		100·4	318	e 13 36	−37	23 0	−180	e 41·5	42·5
Vienna		102·2	319	13 55	−26	24 52	−85	e 43·5	64·5
Pompeii		103·1	311	14 34	+ 8	18 44	?PR_1	32·5	63·5
Pola		103·8	315	e 14 19	−10	e 25 19	−72	e 43·3	73·3
Rocca di Papa		104·5	312	e 14 12	−20	23 54	−164	e 45·0	—
Padova		105·2	315	15 11	+36	26 8	−36	—	72·6
Florence		105·6	314	13 30	−67	26 30	−18	—	53·5
Hamburg		106·3	324	e 14 19	−22	—	—	45·0	60·5
Zurich		107·5	316	e 15 0	+14	e 25 5	−121	—	—
Strasbourg		108·0	319	e 14 28	−20	e 25 38	−92	e 44·5	70·2
Moncalieri		108·1	315	e 14 39	−10	25 40	−91	44·3	75·2
Besançon		109·2	317	18 58	?PR_1	—	—	38·5	—
De Bilt		109·4	322	e 14 40	−15	e 25 49	−94	e 48·5	70·3
Marseilles		109·9	313	e 18 22	?PR_1	29 4	+97	e 45·5	62·1
Uccle		110·0	321	e 14 30	−27	i 26 4	−84	e 44·5	61·1
Paris		111·4	318	e 15 4	0	e 25 41	−120	44·5	67·5
Sitka	E.	111·8	32	—	—	e 29 15	+91	52·0	54·8
Algiers		111·9	305	e 14 49	−18	25 53	−112	45·5	57·5
Barcelona		112·4	310	e 17 48	+159	28 52	+63	e 42·6	65·1
Dyce	N.	112·6	328	i 19 51	?PR_1	26 3	−108	—	63·5
Kew		112·8	321	19 30	?PR_1	—	—	—	74·5
Oxford		113·1	321	i 19 30	?PR_1	—	—	50·7	75·5
Stonyhurst		113·5	322	19 30	?PR_1	—	—	—	74·5
Edinburgh		113·5	326	19 52	?PR_1	27 41	−17	36·5	61·5

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Eskdalemuir	E.	113·6	326	e 15 0	−14	i 19 30	? PR_1	—	—
Tortosa		113·6	310	18 32	[− 1]	29 38	+99	46·2	69·0
Bidston		114·0	322	19 44	?PR_1	—	—	45·5	60·5
Granada		117·2	306	i 19 8	[+23]	i 30 28	+120	—	—
San Fernando		119·4	305	19 24	[+33]	30 24	+99	66·7	89·0
Rio Tinto		119·5	307	23 30	?PR_1	—	—	—	94·5
Coimbra		120·5	310	e 15 31	−14	e 29 34	+41	52·0	84·9
Victoria		121·2	40	13 49	?	20 12	?PR_1	i 80·2	87·1
	Z.	121·2	40	(19 10)	[+14]	(29 49)	+51	29·8	61·8
Berkeley		125·0	50	19 10	[+ 4]	e 20 52	?PR_1	—	55·7
Lick	E.	125·6	51	e 21 25	?PR_1	—	—	—	39·0
Tucson	E.	135·5	53	e 19 39	[+ 8]	e 23 40	?PR_1	e 72·8	75·2
Denver	E.	136·8	41	(e 17 30)	?	—	—	—	26·5
Rio de Janeiro		137·9	215	e 22 30	?PR_1	—	—	41·0	42·3
Chicago		145·2	26	i 19 38	[−10]	—	—	33·4	—
Ottawa		145·4	8	i 19 45	[− 4]	e 32 19	?	e 59·5	—
Ann Arbor	E.	146·3	20	19 48	[− 2]	33 54	?	71·9	83·3
	N.	146·3	20	20 0	[+10]	33 42	?	72·2	84·6
St Louis		146·4	31	19 54	[+ 4]	25 12?	?PR_1	72·1	88·8
Toronto		146·4	13	i 20 24	[+34]	—	—	e 79·7	113·7
Northfield		147·1	5	i 19 50	[− 1]	—	—	68·5	—
Ithaca		148·2	10	20 14	[+21]	—	—	64·0	—
Tacubaya		149·0	71	20 1	[+ 7]	—	—	20·5	20·7
Fordham	E.	150·2	9	20 10	[+14]	24 6	?PR_1	—	74·5
Georgetown	E.	151·4	13	e 20 3	[+ 5]	31 7	?	71·5	—
	N.	151·4	13	i 20 5	[+ 7]	31 17	?	69·8	—
Washington		151·4	13	i 20 18	[+20]	—	—	34·2	—
Cheltenham	N.	151·6	15	i 19 59	[+ 1]	e 24 9	?PR_1	e 49·4	93·4
Vera Cruz		151·8	71	79 37	?L	—	—	(79·6)	—
La Paz		152·0	180	e 20 5	[+ 6]	34 19	?	74·5	89·2
		152·0	180	i 20 14	[+15]	34 39	?	—	78·7
Porto Rico	N.	172·8	340	e 25 36	?PR_1	e 29 52	?	e 57·8	59·5

Additional readings and notes : Batavia gives also i = +2m.31s., T_0 = 4h.1m.24s. Epicentre 12°·4S. 110°·8E. Melbourne PR_1 = +8m.24s., PR_2 = +8m.54s., SR_1 = +15m.42s., SR_2 = +16m.36s. Riverview iP = +8m.7s. and 8m.35s., iS = +15m.4s., SR_1 = +17m.3s., SR_2 = +18m.4s., SR_3 = +18m.25s. and +18m.37s., MN = +22·3m., MZ = +31·5m., T_0 = +4h.1m.25s. Epicentre 13°·0S. 111°·0E. Sydney PR_2 = +10m.0s., SR_1 = +17m.12s. Zi-ka-wei PMN = +10m.34s., PSE = +15m.5s., PSN = +15m.6s., SR_1E = +17m.0s., MN = +25·0m. Nagasaki MN = +32·6m. Hukuoka MN = +33·2m. Osaka MN = +29·6m. Mizusawa PN = +9m.54s. Wellington SR_1 = +23m.54s. Apia eP = +12m.1s. and +12m.54s., T_0 = 4h.1m.33s. Epicentre 12°·0S. 111°·0E. All readings given as at 3h. Honolulu PR_1E = +17m.40s., PR_1N = +17m.48s., SR_1N = +30m.50s. Athens i = +17m.13s., PR_1 = +17m.54s., PR_2 = +20m.13s., i = +24m.9s., eSN = +24m.53s., SR_1N = +31m.36s., MN = +62·6m. Belgrade iS = +18m.0s. (?PR_1), S is given as SR_1, eL = +30·0m., L = +66·9m. Budapest i = +17m.55s., e = +31m.30s. Vienna iE = +17m.23s., +17m.55s., and +18m.12s., iZ = +18m.13s., MN = +48·0m., MZ = +70·0m., Pola MN = +62·4m. Rocca di Papa e = +14m.0s., PR_1 = +17m.33s. and +18m.48s., and several other readings. Padova PR_1 = +19m.39s., SR_1 = +26m.26s. Florence P? = +15m.54s., S? = +28m.33s. Hamburg i = +18m.36s., +25m.27s., +29m.29s., +33m.46s., and +37m.40s., LE = +49·5m., LZ = +51·5m., MZ = +52·5m., MN = +53·5m. Strasbourg MN = +63·7m. Moncalieri MN = +67·5m. De Bilt PR_1E = +18m.55s., MN = +71·8m., T_0 = 4h.1m.24s.? Epicentre 12°·4S. 110°·8E. Marseilles MN = +45·8m. Uccle PR_1 = +19m.12s., e = +27m.7s., i = +28m.40s., SR_1 = +34m.45s., MN = +66·9m. Paris e = +19m.29s., e = +28m.54s., MN = +47·5m. Algiers PR_1 = +19m.34s., PR_2 = +22m.11s. Barcelona ? = +19m.37s. Dyce SE = +26m.11s.? Edinburgh PR_1 = +22m.24s., PR_2 = +23m.5s. Coimbra iSM = +30m.54s., L = +64·5m., MN = +79·5m., T_0 = 4h.1m.32s. Victoria L = +27·6m., iL = +84·8m. and +89·6m., eL = +118·6m. Berkeley MV = +61·1m. Denver LN = +25·5m. All readings are given as for 3h. and increased by 1h. in the table. Ottawa L = +63·5m. St. Louis L = +35·8?m., +63·9m., and +68·4m., MN = +90·8m. Toronto i = +23m.36s., e = +27m.24s. and +33m.54s., i = +37m.12s., L = +39·0m., iL = +51·7m., eL = +61·2m. Northfield L = +66·5m. and +91·5m. Ithaca PR_1 = +23m.48s., L = +86·5m. Fordham PN = +20m.2s. Georgetown eLEN = +49·6m., LE = +88·5m. Cheltenham a possible L = +79·3m. La Paz i = +49m.49s. and +50m.30s., L(rep) = +100·1m. Porto Rico eE = +26m.5s.

Sept. 11. Readings also at 8h. (Batavia and Tiflis), 11h. and 12h. (Batavia), 13h. (Kobe), 14h. (near Tacubaya), 15h. (Batavia), 16h. (Manila and Batavia), 19h. (La Paz and near Mizusawa), 21h. (Manila and Batavia).

Sept. 12d. 0h. 24m. 52s. Epicentre 45°·0N. 11°·5E. (as on 1920 Feb. 28d.).

$A = +\cdot693$, $B = +\cdot141$, $C = +\cdot707$; $D = +\cdot199$, $E = -\cdot980$; $G = +\cdot693$, $H = +\cdot141$, $K = -\cdot707$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Padova		0·5	33	0 5	− 3	0 11	− 3	0·4	0·8
Pola		1·7	95	0 9	−17	—	—	e 1·0	1·1
Chur		2·3	324	i 0 36	0	0 50	−13	—	—
Zurich		3·1	322	e 0 50	+ 1	i 1 29	+ 3	—	1·5
Rocca di Papa	E.	3·4	164	e 1 34	?S	(1 34)	0	—	3·0
Strasbourg		4·4	326	e 1 13	+ 5	2 5	+ 4	—	—

Additional readings: Padova gives also $SR_1 = +47$s. Zurich gives readings for all three components not materially different from the above. Rocca di Papa ePN = +1m.20s., MN = +1·5m., LN = +5·5m. Algiers (Δ = 10°·4) gives just 0h.25m.

Sept. 12d. 5h. 9m. 48s. Epicentre 18°·0N. 97°·0E.(as on 1919 Sept. 8d.).

$A = -\cdot116$, $B = +\cdot944$, $C = +\cdot309$; $D = +\cdot993$, $E = +\cdot122$; $G = -\cdot038$, $H = +\cdot307$, $K = -\cdot951$.

If the Calcutta readings may be taken 6min. too large, this solution will satisfy the observations. If not, the epicentre must be moved some 10° further from Calcutta.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Calcutta	E.	9·3	300	8 0	?	—	—	10·6	—
Manila		23·2	87	—	—	—	—	e 11·3	—
Taihoku		23·8	69	—	—	—	—	e 12·0	—
Zi-ka-wei		25·7	55	e 5 46	+ 1	e 10 14	− 2	—	13·4
Helwan		60·4	295	33 12	?L	—	—	(33·2)	—
De Bilt	E.	77·0	321	—	—	—	—	e 38·2	44·3
	N.	77·0	321	—	—	—	—	e 36·2	38·2
Kew		80·4	321	—	—	—	—	—	47·2
Eskdalemuir		80·9	326	—	—	—	—	35·2	—
Tortosa		83·1	312	—	—	—	—	e 40·2	43·7

Additional readings: Zi-ka-wei gives also MZ = +12·7m., MN = +13·7m. Helwan PN = +38m.12s.

Sept. 12d. 23h. 23m. 42s. Epicentre 56°·0N. 153°·0E.

$A = -\cdot498$, $B = +\cdot254$, $C = +\cdot829$; $D = +\cdot454$, $E = +\cdot891$; $G = -\cdot739$, $H = +\cdot376$, $K = -\cdot559$.

Very rough.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Mizusawa	E.	18·6	210	4 36	+12	8 13	+20
	N.	18·6	210	4 33	+ 9	8 11	+18
Zi-ka-wei		33·2	235	7 2	+ 4	12 56	+29
Batavia		72·8	230	—	—	i 20 58	− 2
Tortosa		80·4	340	12 18	− 3	—	—
Helwan		80·9	312	—	—	22 18	−16
Granada		84·7	342	i 12 44	− 2	23 44	+28

Additional readings: Helwan gives also SN = +24m.18s. Granada Y = +22m.56s.

Sept. 12d. Readings also at 5h. (near Mizusawa), 6h. (near Belgrade), 9h. (Tiflis), 13h. (Batavia), 14h. (Batavia, near Nagasaki, and near Mizusawa), 15h. (Manila), 16h. (Tiflis), 18h. (Florence), 19h. (Batavia).

1921. Sept. 13d. 2h. 36m. 40s. Epicentre 55°·0S. 27°·5W.

A = +·509, B = −·265, C = −·819; D = −·462, E = −·887;
G = −·727, H = +·378, K = −·574.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Rio de Janeiro	E.	34·2	335	e 7 8	+ 1	12 2	−41	16·2	18·9
	N.	34·2	335	e 7 9	+ 2	12 23	−20	16·1	19·3
Cape Town		38·0	75	7 42	+ 4	(13 37)	− 1	13·6	13·8
La Paz		49·5	305	i 9 3	− 1	i 16 11	− 2	24·5	29·3
Christchurch		80·0	193	21 14	?S	(21 14)	−69	42·3	54·6
Wellington		81·9	196	e 10 20	−130	i 22 44	− 1	40·9	42·3
Melbourne		87·0	173	13 26	+27	23 32	− 9	40·1	51·5
Adelaide		89·3	169	—	—	i 23 50	−16	e 44·3	58·3
Riverview		91·3	179	13 23	0	23 46	−41	37·3	53·2
Sydney		91·3	179	24 14	?S	(24 14)	−13	52·5	53·8
San Fernando		93·3	15	—	—	24 14	−34	49·9	58·3
Rio Tinto		94·4	15	27 20	?	—	—	—	45·3
Algiers		95·4	24	e 13 44	− 1	24 18	−52	40·3	52·3
Tacubaya		95·9	296	13 12?	−36	24 20	−55	42·6	53·8
Coimbra		96·6	12	e 15 50	?	24 25	−57	e 40·8	50·2
Helwan	E.	98·6	49	13 50	−13	—	—	—	62·1
	N.	98·6	49	15 20	+77	—	—	—	62·4
Tortosa		98·7	20	—	—	25 29	−14	40·0	82·7
Barcelona		99·7	22	e 15 48	+99	24 40	−73	39·1	57·0
Marseilles		102·1	23	e 17 35	?	—	—	49·3	54·6
Pompeii	E.	102·2	30	24 20	?S	(24 20)	−117	—	—
Athens		102·6	40	e 18 20	?PR$_1$	24 41	−99	e 33·2	70·0
Rocca di Papa		102·6	29	e 18 50	?PR$_1$	—	—	e 49·4	55·2
		102·6	29	e 17 59	?PR$_1$	i 24 52	−88	—	70·4
Georgetown		103·0	322	e 18 44	?PR$_1$	24 51	−93	e 33·1	—
Washington		103·0	322	e 18 25	?PR$_1$	—	—	58·3	—
Florence		104·1	27	18 21	?PR$_1$	—	—	—	53·7
Moncalieri		104·3	25	17 51	?PR$_1$	27 11	+35	43·6	67·4
Colombo		105·6	100	18 20	?PR$_1$	25 20	−88	52·3	56·3
Pola		105·8	29	e 25 14	?S	34 26	?SR$_1$	48·5	64·2
Ithaca		105·9	324	—	—	e 25 20	−91	e 61·8	—
Besançon		106·0	23	18 49	?PR$_1$	—	—	53·3	—
Paris		106·8	20	—	—	e 25 8	−111	51·3	60·3
Kodaikanal		106·9	94	25 26	?S	(25 26)	−94	55·9	62·6
Strasbourg		107·7	23	18 53	?PR$_1$	28 27	+80	e 52·3	58·5
Belgrade		107·7	34	19 6	?PR$_1$	28 23	+76	56·6	—
Batavia		108·1	131	19 21	?PR$_1$	25 17	−114	59·8	—
Ottawa		108·3	327	19 5	?PR$_1$	25 13	−120	e 32·3	—
Ann Arbor	E.	108·4	319	—	—	—	—	65·2	—
Kew		108·8	17	26 20	?S	(26 20)	−57	—	75·3
Oxford		108·9	16	—	—	26 54	−24	43·3	63·5
Uccle		109·1	20	e 19 14	?PR$_1$	i 27 7	−13	45·3	58·7
Chicago		109·4	316	e 18 40	[+20]	—	—	53·3	—
Vienna		109·6	29	e 18 20	[− 1]	29 50	+146	—	59·3
Budapest		109·7	31	e 19 0	[+39]	e 29 30	+125	e 34·3	51·3
Bidston		110·3	15	—	—	25 30	−121	56·9	69·8
De Bilt	E.	110·5	21	—	—	e 25 27	−126	e 45·3	64·1
	N.	110·5	21	e 19 28	?PR$_1$	e 29 4	+91	e 47·3	62·0
Bombay		111·2	87	52 54	?L	—	—	(52·9)	—
Eskdalemuir		112·1	13	i 25 27	?	i 29 12	+85	51·3	64·6
Edinburgh		112·6	13	27 32	?S	(27 32)	−19	57·3	60·5
Hamburg		112·9	22	e 19 38	?PR$_1$	e 29 23	+90	e 48·3	58·3
Lemberg		113·3	34	—	—	—	—	e 59·1	63·3
Dyce		114·1	13	—	—	i 29 20	+77	59·3	63·3
Tiflis		114·5	50	—	—	e 29 20	+74	59·3	70·3
Lick	E.	122·0	290	—	—	—	—	e 30·4	—
Berkeley		122·7	290	i 20 45	?PR$_1$	28 56	−14	40·7	66·7
Simla		123·2	81	e 26 44	?S	(26 44)	−149	e 52·7	56·7
Honolulu	E.	130·2	249	e 21 31	?PR$_1$	—	—	61·3	65·7
	N.	130·2	249	—	—	—	—	60·3	66·3
Victoria		130·6	299	(20 10)	[+50]	11 48	?	20·2	82·1
Manila		132·8	137	e 19 20	[− 4]	—	—	—	—
Taihoku		142·4	131	—	—	—	—	e 62·3	—
Zi-ka-wei		147·6	125	e 20 17	[+25]	31 17	?	—	81·1

For Notes see next page.

NOTES TO SEPT. 13d. 2h. 36m. 40s.

Additional readings and notes: Cape Town gives also S = +9m.11s. (?PR_1). La Paz i = +16m.20s., MN = +26·7m., T_o = 2h.36m.47s. Christchurch PR_1 = +25m.20s., S? = +30m.8s. Wellington e = +17m.8s.(?PR_1) and +31m.32s. Melbourne SR_1 = +29m.32s., SR_2 = +33m.8s. Adelaide i = +24m.20s., e = +28m.44s., i = +29m.56s., e = +33m.20s., i = +34m.32s., e = +36m.56s., +37m.38s., +44m.20s. (?L), +45m.26s., +48m.20s., +49m.8s., +50m.2s., and +54m.20s. Riverview eP = +17m.41s., eS = +24m.7s., MN = +53·0m. San Fernando MN = +53·3m. Algiers i = +25m.5s. Tacubaya MN = +58·8m. Athens ePN = +18m.0s. Rocca di Papa eN = +17m.31s., eLN = +24·7m. Georgetown eN = +18m.52s. Apia (Δ = 104°·0) gives 2h. simply. Florence (another set) P = +17m.20s., M = +55·3m. Moncalieri MN = +55·7m. Pola ePR_1 = +28m.14s., MN = +67·9m. Ithaca L = +71·3m. Paris MN = +63·3m. Belgrade eL = +34·2m., LN = +65·3m. Strasbourg MN = +56·0m. Batavia LN = +51·2m. Ottawa SR_1E = +27m.35s., iE = +28m.38s. Ann Arbor reading has been increased by 1h. Uccle e = +25m.19s., i = +28m.47s., MN = +61·4m. Chicago L = +63·3m. Eskdalemuir iN = +26m.34s., SR_1 = +35m.27s. Edinburgh S = +39m.38s. Hamburg SR_1 = +35m.20s.

Sept. 13d. 8h. 59m. 50s. Epicentre 38°·0N. 20°·5E.

A = +·738, B = +·276, C = +·616; D = +·350, E = −·937; G = +·577, H = +·216, K = −·788.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Athens	2·6	91	i 0 42	+ 1	—	—	1·2	1·4
Pompeii	5·4	303	1 33	+10	2 34	+ 6	—	4·2
Mostar	5·7	341	1 5	−23	2 1	−35	—	3·3
Sarajevo	6·0	346	1 26	− 6	2 55	+11	—	3·4
Sinj	6·4	334	1 32	− 6	3 52	?L	(3·9)	4·9
Belgrade	6·8	0	e 1 31	−13	3 27	?L	(3·4)	5·2
Rocca di Papa	7·0	305	i 1 46	0	4 2	?L	(4·0)	4·4
Pola	8·4	326	e 2 7	0	e 3 36	−11	e 4·8	6·3
Florence	9·0	313	2 56	+40	(3 50)	−13	—	6·7
Budapest	9·5	355	e 2 2	−21	i 5 7	?L	e 9·2	—
Padova	9·8	322	2 34	+ 7	5 21	+58	5·8	6·3
Vienna	10·6	345	2 31	− 7	5 13	+28	i 6·0	7·0
Moncalieri	11·8	310	e 2 18	−38	5 16	+ 2	6·7	10·0
Lemberg	12·1	11	2 58	− 2	e 5 16	− 5	—	6·7
Helwan N.	12·1	129	3 10	+10	—	—	—	—
Marseilles	12·6	300	3 15	+ 8	—	—	6·8	8·5
Zurich	12·8	321	e 3 10	0	—	—	—	—
Algiers	13·9	271	3 25	0	e 6 53	+47	(e 6·9)	11·7
Besançon	14·0	316	3 33?	+ 7	5 46	−22	—	8·2
Strasbourg	14·0	323	3 17	− 9	e 5 44	−24	e 7·7	9·7
Barcelona	14·5	289	—	—	—	—	e 8·0	9·8
Tortosa	15·7	287	3 50	+ 2	6 58	+10	8·2	11·9
Paris	16·9	316	e 5 10	+66	—	—	—	—
Uccle	17·2	323	e 4 1	− 6	—	—	9·9	11·2
Hamburg	17·2	339	e 3 56	−11	—	—	e 9·2	11·2
De Bilt	17·7	328	—	—	e 7 47	+14	9·1	11·9
Tiflis	18·9	71	—	—	—	—	e 11·2	—
Granada	19·1	275	4 44	+14	8 22	+18	—	—
Bidston	22·4	321	—	—	—	—	i 13·0	—
Coimbra	22·5	285	5 5	− 6	i 9 6	− 9	13·2	15·0
Eskdalemuir	23·5	324	—	—	e 9 16	−19	10·2	—
Edinburgh	23·8	326	—	—	—	—	—	15·2
Dyce	24·3	330	—	—	—	—	14·9	—

Additional readings and notes: Zante (Δ = 1°·5) gives 8h.57m. Athens iP = +48s., MN = +1·6m., T_o = 8h.59m.54s. Pola MN = +5·8m. Florence gives its two readings as PS of different instruments. Moncalieri MN = +9·0m. Helwan PE = +4m.10s. Strasbourg MZ = +8·4m., MN = +10·2m. De Bilt MN = +11·5m.

Sept. 13d. Readings also at 0h. (Batavia and Tiflis), 2h. (Manila, Apia, and near Batavia), 4h. (Georgetown and La Paz), 8h. (near Batavia), 10h. (Manila). 11h. (Batavia and Helwan), 14h. (Helwan), 15h. (near Hokoto and Taihoku).

Sept. 14d. 3h. 27m. 35s. Epicentre 38°·0N. 20°·5E. (as on Sept. 13d.).

$A = +\cdot738$, $B = +\cdot276$, $C = +\cdot616$; $D = +\cdot350$, $E = -\cdot937$; $G = +\cdot577$, $H = +\cdot216$, $K = -\cdot788$.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Athens	2·6	91	e 0 42	+ 1	—	—	1·2	1·6
Pompeii	5·4	303	1 49	+26	3 9	?L	(3·2)	3·8
Mostar	5·7	341	i 1 34	+ 6	—	—	(i 3·3)	3·4
Sarajevo	6·0	346	e 1 32	0	—	—	3·3	3·7
Belgrade	6·8	0	e 1 34	−10	(3 39)	+34	i 3·6	4·7
Rocca di Papa	7·0	305	e 1 36	−10	i 3 57	+47	e 8·8	—
Pola	8·4	326	e 2 22	+15	e 3 34	−13	e 4·9	6·9
Florence	9·0	313	3 6	+50	(4 25)	+22	—	7·9
Budapest	9·5	355	e 2 25	+ 2	e 4 13	− 3	e 5·4	—
Padova	9·8	322	2 44	+17	—	—	(6·2)	7·6
Vienna	10·6	345	2 29	− 9	—	—	e 5·8	6·9
Moncalieri	11·8	310	(2 39)	−17	2 39	?P	6·0	7·6
Lemberg	12·1	11	—	—	e 5 1	−20	e 6·6	6·9
Helwan E.	12·1	129	7 25	?L	—	—	(7·4)	—
Algiers	13·9	271	3 23	− 2	—	—	—	11·4
Strasbourg	14·0	323	4 25	+59	—	—	—	9·6
Uccle	17·2	323	e 4 7	0	—	—	e 9·4	—
De Bilt	17·7	328	—	—	e 7 33	0	9·4	11·8
Kew	19·8	319	—	—	—	—	—	14·4
Eskdalemuir	23·5	324	—	—	e 9 29	− 6	12·9	—

Additional readings and notes: Zante ($\Delta = 1°\cdot5$) gives 3h. 30m. Athens iPE = +48s., T_o = 3h.27m.34s. Rocca di Papa ePN = +1m.21s., iN = 1m.46s., iE = +1m.49s. Pola MN = +6·6m. Padova +8m.37s. Moncalieri P = +58s., MN = +8·9m. Helwan PN = +8m.25s. Marseilles ($\Delta = 12°\cdot6$) gives 3h. 30m. Strasbourg MN = +11·3m. De Bilt MN = +11·6m.

Sept. 14d. Readings also at 10h. (La Paz and Helwan), 12h. (Tiflis), 13h. (Kew and Melbourne), 14h. (Tiflis and near Mizusawa), 16h. (Batavia (2) and near Mizusawa), 20h. (Tacubaya), 21h. (Rocca di Papa, Belgrade, and near Athens), 23h. (Manila and near Lick).

Sept. 15d. Readings at 0h. (Riverview, Melbourne, and near Tacubaya), 3h. (Adelaide), 10h. (Tiflis), 13h. (Batavia), 18h. (Simla), 19h. (Eskdalemuir), Edinburgh, Uccle, Helwan, Hamburg, and De Bilt).

Sept. 16d. Readings at 3h. (Taihoku), 5h. (near Algiers), 6h. (Apia and Batavia), 11h. (La Paz), 12h. (Batavia), 13h. (Helwan and Accra), 21h. (De Bilt, Helwan, La Paz, and Rocca di Papa).

Sept. 17d. 22h. 49m. 24s. Epicentre 36°·1N. 137°·3E. (as on 1921 May 22d.).

$A = -\cdot594$, $B = +\cdot548$, $C = +\cdot589$.

	Δ	P.	O−C.	S.	O−C.	L.	M.
	°	m. s.	s.	m. s.	s.	m.	m.
Tokyo	2·0	1 0 33	+ 2	0 54	− 1	1·0	1·0
Osaka	2·1	0 32	− 1	(0 54)	− 4	0·9	1·9
Kobe	2·2	0 34	0	(0 56)	− 4	0·9	0·9

Osaka gives also MN = +1·4m.

Sept. 17d. Readings also at 1h. (near Manila), 4h. (Helwan and Colombo), 7h. (Batavia), 8h. (Helwan), 13h. and 15h. (La Paz), 17h. (Riverview), 23h. (Batavia).

Sept. 18d. Readings at 3h. (Apia), 4h. (near Mizusawa), 6h. (Vera Cruz), 8h. and 14h. (Helwan), 15h. (near Batavia), 17h. (near Athens), 23h. (La Paz).

Sept. 19d. 4h. 6m. 45s. Epicentre 52°·5N. 170°·0W. (as on 1920 Aug. 26d.).

A = −·600, B = −·106, C = +·793; D = −·174, E = +·985; G = −·781, H = −·138, K = −·609.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Sitka	E.	20·3	63	—	—	—	—	e 14·2	18·3
Victoria		29·5	79	—	—	(10 52)	−34	10·9	15·3
Honolulu	E.	32·4	158	—	—	e 12 6	− 8	13·6	15·0
	N.	32·4	158	—	—	—	—	14·0	14·7
Berkeley		35·8	95	—	—	—	—	e 18·4	—
Lick	E.	36·6	95	—	—	—	—	e 18·8	—
Chicago		53·9	68	—	—	e 17 35	+27	27·0	—
Ann Arbor		55·7	65	—	—	—	—	33·4	—
Toronto		57·1	61	—	—	—	—	e 33·0	37·0
Ottawa	E.	58·7	57	—	—	—	—	e 28·2	—
Ithaca		59·5	62	—	—	—	—	34·2	—
Washington		61·7	62	—	—	—	—	e 30·6	—
Cheltenham	N.	61·9	62	—	—	—	—	e 31·1	39·8
Dyce	N.	69·8	9	—	—	—	—	43·8	—
Edinburgh		71·1	10	—	—	—	—	e 35·2	50·2
Eskdalemuir		71·6	10	—	—	e 20 55	+10	33·2	—
Stonyhurst		73·2	10	e 21 15	?S	(e 21 15)	+11	—	53·2
Bidston		73·5	10	—	—	21 40	+32	31·7	46·2
De Bilt	E.	75·4	4	—	—	21 30	0	e 32·2	49·8
	N.	75·4	4	—	—	—	—	e 35·2	48·4
Kew		75·7	9	—	—	—	—	—	52·2
Uccle		76·6	5	—	—	e 21 45	+ 1	e 31·2	54·8
Oxford		77·6	9	—	—	—	—	—	53·2
Paris		78·6	7	—	—	—	—	45·2	48·2
Strasbourg		79·0	2	—	—	—	—	45·2	—
Vienna		79·1	357	—	—	—	—	e 34·2	48·8
Moncalieri		82·5	2	e 4 45	?	22 51	− 1	37·4	—
Pola		82·6	357	—	—	—	—	45·2	—
Marseilles		84·2	3	—	—	—	—	49·3	—
Rocca di Papa		85·8	358	e 12 51	− 1	e 23 9	−19	e 50·8	63·4
Coimbra		86·0	13	36 57	?	49 35	?	e 62·2	—
Tortosa		86·4	8	—	—	—	—	e 48·2	55·6
Rio Tinto		88·6	13	57 45	?L	—	—	(57·8)	64·2
SanFernando	E.	90·0	12	—	—	—	—	—	59·8
Colombo		96·5	290	59 15	?L	—	—	(59·2)	61·2

Additional readings and notes: Sitka gives also eE = +17m.52s. Berkeley eLE = +19·2m. Toronto eL = +43·6m., M = +47·2m. Ottawa e?E = +24m.57s. Washington L = +39·2m. Cheltenham eN = +37m.6s. and +39m.18s. Eskdalemuir eN = +25m.33s. Uccle MN = +52·2m. Kew reading has been increased by 1h. Paris MN = +55·2m. Rocca di Papa eL = +55·8m. Coimbra readings have been increased by 1h. San Fernando MN = +58·4m.

1921. Sept. 19d. 23h. 16m. 30s. Epicentre 19°·0S. 179°·0E.

A = −·945, B = +·017, C = −·326; D = +·017, E = +1·000; G = +·325, H = −·006, K = −·946.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Apia		10·3	61	e 3 1	+27	—	—	5·0	11·6
Wellington		22·6	188	e 6 42	+90	i 10 0	+43	10·7	12·5
Riverview		28·8	234	6 15	− 1	e 11 11	− 2	e 13·7	14·6
Sydney		28·8	234	e 6 6	−10	e 11 12	− 1	14·3	16·2
Adelaide		39·0	239	i 7 48	+ 2	i 13 36	−16	17·2	22·8
Honolulu	E.	46·2	31	8 35	− 6	15 20	−11	18·9	22·3
	N.	46·2	31	—	—	—	—	18·6	22·1
Perth		57·6	244	9 58	+ 2	18 5	+11	32·2	—
Manila		66·3	297	10 58	+ 4	(19 42)	+ 1	19·7	—
Osaka		67·8	324	11 18	+15	—	—	—	24·3

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia	71·1	271	i 11 19	− 5	—	—	—	—
Taihoku	71·1	308	e 12 30	+66	—	—	—	—
Zi-ka-wei	74·6	314	e 11 41	− 5	—	—	—	—
Berkeley	79·2	44	e 12 53	+39	e 21 39	−35	e 36·5	38·9
V.	79·2	44	e 12 17	+ 3	e 21 36	−38	e 36·4	—
Victoria	84·7	34	14 23	+97	22 45	−31	34·0	42·4
Colombo	100·9	273	—	—	—	—	58·5	—
Chicago	105·0	50	25 0	?S	(25 0)	−102	e 48·0	—
La Paz E.	105·1	115	19 22	?PR_1	e 33 3	?SR_1	50·5	52·4
N.	105·1	115	—	—	—	—	54·5	62·3
Toronto	111·3	49	25 6?	?	34 30	?SR_1	e 58·9	64·3
Georgetown	112·5	55	e 29 1	?S	35 52	?SR_1	e 57·1	—
Washington	112·5	55	—	—	—	—	e 57·5	—
Ithaca	113·2	50	—	—	—	—	58·5	—
Ottawa	114·0	47	e 29 15	?S	35 45	?SR_1	54·5	—
Fordham	115·1	53	—	—	—	—	58·0	66·0
Tiflis	135·2	311	e 60 30	?	—	—	e 72·5	—
Dyce N.	141·8	1	—	—	—	—	77·3	81·5
Edinburgh	143·1	2	—	—	—	—	58·5	—
Eskdalemuir	143·7	2	—	—	e 42 30	?SR_1	59·5	99·3
Hamburg	144·4	348	e 19 59	[+12]	e 23 30	?PR_1	e 59·5	82·1
Stonyhurst	145·1	1	—	—	e 42 0	?SR_1	—	90·5
Bidston	145·6	1	—	—	—	—	70·7	91·1
De Bilt	146·6	351	e 20 5	[+14]	e 41 57	?SR_1	e 58·5	85·5
Budapest	147·2	334	19 44	[− 7]	—	—	e 68·5	139·5
Oxford	147·3	0	20 3	[+11]	—	—	60·2	82·2
Vienna	147·6	339	i 19 53	[+ 1]	28 39	?	e 63·5	92·0
Kew	147·6	0	86 30	?L	—	—	(86·5)	97·5
Uccle	147·9	352	19 56	[+ 3]	i 42 10	?SR_1	e 58·5	85·5
Belgrade	148·6	330	e 19 56	[+ 2]	23 20	?PR_1	e 26·9	—
Helwan	148·7	296	22 30	?PR_1	(27 30)	?	—	—
Strasbourg	149·6	349	i 19 59	[+ 4]	e 33 48	?	e 60·5	77·3
Paris	150·1	356	i 20 8	[+12]	—	—	70·5	85·5
Pola	151·4	338	18 30	?	—	—	—	—
Padova	151·5	341	20 27	[+29]	—	—	—	—
Moncalieri	153·0	347	20 36	[+36]	33 24	?	61·5	87·9
Florence	153·2	340	—	—	47 30	?	—	84·5
Pompeii	154·5	332	18 24	?	—	—	—	—
Rocca di Papa	154·5	336	i 20 15	[+13]	—	—	e 69·2	92·6
Marseilles	155·1	349	e 20 38	[+36]	—	—	e 70·5	82·5
Coimbra	157·9	15	e 21 10	[+64]	—	—	59·7	—
Tortosa	158·2	357	20 51	[+45]	—	—	e 68·5	97·4
Algiers	161·9	350	20 58	[+49]	—	—	85·5	98·5
San Fernando	162·0	14	—	—	—	—	—	96·5

Additional readings and notes: Apia gives also +5m.45s., MN = +8·2m. Wellington e = +1m.48s. Riverview eP = +5m.21s., PR_2 = +7m.7s. and +7m.21s., PS = +11m.19s., SR_1 = +13m.8s. and +13m.27s. Adelaide iPR_2 = +9m.18s., i = +13m.48s., iSR_3 = +16m.42s., e = +27m.30s. and +29m.18s. Perth PR_1 = +13m.12s., SR_1 = +23m.26s. and +26m.5s. Manila e = +10m.47s. Batavia i = +12m.17s. and +14m.29s., iN = +21m.14s., iE = +22m.0s. Berkeley iPV = +12m.24s. Chicago S = +33m.45s., L = +57·5m. Toronto L = +84·4m. Georgetown SN? = +35m.44s., eLN? = +45·7m. Ottawa eL?E = +44·5m. Dyce gives its readings as on 20d. Belgrade LN = +29·8m. Hamburg MN = +79·5m., MZ = +81·0m. Stonyhurst eP = +6m.30s. De Bilt MN = +86·8m. Epicentre 28°·0S. 176°·0W. Vienna iZ = +19m.59s. Strasbourg MN = +79·6m. Paris MN = +83·5m. Pola gives its readings as on 20d. Padova PR_1 = +23m.37s. Readings given as on 20d. Rocca di Papa iPN = +20m.17s. Tortosa gives its readings as on 20d. San Fernando MN = +91·7m.

Sept. 19d. Readings also at 2h. (near Apia), 4h. (La Paz), 8h. (Riverview and Manila), 13h. (Tokyo), 15h. (Tiflis).

Sept. 20d. 18h. 51m. 30s. Epicentre 11°·0S. 176°·0W. (as on 1921 May 4d.).

A = −·979, B = −·068, C = −·191 ; D = −·070, E = +·997 ; G = +·190, H = +·013, K = −·982.

Very tentative solution.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Honolulu		36·9	28	—	—	—	—	e 18·2	21·1
Riverview		37·7	228	—	—	(e 13 30)	− 4	e 13·5	15·6
Victoria		75·4	33	—	—	—	—	39·0	41·5
Toronto		102·4	47	—	—	—	—	e 59·4	—
Ottawa		105·0	44	—	—	—	—	e 57·5	—
Hamburg		137·2	355	—	—	—	—	e 78·5	—
De Bilt		138·9	359	—	—	—	—	e 76·5	—
Uccle		140·2	359	e 76 30	?L	—	—	(e 76·5)	—
Vienna	z.	141·1	347	19 30	[−11]	—	—	—	—
Paris		142·1	2	e 19 39	[− 4]	—	—	e 21·5	—
Strasbourg		142·2	356	e 19 36	[− 7]	—	—	—	—
Belgrade		143·4	339	e 19 37	[− 9]	i 21 16	?PR_1	—	—
Helwan		148·3	311	87 30	?L	—	—	(87·5)	—
Rocca di Papa		148·3	348	e 20 0	[+ 7]	—	—	—	26·0

Additional readings and notes : Honolulu gives also MN = +21·2m. Riverview eS? = +12m.12s. Paris readings have been diminished by 1h. Helwan = +72m.30s.

Sept. 20d. 20h. 21m. 15s. Epicentre 1°·5N. 110°·0E. (as on 1918 Jan. 16d.).

A = −·342, B = +·939, C = +·026 ; D = +·940, E = +·342 ; G = −·009, H = +·025, K = −1·000.

But see note at end.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia		8·3	202	i 1 29	−37	i 2 32	−73	—	—
Manila		17·0	39	e 4 23	+18	—	—	7·9	—
Zi-ka-wei	N.	31·6	20	e 6 44	+ 1	e 8 25	?PR_1	—	12·0
Perth		33·8	170	8 55	?PR_1	—	—	—	—
Simla		42·9	319	e 14 9	?S	(e 14 9)	−38	—	—
Mizusawa	E.	47·1	34	8 33	−15	15 19	−23	—	—
Riverview		52·4	136	e 16 42	?S	(e 16 42)	− 7	e 23·2	27·9
Rocca di Papa		94·5	313	i 18 33	?PR_1	—	—	—	18·6

Additional readings : Batavia gives also i = +7m.25s. Mizusawa SN = +17m.27s. Riverview eS? = +20m.51s., MN = +25·2m.

The residuals are far from satisfactory. The main difficulty is to reconcile the good readings at Batavia and Mizusawa. The Batavia S−P gives Δ = 5°·3, T_0 = 20h.21m.22s. ; the Mizusawa S−P gives Δ = 45°·7, T_0 = 20h.21m.10s. The values of T_0 are thus fairly accordant and the mean has been adopted (within 1sec.). And yet the values of Δ only add up to 51°·0, while the distance from Batavia to Mizusawa is 55°·3. To make up the defect of 4°·3 we may perhaps assume an abnormal focal depth, which would have to be 0·050, with epicentre 5°·0 from Batavia, say at 1°·5S. 109°·3E. The result would be—

	Corr. for Focus	Δ	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Batavia	+0·3	5·2	i 1 29	+ 4	i 2 32	+ 1
Manila	−2·0	19·7	e 4 23	+10	—	—
Zi-ka-wei	−3·6	34·7	e 6 44	+ 5	e 8 25	?PR_1
Simla	−4·4	44·8	—	—	(e 14 9)	− 4
Mizusawa	−4·8	50·0	8 33	− 1	15 19	+ 1
Riverview	−4·8	50·7	—	—	(e 16 42)	+75

These are fairly good, if we may presume an error of 1min. in Riverview. But Perth and Riverview are both discordant, and the right clue may be that there was a second shock following the first by about 2min. ; see Zi-ka-wei and Mizusawa (SE and SN).

Sept. 20d. Readings also at 1h. (Ann Arbor, Toronto, and Victoria), 7h. (Zi-ka-wei), 8h. (Manila), 9h. (Riverview and Tiflis), 11h. (Batavia and near La Paz), 12h. (La Paz and Denver), 16h. (La Paz), 18h. (Rocca di Papa and Helwan), 19h. (Batavia), 20h. (near Athens), 22h. (Batavia (2)), 23h. (Batavia, Zi-ka-wei, and near Tokyo and Mizusawa).

Sept. 21d. 11h. 1m. 26s. Epicentre 15°·5N. 39°·0E. (as on 1921 Aug. 14d.).

$A = +\cdot749$, $B = +\cdot606$, $C = +\cdot267$; $D = +\cdot629$, $E = -\cdot777$; $G = +\cdot208$, $H = +\cdot168$, $K = -\cdot964$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Helwan	E.	16·0	335	3 58	+ 6	7 52	+57	—	8·7
	N.	16·0	335	3 22	−30	6 40	−15	—	7·9
Pompeii		33·0	326	7 34	+38	—	—	23·6	—
Belgrade		33·2	336	e 7 32	+34	(e 12 28)	+ 1	e 22·1	—
Rocca di Papa		34·7	325	e 7 10	− 1	i 12 48	− 3	e 20·4	25·1
Budapest	E.	36·0	337	7 30	+ 8	—	—	—	31·6
Pola		36·2	330	—	—	13 34	+21	—	—
Vienna		37·6	335	7 32	− 3	e 13 40	+ 8	—	25·6
Kodaikanal		37·8	93	13 52	?S	(13 52)	+17	21·1	22·4
Simla		38·2	59	e 12 34	?S	(12 34)	−67	—	23·3
Algiers		38·3	311	7 40	0	e 13 44	+ 2	19·6	21·6
Moncalieri		39·5	325	7 46	− 5	13 53	− 6	20·8	24·4
Marseilles		39·9	322	e 8 21	+27	—	—	21·6	—
Colombo		40·9	98	—	—	14 34	+14	—	22·6
Barcelona		41·0	319	—	—	—	—	e 17·8	25·3
Strasbourg		41·8	330	e 8 3	− 6	e 14 25	− 7	e 23·6	36·6
Tortosa		41·8	316	8 15	+ 6	14 34	+ 2	17·5	29·0
Hamburg		44·3	335	e 8 28	0	e 15 3	− 3	e 25·6	28·6
Paris		44·7	325	8 34	+ 3	15 13	+ 2	22·6	24·6
Uccle		44·9	330	e 8 34	+ 2	15 13	− 1	e 18·6	—
San Fernando		45·2	307	8 52	+18	—	—	—	25·1
De Bilt		45·4	332	—	—	15 20	0	e 21·6	32·5
Rio Tinto		45·8	309	21 34	?L	—	—	(21·6)	36·6
Kew		47·6	328	—	—	—	—	—	31·6
Coimbra	E.	47·9	311	—	—	—	—	20·7	28·8
	N.	47·9	311	—	—	(16 4)	+11	16·1	34·6
Oxford		48·3	327	—	—	i 16 1	+ 3	i 20·0	—
Stonyhurst		50·1	329	—	—	—	—	—	32·6
Bidston		50·1	329	—	—	—	—	25·2	39·2
Eskdalemuir		51·2	330	—	—	e 16 41	+ 7	22·6	31·7
Edinburgh		51·5	330	—	—	—	—	28·6	31·6
Cape Town		53·1	201	23 13	?L	26 32	?L	27·5	28·6
Batavia		70·6	103	—	—	i 21 3	+30	—	—
Zi-ka-wei		75·7	61	e 11 57	+ 4	—	—	—	47·7
Ottawa	E.	95·4	320	—	—	e 24 8	−62	e 48·6	—
Toronto		98·4	320	—	—	—	—	71·9	77·8
Chicago		104·5	321	—	—	—	—	59·6	—
La Paz		110·4	259	e 17 10	?	—	—	54·6	60·4
Melbourne		111·9	125	—	—	—	—	56·6	62·6
Victoria		114·2	348	—	—	—	—	68·0	74·4
Riverview		116·8	121	e 52 16	?L	—	—	e 60·0	61·7

Additional readings: Belgrade gives S as SR_1 and LN = +23·8m. Moncalieri MN = +23·9m. Strasbourg eS = +14m.14s. San Fernando MN = +27·3m. De Bilt SR_1 = +18m.48s., MN = +29·5m. Oxford gives S = +14m.34s. Toronto eL = +77·4m. Melbourne readings have been increased by 1h. Riverview MN = +63·0m.

Sept. 21d. Readings also at 1h. (Batavia and Sapporo), 4h. (near Belgrade), 6h. (La Paz, De Bilt, and near Strasbourg and Zurich), 10h. (Tiflis), 12h. and 15h. (La Paz).

Sept. 22d. 6h. 32m. 57s. Epicentre 4°·0S. 101°·0E. (as on 1919 Oct. 12d.).

A = −·190, B = +·979, C = −·070; D = +·982, E = +·191;
G = +·013, H = −·069, K = −·998.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia		6·2	111	i 1 33	− 2	2 24	−25	i 3·4	—
Colombo		23·7	297	9 3	?S	(9 3)	−35	—	12·6
Kodaikanal		27·4	301	10 51	?S	(10 51)	+ 3	16·6	18·0
Perth		31·2	154	—	—	11 3	−51	—	—
Taihoku		35·1	35	—	—	—	—	e 21·0	—
Zi-ka-wei		40·2	28	e 7 56	− 1	14 10	0	—	—
Melbourne		52·4	138	—	—	e 25 33	?L	32·4	34·6
Riverview		55·3	130	—	—	e 17 27	+ 2	28·6	30·9
De Bilt	E.	96·7	322	—	—	—	—	e 57·0	62·1
	N.	96·7	322	—	—	—	—	e 56·0	65·3

Additional readings: Melbourne gives also e = +29m.15s. Riverview eS? = +21m.45s.(?SR_1), MN = +29·0m.

Sept. 22d. 9h. 14m. 0s. Epicentre 6°·5N. 126°·0E. (as on 1920 Nov. 3d.).

A = −·584, B = +·804, C = +·113; D = +·809, E = +·588;
G = −·066, H = +·092, K = −·994.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Manila	9·5	330	—	—	e 3 32	−44	—	—
Batavia	22·9	237	e 5 16	0	e 9 13	−10	—	—
Zi-ka-wei	25·0	351	e 5 35	− 3	e 10 7	+ 4	—	—
De Bilt	102·9	327	—	—	—	—	e 55·0	—
Uccle	104·0	326	—	—	—	—	—	56·0
La Paz	162·9	127	20 2 [− 8]	—	—	—	—	—

Ten minutes have been added to the La Paz reading.

Sept. 22d. Readings also at 2h. (Apia), 6h. (Manila), 13h. (Azores), 14h. (La Paz), 17h. (near Batavia).

Sept. 23d. Readings at 2h. (Toronto, Melbourne, Strasbourg, Victoria, Honolulu, and Vienna), 3h. (De Bilt and Uccle), 4h. (Helwan), 8h. (La Paz), 13h. (Rocca di Papa), 14h. (Taihoku), 16h. (Helwan), 19h. (Manila), 23h. (La Paz).

Sept. 24d. Readings at 1h. (Pompeii), 2h. (Algiers and Taihoku), 3h. (Zi-ka-wei), 5h. (La Paz), 6h. (Taihoku and Helwan), 7h. (Helwan), 15h. (La Paz), 19h. (Helwan).

Sept. 25d. Readings at 5h. (Manila), 10h. (Wellington), 15h. (Manila), 22h. (La Paz), 23h. (near Mizusawa).

Sept. 26d. 9h. 25m. 55s. Epicentre 39°·3N. 33°·2E.

A = +·648, B = +·424, C = +·633; D = +·548, E = −·837;
G = +·530, H = +·347, K = −·774.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Athens		7·5	263	1 47	− 7	3 23	− 1	3·6	4·3
Helwan		9·5	190	4 5	?S	(4 5)	−11	—	—
Belgrade		11·0	304	e 2 48	+ 4	(i 5 23)	+29	i 6·2	7·2
Lemberg		12·4	332	—	—	e 5 11	−18	—	8·1
Budapest		13·1	313	e 3 27	+13	e 7 9	?L	e 9·1	—
Pompeii	E.	14·4	282	3 19	−13	8 5	?L	(8·1)	10·1
Vienna		15·0	312	i 3 38	− 1	i 6 49	+17	e 8·8	9·3

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Pola	15·3	297	e 3 53	+10	—	—	e 8·6	9·2
Rocca di Papa	15·8	286	e 3 47	− 2	i 6 50	0	e 8·0	9·5
Padova	16·8	298	3 55	− 7	6 35	−38	—	—
Zurich	19·6	302	e 4 35	− 1	e 8 17	+ 2	—	—
Moncalieri	19·6	295	i 4 43	+ 7	8 21	+ 6	10·8	12·6
Strasbourg	20·4	305	4 48	+ 2	i 8 32	0	e 11·1	12·8
Besançon	21·2	301	4 52	− 3	9 0	+12	11·1	—
Marseilles	21·2	290	5 1	+ 6	8 55	+ 7	11·1	12·2
Hamburg	21·3	320	e 5 0	+ 3	e 8 53	+ 3	e 12·5	13·4
De Bilt	23·2	313	5 18	− 1	9 28	− 1	e 11·1	15·6
Uccle	23·2	309	e 5 14	− 5	e 9 24	− 5	12·3	13·5
Algiers	23·8	274	5 19	− 7	e 9 34	− 6	e 11·6	17·1
Paris	23·8	304	e 5 24	− 2	i 9 36	− 4	12·1	15·1
Tortosa	24·9	284	5 32	− 5	9 35	−26	10·7	14·7
Kew	26·2	309	—	—	—	—	—	11·1
Eskdalemuir	29·0	316	e 6 15	− 3	11 4	−13	13·1	20·0
Dyce N.	29·1	320	—	—	(11 5)	−14	11·1	20·9
Edinburgh	29·1	317	—	—	11 11	− 8	—	20·2
Rio Tinto	30·9	280	15 5	?L	—	—	(15·1)	18·1
San Fernando	31·0	277	0 51	?	—	—	13·9	17·1
Colombo	52·9	115	34 5	?L	—	—	(34·1)	36·1

Additional readings and notes: Athens gives iE = +3m.35s., MN = +3·9m., T_0 = 9h.25m.45s. Belgrade gives S as SR_1 and MN = +6·3m. Budapest readings are given as at 10h. Vienna iSN? = +6m.54s., MN = +10·1m. Pola MN = +9·6m. Readings given as at 8h. Padova +12m.15s., +14m.15s., and +16m.15s. Moncalieri MN = +12·8m. Strasbourg iP = +4m.50s., iS = +8m.34s., MN = +11·8m., epicentre 39°·0N. 32°·5E. Hamburg MN = +13·2m. De Bilt MN = +13·6m. Uccle P = +5m.18s., iS = +9m.29s. Epicentre 37°·0N. 30°·5E. Paris eSN = +9m.31s., MN = +13·1m. Eskdalemuir MN = +17·3m. San Fernando MN = +18·7m.

Sept. 26d. 21h. 14m. 42s. Epicentre 29°·0N. 137°·0E. (roughly).

A = −·640, B = +·596, C = +·485; D = +·682, E = +·731; G = −·355, H = +·331, K = −·875.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Osaka	5·8	348	1 32	+ 2	(2 44)	+ 5	2·7	3·5
Kobe	5·9	345	1 35	+ 4	(2 47)	+ 6	2·8	3·6
Tokyo	7·0	18	i 1 32	−14	(2 40)	−30	2·7	2·8
Nagasaki	7·2	303	2 6	+17	—	—	3·8	4·0
Mizusawa E.	10·7	17	2 13	−27	3 51	−57	—	—
N.	10·7	17	2 15	−25	3 53	−55	—	—
Zi-ka-wei Z.	13·7	283	e 3 18	− 4	6 0	− 1	—	8·1
Manila	20·7	229	e 5 18	+29	—	—	—	—

Tokyo gives also S = +2m.10s.

Sept. 26d. Readings also at 2h. (Riverview), 3h. (Melbourne), 14h. (Batavia), 18h. (Cape Town), 20h. (Riverview, Sydney, and Manila), 21h. (De Bilt and Victoria).

Sept. 27d. 16h. 20m. 54s. Epicentre 39°·5N. 145°·0E.

A = −·632, B = +·443, C = +·636; D = +·574, E = +·819; G = −·521, H = +·365, K = −·772.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa N.	3·0	263	0 38	− 9	0 57	−26	—	—
Tokyo	5·6	229	i 1 10	−17	2 1	−33	2·6	2·8
Ootomari	7·4	348	2 6	+14	(3 24)	+ 3	3·4	—
Osaka	9·0	241	2 16	0	—	—	2·5	6·3
Kobe	9·2	242	2 26	+ 7	3 54	−14	4·4	4·9
Nagasaki	13·9	246	e 3 46	+21	(6 5)	− 1	6·1	10·1
Zi-ka-wei	20·8	254	e 4 39	−12	e 8 29	−11	—	12·2
Manila	32·6	228	e 7 40	+47	—	—	—	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Tiflis	71·3	310	e 9 6	−139	—	—	—	—
Lemberg	76·6	325	—	—	e 20 6	−98	—	46·8
Hamburg	79·2	335	e 12 14	0	e 22 14	0	42·5	46·1
Dyce	79·4	344	—	—	—	—	46·1	—
Budapest	80·6	327	—	—	—	—	e 45·1	51·1
Edinburgh	80·9	343	—	—	—	—	45·1	53·1
Vienna	81·1	329	12 20	− 6	—	—	e 45·1	55·6
Eskdalemuir	81·4	343	e 12 31	+ 4	22 47	+ 8	43·1	46·9
De Bilt	82·0	336	—	—	e 22 46	0	e 43·1	47·9
Stonyhurst	82·5	341	47 6	?L	—	—	(47·1)	55·6
Uccle	83·3	336	—	—	e 23 0	0	e 44·1	48·6
Strasbourg	84·2	333	e 12 40	− 3	—	—	—	48·2
Kew	84·2	340	—	—	—	—	—	56·1
Oxford	84·2	340	—	—	—	—	—	50·2
Pola	84·9	328	—	—	—	—	48·1	—
Paris	85·7	336	e 12 6	−46	—	—	48·1	49·1
Moncalieri	87·2	331	e 13 8	+ 8	24 17	+34	47·4	50·4
Helwan	87·2	308	23 6	?S	(23 6)	−37	—	—
Rocca di Papa	88·0	326	14 12	+67	—	—	e 48·3	58·6
Marseilles	89·6	332	—	—	—	—	48·1	—
La Paz	143·2	60	e 22 6	?PR_1	—	—	—	—

Additional readings: Mizusawa gives also PE = +39s. Osaka MN = +7·0m. Kobe MN = +4·7m. Zi-ka-wei MN = +12·0m. Hamburg MN = +45·1m. De Bilt MN = +52·8m. Strasbourg MN = +53·2m. Paris MN = +62·1m. Moncalieri MN = +51·6m. Helwan PN = +21m.6s. Rocca di Papa L = +50·3m.

Sept. 27d. Readings also at 1h. (Colombo), 7h. (Helwan, Colombo, and Manila), 9h. (Tortosa), 10h. (La Paz), 11h. (Manila), 14h. (Batavia), 16h. (Tokyo (2) and Mizusawa (4)), 18h. (La Paz), 19h. (Helwan).

Sept. 28d. 17h. 8m. 50s. Epicentre 11°·0N. 127°·0E. (as on 1920 June 10d.).

A = −·591, B = +·784, C = +·191; D = +·799, E = +·602; G = −·115, H = +·152, K = −·982.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Manila		6·9	303	e 1 42	− 3	(2 57)	−10	3·0	3·5
Zi-ka-wei		20·8	347	e 5 5	+14	e 8 44	+ 4	—	—
Helwan	E.	89·4	301	63 10	?L	—	—	(63·2)	—
De Bilt		99·6	329	—	—	—	—	e 51·2	55·0
Uccle		100·8	327	—	—	—	—	e 50·2	—
Eskdalemuir		101·8	335	—	—	—	—	48·2	—

Additional readings: Helwan gives also PN = +61m.10s. De Bilt MN = +53·7m.

Sept. 28d. Readings also at 1h. (Colombo), 3h. (Manila), 6h. (near Mizusawa), 23h. (Taihoku).

Sept. 29d. 13h. 9m. 20s. Epicentre 49°·5N. 152°·5E.

A = −·576, B = +·300, C = +·760; D = +·462, E = +·887; G = −·674, H = +·351, K = −·649.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari		7·1	249	1 56	+ 8	(3 32)	+19	3·5	—
Mizusawa	E.	13·1	222	3 16	+ 2	5 38	− 8	—	—
	N.	13·1	222	3 14	0	5 40	− 6	—	—
Tokyo		16·6	219	e 3 55	− 5	—	—	e 5·8	7·8
Osaka		19·4	226	4 34	0	—	—	—	13·3
Zi-ka-wei		29·6	243	e 6 13	−11	e 11 10	−17	—	—
Manila		43·3	228	e 7 40	−40	—	—	—	—
Honolulu	E.	47·9	107	—	—	e 19 23	?SR_1	21·4	23·6
	N.	47·9	107	—	—	e 19 28	?SR_1	21·2	23·8

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Victoria	52·3	58	—	—	19 27	?	26·3	32·2
Simla	57·7	281	e 32 34	?L	—	—	(e 32·6)	—
Batavia	68·3	230	e 10 59	− 7	i 20 3	− 3	—	—
Edinburgh	72·7	347	—	—	—	—	41·7	45·7
Eskdalemuir	73·2	347	—	—	e 21 8	+ 4	36·7	—
Stonyhurst	74·5	346	21 10	?S	(21 10)	−10	—	52·7
De Bilt	74·7	340	—	—	21 26	+ 4	e 37·7	45·5
Bidston	75·0	346	11 46	− 3	i 21 30	+ 4	—	51·2
Vienna	75·2	331	i 11 49	− 1	—	—	—	45·7
Uccle	76·0	340	e 11 53	− 2	e 20 39	−58	e 38·7	44·7
Oxford	76·4	345	—	—	—	—	—	50·2
Belgrade	76·9	328	e 10 45	−75	e 20 48	−60	e 31·6	35·3
Strasbourg	77·4	338	11 59	− 4	22 21	+28	e 42·7	—
Paris	78·4	341	e 12 4	− 5	e 22 6	+ 1	—	45·7
Pola	79·0	331	—	—	—	—	42·7	—
Besançon	79·1	338	—	—	22 1?	−12	42·7	—
Moncalieri	80·7	336	e 12 51	+28	22 45	+14	42·8	53·7
Rocca di Papa	82·2	330	—	—	i 22 49	+ 1	e 48·2	55·9
Marseilles	82·9	337	e 12 48	+13	e 22 57	+ 1	e 44·7	—
Helwan E.	85·0	312	23 40	?S	(23 40)	+21	—	—
Tortosa	86·4	340	—	—	—	—	e 46·7	51·8
Coimbra	88·8	347	—	—	e 24 40	+39	e 46·7	—
La Paz	133·5	58	i 18 58	[−28]	—	—	63·6	63·9

Additional readings: Osaka gives also MN = +12·6m. De Bilt eSR_1 = +26m.38s., MN = +43·6m. Uccle SR_1 = +27m.10s. Strasbourg S? = +22m.26s. Paris ePE = +12m.33s. Moncalieri MN = +54·5m. Helwan PN = +20m.40s. La Paz gives iP = +63m.6s., which, with L and M, form a separate shock. It would seem that these readings are connected with the long waves of the above shock, and they are entered for what they are worth.

Sept. 29d. Readings also at 6h. (Manila), 8h. (near Athens and near Manila), 11h. (near Tokyo), 13h. (Manila), 14h. (Tucson), 20h. (near Osaka and Kobe).

Sept. 30d. Readings at 0h. (Helwan), 4h. (La Paz), 7h. (Helwan and near La Paz), 10h. (near Mizusawa, Zi-ka-wei, and near Manila), 14h. (Manila), 17h. (near Sarajevo), 18h. (La Paz), 22h. (near Oaxaca and Tacubaya).

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