The International Seismological Summary for 1920 July, August, September.

FORMERLY THE BULLETIN OF THE BRITISH ASSOCIATION SEISMOLOGY COMMITTEE.

Since the last number of the Summary was sent to press the Geodetic and Geophysical Union has held a meeting in Madrid, and I cannot refrain from one or two words of grateful thanks for the great hospitality and kindness, as well as the splendid organisation of our Spanish hosts. It is no light matter to make arrangements for 150 people of different nationalities, and the success attained bears witness to the devotion and hard work of all concerned, especially of Sr. Cubillo, the President of the Spanish National Committee, and Col. Galbis, the organising Secretary.

The Seismology Section was well attended, though we regretted some notable absences, especially those of our Vice-President, Sr. Oddone, and Sr. Agamennone, and of M. de Quervain ; friendly messages were sent to these, and at the moment of writing I have just received, as President of the Section, a letter of thanks from Sr. Agamennone, who has just completed 25 years as Director of the Observatory at Rocca di Papa.

At the meeting of the Section the form of this Summary was discussed, and only one immediate suggestion was made, viz. ; that where possible it should be noted whether a wave was condensational or dilational by adding the letters C or D to the readings. This addition cannot be made at once, as the copy for press is already prepared to the end of 1920, but it will be undertaken as from Jan. 1, 1921. Attention was drawn at the meeting to the commencement of a new publication from the Central Bureau, which will contain memoirs of various seismological matters, and the President was requested to give therein an account of the method for assigning the depth of focus of an earthquake, to which reference has already been made at various times in this Summary. In the present number attention may be called to the cases of abnormal focus on the following dates :

Date. d. h.	Epicentre. ° °	Depth.
July 2 18	7·0S. 153·0E.	+0·070 below normal
20 12	33·8N. 140·5E.	+0·010 ,, ,,
Aug. 3 3	6·5N. 128·0E.	+0·040 ,, ,,
15 8	13·0S. 166·8E.	+0·030 ,, ,,

and also to the following case of *normal* focus

Sept. 20	14	20·6S. 168·8E.	0·000

for the reason that there are numerous observations of [P] in Europe. We may collect them as follows, in order of magnitude :

+20 +12 +11 +9 +8 +8 +8 +7 +6 +4 +4 +3 +3 +2 +2 +1 +1 +1
0 0 0— 1—3—3—4—5—5—6—6—6—8

The algebraic mean of the 31 is [+2s.], and the median is [+1s.]. The mean numerical value is ±5s. Considering the variety of instruments and stations these results may be regarded as closely accordant.

From Sept. 6—16 there are a number of shocks from the epicentre 43°·8N. 11°·2E., and it is natural to enquire how far they support the hypothesis of a 21-minute period, which has been already mentioned several times. But recent work has essentially modified this hypothesis. It seems probable that the periodicity is in some way controlled by the Moon, and in particular that the period is 1/68 of a lunar day (about 22min.). Now the lunar day is, of course, variable, and though it is easy to obtain general evidence of the relation between the earthquake periodicity and the mean lunar day, the special manner in which the variations of the lunar day affect the periodicity are more difficult to identify. The shocks mentioned above give a good illustration of the situation. In the following table the first two columns give the date and time (0) of the principal shocks, to 0·1 min : the third the number of periods (N) of exactly 22·0 min. elapsed since the first shock : the fourth (C) the minutes (omitting days and hours, to be inferred from (0) of the product 22N. : and the fifth the residual O—C. Now the lunar day is at first very close to 68×22·0min., and retains this approximate value to about N=300. The column M gives a correction to reduce to the Moon's meridian passage, interpolating for values of N between passages. It includes an arbitrary zero, adjusted so as to make the residuals (O—C)+M zero in the mean.

Shocks from 43°·8N. 11°·2E., compared with lunar influence.

Date.	Time (O). h. m.	N.	C. m.	O−C. m.	M. m.	O−C+M. m.
Sept. 6	14 5·4	0	0	+ 5·4	− 7·6	− 2·2
7	5 55·7	43	46	+ 9·7	− 9·4	+ 0·3
7	8 11·0	49	58	+13·0	− 9·6	+ 3·4
7	10 14·8	55	10	+ 4·8	− 9·8	− 5·0
7	11 26·4	58	16	+10·4	− 9·9	+ 0·5
7	13 32·3	64	28	+ 4·3	−10·0	− 5·7
7	18 42·7	78	36	+ 6·7	−10·5	− 3·8
8	1 19·2	96	12	+ 7·2	−11·2	− 4·0
8	9 41·4	119	38	+ 3·4	−11·9	+ 3·5
8	18 43·8	143	26	+17·8	−12·2	+ 5·6
11	2 19·7	295	10	+ 9·7	− 9·6	+ 0·1
11	3 50·4	299	38	+12·4	− 8·9	+ 3·5
11	14 32·8	328	16	+16·8	− 8·1	+ 8·7
12	16 31·4	400	40	− 8·6	− 2·2	−10·8
16	4 17·0	629	38	−21·0	+21·7	+ 0·7
16	18 28·8	668	56	−27·2	+26·4	− 0·8

These residuals are all small except two for N=328 and N=400. [Is this possibly connected with the fact that the Moon is then passing the Sun? If the influence is tidal, the sun would also have an influence]. The mean numerical value of the residuals is ±3·7 min. If they were scattered at random from −11·0 min. to +11·0 min., the mean value would be ±5·5m. To put the matter in another way, 14 of the 16 are contained within the limits −5·7m. to +5·6m., just over half the period, only the exceptional 2 above noticed being in the remaining 10·7 min. of the period.

As regards the smaller shocks on Sept. 7 and 8; these were reduced in precisely the same way as those above, to obtain a column O−C+M. These values were then collected in 12 groups from −11·0m. to +11·0m., as follows:—

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
5	1	3	7	6	4	6	3	0	2	5	3

the first group extending from −11·0m. to 9·2, and containing 5 residuals; the second from −9·3 to −7·2, and containing 1; and so on. It will be seen that the large numbers are in groups (4) to (7), *i.e.*, from −5·5m. to +1·7m., near zero but having a mean negative value. Analyzing the 12 groups harmonically the maximum is found to be at −3·5m. If we take the mean numerical value of the 45 residuals as they stand it comes out ±5·0, not much less than 5·5. If we reduce to mean value −3·5m.

it comes out $\pm 4{\cdot}4$. The zero value was adopted in the table rather arbitrarily, and may be a little excessive. Putting all the residuals together, the 12 groups become

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
6	1	4	10	7	5	10	6	0	3	6	3

Groups (4) to (7) thus contain 32 residuals : Groups (12) to (3) contain 14, and groups (8) to (11) contain 15. Or again the six groups (3) to (8) contain 42 residuals, the other six only 19. On the whole there is fair support for the hypothesis of variation in this period of 1/68 of a lunar day, which was independently deduced from quite other evidence.

In the present number of the Summary old epicentres have been used on 49 occasions ; and 31 new ones adopted.

H. H. TURNER.

University Observatory, Oxford.
1924 November 20.

1920 JULY, AUGUST, & SEPTEMBER.

July 1d. 19h. 57m. 31s. Epicentre 36°·1N. 137°·3E. (as on 1920 May 28d.).

A = −·594, B = +·548, C = +·589.

		Δ	P.	O−C.	S.	O−C.	L.	M.
		°	m. s.	s.	m. s.	s.	m.	m.
Tokyo		2·0	0 43	+12	—	—	1·4	1·4
Osaka		2·1	—	—	0 58	0	1·6	2·5
Kobe		2·2	—	—	0 50	−10	1·7	1·9
Mizusawa	E.	4·3	1 7	0	1 58	0	—	—
	N.	4·3	1 8	+ 1	2 6	+ 8	—	—

Tokyo readings have been increased by 1min. Kobe gives MN = +1·8m.

July 1d. Readings also at 0h. (San Fernando), 2h. (Colombo and Kodaikanal), 3h. (Pompeii, Rocca di Papa, Kodaikanal (2), and near Athens), 13h. (La Paz), 14h. (Kodaikanal), 15h. (Helwan, Barcelona, and Balboa Heights), 16h. (La Paz (2)), 17h. (Uccle, Helwan, Strasbourg, and De Bilt), 18h. (Kodaikanal), 19h. (La Paz), 20h. (Florence), 21h. (Lick and near Batavia), 22h. (San Fernando and near Algiers), 23h. (Lick and Apia).

1920. July 2d. 18h. 41m. 5s. Epicentre 7°·0S. 153°·0E.

(as on 1918 Dec. 25d.).

A = −·884, B = +·451, C = −·122; D = +·454, E = +·891; G = +·109, H = −·055, K = −·992.

A focal depth of ·070 below normal is now supported by the antipodal stations, though no such support was forthcoming on 1918 Dec. 25d. But the determination of T_0 from the stations near the Epicentre is not very well supported. An error of 2min. in Riverview P is presumed.

Station and Component.		Corr. for Focus	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview		−3·8	26·9	183	i 3 14	−124	i 9 23	− 4	e 12·1	14·0
Sydney		−3·8	26·9	183	—	—	9 37	+10	12·0	15·1
Adelaide		−4·3	30·9	201	e 5 55	+ 1	i 10 25	− 8	i 12·9	17·5
Melbourne		−4·4	31·6	192	—	—	10 37	− 8	14·8	16·6
Manila		−5·2	38·4	306	e 6 41	−17	—	—	17·5	19·2
Christchurch		−5·4	40·4	158	—	—	11 49	−66	20·2	22·5
Perth		−5·6	42·6	229	7 51	+21	14 7	+43	17·1	—
Taihoku		−5·7	44·3	320	14 0	?S	(14 0)	+14	19·0	—
Batavia		−5·8	45·8	271	e 7 43	−12	i 14 34	+27	e 23·9	—
Mizusawa	E.	−5·9	47·4	350	7 35	−32	14 22	− 6	—	—
	N.	−5·9	47·4	350	7 34	−33	14 14	−14	—	—
Zi-ka-wei		−6·0	48·7	324	e 8 48	+32	—	—	—	—
Honolulu		−6·4	55·7	60	9 25	+23	17 13	+63	e 25·9	34·5
Berkeley	N.	−8·6	90·1	50	e 11 55	−33	e 22 41	0	e 41·3	—
Victoria		−8·6	91·1	42	22 59	?S	(22 59)	+ 7	40·7	46·6
Mauritius		−8·7	92·3	250	42 55	?L	—	—	47·4	49·4
Chicago		—	116·7	45	18 37	?PR_1	28 13	−11	e 49·6	—
Ann Arbor		—	119·0	43	56 31	?L	—	—	(56·5)	—
Helwan		—	120·8	300	19 55	?PR_1	—	—	—	—
Toronto		—	121·5	40	—	—	—	—	e 62·5	70·8
Ottawa		—	123·2	39	—	—	e 34 55	?PR_1	e 51·9	—
Ithaca		—	123·9	41	—	—	—	—	58·9	—
Hamburg		—	124·7	335	e 18 3	[−62]	—	—	e 55·9	68·9
Georgetown		—	124·7	45	—	—	—	—	e 58·4	—
Washington		—	124·7	45	—	—	—	—	e 58·4	—
Vienna		—	124·8	327	18 5	[−60]	—	—	e 63·9	74·5
Northfield		—	125·6	38	—	—	—	—	e 61·9	—
Edinburgh		—	127·6	342	19 55	?PR_1	—	—	—	—
De Bilt		—	127·8	335	e 20 18	?PR_1	e 34 43	?SR_1	e 55·9	72·2

Continued on next page.

Station and Component.	Corr. for Focus	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	°	m. s.	s.	m. s.	s.	m.	m.
Eskdalemuir	—	128·1	342	e 21 27	?PR_1	—	—	52·9	—
Uccle	—	129·0	334	18 9	[−67]	—	—	56·9	62·9
Padova	—	129·0	326	17 55	[−81]	20 55	?PR_1	—	—
Strasbourg	—	129·1	331	e 18 11	[−65]	—	—	e 62·9	80·6
Stonyhurst	—	129·2	340	20 49	?PR_1	—	—	—	83·4
Oxford	—	130·5	339	21 39	?PR_1	—	—	—	76·9
Rocca di Papa	—	130·6	321	i 18 22	[−58]	21 40	?PR_1	e 68·4	77·4
Paris	—	131·3	334	18 16	[−66]	38 39	?SR_1	61·9	71·9
Moncalieri	—	131·6	328	e 18 16	[−66]	28 47	?	67·6	81·4
La Paz	—	133·0	120	i 18 20	[−65]	31 19	?	61·4	65·8
Algiers	—	139·5	322	e 17 50	[−108]	22 7	?PR_1	e 49·9	50·4
Coimbra	—	142·8	337	e 19 45	[0]	—	—	70·9	79·9

Additional readings: Riverview gives also PR_2 = +5m.31s., PS = +9m.41s., SR_2 = +11m.5s., MN = +13·7m., MZ = +20·6m., T_0 = 18h.36m.24s. Adelaide i = +11m.49s. Melbourne SR_1 = +13m.1s. Manila MN = +18·4m. Christchurch SR_1? = +15m.7s. Honolulu SR_2 = +22m.49s. T_0 = 18h.40m.48s. Berkeley ePEV = +11m.54s., eLE = +40·6m., T_0 = 18h.40m.9s. Victoria S = +28m.53s., MV = +45·9m. Chicago L = +55·4m., L = +60·9m., L = +68·9m. Helwan PN = +23m.55s. Toronto L? = +57·6m., iL = +83·1m. Ottawa PR_1? = +29m.55s., L = +65·9m., LE = +74·9m. and +88·9m. Georgetown LE = +64·4m., LN = +64·2m. Washington LE = +66·9m. and +73·9m. Northfield L = +65·9m. De Bilt ePR$_1$ = +21m.27s., MN = +69·4m. Uccle PR_1 = +21m.37s., MN = +70·7m. Strabourg PR_1 = +21m.34s. Paris i = +21m.42s. (?PR_1), MN = +74·9m. La Paz i = +21m.47s. (?PR_1), T_0 = 18h.43m.52s. Coimbra e = +42m.55s., eLN = +65·8m., LE = +80·9m.

1920. July 2d. 21h. 36m. 45s. Epicentre 3°·5S. 128°·5E.

(as on 1919 Aug. 29d.).

A = −·621, B = +·781, C = −·061; D = +·783, E = +·622; G = +·038, H = −·048, K = −·998.

The residuals suggest a few tenths of a degree further north.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Manila		19·5	338	e 4 40	+ 5	—	—	9·0	—
Batavia		21·7	262	5 6	+ 5	i 8 49	−10	—	10·0
Taihoku		29·3	347	6 29	+ 8	(11 20)	− 2	11·3	—
Perth		31·0	201	7 48	+70	11 43	− 8	17·4	—
Adelaide		32·8	165	e 7 51	+56	i 12 33	+12	i 16·0	21·4
Riverview		37·0	146	i 7 31	+ 1	e 13 28	+ 4	e 16·0	30·4
Sydney	E.	37·0	146	13 33	?S	(13 33)	+ 9	25·0	29·0
Melbourne		37·5	160	8 15	+41	14 3	+32	17·6	23·8
Osaka		38·8	10	7 42	− 2	—	—	—	13·7
Nagoya		39·5	11	7 40	−11	—	—	—	—
Tokyo		40·6	15	8 3	+ 3	—	—	e 13·1	14·6
Mizusawa	E.	44·2	15	8 21	− 6	14 46	−19	—	—
	N.	44·2	15	8 22	− 5	14 48	−17	—	—
Calcutta	E.	47·0	307	8 51	+ 4	(15 27)	−14	15·4	—
	N.	47·0	307	9 15	+28	(16 3)	+22	16·0	—
Colombo		49·6	282	9 15	+11	20 15	?SR_1	32·2	34·2
Ootomari		51·7	12	9 9	− 9	—	—	—	—
Christchurch		55·9	142	—	—	17 45	+12	36·2	48·8
Simla		59·8	310	9 39	−32	(e 17 39)	−42	e 17·6	29·6
Mauritius		70·8	250	24 27	?SR_1	—	—	32·8	35·0
Honolulu		76·0	67	12 27	+32	22 51	+74	e 39·2	48·6
Cape Town		104·4	232	—	—	—	—	—	25·8
Victoria		104·6	40	21 52	?	—	—	—	58·3
Vienna		107·2	320	i 14 32	−13	i 19 2	?PR_1	e 56·2	83·6
Hamburg		109·4	326	e 14 42	−13	i 25 33	−110	e 56·2	61·2
Pompeii	E.	110·0	312	18 18	[− 4]	28 15	+47	—	—
Padova		110·9	318	18 29	[+ 4]	24 42	−174	—	—
Rocca di Papa		111·4	313	e 19 9	?PR_1	e 26 42	−59	e 61·8	73·9
Florence		111·8	316	14 22	−44	—	—	—	14·5
De Bilt		112·6	326	e 19 15	?PR_1	e 29 16	+85	e 55·2	69·8
Strasbourg		112·6	320	e 18 36	[+ 6]	e 29 26	+95	e 54·2	72·8
Uccle		113·6	325	—	—	e 29 15	+76	e 58·2	74·2
Moncalieri		113·9	318	i 19 46	?PR_1	30 26	?	59·3	—
Edinburgh		114·9	331	20 15	?PR_1	—	—	—	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Eskdalemuir	115·3	331	19 48	?PR_1	—	—	55·2	—
Paris	115·6	323	e 15 11	−12	e 29 29	+74	61·2	67·2
Stonyhurst	115·8	329	20 9	?PR_1	(29 39)	?	—	66·2
Oxford	116·3	327	i 20 5	?PR_1	—	—	—	—
Algiers	120·0	311	e 20 6	?PR_1	30 15	?	73·2	—
Coimbra	126·6	320	21 15	?PR_1	29 35	− 2	67·2	—
Chicago	130·0	34	21 35	?PR_1	31 45	?	67·8	—
Toronto	132·9	26	—	—	—	—	65·4	74·4
Ottawa	133·0	21	e 19 9	[−16]	—	—	e 23·0	—
Georgetown	137·7	30	e 23 40	?PR_1	32 40	?	i 50·6	—
Washington	137·7	30	19 42	[+ 7]	22 30	?PR_1	—	—
La Paz	154·1	141	e 20 1	[0]	34 29	?	80·8	97·0

Additional readings and notes: Batavia gives also $iP_2 = +5m.32s.$, $S_2 = +9m.12s.$, MN = +12·3m., L = +24·1m. Taihoku e = +8m.40s. ?PR_1. Adelaide i = +14m.3s. Riverview $PR_1 = +9m.7s.$ and +9m.17s., $PR_2 = +9m.47s.$, PS = +13m.48s., MZ = +18·2m., MN = +23·9m., $T_o = 21h.36m.36s.$ Sydney PS = +18m.27s., S = +20m.51s. Osaka MN = +14·2m. Tokyo MN = +14·5m. Christchurch PR_1? = +10m.15s. Lemberg gives 21h.50m. to 22h.30m. Vienna PR_1?N = +19m.0s. Hamburg iZ = +19m.17s., MN = +59·2m. De Bilt MN = +61·0m., $T_o = 21h.37m.2s.$ Epicentre 2°·6S. 127°·1E. Strasbourg $PR_1 = +22m.1s.$ Uccle $PR_1 = +19m.43s.$ Eskdalemuir L reading has been increased by one hour. Paris e = +19m.22s. Coimbra LN = +37·2m. Chicago eL = +54·8m., L = +78·2m. Toronto readings have been increased by 1h. Georgeotwn readings have been increased by 30m. La Paz iP = +19m.21s., $T_o = 21h.35m.36s.$

July 2d. Readings also at 0h. (near La Paz), 2h. (Kodaikanal), 5h. (near Tokyo), 6h. (Strasbourg and near Algiers), 8h. (Apia and Batavia), 9h. (Florence, Uccle, Rocca di Papa, and Strasbourg), 10h. (Batavia, Colombo, Helwan, and Zi-ka-wei), 12h. (Stonyhurst and Taihoku (2)), 13h. (San Fernando), 14h. (near Athens and Stonyhurst), 15h. (Zi-ka-wei), 17h. (Tokyo), 20h. (Stonyhurst, Padova, Vienna, Strasbourg, San Fernando, and Rocca di Papa).

July 3d. 14h. 19m. 0s. Epicentre 36°·1N. 137°·3E. (as on July 1d.).

A = −·594, B = +·548, C = +·589.

	Δ	P.	O−C.	S.	O−C.	L.	M.
	°	m. s.	s.	m. s.	s.	m.	m.
Tokyo	2·0	0 34	+ 3	—	—	0·8	—
Osaka	2·1	—	—	1 10	+12	2·1	3·1
Mizusawa E.	4·3	1 4	− 3	1 42	−16	—	—
De Bilt	82·5	—	—	—	—	e 47·0	52·8
Paris	86·1	—	—	—	—	e 54·0	—
La Paz	150·1	19 55	[− 1]	—	—	—	—

Additional readings: Mizusawa PN = +1m.5s. De Bilt MN = +56·7m.

July 3d. 16h. 34m. 36s. Epicentre 15°·0N. 94°·5W.

A = −·076, B = −·963, C = +·259; D = −·997, E = +·078; G = −·020, H = −·258, K = −·966.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Tacubaya N.	6·3	314	1 29	− 7	—	—	3·8	4·0
Chicago	27·4	11	6 2	0	10 37	−11	e 14·4	—
Toronto	31·4	21	—	—	—	—	17·9	—
La Paz	40·9	140	7 59	− 3	—	—	19·5	30·8
Victoria	40·9	332	17 11	?SR_1	—	—	21·1	24·1
Edinburgh	78·4	35	—	—	22 24	+19	—	—
San Fernando	79·8	55	6 24	?	—	—	—	—
Paris	83·3	41	e 12 37	− 1	e 23 0	0	43·4	43·4
Uccle	83·9	40	e 12 31	−10	e 23 6	− 2	e 40·4	—
De Bilt E.	84·0	38	12 43	+ 1	23 5	− 3	e 39·4	45·2
Puy de Dôme	84·4	44	e 11 54	−50	—	—	—	—
Hamburg	86·3	35	e 12 59	+ 4	e 23 36	+ 3	e 45·4	—
Strasbourg	86·7	40	e 12 58	+ 1	e 23 36	− 2	e 46·4	—
Rocca di Papa E.	92·4	45	e 13 24	− 5	23 42	−57	—	—
N.	92·4	45	e 13 21	− 8	e 23 24	−75	—	—

Additional readings: Tacubaya gives PE = +2m.27s., ME = +3·9m. Paris MN = +57·4m. De Bilt eN = +12m.52s. and +23m.9s., MN = +45·0m., $T_o = +16h.34m.55s.$

July 3d. Readings also at 0h. (Rio Tinto and Lick), 6h. (Helwan), 15h. (Batavia), 17h. (Oaxaca), 18h. (Lick and Taihoku), 19h. (Apia), 22h. (Taihoku and Stonyhurst), 23h. (Accra).

July 4d. 0h. 11m. 35s. Epicentre 2°·0S. 14°·0W.

$A = +\cdot970$, $B = -\cdot242$, $C = -\cdot035$; $D = -\cdot242$, $E = -\cdot970$; $G = -\cdot034$, $H = +\cdot008$, $K = -\cdot999$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
San Fernando		39·1	10	8 15	+28	15 25	+92	20·9	22·4
Granada		40·4	12	7 42	−16	13 55	−18	—	—
Algiers		41·9	22	7 59	−11	14 17	−17	21·4	26·4
Coimbra	E.	42·5	6	9 16	+61	14 22	−20	20·8	24·7
	N.	42·5	6	8 12	− 3	—	—	22·7	23·5
Cape Town		44·0	140	13 32	?S	(13 32)	−90	—	22·5
Tortosa		44·8	16	8 41	+ 9	15 1	−11	e 21·4	29·6
Barcelona		45·9	18	e 9 24	+45	—	—	17·9	25·8
Rocca di Papa		50·0	27	i 9 4	− 3	e 16 10	− 9	e 25·8	28·2
Pompeii	E.	50·1	29	9 7	− 1	16 37	+17	27·4	—
Moncalieri		50·8	20	9 13	+ 1	19 1	?	25·7	28·6
Florence		51·1	24	16 25	?S	(16 25)	− 7	—	29·4
Paris		52·8	13	i 9 22	− 3	e 16 49	− 5	e 25·4	31·4
Helwan	E.	53·7	50	17 19	?S	(17 19)	+14	—	30·0
	N.	53·7	50	14 25	?	—	—	—	28·5
Strasbourg		54·0	19	e 9 32	− 1	17 4	− 5	e 19·4	29·5
Oxford		54·9	10	9 25	−13	—	—	—	33·3
Uccle		55·1	14	e 9 38	− 2	i 17 16	− 6	e 22·4	29·0
La Paz		55·2	252	i 9 41	+ 1	17 27	+ 3	26·7	30·9
De Bilt		56·5	14	9 51	+ 2	17 41	+ 1	26·4	33·1
Stonyhurst		56·7	9	17 25	?S	(17 25)	−17	(23·9)	33·9
Vienna		56·8	24	i 9 52	+ 1	—	—	—	37·9
Eskdalemuir		58·0	8	10 25	+26	—	—	—	—
Edinburgh		58·6	8	—	—	—	—	—	35·4
Hamburg		59·1	16	i 10 7	+ 1	e 18 16	+ 4	29·9	32·4
Toronto		73·9	317	—	—	—	—	41·0	—
Chicago		79·2	314	21 58	?S	(21 58)	−16	e 36·4	—
Colombo		94·1	85	54 25	?L	—	—	(54·4)	59·4
Victoria		104·2	320	51 3	?L	—	—	(51·0)	56·0

Additional readings: San Fernando gives MN = +21·9m. Algiers PR_1 = +9m.48s., MN = +22·1m., T_e = 0h.11m.36s. Rocca di Papa e = +9m.1s., i = +10m.56s. Uccle MN = +32·8m., T_e = 0h.11m.40s. De Bilt SN = +17m.30s., PR_1N = +11m.51s., MN = +37·5m., T_e = 0h.11m.52s. Stonyhurst P = 0h.7m.0s. Edinburgh P = 0h.4m.0s. Hamburg MNZ = +36·1m., T_e = 0h.11m.36s. Toronto L = +46·0m. Chicago S? = +26m.25s. (?SR_1), L = +38·4m. and +43·4m.

July 4d. 12h. 17m. 58s. I } Epicentre 37°·5N. 29°·0E.
20h. 45m. 40s. II }

$A = +\cdot694$, $B = +\cdot385$, $C = +\cdot609$; $D = +\cdot485$, $E = -\cdot875$; $G = +\cdot533$, $H = +\cdot295$, $K = -\cdot793$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
I	Athens	4·2	277	e 1 2	− 3	—	—	e 1·6	1·9
II		4·2	277	e 1 0	− 5	—	—	1·6	2·3
I	Helwan	7·9	165	8 2	?	—	—	—	—
II		7·9	165	5 20	?L	—	—	(5·3)	—
II	Pompeii	11·7	291	4 22	?S	(4 22)	−50	—	—
I	Rocca di Papa E.	13·3	294	i 3 29	+12	—	—	e 7·3	—
I	N.	13·3	294	i 3 15	− 2	—	—	—	6·1
II		13·3	294	e 2 40	−29	5 56	+ 5	—	9·5
II	Vienna	14·1	324	—	—	—	—	e 6·3	11·2
II	Moncalieri	17·6	302	—	—	—	—	10·5	—
I	Strasbourg	19·0	312	e 4 32	+ 3	—	—	e 11·4	—
II		19·0	312	e 4 32	+ 3	e 8 2	0	—	11·3
II	Hamburg	20·8	327	—	—	e 8 20	−20	—	17·1
I	Uccle	22·0	315	e 5 2	− 3	e 9 2	− 3	—	—
II		22·0	315	e 5 2	− 3	e 8 56	− 9	—	—
I	Paris	22·2	309	—	—	e 9 2	− 7	—	—
II		22·2	309	—	—	e 9 6	− 3	—	12·3
I	De Bilt	22·2	319	—	—	e 9 15	+ 6	e 11·8	13·5
II		22·2	319	—	—	e 9 8	− 1	e 12·1	13·4
II	Edinburgh	28·3	321	—	—	—	—	15·3	—

Additional readings: Athens I MN = +2·3m. Athens II MN = +1·9m. Helwan I PE = +10m.2s. Helwan II PE = +7m.20s. Rocca di Papa I eN = +0m.2s. Rocca di Papa II i = +3m.23s. De Bilt I eSN = +9m.12s., MN = +14·8m. De Bilt II eSE = +9m.14s., MN = +14·8m.

July 4d. Readings also at 2h. (La Paz), 4h. (near Mizusawa and Tokyo), 7h. (near Mizusawa), 8h. (Manila), 9h. (De Bilt, Paris, Edinburgh, Strasbourg, Vienna, Helwan, Uccle, Eskdalemuir, and Hamburg, probably from an origin in S.E. Europe, also Kodaikanal), 10h. (near Mizusawa and Tokyo), 12h. (near Tacubaya): 13h. (near Taihoku), 17h. (Batavia), 21h. (Florence), 23h. (San Fernando).

July 5d. Readings at 3h. (Batavia), 9h. (Florence), 10h. (Paris and near Mizusawa, Tokyo, and near Chicago), 11h. (Batavia), 13h. (Florence), 15h. (Manila), 16h. (Taihoku), 17h. and 19h. (Melbourne and near Tacubaya).

July 6d. 3h. 0m. 40s. Epicentre 15°·7S. 167°·3E. (as on 1919 Aug. 31d.).

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	e 5 32	+47	8 49	+20	10·9	—
Riverview	23·4	216	i 5 25	+ 4	i 9 38	+ 5	e 11·4	15·0
Sydney	23·4	216	4 38	−43	9 50	+17	13·5	14·8
Christchurch	28·2	172	7 14	+64	11 56	+53	14·1	19·3
Perth	49·3	240	8 23	−39	—	—	—	—
Honolulu	50·3	44	e 8 32	−37	16 20	− 3	e 27·3	33·3
Manila	54·9	301	e 10 10	+32	(17 14)	− 6	17·2	17·8
Tokyo	57·6	334	e 9 50	− 6	—	—	e 14·0	—
Osaka	58·8	330	10 33	+29	—	—	—	18·6
Batavia	59·9	272	e 10 38	+27	—	—	—	19·6
Mizusawa E.	60·0	337	9 43	−29	17 55	−28	—	—
N.	60·0	337	10 10	− 2	18 9	−14	—	—
Taihoku	60·4	312	e 10 25	+10	(18 29)	+ 1	—	—
Zi-ka-wei	64·1	319	—	—	e 17 48	+86	—	—
Victoria	88·7	38	23 41	?S	(23 41)	−19	—	43·3
Kodaikanal	92·6	280	58 44	?L	—	—	(58·7)	—
Chicago	111·6	50	25 17	?S	(25 17)	−145	59·3	—
La Paz	116·5	119	e 20 41	?PR_1	(29 54)	+92	29·9	—
Toronto	117·6	47	—	—	—	—	e 36·9	—
Helwan	137·3	297	23 20	?PR_1	—	—	—	—
Hamburg	138·2	340	e 22 30	?PR_1	—	—	e 61·3	—
Edinburgh	139·2	351	—	—	39 20	?SR_1	—	—
Vienna	139·7	330	e 19 20	[−19]	i 23 1	?PR_1	—	69·0
Eskdalemuir	139·7	351	27 20	?	—	—	—	—
De Bilt	140·9	341	e 20 13	[+32]	e 41 5	?	e 61·3	62·8
Uccle	142·3	341	e 23 20	?PR_1	—	—	—	—
Strasbourg	143·1	336	e 19 55	[+10]	e 34 20	?	—	69·3
Padova	143·8	330	(18 56)	[−51]	18 56	?P	—	—
Paris	144·6	344	i 19 49	[+ 1]	e 41 45	?	63·3	79·3
Pompeii	145·6	322	19 54	[+ 5]	—	—	—	—
Rocca di Papa	146·0	325	i 19 55	[+ 5]	—	—	—	20·4
Tortosa	152·4	338	20 1	[+ 2]	—	—	45·8	78·8
Algiers	154·7	329	e 20 20	[+18]	25 50	?PR_1	49·3	—
Coimbra	155·2	352	—	—	e 33 20	?	e 49·3	—

Additional readings: Apia gives L = +11·3m. Riverview iP = +6m.0s., PR_1 = +6m.35s., PS = +9m.49s. and +10m.35s., MN = +12·6m., MZ = +15·2m., T_e = 3h.0m.43s. Honolulu iSR_1 = +21m.14s., T_e = 2h.59m.30s. Manila MN = +18·2m. Taihoku gives its S reading as an independent P. Chicago S = +35m.24s., eL = +49·3m., L = +69·3m. Helwan PN = +34m.20s. De Bilt ePR_1 = +23m.7s., MN = +79·0m. Padova P = +14m.30s.

July 6d. Readings also at 0h. (San Fernando), 4h. (Toronto), 5h. (Riverview and Christchurch), 6h. (Helwan and Paris), 9h. (Taihoku), 12h. (La Paz), 15h. (La Paz, Kodaikanal, and near Mizusawa), 17h. (Florence), 18h. (Zi-ka-wei and Taihoku), 19h. (Taihoku (3)), 20h. (Zi-ka-wei), 21h. (Manila), 22h. (Taihoku).

1920. July 7d. 18h. 41m. 24s. Epicentre 60°·2N. 138°·0W.

A = −·369, B = −·332, C = +·868; D = −·669, E = +·743;
G = −·645, H = −·581, K = −·497.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Sitka	N.	3·5	155	1 25	+30	—	—	2·9	3·0
Victoria	N.	14·5	138	6 38	?S	(6 38)	+18	8·1	9·1
	V.	14·5	138	5 6	?	5 26	−54	10·6	13·8
Tucson		33·2	135	—	—	—	—	17·8	19·8
Chicago		35·5	99	7 16	− 2	13 4	+ 1	15·4	19·8
Ann Arbor	E.	37·0	93	6 54	−36	13 24	0	20·5	19·9
Toronto		38·5	89	—	—	—	—	i 21·2	21·5
Ottawa		38·7	82	7 40	− 4	13 36	−12	e 18·6	—
Northfield		41·1	81	6 31	−93	—	—	—	22·2
Honolulu		41·4	209	—	—	—	—	17·8	19·6
Georgetown	E.	42·9	90	e 8 16	− 1	15 6	+19	e 22·8	23·9
	N.	42·9	90	e 8 16	− 1	14 56	+ 9	e 23·0	24·0
Washington		42·9	90	8 16	− 1	14 56	+ 9	—	24·0
Cheltenham	E.	43·1	90	15 0	?S	(15 0)	+11	22·7	24·2
	N.	43·1	90	18 36	?SR_1	—	—	23·2	24·3
Edinburgh		58·5	28	—	—	18 6	+ 1	—	34·4
Eskdalemuir		59·0	28	10 5	0	18 9	− 2	29·1	35·6
Stonyhurst		60·6	29	22 54	?SR_1	33 24	?L	(33·4)	35·1
Oxford		62·7	29	10 33	+ 3	19 0	+ 3	31·0	38·6
Hamburg		63·4	20	e 10 34	0	e 19 10	+ 4	e 32·6	39·6
De Bilt	E.	63·8	24	10 39	+ 2	19 15	+ 4	e 34·6	38·6
	N.	63·8	24	—	—	—	—	e 32·6	36·8
Uccle		64·9	25	e 10 44	0	e 19 24	0	e 31·6	38·0
Paris		66·4	27	e 10 57	+ 3	(e 18 49)	−53	33·6	34·6
Strasbourg		67·7	21	e 11 3	+ 1	20 2	+ 4	—	44·0
Lemberg		69·0	11	—	—	e 20 6	− 8	—	20·2
Puy de Dôme		69·4	28	e 10 36	−37	—	—	—	—
Vienna		69·5	18	i 12 13	+59	20 24	+ 4	e 34·6	46·6
Moncalieri		71·1	25	11 25	+ 1	24 45	?SR_1	38·2	44·9
Coimbra		71·4	38	e 10 16	−70	16 56	?PR_1	25·2	38·0
Barcelona		73·2	29	—	—	—	—	e 41·4	44·3
Tortosa		73·4	31	11 36	− 2	21 8	+ 1	29·5	47·3
Rocca di Papa	N.	75·2	21	11 47	− 3	21 24	− 4	e 42·3	55·7
San Fernando		75·6	38	21 18	?S	(21 18)	−15	40·6	45·6
Granada		75·7	36	11 57	+ 4	i 21 40	+ 6	—	—
Manila		82·8	286	e 40 42	?L	—	—	(e 40·7)	—
Helwan		89·0	9	23 36	?S	(23 36)	−27	—	—
La Paz		95·1	116	e 16 7	?	—	—	—	—
Kodaikanal		104·1	324	61 54	?L	—	—	(61·9)	—

Additional readings: Tucson gives also eN = +19m.2s. Ann Arbor (Wiechert) MN = +24·5m., ME = +21·1m. Ottawa L = +28·6m., T_0 = 18h.41m.34s. Cheltenham gives SE as PE, also SE = +19m.53s. Stonyhurst P = +19m.54s. Hamburg SR_1 = +23m.36s., MN = +37·6m., T_0 = 18h.41m.23s. De Bilt ePR_1N = +13m.0s., eSR_1N = +23m.28s., T_0 = 18h.41m.28s. Uccle PR_1 = +13m.7s., SR_1 = +23m.36s., MN = +40·6m., T_0 = 18h.41m.28s. Paris gives eS as eL., T_0 = 18h.41m.29s. Strasbourg SN = +20m.6s., T_0 = 18h.41m.28s.

July 7d. 19h. 55m. 40s. Epicentre 20°·0S. 111°·0E.

A = −·337, B = +·877, C = −·342; D = +·934, E = +·358;
G = +·123, H = −·319, K = −·940.

Very uncertain. Compare 1919 Nov. 21d., 22°·0S. 114°·7E.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia	14·4	343	—	—	—	—	e 8·7	15·8
Melbourne	34·3	128	12 20	?S	(12 20)	−24	19·9	22·8
Manila	35·9	17	e 7 20	− 1	—	—	—	—
Riverview	38·1	120	e 9 15	?PR_1	e 13 39	0	e 17·3	21·9
Honolulu	98·0	70	—	—	—	—	32·8	37·8
Strasbourg	113·6	315	—	—	—	—	—	76·3
De Bilt	115·3	319	—	—	—	—	e 59·3	63·9
Uccle	115·8	319	—	—	—	—	e 59·3	—
Victoria	128·3	40	—	—	—	—	—	50·9
La Paz	143·5	182	e 19 54	[+ 8]	—	—	—	—

Additional readings: Melbourne gives S = +17m.50s., SR_1 = +18m.50s. Riverview MN = +20·0m. De Bilt MN = +64·1m.

July 7d. Readings also at 2h. (Colombo), 6h. (Berkeley), 8h. (Manila), 9h. (Paris, Manila, La Paz, De Bilt, Batavia, and Melbourne), 10h. (Helwan and Riverview), 11h. (Stonyhurst), 12h. (Taihoku), 13h. (La Paz), 16h. (Stonyhurst), 18h. (Mobile), 19h. (Stonyhurst and Barcelona), 20h. (Georgetown), 23h. (Chicago, Ottawa, and Washington).

July 8d. 4h. 39m. 55s. Epicentre 5°·6S. 102°·0E. (as on 1918 Feb. 13d. 2h.).

A = −·207, B = +·973, C = −·098; D = +·978, E = +·208; G = +·020, H = −·095, K = −·995.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia	4·8	98	i 1 16	+ 2	i 1 57	−14	i 3·2	4·1
Colombo	25·4	299	12 5	?L	—	—	(12·1)	25·1
Manila	27·6	43	e 5 59	− 5	—	—	—	—
Kodaikanal	29·1	303	24 23	?	—	—	—	—
Taihoku	36·1	31	20 58	?L	—	—	(21·0)	—
Zi-ka-wei	41·2	26	e 8 9	+ 4	e 15 29	+65	—	—
Melbourne	50·5	136	e 15 5	?	—	—	22·4	23·6
Riverview	53·5	129	—	—	e 19 47	?SR_1	e 23·8	28·4
Helwan	76·3	303	36 5	?L	—	—	(36·1)	—
Vienna	91·3	318	—	—	—	—	e 68·1	—
Hamburg	95·7	323	—	—	—	—	e 66·1	—
De Bilt	98·7	322	—	—	—	—	e 67·1	71·3
La Paz	155·8	204	20 23	[+20]	—	—	—	—

Additional readings and notes: Batavia gives the recorded S and L as i_1 and i_2. Helwan PN = +33m.5s. De Bilt e = +57m.47s., eE = +60m.53s., MN = +69·2m.

July 8d. Readings also at 0h. (Chicago, Ottawa, and Washington), 1h. (Cheltenham, Paris, and Ithaca), 2h. (Victoria and Riverview), 9h. (near Algiers), 11h. (Zi-ka-wei), 15h. (San Fernando), 18h. (Taihoku), 19h. (Manila, near Tokyo, and near Batavia), 20h. (Batavia, Taihoku, and Helwan), 22h. (Batavia).

July 9d. Readings at 0h. (Batavia), 1h. (Manila), 2h. (Zante (2)), 9h. (Taihoku), 11h. (Manila, Hokoto, and near Taihoku), 12h. (Colombo), 13h. (Taihoku, Batavia, and Paris), 18h. and 20h. (Paris), 23h. (Batavia and Manila).

July 10d. 15h. 58m. 30s. Epicentre 25°·0N. 68°·0E.

A = +·340, B = +·840, C = +·423; D = +·927, E = −·375; G = +·158, H = +·392, K = −·906.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Simla		10·2	51	—	—	e 4 36	+ 1	—	5·7
Kodaikanal		17·3	147	4 12	+ 3	—	—	10·8	13·4
Calcutta	E.	18·8	94	7 54	?S	(7 54)	− 4	10·4	—
	N.	18·8	94	8 0	?S	(8 0)	+ 2	10·3	—
Colombo		21·4	146	8 30	?S	(8 30)	−23	13·5	14·5
Helwan		32·7	284	14 30	?SR_1	—	—	(16·5)	—
Manila		50·6	90	—	—	—	— e	31·5	—
Hamburg		51·7	320	—	—	e 16 30	−10 e	31·5	37·3
Moncalieri		51·9	309	—	—	e 16 44	+ 1	32·6	—
Strasbourg		52·1	312	—	—	—	—	—	33·5
De Bilt		54·0	317	—	—	e 17 4	− 5 e	33·5	39·7
Uccle		54·4	316	—	—	e 17 8	− 6	—	34·5
Paris		55·5	313	—	—	e 23 30	?	35·5	35·5
Kew		57·3	317	—	—	—	—	—	39·5
Oxford		58·0	317	—	—	17 51	− 8	—	42·9
Stonyhurst		58·6	318	37 30	?L	—	—	(37·5)	—
Edinburgh		59·0	320	—	—	18 10	− 1	35·5	41·8
Eskdalemuir		59·1	320	—	—	—	—	35·5	—

Additional readings: Hamburg gives also MN = +34·5m. De Bilt MN = +34·8m. Vienna gives a reading at 16h. (no minutes or seconds).

July 10d. Readings also at 0h. (Eskdalemuir, Edinburgh, Uccle, Paris, and De Bilt), 3h. and 4h. (La Paz), 9h. (Batavia and Manila), 10h. (Kodaikanal), 12h. (near Mizusawa and Tokyo), 19h. (Rocca di Papa), 20h. (Taihoku and Lick (2)), 21h. (Rocca di Papa, Taihoku, and near Tokyo), 22h. (near Tokyo), 23h. (Taihoku and San Fernando).

July 11d. 1h. 30m. 35s. Epicentre 52°·7N. 167°·0W.

A = −·590, B = −·136, C = +·795 ; D = −·225, E = +·974 ;
G = −·774, H = −·179, K = −·606.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Chicago		52·2	69	16 37	?S	(16 37)	− 9	(24·9)	—
Ottawa		56·2	58	e 10 5	+18	i 17 37	+ 1	e 24·9	—
Manila		67·6	268	e 19 53	?S	(e 19 53)	− 4	—	—
Eskdalemuir		71·1	10	11 27	+ 3	20 44	+ 5	34·4	—
Hamburg		73·7	2	e 11 43	+ 3	—	—	—	—
De Bilt	E.	75·0	5	—	—	21 27	+ 1	e 36·4	37·1
	N.	75·0	5	11 51	+ 2	—	—	e 37·4	38·7
Uccle		76·2	6	e 11 56	0	e 21 41	+ 2	e 37·4	39·4
Paris		78·1	8	i 12 7	− 1	e 22 13	+12	39·4	—
Strasbourg		78·6	3	12 8	− 3	e 22 4	− 3	—	43·4
Vienna	E.	79·0	358	i 12 13	0	—	—	—	—
Moncalieri		82·2	4	e 12 32	+ 1	22 44	− 4	34·6	—
Coimbra		85·3	18	—	—	23 11	−11	e 44·8	—
Rocca di Papa		85·5	0	e 12 45	− 6	(i 23 3)	−22	i 23·0	23·3
Tortosa		85·8	10	12 46	− 6	23 11	−17	e 39·4	54·5
Helwan		96·2	346	24 25	?S	(24 25)	−53	—	—

Additional readings : Ottawa gives i = +19m.33s. Helwan PE = +26m.25s.

July 11d. 17h. 27m. 20s. Epicentre 40°·0N. 14°·0E (as on 1919 Oct. 25d.).

A = +·743, B = +·185, C = +·643.

		Δ	P.	O−C.	S.	O—C.	L.	M.
		°	m. s.	s.	m. s.	s.	m.	m.
Pompeii	E.	0·8	0 4	− 8	1 21	+59	—	2·1
Rocca di Papa		2·0	i 0 28	− 3	0 58	+ 3	—	2·4
Padova		5·6	1 11	−16	—	—	—	—
Moncalieri		6·8	e 3 32	?S	(e 3 32)	+27	5·8	—
Vienna		8·4	e 1 40	−27	i 3 30	−17	—	5·0
Strasbourg		9·6	e 2 40	+16	e 5 52	+94	e 6·2	—
Paris		12·0	—	—	e 5 19	0	e 7·3	—
Lemberg		12·1	e 3 16	+16	—	—	—	4·8
Uccle		12·7	—	—	—	—	e 6·7	—
De Bilt		13·5	—	—	e 5 48	− 8	e 8·0	10·1
Hamburg		13·8	—	—	—	—	e 6·7	10·8
Edinburgh		19·5	—	—	7 40	−33	—	—

Additional readings : De Bilt MN = +11·4m.

July 11d. Readings also at 0h. (San Fernando), 8h. (Batavia), 9h. (Strasbourg), 12h. (Helwan), 16h. (Dehra Dun), 20h. (Apia and Manila), 21h. (San Fernando), 22h. (near Oaxaca, near Rocca di Papa (2), and near Tacubaya).

July 12d. 1h. 34m. 28s. Epicentre 34°·6N. 140°·7E. (as on 1919 Aug. 15d.).

A = −·637, B = +·521, C = +·568.

		Δ	P.	O−C.	S.	O−C.	L.	ME.	MN.
		°	m. s.	s.	m. s.	s.	m.	m.	m.
Tokyo		1·3	0 32	+12	—	—	1·3	1·4	—
Osaka		4·3	1 33	+26	—	—	2·6	2·7	2·6
Mizusawa	E.	4·5	0 56	−14	2 6	+ 2	—	—	—
	N.	4·5	1 12	+ 2	2 15	+11	—	—	—
Kobe		4·6	0 32	−39	(1 22)	?P	1·4	1·4	1·6

Tokyo readings have been increased by 1min.

July 12d. Readings also at 2h. (near Osaka and Tokyo), 3h. (near Kobe, Mizusawa (2), Osaka (2), and Tokyo (3)), 4h. (Tokyo (2) and Osaka), 5h. Tacubaya), 6h. (near Tokyo), 16h. (Uccle), 17h. (Helwan), 18h. (De Bilt), 22h. (San Fernando), 23h. (near Oaxaca and Tacubaya).

July 13d. 8h. 11m. 12s. Epicentre 34°·6N. 140°·7E (as on July 12d.).

		Δ	P.	O−C.	S.	O−C.	L.	ME.	MN.
		°	m. s.	s.	m. s.	s.	m.	m.	m.
Tokyo		1·3	0 20	0	—	—	0·6	1·6	1·6
Osaka		4·3	0 54	−13	—	—	2·1	3·0	2·8
Mizusawa	E.	4·5	1 5	− 5	2 8	+ 4	—	—	—
	N.	4·5	1 31	+21	2 38	?L	(2·6)	—	—
Kobe		4·6	1 36	+25	—	—	2·5	3·0	2·9

Kobe gives PSN = +1m.37s.

July 13d. Readings also at 6h. (La Paz), 7h. (Helwan), 9h. (Paris), 11h. (near Pompeii and Rocca di Papa), 13h. (Zi-ka-wei, Manila, near Tokyo, and near Taihoku (2)), 14h. (Strasbourg and De Bilt), 19h. (La Paz), 21h. (San Fernando).

July 14d. Readings at 7h. (Zi-ka-wei), 8h. (De Bilt), 10h. (Taihoku), 11h. (near Mizusawa and Tokyo), 14h. (Florence, Helwan, and near Tokyo), 21h. (Lick), 23h. (Taihoku and San Fernando).

July 15d. Readings at 0h. (near Tacubaya), 1h. (Riverview and Manila), 2h. (Uccle, De Bilt, and Helwan), 4h. (Nagasaki), 8h. (Florence and Cape Town), 11h. (Riverview), 14h. (La Paz, and near Tacubaya), 17h. (La Paz), 20h. (Taihoku), 21h. (San Fernando and Manila), 23h. (Lick).

1920. July 16d. 17h. 14m. 15s. Epicentre 6°·0N. 84°·0W.

A = +·104, B = −·989, C = +·104; D = −·994, E = −·104;
G = +·011, H = −·104, K = −·994.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Balboa Heights		5·3	56	1 28	+ 6	2 20	− 5	2·6	3·0
La Paz		27·4	145	i 6 34	+32	11 57	+69	15·6	20·1
Washington		33·5	10	6 21	−40	12 15	−17	18·1	—
Chicago		35·9	356	7 42	+21	12 50	−19	20·7	—
Ann Arbor	E.	36·4	1	9 33	+128	14 3	+47	18·0	—
Toronto		37·9	6	—	—	—	—	18·4	19·6
Ottawa	E.	40·1	10	8 39	+43	14 15	+ 7	18·4	—
Point Loma		40·9	317	—	—	—	—	—	45·7
Victoria		54·0	330	23 18	?SR_1	—	—	—	35·8
Coimbra		75·2	50	—	—	—	—	e 33·7	—
Rio Tinto		76·3	52	29 45	?	—	—	—	58·7
Edinburgh		79·7	35	—	—	21 45	−35	—	43·7
Stonyhurst		80·2	38	22 57	?S	(22 57)	+32	41·4	43·8
Oxford		80·8	40	—	—	—	—	—	43·2
Paris		83·4	41	i 12 25	−13	—	—	37·7	43·7
Uccle		84·4	40	e 12 30	−14	e 22 39	−33	—	41·8
De Bilt		84·8	39	12 32	−15	22 43	−34	e 39·7	44·7
Strasbourg		86·9	42	—	—	—	—	—	41·7
Moncalieri		87·0	45	e 17 9	?PR_1	29 24	?SR_1	42·9	—
Hamburg		87·4	36	e 12 48	−13	—	—	e 39·7	51·7
Rocca di Papa		91·0	48	e 13 5	−16	—	—	e 23·5	23·9
Vienna		92·5	40	e 13 9	−21	—	—	44·7	—
Helwan		108·5	56	59 45	?L	—	—	(59·6)	—

Additional readings: For Balboa Heights the mean of the N and E components is entered in the table. T_0 = 17h.14m.37s. Ann Arbor gives also LN = +18·4m. These two L's are assumed 10min. in error. Toronto L? = +49·2m. Ottawa LE = +29·8m., T_0 = 17h.15m.54s. Stonyhurst S = +30m.45s. De Bilt MN = +44·3m., T_0 = 17h.14m.34s. Hamburg MN = +48·8m. Rocca di Papa iE = +13m.9s., iN = +13m.12s. Helwan PE = +65m.45s.

July 16d. Readings also at 10h. (near Nagasaki), 14h. (Hamburg, De Bilt, Helwan, and Tacubaya), 18h. (Strasbourg), 19h. (near Tokyo), 20h. (La Paz), 21h. (San Fernando).

July 17d. Readings at 0h. (Moncalieri), 4h. (La Paz), 6h. (near Lick), 11h. (La Paz), 14h. (Uccle), 17h. and 19h. (Taihoku), 23h. (San Fernando).

July 18d. 22h. 27m. 35s. Epicentre 46°·0N. 152°·5E. (as on 1913 Jan. 19d.).

A = −·616, B = +·321, C = +·719; D = +·462, E = +·887; G = −·638, H = +·332, K = −·695.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa E.	10·8	235	2 42	+1	4 49	−1	—	—
N.	10·8	235	2 56	+15	4 48	−2	—	—
Eskdalemuir	76·6	344	—	—	—	—	43·4	—
De Bilt	78·0	340	—	—	e 22 0	0	e 41·4	51·0
Uccle	79·4	340	—	—	—	—	e 41·4	—
Strasbourg	80·5	334	—	—	—	—	—	52·4
Moncalieri	83·9	333	—	—	e 38 24	?	49·3	—
Rocca di Papa	85·2	331	i 12 47	−2	—	—	e 53·4	55·6
Helwan	87·3	309	57 25	?L	—	—	(57·4)	—
San Fernando	95·3	340	58 25	?L	—	—	(58·4)	—

Additional readings: De Bilt MN = +50·8m. Rocca di Papa ePE = +12m.55s. Helwan PN = +55m.25s.

July 18d. Readings also at 3h. (Mauritius), 7h. (near Athens), 11h. (Batavia), 12h. (near Batavia and near Mizusawa), 15h. (near Tokyo), 16h. (La Paz).

July 19d. Readings at 3h. (near Manila), 15h. (La Paz, Taihoku, and near Balboa Heights), 16h. (Zi-ka-wei and near Taihoku).

July 20d. 0h. 21m. 35s. Epicentre 50°·0S. 127°·0W.

A = −·387, B = −·513, C = −·766; D = −·799, E = +·602; G = +·461, H = +·612, K = −·643.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Apia	51·2	299	—	—	—	—	25·4	—
La Paz	57·6	76	i 9 56	0	17 53	−1	26·1	27·9
Riverview	59·8	252	—	—	e 18 43	+22	e 28·2	31·6
Sydney	59·8	252	11 43	+92	—	—	28·9	32·0
Melbourne	60·9	243	—	—	—	—	e 26·4	32·4
Honolulu	76·5	330	e 34 25	?L	—	—	38·4	43·4
Chicago	98·0	28	—	—	—	—	e 46·9	—
Victoria	98·4	2	48 1	?L	—	—	50·6	51·6
Stonyhurst	146·5	63	71 25	?L	—	—	81·4	84·4
Eskdalemuir	146·5	60	—	—	—	—	77·4	—
Edinburgh	146·6	60	—	—	—	—	75·4	—
Paris	147·8	73	e 19 40	[−13]	—	—	75·4	—
Moncalieri	149·5	82	e 21 12	?	35 42	?	62·4	—
Uccle	149·6	70	e 19 43	[−12]	—	—	e 64·4	86·4
De Bilt	150·4	67	—	—	—	—	e 76·4	77·8
Strasbourg	150·9	74	e 19 45	[−12]	—	—	—	—
Rocca di Papa	151·2	91	e 19 43	[−14]	—	—	—	29·3
Pompeii	151·8	94	19 34	[−25]	—	—	—	—
Hamburg	153·6	65	—	—	e 34 25	?	e 78·4	—
Helwan	154·1	133	75 25	?L	—	—	(75·4)	—

Additional readings: De Bilt gives MN = +80·8m. Helwan PN = +65m.25s.

July 20d. 3h. 59m. 30s. Epicentre 34°·0N. 14°·0E.

A = +·804, B = +·201, C = +·559; D = +·242, E = −·970; G = +·543, H = +·135, K = −·829.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Pompeii E.	6·8	3	1 44	0	3 4	−1	—	3·9
Rocca di Papa	7·8	353	i 2 7	+9	3 37	+6	i 3·9	4·4
Moncalieri	12·0	338	e 3 34	+35	—	—	7·3	—
Strasbourg	15·3	344	e 3 33	−10	e 6 29	−10	—	—
Paris	17·1	334	e 4 14	+8	—	—	—	—
Uccle	18·2	340	e 4 14	−5	e 7 42	−2	—	—
De Bilt	19·2	343	—	—	e 7 49	−17	—	11·7

Zante gives a reading at 4h. simply. Strasbourg gives eN = +6m.28s., T_0 = 3h.59m.27s.

July 20d. 12h. 18m. 30s. Epicentre 33°·8N. 140°·5E.

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

A depth of focus 0·010 is suggested.

		Corr. for Focus	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	°	m. s.	s.	m. s.	s.	m.	m.
Tokyo		+0·2	2·0	342	0 32	− 2	—	—	1·0	1·4
Osaka		0·0	4·3	284	1 2	− 5	—	—	2·2	4·0
Kobe	E.	0·0	4·5	285	1 9	− 1	—	—	2·4	3·2
	N.	0·0	4·5	285	1 10	0	—	—	—	2·4
Mizusawa	E.	0·0	5·3	5	1 23	+ 1	2 26	+ 1	—	—
	N.	0·0	5·3	5	1 25	+ 3	2 30	+ 5	—	—
Ootomari		−0·2	13·0	7	1 3	?	—	—	—	—
Zi-ka-wei		−0·2	16·3	266	e 3 46	− 7	—	—	—	—
Taihoku		−0·4	18·7	247	e 3 59	−22	—	—	—	—
Manila		−0·5	26·1	227	e 6 30	+46	—	—	—	—
Honolulu		−1·1	55·0	86	—	—	—	—	33·0	—
Hamburg		−1·4	82·7	333	—	—	e 21 30	−68	—	23·5
Vienna		−1·4	84·0	328	—	—	e 22 42	−11	—	—
Moncalieri		−1·4	90·4	329	e 23 26	?S	(e 23 26)	−37	43·4	—
La Paz		—	149·0	63	19 44	[−10]	—	—	—	—

Osaka gives also MN = +4·1m. Moncalieri S? = +31m.30s.

July 20d. Readings also at 0h. (San Fernando), 3h. (Coimbra), 4h. (near La Paz), 5h. (Coimbra, Chicago, Honolulu, and near Rocca di Papa), 6h. (Eskdalemuir, Uccle, Helwan, Edinburgh, De Bilt, and Strasbourg), 7h. (Helwan), 9h. (near Osaka, Tokyo, and Mizusawa), 11h. (Pompeii), 20h. (Taihoku), 21h. (San Fernando), 23h. (Batavia).

July 21d. 14h. 29m. 5s. Epicentre 34°·4N. 27°·0E.

$A = +·735$, $B = +·375$, $C = +·565$; $D = +·454$, $E = -·891$; $G = +·503$, $H = +·256$, $K = -·825$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Athens		4·4	325	1 18	+10	2 10	+ 9	2·3	3·2
Helwan		5·8	140	2 55	?L	—	—	(2·9)	—
Pompeii	E.	11·8	306	3 34	+38	8 14	?	—	—
Rocca di Papa		13·4	307	e 3 16	− 2	—	—	e 6·9	9·9
Florence		15·4	312	7 55	?L	—	—	(7·9)	9·9
Lemberg		15·6	353	e 6 55	?S	(e 6 55)	+ 9	9·9	11·4
Padova		15·9	318	1 33	?	5 52	?	—	—
Vienna		16·0	333	e 3 56	+ 4	—	—	e 10·1	10·8
Moncalieri		18·2	311	4 23	+ 4	8 38	+54	10·4	14·2
Zurich		19·0	319	e 4 28	− 1	—	—	—	—
Algiers		19·6	284	e 4 36	0	—	—	—	8·5
Strasbourg		20·1	321	4 43	+ 1	8 30	+ 5	10·9	—
Besançon		20·3	315	4 44	− 1	8 48	+19	12·9	—
Tortosa		21·9	295	4 55	− 9	8 58	− 5	9·4	9·6
Hamburg		22·6	333	e 5 7	− 5	e 10 15	+58	e 13·3	18·1
Paris		23·1	316	e 5 17	− 1	e 9 21	− 6	12·9	13·9
Uccle		23·2	322	e 5 16	− 3	e 9 24	− 5	e 12·9	—
De Bilt		23·6	325	—	—	e 9 39	+ 3	e 12·9	16·0
Granada		24·9	285	5 38	+ 1	9 59	− 2	—	—
Oxford		26·7	319	—	—	10 26	− 9	—	—
Eskdalemuir		29·5	324	—	—	10 55	−31	—	—
Edinburgh		29·8	325	—	—	12 55	+84	—	—
Cape Town		68·8	188	19 3	?S	(19 3)	−69	—	38·9

Additional readings and notes: Athens gives also iP = +1m.21s., T_e = 14h.29m.18s. Helwan PN = 14h.29m. Vienna gives its records as at 15h. instead of 14h. Moncalieri MN = +11·9m. Hamburg MN = +19·3m. Uccle i = +9m.33s., T_e = 14h.29m.10s. De Bilt MN = +13·7m.

July 21d. Readings also at 1h. (Lick), 5h. (Colombo), 6h. (San Fernando and near Rocca di Papa), 14h. (Rocca di Papa), 20h. (Apia), 21h. (San Fernando (2)), 22h. (Taihoku), 23h. (near Tokyo).

July 22d. Readings at 0h., 1h., and 16h. (Lick), 18h. (near Rocca di Papa and Pompeii), 20h. (Pompeii, Adelaide, Riverview, and Melbourne), 21h. (Apia, Paris, and Helwan).

July 23d. Readings at 4h. (Apia), 7h. (La Paz), 14h. (near Tokyo), 17h. (Manila), 19h. (near Tacubaya), 22h. (Ootomari).

July 24d. Readings at 0h. (San Fernando), 4h. (La Paz and near Tokyo and Mizusawa), 5h. (La Paz), 7h. (Melbourne, Riverview, and Tacubaya), 9h. (near Mizusawa), 11h. (Helwan), 12h. (Strasbourg), 16h. (Taihoku), 19h. (Rio Tinto), 21h. (San Fernando).

July 25d. Readings at 4h. (Riverview), 5h. (Melbourne), 7h. (Riverview and La Paz), 12h. (La Paz and Mizusawa), 13h. (Chicago and near Tacubaya), 15h. (near Tacubaya), 18h. (La Paz and near Tokyo), 20h. (near Mizusawa (2) and near Tacubaya), 22h. (San Fernando).

July 26d. 5h. 12m. 35s. Epicentre 32°·7S. 73°·7W.

$A = +\cdot 236$, $B = -\cdot 808$, $C = -\cdot 540$; $D = -\cdot 960$, $E = -\cdot 281$; $G = -\cdot 152$, $H = +\cdot 519$, $K = -\cdot 842$.

The residuals for $\Delta > 90°$ suggest a deep focus; but the evidence scarcely suffices for a solution on those lines.

		△	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
La Paz		16·9	19	i 4 7	+ 3	7 12	− 4	8·2	9·6
Georgetown		71·6	358	e 11 23	− 4	20 42	− 3	—	—
Washington		71·6	358	11 22	− 5	20 40	− 5	—	—
Cape Town		74·1	120	21 11	?S	(21 11)	− 4	—	21·8
Chicago		75·5	350	11 45	− 7	21 20	−12	37·8	—
Ann Arbor	E.	75·5	354	8 25	?	15 49	?PR_1	26·0	—
Toronto		76·5	356	—	—	—	—	i 16·6	17·9
Ottawa		78·1	359	—	—	e 22 5	+ 4	—	—
Victoria		92·4	330	23 29	?S	(23 29)	−70	44·1	50·0
Coimbra		93·5	44	16 55	?	23 39	−72	e 35·4	—
Algiers		99·8	52	24 3	?S	(24 3)	−111	42·4	55·4
Oxford		105·5	39	—	—	24 32	−135	—	—
Kew		105·8	39	—	—	—	—	—	51·4
Paris		105·9	42	—	—	e 24 36	−135	53·4	59·4
Stonyhurst		106·0	38	24 49	?S	(24 49)	−123	—	63·4
Eskdalemuir		106·5	35	—	—	e 24 40	−137	47·4	—
Edinburgh		106·9	35	—	—	24 25	−155	—	—
Moncalieri		107·0	48	e 19 11	?PR_1	24 36	−145	27·9	—
Uccle		108·0	41	17 25	?	—	—	—	—
Strasbourg		108·8	45	—	—	e 25 25	−112	e 34·4	—
De Bilt		109·0	40	—	—	e 24 50	−149	e 45·4	61·2
Pompeii		109·5	53	19 8	?PR_1	—	—	—	—
Hamburg		112·3	40	—	—	e 24 25	−203	e 47·4	—
Helwan		117·3	70	26 25	?S	(26 25)	−123	—	—

Additional readings: Ann Arbor gives PN = +8m.1s., LN = +25·6m. Toronto L? = +4·9m. Coimbra i = +25m.25s. De Bilt ePR_1 = +19m.12s., MN = +61·6m.

July 26d. Readings also at 7h. (Taihoku), 9h. (Stonyhurst), 10h. (Batavia and Stonyhurst), 13h. (near Tacubaya and near Manila), 14h. (near Manila), 15h. (near Mizusawa), 16h. (Rocca di Papa, Algiers, and near Mizusawa), 17h. (Taihoku and near Algiers), 20h. (Batavia), 21h. (Batavia, Lick, and Manila), 22h. (Helwan).

July 27d. Readings at 0h. (San Fernando), 3h. (Manila), 12h. (near Tokyo), 17h. (near Lick).

July 28d. Readings at 0h. (San Fernando and Chicago), 1h. (Paris and Helwan), 2h. (La Paz and near Mizusawa and Tokyo), 3h. (Tortosa and near Mizusawa and Tokyo), 4h. (near Kobe), 5h. and 6h. (La Paz), 7h. (Florence), 12h. (De Bilt, La Paz, and Simla), 15h. (La Paz and near Tacubaya), 17h. (Taihoku (2)), 19h. (Apia), 20h. (Rio Tinto), 21h. (near Oaxaca and Tacubaya), 23h. (Batavia and Manila).

July 29d. Readings at 0h. (Helwan and San Fernando), 1h. (2) and 7h. (Stonyhurst), 9h. (near Tokyo), 11h. (near Tacubaya), 13h. (Helwan and near Rocca di Papa), 14h. (Stonyhurst), 15h. (Stonyhurst and near Tokyo), 16h. (Stonyhurst), 22h. (San Fernando), 23h. (Stonyhurst).

July 30d. 20h. 6m. 20s. Epicentre 45°·0N. 16°·0E. (as on 1916 Mar. 12d.).

$A = +\cdot680$, $B = +\cdot195$, $C = +\cdot707$; $D = +\cdot276$, $E = -\cdot961$; $G = +\cdot679$, $H = +\cdot195$, $K = -\cdot707$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Padova		2·9	277	0 42	− 3	1 56	?L	(1·9)	—
Vienna		3·3	4	i 0 50	− 2	i 1 29	− 2	—	2·0
Florence		3·6	252	1 40	?S	(1 40)	+ 1	—	2·6
Rocca di Papa		4·0	218	i 1 16	+14	1 41	− 9	e 2·2	3·6
Pompeii	E.	4·3	195	1 42	?S	(1 42)	−16	(2·7)	—
Zurich	E.	5·6	298	e 1 19	− 8	i 2 37	+ 3	—	2·7
	N.	5·6	298	e 1 24	− 3	i 2 36	+ 2	—	—
	V.	5·6	298	e 1 27?	0	i 2 37	+ 3	—	2·7
Moncalieri		5·8	271	e 1 4	−26	2 54	+15	3·8	—
Strasbourg		6·7	305	1 53	+11	3 16	+14	3·5	—
Besançon		7·3	291	2 37	+46	3 36	+18	3·7	—
Hamburg		9·4	338	—	—	—	—	e 4·7	6·1
Uccle		9·7	311	e 4 22	?S	(e 4 22)	+ 1	—	—
Paris		10·0	298	e 4 8	?S	(e 4 8)	−21	5·1	—
De Bilt		10·1	319	—	—	—	—	e 5·1	—

Additional readings: Vienna gives MN = +2·1m., MZ = +1·9m. Hamburg MN = +7·0m. Paris eS = +4m.55s.

July 30d. Readings also at 0h. (Taihoku), 3h. (near Algiers), 7h. (La Paz and near Tokyo), 16h. (Stonyhurst), 17h. (Taihoku), 20h. (San Fernando).

July 31d. Readings at 1h. (La Paz), 7h. (near Mizusawa), 14h. (near Tokyo), 18h. (Rio Tinto and Mizusawa), 20h. (Taihoku), 23h. (San Fernando).

Aug. 1d. Readings at 0h. (Rio Tinto), 2h. (near Tacubaya), 7h. and 13h. (La Paz), 22h. (Manila), 23h. (La Paz).

Aug. 2d. Readings at 0h. (Tortosa, Uccle, San Fernando, Helwan, and De Bilt), 1h. (Rio Tinto), 5h. (Manila, Riverview, La Paz, Adelaide (2), and Melbourne), 6h. (De Bilt, Chicago, and Kodaikanal), 7h. (Kodaikanal, La Paz, Vienna, Hamburg, and Simla), 12h. (La Paz), 13h. (Taihoku and Manila), 14h. (La Paz), 17h. (Manila), 18h. (near Tacubaya), 19h. (Rio Tinto), 20h. (Taihoku, Riverview, and Melbourne), 21h. (La Paz).

1920. Aug. 3d. 3h. 2m. 15s. Epicentre 6°·5N. 128°·0E.

(as on 1920 Mar. 12d.).

A = −·612, B = +·783, C = +·113; D = +·788, E = +·616;
G = −·070, H = +·089, K = −·994.

A depth of focus 0·040 is adopted for this earthquake. This is greater than the La Paz reading would suggest, but at least this amount is required to bring the stations near the origin into agreement and a greater depth would suit them better.

		Corr. for Focus	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	°	m. s.	s.	m. s.	s.	m.	m.
Manila		−0·6	10·7	320	e 2 21	−10	i 4 0	−32	i 4·3	4·7
Taihoku		−1·6	19·5	342	4 26	+10	—	—	8·2	—
Batavia		−2·1	24·7	239	e 5 5	− 7	8 52	−25	16·8	—
Zi-ka-wei		−2·1	25·5	346	e 5 14	− 7	9 32	− 1	—	—
Tokyo		−2·7	31·1	19	e 7 19	+67	—	—	—	13·5
Mizusawa	E.	−3·0	34·7	17	6 41	− 3	12 9	+ 6	—	—
	N.	−3·0	34·7	17	6 41	− 3	11 46	−17	—	—
Adelaide		−3·5	42·6	167	e 9 21	?PR_1	13 51	− 2	—	17·2
Riverview		−3·7	45·9	151	e 8 3	− 9	i 14 37	− 1	e 22·6	23·4
Sydney		−3·7	45·9	151	—	—	18 9	?SR_1	23·2	26·0
Melbourne		−3·8	47·0	161	—	—	15 15	+24	18·8	19·8
Colombo		−3·8	47·8	274	7 57	−29	10 9	?PR_1	15·4	16·2
Mauritius		−5·0	73·8	247	21 45	?S	(21 45)	+93	—	30·2
Helwan		−5·5	92·6	301	17 45	?PR_1	—	—	—	—
Victoria		−5·7	97·2	39	16 27	?	24 19	−10	39·1	50·8
Vienna		−5·7	99·2	322	i 13 22	−13	23 46	−65	39·8	67·2
Hamburg		−5·7	100·8	329	e 13 30	−14	i 24 0	−67	e 49·8	64·6
Pompeii	E.	−5·9	103·1	315	17 6	?PR_1	24 6	−82	—	—
Padova		−5·9	103·1	320	17 35	?PR_1	24 25	−63	—	—
De Bilt	E.	−5·9	104·0	329	—	—	e 24 14	−83	e 51·8	54·5
	N.	−5·9	104·0	329	—	—	e 24 55	−42	e 50·8	54·6
Rocca di Papa	N.	−5·9	104·0	317	e 18 13	?PR_1	e 25 49	+12	56·0	—
Strasbourg		−6·0	104·3	323	e 17 44	[−18]	e 28 15	+156	e 49·8	—
Uccle		−6·0	105·1	327	—	—	24 18	−89	e 47·8	55·0
Moncalieri		−6·0	105·9	321	12 12	−118	24 51	−64	52·2	—
Eskdalemuir		−6·1	106·3	336	18 10	[+ 1]	26 21	+23	37·8	58·3
Stonyhurst		−6·2	106·8	331	19 3	?PR_1	—	—	—	59·2
Paris		−6·2	107·1	327	—	—	i 24 31	−93	50·8	54·8
Kew		−6·2	107·2	330	—	—	—	—	—	70·8
Oxford		−6·2	107·5	330	17 43	[−30]	24 30	−98	53·0	—
Cape Town		−6·3	109·8	236	17 26	[−55]	—	—	—	29·3
Tortosa		−6·4	112·5	320	18 53	[+23]	28 15	+82	39·0	60·0
Algiers		−6·5	112·8	315	e 18 36	[+ 5]	(29 15)	+140	29·2	48·8
Coimbra		−6·8	118·5	322	17 47	[−61]	24 59	−164	e 37·8	—
San Fernando	E.	−6·9	119·4	318	69 45	?L	—	—	(69·8)	85·8
	N.	−6·9	119·4	318	22 45	?PR_1	—	—	—	79·8
Chicago		—	121·8	30	19 7	[+10]	29 37	+34	e 50·4	—
Ottawa		—	123·9	18	e 20 49	?PR_1	—	—	—	—
Toronto		—	124·1	21	(18 33)	[−30]	—	—	18·6	—
Georgetown		—	129·0	23	e 21 45	?PR_1	—	—	—	—
Washington		—	129·0	23	18 53	[−23]	22 0	?PR_1	—	—
La Paz		—	161·3	124	i 19 51	[−18]	i 31 2	?	51·0	—

Additional readings and notes: Manila gives MN = +4·6m., T_e = 3h.2m.35s. Zi-ka-wei PSN = +9m.54s., SR_1E = +10m.52s., T_e = 3h.2m.4s. Tokyo MN = +13·0m. Riverview PS = +15m.24s., iSR_1 = +17m.58s. and +18m.12s., MN = +24·6m., MZ = +24·1m., T_e = 3h.2m.1s. Helwan PN = +18m.45s. Hamburg MN = +51·8m. Rocca di Papa gives P = +18m.1s., S = +24m.10s., perhaps intended as a local shock. Also eLN = +33·0m., LN = +62·0m. Strasbourg PR_2E = +24m.14s., eSN = +28m.29s. Mauritius PE = +16m.45s., ME = +22·2m. Eskdalemuir gives its records as at 4h. Coimbra S = +28m.17s., LN = +43·8m. Chicago PR_1 = +24m.52s., L = +67·8m. La Paz i = +45m.39s.

1920. Aug. 3d. 19h. 57m. 10s. Epicentre 27°·6S. 66°·3W.

(Close to Andalgala).

A = +·356, B = −·811, C = −·463, ; D = −·916, E = −·402 ;
G = −·186, H = +·424, K = −·886.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
La Paz		11·2	350	i 2 44	− 3	4 56	− 3	5·8	6·4
Rio de Janeiro	E.	21·4	83	i 4 44	−14	8 41	−12	(10·9)	12·2
	N.	21·4	83	i 4 44	−14	8 50	− 3	10·8	12·3
Balboa Heights	E.	38·8	339	—	—	13 26	−23	—	25·9
	N.	38·8	339	7 28	−16	13 20	−29	—	26·6
Porto Rico	E.	45·8	0	—	—	15 3	−22	23·1	25·1
	N.	45·8	0	—	—	e 14 56	−29	e 24·6	29·2
Tacubaya		56·7	322	9 58	+ 8	17 40	− 2	24·4	27·6
Cheltenham	E.	67·1	351	11 0	+ 1	19 49	− 2	—	—
	N.	67·1	351	10 55	− 4	19 39	−12	34·4	41·0
Georgetown	E.N.	67·2	351	e 11 1	+ 2	20 1	+ 9	e 31·0	—
Washington		67·2	351	10 58	− 1	19 48	− 4	34·4	—
Harvard	N.	70·1	356	11 15	− 3	20 23	− 4	e 34·4	38·8
Cape Town		71·0	118	21 12	?S	(21 12)	+34	38·9	44·9
Accra		71·7	73	8 50	?	—	—	—	33·3
Ann Arbor	E.	71·7	348	9 50	−98	20 38	− 8	33·0	41·5
	N.	71·7	348	10 2	−86	20 44	− 2	32·6	41·0
Northfield		72·0	355	—	—	—	—	39·3	—
Chicago		72·1	344	10 50	−41	19 55	−56	31·8	—
Toronto		72·3	350	9 26	?	i 22 2	+68	e 36·1	50·3
Tucson	E.	73·3	322	e 11 58	+20	e 20 19	−47	31·3	33·6
	N.	73·3	322	e 12 34	+56	e 21 51	+45	—	—
Ottawa		73·4	354	11 38	0	21 5	− 2	e 34·3	—
Berkeley		83·9	320	e 12 31	−10	(22 50)	−18	22·8	—
San Fernando		85·4	44	12 50	0	23 32	+ 9	—	64·3
Coimbra	E.	86·5	40	12 59	+ 3	23 33	− 3	e 36·4	50·3
	N.	86·5	40	—	—	23 31	− 5	38·5	50·7
Granada		87·4	45	13 2	+ 1	23 47	+ 2	—	—
Victoria		91·5	327	23 32	?S	(23 32)	−57	37·3	44·2
Algiers		91·6	48	13 21	− 4	24 3	−28	40·8	46·3
Tortosa		92·2	43	13 25	− 3	24 9	−28	37·7	56·9
Barcelona		93·6	44	—	—	i 24 48	− 4	e 43·3	56·0
Oxford		97·6	35	17 53	?PR_1	23 33	−119	59·5	—
Paris		97·9	38	e 13 50	− 9	i 24 32	−63	46·8	52·8
Kew		97·9	35	54 50	?L	—	—	(54·8)	57·8
Stonyhurst		98·2	34	i 24 38	?S	(i 24 38)	−60	52·6	58·5
Eskdalemuir		98·7	30	18 3	?PR_1	24 33	−70	—	53·8
Moncalieri		98·9	43	14 5	0	24 36	−69	39·8	59·8
Besançon		99·0	41	—	—	24 47	−59	52·8	—
Uccle		100·0	38	—	—	24 41	−75	42·8	53·2
Dyce		100·4	29	13 0	−73	24 50	−70	30·3	53·7
Florence		100·5	46	24 50	?S	(24 50)	−71	—	(59·8)
Rocca di Papa		100·5	48	e 14 7	− 6	e 24 49	−72	e 54·0	—
	N.	100·5	48	e 14 13	0	e 24 53	−68	e 41·9	69·1
Zurich		100·6	42	—	—	e 24 50	−71	e 50·8	—
Strasbourg		100·7	41	e 16 50	?	24 51	−71	e 47·8	59·0
Pompeii		101·0	50	17 50	?PR_1	—	—	—	—
De Bilt	E.	101·1	37	—	—	e 24 55	−71	e 46·8	57·7
	N.	101·1	37	—	—	e 24 56	−70	—	57·5
Honolulu		101·2	289	—	—	25 26	−41	48·6	53·1
Padova		101·6	44	13 20	−58	24 51	−80	51·4	61·4
Hamburg		104·3	37	e 17 50	?PR_1	e 25 4	−92	e 50·8	60·2
Vienna		105·7	43	e 18 38	?PR_1	25 12	−97	—	63·8
Athens		106·6	55	e 20 28	?PR_1	i 26 30	−27	e 45·8	61·4
Melbourne		108·4	206	—	—	—	—	55·0	56·0
Riverview		109·1	212	e 25 16	?S	(e 25 16)	−124	e 49·4	52·0
Helwan	E.	109·4	66	20 56	?PR_1	—	—	—	69·6
	N.	109·4	66	24 56	?S	(24 56)	−147	—	68·8
Adelaide		113·2	202	—	—	—	—	—	68·1
Colombo		141·8	116	54 14	?	73 26	?L	79·6	85·6
Batavia		145·6	168	i 19 56	[+ 7]	—	—	e 72·4	84·9
Simla		148·1	75	—	—	—	—	e 74·4	92·0
Manila		165·3	208	e 20 34	[+22]	—	—	—	—
Zi-ka-wei		172·4	300	—	—	e 45 50	?SR_1	—	101·9
Taihoku		172·6	252	—	—	e 33 48	?	—	—

For Notes see next page.

NOTES TO AUG. 3d. 19h. 57m. 10s.

Additional readings and notes: Rio de Janeiro gives also $PR_1E = +4m.50s.$, $PSN = +7m.8s.$, $SR_1N = +9m.8s.$, $SR_1E = +9m.14s.$, $T_0 = 19h.56m.57s.$, SR_2E is assumed to be LE by comparison with the recorded LN. Porto Rico $PR_1 = +10m.2s.$, $SR_1E = +18m.23s.$, $SR_1N = +18m.40s.$ Washington $LE = +31·8m.$, $L = +38·8m.$ and $+47·8m.$, $T_0 = 19h.57m.19s.$ Cape Town $S = +30m.54s.$ (?SR_1). Toronto iP? $= +14m.14s.$, $eL = +45·3m.$, $+58·4m.$ and $+74·0m.$ Ottawa $L = +42·8m.$ and $+53·8m.$, $T_0 = 19h.57m.20s.$ Berkeley $eLN = +22·9m.$ (?eSN). San Fernando $MN = +54·3m.$ Coimbra $PR_1N = +15m.50s.$, $iS = +23m.47s.$, $iSE = +23m.55s.$, $T_0 = 19h.57m.35s.$ Victoria S? $= +28m.57s.$ (?SR_1). Paris $MN = +54·8m.$, $T_0 = 19h.58m.15s.$ Moncalieri $MN = +58·3m.$ Uccle $MN = +56·1m.$ Florence—one hour has been deducted from the readings. Rocca di Papa gives two sets of records; for the first we also have $L = +78·3m.$ and for the second $L = +46·0m.$, and $LN = +56·4m.$ Strasbourg $MN = +63·7m.$ De Bilt $ePR_1 = +18m.2s.$ Honolulu record at $+42m.38s.$ Hamburg eL also at $+43·8m.$, $MN = +61·9m.$ Athens iE $= +25m.22s.$, $MN = +62·3m.$ Riverview eS $= +34m.29s.$ (?SR_1). Batavia eE $= +42m.36s.$, $eLE = +105·5m.$ Zi-ka-wei $MN = +106·4m.$ These observations of M have been increased by 1 hour to accord with the observations of S.

Aug. 3d. Readings also at 0h. (Manila), 2h. (Taihoku), 4h. (Taihoku and Zi-ka-wei), 5h. (Taihoku (2), Manila, Zi-ka-wei, and Mizusawa), 6h. (De Bilt), 8h. and 13h. (2), and 14h. (La Paz), 19h. (Stonyhurst), 21h. (5), 22h., and 23h. (La Paz).

Aug. 4d. Readings at 0h. (San Fernando), 1h. (Moncalieri), 2h. (De Bilt, Helwan, and Paris), 3h. (La Paz), 4h. (Kobe), 6h. (near Mizusawa), 12h. (La Paz), 18h. (near Rocca di Papa and Pompeii), 19h. (near Rocca di Papa), 23h. (San Fernando).

Aug. 5d. 19h. 1m. 44s. Epicentre 21°·1N. 121°·7E. (as on 1919 May 4d.).

$A = -·490$, $B = +·794$, $C = +·360$; $D = +·851$, $E = +·526$; $G = -·189$, $H = +·306$, $K = -·933$.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Hokoto	3·1	321	0 53	+ 4	—	—	1·1	—
Taihoku	3·9	0	1 3	+ 2	—	—	1·5	—
Manila	6·5	186	—	—	3 6	+ 9	8·1	9·2
Zi-ka-wei	10·1	359	e 2 25	− 6	e 4 31	− 1	—	5·4
Colombo	42·9	257	29 16	?L	—	—	(29·3)	—
Helwan	79·9	298	51 16	?	—	—	—	—
Vienna	84·0	321	—	—	—	—	e 42·3	51·3
Hamburg	85·1	326	—	—	—	—	e 43·3	51·3
De Bilt	88·4	327	—	—	—	—	e 47·3	48·4
Strasbourg	88·9	323	—	—	—	—	e 48·3	—
Uccle	89·5	326	—	—	—	—	e 46·3	—
Eskdalemuir	90·4	333	—	—	—	—	43·3	—
Moncalieri	90·8	320	—	—	e 46 43	?L	50·3	—
Stonyhurst	91·1	331	—	—	—	—	49·8	52·3
Kew	91·5	328	—	—	—	—	—	55·3
Tortosa	97·4	319	—	—	—	—	e 51·3	—
San Fernando	104·3	319	57 16	?L	—	—	(57·3)	—

Additional readings: Manila gives $MN = +8·9m.$ Zi-ka-wei $MN = +6·9m.$, $T_0 = 19h.1m.35s.$ Helwan $PN = +46m.16s.$ De Bilt $MN = +48·2m.$

Aug. 5d. Readings also at 4h. (Barcelona), 11h. (La Paz), 14h. (Taihoku), 17h. and 19h. (Taihoku).

Aug. 6d. Readings at 0h. and 8h. (La Paz), 15h (Apia and La Paz), 18h. (near Tokyo, Osaka, and Mizusawa), 19h. (Taihoku), 20h. (Manila), 21h. (Taihoku), 22h. (Apia), 23h. (Manila and Taihoku).

Aug. 7d. Readings also at 0h. (De Bilt), 1h. (San Fernando), 2h. (Vieques and La Paz), 6h. (Tacubaya), 9h. and 10h. (La Paz), 11h. (near Tacubaya and Oaxaca), 13h. (near Oaxaca), 17h. (2) and 18h. (3) (La Paz), 19h. (Helwan), 21h. (Taihoku).

Aug. 8d. Readings at 0h. (La Paz), 1h. (Helwan), 3h. (near Tokyo), 5h. (Uccle), 10h. (Manila and Batavia), 12h. (La Paz), 13h. (Manila), 16h. (Taihoku), 21h. (San Fernando), 23h. (Calcutta).

Aug. 9d. Readings at 1h. (Batavia), 4h. (near Tacubaya), 5h. (near Manila), 10h. (Cape Town), 12h. (Helwan), 17h. (Manila), 21h. (San Fernando), 22h. (Apia).

Aug. 10d. 20h. 48m. 30s. Epicentre 40°·9S. 177°·1E. (as on 1917 Aug. 8d.).
A = −·755, B = +·038, C = −·655; D = +·051, E = +·999; G = +·654, H = −·033, K = −·756.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview	21·7	281	e 5 0	− 1	i 9 1	+ 2	e 12·1	14·4
Vienna	164·5	305	i 19 58	[−13]	—	—	—	21·0
Hamburg	164·7	330	e 19 50	[−22]	—	—	—	—
De Bilt	167·6	337	—	—	—	—	e 82·5	89·1
Strasbourg	169·3	319	e 20 4	[−10]	—	—	—	—
Moncalieri	171·2	301	—	—	e 60 30	?	74·7	—

Additional readings: Riverview gives S = +8m.56s., MN = +16·2m. De Bilt MN = +85·9m.

Aug. 10d. 21h. 53m. 49s. Epicentre 36°·3N. 26°·3E. (as on 1918 July 16d.).
A = +·722, B = +·357, C = +·592; D = +·443, E = −·897; G = +·531, H = +·262, K = −·806.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Athens		2·6	311	0 41	0	—	—	1·2	1·6
Pompeii	E.	10·2	299	4 17	?S	(4 17)	−18	—	—
Vienna		14·0	332	e 3 29	+ 3	—	—	—	11·7
Strasbourg		18·3	318	—	—	—	—	e 9·0	—
Hamburg		20·7	332	e 4 47	− 2	—	—	—	—
Uccle		21·4	320	—	—	e 8 52	− 1	—	—
De Bilt		21·7	323	—	—	e 8 57	− 2	—	15·2

Additional readings: Athens gives m = +54s. De Bilt MN = +14·6m.

Aug. 10d. Readings also at 2h. (La Paz), 5h. (near Mizusawa), 6h. (Port au Prince), 7h. (La Paz), 9h. (La Paz and Melbourne), 19h. (La Paz), 20h. (Manila), 22h. (De Bilt and Tacubaya), 23h. (near Tacubaya).

Aug. 11d. Readings at 5h. (near Athens), 8h. (Apia), 13h. (Batavia and Manila), 20h. (Victoria, Toronto, Rio Tinto, La Paz, Tacubaya, De Bilt, and near Manila), 21h. (San Fernando, Uccle, Helwan, and Paris).

Aug. 12d. 6h. 20m. 55s. Epicentre 25°·0N. 46°·0W. (as on 1919 Jan. 8d.).
A = +·630, B = −·652, C = +·423; D = −·719, E = −·695; G = +·294, H = −·304, K = −·906.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Washington		29·6	305	6 17	− 7	11 35	+ 8	15·2	—
Toronto		33·0	316	—	—	—	—	e 18·6	21·2
Coimbra		34·8	54	e 2 54	?	8 4	?PR_1	16·6	—
San Fernando	E.	35·8	61	15 5	?L	—	—	(15·1)	23·1
Chicago		38·1	309	7 0	−39	13 5	−34	18·3	—
Eskdalemuir		43·4	35	—	—	—	—	19·1	—
Edinburgh		43·7	35	8 5	−19	—	—	—	—
Paris		44·5	45	e 8 26	− 4	e 15 9	0	22·1	24·1
Uccle		46·1	42	e 8 35	− 6	e 15 31	+ 2	e 20·1	—
De Bilt		46·9	42	e 8 59	+13	e 15 48	+ 8	e 21·6	24·4
Moncalieri		47·3	51	—	—	e 15 48	+ 3	23·2	—
Strasbourg		47·8	47	e 8 5	−48	—	—	—	—
Hamburg		50·1	40	e 9 5	− 3	—	—	e 25·5	27·1
Vienna		53·5	47	—	—	e 19 5	?	—	—
Victoria		63·6	315	30 40	?L	—	—	(30·7)	37·6

Additional readings: Coimbra gives ePE = +4m.14s. San Fernando MN = +24·1m. De Bilt MN = +23·9m., T_o = 6h.21m.18s.

Aug. 12d. Readings also at 5h. (De Bilt), 6h. (Helwan and near La Paz), 9h. (near Mizusawa), 20h. (Pompeii), 21h. (Chicago), 22h. (near Taihoku).

Aug. 13d. 2h. 2m. 45s. Epicentre 18°·5S. 63°·5W. (as on 1918 Aug. 17d.).

$A = +\cdot423$, $B = -\cdot849$, $C = -\cdot317$; $D = -\cdot895$, $E = -\cdot446$; $G = -\cdot142$, $H = +\cdot284$, $K = -\cdot948$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
La Paz		4·8	294	i 1 16	+ 2	2 3	− 8	2·1	2·2
Rio de Janeiro	E.	19·5	107	4 51	+16	10 57	?L	13·0	14·0
Washington		58·8	348	10 1	− 3	18 1	− 8	e 30·8	—
Harvard	N.	61·3	354	e 10 19	− 2	e 18 39	− 1	—	—
Ithaca		62·0	349	e 10 15	−10	—	—	—	—
Toronto		63·8	347	i 9 33	−64	(19 15)	+ 4	19·2	20·6
Chicago		64·2	340	9 56	−43	18 19	−56	e 32·2	—
Ottawa		64·8	351	i 10 45	+ 1	i 19 23	0	—	—
Cape Town		73·4	121	22 7	?S	(22 7)	+60	—	—
San Fernando		77·1	44	13 3	+61	—	—	—	23·2
Coimbra	E.	77·9	40	12 45	+39	22 31	+32	33·7	—
	N.	77·9	40	12 49	+43	e 22 35	+36	—	—
Granada		79·2	45	12 33	+19	17 43	?PR_1	—	—
Algiers		83·6	48	e 12 57	+17	23 15	+10	42·8	45·2
Tortosa		83·9	43	12 45	+ 4	23 16	+ 8	37·4	60·0
Oxford		88·6	33	e 11 33	−95	i 23 35	−24	—	—
Stonyhurst		89·1	31	23 51	?S	(23 51)	−13	—	54·2
Paris		89·2	37	—	—	i 23 15	−50	37·2	54·2
Eskdalemuir		89·6	30	15 29	?	23 43	−27	—	—
Edinburgh		90·0	29	—	—	23 15	−59	—	—
Moncalieri		90·5	42	e 17 24	?PR_1	31 21	?SR_1	47·9	—
Uccle		91·1	36	e 13 3	−19	i 23 54	−31	e 43·2	—
Strasbourg		92·1	40	e 13 39	+11	e 24 1	−35	—	—
De Bilt		92·2	35	13 36	+ 8	i 24 0	−37	e 44·2	49·5
Pompeii	E.	93·4	48	16 33	?	23 23	−86	—	—
Hamburg		95·5	35	e 17 15	?PR_1	i 24 18	−53	e 43·2	—
Vienna		97·3	41	e 17 45	?PR_1	e 24 25	−64	—	—
Helwan		103·2	63	24 15	?S	(24 15)	−131	—	—
Colombo		142·5	103	85 15	?L	—	—	(85·2)	95·2
Mizusawa	E.	150·3	319	(19 45)	[−11]	19 45	?[P]	—	—
Batavia		153·6	158	20 2	[+ 1]	—	—	—	—
Manila		174·2	228	e 20 33	[+17]	—	—	—	—

Additional readings and notes: Rio de Janeiro gives its readings at 0h. Ottawa iN = +11m.21s., e = +13m.42s., i = +20m.5s. and +21m.15s. San Fernando MN = +24·2m. Oxford PR_1 = +17m.21s. Paris MN = +47·2m. Uccle PR_1 = +16m.51s. De Bilt ePR_1 = +17m.24s., MN = +59·2m., T_o = 2h.3m.54s. Pompeii gives its readings at 1h. Mizusawa PN = +(19m.51s.), O−C = [−5]. Helwan PN = +30m.15s.

Aug. 13d. Readings also at 1h. (Taihoku), 8h. (Georgetown), 12h. (near Tacubaya), 14h. (Calcutta), 16h. (La Paz and near Tokyo), 21h. (La Paz and San Fernando).

Aug. 14d. Readings at 0h. (La Paz), 4h. (San Fernando), 8h. (Moncalieri), 9h. (La Paz, Colombo, and Helwan), 21h. (Stonyhurst (2)).

Aug. 15d. 6h. 59m. 8s. Epicentre 22°·2N. 93°·2E.

$A = -\cdot052$, $B = +\cdot924$, $C = +\cdot378$; $D = +\cdot998$, $E = +\cdot056$; $G = -\cdot021$, $H = +\cdot377$, $K = -\cdot926$.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Calcutta	4·5	275	1 10	0	2 10	+ 6	3·6	—
Simla	16·8	306	5 16	+74	—	—	—	8·9
Kodaikanal	19·3	234	13 28	?	—	—	—	—
Bombay	19·4	264	8 21	?S	(8 21)	+11	—	—
Colombo	20·0	222	8 52	?S	(8 52)	+29	—	—
Taihoku	26·1	78	—	—	e 11 13	+49	—	—
Zi-ka-wei	26·6	64	e 5 52	− 2	e 10 24	− 9	—	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Batavia	31·4	155	e 7 6	+24	—	—	—	14·1
Hamburg	68·3	323	—	—	26 52	?SR_1	—	—
Strasbourg	70·6	316	e 11 24	+ 3	—	—	e 37·9	—
Moncalieri	71·4	313	—	—	e 21 49	+66	40·6	—
De Bilt	71·5	320	—	—	e 20 53	+ 9	—	46·3
Uccle	72·2	320	—	—	e 20 47	− 5	e 36·9	39·9
Paris	73·9	318	—	—	—	—	39·9	40·9
Edinburgh	75·2	325	—	—	28 52	?SR_1	—	—
Stonyhurst	75·4	321	44 34	?L	—	—	(44·6)	—
La Paz	161·5	285	20 14	[+ 5]	—	—	—	—

Additional readings: Moncalieri gives S? = +32m.19s. De Bilt MN = +40·4m.

1920. Aug. 15d. 8h. 16m. 33s. Epicentre 13°·0S. 166°·8E.

(as on 1919 Nov. 20d.).

A = −·949, B = +·222, C = −·225; D = +·228, E = +·974; G = +·219, H = −·051, K = −·974.

A depth of focus 0·030 has been assumed for this shock, as was done in the case of a former shock from the same origin (1918 Dec. 14d.).

		Corr. for Focus	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	°	m. s.	s.	m. s.	s.	m.	m.
Apia		−1·2	20·8	95	4 40	+ 4	i 9 2	+47	10·6	—
Riverview		−1·6	25·2	213	i 5 31	+ 7	e 9 44	+ 8	e 10·2	11·2
Sydney		−1·6	25·2	213	5 15	− 9	9 39	+ 3	12·8	15·0
Christchurch		−2·1	31·0	170	8 39	?PR_1	13 33	?PR_1	17·3	26·2
Melbourne		−2·1	31·5	214	6 45	+23	12 3	+39	18·4	19·8
Honolulu		−3·0	48·6	46	i 8 45	+ 8	i 15 33	+11	e 22·4	32·4
Manila		−3·3	53·2	300	e 9 7	+ 1	(16 1)	−17	16·0	16·8
Tokyo		−3·4	55·0	334	9 22	+ 5	12 52	?PR_1	14·9	17·7
Osaka		−3·4	56·2	329	9 17	− 8	16 55	+ 1	23·9	28·3
Mizusawa	E.	−3·5	57·4	339	9 32	0	17 8	0	—	—
	N.	−3·5	57·4	339	9 31	− 1	17 6	− 2	—	—
Nagasaki		−3·5	57·8	325	e 9 10	−25	—	—	9·6	—
Taihoku		−3·5	58·3	311	e 9 39	+ 1	(17 18)	− 1	17·3	—
Batavia		−3·6	59·4	270	i 9 26	−19	—	—	e 26·7	—
Zi-ka-wei		−3·6	62·1	316	10 9	+ 7	e 19 17	+72	—	—
Ootomari		−3·7	63·4	343	9 54	−16	—	—	—	—
Berkeley	N.	−4·1	83·5	49	e 12 14	− 1	—	—	—	—
Calcutta		−4·1	84·6	295	12 39	+17	—	—	—	—
Victoria		−4·1	86·9	36	11 32	−63	(22 21)	−34	22·4	29·2
Colombo		−4·2	88·7	277	(12 27)	−18	12 27	? P	24·4	25·4
Tucson	E.	−4·2	90·5	57	e 12 54	− 1	23 40	+ 7	41·8	46·2
Kodaikanal		−4·2	91·6	280	17 33	?PR_1	(23 9)	−36	23·2	24·4
Simla		−4·3	96·5	300	—	—	e 22 33	−124	—	45·6
Bombay		−4·4	97·9	286	13 41	+ 6	—	—	—	—
Mauritius		−4·5	102·7	246	23 39	?S	(23 39)	−119	—	54·2
Chicago		—	110·2	49	17 25	?PR_1	27 27	− 3	53·4	—
Ann Arbor	E.	—	113·1	49	17 51	[−40]	28 9	+14	50·7	—
	N.	—	113·1	49	—	—	28 3	+ 8	50·6	—
Toronto		—	116·1	47	—	—	30 21	+122	e 64·6	—
La Paz		—	118·1	117	i 18 50	[+ 3]	29 49	+74	56·4	65·0
Ithaca		—	118·3	48	—	—	—	—	e 52·4	—
Washington		—	118·4	51	19 27	[+39]	29 27	+50	e 53·4	—
Ottawa		—	118·4	45	e 18 37	[−11]	29 35	+58	e 50·4	—
Cape Town		—	124·2	212	23 9	?PR_1	—	—	—	73·6
Lemberg		—	132·2	328	—	—	e 28 33	?	—	87·6
Dyce		—	135·0	352	i 19 11	[−19]	—	—	—	22·7
Hamburg		—	135·5	340	i 19 9	[−22]	e 22 21	?PR_1	e 63·4	—
Edinburgh		—	136·4	352	18 27	[−66]	—	—	63·4	75·4
Eskdalemuir		—	137·0	352	e 18 58	[−36]	—	—	22·4	—
Vienna		—	137·1	331	19 2	[−32]	—	—	39·4	72·4
De Bilt		—	138·2	343	19 11	[−25]	—	—	e 60·4	72·0
Stonyhurst		—	138·3	351	22 27	?PR_1	—	—	—	23·4
Athens		—	138·8	314	e 19 18	[−20]	22 47	?PR_1	—	—

Continued on next page.

		Corr. for Focus	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	°	m. s.	s.	m. s.	s.	m.	m.
Uccle		—	139·6	343	19 13	[−26]	—	—	45·4	68·6
Oxford		—	140·0	349	19 17	[−22]	22 42	?PR_1	—	77·2
Strasbourg		—	140·4	338	19 8	[−32]	—	—	e 66·4	81·4
Zurich		—	141·1	336	e 19 10	[−31]	—	—	—	—
Padova		—	141·2	332	18 46	[−55]	24 1	?PR_1	—	—
Paris		—	141·9	345	e 19 19	[−24]	i 22 54	?PR_1	51·4	79·4
Besançon		—	142·2	339	19 19	[−24]	22 28	?PR_1	53·4	—
Pompeii	E.	—	143·2	324	18 26	[−79]	25 36	?	31·4	—
Moncalieri		—	143·4	335	19 19	[−27]	37 14	?	60·4	88·2
Barcelona		—	148·4	337	i 19 34	[−19]	—	—	20·1	—
Tortosa		—	149·7	339	19 35	[−20]	—	—	53·8	82·0
Algiers		—	152·1	332	19 35	[−24]	—	—	41·4	79·0
Coimbra	E.	—	152·5	352	20 17	[+17]	29 17	?	43·4	84·8
	N.	—	152·5	352	20 14	[+14]	—	—	—	86·6
Granada		—	154·3	342	20 44	[+43]	32 1	?	—	—
San Fernando		—	155·7	346	19 47	[−16]	—	—	—	116·4

Additional readings: Apia gives PR_1 = +5m.36s., i = +6m.47s. Riverview iP = +5m.2s., PR_1 = +6m.6s. and +6m.23s., PS = +10m.6s., T_e = 8h.14m.17s. Epicentre 1°·0S. 163°·5E. Manila S = +13m.37s., MN = +17·0m. Osaka MN = +25·1m., T_e = 8h.16m.18s. Taihoku e = +10m.33s. Berkeley ePE = +12m.26s. Colombo P = +6m.27s. Toronto L = +46·2m., eL = +72·2m. La Paz i = +29m.16s., T_e = 8h.22m.17s. Ottawa SR_1E = +36m.9s., L = +69·4m., and +72·4m., +82·4m., and +103·4m., T_e = 8h.22m.8s. Lemberg e = +38m.45s. Dyce i = +11m.7s. Vienna iP = +19m.11s., PR_1 = +21m.55s., PR_2 = +22m.45s. De Bilt PR_1 = +22m.3s., MN = +70·8m. Uccle PR_1 = +22m.9s. Strasbourg PR_1ZN = +22m.12s. Barcelona i = +20m.16s. Coimbra PR_1N? = +22m.49s., PR_1E? = +22m.41s., PR_2N = +24m.49s., PR_2E = +24m.41s. San Fernando MN = +95·0m.

Aug. 15d. Readings also at 0h. (Chicago), 1h. (Eskdalemuir, Uccle, De Bilt, and near Mizusawa and Tokyo), 2h. (Mizusawa and Florence), 6h. (Helwan, La Paz, and Stonyhurst), 8h. (Moncalieri and Batavia), 11h. (near Osaka, Kobe, and Tokyo), 12h. (Moncalieri), 13h. (Melbourne, Sydney, Riverview, and near Tacubaya), 14h. (Helwan, Uccle, and De Bilt), 21h. (La Paz and Taihoku), 22h. (De Bilt, Taihoku (2), Zi-ka-wei (2), and Manila).

Aug. 16d. 14h. 41m. 38s. Epicentre 34°·0N. 14°·0E. (as on 1920 July 20d.).

A = +·804, B = +·201, C = +·559; D = +·242, E = −·970;
G = +·543, H = +·135, K = −·829.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Pompeii	6·8	3	1 44	0	2 57	− 8	—	3·2
Athens	8·8	62	2 15	+ 2	e 2 22	?	i 3·0	3·2
Florence	10·0	348	5 22	?L	—	—	(5·4)	8·4
Padova	11·5	353	3 37	+45	—	—	5·9	—
Moncalieri	12·0	338	e 5 10	?S	(5 10)	− 9	9·2	11·0
Zurich	14·0	345	e 4 19	+53	—	—	—	—
Vienna	14·3	6	3 30	0	6 1	−14	e 6·4	6·9
Helwan	15·2	101	13 22	?	—	—	—	—
Strasbourg	15·3	344	e 4 22	+39	—	—	8·4	—
Paris	17·1	334	—	—	7 22	+ 2	—	—
Lemberg	17·4	22	e 5 46	+96	—	—	—	7·5
Uccle	18·2	340	—	—	—	—	e 10·1	—
De Bilt	19·2	343	—	—	8 22	+14	e 10·0	10·7
Hamburg	19·8	356	—	—	e 8 22	+ 3	—	12·1
Eskdalemuir	24·4	336	—	—	—	—	12·4	—

Additional readings: Padova gives +5m.52s. +10m.30s. and +18m.22s. Moncalieri S = +7m.42s. (?SR_1).

Aug. 16d. Readings also at 2h. (Manila and San Fernando), 6h. (Helwan), 17h. (near Tokyo), 21h. (San Fernando), 22h. (Batavia and La Paz).

Aug. 17d. 7h. 42m. 50s. Epicentre 44°·5N. 140°·0E. (as on 1919 Mar. 12d.).

A = −·546, B = +·458, C = +·701 ; D = +·643, E = +·766 ;
G = −·537, H = +·451, K = −·713.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari		2·9	42	0 55	+10	—	—	1·4	2·1
Mizusawa	E.	5·5	170	1 18	− 7	2 11	−20	—	—
	N.	5·5	170	1 23	− 2	2 16	−15	—	—
Tokyo		8·9	181	2 24	+ 9	—	—	3·6	3·6
Kobe		10·5	202	—	—	4 59	+16	5·0	5·0
Zi-ka-wei		19·7	233	e 4 31	− 6	—	—	—	—
De Bilt		75·8	333	—	—	—	—	e 37·2	42·2
Uccle		77·2	333	—	—	—	—	e 38·2	—
La Paz		143·3	49	21 30	?PR_1	—	—	—	—

Kobe gives its reading at 6h. De Bilt MN = +47·6m.

Aug. 17d. Readings also at 0h. and 1h. (Lick), 2h. (Strasbourg, Honolulu, and near Tokyo and Apia), 3h. (Victoria, Uccle, San Fernando, and De Bilt), 4h. (Helwan), 7h. (Lick), 8h. (near Port au Prince), 16h. (near Mizusawa), 20h. (De Bilt), 21h. (San Fernando and Manila).

Aug. 18d. Readings at 1h. (near Kobe), 5h. (Helwan and Colombo), 7h. (Zi-ka-wei and Taihoku (2)), 9h. (Helwan), 10h. (Taihoku), 11h. (Rio Tinto), 19h. (Taihoku), 20h. (San Fernando), 21h. (Helwan, Paris, De Bilt, Hamburg, and near Calcutta).

Aug. 19d. Readings at 1h. (Taihoku, Simla, Zi-ka-wei, and Manila), 2h. (Taihoku, Moncalieri, Uccle, De Bilt, and Eskdalemuir), 3h. and 4h. (La Paz), 7h. (near Rocca di Papa), 8h. (La Paz), 10h. (Moncalieri), 11h. (near Tacubaya), 19h. (Taihoku), 21h. (Tortosa and near La Paz), 23h. (San Fernando and Mizusawa).

1920. Aug. 20d. 16h. 15m. 28s. Epicentre 38°·0S. 73°·5W.

(Suggested by La Paz).

A = +·224, B = −·755, C = −·616 ; D = −·959, E = −·284 ;
G = −·175, H = +·590, K = −·788.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
La Paz		22·0	14	i 5 8	+ 3	i 9 15	+10	11·5	15·7
Vieques	E.	56·7	9	—	—	17 41	− 1	e 26·5	31·4
Oaxaca		59·3	333	20 17	?	27 34	?	31·3	34·1
Tacubaya		62·3	331	10 45	+18	19 5	+13	28·2	36·8
Cape Town		71·2	119	12 4	+40	21 14	+34	—	53·7
Cheltenham	N.	76·8	358	e 12 1	+ 1	21 48	+ 1	48·5	—
Georgetown		77·0	357	—	—	—	—	e 40·7	—
Washington		77·0	357	11 57	− 4	21 40	− 9	37·0	—
Tucson	E.	78·5	329	—	—	—	—	38·6	45·4
Harvard	E.	80·4	1	e 11 39	−42	22 25	− 3	40·4	—
Ithaca		80·5	358	e 11 42	−40	21 44	−45	36·2	—
Chicago		80·6	350	11 22	−61	21 28	−62	38·8	—
Toronto		81·8	356	—	—	—	—	46·9	54·8
Ottawa		83·4	359	i 12 35	− 3	i 22 53	− 8	e 37·0	—
Lick		87·5	323	—	—	—	—	e 42·3	—
Apia		87·9	256	—	—	23 50	− 1	40·9	—
Berkeley	Z.	88·2	323	e 13 2	− 4	—	—	e 42·2	—
Melbourne		96·3	210	24 2	?S	(24 2)	−77	47·2	52·3
San Fernando		97·0	49	17 50	?PR_1	24 38	−48	46·8	63·5
Victoria		97·1	329	23 40	?S	(23 40)	−107	42·8	51·2
Riverview		97·1	217	e 24 10	?S	(e 24 10)	−77	e 43·8	49·1
Rio Tinto		97·6	47	25 32	?S	(25 32)	0	—	67·5
Coimbra	E.	98·2	43	e 11 32	−149	24 27	−71	43·5	57·2
	N.	98·2	43	e 17 5	?PR_1	—	—	—	57·5
Honolulu		98·9	290	—	—	—	—	e 92·5	—
Granada		99·0	50	i 17 52	?PR_1	—	—	—	—
Adelaide		101·2	206	—	—	—	—	e 49·8	60·5
Algiers		102·6	52	e 18 16	?PR_1	27 37	+77	48·5	57·5
Tortosa		103·8	49	18 26	?PR_1	27 31	+60	40·6	63·8

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Barcelona		105·2	50	e 18 35	?PR_1	—	—	e 45·0	58·5
Mauritius	E.	106·1	133	23 32	?	—	—	—	34·2
	N.	106·1	133	27 2	?S	(27 2)	+ 9	—	54·5
Oxford		109·5	38	18 56	?PR_1	28 42	+78	—	63·0
Paris		109·8	41	e 18 58	?PR_1	i 28 39	+73	51·5	60·5
Kew		109·9	38	28 32	?S	(28 32)	+65	—	71·5
Stonyhurst		110·2	37	19 14	?PR_1	28 32	+62	63·2	66·1
Moncalieri		110·5	47	e 16 19	+79	28 46	+73	45·8	71·5
Besançon		110·7	45	19 0	?PR_1	—	—	54·5	—
Eskdalemuir		110·8	35	19 21	?PR_1	28 49	+74	46·5	64·2
Edinburgh		111·2	34	19 17	?PR_1	28 56	+77	45·5	64·8
Rocca di Papa		111·8	51	e 19 18	?PR_1	e 28 56	+72	e 56·0	60·6
	N.	111·8	51	e 19 18	?PR_1	e 27 12	−32	e 51·8	75·0
Uccle		111·9	40	e 18 32	[+ 3]	29 1	+76	e 51·5	62·0
Florence		112·0	50	25 32	?S	35 32	?	54·5	62·5
Zurich		112·3	46	—	—	—	—	e 55·5	—
Strasbourg		112·5	45	e 18 32	[+ 2]	e 29 9	+79	52·0	66·8
Pompeii	E.	112·5	53	17 40	[−50]	27 40	−10	55·5	66·5
Dyce	N.	112·5	32	—	—	(29 10)	+80	29·2	62·5
De Bilt	E.	113·0	40	—	—	27 32	−22	e 50·5	62·6
	N.	113·0	40	—	—	e 27 20	−34	e 52·5	70·2
Padova		113·2	49	18 4	[−28]	27 59	+ 3	47·9	67·3
Hamburg		116·3	40	e 19 38	?PR_1	e 29 39	+79	e 53·5	64·3
Vienna		117·3	46	—	—	—	—	e 53·5	69·9
Helwan	E.	118·8	73	55 14	?L	—	—	(55·2)	78·8
	N.	118·8	73	54 2	?L	—	—	(54·0)	79·9
Lemberg		122·5	49	—	—	—	—	e 63·6	74·0
Batavia		135·8	180	e 20 53	?PR_1	—	—	e 71·4	—
Colombo		140·6	138	25 32	?	—	—	81·5	83·5?
Kodaikanal		141·9	129	68 56	?L	—	—	80·1	83·4
Manila		153·3	213	e 19 32	[−28]	—	—	—	121·3
Simla		155·0	97	—	—	—	—	e 77·8	81·0
Zi-ka-wei		166·0	245	e 24 53	?PR_1	e 35 39	?	—	—

Additional readings: La Paz gives i = +9m.43s., T_o =16h.15m.29s. Epicentre 38°·0S. 73°·5W., as adopted. Vieques eLN = +26·6m., assuming 52 is a misprint for 42 in the reading. Tacubaya LN = +29·9m. Georgetown eLN = +40·5m., LE = +47·5m., LN = +45·8m. Tucson LN = +39·6m. Harvard L? ? = +36·3m., L = +49·9m. and +61·5m. and +109·0m., T_o? = 16h.14m.59s. Toronto eL = +53·1m. and +65·9m. Ottawa e?N = +7m.2s., eE = +27m.52s., T_o? =16h.15m.43s. Berkeley eLE = +42·4m., eLN = +42·5m. Melbourne S = +32m.2s.(?SR_1). San Fernando MN = +60·5m. Victoria S = +32m.2s. Riverview eS = +31m.40s., e = +41m.19s. and 41m.53s., MN = +49·3m. Adelaide e = +51m.50s., +53m.8s., and 55m.32s. Barcelona eL_1 = +27m.46s.(?S). Rocca di Papa LN = +59·0m. Uccle e = +25m.32s., MN = +61·6m. Strasbourg MN = +64·7m. De Bilt eS = +29m.18s. (O−C = −36s.). Hamburg e = +30m.2s., MN = +65·6m., MZ = +65·4m. Helwan PEN increased by 2hrs. Moncalieri MN = +66·4m. Lemberg e = +73m.8s. Batavia eL = +78·4m. and 85·4m.

Aug. 20d. Readings also at 0h. (La Paz), 2h. (Riverview, La Paz, and Manila), 3h. (Apia), 13h. (Apia, Riverview, and Moncalieri), 14h. (Apia, Strasbourg, Uccle, Manila, Pompeii, Melbourne, Adelaide, and Padova), 18h. (La Paz), 19h. (La Paz (3)), 22h. (near La Paz), 23h. (near Tokyo and near Rocca di Papa).

Aug. 21d. 21h. 19m. 18s. Epicentre 53°·0N. 23°·0W. (very doubtful).

A = +·554, B = −·235, C = +·799; D = −·391, E = −·920; G = +·735, H = −·312, K = −·602.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Eskdalemuir		11·8	71	—	—	—	—	5·7	—
Edinburgh		11·8	68	3 12	+16	—	—	—	11·2
Oxford		13·2	86	—	—	—	—	—	10·8
Kew		13·9	87	—	—	—	—	—	10·7
Coimbra		16·2	136	e 3 13	−42	—	—	7·9	10·5
Paris		16·5	94	—	—	—	—	e 7·7	12·7
Uccle		16·9	86	e 4 10	+ 6	—	—	8·3	11·7
De Bilt	E.	17·0	82	—	—	—	—	e 7·4	14·3
	N.	17·0	82	—	—	—	—	e 8·5	12·1

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Besançon	19·3	96	10 42	?L	—	—	(10·7)	11·7
Hamburg	19·5	75	e 4 36	+ 1	—	—	e 11·7	15·7
Strasbourg N.	19·8	90	4 30	− 9	—	—	e 9·4	13·7
Tortosa	20·0	118	4 42	+ 1	—	—	9·1	14·8
San Fernando	20·3	138	1 42	?	—	—	—	—
Granada	20·8	132	—	—	e 10 2	?L	(e 10·0)	—
Moncalieri	21·5	99	—	—	e 9 26	+31	12·1	—
Vienna	25·1	85	—	—	—	—	e 15·3	16·2
Rocca di Papa	26·3	101	—	—	—	—	e 16·3	19·9
Harvard	33·4	271	—	—	(13 2)	+32	15·3	—
Ottawa	34·5	279	e 7 8	− 1	—	—	17·7	—
Helwan	45·4	98	33 42	?	—	—	—	—

Additional readings: Coimbra gives eE = +5m.27s., MN = +10·4m. Paris MN = +10·7m. Hamburg MN = +15·1m. Harvard gives a possible S as LE?. Helwan PE = +32m.42s.

Aug. 21d. Readings also at 0h. (San Fernando), 2h. (Helwan and Moncalieri), 6h. (Lick), 8h. (near Tokyo), 9h. (La Paz), 16h. (Apia and La Paz).

Aug. 22d. Readings at 0h. (Riverview), 1h. (near Tokyo), 4h. (Helwan), 5h. and 11h. (La Paz), 21h. (San Fernando), 23h. (Kew).

Aug. 23d. Readings at 2h. (near Batavia), 5h. (La Paz), 6h. (near Batavia), 7h. (La Paz and Taihoku (2)), 10h. (near Mizusawa), 11h. (La Paz), 16h. (near Mizusawa), 23h. (Apia, Taihoku, and San Fernando).

Aug. 24d. Readings at 2h. (La Paz), 17h. (La Paz, Helwan, and Moncalieri), 18h. (Rio Tinto and De Bilt).

Aug. 25d. 21h. 53m. 25s. Epicentre 7°·0S. 148°·0E. (as on 1919 Oct. 21d.).
A = −·842, B = +·526, C = −·122; D = +·530, E = +·848;
G = +·103, H = −·065, K = −·992.

Very doubtful. The determinations of T_0 from S−P are quite discordant.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview	27·0	174	e 5 23	−35	e 10 30	−11	e 13·0	16·2
Sydney	27·0	174	5 17	−41	10 35	− 6	14·6	16·1
Adelaide	29·3	196	e 6 59	+38	i 11 29	+ 7	13·1	18·6
Melbourne	30·9	185	—	—	11 53	+ 3	18·1	20·3
Manila	34·4	309	e 7 25	+17	—	—	15·6	—
Perth	39·0	226	9 10	?PR_1	13 45	− 7	22·6	—
Batavia	40·9	269	e 8 23	+21	i 13 59	−21	e 24·2	—
Taihoku	41·1	322	—	—	e 14 7	−15	17·5	—
Osaka	43·4	345	7 58	−23	—	—	—	15·2
Nagoya	43·5	348	8 5	−17	—	—	—	—
Honolulu	60·1	60	11 5	+52	19 29	+65	28·6	38·3
Mauritius E.	87·7	250	37 59	?L	—	—	(38·0)	47·2
Victoria	94·4	42	—	—	—	—	—	51·2
Helwan	116·5	299	21 35	?PR_1	(29 35)	+73	—	—
Cape Town	117·1	226	64 50	?L	—	—	(64·8)	69·3
Vienna	122·0	324	e 18 35	[−23]	—	—	e 47·6	71·1
Hamburg	122·5	352	—	—	e 20 35	?PR_1	e 59·6	62·6
De Bilt	125·6	331	—	—	—	—	e 59·6	64·5
Edinburgh	126·1	340	29 35	?S	(29 35)	+ 1	63·6	—
Eskdalemuir	126·5	340	e 21 5	?PR_1	e 31 7	+90	52·6	—
Strasbourg	126·6	326	—	—	—	—	e 61·6	63·6
Uccle	126·8	330	e 21 8	?PR_1	e 38 5	?SR_1	e 58·6	—
Rocca di Papa	127·4	319	e 20 5	[+53]	—	—	—	77·7
Stonyhurst	127·5	340	59 35	?L	68 35	?	(59·6)	—
Moncalieri	128·8	325	e 21 21	?PR_1	39 4	?SR_1	62·1	—
Paris	129·0	330	e 20 35	[+79]	—	—	63·6	64·6
La Paz	137·2	124	i 19 38	[+ 4]	i 23 12	?PR_1	—	—
Coimbra	140·6	330	21 35	?PR_1	34 14	?	e 64·2	—
San Fernando	142·3	325	26 35	?	—	—	—	—

Additional readings: Riverview gives MN = +19·2m., MZ = +18·4m., T_0 = 21h.52m.21s. Perth SR_1 = +17m.38s. Batavia i = +9m.30s. De Bilt ePR_1 = +20m.58s., MN = +64·8m.. Stonyhurst P = +31m.11s., ?S of the present shock.

Aug. 25d. Readings also at 0h. (San Fernando), 3h. (Batavia), 8h. (Manila), 9h. (La Paz), 17h. (La Paz and Batavia).

Aug. 26d. 22h. 59m. 54s. Epicentre 52°·5N. 170°·0W.
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	V.	20·3	63	—	—	e 8 22	− 7	—	—
Victoria		29·5	79	(6 10)	−13	6 10	?P	10·6	15·5
Honolulu		32·4	158	e 7 54	+62	12 6	− 8	16·1	20·9
Berkeley	E.V.	35·8	95	e 6 58	−22	—	—	e 16·2	—
Mizusawa	E.	35·8	269	7 11	− 9	12 53	−14	—	—
	N.	35·8	269	7 10	−10	12 50	−17	—	—
Tokyo		38·9	268	7 29	−16	e 8 58	?PR$_1$	15·2	—
Osaka		42·1	269	8 5	− 7	—	—	—	18·4
Kobe	E.N.	42·3	269	6 53	−80	e 14 28	−11	e 20·0	21·4
Tucson	E.	46·5	91	e 8 31	−13	—	—	23·9	27·5
Zi-ka-wei		53·1	276	e 9 24	− 3	e 16 58	+ 1	—	—
Chicago		53·9	68	8 16	−76	15 39	−89	24·4	—
Ann Arbor	E.	55·7	65	8 36	−68	17 6	−24	28·9	—
Toronto		57·1	61	9 12	−41	17 30	−17	e 32·9	39·9
Taihoku		57·4	271	—	—	e 18 33	+42	—	—
Ottawa		58·7	57	i 9 52	−11	e 17 39	−28	e 27·6	—
Washington		61·7	62	10 20	− 3	18 36	− 8	e 30·0	—
Georgetown	E.	61·7	62	i 10 19	− 4	18 37	− 7	33·1	—
Cheltenham	N.	61·9	62	10 23	− 1	18 44	− 3	31·1	31·8
Harvard	E.	62·3	56	10 25	− 2	19 47	+55	e 33·4	—
	N.	62·3	56	—	—	19 5	+13	e 33·3	—
Manila		65·8	265	e 11 6	+16	20 24	+49	37·2	37·2
Edinburgh		71·1	10	—	—	i 20 36	− 3	—	51·1
Eskdalemuir		71·6	10	11 28	+ 1	20 51	+ 6	33·1	(43·1)
Stonyhurst		73·2	10	21 24	?S	(21 24)	+20	—	53·1
Hamburg		74·0	0	i 11 44	+ 2	e 21 16	+ 2	e 35·1	44·8
De Bilt		75·4	4	11 52	+ 1	21 32	+ 2	e 32·1	52·1
Kew		75·7	9	—	—	—	—	—	48·1
Uccle		76·6	5	11 57	− 2	21 44	0	e 32·1	38·1
Lemberg		77·0	351	—	—	—	—	e 41·0	52·1
Oxford		77·6	9	—	—	i 21 29	−27	—	53·7
Simla		78·0	309	—	—	e 20 42	−78	e 42·2	51·0
Paris		78·6	7	i 12 8	− 3	e 22 5	− 2	37·1	53·1
Strasbourg		79·0	2	i 12 11	− 2	i 22 13	+ 1	e 38·1	—
Vienna		79·1	357	i 12 12	− 2	22 14	+ 1	i 38·7	53·8
Zurich		80·2	1	e 12 18	− 2	—	—	—	—
Padova		82·0	359	10 52	−98	22 18	−28	—	—
Moncalieri		82·5	2	12 32	− 1	22 42	−10	42·5	55·4
Florence		83·7	0	13 26	+46	—	—	—	22·8
Barcelona		85·8	7	e 12 53	+ 1	i 23 19	− 9	e 41·8	—
Rocca di Papa		85·8	358	i 12 47	− 5	23 11	−17	—	—
	N.	85·8	358	e 12 45	− 7	23 14	−14	e 50·0	62·2
Coimbra	E.	86·0	13	e 12 44	− 9	i 23 21	− 9	e 37·6	54·9
	N.	86·0	13	—	—	—	—	e 39·7	55·0
Tortosa		86·4	8	12 44	−11	23 12	−22	e 41·1	59·2
Pompeii	E.	86·7	357	12 40	−17	23 10	−28	—	—
Rio Tinto		88·6	13	30 6	?SR$_1$	—	—	—	63·6
Granada		89·6	11	13 8	− 6	23 56	−14	—	—
San Fernando		90·0	12	39 42	?	50 6	?L	(50·1)	66·6
Algiers		90·6	5	e 12 2?	−77	24 3	−17	61·1	—
Batavia		90·8	263	e 16 39	?PR$_1$	e 24 41	+19	—	—
Kodaikanal		95·2	296	54 54	?L	—	—	59·1	61·4
Helwan		95·6	341	19 6	?PR$_1$	(25 6)	− 6	—	—
Melbourne		98·4	215	—	—	—	—	—	49·6
La Paz		110·2	91	e 18 11	[−12]	—	—	69·1	75·7

Additional readings: Victoria gives P = +1m.15s. Berkeley e?N = +16m.52s. Osaka MN = +18·0m. Tucson ePN = +8m.30s. Toronto i = +12m.48s. Ottawa PR$_1$E = +12m.19s., T$_0$ = 23h.0m.4s. Georgetown iPN = +10m.20s., eL = +30·1m., LN = +34·3m., T$_0$ = 22h.59m.58s. Cheltenham PE = +10m.21s., T$_0$ = 22h.59m.54s. Manila MN = +39·6m. Harvard eN = +31m.0s., LE = +36·6m., LN = +39·1m. and +43·1m., T$_0$? = 22h.58m.55s. Eskdalemuir LN = +43·1m., T$_0$ = 22h.59m.58s. Hamburg MN = +50·1m., T$_0$ = 23h.0m.4s. De Bilt eLN = +41·1m., MN = +53·2m. Uccle MN = +53·1m., T$_0$ = 23h.0m.4s. Paris iS = +22m.14s. Vienna SN = +22m.15s., T$_0$ = 23h.0m.3s. Padova gives +11m.57s. and +21m.6s. Moncalieri MN = +58·6m. Granada PS = +24m.12s., T$_0$ = 23h.0m.11s. San Fernando MN = +60·1m. La Paz i = +19m.29s. (?PR$_1$).

Aug. 26d. Readings also at 18h. (near Tokyo), 22h. (Toronto).

Aug. 27d. 3h. 25m. 8s. Epicentre 2°·0S. 133°·0E. (as on 1918 Jan. 21d.).

$A = -\cdot682$, $B = +\cdot731$, $C = -\cdot035$; $D = +\cdot731$, $E = +\cdot682$; $G = +\cdot024$, $H = -\cdot026$, $K = +\cdot999$.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Manila	20·5	325	e 4 43	− 4	—	—	—	—
Batavia	26·4	260	e 5 52	0	—	—	e 15·4	—
Riverview	36·1	154	e 18 54	?L	e 21 54	?	e 23·0	25·6
Melbourne	37·4	165	—	—	—	—	19·9	21·9
Honolulu	71·2	67	e 23 10	?S	(e 23 10)	?	e 39·9	44·7
La Paz	152·1	132	20 18	[+19]	—	—	—	—

Riverview gives MN = +29·2m.

Aug. 27d. Readings also at 0h. (Cape Town and near Apia), 1h. (Riverview), 4h. (Helwan), 7h. (Helwan, Simla, and Melbourne), 8h. (De Bilt), 11h. (Riverview (2) and Apia), 12h. (Apia, Helwan, and Riverview), 13h. (Chicago, Riverview, and Apia), 15h. (Rocca di Papa), 20h. (Taihoku).

Aug. 28d. Readings at 0h. and 4h. (Helwan), 7h. (La Paz, Oaxaca, and Tacubaya), 10h. (near Tacubaya), 12h. (near Tacubaya and Mazatlan), 13h. (Rocca di Papa), 14h. (Rocca di Papa and La Paz), 17h. (Taihoku), 20h. (La Paz and near Tacubaya), 22h. (San Fernando).

Aug. 29d. 10h. 49m. 8s. Epicentre 18°·0S. 170°·1E. (as on 1920 Jan. 29d.).

$A = -\cdot937$, $B = +\cdot164$, $C = -\cdot309$; $D = +\cdot172$, $E = +\cdot985$; $G = +\cdot304$, $H = -\cdot053$, $K = -\cdot951$.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview	23·2	223	e 5 25	+ 6	e 9 38	+ 9	e 11·3	12·4
Sydney	23·2	223	6 16	+57	—	—	12·4	13·5
Christchurch	25·6	176	—	—	10 4	−10	14·5	17·3
Melbourne	29·6	223	—	—	11 22	− 5	15·7	17·9
Adelaide	32·7	233	—	—	—	—	—	20·9
Honolulu	50·2	40	16 10	?S	(16 10)	−11	23·2	31·7
Chicago	110·9	51	—	—	—	—	e 53·4	—
Toronto	117·0	50	—	—	—	—	e 64·7	68·2
Ottawa	119·6	47	—	—	—	—	e 61·2	—
Helwan	140·7	295	77 52	?L	—	—	(77·9)	—
Uccle	145·3	344	—	—	—	—	e 79·9	—
Strasbourg	146·2	339	20 5	[+15]	—	—	—	—
Rocca di Papa	149·4	326	e 19 59	[+ 4]	29 54	?	e 157·3	160·1

Additional readings: Riverview gives MN = +13·6m. Christchurch SR_1? = +12m.32s. Chicago LE = +57·4m. Helwan PE = +86m.52s. Rocca di Papa ePN = +20m.19s. The L and M for this station probably belong to a later shock; possibly that at 12h. relegated to the notes.

Aug. 29d. Readings also at 0h. (Cape Town), 1h. (Perth), 5h. (Manila), 7h. (La Paz), 8h. (Manila), 9h. (Zi-ka-wei and Taihoku), 12h. (Tucson), 13h. (Chicago), 22h. (San Fernando and Taihoku).

Aug. 30d. Readings at 3h. (near Tokyo), 5h. (Helwan), 6h. (La Paz), 14h. (Manila), 17h. (Taihoku), 18h. (Helwan), 19h. (near Athens), 22h. (San Fernando).

Aug. 31d. Readings at 4h. (Stonyhurst and La Paz), 7h. (near Osaka and near Kobe (2)), 8h. (near Kobe (2)), 11h. (Helwan), 14h. (Taihoku), 16h. (Lick), 17h. (La Paz), 21h. (near Rocca di Papa and Pompeii), 22h. (San Fernando), 23h. (Cape Town).

Sept. 1d. 2h. 45m. 50s. Epicentre 3°·0S. 88°·0W. (as on 1918 Feb. 3d.).

A = +·035, B = −·998, C = −·052 ; D = −·999, E = −·035 ;
G = −·002, H = +·052, K = −·999.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
La Paz	23·8	126	5 10	−16	—	—	—	—
Tacubaya	25·0	334	—	—	9 53	−10	12·8	13·2
Chicago	44·8	1	8 28	− 4	15 50	+38	—	—
Toronto	47·3	8	—	—	—	—	18·2	—
Victoria	59·9	334	17 23	?S	(17 23)	−59	—	22·8
Honolulu	72·7	295	—	—	(22 10)	+72	22·2	27·2
Uccle	93·8	39	—	—	—	—	e 42·2	—
De Bilt	94·3	38	—	—	—	—	e 42·2	47·3

De Bilt gives also eLN = +46·2m. Tacubaya readings increased by 10m., MN = +13·3m.

Sept. 1d. 10h. 33m. 0s. Epicentre 35°·5N. 6°·4W.

A = +·809, B = −·091, C = +·581 ; D = −·111, E = −·994 ;
G = +·577, H = −·065, K = −·814.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
San Fernando N.	1·0	10	2 12	?	—	—	—	3·0
Granada	2·8	53	0 46	+ 2	1 20	+ 3	—	—
Coimbra	5·0	342	e 1 16	− 1	4 16	?	4·9	—
Tortosa	7·6	44	3 26	?S	(3 26)	0	4·6	5·1
Algiers	7·8	77	1 59	+ 1	3 30	− 1	4·2	4·5
Barcelona	9·0	46	—	—	—	—	e 5·2	6·1
Paris	14·8	23	—	—	—	—	e 8·0	9·0
Rocca di Papa	16·1	61	—	—	(e 5 48)	−69	e 5·8	11·0
Kew	16·5	13	—	—	—	—	—	15·0
Strasbourg	16·7	34	—	—	—	—	e 9·0	—
Uccle	17·2	24	—	—	—	—	e 9·0	—
De Bilt E.	18·5	23	—	—	—	—	e 10·3	10·9
N.	18·5	23	—	—	—	—	e 10·6	12·8
Eskdalemuir	19·9	5	—	—	—	—	9·0	—
Hamburg	21·4	27	—	—	(e 9 0)	+ 7	e 9·0	—
Helwan	32·1	89	19 0	?L	—	—	(19·0)	—

Additional readings: Coimbra gives P = +2m.56s. Tortosa records S as P and gives S = +4m.23s.

Sept. 1d. Readings also at 0h. (Rio Tinto), 5h. (La Paz), 11h. (Apia), 12h. (Manila), 15h. (La Paz and Stonyhurst), 16h. (Taihoku), 17h. (La Paz), 18h. (Apia), 21h. (Padova, San Fernando, Strasbourg, and Vienna).

Sept. 2d. Readings at 0h. (near Rocca di Papa and Pompeii), 3h. (La Paz), 11h. (Helwan), 18h. (Manila), 19h. (San Fernando).

Sept. 3d. Readings at 1h. (Taihoku), 2h. (Edinburgh, Stonyhurst, Helwan, De Bilt, and Apia), 3h. (Paris, Strasbourg, Honolulu, and near Rocca di Papa), 4h. (Uccle, Edinburgh, Stonyhurst, Eskdalemuir, De Bilt, and Chicago), 5h. (Helwan), 6h. and 7h. (La Paz), 16h. (near Balboa Heights), 17h. (La Paz), 19h. (De Bilt, Uccle, Helwan, Strasbourg, Hamburg, Manila, San Fernando, Batavia, and Vienna), 20h. (Paris).

1920. Sept. 4d. 14h. 8m. 55s. Epicentre **51°·0S. 3°·0E.**
(adopted from De Bilt).

A = +·628, B = +·033, C = −·777 ; D = +·052, E = −·999 ;
G = −·776, H = −·041, K = −·629.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Cape Town		20·5	39	(5 47)	+60	5 47	?P	9·3	11·3
Mauritius		52·6	75	15 35	?	23 47	?	—	24·7
Seychelles		63·8	62	18 35	?S	(18 35)	−36	28·1	29·6
		63·8	62	18 25	?S	(18 25)	−46	—	—
La Paz		65·4	274	i 10 48	+ 1	19 30	0	31·2	32·7
Perth		78·2	127	—	—	28 5	?SR_1	—	—
Helwan		84·7	24	19 35	?	(23 5)	−11	—	46·0
Colombo		87·2	75	23 5	?S	(23 5)	−38	43·1	53·1
San Fernando		87·8	353	24 20	?S	(24 20)	+30	45·6	54·1
Algiers		87·8	0	—	—	—	—	e 40·1	52·1
Granada		88·3	355	i 13 4	−3	i 23 54	− 1	—	—
Kodaikanal		88·4	70	38 11	?	—	—	42·1	47·7
Rio Tinto		89·1	353	31 5	?SR_1	—	—	—	60·1
Athens	E.	90·8	15	e 13 21	+ 1	24 43	+21	e 39·6	52·3
	N.	90·8	15	e 13 26	+ 6	24 51	+29	e 46·6	52·2
Coimbra	E.	91·8	351	14 39	+73	25 9	+36	43·4	47·3
	N.	91·8	351	—	—	24 59	+26	43·2	61·5
Tortosa		91·9	358	14 48	+82	24 54	+20	e 33·1	56·2
Azores		92·2	338	65 53	?L	—	—	(65·9)	—
Pompeii	E.	92·2	9	15 5	+97	—	—	46·1	54·1
Barcelona		92·5	0	—	—	e 24 47	+ 7	e 39·3	51·3
Rocca di Papa	N.	93·2	6	e 14 4	+31	—	—	e 44·8	57·6
		93·2	6	e 13 57	+24	e 26 47	+120	45·8	59·6
Batavia		93·7	103	i 15 4	+88	i 24 39	−14	e 39·1	—
Moncalieri		96·0	3	15 14	+85	26 15	+59	42·4	60·0
Strasbourg		99·7	3	e 17 17	+188	e 33 5	?	e 48·1	58·0
Paris		99·8	359	e 22 28	?	32 59	?	43·1	59·1
Vienna		99·9	9	e 13 23	−47	e 27 17	+82	e 49·1	64·1
Uccle		101·8	1	—	—	e 24 59	−74	41·1	55·7
Lemberg		102·4	14	—	—	e 26 5	−14	e 51·0	55·7
Kew		102·5	358	46 5	?L	—	—	(46·1)	75·1
Oxford		102·8	357	—	—	—	—	—	61·2
De Bilt		103·1	1	e 16 17	+111	e 27 43	+78	49·1	58·6
Bidston		104·6	357	26 17	?S	(26 17)	−21	—	59·4
Simla		104·8	57	—	—	e 29 17	+157	—	56·4
Hamburg		104·8	3	19 29	?PR_1	—	—	e 51·1	57·1
Stonyhurst		105·0	357	e 35 17	?SR_1	e 42 5	?	56·8	62·6
Edinburgh		108·0	357	—	—	e 28 5	+55	54·1	59·8
Dyce	N.	108·3	358	—	—	—	—	51·5	58·1
Harvard		113·4	310	13 15	−118	21 34	?PR_1	57·4	—
Ottawa		117·9	310	20 22	?SR_1	30 21	?	e 48·1	—
Toronto		118·5	306	63 59	?L	70 47	?	78·6	80·6
Chicago		121·6	299	21 9	?PR_1	31 55	?	50·8	—
Victoria		146·0	289	49 7	?	—	—	—	84·0

Additional readings: Cape Town gives P = 14h.4m.42s. This has been corrected by 10m., making it exactly equal to the S reading; it now seems to be a possible P, although 1m. out. Mauritius PE = +14m.47s. Seychelles reading given at 15h. La Paz MN = +31·2m. T_o = 14h.8m.59s. Helwan MN = +52·0m. Colombo S = +30m.5s. San Fernando MN = +48·6m. Algiers MN = +58·1m. Athens PR_1E = +17m.25s., PR_2N = +19m.27s. T_o = 14h.8m.41s. Coimbra SR_1N = +31m.9s. T_o = 14h.11m.11s. Rocca di Papa PR_1E = +17m.9s., PR_1N = +18m.13s., eL = +33·0m., MN = +55·4m. Moncalieri MN = +56·6m. Strasbourg MN = +59·7m. Paris MN = +56·1m. Uccle SR_1 = +33m.35s., MN = +51·8m. De Bilt MN = +52·1m. Epicentre 51°·0S. 3°·0E. Bidston gives S = +34m.17s. ?SR_1. Hamburg MZ = +59·3m., MN = +61·9m. Dyce ME = +61·7m. Harvard e = +26m.1s., eLE = +46·2m., LE = +84·5m., LN = +85·2m., T_o = 14h.8m.30s. Ottawa LE = +58·1m., +71·1m., +81·1m., +91·1m., and +96·1m., T_o = 14h.17m.16s. Toronto i = +67m.35s.

Sept. 4d. Readings also at 2h. (Riverview), 3h. (Apia), 9h. (La Paz), 11h. (2), 12h. (2), 13h., 14h. (2) (Stonyhurst), 16h. (Ann Arbor and La Paz), 18h. (near Rocca di Papa), 19h. (Rio Tinto), 20h. (Helwan and near Tokyo), 22h. (Apia), 23h. (near Mizusawa).

Sept. 5d. Readings at 2h. (La Paz), 3h. (Helwan), 4h. and 7h. (La Paz), 12h. (Taihoku), 14h. (Manila), 20h. (near Tacubaya), 21h. (San Fernando).

Sept. 6d. 4h. 40m. 30s. Epicentre 36°·0N. 139°·0E. (as on 1919 Jan. 24d.).

A = −·611, B = +·531, C = +·588.

		Δ	P.	O−C.	S.	O−C.	L.	M.
		°	m. s.	s.	m. s.	s.	m.	m.
Tokyo		0·8	0 14	+ 2	—	—	0·4	0·5
Osaka		3·2	—	—	1 48	+20	2·8	3·6
Mizusawa	E.	3·5	0 50	− 5	1 23	−14	—	—
	N.	3·5	0 48	− 7	1 17	−20	—	—

Tokyo gives also MN = +0·6m.

Sept. 6d. 6h. 29m. 10s. Epicentre 35°·0N. 24°·0E. (as on 1918 Sept. 30d.).

A = +·748, B = +·333, C = +·574.

	Δ	P.	O−C.	S.	O−C.	L.	M.
	°	m. s.	s.	m. s.	s.	m.	m.
Athens	2·9	0 43	− 2	1 20	0	1·4	1·5
Pompeii	9·4	e 2 41	+19	—	—	—	—
Rocca di Papa	11·1	e 2 49	+ 3	e 4 38	−19	e 6·0	—
De Bilt	21·7	—	—	—	—	e 12·0	13·2

Athens gives also MN = +1·6m.

Sept. 6d. 14h. 5m. 24s. Epicentre 43°·8N. 11°·2E. Florence (as on 1920 Mar. 8d.).

A = +·708, B = +·140, C = +·692; D = +·194, E = −·981;
G = +·679, H = +·134, K = −·722.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Florence		0·0	—	0 13	+13	—	—	—	0·8
Padova		1·7	17	0 19	− 7	0 39	− 9	—	—
Rocca di Papa		2·3	152	i 0 57	?S	2 18	?	e 8·4	—
		2·3	152	i 0 54	?S	(i 0 54)	− 9	1·9	2·2
Moncalieri		2·8	295	0 40	− 3	1 7	−10	—	1·6
		2·8	295	0 43	− 1	1 9	− 8	—	1·7
Pompeii	E.	3·9	142	1 19	+18	2 22	?L	(2·4)	3·9
Zurich	E.	4·0	332	1 1	− 1	i 1 51	+ 1	—	2·5
	N.	4·0	332	1 1	− 1	i 1 57	+ 7	—	2·2
	Z.	4·0	332	1 1	− 1	i 2 3	+13	—	2·1
Besançon		5·0	316	1 13	− 4	1 52	−15	2·6	—
Strasbourg		5·3	334	i 1 15	− 7	2 6	−19	2·5	3·3
Vienna	V.	5·7	37	e 1 30	+ 2	i 1 55	−41	i 2·3	3·6
		5·7	37	e 1 33	+ 5	2 0	−36	i 2·9	4·2
Barcelona		7·0	254	1 48	+ 2	—	—	4·2	4·9
Paris		7·8	313	e 1 59	+ 1	—	—	3·9	4·6
Uccle		8·4	329	e 2 18	+11	e 3 49	+ 2	i 4·5	—
Tortosa		8·4	253	2 8	+ 1	3 41	− 6	4·0	5·7
De Bilt		9·2	336	—	—	e 3 58	−10	4·6	6·2
Algiers		9·3	224	—	—	—	—	e 4·6	7·1
Hamburg		9·8	356	e 2 24	− 3	—	—	e 4·6	6·7
Lemberg		10·7	51	—	—	—	—	e 5·9	8·3
Kew		10·8	319	—	—	—	—	—	6·6
Oxford		11·5	318	2 46	− 6	5 1	− 6	5·7	8·1
Granada		13·0	244	3 10	− 3	5 34	−10	—	—
Bidston		13·4	321	2 48?	?	6 18	+25	—	8·2
Rio Tinto		14·7	252	14 36	?	—	—	—	16·1
Eskdalemuir		14·8	326	—	—	6 36	+ 9	—	—
Coimbra		15·0	263	e 4 20	+41	e 7 4	+32	8·1	9·9
San Fernando		15·2	247	3 54	+12	—	—	—	11·1
Edinburgh		15·3	328	—	—	6 36	− 3	—	8·6
Helwan		21·2	124	10 36	?L	—	—	(10·6)	—

Additional readings: Florence gives also P = +24s. and +26s. Padova readings have been corrected by +1m. Zurich gives iPEN = +1m.11s., iPZ = +1m.9s., iZ = +1m.18s. and +1m.35s., iN = +1m.42s., iE = +1m.36s. Strasbourg (P) = +1m.39s., MN = +3·0m., T_o 14h.5m.36s. Hamburg MZ = +6·4m., MN = +6·9m. Lemberg e = +7m.54s. Coimbra LN = +8·4m., MN = +8·6m., T_o = 14h.6m.22s. San Fernando MN = +11·6m.

Sept. 6d. 23h. 16m. 50s. Epicentre 48°·4N. 150°·4E.

A = −·577, B = +·328, C = +·748 ; D = +·494, E = +·870 ;
G = −·650, H = +·369, K = −·664.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa	E.	11·4	219	2 45	− 5	4 59	− 5	—	—
	N.	11·4	219	2 58	+ 8	4 58	− 6	—	—
Nagoya		16·5	222	3 59	0	—	—	—	—
Osaka		17·6	224	4 13	+ 1	—	—	5·0	5·1
Hamburg		72·7	338	e 11 28	− 6	—	—	e 41·2	52·2
Eskdalemuir		74·0	347	—	—	—	—	38·2	—
Stonyhurst		75·2	345	46 10	?L	51 22	?	57·4	—
De Bilt		75·3	340	—	—	21 33	+ 4	e 40·2	44·9
Vienna		75·5	331	i 11 46	− 6	—	—	—	53·2
Bidston		75·7	345	46 58	?L	49 34	?	(47·0)	52·2
Uccle		76·6	340	e 11 46	−13	e 21 40	− 4	e 40·2	—
Strasbourg		77·8	337	e 12 10	+ 4	—	—	e 46·2	—
Paris		78·9	340	—	—	—	—	46·2	—
Moncalieri		81·0	335	e 16 37	?	23 31	+56	47·4	—
Rocca di Papa	N.	82·4	330	e 12 16	−16	—	—	—	12·7
		82·4	330	e 12 28	− 4	—	—	e 48·8	—
Helwan		84·7	312	44 10	?L	—	—	(44·2)	—
La Paz		135·3	58	19 16	[−15]	—	—	—	—

De Bilt gives MN = +56·4m. Helwan PN = +47m.10s.

Sept. 6d. Readings also at 1h. (La Paz), 4h. (Colombo), 11h. (Stonyhurst), 12h. (Dyce and Stonyhurst), 13h. and 14h. (Stonyhurst), 15h. (Stonyhurst, Zi-ka-wei, and near Taihoku), 16h. (Stonyhurst and Taihoku), 17h. (Padova, Vienna, and Manila), 18h. (Taihoku and Florence), 19h. (Strasbourg), 21h. (Kodaikanal).

1920. Sept. 7d. 5h. 55m. 40s. Epicentre 43°·8N. 11°·2E.

(as on 1920 Sept. 6d.).

A = +·708, B = +·140, C = +·692 ; D = +·194, E = −·981 ;
G = +·679, H = +·134, K = −·722.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Florence		0·0	—	0 20	+20	—	—	—	—
Padova		1·7	17	0 17	− 9	0 39	− 9	—	—
Milan		2·3	320	—	—	1 40	+37	(1·7)	—
Rocca di Papa		2·3	152	i 0 53	?S	(i 0 53)	−10	e 9·9	—
Moncalieri		2·8	295	0 41	− 3	1 10	− 7	—	7·0
		2·8	295	i 0 40	− 4	1 10	− 7	—	1·4
Chur		3·2	338	e 0 50	0	i 1 33	+ 5	—	—
Pompeii		3·9	142	1 21	+20	—	—	2·3	3·0
Zurich	E.	4·0	332	e 0 57	− 5	i 1 42	− 8	—	2·3
	N.	4·0	332	e 0 55	− 7	i 1 34	−16	—	2·0
	V.	4·0	332	e 0 57	− 5	i 1 43	− 7	—	2·3
Neuchatel		4·4	318	1 6	− 2	1 52	− 9	—	—
Besançon		5·0	316	1 14	− 3	1 40	−37	2·3	—
Strasbourg		5·3	334	i 1 18	− 4	2 11	−14	—	4·9
Vienna	E.	5·7	37	e 1 33	+ 5	2 9	−27	—	3·7
	N.	5·7	37	e 1 34	+ 6	i 1 49	−47	—	3·9
	Z.	5·7	37	e 1 30	+ 2	i 1 55	−41	—	3·7
Barcelona		7·0	254	i 1 42	− 4	3 13	+ 3	4·4	5·2
Paris		7·8	313	i 1 51	− 7	e 3 13	−18	3·9	4·3
Tortosa		8·4	253	2 0	− 7	3 37	−10	3·8	6·0
Uccle		8·4	329	1 59	− 8	i 3 37	−10	i 4·3	—
De Bilt		9·2	336	2 18	− 1	4 3	− 5	4·3	5·6
Algiers		9·3	224	2 20	0	4 18	+ 8	4·8	6·8

Continued on next page.

		Δ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	L. m.	M. m.
Hamburg	E.	9·8	356	i 2 31	+ 4	e 4 31	+ 8	—	—
	N.	9·8	356	i 2 29	+ 2	i 4 36	+13	—	—
	Z.	9·8	356	i 2 26	− 1	i 4 39	+16	—	—
Lemberg		10·7	51	e 2 56	+16	i 5 17	+29	e 6·9	8·2
Kew		10·8	316	3 20	+39	—	—	—	6·3
Athens		11·2	117	e 2 56	+ 9	4 59	0	5·4	9·0
Oxford		11·5	318	2 39	−13	i 4 42	−25	5·5	6·8
West Bromwich		12·4	320	2 50	−15	4 55	−34	—	—
Granada		13·0	244	3 10	− 3	5 34	−10	—	—
Stonyhurst		13·4	323	3 20	+ 2	5 20	−33	6·8	7·8
Bidston		13·4	321	3 8	−10	5 44	− 9	—	8·5
Rio Tinto		14·7	252	9 20	?L	—	—	(9·3)	16·3
Eskdalemuir		14·8	326	3 23	−13	6 2	−25	—	8·8
Coimbra	E.	15·0	263	3 27	−12	6 10	−22	7·9	10·0
	N.	15·0	263	—	—	—	—	7·4	8·7
San Fernando		15·2	247	3 32	−10	6 38	+ 1	8·7	9·3
Edinburgh		15·3	328	3 34	− 9	6 8	−31	—	8·8
Dyce	E.	15·8	333	i 3 43	− 6	6 41	− 9	8·1	11·2
	N.	15·8	333	i 3 39	−10	6 41	− 9	8·2	11·2
Helwan		21·2	124	5 20	+25	—	—	—	—
Simla		52·5	80	—	—	—	—	e 26·7	—
Harvard	E.	57·5	300	e 10 42	+46	17 46	− 7	e 27·4	—
Ottawa		57·6	307	10 1	+ 5	18 1	+ 7	e 27·5	—
Toronto		61·8	307	—	—	—	—	e 35·6	37·7
Washington		63·2	300	—	—	—	—	e 36·3	—
Georgetown		63·2	300	—	—	—	—	e 30·3	—
Chicago		67·7	309	19 50	?S	(19 50)	− 8	32·2	—
Colombo		69·8	101	40 20	?L	—	—	(40·3)	—
Cape Town		77·8	174	40 2	?L	—	—	(40·0)	52·3
Victoria		79·5	331	32 34	?	—	—	39·4	44·1
Zi-ka-wei		81·7	54	—	—	e 22 40	− 3	—	—
Manila		93·6	67	—	—	e 26 20	+88	—	—
La Paz		93·9	253	e 13 26	−11	24 51	− 4	46·4	54·3
Batavia		98·2	91	i 52 9	?L	—	—	(i 52·2)	52·6

Additional notes and readings: Florence gives P = +30s. Padova gives its readings 1m. early. Moncalieri MN = +2·5m. Chur iP = +0m.52s. Zurich iN = +1m.10s., iE = +1m.14s., iV = +1m.12s., and +1m.20s. Vienna iPZ = +1m.35s., iPE = +1m.38s., iPN = +1m.39s., i_2N = +1m.58s., i_2Z = +2m.7s., i_3N = +2m.11s. Epicentre 44°·1N. 10°·1E. Paris MN = +5·3m. De Bilt MN = +6·5m., T_0 = 5h.55m.50s. Hamburg iZ = +3m.14s., iE = +3m.25s. Coimbra iE = +6m.39s., T_0 = 5h.55m.56s. San Fernando MN = +10·8m., T_0 = 5h.55m.24s. Harvard i = +11m.9s., L = +33·3m., T_0 = 5h.55m.44s. Ottawa LE = +34·3m., and +46·3m., T_0 = 5h.55m.44s. Chicago S = +26m.20s. Zi-ka-wei reading has been corrected by −10m. Basel (actual position uncertain) gives S = +2m.1s.

Sept. 7d. 8h. 11m. 0s. Epicentre 43°·8N. 11°·2E. (as at 5h.).

	Δ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	L. m.	M. m.
Florence	0·0	—	0 8	+ 8	—	—	—	0·6
Padova	1·7	17	0 17	− 9	0 39	− 9	—	—
Rocca di Papa	2·3	152	i 0 48	+12	—	—	—	2·4
Moncalieri	2·8	295	0 46	+ 2	1 10	− 7	—	1·6
Pompeii	3·9	142	1 31	+30	(1 31)	−16	—	—
Zurich	4·0	332	e 0 57	− 5	i 1 45	− 5	—	2·2
	4·0	332	i 1 16	+14	i 1 52	+ 2	—	—
Besançon	5·0	316	1 14	− 3	2 0	−17	—	—
Strasbourg	5·3	334	e 1 12	−10	e 2 3	−22	e 2·4	2·9
Vienna	5·7	37	1 28	0	2 34	− 2	2·8	4·2
Paris	7·8	313	e 1 59	+ 1	e 3 20	−11	4·2	5·0
Uccle	8·4	329	e 2 21	+14	—	—	e 4·3	—
De Bilt	9·2	336	—	—	—	—	e 6·2	—
Hamburg	9·8	356	—	—	e 3 18	−65	e 4·9	6·7

Additional readings and notes: Florence gives also P = +12s. Padova readings have been increased by 1m. Vienna MN = +3·4m. Hamburg MN = +5·6m.

Sept. 7d. 10h. 14m. 50s. Epicentre 43°·8N. 11°·2E. (as at 8h.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Florence	0·0	—	0 12	+12	—	—	—	0·6
Padova	1·7	17	0 24	− 2	0 45	− 3	—	—
Rocca di Papa	2·3	152	e 0 4	−32	—	—	—	1·7
Moncalieri E.	2·8	295	0 45	+ 1	—	—	1·3	—
Pompeii	3·9	142	2 10	?L	—	—	(2·2)	—
Zurich E.	4·0	332	e 1 1	− 1	—	—	—	—
Strasbourg	5·3	334	e 1 23	+ 1	—	—	—	—
Vienna	5·7	37	1 57	+29	2 50	+14	—	3·5
Hamburg	9·8	356	—	—	e 4 10	−13	—	—

Additional readings: Florence gives P = +20s. and +34s. Padova gives its readings 1m. early. Rocca di Papa iP = +10s. Zurich eN = +1m.3s.

Sept. 7d. 11h. 26m. 25s. Epicentre 43°·8N. 11°·2E. (as at 10h.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Florence	0·0	—	0 27	+27	—	—	—	0·7
Padova	1·7	17	0 28	+ 2	0 49	+ 1	—	—
Rocca di Papa	2·3	152	e 1 11	?L	—	—	(e 1·2)	2·2
Moncalieri	2·8	295	—	—	e 1 18	+ 1	—	—
Pompeii	3·9	142	3 6	?	—	—	—	—
Zurich E.	4·0	332	e 1 12	+10	e 1 32	−18	i 1·8	—
N.	4·0	332	e 1 7	+ 5	e 1 28	−22	i 1·8	—
Strasbourg	5·3	334	e 2 5	?S	(2 5)	−20	—	—
Vienna	5·7	37	e 2 35	?S	(e 2 35)	− 1	—	—
Hamburg	9·8	356	—	—	e 4 35	+12	—	—

Additional readings: Florence gives also P = +0m.46s. Padova gives its readings 1m. early.

Sept. 7d. 13h. 32m. 20s. Epicentre 43°·8N. 11°·2E. (as at 11h.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Florence	0·0	—	0 10	+10	—	—	—	0·6
Padova	1·7	17	0 24	− 2	0 46	− 2	—	—
Rocca di Papa	2·3	152	i 0 55	+19	(i 0 55)	− 8	—	2·7
Moncalieri	2·8	295	0 39	− 5	1 3	−14	—	1·5
	2·8	295	0 40	− 4	1 7	−10	—	1·6
Pompeii	3·9	142	1 40	?S	(1 40)	− 7	—	—
Zurich	4·0	332	e 1 3	+ 1	i 1 42	− 8	—	2·3
v.	4·0	332	e 0 59	− 3	i 1 43	− 7	—	—
Besançon	5·0	316	2 0	?S	(2 0)	−17	2·7	—
Strasbourg	5·3	334	e 1 22	0	—	—	e 2·5	—
Vienna	5·7	37	1 42	+14	—	—	—	3·4
Uccle	8·4	329	e 2 49	+42	—	—	e 4·5	—
Hamburg	9·8	356	e 2 40	+13	—	—	i 5·4	7·3
Bidston	13·4	321	7 22	?L	—	—	(7·4)	10·5

Additional readings: Florence gives P = +17s. and +23s. Padova gives its readings 1m. early. Moncalieri MN = +1·8m. Vienna MN = +3·7m. Hamburg MN = +7·5m.

Sept. 7d. 18h. 42m. 43s. Epicentre 43°·8N. 11°·2E. (as at 13h.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Florence	0·0	—	0 17	+17	—	—	—	0·6
Padova	1·7	17	0 30	+ 4	0 51	+ 3	—	—
Milan	2·3	320	0 36	0	—	—	—	1·0
Rocca di Papa	2·3	152	e 0 59	?S	(e 0 59)	− 4	(1·5)	2·3
Moncalieri	2·8	295	0 42	− 2	1 17	0	—	—
Pompeii	3·9	142	2 17	?L	—	—	(2·3)	—
Zurich E.	4·0	332	e 1 2	0	i 1 45	− 5	—	2·1
Strasbourg	5·3	334	e 1 17	− 5	—	—	—	—
Vienna	5·7	37	1 36	+ 8	—	—	—	3·7
Uccle	8·4	329	—	—	—	—	e 4·4	—
De Bilt	9·2	336	—	—	—	—	e 5·2	5·7
Hamburg	9·8	356	—	—	e 3 53	−30	—	7·5

Additional readings: Florence gives P = +23s. +33s. and M = +0·8m. Padova gives its readings 1m. early. Rocca di Papa PR_1N = +1m.29s. (?L). Zurich MN = +2·0m. De Bilt eLN = +6·2m.

Sept. 7d. Other shocks, probably from this origin, not entered in the tables. The phase recorded is in each case the first given—usually P.

Florence	Padova	Rocca di Papa	Moncalieri	Zurich
h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
6 7 7	—	—	—	—
6 34 25	6 34 35	6 34 42	—	—
—	—	—	—	7 45 11
—	—	—	—	7 51 54
8 15 27	—	—	—	—
8 25 35	—	—	—	—
8 28 30	8 28 33	8 29 12	8 29 17	8 29 52
8 40 37	—	—	—	—
8 48 6	8 48 28	8 49 6	8 48 58	8 49 29
8 52 5	—	8 53 12	—	—
9 1 22	9 1 30	9 1 54	—	9 2 14
9 14 0	—	—	—	—
9 45 50	—	—	—	—
9 53 34	9 53 47	9 53 54	—	—
10 27 17	—	—	—	—
—	—	—	10 54 16	—
13 35 16	—	—	—	—
13 36 35	—	—	—	—
15 46 52	—	—	—	—
16 14 15	16 14 39	16 14 48	—	—
—	—	16 42 6	—	—
—	—	16 48 12	—	—
17 29 36	17 29 32	—	—	—
—	18 4 53	—	18 3 20	—
—	—	18 5 36	18 5 52	18 5 42
18 18 30	—	—	—	—
19 9 0	—	—	—	—
21 7 41	—	—	—	—
23 35 38	23 36 50	23 36 33	e 23 36 26	—

Strasbourg e = 8h.30m. Vienna gives P = +7h.44m.44s. Padova, as in the tabulated shocks, has been assumed one minute in error, and the times entered are that interval later than the ones given.

Sept. 7d. 21h. 54m. 25s. Epicentre 36°·0N. 139°·0E. (as on 1920 Sept. 6d.).
A = −·611, B = +·531, C = +·588.

	Δ	P.	O−C.	S.	O−C.	L.	M.
	°	m. s.	s.	m. s.	s.	m.	m.
Tokyo	0·8	−0 13	−25	—	—	0·7	0·7
Osaka	3·2	e 0 50	0	—	—	1·9	2·7
Kobe	3·4	0 52	− 1	—	—	—	2·5
Mizusawa	3·5	0 57	+ 2	2 4	+27	(2·1)	—

Kobe gives MN = +1·4m.

Sept. 7d. Readings also at 4h. (near Batavia), 7h. (near Calcutta and La Paz), 12h. (Batavia), 19h. (La Paz (2)), 20h. (near Tokyo), 21h. (Lick (2)), 22h. (La Paz), 23h. (Perth).

Sept. 8d. 1h. 19m. 14s. I
9h. 41m. 24s. II
18h. 43m. 50s. III
Epicentre 43°·8N. 11°·2E. (as on 7d.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
I Florence	0·0	—	−0 1	− 1	—	—	—	0·3
II	0·0	—	0 12	+12	—	—	—	0·5
III	0·0	—	−0 55	−55	—	—	—	−0·2
I Padova	1·7	17	−0 2	−28	0 19	−29	—	—
II	1·7	17	0 15	−11	0 36	−12	—	—
III	1·7	17	0 30	+ 4	0 51	+ 3	—	—
II Milan	2·3	320	0 46	+10	—	—	—	1·0
I Rocca di Papa	2·3	152	e 0 34	− 2	—	—	—	1·9
II	2·3	152	e 0 30	− 6	—	—	—	2·6
III	2·3	152	e 0 28	− 8	(e 1 1)	− 2	—	2·2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
I	Moncalieri	2·8	295	0 30	−14	—	—	—	—
II		2·8	295	0 32	−12	0 59	−18	—	2·1
III		2·8	295	e 0 45	+ 1	1 12	− 5	—	—
II	Pompeii	3·9	142	4 27	?	—	—	—	—
III		3·9	142	2 30	?L	—	—	(2·5)	—
I	Zurich	4·0	332	e 0 35	−27	i 1 13	−37	—	1·6
II		4·0	332	e 0 58	− 4	i 1 32	−18	—	1·9
III		4·0	332	e 1 7	+ 5	i 1 58	+ 8	—	—
II	Besançon	5·0	316	1 20	+ 3	1 56	−21	—	—
I	Strasbourg	5·3	334	e 0 53	−29	—	—	—	—
II		5·3	334	e 1 12	−10	e 2 4	−21	e 2·4	—
III		5·3	334	e 1 46	+24	—	—	e 2·9	—
I	Vienna	5·7	37	1 35	+ 7	e 2 38	+ 2	—	3·0
II		5·7	37	e 1 30	+ 2	—	—	—	3·5
III		5·7	37	e 1 2	−26	—	—	—	3·8
II	Paris	7·8	313	e 1 53	− 5	3 24	− 7	4·1	4·6
I	Uccle	8·4	329	e 2 4	− 3	—	—	—	10·8
II		8·4	329	—	—	—	—	e 4·1	—
I	De Bilt E.	9·2	336	—	—	e 5 4	+56	e 7·9	9·2
I	N.	9·2	336	—	—	—	—	e 11·1	12·0
II		9·2	336	—	—	e 4 16	+ 8	e 5·0	5·4
III		9·2	336	—	—	—	—	e 5·2	—
II	Hamburg	9·8	356	—	—	e 4 36	+13	—	7·2
III		9·8	356	e 2 10	−17	—	—	—	7·2
I	Helwan	21·2	124	0 46	?	—	—	—	—

Additional readings: Florence gives other P's and M's slightly different from those entered. Padova readings are given 1min. early. Rocca di Papa (I) iP = +0m.36s., PR_1 = +0m.52s. Rocca di Papa (II) ePN = +0m.42s., ePE = +0m.48s. Zurich (I) ePN = +0m.32s., iPNEV = +0m.41s., MN = +1·5m. Zurich (II) ePNE = +0m.28s. Zurich (III) eN = +1m.8s., eV = +1m.14s., iSNV = +1m.59s. Paris (II) e = +2m.53s. De Bilt (II) MN = +7·0m.

Sept. 8d. Additional repetitions from 43°·8N. 11°·2E., being a continuation of the table for Sept. 7d.

Florence	Padova	Rocca di Papa	Moncalieri	Zurich
h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
0 55 11	0 55 13	0 56 6	0 55 58	—
3 7 0	—	—	—	—
3 33 21	—	3 34 18	—	—
—	—	—	5 57 19	—
6 4 15	—	—	—	—
7 43 12	—	—	—	—
—	—	8 19 12	—	—
9 50 49	—	—	—	—
10 50 35	—	—	—	—
11 4 28	—	—	—	—
—	—	—	11 12 30	—
13 51 4	13 51 22	13 51 48	—	—
14 37 35	—	—	—	—
—	—	—	16 3 51	—
17 51 7	17 52 31	17 52 6	17 52 59	17 53 14
19 43 20	—	—	—	—
19 51 0	—	—	—	—
22 19 45	—	—	—	—
22 51 25	—	—	—	—
23 19 42	23 20 54	23 21 54	—	—

Padova readings are given 1min. early. Strasbourg gives e = 17h.54m. Pompeii P = 8h.19m.11s. and 17h.55m.1s.

1920. Sept. 8d. 1h. 45m. 35s. Epicentre **22°·0S. 180°·0.**

(as on 1917 May 24d.).

$A = -\cdot 927$, $B = \cdot 000$, $C = -\cdot 375$; $D = \cdot 000$, $E = +1\cdot 000$;
$G = +\cdot 375$, $H = \cdot 000$, $K = -\cdot 927$.

The Japanese stations would require the origin 1·5 degree further away, but as this is the only origin in the neighbourhood the old epicentre is retained for comparison.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Apia		11·3	45	i 3 4	+15	5 3	+ 1	6·5	—
Christchurch		22·4	194	(4 45)	−25	4 45	?P	11·1	16·4
Riverview		28·0	239	i 6 5	− 3	12 5	+66	15·0	16·7
Sydney		28·0	239	6 13	+ 5	—	—	16·2	18·8
Melbourne		34·0	234	6 49	−16	—	—	17·7	23·4
Adelaide		38·3	240	i 7 43	+ 3	—	—	e 22·6	26·9
Honolulu		48·4	28	8 49	− 7	i 15 1	−58	e 21·4	31·4
Manila		68·5	297	e 11 29	+21	—	—	—	—
Tokyo		69·1	327	e 12 11	+59	e 15 46	?PR_1	e 22·2	30·8
Osaka		70·7	322	11 43	+22	22 6	+92	34·7	37·2
Kobe		70·9	322	11 41	+19	22 31	+114	32·4	33·1
Mizusawa	E.	71·1	330	11 43	+19	—	—	30·8	—
Batavia		72·1	270	i 11 46	+15	i 20 58	+ 7	e 33·4	40·0
Nagasaki		72·7	320	11 47	+13	—	—	—	—
Taihoku		73·7	309	e 12 0	+20	—	—	e 27·3	—
Zi-ka-wei		77·3	313	e 12 17	+14	e 23 5	+73	—	—
Berkeley	E.	80·7	42	e 12 18	− 5	(e 22 16)	−15	e 22·3	—
	Z.	80·7	42	e 12 22	− 1	(e 22 12)	−19	e 22·2	—
Lick		80·9	43	e 12 23	− 1	(e 22 20)	−14	e 22·3	22·4
Tucson	E.	85·5	52	e 12 45	− 6	e 23 2	−23	—	—
	N.	85·5	52	12 47	− 4	i 23 3	−22	—	—
Victoria, B.C.		86·7	34	(13 12)	+15	(23 3)	−35	e 29·6	32·4
Tacubaya	E.	89·1	70	13 1	−10	24 23	+19	—	—
	N.	89·1	70	13 5	− 6	23 26	−38	—	—
Colombo		102·0	273	18 25	?PR_1	20 25	?	—	77·4
La Paz		102·9	114	14 8	−17	i 24 18	−125	39·5	44·1
Kodaikanal		105·3	275	20 19	?PR_1	(26 13)	−32	26·2	30·0
Chicago		106·2	51	14 12	−28	24 25	−149	41·3	—
Ann Arbor	E.	109·1	51	18 43	?PR_1	25 25	−115	45·5	—
	N.	109·1	51	—	—	25 7	−133	45·3	—
Mauritius	N.	109·5	239	26 25	?S	(26 25)	−59	—	47·8
	E.	109·5	239	24 25	?	—	—	—	47·9
Simla		111·7	298	e 19 7	?PR_1	—	—	—	—
Toronto		112·5	50	—	—	26 31	−79	66·4	72·2
Georgetown	E.	113·4	56	e 20 58	?PR_1	26 10	−107	59·7	—
	N.	113·4	56	e 20 41	?PR_1	26 19	−98	—	—
Washington		113·4	56	18 25	[− 7]	27 21	−36	—	—
Cheltenham	N.	113·5	56	25 9	?S	35 10	?SR_1	—	—
Ithaca		114·4	51	—	—	e 26 45	−80	—	—
Ottawa		115·4	49	—	—	27 23	−50	e 47·4	—
Harvard		118·3	52	e 19 17	?PR_1	25 32	−184	65·5	—
Porto Rico		118·9	81	—	—	29 31	+50	—	—
Cape Town		121·4	199	27 38	?S	(27 38)	−82	—	89·6
Dyce	E.	144·8	3	i 19 51	[+ 3]	—	—	41·9	—
	N.	144·8	3	i 19 49	[+ 1]	i 33 25	?	53·0	—
Edinburgh		146·0	3	i 19 55	[+ 5]	—	—	—	42·2
Lemberg		146·4	332	e 20 1	[+11]	—	—	—	35·6
Eskdalemuir		146·6	4	19 49	[− 2]	33 26	?	44·4	—
Hamburg		147·5	350	19 50	[− 2]	i 31 46	?	e 72·4	74·4
Stonyhurst		148·1	3	20 13	[+20]	—	—	42·4	42·9
De Bilt		149·7	354	19 56	[+ 1]	e 31 44	?	—	95·7
Oxford		150·3	2	20 1	[+ 5]	—	—	—	43·1
Kew		150·6	0	24 25	?PR_1	—	—	—	44·4
Vienna		150·7	337	i 19 55	[− 2]	32 4	?	53·4	84·9
Uccle		151·0	353	i 19 55	[− 2]	—	—	43·4	53·6
Strasbourg		152·8	349	i 19 55	[− 5]	e 32 13	?	e 63·4	—
Paris		153·2	356	e 19 59	[− 1]	i 32 7	?	52·4	65·4
Zurich		153·7	347	e 20 2	[+ 1]	—	—	—	—
Athens		154·1	313	e 20 0	[− 1]	37 22	?	e 45·9	—
Besançon		154·4	351	19 54	[− 7]	(30 25)	?	30·4	—
Padova		154·7	340	19 49	[−13]	30 7	?	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Moncalieri		156·2	346	19 59	[− 4]	35 49	?	51·7	—
Florence		156·3	339	20 43	[+39]	—	—	—	21·2
Pompeii		157·6	330	20 16	[+10]	—	—	—	—
Rocca di Papa		157·6	335	i 20 5	[− 1]	28 13	?	e 48·0	—
Coimbra	E.	160·5	19	20 6	[− 2]	—	—	51·0	—
	N.	160·5	19	20 8	[0]	32 0	?	50·8	—
Barcelona		160·5	355	e 20 11	[+ 3]	—	—	e 49·2	—
Tortosa		161·2	359	20 6	[− 3]	30 51	?	51·9	58·3
Rio Tinto		163·3	18	26 25	?	—	—	—	52·4
Granada		164·5	11	i 20 14	[+ 2]	35 10	?	—	—
San Fernando		164·6	19	20 15	[+ 3]	—	—	—	53·9
Algiers		165·0	351	e 19 55	[−17]	25 5	?	29·4	47·4

Additional readings: Christchurch gives $SR_1 = +6$m.49s. Riverview gives its readings 1h. late, $PR_1 = +6$m.25s., $PS = +13$m.7s., $MN = +16·1$m., $MZ = +16·5$m., $T_e = 2$h.44m.0s., 24°·0S. 163°·5W. Melbourne $PR_1 = +7$m.43s., $SR_1 = +14$m.55s. Adelaide $i = +8$m.55s. and $+10$m.25s., $e = +15$m.1s. Osaka $MN = +37·6$m. Batavia $i = +15$m.22s. and $+62$m.44s. Lick e?E = +22m.39s. Victoria gives its P as S and its S as L. Chicago $PR_1 = +17$m.56s., $PR_2 = +19$m.56s., $SR_1 = +33$m.15s., $T_e = 1$h.47m.32s. Toronto $L = +29·3$m., $eL = +67·5$m. Georgetown iE = +25m.7s., iN = +35m.9s., eLE = +35·9m. Washington $PR_1 = +21$m.45s. Ithaca $e = +34$m.34s. Ottawa PR_1N? = +19m.50s., eE = +20m.52s., iE = +25m.16s., and +26m.25s. Harvard iE = +20m.37s., eLE = +47·0m., and a number of other readings. Also $T_e = 1$h.46m.17s. Epicentre 20°·0S. 153°·0W. Porto Rico $ePR_1N = +20$m.59s., $ePR_1E = +21$m.17s. Dyce LE = +43·4m. Hamburg eE = +42m.28s., MZ = +94·4m. De Bilt $ePR_1 = +23$m.29s., MN = +89·4m. Vienna ePN = +19m.57s., iPN = +19m.58s., SN = +32m.5s., ME = +97·9m. Uccle $PR_1 = +23$m.45s., MN = +55·0m. Paris $i = +20$m.27s., $PR_1 = +23$m.58s., $i = +34$m.24s., MN = +80·4m. Athens $ePR_1 = +24$m.18s. Padova readings are given 1m. early. Rocca di Papa $PR_1 = +20$m.49s. Coimbra $PR_1E = +24$m.38s., $PR_1N = +25$m.18s., iN = +25m.46s., $PR_2E = +29$m.48s., iN = +36m.18s., iNE = +44m.33s., iE = +46m.18s. Granada $SR_1 = +45$m.9s.

Sept. 8d. Readings also at 0h. (La Paz), 2h. (Taihoku), 9h. (Besançon and Manila), 10h. (La Paz), 16h. (Mizusawa), 21h. (San Fernando and Taihoku), 22h. (Lick).

1920. Sept. 9d. 18h. 56m. 0s. Epicentre 15°·0S. 171°·5E.

A = −·955, B = +·143, C = −·259; D = +·148, E = +·989; G = +·256, H = −·038, K = −·966.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview		26·3	221	e 5 47	− 4	i 10 41	+13	e 12·7	13·0
Sydney		26·3	221	5 48	− 3	(10 54)	+26	10·9	13·2
Christchurch		28·5	178	—	—	20 54	?	(15·8)	29·5
Melbourne		32·7	221	7 0	+ 6	12 30	+11	16·8	18·0
Adelaide		35·6	230	e 7 12	− 6	i 12 48	−16	e 17·5	23·0
Honolulu		47·1	41	e 8 48	0	e 16 18	+36	e 25·0	30·8
Manila		58·1	299	e 9 35	−25	—	—	—	—
Osaka		60·3	328	10 24	+10	18 28	+ 1	27·3	30·4
Kobe		60·5	328	e 10 50	+34	—	—	27·0	30·6
Mizusawa	E.	61·1	335	10 18	− 2	18 17	−20	—	—
	N.	61·1	335	10 29	+ 9	17 57	−40	—	—
Taihoku		63·0	311	e 10 40	+ 8	—	—	27·6	31·5
Batavia		63·9	272	i 10 22	−15	—	—	e 26·4	29·4
Zi-ka-wei		66·6	317	e 10 45	−10	e 19 13	−32	—	—
Ootomari		66·8	340	10 47	−10	—	—	29·4	30·8
Berkeley		81·4	47	e 13 1	+34	—	—	e 38·0	—
Lick		81·7	48	—	—	—	—	e 41·2	—
Victoria		85·7	38	13 11	+19	23 1	−26	35·8	41·2
Colombo		93·4	277	12 0	−94	—	—	—	79·0
Kodaikanal		96·5	280	17 6	?PR_1	—	—	57·6	63·2
Simla		101·3	300	—	—	e 24 54	−74	—	53·9
Mauritius	E.	105·9	243	14 6	−33	—	—	—	57·8
Chicago		108·0	50	28 54	?S	(28 54)	+104	42·0	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Ann Arbor E.	110·9	49	17 54	?PR_1	—	—	47·7	—
La Paz	113·4	116	e 19 58	?PR_1	34 10	?SR_1	62·0	64·4
Toronto	114·1	47	19 12	[+38]	29 6	+63	58·9	80·6
Georgetown E.	116·0	52	—	—	—	— e	62·0	—
Ottawa	116·5	45	(e 19 31)	[+48]	30 23	?	e 47·8	—
Harvard	120·2	48	e 19 47	[+54]	e 31 27	?	59·8	—
Cape Town	124·7	208	58 15	?L	(33 30)	?	(58·2)	86·2
Dyce N.	137·5	354	i 23 0	?PR_1	—	—	—	77·0
Hamburg	138·8	343	e 19 54	[+16]	—	— e	63·0	77·0
Edinburgh	138·9	354	e 23 0	?PR_1	—	—	—	78·5
Helwan	140·5	299	22 0	?PR_1	—	—	—	—
Stonyhurst	140·8	353	23 18	?PR_1	—	—	—	83·0
Vienna	141·0	334	e 19 45	[+ 4]	—	— e	53·0	78·2
De Bilt	141·4	344	e 19 38	[− 4]	e 32 56	? e	67·0	74·0
Uccle	142·7	345	e 19 36	[− 8]	—	—	—	73·4
Oxford	142·8	352	23 25	?PR_1	—	—	46·2	79·0
Kew	143·0	352	—	—	—	—	—	88·0
Strasbourg	143·9	340	19 42	[− 5]	—	—	—	80·4
Paris	145·0	346	e 22 25	?PR_1	—	—	63·0	83·0
Padova	145·1	335	11 30	?	22 0	?PR_1	—	—
Moncalieri	147·0	339	19 56	[+ 5]	36 13	?	56·3	90·8
Pompeii	147·4	327	20 52	[+60]	—	—	—	—
Rocca di Papa	147·6	329	e 19 42	[−10]	29 18	? e	70·8	82·5
Barcelona	152·0	343	—	—	—	— e	70·8	82·0
Tortosa	153·0	345	20 13	[+13]	33 54	?	53·0	82·7
Coimbra N.	154·8	0	19 48	[−14]	e 27 46	?	43·8	89·1
Algiers	155·9	337	e 20 20	[+17]	—	—	37·0	82·0
Rio Tinto	157·2	356	28 0	?	—	—	—	108·0
Granada	157·4	350	20 25	[+20]	21 32	?	—	—
San Fernando	158·5	355	20 54	[+47]	—	—	—	91·0

Additional readings: Riverview gives also i = +6m.14s. and 6m.37s., PS = +11m.9s., MN = +13·4m., MZ = +13·5m., T_0 = 18h.55m.36s. Christchurch gives L as PR_1 and records for L +26·0m. Melbourne PR_1 = +8m.42s., SR_1 = +14m.0s. Berkeley e?E = +24m.17s., eLV = +38·7m. Lick eV = +38m.37s. Chicago S = +35m.55s., L = +48·0m. La Paz iP? = +33m.33s. Toronto i = +11m.12s., e? = +31m.54s., iL = +62·8m., L = +72·2m. Georgetown LE = +65·4m. Ottawa eP is given as PR_1, e = +36m.47s. Harvard e = +38m.18s., L = +62·0m., +65·4m., and +77·0m., T_0 = 18h.55m.36s. Cape Town gives its reading P = +33m.30s. from Milne-Shaw. Hamburg eZ = +22m.14s. (?PR_1), eNE = +23m.12s., +45·0m., and +46·0m. Helwan PN = +23m.0s. Vienna eZ = +22m.19s., eE = +22m.30s. De Bilt PR_1 = +22m.27s., MN = +77·5m. Uccle PR_1 = +22m.41s., MN = +79·0m. Strasbourg PR_1 = +22m.40s., MN = +76·9m. Moncalieri MN = +88·8m. Rocca di Papa P = +20m.0s., PR_1E = +23m.18s., PR_1N = +23m.24s., SN = +26m.54s. Coimbra ePE = +20m.24s., eS = +30m.18s., ME = +91·3m. Granada readings have been increased by 1h. San Fernando MN = +93·0m.

Sept. 9d. Readings also at 0h. (La Paz), 1h. (Taihoku), 4h. (near Rocca di Papa), 6h. (near Tokyo), 8h. (La Paz), 9h. (Florence (2), Strasbourg, and near Rocca di Papa), 15h. (near Tokyo), 16h. (near Lick and Berkeley), 17h. (near Pompeii and Rocca di Papa), 21h. (Mizusawa), 22h. (Apia and Manila).

Sept. 10d. 22h. 3m. 0s. Epicentre 12°·6S. 150°·0E. (as on 1918 July 31d.).

A = −·845, B = +·488, C = −·218; D = +·500, E = +·866; G = +·189, H = −·109, K = −·976.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Riverview	21·3	177	e 4 58	+ 1	e 8 49	− 1 e	12·0	12·9
Honolulu	61·3	57	e 18 36	?S	(18 36)	− 4	23·0	29·0
Helwan	121·0	298	87 0	?L	—	—	(87·0)	—
Chicago	122·4	48	—	—	—	— e	53·7	—
De Bilt	131·5	331	—	—	—	— e	66·0	73·0
Uccle	132·7	331	—	—	—	— e	65·0	—
San Fernando	148·0	322	82 0	?L	—	—	(82·0)	—

Additional readings: Riverview gives PS = +9m.15s., MN = +18·0m., T_0 = 22h.3m.9s. Helwan PN = +91m.0s. De Bilt MN = +85·2m.

Sept. 10d. Readings also at 2h. (Moncalieri and near Rocca di Papa and Padova), 3h. (Florence), 4h. (near Padova (2)), 7h. (Vienna and near Pompeii, Rocca di Papa (2), Padova, Florence, and Mizusawa), 8h. (La Paz (2) and Rio Tinto), 9h. (Rocca di Papa), 14h. (near Tacubaya), 15h. (Taihoku and near Batavia), 16h. (Moncalieri), 21h. (Taihoku), 22h. (near Tokyo).

Sept. 11d. 2h. 19m. 40s. I
3h. 50m. 25s. II
14h. 32m. 45s. III
} Epicentre 43°·8N. 11°·2E. (as on 1920 Sept. 8d.).

A = +·708, B = +·140, C = +·692 ; D = +·194, E = −·981 ;
G = +·679, H = +·134, K = −·722.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
I Florence	0·0	—	0 0	0	—	—	—	0·6
II	0·0	—	0 25	+25	—	—	—	0·7
III	0·0	—	0 10	+10	—	—	—	0·4
I Rocca di Papa	2·3	152	e 0 56	+20	—	—	(e 1·2)	2·3
II	2·3	152	e 0 47	+11	—	—	—	2·6
III	2·3	152	e 0 48	+12	—	—	—	2·0
I Moncalieri	2·8	295	e 0 55	+11	—	—	—	—
II	2·8	295	e 0 41	− 3	1 15	− 2	—	—
III	2·8	295	0 46	+ 2	1 19	+ 2	—	—
II Pompeii	3·9	142	2 36	?L	—	—	(2·6)	—
I Zurich	4·0	332	e 1 2	0	i 1 33	−17	—	—
II	4·0	332	e 1 3	+ 1	i 1 48	− 2	i 2·0	2·1
III	4·0	332	e 0 38	−24	i 1 35	−15	—	—
I Strasbourg	5·3	334	e 1 58	+36	—	—	—	—
II	5·3	334	e 1 22	0	e 2 13	−12	e 2·6	—
III	5·3	334	—	—	—	—	e 2·1	—
II Vienna	5·7	37	e 1 59	+31	—	—	—	3·9
III	5·7	37	e 2 31	?S	(e 2 31)	− 5	—	3·8
II Uccle	8·4	329	e 3 47	?S	(e 3 47)	0	—	—
II De Bilt	9·2	336	—	—	—	—	e 5·1	5·5
II Hamburg	9·8	356	e 1 35	−52	—	—	—	6·6
III	9·8	356	e 3 15	+48	—	—	—	6·2

Additional Readings: Rocca di Papa I PR,E = +1m.32s. Rocca di Papa III iPE = +0m.51s. Zurich I eN = +1m.1s., eV = +1m.8s. Zurich II iE = +1m.46s. Zurich III ePE? = +0m.17s., iN = +1m.36s.

Sept. 11d. Readings also at 0h. (Florence), 2h. (Moncalieri), 4h. (Algiers), 5h. (Florence), 6h. (near Rocca di Papa and Padova), 7h. (near Florence), 8h. (Moncalieri (2)), 14h. (La Paz (2) and near Zurich), 17h. (Batavia), 20h. (San Fernando), 23h. (near Tacubaya).

Sept. 12d. 16h. 31m. 24s. Epicentre 43°·8N. 11°·2E. (as on Sept. 11d.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Florence	0·0	—	0 22	+22	—	—	—	0·6
Padova	1·7	17	0 36	+10	0 58	+10	—	—
Rocca di Papa	2·3	152	e 0 52	+16	—	—	—	2·0
Moncalieri	2·8	295	e 0 47	+ 3	1 11	− 6	—	—
Pompeii	3·9	142	2 29	?L	—	—	(2·5)	—
Zurich E.	4·0	332	1 6	+ 4	i 1 39	−11	—	—
N.	4·0	332	1 1	− 1	i 1 40	−10	—	—
Strasbourg	5·3	334	e 1 8	−14	e 2 6	−19	—	—
Vienna	5·7	337	2 2	+34	—	—	—	3·7
Uccle	8·4	329	—	—	—	—	e 4·3	—
De Bilt	9·2	336	—	—	—	—	e 4·8	5·7
Hamburg	9·8	356	e 3 36	+69	—	—	—	5·6

Additional readings: Florence P = +0m.33s. Padova readings are given 1m. early. Rocca di Papa ePN = +0m.55s. Zurich eV = +1m.3s. De Bilt MN = +6·5m.

Sept. 12d. Readings also at 1h. (near Florence, Padova, and Rocca di Papa), 8h. (Batavia), 9h. (Berkeley), 11h. (near Tacubaya and Oaxaca), 12h. (La Paz), 14h. (near Padova), 15h. (Batavia), 17h. (La Paz and near Athens), 18h. (Helwan, Moncalieri (2), and near Oaxaca), 19h. (Taihoku and near Tacubaya), 20h. (San Fernando), 22h. (La Paz), 23h. (La Paz and Uccle).

Sept. 13d. Readings at 0h. (Uccle and Helwan), 8h. (La Paz), 12h. (near Batavia), 13h. (Helwan and near Batavia), 15h. (Batavia), 17h. and 19h. (La Paz), 23h. (Florence).

Sept. 14d. 2h. 8m. 45s. Epicentre 41°·0N. 21°·5E.

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

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Athens	3·3	150	0 51	− 1	1 31	0	1·6	2·0
Pompeii	5·3	270	1 23	+ 1	—	—	—	—
Rocca di Papa	6·7	280	i 1 43	− 1	—	—	e 8·2	4·2
Vienna	8·1	335	2 4	+ 1	4 11	+31	i 4·7	6·0
Padova	8·3	306	2 1	− 5	3 36	− 9	—	—
Lemberg	9·0	10	—	—	e 4 3	0	—	5·6
Moncalieri	10·8	296	e 3 6	+25	4 42	− 8	6·7	9·5
Zurich	11·2	309	e 2 49	+ 2	—	—	—	—
Strasbourg	12·3	312	e 3 49	+46	5 36	+10	e 7·0	7·4
Besançon	12·7	305	5 6	?S	(5 6)	−31	(7·1)	—
Helwan	13·7	141	6 15	?S	(6 15)	+14	(7·2)	—
Hamburg	14·8	332	e 3 31	− 5	(e 6 26)	− 1	e 6·4	10;2
Uccle	15·4	316	—	—	e 6 36	− 5	e 8·6	—
Paris	15·6	307	—	—	e 6 49	+ 3	—	10·2
De Bilt	15·8	320	—	—	6 56	+ 6	8·6	10·7
Kew	18·2	312	—	—	—	—	—	14·2
Oxford	19·0	312	—	—	i 7 59	− 3	10·9	12·8
Eskdalemuir	21·7	320	8 57	?S	(8 57)	− 2	14·2	—
Edinburgh	21·9	321	—	—	—	—	12·2	15·4

Additional readings and notes: Athens gives MN = +2·2m., T_0 = 2h.8m.45s. Rocca di Papa iPN = +1m.47s. Padova readings 1m. early. Moncalieri MN = +8·8m. Hamburg MN = +10·0m., MZ = +10·4m. De Bilt MN = +10·6m. Oxford iSR_1 = +10m.13s.

Sept. 14d. Readings also at 1h. (Taihoku), 4h. (near Tacubaya), 5h. (Moncalieri), 7h. (San Fernando), 13h. (La Paz), 18h. (Rio Tinto and La Paz), 19h. (Taihoku), 20h. (near Florence and Rocca di Papa), 22h. (San Fernando), 23h. (Manila (2), Batavia, and La Paz).

Sept. 15d. Readings at 1h. and 6h. (Helwan), 7h. (Apia and Batavia), 8h. (Kobe), 11h. (Lick), 12h. (La Paz), 14h. (near Rocca di Papa and Pompeii), 16h. (Apia), 20h. (Helwan), 22h. (Florence and San Fernando).

Sept. 16d. 4h. 17m. 0s. Epicentre 43°·8N. 11°·2E. (as on Sept. 12d.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Florence	0·0	—	0 10	+10	—	—	—	0·5
Padova	1·7	17	0 46	+20	1 7	+19	—	—
Rocca di Papa	2·3	152	e 0 36	0	(i 0 54)	− 9	—	2·3
Moncalieri	2·8	295	0 51	+ 7	1 24	+ 7	—	—
Pompeii	3·9	142	2 40	?L	—	—	(2·7)	—
Zurich E.	4·0	332	e 1 4	+ 2	i 1 43	− 7	—	2·3
N.	4·0	332	e 1 9	+ 7	i 1 45	− 5	—	2·1
V.	4·0	332	e 1 2	0	i 1 44	− 6	—	—
Besançon	5·0	316	2 1	?S	(2 1)	−16	—	—
Strasbourg	5·3	334	e 1 9	−13	—	—	—	—
Vienna	5·7	[illegible]	e 1 58	+30	—	—	i 2·9	3·8
Uccle	8·4	320	—	—	e 3 48	+ 1	e 4·6	—
De Bilt	9·2	336	—	—	—	—	e 5·0	—
Hamburg	9·8	356	—	—	—	—	e 4·8	5·8

Zurich gives iPN = +1m.28s. Padova readings given 1m. early.

Sept. 16d. 15h. 8m. 0s. Epicentre 42°·3N. 140°·0E. (as on 1915 Mar. 17d.).

A = −·567, B = +·475, C = +·673 ; D = +·643, E = +·766 ;
G = −·516, H = +·433, K = −·740.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa	3·3	166	0 51	− 1	1 22	− 9	—	—
Ootomari	4·8	23	1 38	+24	2 3	− 8	2·6	3·6
Tokyo	6·6	182	1 36	− 5	2 35	−25	3·3	3·5
Nagoya	7·5	199	1 57	+ 3	—	—	—	—
Kobe	8·5	208	2 20	+11	—	—	4·1	4·4
Osaka	9·2	204	2 23	+ 4	(4 6)	− 2	4·1	5·7
Zi-ka-wei	18·9	237	e 4 12	−16	e 7 42	−18	—	—
Manila	32·9	215	e 7 22	+26	—	—	—	—
Hamburg	75·0	333	e 11 59	+10	e 21 42	+16	41·0	—
Eskdalemuir	76·6	339	—	—	—	—	36·0	—
Vienna	76·7	327	i 12 11	+12	—	—	—	50·5
De Bilt	77·8	334	—	—	—	—	e 38·0	46·6
Uccle	79·2	334	—	—	—	—	e 40·0	42·0
Strasbourg	79·9	330	—	—	—	—	e 45·0	—
Paris	81·5	334	—	—	—	—	e 44·0	53·0
Helwan	82·0	304	55 0	?L	—	—	(55·0)	—
Pompeii	82·8	322	12 40	+ 5	—	—	—	—
Moncalieri	82·9	328	—	—	e 23 5	+ 9	46·2	—
Rocca di Papa	83·5	323	i 12 44	+ 5	i 16 3	?PR_1	—	—
N.	83·5	323	i 12 44	+ 5	e 16 30	?PR_1	e 40·3	55·3
Rio Tinto	93·5	334	60 0	?	—	—	—	68·0
La Paz	144·2	51	i 19 52	[+ 5]	—	—	—	—

Additional readings: Mizusawa gives SN = +1m.24s. Kobe MN = +4·5m.
Osaka MN = +5·8m. De Bilt MN = +42·0m. Helwan PN = +52m.0s.
Moncalieri S? = +34m.33s.

Sept. 16d. 18h. 28m. 50s. Epicentre 43°·8N. 11°·2E. (as at 4h.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Rocca di Papa	2·3	152	e 0 58	+22	(i 1 2)	− 1	—	2·7
Moncalieri	2·8	295	0 42	− 2	1 14	− 3	—	—
Pompeii	3·9	142	2 20	?L	—	—	(2·3)	—
Zurich N.	4·0	332	e 1 7	+ 5	1 54	+ 4	—	2·2
E.	4·0	332	e 1 7	+ 5	1 56	+ 6	—	2·2
Strasbourg	5·3	334	e 1 37	+15	—	—	—	—
Vienna	5·7	37	e 1 54	+26	—	—	—	3·5

Additional readings: Rocca di Papa gives its readings as ePN and iPE.
Zurich ePV = +1m.9s., iN = +1m.41s., iE = +1m.42s.

Sept. 16d. Readings also at 8h. (Moncalieri), 9h. (La Paz, Manila, Algiers, De Bilt, and Helwan), 11h. (La Paz (2), Manila, and Mizusawa), 12h. (Apia), 15h. (Lick), 22h. (Florence), 23h. (San Fernando).

Sept. 17d. 23h. 50m. 36s. Epicentre 32°·5N. 42°·0W.

A = +·627, B = −·564, C = +·537 ; D = −·669, E = −·743 ;
G = +·399, H = −·360, K = −·843.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Azores	14·3	64	5 0	+90	—	—	—	—
Harvard	25·0	301	—	—	10 29	+26	e 12·7	—
Coimbra	27·9	64	—	—	e 10 54	− 3	12·6	—
Ottawa	29·0	306	—	—	e 11 34	+17	e 15·0	—
Rio Tinto	29·2	70	18 54	?L	—	—	(18·9)	21·9
San Fernando	29·6	72	12 24	?S	(12 24)	+57	—	19·4
Toronto	31·2	304	—	—	i 11 0	−54	e 17·1	21·2
Tortosa	34·4	63	—	—	—	—	15·4	16·6
Eskdalemuir	35·3	39	13 2	?S	(13 2)	+ 2	—	—
Edinburgh	35·6	39	—	—	—	—	18·4	—
Chicago	37·1	298	7 31	0	13 24	− 1	18·4	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Uccle		38·3	48	—	—	e 13 41	− 1	e 16·7	20·4
De Bilt		39·1	46	—	—	e 13 58	+ 5	e 19·4	20·8
Moncalieri		40·0	58	—	—	(14 7)	0	14·1	—
Rocca di Papa	N.	43·8	61	e 8 24	0	14 48	−11	e 16·8	—
Pompeii		45·3	62	8 24	−11	15 24	+ 5	—	—
Vienna		45·9	50	e 8 24	−15	—	—	—	—
La Paz		55·0	211	i 9 40	+ 1	—	—	—	—
Victoria		61·0	312	—	—	—	—	—	36·6
Helwan		61·5	71	35 24	?L	—	—	(35·4)	—

Additional readings: Harvard L = +13·2m. Paris (Δ = 36°·8) gives 0h.1m.3s. De Bilt gives MN = +21·3m. Moncalieri gives its reading e = 23h.41m.14s., S? = 23h.53m.49s. Rocca di Papa ePE = +7m.54s., also another ePN = +9m.42s., and SN = +15m.6s. Pompeii gives its readings 1h. late. Helwan PE = +38m.24s.

Sept. 17d. Readings also at 0h. (Lick, Sapporo, and Manila), 1h. (Rocca di Papa), 2h. and 8h. (La Paz), 10h. (near Hokoto and Taihoku), 14h. (La Paz and Helwan), 15h. (La Paz), 18h. (Riverview), 19h. (La Paz).

Sept. 18d. Readings at 0h. (near La Paz), 2h. (near Tacubaya), 4h. (La Paz), 5h. (near Tacubaya), 12h. (near La Paz), 13h. (Apia), 19h. (San Fernando), 21h. (La Paz).

Sept. 19d. Readings at 2h. (La Paz), 3h. (near Tokyo), 6h. (Manila), 9h. (La Paz), 16h. (near Oaxaca and Tacubaya), 19h. (La Paz).

1920. Sept. 20d. 14h. 38m. 50s. Epicentre 20°·6S. 168°·8E.

A = −·918, B = +·182, C = −·352; D = +·194, E = +·981; G = +·345, H = −·068, K = −·936.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Apia		19·7	73	i 4 40	+ 3	8 26	+ 9	10·2	—
Riverview		20·5	226	i 4 52	+ 5	i 8 42	+ 8	e 9·6	10·8
Sydney		20·5	226	4 52	+ 5	8 46	+12	9·9	11·2
Christchurch		23·2	173	5 46	+27	—	—	9·9	17·2
Melbourne		26·8	225	5 34	−22	10 16	−21	—	—
Adelaide		30·1	235	i 6 19	−10	i 11 10	−26	i 15·0	16·1
Honolulu		53·0	40	i 9 46	+20	i 17 28	+32	—	31·3
Manila		58·7	304	e 10 7	+ 4	18 37	+30	30·0	30·3
Batavia		61·6	275	i 10 28	+ 5	i 18 43	0	25·0	34·4
Tokyo		62·6	335	10 29	0	19 33	+37	31·0	32·2
Nagoya		63·4	331	10 32	− 2	—	—	—	—
Osaka		63·7	331	10 35	− 1	19 9	0	27·1	32·4
Kobe		63·9	330	10 53	+16	19 29	+17	27·5	34·6
Taihoku		64·7	315	10 49	+ 6	(19 19)	− 2	19·3	34·8
Nagasaki		65·0	326	9 10	−95	—	—	—	—
Mizusawa	E.	65·1	337	10 46	0	19 21	− 5	—	—
	N.	65·1	337	10 47	+ 1	19 19	− 7	—	—
Zi-ka-wei		68·9	320	10 27	−43	e 20 6	− 7	—	37·3
Ootomari		71·2	343	11 25	+ 1	20 45	+ 5	32·8	35·7
Berkeley	E.	87·1	48	e 12 55	− 5	e 23 22	−20	e 39·8	44·9
	N.	87·1	48	e 12 59	− 1	e 23 21	−21	e 39·9	46·7
	Z.	87·1	48	e 12 57	− 3	—	—	—	46·1
Lick	E.	87·4	49	e 13 0	− 1	e 23 24	−21	e 40·4	44·6
	N.	87·4	49	e 12 58	− 3	e 23 23	−22	e 40·4	49·0
Calcutta	E.	89·5	294	12 [illegible]	−16	23 46	−23	34·6	52·1
	N.	89·5	294	13 10	− 1	23 58	−11	—	—
Colombo		91·4	279	14 10	+[illegible]	25 10	+42	65·2?	80·2
Victoria, B.C.		91·7	33	12 36	−[illegible]	(23 26)	−66	23·4	45·1
	Z.	91·7	33	12 40	−[illegible]	(23 40)	−52	23·7	40·7
Tucson	E.	93·2	57	13 32	−[illegible]	24 4	−43	42·2	53·4
	N.	93·2	57	—	−[illegible]	24 0	−47	43·8	49·7
Kodaikanal		94·8	280	13 46	−[illegible]	(19 52)	?PR$_1$	19·9	62·5
Tacubaya	E.	98·6	74	14 36	−[illegible]	24 31	−71	36·1	47·3
	N.	98·6	74	14 [illegible]	−[illegible]	24 33	−69	34·3	47·2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Oaxaca		100·0	76	24 5	?S	(24 5)	−111	46·2	49·6
Denver	E.	100·3	51	e 23 10	?	33 10	?SR$_1$	44·2	52·2
Dehra Dun		100·9	299	e 18 25	?PR$_1$	—	—	—	—
Mauritius	E.	101·2	243	12 28	−108	—	—	—	55·8
	N.	101·2	243	18 28	?PR$_1$	—	—	—	53·8
Simla		101·8	300	e 18 10	?PR$_1$	28 4	+111	42·4	62·9
Bombay		102·2	286	17 14	?	—	—	—	58·1
Seychelles		110·5	258	19 10	?PR$_1$	(28 55)	+82	28·9	68·2
La Paz		113·0	120	e 15 43	+32	i 25 44	−130	47·4	56·9
Chicago		113·5	51	14 58	−16	25 30	−148	43·8	62·9
Cape Town		118·6	209	20 16	?PR$_1$	30 30	+111	—	78·7
		118·6	209	20 20	?PR$_1$	29 30	+51	66·2	77·2
Toronto		119·7	50	18 52	?	i 29 40	+53	36·5	71·0
Washington		121·3	55	16 3	+14	26 0	−179	e 44·7	—
Georgetown	E.	121·3	55	e 19 5	[+ 9]	e 30 27	?	e 49·6	69·2
	N.	121·3	55	e 19 5	[+ 9]	e 30 27	?	e 50·5	—
	Z.	121·3	55	e 19 10	[+14]	30 40	?	e 49·6	65·6
Cheltenham	E.	121·4	55	14 15	−94	—	—	59·4	67·8
	N.	121·4	55	26 5	?S	37 19	?SR$_1$	61·0	72·6
Ithaca		121·7	51	e 27 34	?S	(e 27 34)	−88	54·5	—
Ottawa		122·3	47	19 7	[+ 8]	29 50	+44	e 51·0	66·2
Northfield		124·5	48	22 10	?PR$_1$	—	—	61·2	—
Harvard	E.	125·7	51	—	—	i 29 6	−25	e 57·0	70·2
	N.	125·7	51	—	—	—	—	e 54·9	71·9
Rio de Janeiro		126·5	142	e 21 25	?PR$_1$	—	—	—	—
Porto Rico	E.	129·0	82	—	—	—	—	61·3	63·2
	N.	129·0	82	—	—	—	—	62·4	64·0
Lemberg		139·6	323	e 19 40	[+ 1]	e 32 52	?	e 66·4	83·2
Helwan	E.	140·7	291	19 34	[− 6]	—	—	—	98·2
	N.	140·7	291	19 52	[+12]	—	—	—	99·7
Dyce	E.	142·8	351	19 38	[− 7]	31 54	?	46·7	68·6
	N.	142·8	351	19 40	[− 5]	33 2	?	46·3	67·6
Hamburg	E.	143·3	339	e 19 39	[− 7]	e 22 52	?PR$_1$	e 64·4	85·0
	N.	143·3	339	e 19 41	[− 5]	e 22 56	?PR$_1$	e 68·3	84·4
Edinburgh		144·3	351	19 42	[− 5]	—	—	51·2	81·7
Vienna	E.	144·6	329	e 19 40	[− 8]	36 48	?	e 68·7	83·5
	N.	144·6	329	e 19 43	[− 5]	36 47	?	e 69·0	83·2
Eskdalemuir		144·8	351	19 45	[− 3]	30 52	?	51·2	—
Athens		145·2	309	19 45	[− 3]	35 40	?	e 63·7	73·0
Stonyhurst		146·1	350	i 19 58	[+ 8]	32 40	?	76·4	95·2
De Bilt	E.	146·1	340	19 50	[0]	e 42 10	?SR$_1$	e 76·2	81·6
	N.	146·1	340	—	—	e 42 16	?SR$_1$	70·2	84·2
Uccle		147·4	341	i 19 51	[− 1]	e 33 34	?	e 68·2	86·2
Oxford		147·9	349	i 19 56	[+ 3]	i 42 23	?SR$_1$	71·2	95·4
Kew		148·0	348	17 10	?	—	—	—	103·2
Strasbourg		148·2	334	i 19 53	[0]	32 28	?	e 66·7	87·7
Zurich		148·8	334	e 19 54	[0]	—	—	—	—
Padova		148·8	329	20 3	[+ 9]	—	—	—	86·8
Paris		149·7	342	i 19 56	[+ 1]	e 42 11	?SR$_1$	63·2	88·2
Milan		150·0	330	20 4	[+ 8]	—	—	73·2	81·8
Besançon		150·0	336	19 57	[+ 1]	30 44	?	65·2	—
Florence		150·2	326	19 58	[+ 2]	—	—	—	20·3
Pompeii	E.	150·3	318	19 58	[+ 2]	28 28	?	46·2	84·2
Rocca di Papa		150·8	322	i 20 4	[+ 7]	e 21 10	?PR$_1$	e 57·3	92·3
	N.	150·8	322	i 20 4	[+ 7]	—	—	e 71·3	93·3
Moncalieri		151·1	332	19 57	[0]	33 56	?	46·0	92·6
Barcelona		156·3	334	20 0	[− 4]	44 0	?SR$_1$	e 66·2	88·2
Tortosa		157·5	337	20 10	[+ 4]	33 53	?	62·7	88·1
Algiers		159·8	326	20 11	[+ 3]	34 40	?	51·2	91·2
Coimbra		160·3	354	20 12	[+ 4]	36 54	?	e 64·9	92·4
Granada		162·2	340	20 15	[+ 6]	—	—	—	—
Rio Tinto		162·4	348	26 10	?PR$_1$	—	—	—	108·2
San Fernando		163·6	346	20 31	[+20]	—	—	79·8	110·2

Additional readings: Riverview [illegible] iP = +5m.8s., iPR$_2$ = +6m.18s., PS = +9m.6s., MN = +13·7m., MZ = +20·6m., T$_e$ = 14h.38m.46s. Epicentre 18°·5S. 167°·0E. Adelaide iPR$_1$ = +7m.4s., iPR$_2$ = +7m.16s., iPR$_3$ = +8m.10s., i = +9m.10s., and +[illegible].40s., SR$_3$ = +13m.22s., i = +14m.40s. Honolulu PR$_1$ = +12m.3[illegible], SR$_1$ = +21m.58s., T$_e$ = 14h.39m.0s. Manila iP = +11m.19s., iR = +13m.22s., MN = +30·2m., T$_e$ = 14h.38m.29s. Batavia i = +13m.3s. (PR$_1$), and i+22m.37s., MN = +36·8m., T$_e$ = 14h.39m.6s. Osaka [illegible] = +35·8s., T$_e$ = 14h.39m.3s. Zi-ka-wei PSN = +20m.31s., PSE = +21m.0[illegible], SR$_1$E = +24m.20s., SR$_1$N = +24m.42s., SR$_2$N = +26m.[illegible], SR$_2$E = +28m.13s., MN = +34·9m.

Notes continued on next page.

Ootomari MN = +36·1m. Dehra Dun gives its reading for 21d. Victoria gives S as L and PR_1 as S = +16m.32s. For vertical instrument S = +16m.55s. Oaxaca S = +32m.47s., MN = +49·4m. Denver LN = +45·2m. Seychelles readings 1h. late. La Paz iP = +18m.51s., iS = +29m.28s., L = +53·1m., T_0 = 14h.45m.1s. Chicago PR_1 = +19m.40s. Cape Town—the Milne-Shaw readings are given first. Toronto i = +20m.28s. and +28m.4s., L = +61·5m. and 62·1m., eL = +77·1m. Georgetown iE = +27m.32s., LE = +59·2m., LN = +59·4m., LZ = +58·8m. Ithaca eS = +39m.30s., e = +42m.40s. Ottawa iE = +26m.5s., iE = +27m.37s., L = +61·2m., T_0 = 14h.45m.12s. Northfield eL = +53·2m. Harvard PR_1E = +20m.24s., PR_1N = +20m.56s., iE = +22m.6s., PR_2E = +26m.18s., iE = +32m.40s., iN = +32m.53s., SR_1E = +37m.7s., SR_1N = +37m.38s., eE = +40m.12s., SR_2E = +42m.52s., T_0 = 14h.38m.36s. Porto Rico ePR_1N = +22m.46s., iPR_1E = +22m.45s., ePR_2E = +26m.30s., iSR_1E = +39m.19s. Vienna iPZ = +19m.44s., iPN = +19m.47s., i = +35m.38s. Hamburg iPZ = +19m.37s. Athens iN = +20m.54s. and +21m.18s., PR_1N = +24m.12s., PR_1E = +24m.15s., PR_2E = +28m.44s., MN = +65·8m., T_0 = 14h.39m.5s. De Bilt e = +17m.30s., eE = +47m.14s., eN = +47m.38s. Paris MN = +89·2m. Strasbourg MN = +81·1m. Zurich iP = +19m.58s. Moncalieri MN = +90·5m. Barcelona three readings +24m.19s., +28m.0s., and +34m.31s. Algiers PR_1 = +24m.0s. Coimbra PR_1N = +24m.44s., PR_1E = +25m.34s., LN = +51·2m., MN = +95·7m. San Fernando MN = +97·7m.

Sept. 20d. 17h. 28m. 15s. Epicentre 20°·6S. 168°·8E. (as at 14h.).

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Apia	19·7	73	e 4 45	+ 8	—	—	10·0	—
Riverview	20·5	226	i 4 47	0	i 8 37	+ 3	—	11·7
Manila	58·7	304	e 9 45	−18	—	—	—	—
Batavia	61·6	275	e 10 7	−16	—	—	—	—
Osaka	63·7	331	10 2	−34	—	—	—	19·5
La Paz	113·0	120	20 9	?PR_1	—	—	—	—
Vienna	144·6	329	i 19 29	[−19]	—	—	—	21·0
De Bilt	146·1	340	19 45	[− 5]	—	—	—	—
Uccle	147·4	341	19 36	[−16]	—	—	—	—
Strasbourg	148·2	334	19 45	[− 8]	—	—	—	—
Padova	148·8	329	19 45	[− 9]	—	—	—	—
Paris	149·7	342	19 44	[−11]	—	—	86·8	89·8
Rocca di Papa	150·8	322	i 19 45	[−12]	—	—	—	20·0

Riverview gives also iP = +4m.35s., MZ = +9·8m., MN = +12·4m.

Sept. 20d. 20h. 25m. 57s. Epicentre 40°·0N. 144°·5E. (as on 1917 April 21d.).

A = −·624, B = +·445, C = +·643; D = +·581, E = +·814; G = −·523, H = +·373, K = −·766.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa	E.	2·8	252	0 44	0	1 16	− 1	—	—
	N.	2·8	252	0 44	0	1 18	+ 1	—	—
Tokyo		5·7	222	1 29	+ 1	—	—	2·8	3·5
Ootomari		6·8	350	1 49	+ 5	—	—	—	—
Osaka		8·9	236	2 42	+27	—	—	4·5	5·4
Kobe		9·1	237	e 2 16	− 2	—	—	e 5·4	6·8
Zi-ka-wei		20·7	252	e 4 43	− 6	e 8 47	+ 9	—	—
Taihoku		24·3	239	—	—	e 8 7	?	—	—
Hamburg		78·6	335	—	—	—	—	e 42·0	48·0
Edinburgh		80·3	344	—	—	—	—	45·0	—
Vienna		80·6	328	12 7	−16	—	—	e 43·6	52·4
Eskdalemuir		80·8	344	—	—	—	—	46·0	—
De Bilt		81·4	337	—	—	e 22 42	+ 3	42·0	48·0
Strasbourg		83·6	332	—	—	—	—	e 44·0	—
Kew		83·6	340	—	—	—	—	—	53·0
Paris		85·1	338	—	—	—	—	e 46·0	54·0
Moncalieri		86·6	331	—	—	—	—	47·9	—
Tortosa		92·8	335	—	—	—	—	e 48·0	54·4

Additional readings: Osaka gives MN = +5·6m. Kobe LN = +4·1m., MN = +6·0m. Taihoku gives its single reading as at 21h. De Bilt MN = +52·5m.

Sept. 20d. 23h. 35m. 8s. Epicentre 45°·5N. 94°·0E.

A = −·049, B = +·699, C = +·713; D = +·998, E = +·070; G = −·050, H = +·711, K = −·701.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Simla		19·4	228	e 3 58	−36	—	—	—	7·9
Dehra Dun		19·6	225	4 52	+16	—	—	—	—
Calcutta	E.	23·4	193	5 16	− 5	9 40	+ 7	15·3	—
	N.	23·4	193	5 28	+ 7	9 34	+ 1	14·9	—
Zi-ka-wei		25·6	114	—	—	—	—	e 14·3	—
Sapporo		33·5	76	15 29	?L	19 47	?	24·6	—
Kodaikanal		38·1	209	17 28	?L	—	—	(17·5)	—
Colombo		40·5	201	21 52	?L	—	—	(21·9)	—
Lemberg		45·6	301	—	—	—	—	e 21·9	26·0
Helwan		50·6	274	17 52	?S	(17 52)	+86	—	—
Vienna		50·8	305	e 9 19	+ 7	—	—	e 24·4	29·5
Hamburg		51·9	311	—	—	—	—	e 28·9	31·0
De Bilt		55·2	311	—	—	e 17 17	− 7	e 28·9	32·8
Strasbourg		55·6	308	e 27 48	?L	—	—	(e 27·8)	30·9
Rocca di Papa		56·4	298	—	—	e 21 34	?SR_1	—	—
Edinburgh		57·2	319	—	—	—	—	30·9	36·4
Eskdalemuir		57·6	319	—	—	—	—	27·9	—
Moncalieri		57·6	304	e 21 11	?SR_1	26 43	?L	31·6	33·6
Kew		58·3	314	—	—	—	—	—	34·9
Paris		58·3	310	—	—	e 21 52	?	—	33·9
Oxford		58·7	314	—	—	—	—	29·8	35·7
Tortosa		64·3	305	—	—	—	—	e 34·9	38·1
Coimbra		69·8	307	e 13 35	+139	23 15	+171	e 40·2	—

Additional readings: Helwan gives also PN = +13m.52s. (?PR_1N). Hamburg e = +22m.52s., eN = +26m.31s. De Bilt eSR_1 = +21m.0s., MN = +32·8m.

Sept. 20d. Readings also at 5h. (San Fernando), 7h. (Kew), 13h. (Apia), 15h. (Florence), 16h. (Mauritius), 18h. (Manila), 23h. (Helwan).

Sept. 21d. 2h. 34m. 18s. Epicentre 18°·0S. 167°·0E. (as on 1920 Feb. 27d.).

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.
Riverview	21·3	219	e 4 36	−21	i 8 57	+ 7	e 10·2	10·6
Sydney	21·3	219	4 54	− 3	8 42	− 8	10·3	11·3
Christchurch	26·0	171	5 48	0	9 54	−28	13·3	15·9
Melbourne	27·7	220	—	—	11 24	+30	14·7	16·2
Adelaide	30·4	231	i 5 0	−92	—	—	—	16·2
Honolulu	52·2	43	17 6	?S	(17 6)	+20	24·3	34·9
Manila	55·9	303	e 9 53	+ 8	—	—	—	—
Batavia	59·8	273	e 10 5	− 6	i 18 39	+18	—	—
Kodaikanal	92·8	280	57 12	?	—	—	—	—
Chicago	113·2	50	29 12	?S	(29 12)	+76	e 58·7	—
La Paz	115·7	119	e 16 13	+49	29 13	+57	61·7	67·6
Toronto	119·3	49	—	—	—	—	e 64·6	72·1
Ottawa	121·7	48	—	—	—	—	e 60·7	—
Harvard	125·4	50	e 77 59	?	—	—	81·3	—
Helwan	138·0	295	39 42	?	—	—	—	—
Vienna	141·5	328	19 29	[−13]	—	—	—	21·4
De Bilt	143·1	342	—	—	—	—	e 82·7	85·1
Oxford	145·0	347	e 20 2	[+14]	—	—	—	—
Strasbourg	145·1	336	e 19 42	[− 6]	—	—	—	—
Paris	146·7	341	e 19 42	[− 9]	—	—	78·7	—
Rocca di Papa	147·7	323	i 19 57	[+ 5]	—	—	—	21·7

Additional readings: Riverview gives iP = +4m.42s. and +5m.54s., MZ = +11·0m., MN = +11·2m. Epicentre 17°·0S. 169°·0E., T_o = 2h.33m.26s. Christchurch SR_1 = +11m.18s. Chicago S = +40m.5s. La Paz P? = +19m.42s. (?PR_1). Helwan PN = +40m.42s. De Bilt MN = +85·4m. Rocca di Papa iPN = +20m.4s.

Sept. 21d. 17h. 42m. 6s. Epicentre 45°·3N. 153°·5E.

$A = -·630$, $B = +·314$, $C = +·711$; $D = +·446$, $E = +·895$; $G = -·636$, $H = +·317$, $K = -·703$.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari		7·6	284	2 6	+11	—	—	4·3	6·2
Mizusawa	E.	11·0	240	2 37	− 7	4 26	−28	—	—
	N.	11·0	240	2 38	− 6	4 29	−25	—	—
Tokyo		14·2	232	3 19	−10	5 29	−44	9·4	11·2
Nagoya		16·1	237	3 46	− 7	—	—	—	—
Osaka		17·4	239	4 9	− 1	7 24	− 3	7·4	11·5
Kobe		17·6	239	4 5	− 7	7 27	− 4	10·2	12·5
Zi-ka-wei		28·6	252	6 0	−14	e 10 47	−23	—	18·4
Taihoku		32·7	242	e 7 44	?SR_1	—	—	—	—
Manila		41·2	233	e 7 48	−17	—	—	—	—
Honolulu		46·1	103	14 48	?S	(14 48)	−41	e 21·9	31·2
Batavia		66·2	233	i 10 52	− 1	i 19 40	0	—	—
Colombo		73·6	265	44 54	?L	—	—	(44·9)	56·9
Lemberg		75·3	330	e 12 0	+ 9	—	—	e 45·5	50·3
Hamburg		76·4	339	i 12 0	+ 3	e 21 48	+ 6	e 42·4	46·0
Edinburgh		77·0	348	—	—	i 22 0	+11	—	49·4
Chicago		77·3	42	11 17	−46	21 54	+ 2	e 42·4	—
Eskdalemuir		77·5	348	12 1	− 3	21 57	+ 2	39·4	—
Ann Arbor		78·7	39	22 0	?S	(22 0)	− 8	—	—
Stonyhurst		78·8	346	18 30	?PR_1	—	—	—	50·4
De Bilt		78·9	340	12 17	+ 5	22 15	+ 4	e 38·9	55·8
Riverview		79·2	182	e 12 12	− 2	(e 22 18)	+ 4	e 22·3	55·0
Vienna		79·3	333	12 15	0	e 22 19	+ 4	39·9	54·4
Ottawa		79·5	32	—	—	e 22 18	0	e 36·9	—
Uccle		80·3	341	12 19	− 2	22 27	0	e 38·9	56·9
Kew		80·6	345	—	—	—	—	—	56·9
Oxford		80·6	346	e 12 30	+ 7	i 22 40	+10	—	54·9
Strasbourg		81·6	338	i 12 26	− 2	22 40	− 2	e 41·9	51·5
Paris		82·6	342	i 12 33	− 1	e 22 53	0	43·9	57·9
Besançon		83·2	339	12 35	− 2	23 5	+ 6	49·9	—
Melbourne		83·5	187	—	—	—	—	e 32·9	52·9
Harvard		83·7	31	—	—	—	—	e 45·2	—
Georgetown		84·3	31	—	—	e 23 8	− 3	—	—
Washington		84·3	37	12 42	− 2	23 10	− 1	62·4	—
Moncalieri		84·8	337	12 39	− 8	23 9	− 8	46·1	52·6
Rocca di Papa	E.	86·3	332	12 51	− 4	—	—	—	—
	N.	86·3	332	12 54	− 1	e 20 12	?	e 48·0	59·5
Pompeii		86·4	330	12 14	−41	—	—	—	—
Helwan		88·4	314	13 54	+47	—	—	—	—
Barcelona		89·6	339	—	—	e 23 47	−23	—	24·3
Tortosa		90·6	341	—	—	—	—	e 35·9	62·2
Coimbra	E.	93·1	347	e 12 40	−53	e 23 16	−90	e 49·3	—
	N.	93·1	347	e 13 16	−17	23 8	−98	e 48·3	—
Algiers		93·8	337	—	—	—	—	55·9	60·9
San Fernando		96·3	345	27 24	?S	(27 24)	+125	—	60·9
La Paz		134·9	62	i 19 32	[+ 2]	—	—	75·9	82·4

Additional readings: Tokyo gives MN = +11·2m. Osaka MN = +8·5m. Kobe 6min. has been added to P, MN = +12·3m. Zi-ka-wei MN = +17·2m., T_0 = 17h.42m.5s. Honolulu eS = +18m.54s. (?SR_1). Hamburg MN = +53·8m., MZ = +55·0m. Chicago L = +45·4m. Eskdalemuir PR_1 = +15m.5s., SR_1 = +27m.4s., T_0 = 17h.42m.10s. Ann Arbor PN = +21m.48s. De Bilt PR_1N = +15m.14s., eE = +22m.23s., SR_1 = +27m.53s., MN = +56·1m., T_0 = 17h.42m.23s. Riverview gives e? = −0m.36s. and +7m.30s., eL = 23·0m., MN = +27·8m. Vienna iPZ = +12m.13s. Uccle SR_1 = +28m.6s., MN = +45·6m., T_0 = 17h.42m.15s. Paris iS = +22m.58s., MN = +44·9m. Harvard L = +52·0m. and +55·7m., T_0 = 17h.42m.46s. Georgetown eE = +22m.54s. Rocca di Papa iPN = +12m.38s. Helwan PE = +14m.54s. Coimbra eLN = +33·7m., T_0 = 17h.42m.16s. San Fernando MN = +68·4m. La Paz i = +23m.5s. (?PR_1).

Sept. 21d. Readings also at 0h. (near La Paz), 1h. (Apia), 5h. (Chicago, Manila, Honolulu, and near Sapporo), 6h. (De Bilt), 7h. (near Tokyo), 13h. (La Paz), 14h. (Helwan), 15h. (Rio Tinto), 16h. (Riverview, Melbourne, and Stonyhurst), 17h. (Stonyhurst), 19h. (Cape Town), 23h. (Taihoku).

Sept. 22d. Readings also at 2h. (Sapporo), 11h. (near Oaxaca and Tacubaya), 12h. (Helwan), 16h. (Taihoku and Moncalieri), 17h. (La Paz and near Tacubaya), 18h. (La Paz), 19h. and 23h. (San Fernando).

Sept. 23d. 5h. 32m. 35s. Epicentre 49°·0N. 156°·0E.

A = −·599, B = +·267, C = +·755; D = +·407, E = +·914; G = −·689, H = +·307, K = −·656.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Ootomari		9·2	260	2 27	+ 8	(4 13)	+ 5	4·2	5·2
Mizusawa	E.	14·5	233	3 32	− 1	6 2	−18	—	—
	N.	14·5	233	3 35	+ 2	6 6	−14	—	—
Tokyo		17·9	228	4 11	− 5	5 55	?PR$_1$	10·3	10·4
Nagoya		19·7	232	4 38	+ 1	—	—	—	—
Osaka		20·8	234	5 9	+18	(8 47)	+ 7	8·8	9·0
Kobe		21·0	235	4 52	− 1	(8 27)	−17	8·4	9·2
Zi-ka-wei		31·5	249	e 6 37	− 6	e 11 31	−29	—	—
Taihoku		35·9	240	—	—	—	—	e 17·4	—
Manila		44·8	232	e 8 39	+ 7	(e 14 57)	−15	e 15·0	15·1
Honolulu		45·6	109	15 43	?S	(15 43)	+21	e 23·2	39·1
Batavia		69·8	233	11 17	+ 1	20 24	0	—	—
Hamburg		73·4	340	i 11 41	+ 3	—	—	e 36·4	46·9
Chicago		73·4	44	10 49	−49	21 7	0	38·7	—
Edinburgh		73·7	349	—	—	e 21 25	+15	—	52·4
Kodaikanal		74·8	270	46 25	?L	—	—	(46·4)	—
Stonyhurst		75·5	347	e 22 7	?S	(22 7)	+35	—	52·4
De Bilt		75·9	341	11 57	+ 3	21 40	+ 4	e 38·4	45·8
Vienna		76·7	334	e 11 59	0	e 21 43	− 2	e 39·4	48·9
Uccle		77·3	341	12 2	− 1	21 48	− 4	e 38·4	47·4
Strasbourg		78·7	339	i 12 11	0	e 21 58	−10	e 39·4	53·4
Zurich		79·6	339	e 12 16	− 1	—	—	—	—
Paris		79·6	344	e 12 24	+ 7	e 22 37	+18	45·4	48·4
Besançon		80·3	340	12 20	− 1	—	—	40·4	—
Moncalieri		82·0	339	12 31	+ 1	22 38	− 8	32·9	—
Riverview		83·0	183	—	—	—	—	e 41·3	42·5
Rocca di Papa		83·7	333	i 12 37	− 3	23 1	− 5	e 46·5	54·5
Pompeii		84·0	330	11 49	−53	—	—	—	—
Helwan		87·0	314	23 25	?S	(23 25)	−16	—	—
Algiers		90·9	339	—	—	—	—	50·4	54·4
La Paz		131·8	62	i 19 33	[+10]	22 56	?PR$_1$	—	—

Additional readings: Osaka gives also MN = +9·1m. Honolulu S = +20m.13s. (?SR$_1$). De Bilt eSR$_1$N = +26m.45s., MN = +40·3m., T$_e$ = 5h.32m.48s. Vienna iP = +12m.1s. Uccle SR$_1$ = 27m.7s. Strasbourg MN = +45·8m., T$_e$ = 5h.32m.57s. Riverview e? = +26m.31s., e = +36m.37s., MN = +44·0m. Rocca di Papa gives S 10min. too early.

Sept. 23d. 19h. 37m. 0s. Epicentre 49°·0N. 156°·0E. (as at 5h.).

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Mizusawa	E.	14·5	233	3 35	+ 2	—	—	—	—
	N.	14·5	233	3 38	+ 5	6 25	+ 5	—	—
Tokyo		17·9	228	e 2 57	−79	—	—	—	—
Nagoya		19·7	232	2 27	−130	—	—	—	—
Osaka		20·8	234	(4 51)	0	—	—	4·8	6·2
Kobe		21·0	235	(4 38)	−15	—	—	4·6	5·2
Zi-ka-wei		31·5	249	6 36	− 7	e 8 44	?PR$_1$	—	9·0
Taihoku		35·9	240	e 7 5	−16	—	—	8·6	—
Manila		44·8	232	(7 8)	−84	7 8	?P	8·8	9·1
Batavia		69·8	233	e 7 50	?	—	—	e 32·7	—
Hamburg		73·4	340	—	—	—	—	e 44·0	47·0
Edinburgh		73·7	349	—	—	—	—	45·0	54·5
De Bilt		75·9	341	—	—	e 23 8	+92	e 44·0	50·6
Vienna		76·7	334	—	—	—	—	e 45·0	55·0
Uccle		77·3	341	—	—	—	—	e 45·0	50·4
Strasbourg		78·7	339	e 30 6	?SR$_1$	—	—	e 46·0	49·0
Paris		79·6	344	—	—	—	—	e 47·0	50·0
Moncalieri		82·0	339	—	—	e 23 31	+45	46·6	55·5
Rocca di Papa		83·7	333	—	—	—	—	e 48·0	49·5
Helwan		87·0	314	47 0	?L	—	—	(47·0)	—
Coimbra	E.	89·8	349	e 23 55	?S	(e 23 55)	−17	e 52·5	57·2
	N.	89·8	349	e 24 25	?S	(e 24 25)	+13	—	57·1
San Fernando		93·1	346	—	—	—	—	—	58·0
La Paz		131·8	62	20 18	[+55]	—	—	—	—

Additional readings: Osaka gives also PS = +2m.17s., MN = +6·8m. Kobe gives PS = +2m.4s. Zi-ka-wei readings have been increased by 5m., T$_e$ = 19h.35m.59s. Taihoku readings have been increased by 5m. Manila e = +4m.30s., MN = +9·6m., but this is probably another shock. Hamburg MZ = +53·0m. De Bilt MN = +50·7m. Helwan PN = +34m.0s. Coimbra S = +38m.0s. San Fernando MN = +59·5m.

Sept. 23d. Readings also at 1h. (Apia, La Paz, and Batavia), 5h. (Cape Town), 8h. (Moncalieri), 9h. (Rocca di Papa and Pompeii), 10h. (Moncalieri), 14h. (Sapporo), 15h. (Barcelona), 17h. (Batavia and near La Paz), 20h. (near Nagasaki), 23h. (San Fernando).

1920. Sept. 24d. 21h. 54m. 50s. Epicentre 6°·0N. 83°·0W.

A = +·121, B = −·987, C = +·104; D = −·993, E = −·122; G = +·013, H = −·104, K = −·994.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Balboa Heights	E.	4·5	49	0 57	−13	2 0	− 4	2·5	2·9
	N.	4·5	49	0 54	−16	1 56	− 8	2·7	3·8
Oaxaca	E.	17·5	311	4 23	+12	8 2	+33	8·8	9·5
	N.	17·5	311	4 23	+12	8 2	+33	8·8	9·4
	Z.	17·5	311	4 23	+12	8 10	+33	8·9	9·7
Tacubaya	E.	20·8	312	5 1	+10	9 9	+29	10·5	11·7
	N.	20·8	312	5 1	+10	9 14	+34	10·7	11·5
Porto Rico		21·1	53	i 4 56	+ 2	i 8 55	+ 9	10·4	10·6
La Paz		26·8	147	i 5 56	0	10 38	+ 1	12·8	17·1
Georgetown	E.	33·4	11	e 6 53	− 7	12 14	−16	18·6	—
	N.	33·4	11	e 6 53	− 7	12 17	−13	e 15·3	—
Washington		33·4	11	6 50	−10	12 46	+16	18·2	—
Chicago		35·0	355	7 0	−22	13 5	− 5	18·2	—
Ithaca		36·9	10	7 20	− 9	e 13 4	−18	18·0	—
Tucson	E.	37·0	321	7 25	− 5	13 24	0	19·9	20·6
	N.	37·0	321	7 28	− 2	e 13 21	− 3	e 18·9	22·6
Harvard	E.	37·8	16	7 40	+ 4	13 14	−21	e 15·9	—
	N.	37·8	16	7 40	+ 4	13 20	−15	e 16·0	—
Toronto		37·8	7	—	—	13 52	+17	e 17·6	22·6
Ottawa		39·9	10	7 47	− 7	13 53	−12	e 16·4	—
Victoria		54·5	329	17 39	?S	(17 39)	+24	27·5	34·7
Honolulu		73·9	291	—	—	21 40	+27	34·3	42·0
Coimbra	E.	74·4	50	e 12 0	+15	21 31	+12	33·5	—
	N.	74·4	50	e 11 33	−12	21 31	+12	31·6	—
Rio Tinto		75·6	53	27 10	?SR_1	—	—	—	55·2
San Fernando		75·9	55	21 10	?S	(21 10)	−26	—	—
Granada		77·9	54	i 12 18	+12	i 22 7	+ 8	—	—
Edinburgh		79·4	36	—	—	22 10	− 6	—	—
Oxford		80·2	40	—	—	22 30	+ 5	39·1	41·1
Tortosa		81·2	50	12 35	+ 9	22 47	+10	34·5	36·5
Barcelona		82·4	50	—	—	25 10	+140	—	—
Paris		82·6	42	e 12 33	− 1	i 22 54	+ 1	37·2	40·2
Uccle		83·7	40	e 12 41	+ 1	23 7	+ 1	35·2	42·2
De Bilt	E.	84·2	40	—	—	23 9	− 1	e 39·2	41·8
	N.	84·2	40	—	—	23 14	+ 4	e 39·2	40·2
Strasbourg		86·0	42	e 12 58	+ 5	e 23 31	+ 1	e 36·2	44·2
Hamburg		87·3	38	e 13 4	+ 3	e 23 28	− 16	e 40·2	—
Rocca di Papa	E.	90·3	49	i 13 20	+ 2	i 25 22	+65	—	—
Vienna		91·8	41	e 13 23	− 3	—	—	—	—
Cape Town		102·8	125	50 41	?L	—	—	(50·7)	57·4
Helwan		107·7	58	27 10	?S	(27 10)	+ 3	—	—

Additional readings: Oaxaca readings have been diminished by 4m. Chicago $SR_1 = +15$m.34s., $T_0 = 21$h.54m.9s. Ithaca gives also LE = +16·0m., $T_0 = 21$h.54m.56s. Tucson $PR_1E = +8$m.52s., $PR_1N = +9$m.0s., $T_0 = 21$h.54m.46s. Harvard iE = +8m.45s., iN = +8m.55s., $T_0 = 21$h.54m.3s. Toronto eL = +20·8m. Ottawa $PR_1 = +9$m.17s., $T_0 = 21$h.54m.54s. Uccle $SR_1 = +28$m.40s., $T_0 = 21$h.55m.2s. De Bilt $eSR_1 = +28$m.53s. Rocca di Papa eE = +13m.10s., eN = +13m.16s., iPN = +13m.27s. Helwan PE = +25m.10s.

Sept. 24d. Readings also at 0h. (San Fernando), 1h. (Zi-ka-wei and Moncalieri), 3h. (Zi-ka-wei), 4h. (Batavia, Manila, Riverview, and La Paz), 5h. (Zi-ka-wei, Manila, Helwan, and Victoria), 6h. (Kodaikanal), 9h. (Athens), 11h. (Zi-ka-wei), 14h. (Athens, Zante, Pompeii, and near Rocca di Papa), 15h. (near La Paz), 17h. (Ann Arbor), 23h. (Colombo, Toronto, and near Tacubaya).

Sept. 25d. Readings at 0h., 1h., 2h. (2) (La Paz), 13h. (Algiers), 14h. (Rocca di Papa), 18h. (Algiers), 20h. (San Fernando).

Sept. 26d. Readings at 0h. (La Paz, Helwan, Zi-ka-wei, Calcutta, and near Pompeii and Rocca di Papa), 1h. (near Rocca di Papa), 2h. (near Pompeii and Rocca di Papa), 3h. (near Rocca di Papa), 6h. (Tortosa and near Tokyo), 8h. and 10h. (2) (near Rocca di Papa), 13h. (San Fernando), 19h. (near Rocca di Papa and Pompeii).

Sept. 27d. 5h. 25m. 45s. Epicentre 27°·0N. 109°·5W. (as on 1918 May 23d.).

A = −·297, B = −·840, C = +·454; D = −·943, E = +·334; G = −·152, H = −·428, K = −·891.

		Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
		°	°	m. s.	s.	m. s.	s.	m.	m.
Mazatlan		4·8	143	—	—	—	—	2·4	3·4
Tucson	E.	5·4	348	e 1 53	+30	—	—	2·6	3·2
	N.	5·4	348	e 1 25	+ 2	—	—	2·7	3·8
Tacubaya		12·1	127	3 50	+50	—	—	8·0	8·8
Berkeley		15·3	318	—	—	(e 6 10)	−29	e 6·2	—
Chicago		23·2	45	5 34	+15	9 35	+ 6	11·9	14·0
Victoria		23·9	337	9 31	?S	(9 31)	−11	12·0	15·4
Ann Arbor		26·0	47	12 57	?L	—	—	(13·0)	—
Toronto		29·4	48	i 5 9	−73	—	—	e 16·4	19·8
Ithaca		30·9	49	—	—	e 16 27	?L	17·5	—
Ottawa		32·5	46	6 23	−30	12 23	+ 7	e 17·9	—
Northfield		34·1	50	—	—	—	—	e 18·2	—
Harvard	E.	34·7	54	—	—	—	—	18·9	20·3
	N.	34·7	54	—	—	e 12 56	+ 5	18·8	—
Edinburgh		76·4	34	—	—	—	—	44·2	—
Eskdalemuir		76·6	34	—	—	—	—	40·2	—
Stonyhurst		77·8	35	42 15	?	45 3	?	48·0	—
Oxford		79·4	39	—	—	—	—	e 46·4	—
Kew		80·1	37	—	—	—	—	—	48·2
De Bilt		82·5	35	—	—	e 24 33	+101	39·2	50·8
Uccle		82·8	36	—	—	—	—	e 34·2	—
Rio Tinto		83·0	51	50 15	?L	—	—	(50·2)	57·2
Paris		83·0	38	—	—	—	—	e 41·2	49·2
San Fernando		84·0	52	47 15	?L	—	—	(47·2)	55·2
Hamburg		84·0	31	—	—	—	—	e 48·2	—
Strasbourg		86·0	38	—	—	—	—	e 45·2	55·2
Vienna		90·5	33	—	—	—	—	e 44·2	61·8
Rocca di Papa		93·0	40	i 25 33	?S	(25 33)	+48	e 56·4	58·2

Additional readings: Mazatlan has been diminished by 1hr. Ann Arbor gives PN = +13m.3s., PE (Wiechert) = +12m.51s. Harvard eN? = +11m.30s., eE = +18m.19s., LE = +19·3m., eN = +19m.22s., LE = +20·3m. LN = +21·7m. De Bilt MN = +42·2m. San Fernando MN = +50·2m. Rocca di Papa eN = +25m.33s.

Sept. 27d. 5h. 29m. 36s. Epicentre 43°·7N. 144°·4E.

A = −·588, B = +·421, C = +·691.

		Δ	P.	O−C.	S.	O−C.	L.	M.
		°	m. s.	s.	m. s.	s.	m.	m.
Ootomari		3·2	0 49	− 1	(1 20)	− 8	1·3	1·4
Mizusawa	E.	5·2	1 22	+ 2	2 24	+ 2	—	—
	N.	5·2	1 22	+ 2	2 26	+ 4	—	—
Tokyo		8·8	2 23	+10	—	—	—	—
Zi-ka-wei		22·0	e 5 2	− 3	—	—	—	—

No additional readings.

Sept. 27d. Readings also at 3h. (Apia), 5h. 42m. (near Georgetown, Washington, Cheltenham, and Northfield), 7h. (Manila (2)), 8h. (Pompeii, Helwan, and near Rocca di Papa), 10h. (Riverview, Sydney, Melbourne, and near Mizusawa and Tokyo), 13h. (Batavia, Manila, and near Tokyo), 14h. (Helwan), 15h. (Mazatlan and Azores), 18h. (Apia), 21h. (San Fernando and near Mizusawa), 23h. (Helwan and Lick).

Sept. 28d. 15h. 17m. 20s. Epicentre 38°·0N. 29°·5E.

A = +·686, B = +·388, C = +·616; D = +·492, E = −·870; G = +·536, H = +·303, K = −·788.

	Δ	Az.	P.	O−C.	S.	O−C.	L.	M.
	°	°	m. s.	s.	m. s.	s.	m.	m.
Athens	4·5	271	i 1 10	0	—	—	1·6	2·2
Helwan	8·3	169	1 40	−26	(3 40)	− 5	—	—
Pompeii	11·9	288	2 54	− 4	5 40	?L	(5·7)	7·7
Lemberg	12·4	344	—	—	e 5 28	− 1	e 7·6	8·5
Rocca di Papa N.	13·4	292	e 3 22	+ 4	6 4	+11	7·8	8·8
Vienna	14·0	322	i 3 28	+ 2	6 14	+ 6	i 7·0	8·2
Padova	15·1	305	3 38	− 2	7 43	?L	(7·7)	—
Moncalieri	17·7	300	e 4 4	− 9	6 38	−55	9·3	11·9
Zurich	17·9	308	e 4 19	+ 3	—	—	—	—
Strasbourg	18·9	311	i 4 33	+ 5	e 7 57	− 3	e 9·7	12·0
Besançon	19·5	306	5 17	+42	10 36	?L	(10·6)	10·7
Hamburg	20·5	326	e 4 51	+ 4	e 8 37	+ 3	e 11·8	13·4
Algiers	21·0	275	4 53	0	—	—	9·7	—
Uccle	21·9	314	5 4	0	e 8 56	− 7	e 10·7	12·3
De Bilt	22·1	318	5 4	− 2	9 7	0	11·2	14·4
Paris	22·2	308	e 5 10	+ 3	e 8 59	−10	11·7	13·7
Tortosa	22·5	287	5 10	− 1	(e 9 25)	+10	e 9·4	16·0
Oxford	25·5	313	i 5 38	− 5	e 10 3	−10	14·9	16·3
Edinburgh	28·1	320	—	—	—	—	14·7	16·5
Coimbra	29·3	287	—	—	8 38	?	e 17·4	—

Additional readings: Helwan readings given as PN and PE respectively. Rocca di Papa iPE = +3m.14s., iPN = +3m.17s., L = +9·6m. Vienna iZ = +3m.32s., iN = +3m.58s. +4m.9s., and +4m.31s. Strasbourg MN = +11·6m., T_o = 15h.17m.39s. Hamburg i = +10m.6s., MZ = +13·8m., MN = +16·0m., T_o = 15h.17m.29s. De Bilt MN = +12·4m. Tortosa S? = +7m.3s. (?PR_1).

Sept. 28d. Readings also at 0h. (Ottawa), 1h. (Manila), 11h. (De Bilt and Helwan), 17h. (Azores), 18h. (San Fernando), 19h. (Rio Tinto).

Sept. 29d. Readings at 3h. (Apia), 4h. (Florence), 7h. (near Pompeii and Rocca di Papa), 9h. (Padova), 11h. (Azores), 12h. (Taihoku and near Tucson), 17h. (near La Paz), 20h. (San Fernando).

Sept. 30d. Readings at 1h. (Lick), 5h. (La Paz), 10h. (Riverview), 12h. (Taihoku), 14h. (Uccle, Taihoku, Manila, and near Zi-ka-wei), 15h. (De Bilt and Helwan), 17h. (Batavia), 19h. (San Fernando).

I.W. County Press.—2294-11-24.