DEPARTMENT OF THE INTERIOR
CANADA
SIR JAMES ALEXANDER LOUGHEED, K.C.M.G., K.C., *Minister*. W. W. CORY, C.M.G., *Deputy Minister*

PUBLICATIONS

OF THE

Dominion Observatory

OTTAWA

OTTO KLOTZ, LL.D., D.Sc., *Director*

Vol. V, No. 4

The Location of Epicentres, 1917-18

BY

ERNEST A. HODGSON, M.A.

OTTAWA
GOVERNMENT PRINTING BUREAU
1921

23058—1

LOCATION OF EPICENTRES
1917–18

ERNEST A. HODGSON, M.A.

The accompanying list of epicentres for 1917–18 is a continuation of a similar list put out by the Dominion Observatory each year since 1911. This publication from 1911 to 1916 appeared in The Journal of the Royal Astronomical Society of Canada, and all, except those for 1916, were published by Dr. Klotz.

The series for 1917–18 have been delayed through various causes, not the least of which has been the delay in receiving bulletins from Europe while the war was going on.

The method used in selecting the records with which to deal is the same in this issue as in former years. Only those earthquakes are reported on of which at least a trace was registered at Ottawa. Tabular sheets were kept of these earthquakes and all the data relative to them, sent in from other stations, were entered on the forms. In every case the values for O (the time at the origin) and Δ (the distance from the station to the epicentre) were computed, using the Klotz tables. Where the values for these were given by the station, and where the given values differed from the O or Δ computed, the computed value was used, in order that the basis of the investigation might be uniform. There were few stations, however, which were using tables other than those incorporated by Dr. Klotz in his collection. No doubt these tables are subject to correction and they will, in time, be improved upon; but the remarkably large number of earthquakes with large numbers of stations deriving values for O differing from the mean by only a few seconds, shows that the tabular values are a very close approximation to the true ones.

Where a station gave e instead of P, but reported S, the e was treated as P to get Δ and O. If these values were close to the ones indicated by the location work, they were retained, and e was looked upon as P. If the derived values were obviously out, the resulting Δ is not reported in the last column.

In the tabular matter the first column gives the date and the Ottawa serial number of the earthquake. The second, third and fourth columns give the values for O and Δ as determined from the records of the various stations. Where an epicentre was possible of determination, the values of ϕ and λ (the latitude and longitude of the place) and an adopted value for O are given in the fifth column. The sixth column gives the locations as given by press reports or by the bulletins from various stations. The last two columns give the values of Δ given by various stations, which values do not fit into the determined epicentre.

23058—1½

The determination of the epicentres has been by the stereographic method as formerly. The plotting is done with considerable care on sheets of drawing paper 18″ by 14″. The scale used is one in which the radius of the projected equator is exactly ten centimetres.

During 1917 there were 89 earthquakes registered at Ottawa. Of these, locations have been found for 28, approximate locations for 15, a doubtful location for one, and no location for 46.

In 1918 there were 142 earthquakes registered at Ottawa—almost half as many again as the normal average registration. Of these, locations have been found for 49, approximate locations for 17, doubtful locations for 10, and no location for 66.

As in previous years, it has been found on examination of those records whose values for Δ failed to reach the epicentre, that there are very many cases where PR_1 has been read as P. This error can often be avoided in reading an earthquake record which is obviously from a distant epicentre, (long continued L waves of regular sinusoidal character without very many serrations), if we assume the first recorded phase to be PR_1 and endeavour to read the record on that basis; then determining where P should appear and examining the record at that point for confirmatory traces. The confirmation of LR_1 will also assist in determining whether or not the first obviously recorded phase is P or PR_1.

The vertical seismograph assists greatly in determining the arrival of P. Unfortunately these instruments are almost all of mechanical registration type and consequently friction renders them less sensitive than we could wish them to be. Some years ago Marvin pointed out that a continuous vibration of small amplitude of the pen point sufficed to remove this friction. This was accidentally discovered again by the author, who had not heard of Marvin's report. A generator happened to be running in the Observatory at a time when microseisms were unusually great—greater than for some six years past. The vertical seismograph recorded these as long as the generator was running, but the micros ceased with the stopping of the generator. Experiment showed that it was the vibration of the stylus by the generator, removing the friction, which enabled the instrument to record the micros. An electric buzzer was obtained without the sound box; the make and break was shorted so that it could not break; the electric current from the lighting system (60 cycle) was used with a lamp in series and a vibration without sound was obtained. This buzzer was screwed to the top of the pillar which supports the stylus of our Spindler and Hoyer Vertical Seismograph (Wiechert type, 80 kg.), with the result that its sensitivity was increased enormously. This fact is again reported in the hope that the method of obtaining the vibration conveniently may be of use to others having a similar instrument. Our vertical seismograph is now of the greatest value in determining the time of arrival of the P wave.

It would be of great assistance in locating epicentres and also in investigations having in view the improvement of our tables and in utilizing them as the basis of deductions as to the nature of the interior of the earth, if each station would record every certain visible phase difference, especially preceding L, whether it fits into the

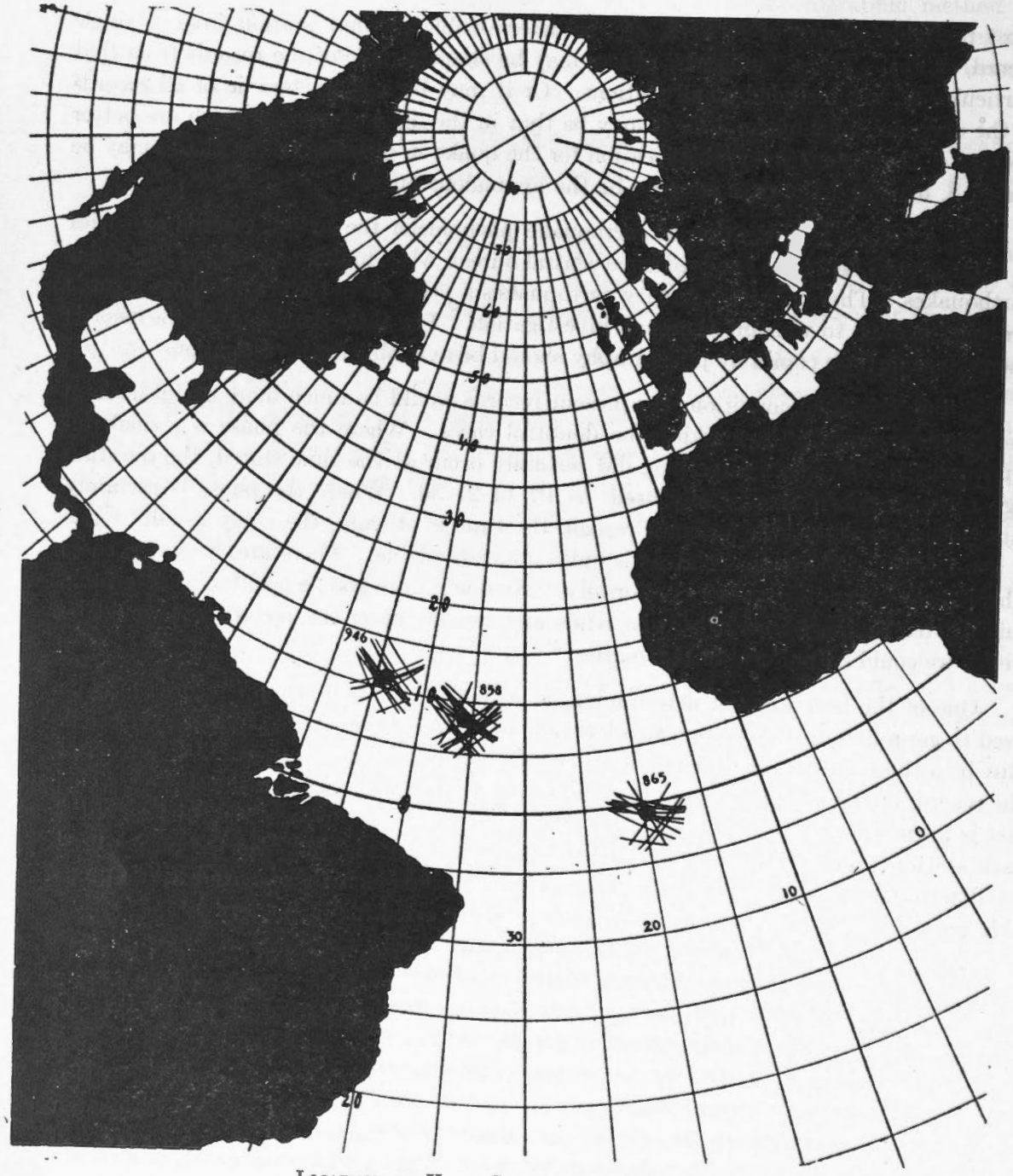
most probable scheme of P, S, L, etc. as determinable by that station from a single record, or not. These " unused " phases may be characteristic of the records from that particular region, recorded at all stations. Or it may be a characteristic of all records of the one particular quake. Or it may be that in the light of records which are better because of their more favourable location for the quake in question, these phases may be the P, S, or L and the ones adopted be the anomalous ones.

For a proper investigation of earthquake phenomena the actual records or copies of them should be in the hands of some central bureau when making a study of particular earthquakes. There are, say, twenty earthquakes a year on the average, whose records are good enough to warrant thorough investigation. For these earthquakes, the records themselves or their copies by photography should be available for investigation.

Failing this ideal condition, our present records would be much more useful if there were some uniformity in marking the doubtful cases. Where the phase is a doubtful interpretation but where something did certainly occur at the time stated, the question sign after the phase is generally used: as P? 14–21–30. Where the phase is certainly interpreted correctly but, for some reason, the time is obscure, the entry usually reads P (14–21–30). This nomenclature is quite understandable. There are, however, cases where there does not seem to be uniformity. No one is in so good a position to determine this matter as the seismologist who reads and reports upon the record. It would be well if we could be uniform in this matter.

One of the best ways of determining, as a first step, which sets of records may be used to get a first approximation to a location, is to take those whose O's agree very well. But into these values for O enter in an accumulating way in many cases, the errors of the record, of the reader and last, but far from least, the time error at the station. This last is a known quantity at the station reporting. A great purpose would be served if each station would report not only the types of instruments, but also the means used for determining the time, and the probable error of the given times. And if this probable error differs for different quakes it should be reported for each one.

One of the most remarkable facts brought out by this series of locations is given by Nos. 858, 865 and 946, dated respectively, May 20 '18, June 3 '18, and December 2 '18. The values for O are in each case in remarkably good agreement. In No. 858 twenty-two stations entered into the location work. Of these, nineteen are within ten seconds of the adopted value for O and fourteen are within five seconds of it. In No. 865 fourteen stations entered into the location work. Of these, thirteen are within ten seconds of the adopted value for O and ten are within five seconds of it. In No. 946 nineteen stations entered into the location work. Of these, fifteen are within ten seconds



LOCATIONS BY KLOTZ STEREOGRAPHIC METHOD
Nos. 858, 865 and 946
1918

of the adopted value for O and ten are within five seconds of it. The map given shows how the circles for these stations intersect to give the locations. These are as follows:—

No. 858 ϕ = 7° 45′ N. λ = 36° W.
No. 865 ϕ = 1° S. λ = 19° 45′ W.
No. 946 ϕ = 11° N. λ = 44° W.

As shown by the map, these points all lie in an approximate straight line off the N.E. coast of South America, in a region not usually supposed to be seismic. The data agree so completely within themselves that there can be no doubt that the locations are very approximately close to those given.

LOCATION OF EPICENTRES
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
Jan. 26 728	No Location					Ottawa	180
						Harvard	(410)
Jan. 30 729	Ottawa	2–45–43	7440	$\varphi = 56°$ N	Berkeley	Stoneyhurst	3420
	Osaka	?	2320	$\lambda = 162°{\cdot}7$ E	$\varphi = 57°$ N	Fordham	7960
	Harvard	2–45–37	7920	O = 2–45–40	$\lambda = 160°\ 10'$ E	Victoria	5280
	Georgetown	2–45–41	8000			Manila	5000
	Berkeley	2–45–28	5740		Zi-ka-wei	La Paz	14800
	Barcelona	2–45–47	8970		$\varphi = 42°\ 20'$ N	Sydney	9280
	Zi-ka-wei	2–45–21	4200		$\lambda = 167°\ 26'$ E		
	Sitka	2–45–12	3550				
	Tucson	2–45–46	6900				
	Washington	2–45–47	7925				
	Cheltenham	2–45–17	8320				
	St. Louis	2–45–30	7380				
	Ithaca	2–45–40	7700				
	Northfield	2–45–45	7600				
	Toronto	2–45–42	7490				
	Lawrence	2–45–38	7150				
	Batavia	2–45–44	8540				
	Lick	2–45–20	5900				
	Tacubaya	2–45–31	8820				
	Algiers	2–45–41	9420				
	Paris	2–45–35	8320				
	Marseilles	2–45–45	9160				
	Athens	2–45–31	9000				
Jan. 31 730	Zi-ka-wei	4–00–01	2820	$\varphi = 6°$ N	Manila	Washington	(1960)
	Sydney	4–00–08	5020	$\lambda = 125°$ E	$\varphi = 5°{\cdot}6$ N	Victoria	5820
	Osaka	4–00–25	3170	O = 4–00–02	$\lambda = 124°{\cdot}8$ E	Manila	1620
	Batavia	4–00–00	2520	(Approx.)		La Paz	14900
Feb. 12 731	No Location					Victoria	3470
						Honolulu	6110
Feb. 15 732	Ottawa	0–48–23	8420	$\varphi = 31°$ S		Barcelona	(7300)
	La Paz	0–48–11	1630	$\lambda = 67°{\cdot}5$ W		Toronto	7480
	Washington	0–48–34	7640	O = 0–48–20		Victoria	(3660)
	Tacubaya	0–48–10	6570			Georgetown	8240
						Harvard	(6800)
						Northfield	(7540)
						Algiers	(9500)

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
Feb. 20	Ottawa	19-29-31	2900	φ = 19°·5 N		Stoneyhurst	6900
733	Barcelona	19-29-45	7900	λ = 78° 45′W		Toronto	(2010)
	Washington	19-29-33	2210	O = 19-29-35		Victoria	(6940)
	Georgetown	19-29-31	2300			Tucson	5140
	Lawrence	19-29-31	2770			Lick	(5070)
	Cheltenham	19-29-35	2200			La Paz	3800
	Harvard	19-29-11	2690			Besancon	7640
	St. Louis	19-29-50	2360				
	Ithaca	19-30-00	2560				
	Balboa	19-30-04	1030				
	Northfield	19-29-13	2960				
	Berkeley	19-29-44	4620				
	Tacubaya	19-29-38	2270				
	Algiers	19-29-55	7940				
	Marseilles	19-29-40	8260				
Mar. 3	No Location					Ottawa	3040
734						Harvard	(2930)
						Washington	(3810)
Mar. 6	Ottawa	(3-05-18)	(4000)	φ = 14° N		Victoria	(2040)
735	Harvard	3-05-19	3680	λ = 96° 50′ W		Sitka	7960
	Tucson	3-05-52	2600	O = 3-05-35		St. Louis	1740
	Washington	(3-05-35)	(3515)			Balboa	580
	Lawrence	3-05-59	2600				
	Cheltenham	3-05-30	3690				
	Berkeley	3-05-38	3660				
	La Paz	3-05-31	4780				
Mar. 15	Honolulu	(0-14-36)	(5780)	φ = 38° N	Off coast of	Ottawa	(7140)
736	Manila	(0-13-05)	(4520)	λ = 143° 30′ E	Rikuzen, Japan.	Toronto	11920
	Zi-ka-wei	0-14-18	2170	O = 0-14-30	Osaka rep.	Coimbra	(5740)
	Osaka	0-14-29	810				
	Paris	0-14-42	9140				
Mar. 26	No Location					Georgetown	(2770)
737						Washington	2510
						Tacubaya	1990
Mar. 26	No Location					Washington	(2330)
738						Tacubaya	2000
April 21	No Location					Harvard	(8450)
739						Georgetown	(6600)
						Barcelona	5470
						Coimbra	6360
						Osaka	7680
						Algiers	5540
April 28	No Location					No data	
740							

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
April 29 741	No Location					No data	
April 29 742	Ottawa Barcelona Paris Zi-ka-wei	11–52 ? 11–54–29 11–55–30 11-55–32	(11000) 7550 6780 2720	$\varphi = 38°$ N $\lambda = 93° \cdot 5$ E O = (11–55·5)		Osaka	9980
May 1 743	Sitka Osaka Sydney Zi-ka-wei Tucson	18–27–13 18–26–50 18–25–12 18–26–19 18–27–01	9400 8620 3700 9460 9440	$\varphi = (20°$ S) $\lambda = (170°$ W) O = (18–28) Approximate	Osaka rep. "Tonga I'ds" Sydney rep. $\varphi = 27°$ S $\lambda = 171°$ W	Ottawa Ithaca La Paz Georgetown Toronto Victoria Cheltenham Vieques Barcelona Washington Lawrence Northfield Balboa Manila Algiers Berkeley Lick Tacubaya	12900 (8860) 9340 9200 10440 6370 (9580) 8480 (3230) 8760 9380 8360 6140 9780 9760 9380 9100 9900
May 2 744	No Location						
May 2 745	No Location						
May 2 746	No Location					No data	
May 3 747	Tacubaya La Paz	12–42–38 12–41–00	2030 2400	Off coast of Cent'l America, in Pacific.		Insufficient data	
May 4 748	Ottawa Osaka La Paz Algiers	(1-24–54) 0-43–52 0–44–13 (0–49–58)	(5020) 8380 9440 (10300)	$\varphi = 40°$ N $\lambda = 137° 30'$ W O = (0–44) Approximate			
May 9 749	Honolulu Manila Osaka Zi-ka-wei Berkeley	15–54–55 15–54–52 ? 15–54–50 15–54–47	7020 2510 2440 3050 9620	$\varphi = 8°$ N $\lambda = 140° 30'$ E O = 15–54–51 * approx. O = good	Manila. "Marianne Islands"	Ottawa Barcelona Algiers Paris Athens Lick Coimbra Victoria	8380 (8840) 9000 8020 (5350) 9230 11920 6370

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data
May 22 750	Ottawa		30		Ogdensburg, reported in press	No other data
May 25 751	No Location					No data
May 28 752	No Location					No data
May 31 753	Ottawa	8–47–23	5580	$\varphi = 56°$ N		La Paz 9140
	Ithaca	8–47–12	5860	$\lambda = 158°$ W		Victoria 2290
	Harvard	8–47–46	5800	O = 8–47–30		Sydney (8560)
	Georgetown	8–47–33	6020			Lick (2650)
	Berkeley	8–47–26	3220			
	Barcelona	8–47–32	9080			
	Toronto	8–47–30	5550			
	Tucson	8–47–27	4540			
	Washington	8–47–17	6140			
	Lawrence	(8–47–31)	(4800)			
	Cheltenham	8–47–27	6130			
	Northfield	8–47–46	5680			
	Coimbra	8–47–27	9100			
	Manila	8–47–27	8140			
	Osaka	8–47–28	5310			
	Zi-ka-wei	8–47–18	6700			
	Algiers	8–47–30	9600			
	Tacubaya	8–47–39	6260			
	Paris	8–47–24	8440			
	Marseilles	8–47–57	8800			
	Athens	8–47–34	9560			
May 31 754	No Location					Tacubaya 2400
June 1 755	No Location					Harvard 2140 Washington (380)
June 3 756	No Location					Washington (290)
June 3 757	No Location					Washington (3200)
June 4 758	Sitka	1–30–00	1190	$\varphi = 54°$ N		Ottawa (7100)
	Washington	1–29–36	6010	$\lambda = 157°{\cdot}2$ W		Toronto (6900)
	Coimbra	1–29–38	9060	O = 1–29–38		Victoria 1610
	Eskdalemuir	1–29–27	7650			Harvard (6260)
	Paris	1–29–37	8420			Osaka 5540

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
June 8	Ottawa	(0–51–19)	(3730)	$\varphi = 14°$ N	San Salvador	Victoria	(4020)
759	Harvard	0–51–32	3520	$\lambda = 89°$ W	destroyed	Honolulu	2440
	Tucson	0–51–23	3110	O = 0–51–27	$\varphi = 13° \cdot 6$ N		
	Washington	0–51–46	2875		$\lambda = 89°$ W		
	Georgetown	0–51–24	3080				
	Lawrence	(0–51–40)	(2780)				
	Coimbra	(0–51–19)	(8540)				
	La Paz	0–51–40	4015				
	Berkeley	0–51–23	4260				
	Tacubaya	0–51–03	1547				
June 9	No Location					Harvard	(7660)
760							
June 10	Ottawa	4–32–30	3940	$\varphi = 44°$ N		Osaka	8720
761	Berkeley	4–32–39	750	$\lambda = 127° \cdot 5$ W		Algiers	(2900)
	Harvard	4–32–21	4500	O = 4–32·5			
	Washington	4–32–32	4030	Location			
	Eskdalemuir	(4–32–26)	(8000)	approximate			
	Tacubaya	4–32–08	3928				
	Paris	4–32–36	8740				
	Georgetown	4–31–59	4300				
June 12	No Location				Felt in lower	Ottawa	(560)
762					St. Lawrence	Harvard	500
						Washington	(2150)
June 13	Berkeley	6–42–02	9280	$\varphi = 30°$ S		Ottawa	(9450)
763	Batavia	(6–41–47)	(8420)	$\lambda = 175°$ W		Toronto	(9400)
	Manila	6–41–27	9000	O = 6–41·7		Victoria	6380
	Tacubaya	6–41–35	10160	Location		Harvard	(8940)
	Lick	6–42–10	9300	approximate		Washington	(3840)
						Honolulu	6900
						La Paz	9540
						Algiers	10040
						Paris	(10300)
						Athens	(8700)
June 16	No Location					Victoria	1120
764						Washington	(3580)
June 16	No Location					Washington	(3620)
765							
June 22	No Location					Ottawa	5650
766						Washington	(6075)

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
June 24 767	No Location					Ottawa Toronto Sitka Washington Honolulu La Paz Manila Osaka Algiers Eskdalemuir Tacubaya	(7960) (4780) 8120 3800 4120 8360 3180 8640 (3400) 8750 8940
June 26 768	Berkeley Sitka Tucson Batavia La Paz Manila Osaka Lick Tacubaya	5–49–40 5–49–40 5–49–38 (5–49–34) 5–49–45 5–49–31 5–49–26 5–49–30 5–49–43	8020 8800 8660 (8940) 10900 8220 8060 8050 8940	$\varphi = 17°$ S $\lambda = 172°$ W O = 5–49·6	Press dispatch gives "75 miles S.W. of Samoa"	Ottawa Denver Georgetown Ithaca Toronto Victoria Harvard Barcelona Santa Clara Washington Honolulu Lawrence Coimbra Zi-ka-wei Algiers Marseilles Besancon	10000 10040 10040 9840 9650 8200 9780 1240 10040 9515 4780 8940 2220 10340 6860 (7800) 9400
June 27 769	No Location					Ottawa Toronto Washington La Paz Eskdalemuir Tacubaya	1910 2440 3420 3980 8600 2480
June 28 770	No Location					No data	
June 29 771	Ottawa Washington La Paz Tacubaya	(16–06–53) (16–06–28) 16–06–37 16–06–15	(4050) (3840) 6350 1410	$\varphi = 22°{\cdot}5$ N $\lambda = 111°\ 30'$ W O = 16–06–33		Georgetown Harvard Lawrence	5070 (2440) 2280
June 30 772	Ottawa Georgetown Harvard Washington La Paz Eskdalemuir Tacubaya Paris Balboa Vieques	17–50–25 17–50–28 (17–50–23) 17–50–30 17–50–26 17–50–42 17–50–26 17–50–52 ? 17–50–38	4150 3410 (3460) 3400 2820 8350 2700 8440 300 1820	$\varphi = 7°$ N $\lambda = 77°\ 40'$ W O = 17–50–30		Ithaca Coimbra	4020 9340

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
July 1 773	No Location				Victoria 'quake as felt by wireless operator, Graham Id.	Toronto Victoria Harvard	(5220) (270) (3000)
July 4 774	Victoria Barcelona Manila Sydney Batavia Berkeley Eskdalemuir	0–38–20 (0–38–18) 0–37–26 0–38·8 0–38–19 0–38–28 0–38–45	9190 (10080) 1720 6780 3890 9880 9380	$\varphi = 27°$ N $\lambda = 123°$ E O = 0–38–29		Ottawa Washington Harvard Honolulu Coimbra Osaka Algiers	(4800) 8675 5000 4780 4580 2030 (5900)
July 4 775	No Location					Ottawa Coimbra Manila Osaka Batavia Eskdalemuir	(4720) (3840) 2170 2560 (3690) 9380
July 12 776	No Location					Victoria Sydney	4120 2850
July 13 777	No Location			Precise location impossible. "West Indies."		Ottawa Georgetown Washington Harvard Vieques	(4100) 2280 2090 2220 210
July 15 778	No Location					La Paz Sydney Eskdalemuir	6920 (3420) (4620)
July 25 779	Ottawa Washington Harvard Coimbra Osaka Zi–ka–wei Algiers Eskdalemuir	3–19–12 3–19–20 3–19–02 3–19–18 3–19–03 3–19–00 3–19–22 3–19–09	5660 6125 6300 9080 5420 6640 9600 7700	$\varphi = 54°{\cdot}5$ N $\lambda = 158°\ 15'$ W O = 3–19–11		Toronto Victoria Georgetown Northfield	10720 1710 6700 6400
July 25 780	Ottawa Washington Eskdalemuir	22–32–54 22–33–05 22–32–59	5710 6140 7640	$\varphi = 54°$ N $\lambda = 160°$ W O = 22–32–59		Toronto Victoria Georgetown Harvard Coimbra Paris	(9020) 1400 5960 6720 8640 8400

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Locations	Other data	
July 27 781	Ottawa	1–01–13	2920	$\varphi = 19° 30'$ N	Pens of seismograph at Vieques thrown off by shock	Denver	2440
	Ithaca	1–00–21	2770	$\lambda = 68° 50'$ W		Sydney	11120
	Toronto	1–01·0	2990	O = 1–01–16		Tacubaya	4200
	Sitka	1–01–49	6600				
	Washington	1–01–21	2340				
	Georgetown	1–01–22	2330				
	Cheltenham	1–01–27	2290				
	Harvard	1–01–04	2560				
	Balboa	1–01–08	1720				
	Northfield	1–00–53	2875				
	Honolulu	1–01–27	9280				
	Barcelona	1–01–26	6820				
	Cleveland	1–01–12	2760				
	Coimbra	1–01–05	6080				
	La Paz	?	3790				
	Algiers	1–01–10	7200				
	Berkeley	1–01–19	5580				
	Lick	1–01–28	5420				
	Eskdalemuir	1–01–19	6700				
	Paris	1–01–21	7000				
July 27 782	Ottawa	2–51–23	8550	$\varphi = 32°$ S		Harvard	7870
	Ithaca	2–50–52	8280	$\lambda = 70° 40'$ W		Coimbra	9580
	Washington	2–51–41	7725	O = 2–51–23		Toronto	(10740)
	Georgetown	2–51–22	8060	Epicentre and O are approximate.		Northfield	9450
	Cheltenham	2–51–23	7880			Sydney	(3910)
	La Paz	2–51–19	1850			Algiers	(4060)
	Tacubaya	2–51–25	6610			Lick	9020
	Berkeley	2–51–43	9300			Eskdalemuir	(5220)
						Athens	8200
July 27 783	No Location				West Indies. Exact location impossible from given data.	Ottawa	(3550)
						Toronto	3720
						Washington	2150
						Georgetown	2410
						Harvard	2640
						Vieques	320
						Coimbra	(2460)
						La Paz	3640
						Paris	6660
July 28 784	No Location				No data giving Δ		
July 29 785	Honolulu	14–32–48	5880	$\varphi = 41°$ N		Ottawa	(5300)
	Zi-ka-wei	14–32–02	2380	$\lambda = 143°$ E		Victoria	5730
	Eskdalemuir	14–32–29	8850	O = 14–32·5		Washington	(4370)
	Paris	14–32–30	9250			Barcelona	9600
						Manila	(5040)
						Osaka	1490

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
July 29	Honolulu	21–53–38	6780	$\varphi = 1°$ S	Near New	Ottawa	(14000)
786	Sitka	21–52–46	9500	$\lambda = 143°\ 15'$ E	Guinea	Toronto	(11330)
	Osaka	21–52–30	4060	O = (21–52·5)		Victoria	(7420)
	Sydney	21–52–17	3390			Washington	(2030)
	Zi-ka-wei	21–52–19	4280			Cheltenham	8920
						Coimbra	9780
						La Paz	8820
						Algiers	(7300)
						Berkeley	9560
						Eskdalemuir	11450
						Batavia	810
						Georgetown	2010
July 31	Manila	(23–54–09)	(2300)	$\varphi = 28°$ N		Toronto	(6320)
787	Osaka	23–54–19	2960	$\lambda = 104°$ E		Victoria	(7420)
	Zi-ka-wei	23–54–08	1700	O = 23–54–10		Georgetown	(5700)
	Algiers	23–54–12	9000	Epicentre		Barcelona	6700
	Batavia	(23–54–00)	(3690)	and O are		Coimbra	(4040)
	Athens	(23–54–07)	(7380)	approximate.		Sydney	(5420)
	Paris	(23–54–11)	(8500)			Eskdalemuir	(7660)
July 31	No Location					Ottawa	(8000)
788						Toronto	(7380)
						Washington	(8430)
						Georgetown	8280
						Harvard	8710
						Coimbra	8160
						Dyce	7400
						Barcelona	7680
						Osaka	770
						Sydney	(3300)
						Algiers	(8100)
						Tacubaya	8350
						Berkeley	7600
						Eskdalemuir	8080
Aug. 5	Honolulu	15–50–49	7020	$\varphi = 40°·9$ S	Press report	Ottawa	11420
789	Osaka	15–50–34	9320	$\lambda = 177°·1$ E	"New Zealand,"	Washington	(4080)
	Sydney	15–50–10	2440	O = 15–50–32	Sydney gives:	Harvard	(13000)
	Batavia	15–50–36	7770		$\varphi = 40°·9$ S	Toronto	9520
					$\lambda = 177°·1$ E	Victoria	(10020)
						Coimbra	8980
						La Paz	9330
						Manila	9230
						Zi-ka-wei	10740
						Algiers	11700
						Tacubaya	307
						Paris	(9760)
Aug. 9	No Location					Washington	2440
790						Vieques	540
						Sydney	2450

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
Aug. 21 791	No Location					Ottawa Paris	(4450) 2550
Aug. 21 792	No Location					Toronto Coimbra	7260 3400
Aug. 30 793	No Location					Ottawa Ithaca Balboa Harvard Toronto	4530 4220 950 (4340) (2900)
Aug. 30 794	No definite location				There were two 'quakes within a few minutes of each other,—one in or near the Celebes and the other near the Aelutian Islds. Reports from Timor and Roti by way of Batavia and Osaka.	Ottawa Washington Georgetown Cheltenham Harvard Northfield Toronto Victoria Barcelona La Paz Sydney Osaka Zi-ka-wei Algiers Batavia Berkeley Paris	7650 (8510) 2160 2150 7550 (7780) 10040 (8000) (9160) 9060 3500 4380 5070 (10400) 2210 5140 (9940)
Aug. 31 795	Ottawa Sitka Tucson Coimbra Washington Algiers Georgetown Lick Cheltenham Berkeley Ithaca Tacubaya Balboa Paris Northfield Toronto Barcelona	11–36–20 11–36–22 11–36–03 11–36–32 11–36–15 11–36–32 11–36–23 11–36–16 11–36–16 11–36–09 11–35–53 11–36–15 11–36–11 11–36–32 (11–36–33) 11–36–23 11–36–35	4470 8020 5060 7600 3740 8460 3700 6140 3780 6240 4050 3180 880 8600 (4120) 4340 8440	φ = 5° N λ = 74° W O = 11–36–20	Press report, Colombia	Harvard St. Louis Vieques Honolulu Victoria	4880 8200 2020 9640 6840
Sept. 20 796	No Location					Honolulu Sydney	6220 2350

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
Oct. 7 797	No Location					Ottawa Washington Harvard Victoria Coimbra Algiers La Paz	2750 (3100) 5015 (2490) 4740 5060 4930
Oct. 13 798	Tacubaya		234		Felt at VeraCruz	Data of other stations was incomplete.	
Oct. 19 799	No Location					Ottawa Washington Georgetown Harvard Toronto Victoria Tacubaya	3600 3020 (4220) 2740 4800 5250 1183
Oct. 22 800	Harvard Balboa Coimbra	(7–21–23) ? 7–20–38	(3375) 740 7300	$\varphi = 12°$ N $\lambda = 75°\ 50'$ W O = ? Location doubtful.		Washington Tacubaya	3925 4020
Nov. 4 801	No Location					Coimbra Zi-ka-wei Algiers Sydney Osaka Manila La Paz	(7560) 4050 9800 (2600) 7240 4160 2920
Nov. 7 802	No Location					St. Louis Tacubaya	1360 2140
Nov. 8 803	No Location					No definite data	
Nov. 14 804	No Location					Tacubaya	790
Nov. 15 805	No Location					No definite data	
Nov. 16 806	Berkeley Victoria Zi-ka-wei Sydney Osaka Tacubaya Batavia Lick Honolulu	3–19–42 3–19–59 3–19–36 3–19–30 3–19–50 3–19–51 ..... 3–19–39	9300 9290 9230 2850 8460 9860 (8000) 9360 6340	$\varphi = 29°{\cdot}5$ S $\lambda = 180°$ W O = 3–19–45 Location and O approximate.	Sydney gives: $\varphi = 29°$ S $\lambda = 178°$ W	Ottawa Coimbra Georgetown Washington Toronto Algiers Athens Paris La Paz	9560 10640 (8840) 9025 10310 (9500) (10060) (11000) 10580

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
Nov. 16 807	Zi-ka-wei Sydney Osaka Manila Batavia	22–16–51 22–17·2 ..... 22–16–59 (22–16–49)	2810 4800 2870 1170 (2520)	φ = 8° N λ = 126° E O = 22–16–58		La Paz	15500
Nov. 18 808	Zi-ka-wei Sydney Osaka	2–57–41 2–57–36	2570 5600 2680	φ = 10° N λ = 124° E O = 2–57–38	Sydney gives: φ = 11° S λ = 126° E Manila gives "Sulu Sea"	Coimbra Dyce Honolulu La Paz	7300 (7600) 7020 15400
Nov. 24 809	Honolulu Zi-ka-wei Sydney Manila Osaka	11–10–57 11–10–53 11–10–53 11–11–27	6340 2930 5000 2150 2360	φ = 13° N λ = 142° E O = 11–10–55	Reported from Guam, Marianne Ids.		
Dec. 21 810	Ottawa Berkeley Dyce Georgetown Ithaca Coimbra Zi-ka-wei Washington Cheltenham Northfield Barcelona Tacubaya Paris	17–54–45 17–54–22 17–54–30 17–54–07 17–54–17 17–54–36 17–54–34 17–54–29 17–54–21 17–54–25 17–54–40 17–54–19 17–54–28	5040 3020 7380 5760 5500 8750 6920 5600 5740 5520 8830 6140 (8200)	φ = 56° N λ = 152° 45′ W O = 17–54–27		Victoria Sitka Tucson St. Louis Fordham Osaka Sydney Manila La Paz	(2660) 1430 4400 2010 5530 8440 6400 4440 9450
Dec. 21 811	Ottawa Victoria Washington Paris	..... 20–46–23 (20–52–16) (20–52–46)	(5000) 2390 (5480) (7900)	φ = 57° N λ = 154°·5 W O = ? Location approximate			
Dec. 23 812	No Location					No definite data	
Dec. 23 813	No Location					No definite data	
Dec. 26 814	No Location					No definite data	
Dec. 28 815	Ottawa Tacubaya Paris Berkeley	21–14–37 21–14–26 21–14–43 21–14–19	5140 6100 (8100) 3060	φ = 57° N λ = 153° W O = 21–14–30		Dyce Victoria Coimbra Washington Cheltenham Northfield Sydney Barcelona	8320 2070 6980 4820 5310 (4840) 6400 8300

LOCATION OF EPICENTRES—*Continued*
1917

Date	Station	O	Δ	Epicentre	Location	Other data	
Dec. 29 816	Ottawa	22–50–29	3690	$\varphi = 14°$ N	Guatemala destroyed	Fordham	3440
	Dyce	22–50–41	9000	$\lambda = 93°$ W		Sydney	(12580)
	Georgetown	22–50–25	3070	O = 20–50–28		La Paz	4740
	Ithaca	22–50–09	3580			Batavia	165
	Toronto	22–50–00	3810				
	Victoria	22–49–51	4990				
	Algiers	22–50–51	9520				
	Coimbra	22–50–44	8760				
	Sitka	22–49–59	6000				
	Tucson	22–50–02	2590				
	Washington	22–50–35	3040				
	Cheltenham	22–50–08	3240				
	St. Louis	22–50–20	2700				
	Balboa	.....	1175				
	Northfield	22–50–28	3600				
	Barcelona	22–50–28	9580				
	Tacubaya	22–50–48	518				
	Paris	22–50–35	(9400)				
	La Paz	22–50–56	4160				
	Berkeley	22–50–22	3590				
	Lick	22–50–18	3500				
				1918			
Jan. 4 817	Ottawa	?	(3680)	$\varphi = 14° 30'$ N	Press report, Guatemala	Georgetown	3690
	Washington	(4–32–32)	(2960)	$\lambda = 88° 40'$ W		Harvard	3910
	Balboa	4–33–09	1127	O = (4–32·6)		Tucson	3640
	La Paz	4–32–33	4160				
	Tacubaya	4–32–11	1283				
Jan. 13 818	No Location					Harvard	(3910)
Jan. 25 819	Ottawa	1–21–32	(3600)	$\varphi = 15° 00'$ N		Toronto	(6900)
	Washington	(1–20–58)	(2850)	$\lambda = 89° 45'$ W		Harvard	(4600)
	St. Louis	1–22–05	2220	O = (1–21·1)		Eskdalemuir	5515
	Balboa	1–21–12	1255			La Paz	3060
	Vieques	1–20–00	2620				
	Tacubaya	1–21–00	1090				
Jan. 30 820	Ottawa	21–18–46	8560	$\varphi = 53° 00'$ N	Osaka reports— Off west coast of Okujiri Id., Japan.	Victoria	(3270)
	Georgetown	21–19–00	8780	$\lambda = 141° 00'$ E		Harvard	5110
	Dyce	21–18–42	7480	O = 21–18–38		Zi-ka-wei	1450
	Washington	21–19–02	8750			Sydney	8250
	Honolulu	21–18–28	6220			Osaka	925
	Northfield	21–19–05	8490			Stoneyhurst	(7480)
	Barcelona	21–18–40	8610			Algiers	8780
	Naples	21–18–23	8380			Besancon	5750
	Berkeley	21–18–32	7340				
	Lick	21–18–29	7490				
	Athens	21–18–34	8000				
	Milan	21–18–24	8160				
	Paris	21–18–39	8000				
	Marseilles	21–18–33	8510				
	Uccle	21–18–33	7800				
	Zürich	21–18–34	7980				
	Budapest	21–18–29	7560				

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Feb. 3 821	No Location					Sydney	(2500)
Feb. 4 822	No Location				Press report, Revelstoke, B.C.	Ottawa Victoria	(3100) 550
Feb. 12 823	No Location						
Feb. 12 824	No Location						
Feb. 12 825	No Location						
Feb. 12 826	No Location					Georgetown	(2980)
Feb. 13 827	Zi-ka-wei Batavia Sydney	2–31–57 2–31–47 ?	4400 410 5670	$\varphi = 6° 30' S$ $\lambda = 103° 35' E$ O = 2–31–52		Ottawa Osaka	(12000) 9800
Feb. 13 828	Ottawa Zi-ka-wei Dyce Osaka Manila Harvard Athens Uccle Zürich Budapest	6–07·8 6–07–38 6–07–28 6–07–01 6–06–37 6–08 ca 6–07–16 6–07·3 ? 6–07–42	(13000) 700 9350 2210 1330 (12400) 8740 9380 (9500) 8260	$\varphi = 24° 15' N$ $\lambda = 115° 30' E$ O = 6–07·4	Press report, Amoy, China Journal of Meteorological Society of Japan gives: $\varphi = 24° N$ $\lambda = 116° E$	Sydney La Paz Naples Algiers	6600 19200 (13000) (4920)
Feb. 18 829	No Location						
Feb. 19 830	No Location					Sydney La Paz	2400 15360
Feb. 20 831	No Location					Balboa La Paz Tacubaya	650 4280 2860
Feb. 23 832	No Location						
Feb. 24 833	Washington La Paz Tacubaya	23–00–16 22–59–29 23–00–22	3290 3600 3780	$\varphi = 14° N$ $\lambda = 62° 15' W$ O = 23–00–02			
Feb. 25 834	No Location						

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Feb. 27 835	No Location					Sydney	2380
Mar. 11 836	No Location					Balboa La Paz	386 2580
Mar. 16 837	Ottawa Coimbra Harvard Uccle	13-40-31 13-37-15 13-40-46 13-38-01	3380 8560 3350 8840	$\varphi = 29° 15' N$ $\lambda = 107° 15' W$ O = 13-39		Washington Paris	6700 (5180)
Mar. 19 838	Osaka Sydney	5-55-17 5-55-31	6160 2640	$\varphi = 13° 30' S$ $\lambda = 164° 30' E$ O = 5-55-24			
Mar. 21 839	No Location					Ottawa Tacubaya	(6000) 1267
Mar. 21 840	No Location					Georgetown Tacubaya	(3740) 1240
Mar. 21 841	No Location					Tacubaya	1240
Mar. 22 842	No Location					Osaka	3440
April 10 843	Ithaca Washington Harvard		100 (100) 390		Probably Virginia		
April 10 844	Zi-ka-wei Manila Sydney Budapest	2-04-20 2-03-53 2-03-45 2-03-50	1210 2680 7900 7050	$\varphi = 36° N$ $\lambda = 133° E$ O = 2-03-57	Osaka gives, Japan Sea	Dyce Ithaca Coimbra Harvard Barcelona Lawrence Osaka La Paz Algiers Milan Uccle Paris Berkeley Zürich	7720 240 5920 (3710) 8180 1620 780 10440 8200 7440 7390 7650 7500 7580
April 13 845	No Location					Barcelona Sydney Algiers	(5830) (5900) 6400

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
April 15 846	Ottawa	8–27–44	5050	$\varphi = 60° 45'$ N			
	Victoria	(8–27–31)	(2410)	$\lambda = 153° 45'$ W			
	Ithaca	8–27–15	5480	O = 8–27–39			
	Georgetown	8–27–47	5530				
	Harvard	8–27–41	5740				
	Washington	8–27–46	5540				
	Uccle	8–27–48	7490				
April 17 847	No Location					Victoria	(550)
April 17 848	Victoria	6–32–12	(1110)	$\varphi = 38°$ N	Press reports,	Harvard	3220
	Lawrence	6–42–50	2500	$\lambda = 124° 15'$ W	Eureka, Cal.,		
				O = ?	O = 6–45		
April 21 849	Ottawa	22–32–24	3600	$\varphi = 33° 30'$ N	San Jacinto,	Zi-ka-wei	(8440)
	Harvard	22–32–24	4040	$\lambda = 116° 30'$ W	California	Budapest	8750
	Georgetown	22–32–22	3500	O = 22–32–26		Fordham	3760
	Halifax	22–32–13	4720				
	Saskatoon	22–32–27	2220				
	Berkeley	22–32–12	780				
	Spring Hill	22–32–24	2750				
	Dyce	22–32–48	8200				
	Toronto	22–32–24	3520				
	Victoria	22–32–38	1710				
	Ithaca	22–32–04	3660				
	Coimbra	22–32–21	9120				
	Barcelona	22–32–27	9680				
	Sitka	22–32–07	3070				
	Tucson	22–32–23	650				
	Washington	22–32–13	3600				
	Lawrence	22–32–49	1800				
	Cheltenham	22–32–32	3500				
	St. Louis	22–32–07	2590				
	Northfield	22–32–33	3500				
	Osaka	22–32–47	9230				
	La Paz	22–32–34	7600				
	Sydney	(22–32·4)	(11920)				
	Algiers	22–32–29	9030				
	Paris	22–32–28	9200				
	Lick	22–32–43	450				
	Zürich	22–32–22	9640				
April 27 850	No Location					Ottawa	(4100)
						Harvard	(3950)
						La Paz	6780
May 1 851	No Location					Ottawa	(440)
						Ithaca	(230)
						Harvard	(270)
						Washington	550
May 2 852	No Location						

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
May 2 853	No Location						
May 6 854	No Location					Ottawa Washington Lawrence Paris	(2610) (4220) 1630 (8800)
May 9 855	No Location						
May 11 856	Ottawa Harvard La Paz	21–23–16 21–23–57 21–23–07	8980 8890 4820	$\varphi = 28°$ S $\lambda = 113°$ W O = 21–23–27 Location doubtful		Washington	(8800)
May 16 857	No Location					Ottawa Georgetown La Paz	(2930) (3210) 5320
May 20 858	Ottawa Georgetown Ithaca Harvard Dyce Washington Cheltenham St. Louis Vieques Coimbra Barcelona La Paz Naples Northfield Athens Algiers Uccle Besancon Paris Marseilles Berkeley Budapest	14–35–55 14–35–57 14–35–39 14–35–43 14–36–03 14–35–57 14–36–04 14–36–10 14–36–11 (14–36–03) 14–35–56 14–36–03 14–36–05 (14–35–49) 14–35–59 14–35–54 14–35–57 14–35–54 14–35–57 14–36–02 14–36–05 14–36–05	5740 5440 5720 5130 6180 5400 5340 6440 3240 (4300) 5200 4370 6180 (5520) 6820 5000 6020 5940 5750 5540 9280 6680	$\varphi = 7° 45'$ N $\lambda = 36°$ W O = 14–35–59		Toronto Victoria Honolulu Lawrence Fordham Balboa Osaka Zürich	6340 10180 3810 8320 5240 (3220) 15800 6080

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
May 20	Ottawa	17–55–15	8120	$\varphi = 28° 30'$ S	La Serena, Chili	Victoria	9160
859	Georgetown	17–55–02	7600	$\lambda = 72°$ W		St. Louis	3910
	Ithaca	17–55–07	7880	O = 17–55–18		Fordham	7780
	Harvard	17–55–13	7890			Barcelona	(9060)
	Washington	17–55–34	7300			Algiers	(9060)
	Balboa	(17–55–47)	(3220)			Uccle	(9260)
	Northfield	(17–55–13)	(8060)			Dyce	6750
	Coimbra	17–55–27	9400			Nogaya	725
	La Paz	17–55–12	1490			Osaka	3080
	Berkeley	17–55–09	9040			Zi-ka-wei	3330
	Lick	17–55–14	8960			Batavia	730
						Sydney	3300
						Naples	6820
						Manila	4180
May 22	No Location					Ottawa	5300
860						Harvard	(4840)
						Osaka	7080
						Coimbra	10960
						La Paz	6200
May 23	Ottawa	11–57–13	3660	$\varphi = 26°$ N		Sitka	3280
861	Ithaca	11–57–25	(3380)	$\lambda = 109° 30'$ W		Denver	(2440)
	Victoria	11–57–14	2780	O = 11–57–24		Washington	4600
	Georgetown	11–56–45	3920			Coimbra	8740
	Harvard	11–57–22	4115			La Paz	7800
	Dyce	11–57–40	8560			Barcelona	(8700)
	Lawrence	11–57–40	1890			Sydney	13000
	St. Louis	11–57–33	2290			Algiers	(9300)
	Paris	(11–57–44)	(9200)			Uccle	(8800)
	Berkeley	11–57–21	1660				
	Lick	11–57–26	1580				
May 25	Ottawa	19–29–26	8520	$\varphi = 30°$ S		Victoria	(10040)
862	Ithaca	19–29–00	8320	$\lambda = 89°$ W		Georgetown	3030
	Harvard	19–29–34	8050	O = 19–29–22		Cheltenham	6370
	Washington	19–29–30	7680	Location and		Balboa	(2010)
	Honolulu	19–29–33	9520	O approxi-		Coimbra	9060
	La Paz	19–29–09	2860	mate.		Algiers	(7940)
						Uccle	8420
						Paris	(9480)
						Sydney	9500
May 26	No Location						
863							
May 30	No Location						
864							

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
June 3	Dyce	0–03–25	6600	$\varphi = 1°$ S			
865	Georgetown	(0–03–19)	(7340)	$\lambda = 19° 45'$ W			
	La Paz	0–03–16	5560	O = 0–03–15			
	Harvard	0–03–07	7120				
	Ithaca	0–03–04	7560				
	Coimbra	0–03–10	4620				
	Washington	0–03–20	7300				
	Barcelona	0–03–14	5080				
	Naples	0–03–22	5870				
	Athens	0–03–20	6190				
	Algiers	0–03–11	4660				
	Uccle	0–03–14	6150				
	Paris	0–03–18	5820				
	Zürich	(0–03–14)	(5960)				
June 4	Zi-ka-wei	4–02–37	5640	$\varphi = 9°$ S	Location	Melbourne	2590
866	Osaka	4–03–31	4540	$\lambda = 152° 30'$ E	approximate	Harvard	6000
	Sydney	4–03·5	2900	O = 4–03+			
June 4	No Location					Ottawa	(12000)
867						Harvard	(13000)
						La Paz	11820
						Osaka	8150
						Uccle	(9380)
						Melbourne	4560
June 7	Ottawa	21–27–10	3780	$\varphi = 18°$ N		Victoria	4180
868	Toronto	21–28·1	3600	$\lambda = 101° 30'$ W		Georgetown	(2740)
	Coimbra	21–27–22	9100	O = 21–27–11		Harvard	7040
	La Paz	21–27–23	5320				
	Washington	21–27–04	3300				
	Uccle	21–27·5	9380				
	Berkeley	21–26–53	3020				
June 11	Georgetown	12–36–20	2640	West Indies.	O = 12–36–25		
869	La Paz	12–36–14	4100	Exact location			
	Washington	12–36–47	2400	impossible.			
	Northfield	12–36–16	2850				
June 12	No Location					Washington	3410
870						Harvard	(5610)
June 13	Ottawa	8–58–34	3460	$\varphi = 15°$ N		Georgetown	3820
871	Ithaca	8–58–29	3760	$\lambda = 85° 45'$ W			
	La Paz	8–58–45	3980	O = 8–58–38			
	Washington	8–58–44	2780				
	Harvard	8–58–37	3380				
June 16	No Location					Victoria	(4120)
872						Sydney	2800

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
June 16 873	Ottawa Ithaca Washington Harvard Balboa	12–27–48 12–27–50 12–27–47 12–27–44 ?	3410 3110 2825 3330 630	φ = 14° N λ = 79°·5 W O = 12–27–47 Location approximate.			
June 17 874	No Location					No definite data	
June 22 875	No Location					Ithaca La Paz Balboa Harvard	4420 3330 300 (6000)
June 24 876	No Location					Victoria Melbourne Sydney	2040 2440 2300
June 26 877	No Location					Harvard Sydney	(10050) 2500
July 1 878	No Location					Victoria La Paz Coimbra Washington Zi-ka-wei Osaka Sydney Batavia Naples	6300 14430 8340 4200 2500 2550 5200 2810 4050
July 3 879	Sydney La Paz Melbourne Zi-ka-wei Manila	6–51–57 ? 6–54·3 6–52–14 6–52–28	3350 16300 3600 4200 2740	New Guinea. Exact location impossible from data. φ = (5° S) λ = (138° E) O = (6–52)	Sydney gives: φ = 3°·5 S λ = 144°·5 E	Ottawa Toronto Victoria Harvard Coimbra Washington Northfield Dyce Osaka Batavia Naples Algiers Berkeley Zürich Budapest Athens	(12000) (5780) 9000 (13000) (12240) (5520) (5800) 10360 3280 890 9000 9600 7320 (860) 3240 8650

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
July 8 880	Sydney	10–22–12	9000	$\varphi = 25°$ N	Sydney quotes "Assam."	Ottawa	(9420)
	Coimbra	10–22–36	8720	$\lambda = 91° 15'$ E		Toronto	9640
	Melbourne	10–22·2	8800	O = 10–22–15		Victoria	7720
	Barcelona	10–22–19	8040			La Paz	16550
	Osaka	10–22–01	4280			Cheltenham	9800
	Perth	10–22–27	6600			St. Louis	(7840)
	Algiers	10–22–10	8200			Zi-ka-wei	2140
	Uccle	10–22–05	7750			Naples	5780
	Besancon	10–22–35	7560			Berkeley	(8800)
	Zürich	10–22–06	7530				
	Budapest	10–22–13	6620				
	Athens	10–22–09	6340				
July 12 881	No Location					No definite data	
July 14 882	No Location					No definite data	
July 15 883	Ottawa	0–22–55	3860	$\varphi = 40°·5$ N	Press report, "Eureka, Cal."	Naples	6540
	Saskatoon	0–22–56	1910	$\lambda = 125°·5$ W			
	Victoria	0–22–51	980	O = 0–22–49			
	La Paz	0–23–10	8760				
	Harvard	0–22–37	4280				
	Georgetown	0–22–47	4080				
	Washington	(0–22–57)	(3920)				
	Cheltenham	0–23–05	4010				
	Lawrence	0–22–27	2900				
	St. Louis	0–22–39	3070				
	Northfield	(0–22–18)	(4370)				
	Uccle	0–23·0	8800				
	Berkeley	0–22–54	480				
July 16 884	Barcelona	20–03–26	2230	$\varphi = 36°$ N	Athens gives: "Crete Milas and Santorin."	Washington	(2730)
	Naples	20–03–32	970	$\lambda = 26° 30'$ E		Besancon	2050
	Uccle	20–03–32	2400	O = 20–03–40			
	Zürich	20–03–46	1900				
	Athens	20–03–56	270				
July 21 885	Sydney	6–09–10	3100	$\varphi = 6°$ S	Sydney gives: $\varphi = 6°$ S $\lambda = 153°$ E Harvard gives: "Ladrone Ids. or between Formosa and Great Liu Kiu Ids."	Ottawa	(8640)
	Perth	6–09–36	4780	$\lambda = 153°$ E		Toronto	(7840)
	Zi-ka-wei	6–10–48	5520	O = 6–09·5 Location and O are approx.		Victoria	5560
						Harvard	(12400)
						Coimbra	(7920)
						Melbourne	4780
						St. Louis	(9100)
						Osaka	710
						La Paz	16040
						Zürich	(9860)
July 21 886	No Location					Perth	6420
						Sydney	2550

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
July 23 887	No Location					Sydney	4660
July 24 888	No Location					Melbourne Sydney	2290 2500
July 25 889	No Location					Osaka Manila	430 (4540)
July 29 890	No Location					Sydney	2400
July 29 891	Zi-ka-wei Osaka Manila Sydney	16–50–19 16–50–01 16–50–06 16–50·6	4120 4320 3120 3070	φ = 3° S λ = 147°·5 E O = 16–50–15 Location and O approx.		Victoria La Paz	10900 (12750)
July 31 892	Ottawa Georgetown Balboa	14–36–20 14–36–19 14–36–44	4210 3520 1160	φ = 9°·5 N λ = 90° W O = 14–36·5		Toronto Ithaca Harvard Vieques La Paz	(3330) 3420 (6450) 3000 3550
Aug. 4 893	No Location					Algiers	60
Aug. 5 894	No Location					Victoria Sydney	(5200) (1900)
Aug. 8 895	Perth Manila Sydney Zi-ka-wei	9–48–23 (9–48–18) 9–47–57 9–48–32	4520 (4020) 2980 4780	φ = 7° S λ = 150° 15′ E O = 9–48·2		Ottawa Georgetown Victoria Washington Honolulu Balboa Melbourne La Paz	8640 9000 4120 8650 7480 285 2220 13200

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Aug. 15 896	Victoria	12–17–53	11780	$\varphi = 1°$ S	Press report, "Felt in Celebes Sea."	Ottawa	6300
	Zi-ka-wei	12–17–11	3400	$\lambda = 126°$ E		La Paz	15650
	Osaka	12–17–08	4020	O = 12–17–30		Georgetown	5180
	Budapest	12–17–49	11460			Sitka	8960
	Sydney	12–17–32	5470			Washington	5290
						Honolulu	8925
						Harvard	5310
						St. Louis	5660
						Balboa	10020
						Vieques	4680
						Zürich	11300
						Tucson	8660
						Algiers	8800
						Barcelona	(4630)
						Milan	(2240)
						Dyce	(6440)
						Uccle	9780
						Coimbra	8000
						Lemberg	9520
						Batavia	1020
						Berkeley	(9960)
						Naples	13000
Aug. 15 897	Honolulu	17–30–47	8080	Near New Guinea. Exact location impossible from data. O = 17–30–20		Harvard	(9850)
	Osaka	17–30–35	3420			Victoria	9880
	Perth	17–30–09	5010			La Paz	15300
	Zi-ka-wei	17–29–52	2940			Lemberg	5320
Aug. 17 898	Ottawa	6–53–27	7300	$\varphi = 19°{\cdot}5$ S			
	La Paz	?	400	$\lambda = 71°$ W			
	Georgetown	6–53–27	6540	O = 6–53–30			
	Washington	6–53–29	6520				
	Ithaca	6–53–37	6820				
	Coimbra	6–53–31	9230				
Aug. 21 899	Ottawa	4–12–50	420	$\varphi = 44°$ N	Harvard gives: $\varphi = 44°\ 17'\ 40''$N $\lambda = 72°\ 32'\ 18''$ W		
	Harvard	4–11–54	225	$\lambda = 73°$ W			
				O = 4–12 ca			
Aug. 22 900	No Location					La Paz	5330
Aug. 23 901	Honolulu	6–36–41	5320	$\varphi = 11°$ S	Sydney gives: $\varphi = 10°$ S $\lambda = 161°{\cdot}5$ E O = 6–36–21	Harvard	(11820)
	Osaka	6–36–34	5880	$\lambda = 166°$ E		Toronto	11020
	Manila	(6–36–23)	(5780)	O = 6–36–31		Victoria	4140
	Zi-ka-wei	6–36–30	6710			La Paz	11020
	Sydney	6–36–30	2870			Perth	5340

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Sept. 2 902	Honolulu Zi-ka-wei Sydney	14–15–36 14–14–53 14–14–58	5880 4460 3100	φ = 3° S λ = 150°·5 E O = 14–15–10 Location and O are doubtful.		Osaka Batavia	3340 250
Sept. 4 903	No Location					No definite data	
Sept. 7 904	Georgetown Sitka Washington Honolulu Lawrence Cheltenham St. Louis Athens Sydney Coimbra Lick Algiers Apia Uccle Lemberg Osaka	17–16–14 17–16–01 17–16–12 17–16–11 17–16–17 17–16–43 17–16–09 17–16–03 17–16–28 17–16–09 17–16–13 17–16–29 17–16–47 17–16–03 17–16–34 ?	9520 5070 9470 5320 8540 9540 8920 9650 8790 10520 7300 10000 7600 9160 8020 2090	φ = 43° N λ = 151°·5 E O = 17–16–18		Ottawa Harvard Saskatoon Halifax Tucson Denver Vieques Northfield Toronto Ithaca Barcelona Dyce Zürich Melbourne La Paz Perth Berkeley Manila Batavia Zi-ka-wei Besancon Agram	7360 8900 5500 8000 7640 (10040) 6160 (8120) (7140) 8640 10280 8740 9480 7960 11100 9780 7900 4880 6370 3300 9660 9360
Sept. 8 904a	No Location					Honolulu Harvard Osaka Uccle Agram	4880 (6485) 3110 9100 8440
Sept. 8 905	Honolulu Uccle Agram	5–40–32 5–40–42 5–40–58	5000 8800 8800	φ = 47° N λ = 154°·5 E O = 5–40–44		La Paz	13280
Sept. 11 906	Batavia Zi-ka-wei Sydney	4–06–11 4–06–20 4–06–07	2510 2660 5240	φ = 8° N λ = 125° 30′ E O = 4–06–13	Manila gives "Central Mindanao"	Honolulu Harvard	8800 2000
Sept. 11 907	No Location					No definite data	
Sept. 12 908	No Location					Victoria	1410

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Sept. 14	Ottawa	17–05–01	8880	$\varphi = 46°$ N		Victoria	2770
909	Washington	17–05–14	9180	$\lambda = 150°{\cdot}5$ E		Osaka	2210
	Georgetown	17–05–08	9380	O = 17–05–04		Coimbra	9820
	Honolulu	17–05–01	5100				
	Zi-ka-wei	17–04–52	2900				
	Uccle	17–05–06	8800				
	Agram	17–05–04	8860				
	Athens	17–05–07	9160				
Sept. 16	No Location				Sydney gives:	Sydney	1910
910					$\varphi = 47°{\cdot}5$ S		
					$\lambda = 165°$ E		
					O = 13–04–03		
Sept. 22	Batavia	(10–54–18)	(1280)	$\varphi = 1°$ N		Victoria	1720
911	Zi-ka-wei	10–54–58	4050	$\lambda = 98°$ E			
	Sydney	10–54–54	6400	O = 10–54–50			
Sept. 29	Ottawa	12–07–19	8720	$\varphi = 34°{\cdot}5$ N		Georgetown	10040
912	Barcelona	12–07–00	2970	$\lambda = 34°\ 15'$ E		Osaka	10640
	Dyce	12–06–58	3530	O = 12–07–06		La Paz	(9550)
	Coimbra	12–07–08	3750			Lemberg	(1940)
	Algiers	12–07–54	3000				
	Uccle	12–07–07	2950				
	Agram	12–07–11	2030				
	Zürich	12–07–01	2640				
	Athens	12–07–16	1040				
Sept. 30	Ottawa	13–34–32	6820	$\varphi = 52°$ N		Honolulu	2740
913	Washington	13–34–28	6980	$\lambda = 175°$ W		Harvard	(10155)
	Ithaca	13–34–36	6760	O = 13–34–30		St. Louis	(3910)
	Zi-ka-wei	13–34–28	5440			Agram	8760
						Toronto	(7260)
						Sydney	(9440)
						Victoria	1710
						Coimbra	(9140)
Sept. 30	No Location				Sydney gives:	Victoria	2760
914					$\varphi = 24°$ S	Melbourne	3820
					$\lambda = 172°{\cdot}5$ E	La Paz	8780
					Batavia gives a	Perth	5310
					Δ which agrees.	Batavia	(7080)
					If correct for *	Zi-ka-wei	5160
					the	Algiers	(8200)
					O = 17–51–40	Uccle	(9400)
						Agram	9500
						Sydney	2270
Oct. 1	Zi-ka-wei	1–09–41	6280	$\varphi = 53°$ N		Batavia	120
915	Agram	1–09–47	8980	$\lambda = 164°\ 15'$ W			
				O = 1–09–44			
				Location and			
				O are doubtful.			

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Oct. 11 916	Ottawa	14–14–10	3190	φ = 18° N	Felt at Porto Rico	Spring Hill	2750
	Saskatoon	14–14–44	4980	λ = 66° 15′ W		Honolulu	3800
	Halifax	14–14–10	3090	O = 14–14–27		Lawrence	(3460)
	Sitka	14–14–50	6940			Osaka	14200
	Algiers	14–14–30	7200			Batavia	(12000)
	Tucson	14–14–15	4680			Lemberg	8500
	Uccle	14–14–25	7310			Budapest	4850
	Washington	14–14–24	2460			Sydney	16000
	Besancon	14–14–21	7600				
	Georgetown	14–14–07	2550				
	Agram	14–14–42	8040				
	Cheltenham	14–14–17	2550				
	Berkeley	14–14–23	5820				
	Harvard	14–14–14	2690				
	Lick	14–14–18	5860				
	St. Louis	14–14–11	3240				
	Zürich	14–14–18	7880				
	Ithaca	14–14–16	2860				
	Northfield	14–14–34	2870				
	Toronto	14–14–47	2990				
	Victoria	14–14–23	6110				
	Barcelona	14–14–53	6840				
	Dyce	14–14–48	6780				
	Coimbra	14–14–58	5700				
	La Paz	14–14–22	3880				
Oct. 11 917	Washington	17–03–39	2450	φ = 18° N		Harvard	2150
	Georgetown	17–03–34	2480	λ = 68° W		St. Louis	4660
	Cheltenham	17–03–38	2450	O = 17–03–37			
	Ithaca	17–03–27	2840				
	Uccle	17–03–36	7260				
	Agram	17–03–48	8080				
Oct. 12 918	Georgetown	(0–14–42)	(3030)	φ = 11°·5 N		Washington	2460
	Harvard	(0–14–23)	(3440)	λ = 75° 15′ W			
				O = 0–14–30			
				Doubtful.			
Oct. 12 919	Washington	8–19–39	2440	West Indies.		La Paz	(5080)
	Georgetown	8–19–33	2540	Exact location			
	Harvard	8–19–31	2640	not possible.			
Oct. 14 920	Washington	0–24–26	2480	φ = 19° N	Felt at Porto Rico		
	Georgetown	0–24–24	2520	λ = 66° W			
	Harvard	0–24–27	2580	O = 0–24–25			
	Ithaca	0–24–30	2770	Location			
	La Paz	0–24–16	4000	approximate			
Oct. 14 921	Melbourne	12–00–36	4120	φ = 22°·5 S		Honolulu	2360
	Osaka	12–00–32	8060	λ = 177° W		Harvard	10320
	Sydney	12–00–22	3350	O = 12–00–36.		Ithaca	10900
	La Paz	(12–00–48)	(10390)				

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Oct. 15 922	No Location					No definite data	
Oct. 18 923	Ottawa	21–33–47	(2890)	Exact location not possible from data, West Indies. O = 21–33–34		Harvard	3235
	Washington	21–33–31	2440			Ithaca	2980
	Georgetown	21–33–16	2610				
	Cheltenham	21–33–41	2430				
Oct. 19 924	No Location					Spring Hill	(1790)
Oct. 19 925	Ottawa	3–22–49	3620	φ = 13° 15′ N		Honolulu	7260
	Tucson	3–22–48	3020	λ = 90° W		Northfield	3050
	Washington	3–22–42	3070	O = 3–22–45		Toronto	3910
	Georgetown	3–22–48	3040			Victoria	5750
	Lawrence	(3–22–54)	(2720)			Coimbra	8400
	Cheltenham	3–22–43	3030			Uccle	(9400)
	Harvard	(3–22–47)	(3360)			Agram	7040
	St. Louis	3–22–38	2800				
	Ithaca	3–22–47	3760				
	La Paz	3–22–39	4250				
	Berkeley	(3–22–41)	(4040)				
Oct. 25 926	Ottawa	3–42–50	3040	φ = 18° N		Honolulu	10040
	Spring Hill	3–43–00	2480	λ = 68°·5 W			
	Washington	3–42–58	2410	O = 3–42–53			
	Georgetown	3–42–43	2580				
	Cheltenham	3–43–25	2450				
	Harvard	3–42–59	2630				
	St. Louis	3–42–51	3070				
	Ithaca	3–43–05	2800				
	Toronto	3–43–15	3070				
	Victoria	3–42–40	6130				
	Barcelona	(3–42–43)	(7100)				
	Dyce	(3–42–21)	(7200)				
	Coimbra	3–42–48	6230				
	Algiers	3–43–02	7020				
	Uccle	3–42·8	7260				
	Agram	3–43–04	8000				
	Zürich	3–43–04	7440				
Oct. 27 927	Osaka	15–27–16	5520	φ = 10° S	Sydney gives:	Ottawa	(13000)
	Batavia	15–27–17	5880	λ = 160° E	φ = 11°·5 S	Honolulu	5000
	Sydney	15–27–05	2750	O = 15–27–13	λ = 162°·5 E	Harvard	(12250)
	Manila	(15–27–55)	(4760)			Victoria	4180
						Melbourne	3810
						Coimbra	(13000)
						Zi-ka-wei	4020

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Oct. 27 928	Osaka Zi-ka-wei Manila Sydney	17–07–21 17–06–38 (17–06–32) 17–06–24	3600 4500 (3560) 3800	$\varphi = 1°$ N $\lambda = 150°$ E O = 17–06–33		Ottawa Honolulu Harvard Dyce Melbourne Algiers Uccle Lemberg Budapest	(13500) 3600 11100 (8560) 4100 9000 (11180) (8200) 7800
Oct. 29 929	No Location					Washington Harvard	2020 (7000)
Nov. 2 930	No Location					No definite data	
Nov. 3 931	Sydney Melbourne	11–13–42 11–13–54	2160 1940	$\varphi = 51°$ S $\lambda = 162°$ E O = 11–13–48 Location approximate.	Sydney gives: $\varphi = 52°$ S $\lambda = 164°$ E	Victoria Harvard Algiers	9310 (8540) (6160)
Nov. 5 932	No Location					Washington Balboa Harvard La Paz	3400 910 6580 4270
Nov. 8 933	Halifax Saskatoon Tucson Washington Georgetown Lawrence Cheltenham St. Louis Ithaca Northfield Sydney Barcelona Milan Lemberg Berkeley Lick Budapest	4–38–36 4–38–49 4–37–56 4–38–05 4–38–06 4–38–01 4–38–20 4–38–03 4–38–22 4–38–04 4–38–00 4–38–27 4–38–25 4–38–15 4–37–51 4–37–47 4–38–50	9380 7100 8320 9440 9560 8660 9540 8920 9220 9300 8800 9490 9180 8340 7020 7180 8200	$\varphi = 47°$ N $\lambda = 145°$ E O = 4–38–20	Toronto quotes: $\varphi = 51° 26'$ N $\lambda = 45°$ E Osaka gives "Yezzo"	Ottawa Honolulu Toronto Victoria Harvard Osaka La Paz Athens Melbourne Coimbra Zi-ka-wei Algiers Uccle Manila Agram Marseilles Paris Zürich	8180 5780 8560 5050 8750 2180 15650 9550 9520 (9400) 3020 9700 9100 4630 9120 9740 9350 9380
Nov. 9 934	No Location					No definite data	
Nov. 10 935	No Location					No definite data	

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Nov. 10 936	Coimbra	15–12–02	1680	$\varphi = 44°$ N			
	Algiers	15–11–44	1160	$\lambda = 11°$ E			
	Milan	15–11–52	310	O = 15–11–40			
	Besancon	15–11–08	940	Epicentre and			
	Agram	15–11–46	460	O are ap-			
	Marseilles	15–11–50	620	proximate.			
	Paris	15–11–15	790				
	Zürich	15–11–30	680				
	Athens	15–12–40	930				
Nov. 11 937	No Location					Osaka	370
						Zi-ka-wei	1740
Nov. 12 938	Ottawa	21–45–00	2880	$\varphi = 18°$ N		St. Louis	(3330)
	Washington	21–44–36	2500	$\lambda = 69°$ W		Balboa	990
	Georgetown	21–44–40	2500	O = 21–44–45		Northfield	(2400)
	Cheltenham	21–45–15	2270			Victoria	6330
	Ithaca	21–44–38	2770			Barcelona	(6860)
	Toronto	21–44–59	2990			Uccle	8200
	Harvard	21–44–17	2650				
	La Paz	21–44–40	3730				
	Algiers	21–44–39	7100				
	Agram	21–44–53	7960				
Nov. 16 939	No Location				Tucson gives Guatemala	Tucson	1760
Nov. 18 940	Sydney	18–41–36	3470	$\varphi = 8°$ S	Sydney gives:	Sitka	(4540)
	Melbourne	18–42–00	3240	$\lambda = 132°$ E	$\varphi = 10°$ S	Georgetown	12700
	Osaka	18–41–56	4380	O = 18–41–53	$\lambda = 132°$ E	Honolulu	7600
	Zi-ka-wei	18–42–04	3780	Location and	"Port Darwin"	Lawrence	1190
	Agram	18–41–51	11740	O are doubtful.		Ithaca	12380
	Perth	?	3400			Northfield	2180
						Toronto	(3070)
						Marseilles	8580
						Victoria	2770
						Paris	5120
						Harvard	(16000)
						Lemberg	(9440)
						La Paz	16400
						Berkeley	14400
						Coimbra	(7660)
						Zürich	5020
						Barcelona	(10640)
						Besancon	8280
Nov. 22 941	No Location					Osaka	2480
						Agram	8660

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Nov. 23 942	La Paz Melbourne Osaka Agram Sydney	? (22–57–24) ? 22–57–43 22–57–48	16100 (3600) 3040 11740 3410	Exact location impossible, East Indies, near New Guinea. O = 22–57–40		Honolulu Victoria Harvard Coimbra Barcelona Algiers Uccle	7480 (7400) 10550 8870 (10300) 9960 (7260)
Nov. 25 943	No Location					Coimbra Barcelona Uccle	860 (2520) (2440)
Nov. 30 944	No Location					Harvard Zi-ka-wei	(11970) 4300
Dec. 1 945	La Paz Coimbra Algiers Uccle Agram Paris Barcelona	? (2–35–13) 2–35–08 2–35–12 2–35–01 (2–35–06) 2–35–08	14760 (6860) 5960 5350 4640 (5600) 5880	φ = 36° N λ = 71° E O = 2–35–08	Victoria gives "Alaska"	Victoria Osaka Zi-ka-wei Helwan	2760 7560 5400 940
Dec. 2 946	Ottawa Harvard Toronto Georgetown Vieques Cheltenham La Paz Washington Coimbra Barcelona Northfield Algiers Uccle Agram Paris Marseilles Lemberg Zürich Budapest	9–47–30 (9–47–48) 9–47–18 9–47–24 (9–47–33) 9–47–36 9–47–31 9–47–28 9–47–25 9–47–22 (9–47–30) 9–47–23 9–47–23 9–47–42 9–47–25 9–47–29 9–47–36 9–47–16 9–47–34	4800 (4220) 5220 4540 (2540) 4580 3930 4480 4630 5540 (4540) 5450 6200 6560 5940 5870 7480 6400 7120	φ = 11° N λ = 44° W O = 9–47–29	Victoria gives "Aleutian Ids."	Honolulu Ithaca St. Louis Victoria	2150 4680 5200 3240

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Dec. 4 947	Ottawa	11-47-43	8000	$\varphi = 26°$ S	Press report, Northern Chili, Santiago. La Paz gives: $\varphi = 27° 30'$ S $\lambda = 70°$ W	Victoria	9140
	Harvard	11-47-37	7550	$\lambda = 71°$ W		Vieques	5740
	Toronto	11-48-24	7850	O = 11-48 ca		Honolulu	8540
	Georgetown	11-47-37	7320	Location and		Melbourne	3910
	Cheltenham	11-48-01	7020	O are approx-		St. Louis	7640
	Tucson	11-48-24	7580	imate.		Balboa	(2320)
	Spring Hill	11-47-58	6350			Osaka	17780
	Ithaca	11-48-51	7520			Zi-ka-wei	10820
	La Paz	11-47-29	1200			Helwan	3440
	Washington	11-47-54	7030			Uccle	9800
	Lawrence	11-47-39	7640			Agram	9960
	Northfield	11-47-42	7820			Marseilles	10240
	Coimbra	11-48-02	9650			Paris	8600
	Barcelona	(11-48-28)	(9770)			Lemberg	5220
	Algiers	11-48-09	9750			Budapest	9600
	Lick	11-48-08	8680				
	Berkeley	11-47-58	8800				
Dec. 6 948	No Location					No definite data	
Dec. 6 949	Ottawa	8-40-58	3650	$\varphi = 50°$ N	Toronto gives: $\varphi = 49° 32'$ N $\lambda = 127°$ W Victoria gives N.W. of Estevan, off Vancouver Island.	Vieques	6000
	Saskatoon	8-40-56	1460	$\lambda = 127°$ W			
	Halifax	8-40-57	4560	O = 8-40-58			
	Harvard	8-40-54	3930				
	Victoria	8-40-39	435				
	Toronto	8-41-12	3520				
	Georgetown	8-40-54	3980				
	Honolulu	8-41-12	3910			—	
	Sitka	8-40-54	1070				
	Cheltenham	8-40-56	4020				
	Tucson	8-40-50	2450				
	Spring Hill	8-40-44	3840				
	Ithaca	8-41-37	3700				
	La Paz	8-41-12	9220				
	Washington	8-40-56	3940				
	St. Louis	8-40-57	3070				
	Lawrence	8-40-50	2700				
	Northfield	8-40-24	4200				
	Algiers	8-41-01	9300				
	Berkeley	8-41-08	1330				
	Lick	8-41-02	1460				
Dec. 6 950	No Location			Possibly same as No. 949		Victoria	270
						Georgetown	(6240)
						Cheltenham	290
						Lawrence	(2840)
Dec. 9 951	Zi-ka-wei	18-03-41	5780	$\varphi = 52°{\cdot}5$ N		Victoria	(1400)
	Agram	18-03-53	9010	$\lambda = 172°$ W		Honolulu	1180
				O = 18-03-47			

LOCATION OF EPICENTRES—*Continued*
1918

Date	Station	O	Δ	Epicentre	Location	Other data	
Dec. 9 952	Honolulu Zi-ka-wei Agram	(18–53–42) 18–52–52 18–53–02	(4020) 5300 9140	$\varphi = 52°$ N $\lambda = 179°$ E O = 18–53–00			
Dec. 9 953	No Location					No definite data	
Dec. 21 954	Ottawa Georgetown Ithaca Washington Balboa Coimbra	9–24–51 9–24–44 9–26–06 9–25–21 9–25–58 (9–24–09)	4920 4260 4020 3740 1000 (7920)	$\varphi = 3°$ N $\lambda = 78°$ W O = 9–25 ca Location and O are only approximate.		Victoria Osaka	(2770) 350
Dec. 23 955	No Location					Toronto Vieques	(4120) (4580)
Dec. 25 956	No Location					Honolulu Osaka Zi-ka-wei Uccle Agram	5520 3100 4920 9740 11880
Dec. 26 957	No Location					No definite data	

Dominion Observatory, Ottawa, April 30, 1921.