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The Location of Epicentres, 1922

BY

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OTTAWA
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LOCATION OF EPICENTRES, 1922

In March, 1922, one Milne-Shaw horizontal seismograph was added to the equipment of the seismological station of the Dominion Observatory and a second of the same type was put in operation in December of the same year. These new instruments have resulted in a marked increase in the number of earthquakes recorded at Ottawa. With the installation of more sensitive seismographs at a large percentage of the other stations the amount and value of the data available for location work have been materially increased.

During the year 1922, one hundred and twenty earthquakes, serially numbered 1251 to 1370 inclusive, were recorded by the seismographs at this station. Utilizing all available data, determinations were made of the geographical co-ordinates for fifty-four of the epicentres, and, of the remaining sixty-six, twelve were roughly located either by Press reports or from the bulletins of one or more of the co-operating stations. The method followed, as well as the form of tabulating the results, has been consistently the same ever since the work was first undertaken in the year 1911. Readings given by the various stations are all reduced by means of the Klotz Tables, and the epicentres determined by means of the stereographic projection method. No attempt is made to use those records which do not give readings for P and S, from which to deduce the value of Δ and O, which, respectively, are the distance from the station to the epicentre, measured in kilometres, and the Greenwich Mean Time of the disturbance at its origin expressed in hours, minutes and seconds.

No doubt a much closer approximation to the epicentre should result if corrections were applied for estimated depth of focus, and "Shadow Zone" readings made use of in the case of distant earthquakes. Such detailed analysis cannot be undertaken at any one station for every earthquake. Probably for some time to come the programme at this station will include such a minute examination of only a few of the largest earthquake records in any one year. However, it is felt that these locations, which have been carefully and consistently calculated, will serve a useful purpose in seismological research.

DOMINION OBSERVATORY,
OTTAWA, CANADA,
June, 1926.

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1251 Jan. 6	Coimbra.....	14-11-26	8850	$\phi = 12^\circ \text{ S}$ $\lambda = 61^\circ.5 \text{ W}$ O = 14-11-30		Victoria (8020) Stonyhurst 7960 Belgrade 8050
	Algiers.....	14-13-47	8800			
	Wien.....	(14-12-21)	(9660)			
	Cheltenham.....	14-11-40	5750			
	Pola.....	(14-12-08)	(9800)			
	Georgetown.....	14-10-59	6220			
	Washington.....	14-10-50	6240			
	Chicago.....	14-11-07	6520			
	Balboa.....	14-10-40	3100			
	Hamburg.....	(14-11-9)	(9900)			
	La Paz.....	14-10-14	1060			
	De Bilt.....	(14-11-57)	(9650)			
	Uccle.....	14-11-29	9880			
	Berkeley.....	(14-10-38)	(8550)			
1252 Jan. 9	Ottawa.....	5-09-32	3440	$\phi = 24^\circ.5 \text{ N}$ $\lambda = 47^\circ \text{ W}$ O = 5-09-26	De Bilt gives North Atlantic Ocean. Uccle gives $\phi = 33^\circ \text{ N}$ $\lambda = 57^\circ \text{ W}$. Zürich gives $\phi = 24^\circ \text{ N}$ $\lambda = 48^\circ \text{ W}$	Port-au-Prince 6450
	St. Louis.....	(5-09-27)	(4450)			
	Ithaca.....	5-09-13	3560			
	Strasbourg.....	5-09-31	5310			
	Coimbra.....	5-09-43	3600			
	Algiers.....	5-09-20	4860			
	La Paz.....	5-09-39	4890			
	Paris.....	5-09-33	4920			
	Wien.....	5-09-27	6110			
	Toronto.....	5-09-57	3330			
	Pola.....	5-09-33	5950			
	Porto Rico.....	5-09-34	2210			
	Cheltenham.....	5-09-23	3280			
	Georgetown.....	5-09-05	3520			
	Dyce.....	5-09-22	5080			
	Washington.....	5-09-18	3400			
	Chicago.....	5-09-26	4220			
	Stonyhurst.....	5-09-6	4880			
	Hamburg.....	5-09-23	5740			
	Innsbruck.....	5-09-34	5600			
	Königsberg.....	5-09-33	5250			
	Rio de Janeiro..	5-08-41	5580			
	Firenze.....	5-09-06	5800			
	De Bilt.....	5-09-32	5250			
	Göttingen.....	5-09-26	5660			
	Barcelona.....	5-09-19	4850			
	Belgrade.....	5-09-20	6540			
	Naples.....	5-09-43	6250			
	Uccle.....	5-09-22	5240			
	Besançon.....	5-09-28	5230			
	Zürich.....	5-09-32	5400			
	Berkeley.....	5-09-15	7700			

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data	
1253 Jan. 17	Ottawa.....	3-50-17	4780	$\phi = 4^{\circ}.5$ N. $\lambda = 66^{\circ}.2$ W O = 3-50-30	Dr. Perry Byerly of Berkeley, Cal. after analyzing seismograms from many different stations, concluded that there were three distinct quakes all happening within 6 seconds: No. 1 O = 3-50-20 $\phi = 4^{\circ} 35'.2 \pm 32''$ S $\lambda = 63^{\circ} 56'.3 \pm 22''$ W No. 2 O = 3-50-22 $\phi = 5^{\circ} 11'.5 \pm 5'$ N $\lambda = 66^{\circ} 45'.2 \pm 4'$ W No. 3 O = 3-50-24 $\phi = 3^{\circ} 12'.1 \pm 3'$ S $\lambda = 82^{\circ} 50'.2 \pm 3'$ W Using La Paz and Rio de Janeiro in conjunction with those listed on the left, gives an indication of an epicentre in agreement with No. 1. Uccle gives $\phi = 4^{\circ}$ N $\lambda = 65^{\circ}$ W	St. Louis	1090
	Saskatoon.....	3-50-22	6160			Osaka	9560
	Georgetown.....	3-50-16	4040			Victoria	1170
	Ithaca.....	3-50-32	4280			Honolulu	8200
	Strasbourg.....	3-50-16	8640			Perth	7700
	Coimbra.....	3-50-22	7250			Helwan	2950
	Algiers.....	3-50-16	8090			Balboa	650
	Wien.....	3-50-55	8380			Belgrade	10520
	Paris.....	3-50-31	8100			Zi-ka-wei	7860
	Pola.....	3-50-35	8850			Stonyhurst	1490
	Dyce.....	(3-50-19)	(8200)			Königsberg	8480
	Washington.....	3-50-21	4000			Port-au-Prince	950
	Athens.....	3-50-35	8840			La Paz	1360
	Northfield.....	3-50-35	4400			Rio de Janeiro	2900
	Naples.....	3-50-27	8100				
	Uccle.....	3-50-32	8180				
	Hamburg.....	3-50-39	8420				
	Göttingen.....	3-50-45	8260				
	Hohenheim.....	3-50-33	8520				
	Besançon.....	3-50-22	8450				
	München.....	3-50-47	8350				
	Barcelona.....	3-50-20	8080				
	Rocca di Papa...	3-50-24	8840				
Innsbruck.....	3-50-46	8300					
Firenze.....	3-50-33	8600					
De Bilt.....	(3-50-39)	(8320)					
1254 Jan. 19	No Location....				Manila gives North Mindanao	Honolulu 5700 Perth 4600 Manila 3120 Uccle (9400)	
1255 Jan. 22	No Location....					La Paz 9320 Victoria (2390) Honolulu 1770 Perth 5950 Belgrade 1330	

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1256 Jan. 22	No Location....					Honolulu 1730 Perth 5180 La Paz (8760) Belgrade 10250
1257 Jan. 26	No Location....					Victoria 660 Tucson 2050
1258 Jan. 31	Ottawa..... Saskatoon..... Halifax..... Harvard..... Toronto..... St. Louis..... Fordham..... Ithaca..... Strasbourg..... Coimbra..... Algiers..... La Paz..... Paris..... Wien..... Victoria..... Cheltenham..... Tucson..... Porto Rico..... Honolulu..... Pola..... Georgetown..... Dyce..... Washington..... Ootomari..... Chicago..... Lick..... Northfield..... Lemberg..... Berkeley..... Stonyhurst..... Ucele..... Hamburg..... Zürich..... Innsbruck..... Firenze..... Göttingen..... Athens..... Barcelona..... De Bilt..... Belgrade..... Naples.....	13-17-19 13-17-06 13-17-09 13-16-59 13-17-19 13-17-16 13-17-23 13-17-20 13-17-42 13-17-45 13-17-26 13-17-33 13-17-35 13-17-30 13-17-12 13-17-06 13-17-28 13-17-16 13-17-08 13-17-12 13-17-39 13-17-15 13-17-24 13-17-07 13-17-21 13-17-09 13-17-29 13-17-21 13-17-6 13-17-26 13-17-28 (13-16-30) 13-17-39 13-16-55 13-17-27 13-17-15 13-18-05 (13-17-29) 13-18-02 13-17-47	3900 2000 4940 4480 3910 2990 4120 3910 8840 8820 9750 8750 8800 9400 880 4020 1830 6250 3680 9950 4080 7800 4020 7140 3120 540 4280 9440 960 7960 8820 8750 9350 9230 10050 8940 10140 9060 (8750) 9600 9600	$\phi = 41^{\circ}.5$ N $\lambda = 126^{\circ}.8$ W O = 13-17-23	Press report of quake in Pacific off Eureka, Cal. Uccle gives $\phi = 40^{\circ}$ N $\lambda = 127^{\circ}$ W Zürich gives $\phi = 40^{\circ}$ N $\lambda = 125^{\circ}$ W Berkeley and Lick give $\phi = 41^{\circ} 8' \pm 3'$ N $\lambda = 125^{\circ} 30' \pm 3'$ W	Osaka 7460 Nagasaki (4200) Besançon (10850)

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1259 Feb. 16	Ottawa.....	3-14-40	3720	$\phi = 11^{\circ}.5$ N $\lambda = 85^{\circ}$ W O = 3-14-37	Press reports quake at Nicaragua.	Algiers (7320) Strasbourg 2700 Fordham 4260 Washington 2440
	St. Louis.....	3-14-40	2990			
	Porto Rico.....	3-14-53	2220			
	Cheltenham.....	3-14-55	3720			
	Cartuja.....	3-14-36	8650			
	Wien.....	3-14-37	10050			
	Balboa.....	3-14-55	660			
	Chicago.....	3-14-10	3360			
	Georgetown.....	3-14-39	3080			
	Coimbra.....	3-13-41	7680			
	La Paz.....	3-14-57	3420			
1260 Feb. 19	No Location....					Cartuja (2960) Chicago 2520 Coimbra (1750) La Paz 6680
1261 Feb. 20	No Location....					Perth 8520 La Paz (4200)
1262 Feb. 28	No Location....					Tucson 2030
1263 Mar. 4	St. Louis.....	13-07-30	7700	$\phi = 56^{\circ}$ N $\lambda = 155^{\circ}$ E O = 13-07-43	Coimbra gives $\phi = 57^{\circ}.6$ N $\lambda = 171^{\circ}$ E Zürich gives $\phi = 53^{\circ}$ N $\lambda = 145^{\circ}$ E Belgrade gives Kamchatka	Ottawa 6580 Honolulu 4720 Perth 3720 Washington 7200 Chicago 6400 Fordham 7100 Northfield 6760 Ootomari 910 Nagasaki 2500
	Cartuja.....	13-08-05	8880			
	Algiers.....	13-07-53	8940			
	Wien.....	13-08-13	7200			
	Strasbourg.....	13-07-38	8050			
	Hamburg.....	13-07-38	7500			
	Helwan.....	13-07-52	8800			
	Pola.....	13-07-44	8200			
	Athens.....	13-07-44	8520			
	Paris.....	13-07-42	8100			
	Georgetown.....	13-07-43	8160			
	Königsberg.....	13-07-38	7020			
	Firenze.....	13-07-48	8300			
	Coimbra.....	13-07-37	9160			
	Göttingen.....	13-07-40	7660			
	Barcelona.....	13-07-43	8840			
	Belgrade.....	13-07-45	7980			
	Naples.....	13-07-48	8500			
	De Bilt.....	13-07-42	7720			
	Innsbruck.....	13-07-40	8080			
	Uccle.....	13-07-38	7880			
	Batavia.....	13-07-44	7660			
	Besançon.....	13-07-45	8150			
Zürich.....	13-07-38	8150				
Berkeley.....	13-07-09	6250				

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Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1264 Mar. 10	No Location . . .				Press report of quake felt at Los Angeles, Fresno, Bakersfield and San Luis Obispo, Cal. Berkeley and Lick report this quake in San Andreas Rift, east of Shandon, Cal. Union Oil Co. pipe line to San Luis Obispo broken in four places between Shandon and Antelope and between Cholame and Annette.	St. Louis 5880 Chicago 1930 Fordham (1790) Georgetown 3500
1265 Mar. 10	No Location . . .					Cartuja (8500) Algiers (3030) Strasbourg 1950 Chicago (2280) Pola 5550 Coimbra (10050) Belgrade 1670 Batavia 7250 La Paz 5900
1266 Mar. 12	Rio de Janeiro . . La Paz	16-51-45 16-51-52	3240 2510	$\phi = 38^\circ \text{ S}$ $\lambda = 73^\circ \text{ W}$ $O = 16-51-48$		Chicago (9980) Coimbra 10050
1267 Mar. 22	No Location . . .				St. Louis reports quake felt at Hickman and Paducah, Kentucky and at Poplar Bluff, Missouri.	Ithaca 260 Chicago 360 St. Louis 190

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1268 Mar. 28	Ottawa.....	3-57-53	7280	$\phi = 19^{\circ}.5 S$ $\lambda = 67^{\circ}.5 W$ O = 3-57-55	Coimbra gives $\phi = 19^{\circ}.2 S$ $\lambda = 67^{\circ} W$ Zürich gives $\phi = 16^{\circ} S$ $\lambda = 53^{\circ} W$ Belgrade gives Tarapaco, Chile	Toronto 7600
	Ithaca.....	3-57-54	6950			Algiers 9160
	Cartuja.....	3-58-02	9060			Porto Rico 3900
	Honolulu.....		10700			Strasbourg 9400
	Tucson.....	3-57-54	7340			Hamburg 9450
	Cheltenham.....	3-57-48	6480			Helwan 4250
	Washington.....		6500			Paris 9280
	Fordham.....	3-57-57	6710			Zi-ka-wei 3000
	Northfield.....	3-57-48	7180			Göttingen 9450
	Georgetown.....	3-57-51	6600			Barcelona (9120)
	Coimbra.....	3-57-57	9010			Belgrade (8680)
	Rio de Janeiro...	3-58-06	2340			De Bilt (9350)
						Innsbruck 9350
			Uccle 9380			
			Zürich 9400			
1269 April 2	No Location....					Chicago 5520 La Paz 5320
1270 April 2	Ottawa.....	(19-17-06)	(6370)	$\phi = 53^{\circ}.5 N$ $\lambda = 165^{\circ} W$ O = 19-17-41	La Paz and Coimbra give Aleutian Islands. De Bilt gives Fox Islands.	Toronto 2510
	Wien.....	(19-17-28)	(9100)			Georgetown (8840)
	Ithaca.....	(19-17-8)	(6220)			Ootomari 3200
	St. Louis.....	19-17-50	5600			
	Victoria.....	19-16-37	2410			
	Algiers.....	19-17-57	9660			
	Zi-ka-wei.....	19-17-50	6150			
	Hamburg.....	19-18-06	7960			
	Chicago.....	19-17-43	5560			
	Königsberg.....	(19-17-26)	(8440)			
	Stonyhurst.....	19-18-1	7850			
	Strasbourg.....	(19-17-37)	(8920)			
	Paris.....	19-17-23	8300			
	Barcelona.....	(19-17-35)	(9480)			
	De Bilt.....	19-17-52	8250			
	Belgrade.....	19-17-53	9050			
	Dyce.....	19-17-48	7600			
	Coimbra.....	19-17-50	9340			
	Uccle.....	19-17-54	8360			
	Lick.....	19-17-52	3550			
1271 April 5	Ottawa.....		12700	$\phi = 7^{\circ} N$ $\lambda = 148^{\circ}.5 E$ O = 9-59-15	De Bilt gives "In or near New Guinea."	Wien (8650)
	Zi-ka-wei.....	9-59-31	3750			Toronto (8680)
	Osaka.....	10-00-16	3400			Victoria 6860
	Manila.....	9-58-34	3070			Hamburg (11000)
	Nagasaki.....	9-58-41	3730			Chicago (10620)
					Perth 7700	
					Strasbourg (8200)	
					Uccle (8180)	
					La Paz 14000	

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1272 April 6	Coimbra.....	3-13-26	8820	$\phi = 10^{\circ} \cdot 5 \text{ S}$ $\lambda = 75^{\circ} \text{ W}$ O = 3-13-14 Location doubtful.		Chicago (4050)
	La Paz.....	3-13-02	1000			
1273 April 6	Coimbra.....	8-01-23	8840	$\phi = 10^{\circ} \cdot 5 \text{ S}$ $\lambda = 75^{\circ} \text{ W}$ O = 8-01-04 Location doubtful.		Chicago (4260)
	La Paz.....	8-00-45	1010			
1274 April 8	Ottawa.....	20-42-14	4450	$\phi = 72^{\circ} \text{ N}$ $\lambda = 8^{\circ} \cdot 5 \text{ W}$ O = 20-42-15	Hamburg gives Jan Mayen Uccle gives $\phi = 70^{\circ} \text{ N}$ $\lambda = 20^{\circ} \text{ W}$ Zürich gives $\phi = 71^{\circ} \cdot 8 \text{ N}$ $\lambda = 8^{\circ} \cdot 9 \text{ W}$	Ithaca 3120 St. Louis (2900) Toronto 4020 Victoria 2820 Washington 5740 Potsdam 3240 La Paz 11220
	Wien.....	20-41-35	3330			
	Lemberg.....	20-42-1	3070			
	Athens.....	20-42-26	4000			
	Algiers.....	20-41-52	4150			
	Zi-ka-wei.....	20-42-21	8200			
	Hamburg.....	20-42-24	2200			
	Georgetown....	20-42-11	5320			
	Chicago.....	20-42-21	5160			
	Cheltenham....	20-42-37	4950			
	Königsberg....	20-42-30	2250			
	Helwan.....	20-42-17	5300			
	Göttingen.....	20-42-04	2510			
	Hohenheim....	20-42-01	2780			
	München.....	20-41-58	2990			
	Innsbruck.....	20-42-40	2660			
	Barcelona.....	20-42-20	3120			
	De Bilt.....	20-42-16	2330			
	Strasbourg....	20-42-08	2810			
	Paris.....	20-42-14	2620			
	Belgrade.....	20-42-28	3070			
	Naples.....	20-42-02	3800			
	Dyce.....	20-42-38	1480			
Coimbra.....	20-42-06	3550				
Uccle.....	20-42-09	2500				
Besançon.....	20-42-21	2770				
Zürich.....	20-42-01	2970				
Berkeley.....	20-42-36	6860				
1275 April 11	No Location....					Victoria 3200 Zi-ka-wei 6780 Chicago (4080) Perth 7690 Strasbourg 1800 La Paz 11460

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Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1276 April 11	No Location . . .					Zi-ka-wei 6950
1277 April 13	No Location . . .					St. Louis 2750 Georgetown (2610)
1278 April 17	No Location . . .					No data.
1279 April 20	Chicago La Paz	5-48-19	3190 3800	$\phi = 15^\circ \text{ N}$ $\lambda = 90^\circ \text{ W}$ O = 5-48-19	Press reports quake in Guatemala.	
1280 April 25	No Location . . .					Wien (8000) Zi-ka-wei 6550 Chicago 8440 Perth 5700 Innsbruck 1710
1281 April 26	Zi-ka-wei Manila Uccle Ootomari Nagasaki	1-11-30 1-11-38 1-11-39	1720 2950 9230 850 900	$\phi = 36^\circ.5 \text{ N}$ $\lambda = 138^\circ.5 \text{ E}$ O = 1-11-36	Nagasaki reports quake near Kisarazu.	Wien 7800 Honolulu 2720
1282 April 26	Wien Königsberg Lemberg Zi-ka-wei Strasbourg Uccle De Bilt Innsbruck Ootomari Nagasaki	3-58-57 3-59-05 3-59-03 3-59-11 3-59-09 (3-59-18) 3-59-14	9120 8060 9300 3120 8920 8900 (8680) 9010 725 2300	$\phi = 45^\circ \text{ N}$ $\lambda = 152^\circ.5 \text{ E}$ O = 3-59-08		Osaka 5200 Honolulu 4080 Chicago (5620) Stonyhurst 3000
1283 April 28	No Location . . .					No data.
1284 April 28	No Location . . .					No data.
1285 May 1	No Location . . .					No data.
1286 May 3	Ottawa Zi-ka-wei	4-00-23 4-00-11	6620 5900	$\phi = 50^\circ \text{ N}$ $\lambda = 170^\circ.5 \text{ W}$ O = 4-00-17 Location only approximate.		

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1287 May 4	Ottawa..... Paris..... Honolulu..... Strasbourg..... Hamburg..... Helwan..... Washington..... Chicago..... Belgrade..... Wien..... Uccle..... Königsberg..... De Bilt..... Batavia..... Tokio..... Ootomari..... Nagasaki..... Berkeley.....	9-12-59 9-12-59 9-12-45 9-12-52 9-12-56 9-13-16 9-13-58 9-12-53 9-12-41 9-12-18 9-12-48 (9-13-28) 9-12-58 9-12-56 9-12-56 9-12-52 9-13-17	8680 9020 5100 9000 8420 9280 8800 8520 9160 9480 8900 (7320) 8720 7400 1610 700 2460 6480	$\phi = 45^{\circ}.5$ N $\lambda = 154^{\circ}.2$ E. O = 9-12-59	Manila, Tokio, De Bilt and Zürich give Kurile Islands.	Lemberg 9780
1288 May 5	No Location....					Belgrade 9400 Wien 8000 Tokio 540 Ootomari 600
1289 May 11	No Location....					La Paz 3600 Chicago (5800)
1290 May 11	Ottawa..... La Paz..... Algiers..... Hamburg..... Chicago..... Washington..... Georgetown..... Ithaca..... Coimbra..... Wien..... Uccle..... De Bilt.....	6-45-25 6-45-32 6-45-30 6-45-35 6-45-08 6-46-07 (6-45-28) 6-45-2 6-45-34 6-45-38 6-45-32 6-45-50	4000 3050 6860 7660 4400 3410 (3400) 3910 5870 8000 7220 7150	$\phi = 11^{\circ}$ N $\lambda = 60^{\circ}$ W O = 6-45-33	Port au Prince and Coimbra give Martinique.	Belgrade 3440
1291 May 11	No Location....					Zi-ka-wei 7450 Perth 4120 Belgrade 13000

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1292 May 12	Honolulu..... Zi-ka-wei..... Batavia..... Berkeley.....	18-39-16 18-39-35 18-39-19 18-39-28	6120 7800 7100 9700	$\phi = 23^{\circ}.5$ S $\lambda = 170^{\circ}.5$ E O = 18-39-24	De Bilt gives Pacific Ocean near New Caledonia	La Paz 8840 Fordham 3600 Algiers 10000 Strasbourg 11460 Cartuja 12740 Helwan (2230) Perth 7040 Belgrade 11920 Coimbra 10180
1293 May 14	No Location....					No data.
1294 May 22	No Location....					Balboa 160
1295 May 28	No Location....					No data.
1296 May 28	No Location....					No data.
1297 June 2	Zi-ka-wei..... Manila..... Wien..... Königsberg..... Batavia..... Melbourne..... Nagasaki.....	20-11-41 20-10-59 (20-11-43) (20-11-52) 20-11-43 20-11-6	2640 1480 (10800) (10220) 2660 5320 2564	$\phi = 8^{\circ}$ N $\lambda = 126^{\circ}.5$ E O = 20-11-36	Belgrade, Manila, Tokio and Nagasaki give Mindanao.	Algiers (8800) Helwan 9300 Coimbra 10600 Honolulu 9520 Washington (8280) Chicago 8840 Cartuja (12080) Belgrade 8910 Dyce 4500 Uccle (6900) Tokio 1640
1298 June 3	No Location....					No data.
1299 June 3	Zi-ka-wei..... Tokio..... Osaka.....	4-56-32 4-56-28	1930 170 460	$\phi = 34^{\circ}$ N $\lambda = 140^{\circ}.5$ E O = 4-56-30		
1300 June 4	No Location....					Manila 410
1301 June 8	No Location....					No data.

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1302 June 12	Ottawa..... Fordham..... Denver..... St. Louis..... Algiers..... Toronto..... Coimbra..... Cheltenham..... Porto Rico..... Paris..... Strasbourg..... Washington..... Chicago..... Balboa..... Georgetown..... Belgrade..... Ithaca..... Uccle..... De Bilt..... La Paz..... Besançon.....	4-47-27 4-47-20 4-47-39 4-47-44 4-47-56 4-48-15 4-48-27 4-47-14 4-47-15 4-48-24 4-48-58 4-47-23 4-47-23 4-46-58 4-47-22 4-47-22 4-47-17 4-48-00 4-48-23 4-47-44 (4-48-32)	3750 3720 830 2360 9880 3330 8800 3500 4520 9050 9050 3360 2820 4400 3400 10400 3580 9280 9020 6180 (9280)	$\phi = 32^\circ$ N $\lambda = 114^\circ.5$ W O = 4-47-49	De Bilt gives Western North America	Stonyhurst 5440 Honolulu 5080 Port-au-Prince 1540 Cartuja 8150 Dyce 7700 Tucson 1210 Lemberg 8800 Wien 9220
1303 June 12	St. Louis..... Tucson..... Cartuja..... La Paz..... Strasbourg.....	10-42-33 10-42-21 10-42-14 10-42-21 (10-41-08)	2690 1660 10400 6040 (11050)	$\phi = 17^\circ$ N $\lambda = 111^\circ.8$ W O = 10-42-22		Coimbra 8800 Washington 2880 Chicago 2850 Zi-ka-wei 8480
1304 June 16	No Location....					No data.
1305 June 16	No Location....					No data.
1306 June 16	St. Louis..... Victoria..... Cheltenham..... Honolulu.....	20-58-09 20-59-07 20-59-05	3070 520 3840 3960	$\phi = 44^\circ.5$ N $\lambda = 126^\circ$ W O = 20-58-47 Location approximate only.		Tucson 340
1307 June 27	Strasbourg..... Honolulu..... Zi-ka-wei..... Batavia.....	(14-29-48) 14-29-54 14-30-14 (14-29-46)	(11300) 8100 2720 (2650)	$\phi = 7^\circ.5$ N $\lambda = 127^\circ$ E O = 14-29-55	De Bilt gives origin in or near E. Mindanao	Chicago (8420) Manila 1700 La Pas (15570) Tokio 4820

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1308 July 2	Ottawa.....	13-35-56	5640	$\phi = 54^{\circ}.5$ N	De Bilt and Zürich give Pacific Ocean south of Alaska.	Toronto 4450
	Algiers.....	13-36-01	9660	$\lambda = 160^{\circ}$ W		Tucson 5440
	Hamburg.....	13-35-57	8020	O = 13-36-02		Georgetown (5080)
	Osaka.....	13-35-54	5250			Lemberg 7480
	Honolulu.....	13-35-49	3560			Wien (7400)
	Paris.....	13-36-03	8450			Innsbruck 8000
	Coimbra.....	13-36-01	9160			Belgrade 7900
	Strasbourg.....	13-35-55	8600			Besançon (9200)
	Cartuja.....	13-36-02	9550			Berkeley 3330
	St. Louis.....	13-35-59	5320			
	Zi-ka-wei.....	13-35-51	6540			
	Manila.....		(7950)			
	Washington.....	13-36-36	6320			
	Chicago.....	13-35-59	5180			
	Ithaca.....	13-36-2	5650			
	Dyce.....	13-35-19	8000			
	Uccle.....	13-36-17	7900			
	Königsberg.....	13-35-58	7850			
	Barcelona.....	13-36-02	9200			
	De Bilt.....	13-36-05	8080			
	Agram.....	13-36-07	8800			
	La Paz.....	(13-36-17)	(11720)			
	Tokio.....	13-36-41	4850			
	Zürich.....	13-35-54	8750			
1309 July 2	No Location....				Press report of quake felt in the Maritime Prov'ces.	Georgetown (1330)
1310 July 4	No Location....					Manila 600
1311 July 5	No Location....				Probably Kurile or Aleutian Is.	Uccle 8360 Agram (8800)
1312 July 10	Ottawa.....	9-38-00	6380	$\phi = 10^{\circ}$ S	De Bilt gives West Brazil.	Strasbourg 8360
	Algiers.....	9-38-14	8050	$\lambda = 61^{\circ}$ W		Agram 8220
	Coimbra.....	9-38-06	7720	O = 9-38-02		Zürich 8360
	Cartuja.....	9-37-52	7960	Location approximate		
	Chicago.....	9-38-03	6200	only.		
	Ithaca.....	9-37-59	6080			
1313 July 13	Coimbra.....	(4-56-16)	(12950)	$\phi = 7^{\circ}$ N	Manila gives Mindanao.	Tokio 2800
	Helwan.....	4-58-06	9940	$\lambda = 124^{\circ}.5$ E		Manila 2320
	Zi-ka-wei.....	4-57-55	2620	O = 4-58-04		
	Batavia.....	4-58-11	2410			
1314 July 25	No Location...					No data.
1315 July 26	No Location....					Ottawa (1970)

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1316 Aug. 9	No Location . . .					No data.
1317 Aug. 11	Ottawa	(8-19-6)	(8360)	$\phi = 35^{\circ} \cdot 5$ N	Strasbourg gives	Georgetown 9300
	Algiers		2110	$\lambda = 28^{\circ}$ E	$\phi = 34^{\circ}$ N,	Dyce 2760
	Helwan	8-19-47	640	O = 8-19-39	$\lambda = 30^{\circ}$ E	Wien 3030
	Coimbra	8-19-55	2960			Chicago (8520)
	Paris	8-19-36	2510		Zürich gives	
	Strasbourg	8-19-34	2210		origin as near	
	Athens	8-19-20	580		Rhodes off SW.	
	Hamburg	8-19-34	2440		coast of Asia	
	Cartuja	8-19-55	2680		Minor.	
	Lemberg	8-19-49	1680			
	Barcelona	8-19-33	2320		De Bilt gives	
	Belgrade	8-19-52	1030		Mediterranean Sea	
	Innsbruck	8-19-41	1880		near Asia Minor.	
	De Bilt	8-19-30	2590			
	Königsberg	8-19-22	2360			
	Agram	8-19-33	1570			
	Besançon	8-19-44	2200			
	Uccle	8-19-36	2490			
	Zürich	8-19-39	2035			
1318 Aug. 11	Algiers	13-38-11	9600	$\phi = 57^{\circ} \cdot 5$ N		Toronto (6220)
	Victoria	13-37-54	2070	$\lambda = 151^{\circ}$ W		Honolulu 3400
	Cartuja	13-39-24	9020	O = 13-38-5		Chicago (5200)
	Hamburg	(13-39-31)	(7020)			Ithaca (7380)
	Dyce	(13-38-39)	(6720)			Ootomari 2650
	Wien	13-38-23	8120			
	Agram	13-38-18	8400			
	Uccle	13-37-9	8260			
1319 Aug. 13	Ottawa	0-09-58	8200	$\phi = 35^{\circ}$ N	Strasbourg gives	Tokio 4610
	Algiers	0-10-02	2100	$\lambda = 27^{\circ} \cdot 5$ E	$\phi = 35^{\circ}$ N	La Paz 9200
	Helwan	0-10-00	650	O = 0-09-55	$\lambda = 31^{\circ}$ E	Georgetown 9580
	Coimbra	0-10-05	2990			
	Paris	0-09-58	2440		Innsbruck, Zürich	
	Strasbourg	0-09-53	2140		and Wien give	
	Athens	0-09-56	435		Asia Minor.	
	Hamburg	0-10-01	2300			
	Cartuja	0-09-52	2770			
	Chicago	(0-10-39)	(8720)		Belgrade, Uccle	
	De Bilt	0-09-48	2540		and De Bilt give	
	Dyce	0-09-06	3380		Ægean Sea	
	Lemberg	0-09-57	1690			
	Wien	0-09-56	1670		Helwan reports	
	Königsberg	0-09-49	2210		quake felt	
	Barcelona	0-09-46	2340		throughout Egypt.	
	Agram	0-09-56	1480			
	Innsbruck	0-09-56	1880			
	Belgrade	0-10-01	1150			
	Besançon	0-09-48	2220			
	Uccle	0-09-37	2550			
	Zürich	0-10-01	1980			

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1320 Aug. 16	Ottawa.....	15-56-27	7860	$\phi = 53^\circ \text{ N}$ $\lambda = 158^\circ \text{ E}$ $O = 15-56-30$	Zürich gives $\phi = 54^\circ \text{ N}$ $\lambda = 157^\circ \text{ E}$	
	Algiers.....	15-56-20	9940			
	Helwan.....	15-56-29	9480			
	Coimbra.....	15-56-36	9480			
	Honolulu.....	15-55-58	5080			
	Strasbourg.....		8200			
	Paris.....	15-56-34	8440			
	Zi-ka-wei.....	15-56-22	3740			
	Cartuja.....	15-56-35	9750			
	Georgetown.....	15-56-11	8800			
	Hamburg.....	15-56-45	7660			
	De Bilt.....	15-56-36	8060			
	Chicago.....	15-56-24	7660			
	Lemberg.....	15-56.5	7960			
	Wien.....	15-56-49	7920			
	Osaka.....	15-56-03	2800			
	Königsberg.....	15-56-29	7450			
	Barcelona.....	15-56-32	9300			
	Agram.....	15-56-35	8440			
	Tokio.....	15-56-46	2290			
Batavia.....	(15-56-29)	(8200)				
Innsbruck.....	15-56-40	8350				
Belgrade.....	15-56-36	8380				
Uccle.....	15-56-31	8250				
Zürich.....	15-56-36	8450				
Nagasaki.....	15-56-40	2970				
Coimbra gives Bering Sea.						
Hamburg, De Bilt, Tokio, Innsbruck and Nagasaki give Kamchatka.						
Belgrade and Uccle give Aleutian Is.						
1321 Aug. 18	No Location....				Berkeley reports quake felt at Fresno and Bakers- field, California.	Berkeley 240 Lick 180
1322 Aug. 25	Strasbourg.....	11-46-54	1700	$\phi = 37^\circ \text{ N}$ $\lambda = 3^\circ \text{ E}$ $O = 11-47-25$ Location approximate.	Zürich, De Bilt and Innsbruck give Algiers.	Honolulu 5700 Coimbra 460 Königsberg (1350) Melbourne 3520
	Barcelona.....	(11-47-27)	(500)			
	Innsbruck.....	11-47-52	1250			
	Zürich.....	11-47-27	1340			
1323 Aug. 25	Ottawa.....	19-29-55	9200	$\phi = 51^\circ \text{ N}$ $\lambda = 93^\circ.5 \text{ E}$ $O = 19-29-39$	De Bilt gives in or near NW. Mongolia	Honolulu 10150 Hamburg 4800 Lemberg 10750 Wien 7250 Belgrade 13200 Ootomari 1110 Nagasaki 4000
	Algiers.....	19-29-38	6920			
	Coimbra.....	19-29-30	7480			
	Paris.....	(19-29-40)	(6000)			
	Cartuja.....	19-29-28	7600			
	De Bilt.....	19-29-47	5530			
	Königsberg.....	(19-29-56)	(4200)			
	Agram.....	19-29-32	5380			
	Uccle.....	19-29-28	5850			

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1324 Aug. 29	Zi-ka-wei.....	17-00-57	2170	$\phi = 12^\circ \text{ N}$ $\lambda = 124^\circ \text{ E}$ O = 17-01-09	Manila gives Tablas I. Tokio, De Bilt and Nagasaki give Philippine Is.	Coimbra (7550) Hamburg (9900) Agram 9280 Tokio 2580
	Osaka.....	17-01-43	2700			
	Batavia.....	17-00-48	2720			
	Nagasaki.....	17-01-08	2340			
1325 Aug. 30	No Location....					Chicago 1430
1326 Sept. 1	Paris.....	19-16-30	9340	$\phi = 25^\circ \text{ N}$ $\lambda = 120^\circ \text{ E}$ O = 19-16-10	Uccle gives $\phi = 27^\circ \text{ N}$ $\lambda = 123^\circ \text{ E}$ Strasbourg, Manila, Naples and Zürich give Formosa.	Ottawa 8180 Algiers (12580) Toronto (8550) Victoria 2800 Cartuja 7800 Washington (8520) Chicago 8380 Georgetown 9900 Coimbra 10050 Ithaca 8350 Königsberg 9700 Berkeley 9380 Ootomari 2690
	St. Louis.....	19-16-42	11620			
	Cheltenham.....	19-16-34	12600			
	Sitka.....	19-15-51	8700			
	Honolulu.....	19-15-54	8360			
	Strasbourg.....	19-15-50	9900			
	Helwan.....	(19-16-09)	(8740)			
	Hamburg.....	19-16-10	9120			
	Athens.....	19-16-06	9050			
	Manila.....	19-16-01	1100			
	Lemberg.....	19-16-08	8700			
	Wien.....	19-16-09	9060			
	Dyce.....	19-16-17	9350			
	De Bilt.....	19-16-10	9480			
	Osaka.....	19-15-58	1750			
	Melbourne.....	19-15-8	7380			
	Batavia.....	19-16-33	3240			
	Belgrade.....	19-16-02	9080			
	Innsbruck.....	19-16-25	9080			
	Besançon.....	19-16-18	9560			
Naples.....	19-16-20	9300				
Uccle.....	19-16-10	9560				
Zürich.....	19-16-06	9600				
Nagasaki.....	19-15-56	1290				
1327 Sept. 3	No Location....					Georgetown (1610)
1328 Sept. 4	Algiers.....	17-08-56	5450	$\phi = 24^\circ \text{ N}$ $\lambda = 52^\circ \text{ W}$ O = 17-09-05	Uccle gives $\phi = 24^\circ \text{ N}$ $\lambda = 51^\circ \text{ W}$ De Bilt gives Atlantic Ocean.	Cartuja 7680 Washington 5720 Coimbra 7530 Wien (11050) La Paz 590 Zürich 8260 Berkeley 6710
	Paris.....	17-09-10	5520			
	Strasbourg.....	17-08-53	5820			
	Chicago.....	17-08-25	3140			
	Hamburg.....	17-09-32	5660			
	Barcelona.....	17-09-03	5440			
	Dyce.....	17-09-12	5520			
	Besançon.....	(17-09-01)	(5720)			
	De Bilt.....	17-09-24	5550			
	Uccle.....	17-09-18	5550			

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1329 Sept. 4	No Location....					Manila 1860 Nagasaki 1240
1330 Sept. 11	No Location....					La Paz 3600
1331 Sept. 12	No Location....					Chicago 5100
1332 Sept. 14	Strasbourg..... Helwan..... Hamburg..... Manila..... Wien..... Osaka..... Königsberg..... Uccle..... Zürich.....	19-31-55 19-31-57 19-31-33 19-31-35 (19-31-53) 19-31-48 19-31-43	9450 8620 9250 1200 9150 1700 (8380) 9520 9560	$\phi = 25^\circ \text{ N}$ $\lambda = 121^\circ \text{ E}$ O = 19-31-46	Manila and Zürich give Formosa.	Victoria 4660 Honolulu 5300 Coimbra (11980) Belgrade 12820 Melbourne 6550 Ootomari 3335 Nagasaki 1670
1333 Sept. 16	Helwan..... Wien..... Manila..... Osaka.....	22-44-54 22-44-27 	8680 9340 1100 1700	$\phi = 24^\circ.5 \text{ N}$ $\lambda = 121^\circ.8 \text{ E}$ O = 22-44-40	Manila gives NE. Formosa	Coimbra 8250 Ootomari 4507 Nagasaki 1550
1334 Sept. 17	No Location....				Manila gives N. Formosa.	Honolulu (5200) Helwan 8320 Manila 1800 Coimbra 8550 Osaka 1800 Nagasaki 1530
1335 Sept. 17	Helwan..... Wien..... Manila..... Osaka.....	9-59-30 9-59-31 	8650 9000 1500 1680	$\phi = 25^\circ.5 \text{ N}$ $\lambda = 121^\circ.8 \text{ E}$ O = 9-59-30	Manila gives N. of Formosa	Honolulu 5200 Coimbra (7400) Nagasaki 1620
1336 Sept. 29	No Location....					No data.
1337 Sept. 29	No Location....					Washington (5310) Chicago 2930
1338 Sept. 30	No Location....					No data.

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1339 Oct. 6	Ottawa..... Cartuja..... Washington..... Chicago..... Uccle.....	5-28-11 5-28-35 5-29-07 5-28-54 (5-29-3)	5240 8400 5820 5750 (6800)	$\phi = 65^{\circ} \cdot 5$ N $\lambda = 159^{\circ} \cdot 5$ W O = 5-28-8 Location doubtful.		Georgetown (2380)
1340 Oct. 7	No Location....					No data.
1341 Oct. 11	Ottawa..... St. Louis..... Algiers..... Porto Rico..... Honolulu..... Rio de Janeiro.. Washington..... Balboa..... Northfield..... Barcelona..... Ithaca..... Coimbra..... Cartuja..... Georgetown..... La Paz.....	14-49-40 14-49-50 14-50-09 14-49-51 14-50-01 14-50-37 14-49-49 14-49-21 14-49-48 14-49-42 14-49-43 14-49-49 14-49-48 14-49-47 430	6880 6240 9380 3620 9900 2900 6040 3070 6680 9350 6520 9050 9300 6150 430	$\phi = 16^{\circ} \cdot 2$ S $\lambda = 72^{\circ}$ W O = 14-49-50	Zürich gives $\phi = 16^{\circ}$ S $\lambda = 73^{\circ}$ W Hamburg, Coimbra La Paz, Besançon, Naples and Uccle give Peru.	Helwan 9380 Chicago 5870 Hamburg 9480 Dyce 9400 Wien 9520 Manila (9900) Belgrade 4500 Besançon 9320 De Bilt 9420 Naples 9400 Uccle 9440 Zürich 9420 Wellington 9400
1342 Oct. 14	No Location....					No data.
1343 Oct. 14	Hamburg..... Coimbra..... Wien..... Osaka..... Königsberg..... Besançon..... De Bilt..... Nagasaki..... Uccle..... Zürich.....	(23-46-54) 23-45-13 23-46-52 23-46-56 23-45-59 23-46-56 23-47-2 23-46-56	(9120) 11200 9060 1760 8480 10220 9340 1200 9280 9650	$\phi = 24^{\circ}$ N $\lambda = 121 \cdot 5$ E O = 23-46-40ca	Zürich and De Bilt give Formosa	Chicago (7500) Ootomari 4300
1344 Oct. 16	Helwan..... Wien..... Dyce..... Königsberg..... Belgrade..... Uccle..... Zürich.....	16-01-18 16-01-24 16-01-46 16-01-4 16-01-04 16-01-25	5440 5840 4660 5320 5800 6570 (6000)	$\phi = 41^{\circ} \cdot 5$ N $\lambda = 92^{\circ} \cdot 7$ E O = 16-01-24 Location approximate.	Zürich gives neighbourhood of Himalayas	Coimbra (7550) Manila 5220 Ootomari 304

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1345 Oct. 17	No Location....				Nagasaki gives Taiwan. De Bilt gives Bay of Bengal (Andaman I.).	Wien 8900 De Bilt 8900 Nagasaki 1000
1346 Oct. 24	Ottawa..... Algiers..... St. Louis..... Sitka..... Honolulu..... Toronto..... Helwan..... Athens..... Wien..... Georgetown.... Cartuja..... Coimbra..... Dyce..... Ithaca..... Hamburg..... Washington.... Chicago..... Northfield..... Osaka..... Königsberg..... Stonyhurst..... Belgrade..... Batavia..... Innsbruck..... Barcelona..... Besançon..... De Bilt..... Naples..... Uccle..... Ootomari..... Zürich..... La Paz.....	21-22-03 21-21-49 21-22-22 21-20-54 21-20-56 (21-22-59) 21-21-24 21-21-13 21-21-14 21-21-26 21-21-20 21-21-21 21-21-09 21-21-48 21-21-10 21-22-36 21-23-14 21-22-08 21-21-12 21-21-0 21-21-19 21-21-08 21-21-12 21-21-13 21-21-27 21-21-12 21-20-52 21-21-13 21-21-13 21-21-13	8050 9080 7760 4750 5200 (7960) 9100 9000 8380 8950 9950 9420 8060 8400 8120 8880 7850 8300 1780 7580 8440 8480 7220 8680 9480 8720 8400 9200 8520 624 8740 14770	$\phi = 49^\circ$ N $\lambda = 152^\circ.5$ E O = 21-21-27	Zürich gives $\phi = 47^\circ$ N $\lambda = 153^\circ$ E Uccle gives $\phi = 50^\circ$ N $\lambda = 159^\circ$ E Coimbra gives $\phi = 52^\circ.5$ N $\lambda = 159^\circ$ W Cartuja and De Bilt give Kurile Is. Strasbourg and Naples give Kamchatka.	Melbourne 8800 Wellington 8320
1347 Oct. 27	Wien..... Osaka..... Manila..... De Bilt..... Uccle.....	(14-22-21) 14-22-53 14-23-2	(9520) 1730 1350 9350 9280	$\phi = 26^\circ$ N $\lambda = 122^\circ$ E O = 14-22-8 Location approximate.	De Bilt reports quake felt at N. Formosa.	Stonyhurst 4780
1348 Oct. 30	No Location....					No data.

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1349 Oct. 30	No Location....					No data.
1350 Nov. 4	No Location....					No data.
1351 Nov. 7	Ottawa..... Algiers..... Cartuja..... Chicago..... Washington..... Northfield..... Rio de Janeiro.. Georgetown..... Victoria..... Coimbra..... La Paz..... Wellington.....	23-00-23 23-00-58 23-00-33 23-00-20 23-00-12 23-00-18 23-00-17 23-00-18 23-00-18 23-00-37 23-00-19 23-00-0	8060 9550 9750 7750 7420 8020 2980 7400 9480 9000 1320 10050	$\phi = 27^\circ \text{ S}$ $\lambda = 73^\circ \text{ W}$ O = 23-00-23	De Bilt gives Pacific Ocean near Chile.	Helwan (8600) Honolulu 6120 Toronto (10880) Wien (8200) Stonyhurst 9280 De Bilt (9550)
1352 Nov. 8	No Location....				De Bilt gives Atlantic Ocean off Ascension I.	Cartuja 7080 Algiers 5040 Coimbra 6520 De Bilt 6800
1353 Nov. 11	Ottawa..... Halifax..... Algiers..... Paris..... Cartuja..... Strasbourg..... Ithaca..... Chicago..... Honolulu..... Tucson..... Cheltenham..... Porto Rico..... Sitka..... Washington..... Balboa..... Victoria..... Firenze..... Wien..... Coimbra..... Osaka..... Stonyhurst..... Uccle..... Sydney..... Belgrade..... Barcelona..... Besançon..... De Bilt.....	4-32-37 4-32-58 4-33-14 4-33-20 4-32-54 4-33-05 4-32-36 4-32-52 4-33-20 4-32-33 4-32-46 4-32-34 4-32-38 4-32-34 4-32-15 4-33-00 4-33-25 4-32-02 (4-32-23) 4-33-00 4-33-13 4-31-01 4-32-37 4-32-48 4-33-15 4-33-23	8230 8200 9750 10250 9800 10650 7900 7750 10050 8120 7320 5050 10950 7560 4370 9900 10260 12700 (9780) 17000 10180 10420 11460 10980 10140 10350 10350	$\phi = 28^\circ \cdot 7 \text{ S}$ $\lambda = 72^\circ \text{ W}$ O = 4-32-48	Dr. Gutenberg gives $\phi = 29^\circ \cdot 5 \text{ S}$ $\lambda = 71^\circ \cdot 6 \text{ W}$ O = 4-32-17 Tokio gives $\phi = 27^\circ \text{ S}$ $\lambda = 71^\circ \text{ W}$ Manila, Naples Nagasaki and Coimbra give Chile. Zürich reports quake felt at La Serena, Copiapo, Vallinar and Coquimbo, Chile. De Bilt reports tidal wave at Coquimbo, Chile.	Denver 7600 Dyce 9980 Lemberg 10050 Zi-ka-wei 10640 Athens 9280 Manila (17000) Zürich (10060) Innsbruck 10120 Nagasaki 10000+ Wellington 8900 Otomari 17597

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1354 No. 11	Ottawa.....	18-09-33	8080	$\phi = 27^\circ \text{ S}$ $\lambda = 71^\circ \text{ W}$ O = 18-09-34	Press despatches of shocks felt in Chile in neighbourhood of Antofagasta	Strasbourg 10050
	Cartuja.....	18-09-34	9980			Algiers 9500
	Rio de Janeiro..	18-09-13	2900			Helwan (8500)
	Georgetown.....	18-09-27	7480			Toronto (6780)
	Washington.....	18-09-30	7420			Coimbra 8880
	Chicago.....	18-09-40	7700			Stonyhurst 4880
	Victoria.....	18-09-36	9820			Uccle 9400
La Paz..	18-09-57	1160				
1355 Nov. 12	No Location....					Rio de Janeiro 3150 Victoria 4780
1356 Nov. 17	Ottawa.....	11-03-15	8020	$\phi = 27^\circ \text{ S}$ $\lambda = 77^\circ.3 \text{ W}$ O = 11-03-03 Location approximate.	Press despatch of shocks felt at Copiapo and Vallinar, Chile. De Bilt gives "Origin near Chile."	Strasbourg 11000
	Ithaca.....	11-03-11	7720			Algiers (9400)
	Cartuja.....	11-03-30	9880			Helwan (8450)
	Chicago.....	11-03-37	7580			Honolulu 5920
	Georgetown.....	11-02-04	7560			Washington 8800
	Balboa.....	11-03-05	3960			Toronto (7480)
	La Paz.....	11-02-36	1490			Victoria 9080
1357 Nov. 22	No Location....					No data
1358 Dec. 2	No Location....				De Bilt gives N. Formosa.	Coimbra 10050 Osaka 1760 De Bilt 9380 Nagasaki 1400
1359 Dec. 6	Cartuja.....	13-53-43	8050	$\phi = 36^\circ \text{ N}$ $\lambda = 76^\circ.5 \text{ E}$ O = 13-53-58	Zürich gives $\phi = 37^\circ \text{ N}$ $\lambda = 70^\circ \text{ E}$ De Bilt gives Pamir.	Strasbourg (5000)
	Algiers.....	13-53-48	7280			Victoria 2760
	Dyce.....	13-54-08	6820			Firenze 4660
	Coimbra.....	13-54-11	7860			Chicago (7550)
	Lemberg.....	13-54.1	4880			Athens (550)
	Wien.....	(13-54-06)	(5420)			Königsberg (4500)
	Osaka.....		5750			Stonyhurst 5320
	Barcelona.....	(13-53-53)	(7150)			La Paz 1310
	Innsbruck.....	13-53-50	(6150)			De Bilt 5050
						Ootomari 3428
			Naples 2400			
			Zürich (5000)			
1360 Dec. 13	No Location....					Manila 630
1361 Dec. 14	No Location....					Ottawa 8800 Honolulu (4860) Algiers 8840 Victoria 5150 Osaka 4300 Perth 3800 Uccle (10900)

LOCATION OF EPICENTRES, 1922

Date	Station	O	Δ	Epicentre	Other Locations	Other Data
1362 Dec. 17	No Location....				Zürich and De Bilt give Central Asia.	Hamburg 5200 Strasbourg (9580) Algiers 6680 Cartuja 9010 Coimbra (8000) Lemberg 5800 Königsberg (3960) Belgrade 1140
1363 Dec. 18	Chicago..... Cheltenham..... Washington..... Ithaca.....	12-35-01 12-34-45 12-35-55 12-34-56	3050 2500 2450 2700	$\phi = 16^{\circ}.5$ N $\lambda = 74^{\circ}.5$ W O = 12-35-0		
1364 Dec. 18	No Location....					No data.
1365 Dec. 19	No Location....					No data.
1366 Dec. 23	No Location....					Chicago (6920) La Paz 9400 Perth 3750
1367 Dec. 25	No Location....				Press reports quake felt in New Zealand.	Coimbra 9400 La Paz (8200) Melbourne 2980 Sydney 2150 Perth 7500
1368 Dec. 25	No Location....					No data.
1369 Dec. 25	No Location....					No data.
1370 Dec. 31	Dyce..... Hamburg..... Sitka..... Honolulu..... Coimbra..... Wien..... Athens..... Osaka..... Königsberg..... Stonyhurst..... Manila..... Belgrade..... Innsbruck..... De Bilt..... Uccle..... Zürich..... Ootomari.....	7-20-19 7-20-03 7-19-39 7-19-54 7-20-41 7-20-09 7-20-07 (7-19-15) 7-20-0 (7-19-02) 7-20-20 7-20-22 7-20-03 7-20-11 7-20-09	8200 8520 5070 5310 9600 8700 9280 1500 (8940) 8800 (5250) 8650 8800 8800 8800 8920 678	$\phi = 44^{\circ}.5$ N $\lambda = 149^{\circ}.5$ E O = 7-20-00	Zürich gives $\phi = 49^{\circ}$ N $\lambda = 143^{\circ}$ E Uccle and Naples give Kurile Is.	Chicago 3550 Victoria 2440 Naples 7900