SEISMOLOGICAL REPORTS.

SEISMOLOGICAL REPORTS FOR JANUARY, 1920.

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Weather Bureau, Washington, D. C., March 3, 1920.

SEISMOLOGICAL ABBREVIATIONS USED IN THE INSTRUMENTAL REPORTS.

CHARACTER OF THE EARTHQUAKE.

I=noticeable.
II=conspicuous.
III=strong.
d=(terræ motus domesticus)=local earthquake (sensible or felt).
v=(terræ motus vicinus)=near-by earthquake (within 1,000 km.).
r=(terræ motus remotus)=distant earthquake (1,000 to 5,000 km. distant).
u=(terræ motus ultimus)=very distant earthquake (beyond 5,000 km.).
Δ=distance to epicenter.

PHASES.

P=(undæ primæ)=first preliminary tremors.
PR_n=P waves reflected n times at the earth's surface.
S=(undæ secundæ)=second preliminary tremors.
SR_n=S waves reflected n times at the earth's surface.
PS=transformed waves; longitudinal (P) to transversal (S) or vice versa.
L=(undæ longæ)=long waves in the principal portion.
M=(undæ maximæ)=greatest motion in the principal portion.
C=(coda)=trailers.
O=time at epicenter.
L_{rep1}=Long waves reaching the station from the antiepicenter (40,000 km.$-\Delta$).
L_{rep2}=long waves again reaching the station from the antiepicenter (40,000 km.$+\Delta$).
F=(finis)=end of perceptable trace.

NATURE OF THE MOTION.

i=(impetus)=abrupt beginning.
e=(emersio)=gradual appearance.
T=period=twice time of oscillation.
A=amplitude of earth's movement, reckoned from the zero line. E, N, or Z attached to a symbol signifies the E–W, the N–S, or the vertical component, respectively, thus:
P_E is the E–W component of P.
P_N is the N–S component of P.
P_Z is the vertical component of P.

μ=micron, $\frac{1}{1,00}$ mm.

INSTRUMENTAL CONSTANTS.

T_0=period of instrument.
V=magnification of instrument.
e=damping ratio.

List of instrumental stations from which reports are received.

Location.	Latitude, N.	Longitude, W.	Elevation, meters.	Description of instruments.	Instrumental constants. E-W. V	E-W. T_0	E-W. ε	N-S. V	N-S. T_0	N-S. ε	Institution.	In charge.
ALABAMA.	° ′ ″	° ′ ″										
Mobile	30 41 44	88 08 46	60	Wiechert 80-kg., astatic, horizontal pendulum.	.....	.....	.....	.....	.....	.....	Spring Hill College, seismic observatory.	Cyril Ruhlman, S. J.
ALASKA.												
Sitka	57 03 00	135 30 03	15.2	Two Bosch-Omori 10 and 12 kg.	10	17	.....	10	15	.....	U. S. Coast and Geodetic Survey, Magnetic Observatory.	F. P. Ulrich.
ARIZONA.												
Tucson	32 14 48	110 50 06	769.6	.....do.....	10	17	.....	10	18	.....	.....do.....	Wm. H. Cullum.
CALIFORNIA.												
Point Loma	32 43 03	117 15 10	91.4	Two-component C. D. West seismoscope.	.....	.....	.....	.....	.....	.....	Theosophical University	F. J. Dick.
COLORADO.												
Denver	39 40 36	104 56 54	1,655	Wiechert 80-kg., astatic, horizontal pendulum.	.....	.....	.....	.....	.....	.....	Sacred Heart College, earthquake station.	A. W. Forstall, S. J.
DISTRICT OF COLUMBIA.												
Washington	38 54 25	77 04 24	42.4	Wiechert 200-kg., astatic, horizontal pendulum; *80-kg. vertical.*	165	5.4	0	143	5.2	0	Georgetown University	F. A. Tondorf, S. J.
					VERTICAL: V, 80; T_0, 5.0; ε, 0.							
Do	38 54 12	77 03 03	21	Marvin, vertical pendulum, undamped, mechanical registration.	110	6.4	.....	110	6.4	.....	U. S. Weather Bureau	W. J. Humphrey.
HAWAII.												
Honolulu	21 19 12	158 03 48	15.2	Milne seismograph of the Seismol. Comm. Brit. Assoc.	.....	18.4	10″.40.	.....	.....	.....	U. S. Coast and Geodetic Survey, Magnetic Observatory.	Frank Neumann.
ILLINOIS.												
Chicago	41 47 00	87 37 00	180.1	Two Milne-Shaw horizontal pendulums, 0.45-kg.	150	12	20:1	150	8	20:1	University of Chicago	H. J. Cox.
KANSAS.												
Lawrence	38 57 30	95 14 58	301.1	Wiechert	177	3.4	4:1	205	3.4	4:1	University of Kansas, department physics and astronomy.	F. E. Kester.
MARYLAND.												
Cheltenham	38 44 00	76 50 30	71.6	Two Bosch-Omori 10 and 12-kg.	10	14	.....	10	14	.....	U. S. Coast and Geodetic Survey, Magnetic Observatory.	George Hartnell.
MASSACHUSETTS.												
Cambridge	42 22 36	71 06 59	5.4	Two Bosch-Omori 100-kg., horizontal pendulum, mechanical registration.	80	23	0	50	25	4:1	Harvard University seismographic station.	J. B. Woodworth.
MISSOURI.												
St Louis	38 38 15	90 13 58	160.4	Wiechert 80-kg., astatic, horizontal pendulum.	80	7	5:1	.....	.....	.....	St. Louis University, geophysical observatory.	J. B. Goesse, S. J.
NEW YORK.												
Buffalo	42 53 02	78 52 40	180.5	Wiechert 80-kg., horizontal.	80	7	5:1	.....	.....	.....	Canisius College	John A. Curtin, S. J.
Ithaca	42 26 58	76 29 09	242.6	Two Bosch-Omori 25-kg., horizontal pendulum, mechanical registration.	13	22	4:1	14	25	4:1	Cornell University	Heinrich Ries.
New York	40 51 47	73 53 08	23.9	Wiechert 80-kg.	72	5.0	0	72	5.0	0	Fordham University	D. H. Sullivan, S. J.
PANAMA CANAL ZONE.												
Balboa Heights	8 57 39	79 33 29	27.6	Two Bosch-Omori 100-kg. and 25-kg.	35	20	.....	10	20	.....	Panama Canal, Department Operation and Maintenance.	Governor, Panama Canal.
PORTO RICO.												
Vieques	18 09 00	65 27 00	19.8	Two Bosch-Omori	10	17	.....	10	19	.....	U. S. Coast and Geodetic Survey, Magnetic Observatory.	W. M. Hill.
VERMONT.												
Northfield	44 10 00	72 41 00	256	Two Bosch-Omori mechanical registration.	10	15	.....	10	16	.....	U. S. Weather Bureau	Wm. A. Shaw.
CANADA.												
Ottawa	45 23 38	75 42 57	83	Two Bosch photographic horizontal pendulum, one Spindler & Hoyer 80-kg. vertical seismograph.	120	26	.....	.....	.....	.....	Dominion Observatory, earthquake station.	Otto Klotz.
Toronto	43 40 01	79 23 54	113.7	Milne horizontal pendulum, North, in the meridian.	.....	18	.....	.....	.....	.....	Dominion Meteorological Service.	
Victoria	48 24 00	123 19 00	67.7	Wiechert, vertical; Milne horizontal pendulum, North, in meridian.	.....	18	.....	.....	.....	.....	.....do.....	

[1] Sensitivity.

For the reports of the stations at the University of California, Berkeley, Calif., and at the Lick Observatory, Mount Hamilton, Calif., see *Bulletin of the Seismographic Stations, University of California;* for the report of the station at the University of Santa Clara, Santa Clara, Calif., see *Record of the Seismographic Station, University of Santa Clara.*

TABLE 1.—*Noninstrumental earthquake reports, January, 1920.*

Day.	Approximate time, Greenwich civil.	Station.	Approximate latitude.	Approximate longitude.	Intensity, Rossi-Forel.	Number of shocks.	Duration.	Sounds.	Remarks.	Observer.
		CALIFORNIA.								
1920.	*H. m.*		° ′	° ′			*Sec.*			
Jan. 1	2 20	Corona	33 52	117 35	4	1	Short.	None	Doors rattled	T. C. Sias.
	2 25	Escondido	33 06	117 05	5	1	5	....do	Felt by many	H. L. Harlow.
		Warner Springs	33 15	116 45	5	1		....do	Cracked adobe walls	J. A. Ream.
	2 30	Nellie	33 22	116 52	5	1	60	Faint rumbling	Rapid trembling shock	J. P. Rolarts.
	2 34	Calexico	32 41	115 30	3	1	5	....do		H. M. Rouse.
		Elsinore	33 37	117 15	5	1		None	Felt by many	W. L. Wilhite.
		Hemet	33 45	116 58	5	2	4	Rumbling	....do	C. S. McManigal.
	2 35	San Diego	32 40	117 10	4	1	1	None	Chandeliers moved	U. S. Weather Bureau.
	2 37	El Cajon	32 48	116 58	4	1		Rumbling	Felt by several	E. P. Kessler.
	2 40	Julian	33 05	116 37	5	2	6	Loud rumbling	Felt by many	J. H. L. Vogt.
		Mesa Grande	33 11	116 42	5	2	13	Muffled	Jarring motion	E. H. Davis.
		Mount Wilson	34 13	118 16	2	1	12	Faint	Star images in 60-inch telescope vibrated rapidly.	Mount Wilson Observatory.
	2 46	Aguanga	33 26	116 51	5	1	2	Loud	Abrupt bumping motion	A. J. Berg.
30	23 30	Santa Barbara	34 23	119 40	3	1	2	None	Felt by several	A. W. Mutter.
	23 33	....do			2	1	2	....do	....do	Do.
	23 35	....do			2	1	2	....do	Felt by one	Do.
	23 38	....do			2	1	2	....do	....do	Do.
31	1 00	....do			3	1	2	....do	....do	Do.
	1 03	....do			3	1	2	....do	....do	Do.
	1 07	....do			3	1	2	....do	....do	Do.
		WASHINGTON.								
24	7 09	Clallam Bay	48 15	124 15	5	3	10–15	Rumbling	Most severe ever noticed	M. Rasmussen.
	7 10	Blaine	49 00	122 45	4	1	8	....do	Felt by many	J. Crilly.
	7 12	Marietta	48 47	122 35		2	5	....do	....do	S. B. Mayhew.
	7 14	Anacortes	48 50	122 40	5	2		Loud rumbling	Long duration	D. Allmond.
	7 15	Tatoosh	48 23	124 45	2	3	Few.	None	Felt by one	Mrs. A. K. Willis.
	7 20	Forks	47 56	124 20	5	2	60	Faint rumbling	Many awakened	Mrs. Ruth Johnson.

TABLE 2.—*Instrumental seismological reports, January, 1920.*

(Time used: Mean Greenwich, midnight to midnight. Nomenclature: International.

[For significance of symbols and descriptions of instruments and stations, see this REVIEW, p. 62.]

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
								ALABAMA. *Spring Hill College, Mobile.*
1920.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
Jan. 4		eP	4 26 48				1,410?	*Southern Mexico;* record peculiar—periods all short; P and S have same period; interval S–P too short; L absent. E damped, N undamped, yet records identical. Seems to be a superimposition of P waves of different shocks.
		iS or P	4 29 14	3.5				
		M	4 29 18	3.5	*5,300	*5,300		
		F	4 43 00					

* Trace amplitude.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
								ARIZONA. *U. S. C. & G. S. Magnetic Observatory, Tucson.*
1920.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
Jan. 1		eP_E	2 35 41					
		P_N	2 36 12					
		L_E	2 36 22					
		M_E	2 37 11		50			
		M_N	2 36 46			20		
		F_E	2 41 00					
		F_N	2 40 00					
4		P_E	4 25 33	4				Time marks missing for 12 minutes before L on N; times of P and S interpolated over that interval.
		P_N	4 25 44					
		S_E	4 29 03					
		S_N	4 29 14					
		L_E	4 31 00	16				
		L_N	4 31 00					
		M_E	4 33 15		720			
		M_N	4 33 05	9		400		
		C_E	4 39 00	9				
		C_N	4 37 00	8				
		F_E	5 00 00	6				
		F_N	4 43 00					
12		e_N	23 04 38					Irregular record; possibly not seismic. Time marks missing.
		M_N	23 10 35			50		
		F_N	23 18 00					
25		e_N	0 13 35					Do.
		F_N	0 28 00					
25		e_N	20 25 01			20		Do.
		M_N	20 37 55					
		F_N	20 42 00					

TABLE 2.—*Instrumental seismological reports, January, 1920*—Contd.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
								CALIFORNIA. *Theosophical University, Point Loma.*
1920.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
Jan. 1			2 42 00		500	700		Intensity, 2-3; Rossi-Forel.
14					100	100		Tremors during the hours preceding 15 h.
								COLORADO. *Sacred Heart College, Denver.*
1920.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
Jan. 4		P	4 26 00					P rather indistinct.
		S	4 30 00					
		L_N	4 35 00	8		*2,000		
		L_E	4 35 00	8	*2,500			
		M_N	4 35 00	8		*3,000		
		M_E	4 36 30	6	*6,000			
		C_N	4 40 00					
		C_E	4 38 00					
		F_N	4 46 00					
		F_E	4 44 00					
15		L	13 30 00					Distinct but too small to be analyzed.
		F	13 40 00					
17								Activity visible at intervals during day.
20		L_N	13 46 00					Distinct but very small.
		F_N	13 59 00					
22								Wavelets at intervals during day.
25								Thickening of pen-marks and wavelets during day.

* Trace amplitude.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
								WASHINGTON, D. C. *Georgetown University.*
1920.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
Jan. 4		eP_E	4 27 53					
		eP_N	4 27 53					
		S_E	4 32 52					
		S_N	4 32 46					
		eL	4 35 18					No distinct *M.*
		F	5 20 00					
30		eP_E	18 33 18					Heavy micros.
		eP_N	18 33 18					
		S	18 39 11					
		eL_E	18 43 18	10				No distinct *M.*
		L_E	18 44 48	16				
		L_N	18 46 22	18				
		F	19 *ca.*					

TABLE 2.—*Instrumental seismological reports, January, 1920*—Con.

WASHINGTON, D. C. *U. S. Weather Bureau.*

1920.			H. m. s.	Sec.	μ	μ	Km.	
Jan. 4		P	4 28 00					Time correction uncertain.
		S	4 32 40					
		P?	4 34 00					
		S?	4 39 05					
		eL	4 40 00					L nowhere well defined.
		F	5 15 *ca.*					Lost in micros. Whole record jumbled; apparently two quakes superimposed.
26		eL	21 37 30					
		F	21 45 *ca.*					
26		P	23 06 40					Time correction not certain.
		S?	23 10 35					
		F	23 15 *ca.*					
30		eP	18 33 45					
		P_m1	18 39 15					
		S	18 41 50					
		L	18 44 45					
		F	19 10 *ca.*					

HAWAII. *U. S. C. & G. S. Magnetic Observatory, Honolulu.*

1920.			H. m. s.	Sec.	μ	μ	Km.	
Jan. 1		P	12 21 42					
		eL	12 34 30					
		M	12 46 42	15	*200			
		C	12 52 42					
		F	13 36 42					
1		eP	15 47 00					
		L	16 01 30					
		M	16 09 30	18	*100			
		C	16 15 00					
		F	16 22 00					
2		e	13 33 24					
		M	13 37 12	15	*100			
		C	13 40 00					
		F	13 45 00					
4		S	4 39 36	15				First recorded motion?
		S_m1	4 45 48	20				
		L	4 50 00					
		M	4 54 30	18	*1200			
		C	4 57 00					
		F	5 32 00					
7		eP	9 33 00					Beginning and end obscured by continuous slight tremors, probably microseismic.
		L	9 43 00					
		M	9 47 00	15	*300			
		C	9 50 00					
12		P_m1	13 57 42					Air tremors present throughout.
		S	14 02 24	18				
		L	14 06 36					
		M	14 17 42	16	*2100			
		C	14 26 00					
		F	14 50 00					
13		eP	23 10 12	16				
		L	23 23 36					
		M	23 34 36	19	*1400			
		C	23 43 00	17				
		F	24 19 00	16				
14		eP	14 49 00	15				Phases ill-defined.
		S	14 56 24	20				
		L	15 05 54					
		M	15 16 06	17	*300			
		C	15 34 00	20				
		F	16 02 00	20				
21		P	6 18 30	19				
		L	6 21 00					
		M	6 21 42	15	*200			
		C	6 28 00	20				
		F	6 44 00	18				
22		iP	21 35 24	20				
		S	21 40 24	18				
		eL	21 43 42					
		M	21 46 30	20	*400			
		C	21 54 00	15				
		F	22 40 00	19				
26		eP	11 35 48	20				
		eL	11 52 00					
		M	11 55 06	17	*200			
		C	11 57 00	18				
		F	12 18 00	20				
30		eP	19 47 12	16				
		S	19 50 00	15				
		eL	19 52 42					
		M	19 57 30	19	*800			
		C	20 00 00	20				
		F	20 47 00	18				

* Trace amplitude.

TABLE 2.—*Instrumental seismological reports, January, 1920*—Con.

ILLINOIS. *U. S. Weather Bureau, Chicago.*

1920.			H. m. s.	Sec.	μ	μ	km.	
Jan. 1		L	12 59 *ca.*	22				
		L	13 08 00	16				
		F	13 40 00					Lost in micros.
1		L	16 29 00	20				Very heavy micros; may not be seismic.
		F	16 40 *ca.*					
4		P	4 27 26				2,670	
		S	4 31 44					From beginning of S. record very confused.
		Lz	4 33 52					
		F	5 50 *ca.*					
13		L	23 56 00	24				
14		L	0 05 00	18				
		F	0 30 *ca.*					Lost in very heavy micros.
14		eL	15 37 30					
		L	15 37 35	18				Lost in heavy micros.
		F	16 10 00					
22		eL	22 11 00					
		L	22 15 00	22				
		L	22 18 00	18				
		F	23 *ca.*					Lost in micros.
26		e	21 31 00					Phases indeterminable.
		F	22 10 *ca.*					Do.
26		Pz	23 12 00					
		F	23 30 *ca.*					
30		P	18 34 50					
		P_{R1}	18 39 50					
		S	18 42 35					
		L	18 47 00					
		L	18 57 00	15				
		F	20 *ca.*					Lost in micros.

KANSAS. *University of Kansas, Lawrence.*

1920.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4		eP_m	4 26 48		*500		2,020	
		eS_m	4 30 13					
		L_m	4 33 12					
		M_m	4 38 00		*2,500			
		F_m	4 59 15					

* Trace amplitude.

MARYLAND. *U. S. C. & G. S. Magnetic Observatory, Cheltenham.*

1920.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4		P_m	4 27 37	4				
		P_N	4 27 44	4				
		S_m	4 32 36	3–8				
		S_N	4 32 23	2–8				
		eL_N	4 38 47					L waves not definitely shown on E.
		M_m	4 32 50		10			
		M_N	4 42 30	12		40		
		F_m	5 01 00					
		F_N	5 05 00					

MISSOURI. *St. Louis University, St. Louis.*

1920.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4		P	4 26.85				2,330	
		S	4 30.65					L not distinguishable.
		M	4 37.50					
		F	4 58 00					

PORTO RICO. *U. S. C. & G. S. Magnetic Observatory, Vieques.*

1920.			H. m. s.	Sec.	μ	μ	Km.	
Jan. 4		eP_m	4 28 32					No definite phases.
		eP_N	4 28 45					
		eL_m	4 36 50		10			
		F	4 50 00					
15		P_m	16 26 30					Small waves of period from 1½ to 3 seconds overlie the longer waves for most of the record.
		P_N	16 26 30	2				
		L_m	16 26 51					
		L_N	16 26 56					
		M_m	16 27 33	9	80			
		M_N	16 27 21			100		
		C_m	16 28 00					
		C_N	16 30 00	5				
		F	16 38 00	5				
26		P	21 23 51	1				Felt strongly in Porto Rico. On N there is a faint disturbance beginning 21:23:27, which may be P of an earlier shock.
		L	21 24 22					
		M_m	21 24 54	9	60			
		M_N	21 24 47	13		140		
		C_m	21 27 00	6				
		C_N	21 26 00	6				
		F_m	21 43 00					
		F_N	21 34 00	6				

* Trace amplitude.

TABLE 2.—*Instrumental seismological reports, January, 1920*—Con.

PORTO RICO.—*U. S. C. & G. S. Magnetic Observatory, Vieques*—Con.

1920.			H. m. s.	Sec.	μ	μ	Km.	
Jan. 26		P	23 02 37	2				Felt strongly in Porto Rico.
		L	23 03 01					
		M_E	23 03 29	9	90			
		M_N	23 03 24	10		260		
		F	23 12 00	4				
30		P_E	18 31 33	7				P distinct on both components; other phases indefinite.
		P_N	18 31 32	6				
		eS_E	18 35 24					
		eL_E	18 39 30					
		M_E	18 39 45		20			
		F_E	18 51 00					
		F_N	18 38 00					

VERMONT. *U. S. Weather Bureau, Northfield.*

1920.			H. m. s.	Sec.	μ	μ	Km.	
Jan 4		eL	4 45 00					Amplitude very small.
		F	5 05 00					

CANADA. *Dominion Observatory, Ottawa.*

1920.			H. m. s.	Sec.	μ	μ	Km.	
Jan. 4		O	4 22 03				3,440	
		eP	4 28 39					
		eS	4 33 52					S waves seem to have short period P waves of a second shock superimposed upon them.
		eL?	4 37 42					
		L	4 45 00	15				
		L	4 55 00	8				
		F	5 15 00					
14			0 00 00					Traces of disturbances; phases lost in very heavy micros; may not have been seismic.
			14 49 00					
30		O	18 28 07				3,820	
		eP	18 35 12					
		$eP_{NI}?_N$	18 36 08					
		S	18 40 49					
		L	18 44 20	24				
		L	18 48 00					
		F	19 10 00					
30		L_E	20 30 to 20 40 00	20				

CANADA. *Dominion Meteorological Service, Toronto.*

1920.			H. m. s.	Sec.	μ	μ	Km.	
Jan. 1								Small micros masked sheet at 2h. 42m. when other station records quake.
1		L	13 01 48					Micros masked initial phases.
		eL	13 06 24					
		M	13 10 30		*300			
		L	13 13 30					
		F						Lost in micros.
1		eL	16 37 18					Gradual thickening, well marked.
		M	16 40 36		*200			
		F						Lost in micros.
2								Small micros masked sheet at 13h. 20m. when other station records quake.
4		P	4 27 36				3,600	Disastrous Mexican quake.
		P	4 28 48					
		S	4 33 00					
		L	4 41 54					
		L	4 43 24					
		eL	4 44 48					
		M	4 47 48		*1,000			
		eL	4 51 18					
		F	5 23 36					
7								Irregular instrumental clockwork prevented record of quake recorded at other station at 9h. 44m.
12		L	14 16 42					
		L	14 22 42		*100			
12		L	14 39 06					May not be seismic.
		eL	14 44 12					
		M	14 46 30		*200			

* Trace amplitude.

TABLE 2.—*Instrumental seismological reports, January, 1920*—Con.

CANADA.—*Dominion Meteorological Service, Toronto*—Continued.

1920.			H. m. s.	Sec.	μ	μ	Km.	
Jan. 13		P?	23 27 30					
		L	23 54 00					
14		L	0 00 06					
		L	0 04 18					
		eL	0 06 12					
		M	0 13 30		*300			
		eL	0 20 36					
		F?	0 54 30					
14		L	1 02 06					May not be seismic.
		eL	1 18 36					
		M	1 19 48		*200			
		F?	1 22 36					
14		P	15 41 48					
		L	15 49 12					
		eL	15 50 30					
		M	15 54 42		*800			
		F	16 51 36					
14		L	17 33 18		*100			
15		L	12 37 36					
		L	12 47 54					Last two phases may not be seismic.
		M	12 49 42		*200			
20		L	17 00 24					May not be seismic.
		M	17 01 48		*200			
		F	17 17 36					
22		eL	22 25 06					
		M	22 30 12		*300			Gradual thickening.
		F	22 45 00					
22		eL	23 58 18					
		M	23 59 18		*200			
23		F	0 06 24					
24		L	7 17 54		*100			May not be seismic.
		L	7 37 54					
30		P?	18 37 00					Small micros render P. entry doubtful.
		eS	18 43 18					
		iL	18 47 30					
		M	18 49 54		*1,300			
		F						
30		L	20 29 18					
		L	20 32 12		*200			Micros going on.
		F						

* Trace amplitude.

CANADA. *Dominion Meteorological Service. Victoria.*

1920.			H. m. s.	Sec.	μ.	μ.	Km.	
Jan. 1		P	2 42 06					
		M	2 46 02		*100			
		F	2 49 58					
1		L	12 46 04					
		M	12 50 59		*100			
		F	13 21 29					
2		P	13 20 35				665	May be off west coast.
		L	13 22 04					
		M	13 22 33		*500			
		F	13 30 25					
				VERTICAL.				
		P	*13 20 10*	*2*			520	
		S. & L	*13 21 20*	*7*				
		M	*13 23 00*	*8*	*4*			
4		P	4730 29				2,390?	Destructive Mexican quake.
		S	4 34 25					
		L	4 40 49					
		iL	4 45 38					
		M	4 47 42		*1,600			
		F	5 33 55					
				VERTICAL.				
		P	*4 29 25*	*2*			3,170	
		S	*4 34 20*	*6*				
		L	*4 43 30*	*12*				
		M	*4 47 46*	*10*	*4*			
7		M	9 44 56		*200			
		F	9 50 53					
12		P	14 00 50				3,620	Mexico?
		S	14 05 15					
		L	14 12 38					
		M	14 18 32		*400			
		F	14 53 56					
13		P	23 23 32					
		L	23 40 15					
		M	23 45 45		*700			
		F	1 45 10					

* Trace amplitude.

TABLE 2.—*Instrumental seismological report, January, 1920*—Con.

CANADA. *Dominion Meteorological Service. Victoria*—Continued.

1920. Jan. 14	.....	P.....	15 02 25	.....	.....	.....	4,120	Mexico?
		S.....	15 08 19	.....	.....	.....	.....	
		L.....	15 19 08	.....	.....	.....	.....	
		M.....	15 27 29	.....	*400	.....	.....	
		F.....	17 03 53	.....	.....	.....	.....	
15	.....	L.....	12 28 04	.....	.....	.....	.....	
		M.....	12 32 29	.....	*100	.....	.....	
		F.....	12 39 52	.....	.....	.....	.....	
21	.....	M.....	6 30 47	.....	*50	.....	.....	
		F.....	6 42 41	.....	.....	.....	.....	
22	.....	P.....	21 42 00	.....	.....	.....	.....	
		S.....	21 48 06	.....	.....	.....	4,330	Probably Mexico?
		L.....	21 55 46	.....	.....	.....	.....	
		M.....	22 03 22	.....	*500	.....	.....	
		F.....	22 43 29	.....	.....	.....	.....	
24	.....	P.....	7 09 16	.....	.....	.....	35	Probably under Strait of Georgia and northeast of Victoria.
		M.....	7 09 20	.....	*2,000	.....	.....	
		F.....	7 24 01	.....	.....	.....	.....	
				VERTICAL.				
		P.....	7 09 16	1	.....	.....	35	
		L.....	7 09 18	?	.....	.....	.....	
		M.....	7 09 20	?	214	.....	.....	
		F.....	7 13 30	.....	.....	.....	.....	
30	.....	P.....	18 44 23	.....	.....	.....	3,620?	
		S.....	18 49 48	.....	.....	.....	.....	
		L.....	18 54 42	.....	.....	.....	.....	
		M.....	19 12 30	.....	*500	.....	.....	
		F.....	19 24 00	.....	.....	.....	.....	
30	.....	M.....	20 13 01	.....	*400	.....	.....	
		F.....	20 24 25	.....	.....	.....	.....	

* Trace amplitude.

The following stations recorded no earthquakes during January, 1920:

ALASKA. *U. S. C. & G. S. Magnetic Observatory, Sitka.*

Reports for January, 1920, have not been received from the following stations:

Massachusetts. Harvard University, Cambridge.
New York. Canisius College, Buffalo; Cornell University, Ithaca; Fordham University, New York.
Canal Zone. Department of Operation and Maintenance, Panama Canal.

SEISMOLOGICAL DISPATCHES.[1]

México City, Mexico, January 3.—One of the earth shocks that are not uncommon here was felt at 10 o'clock to-night. The shock was more severe than that of December 17, but did not cause as much apprehension as the December seismic disturbance, which came on the date of a groundless prediction of a cataclysm from astronomical causes. Incomplete press reports indicate that the State of Vera Cruz suffered more than any other section, although seismic disturbances were felt throughout the entire Republic. Advices from Cordoba say that 30 dead have already been accounted for in the village of San Juan Coscomatepec, where many houses were destroyed. There are unconfirmed reports of a similar catastrophe in the village of Huatusco. At Jalapa, farther north, 50 victims of the earthquake have been counted, including numerous dead. Lack of communication with the other small towns and villages in the theater of disturbance makes even approximate estimates of the casualties impossible. The earthquake caused great alarm in the large cities. Marine disturbances have occurred off Vera Cruz city, and there were some casualties there, although the number is not known, with considerable destruction of property. Late reports received here say that the death list in San Juan Coscomatepec was augmented as a result of the collapse of the church tower, which crashed in upon the crowds gathered inside the edifice to pray, following the first shock. Vera Cruz city is without water, while the lighting systems of Orizaba and Jalapa are out of commission. The villages of Teocelo and Couztlan, in the State of Vera Cruz, were virtually destroyed by the earthquake last night, and heavy casualties have resulted, according to late press reports received here.—(A)

Mexico City, Mexico, January 5.—Reports received up to 11 o'clock last night indicated the center of the seismic convulsion was in the neighborhood of Mount Orizaba, a volcano situated about 70 miles west of Vera Cruz on the line between the States of Vera Cruz and Pueblo. It was in this neighborhood that the most serious damage was done. Teocelo, a village 35 miles northeast of the volcano, has been virtually destroyed, and a similar fate befell Couztlan, a small hamlet in that neighborhood. Wires have been torn down by the violence of the tremor, and only fragmentary reports have reached this city, but it is stated that there were many casualties in both towns. Many houses and churches in Jalapa, a city 50 miles northwest of Vera Cruz, were damaged, while reports from Orizaba, a city 10 miles south of the volcano, state that several business blocks and churches near the center of the town were cracked. In the suburbs of Orizaba the shock was very severe, many persons being reported killed beneath their wrecked houses. Fifteen shocks were experienced at Cordoba, a city 10 miles east of Orizaba, where 11 were distinctly felt. First reports received here stated that the tremor centered at Acambaro, a town near Teluca, about 25 miles southwest of Mexico City, but more recent advices state the shocks were not severe there.—(A)

Mexico City, Mexico, January 8.—A violent volcanic eruption has been caused by the recent earthquake near Cordoba, where Cero de San Miguel, a small and apparently extinct volcano, has been burst in twain. The new crater is throwing out smoke, ashes, and flame, while lava is flooding the near-by territory in a stream more than 200 yards wide, resulting in not less than 200 deaths.—(A)

Mexico City, Mexico, January 13.—San Joaquin, a village of 3,000 inhabitants in the Jalapa district, State of Vera Cruz, was destroyed this morning by an earthquake, according to advices given out by the department of agriculture, which gave no details as to casualties. Shocks were detected at the astronomical observatory near this city at 5:18 o'clock this morning.—(A)

Mexico City, Mexico, January 22.—Strong earthquake shocks were felt in the city of Vera Cruz from 3 to 5 o'clock this morning. There were no casualties, although some residences were damaged. Reports from Vera Cruz state the tremors demolished at Couztlan all structures which were not destroyed in the earthquake of January 6, while shocks lasting 20 minutes caused further damage at Salmoral and San Francisco de las Penas.—(A)

[1] Reported by the organization indicated and collected by the seismological station at Georgetown University, Washington, D. C. [(A) indicates Associated Press.]