SECTION V.—SEISMOLOGY.

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.
PRn = P waves reflected n times at the earth's surface.
S = (undæ secundæ) = second preliminary tremors.
SRn = 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_{rep_1} = long waves reaching the station from the anti-epicenter (40,000 km. $-\Delta$).
L_{rep_2} = long waves again reaching the station from the anti-epicenter (40,000 km. $+\Delta$).
F = (finis) = end of perceptible trace.

NATURE OF THE MOTION.

i = (impetus) = abrupt beginning.
e = (emersio) = gradual appearance.
T = period = twice the time of oscillation.
A = amplitude of the 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:
A_E is the E–W component of A.
A_N is the N–S component of A.
A_Z is the vertical component of A.
} Measured in microns (μ), $\frac{1}{1000}$ mm.

INSTRUMENTAL CONSTANTS.

T = period of instrument.
V = magnification of instrument.
ϵ = damping ratio.

SEISMOLOGICAL REPORTS FOR JANUARY, 1918.

W. J. HUMPHREYS, Professor in Charge.

[Dated: Seismological Investigations, Weather Bureau, Washington, Mar. 2, 1918.]

TABLE 1.—*Noninstrumental earthquake reports, January, 1918.*

Day.	Approximate time, Greenwich Civil.	Station.	Approximate latitude.	Approximate longitude.	Intensity Rossi-Forel.	Number of shocks.	Duration.	Sounds.	Remarks.	Observer.
		CALIFORNIA.								
1918.	*H. m.*		° ′	° ′			*M. s.*			
Jan. 14	.....	Eureka	40 48	124 11	.....	1	.....	.....	.....	U. S. Weather Bureau.
16	12 00	Brawley	33 00	115 31	3	1	.....	None	.....	M. D. Witter.
		MAINE.								
14	7 20	Calais	45 11	67 17	3	1	.....	Rumbling...	Like coal through shute.	U. S. Weather Bureau.
	7 20	Eastport	44 54	66 59	3	1	.....	Rumbling...	Like coal through shute.	U. S. Weather Bureau.
		TENNESSEE.								
17	16 45	Knoxville	35 56	83 58	5	1	0 03	Explosion...	May have been dynamite on ice jam in river.	U. S. Weather Bureau.

TABLE 2.—*Instrumental seismological reports, January, 1918.*

[Time used: Mean Greenwich, midnight to midnight. Nomenclature: International.]

[For significance of symbols, see REVIEW for January, 1918, p. 34.]

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.

Alaska. *Sitka. Magnetic Observatory.* U. S. Coast and Geodetic Survey. J. W. Green.

Lat. 57° 03′ 00″ N.; long., 135° 30′ 06″ W. Elevation, 15.2 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

Instrumental constants		V	T_0
	E	10	16.6
	N	10	15.4

(Report for January, 1918, not received.)

Arizona. *Tucson. Magnetic Observatory.* U. S. Coast and Geodetic Survey. F. P. Ulrich.

Lat. 32° 14′ 48″ N.; long., 110° 50′ 06″ W. Elevation, 769.6 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

Instrumental constants:		V	T_0
	E	10	14
	N	10	19

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	eP_N	4 36 54	5	.....	.....	.....	
		eS_N	4 42 20	.....	.....	.....	.....	
		eL_N	4 46 32	.....	.....	.....	.....	
		eL_E	4 46 ..	.....	.....	.....	.....	
		M_N	4 47 13	6	.....	20	.....	
		M_E	4 47 26	8	30	.....	.....	
		F	5 04 ..	7	.....	.....	.....	
25	.....	e_E	1 25 38	.....	.....	.....	.....	No definite phases.
		e_N	1 26 07	.....	.....	.....	.....	
		M_E	1 36 00	7	60	.....	.....	
		M_N	1 39 01	6	.....	40	.....	
		F	2 13 ..	.....	.....	.....	.....	

California. *Berkeley. University of California.*

Lat., 37° 52′ 16″ N.; long., 122° 15′ 37″ W. Elevation, 85.4 meters.

(*See* Bulletin of the Seismographic Stations, University of California.)

California. *Mount Hamilton. Lick Observatory.*

Lat., 37° 20′ 24″ N.; long., 121° 38′ 34″ W. Elevation, 1,281.7 meters.

(*See* Bulletin of the Seismographic Stations, University of California.)

California. *Point Loma. Raja Yoga Academy.* F. J. Dick.

Lat., 32° 43′ 03″ N.; long., 117° 15′ 10″ W. Elevation, 91.4 meters.

Instrument: Two-component, C. D. West seismoscope.

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 21	.....	.....	.....	.....	200	100	.....	Microseisms during 24 hours preceding 16 h. 0 min. (G. M. T.) on dates given.
27	.....	.....	.....	.....	200	300	.....	
28	.....	.....	.....	.....	100	100	.....	

California. *Santa Clara. University of Santa Clara.* J. S. Ricard, S. J.

Lat., 37° 26′ 36″ N.; long., 121° 57′ 03″ W. Elevation, 27.43 meters.

(See record of the Seismographic Station, University of Santa Clara.)

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.

Colorado. *Denver. Sacred Heart College.* Earthquake Station. A. W. Forstall, S. J.

Lat., 39° 40′ 36″ N.; long., 104° 56′ 54″ W. Elevation, 1,655 meters.

Instrument: Wiechert 80 kg., astatic, horizontal pendulum.

(No seismic disturbance was observed during the month.)

District of Columbia. *Washington. U. S. Weather Bureau.*

Lat., 38° 54′ 12″ N.; long., 77° 03′ 03″ W. Elevation, 21 meters.

Instrument: Marvin vertical pendulum, undamped. Mechanical registration.

Instrumental constants	V	T_0
	110	6.4

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	P?	4 38 25	.....	.....	.....	.....	Microseisms present.
		S	4 43 05	.....	.....	.....	.....	
		L	4 45 45	24	.....	.....	.....	
		F	5 25 ..	.....	.....	.....	.....	
13	.....	S?	0 02 55	.....	.....	.....	.....	Microseisms present.
		L	0 04 00	.....	.....	.....	.....	
		F	0 15 ..	.....	.....	.....	.....	
25	.....	P	1 26 40	.....	.....	.....	.....	Microseisms present.
		S?	1 31 12	.....	.....	.....	.....	
		L	1 34 15	24	.....	.....	.....	
		F	2 15 ..	.....	.....	.....	.....	
30	.....	P	21 31 02	.....	.....	.....	8,750	
		S	21 41 00	.....	.....	.....	.....	
		L	22 01 00	.....	.....	.....	.....	
		F	22 40 ..	.....	.....	.....	.....	

District of Columbia. *Washington. Georgetown University.* F. A. Tondorf, S. J.

Lat., 38° 54′ 25″ N.; long., 77° 04′ 24″ W. Elevation, 42.4 meters. Subsoil: Decayed diorite.

Instruments: Wiechert 200 kg. astatic horizontal pendulums, 80 kg. vertical.

Instrumental constants:		V	T_0	e
	E	165	5.4	—
	N	143	5.2	—
	Z	30	3.0	—

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	eP	4 37 02	.....	.....	.....	.....	Heavy microseisms. No distinct Main.
		S_N	4 42 31					
		eL_E	4 46 24	29				
		F	5 13 ..					
12	.....	e?	23 59 27	.....	.....	.....	.....	Heavy microseisms, e very uncertain.
13	.....	S	0 03 00	.....	.....	.....	.....	
		eL	0 03 54	7	.....	.....	.....	
		F	0 25 ..	.....	.....	.....	.....	
25	.....	e	1 26 38	.....	.....	.....	.....	Heavy microseisms, S doubtful.
		S_E	1 33 31	.....	.....	.....	.....	
		S_N	1 33 35	.....	.....	.....	.....	
		eL	1 37 12	16	.....	.....	.....	
		L	1 41 01	12	.....	.....	.....	
		F	2 20 ..	.....	.....	.....	.....	
30	.....	iP_N	21 31 01	.....	.....	.....	.....	Heavy microseisms. No distinct M. F lost in microseisms.
		eP_E	21 31 03	.....	.....	.....	.....	
		iS	21 41 00	.....	.....	.....	.....	
		L_E	22 01 14	24	.....	.....	.....	
		L_N	22 08 22	17	.....	.....	.....	
			VERTICAL		A_Z			
		iP	*21 51 05*	.....	.....	.....	.....	
		iS	*21 41 00*	.....	.....	.....	.....	
		L	*22 07 55*	*16*	.....	.....	.....	
		F	*22 17 ..*	.....	.....	.....	.....	

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.

Hawaii. *Honolulu. Magnetic Observatory.* U. S. Coast and Geodetic Survey. Frank Neuman.

Lat., 21° 19′ 12″ N.; long., 158° 03′ 48″ W. Elevation, 15.2 meters.

Instrument: Milne seismograph of the Seismological Committee of the British Association.

Instrumental constant..T_0 18.5

1818.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	eP	4 52 00	.....	.....	.....	.....	
		eL	5 04 18	.....	.....	.....	.....	
		M	5 07 18	20	*500	.....	.....	
		F	5 43 ..	.....	.....	.....	.....	
4	.....	eP	16 03 48	.....	.....	.....	.....	
		eS	16 08 54	.....	.....	.....	.....	
		eL	16 11 48	23	.....	.....	.....	
		M	16 21 12	20	*400	.....	.....	
		C	16 34 ..	.....	.....	.....	.....	
		F	17 06 ..	.....	.....	.....	.....	
12	.....	e	18 54 24	.....	.....	.....	.....	
		M	19 05 00	19	*100	.....	.....	
		F	19 07 ..	.....	.....	.....	.....	
15	.....	e	16 04 36	25	.....	.....	.....	
		M	16 13 00	19	*300	.....	.....	
		C	16 19 ..	.....	.....	.....	.....	
		F	16 21 ..	.....	.....	.....	.....	
21	.....	e	20 20 24	.....	.....	.....	.....	Beginning and final phases lost in tremors due to rapid change in temperature.
		M	20 26 30	19	*1100	.....	.....	
		C	20 28 ..	.....	.....	.....	.....	
24	.....	e	15 08 30	.....	.....	.....	.....	
		M	15 13 00	.....	*200	.....	.....	
		F	15 40 ..	.....	.....	.....	.....	
25	.....	eS	1 39 54	.....	.....	.....	.....	
		eL	1 50 30	20	.....	.....	.....	
		M	1 54 42	24	*600	.....	.....	
		C	2 03 ..	.....	.....	.....	.....	
		F	2 41 ..	.....	.....	.....	.....	
30	.....	eP	21 28 12	.....	.....	.....	.....	
		S	21 36 00	.....	.....	.....	.....	
		eL	21 42 42	23	.....	.....	.....	
		M	21 44 00	20	*4400	.....	.....	
		C	21 48 ..	.....	.....	.....	.....	
		F	23 03 ..	.....	.....	.....	.....	

* Trace amplitude.

Kansas. *Lawrence. University of Kansas.* Department of Physics and Astronomy. F. E. Kester.

Lat., 38° 57′ 30″ N.; long., 95° 14′ 58″ W. Elevation, 301.1 meters.

Instrument: Wiechert.

	V	T_0	e
Instrumental constants.. E	177	3.4	4:1
Instrumental constants.. N	205	3.4	4:1

(Report for January, 1918, not received.)

Maryland. *Cheltenham. Magnetic Observatory.* U. S. Coast and Geodetic Survey. George Hartnell.

Lat., 38° 44′ 00″ N.; long., 76° 50′ 30″ W. Elevation, 71.6 meters.

Instruments: Two Bosch-Omori, 10 and 12 kg.

	V	T_0
Instrumental constants.. E	10	32
Instrumental constants.. N	10	27

1918.			H. m. s.	Sec.	μ	μ	km.
Jan. 4	.....	eS_N	4 42 58	.....	.....	.....	.....
		eL_N	4 46 ..	.....	.....	.....	.....
		eL_E	4 46 38	.....	.....	.....	.....
		M_N	4 47 08	4	.....	10	.....
		M_E	4 47 44	20	30	.....	.....
		F	6 00 ..	.....	.....	.....	.....
25	.....	eP_N	1 31 49	.....	.....	.....	.....
		eP_E	1 32 10	.....	.....	.....	.....
		eL_E	1 37 ..	.....	.....	.....	.....
		M_E	1 38 20	8	50	.....	.....
		M_N	1 39 10	8	.....	20	.....
		F	1 56 ..	.....	.....	.....	.....
30	.....	eP	21 31 06	.....	.....	.....	.....
		M_N	21 41 10	.....	.....	10	.....
		M_E	21 44 14	.....	10	.....	.....
		F	21 59 ..	.....	.....	.....	.....

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.

Massachusetts. *Cambridge. Harvard University Seismographic Station.* J. B. Woodworth.

Lat., 42° 22′ 36″ N.; long., 71° 06′ 59″ W. Elevation, 5.4 meters. Foundation: Glacial sand over clay.

Instruments: Two Bosch-Omori 100 kg. horizontal pendulums (Mechanical registration).

	V	T_0	e
Instrumental constants.... E	80	23	0
Instrumental constants.... N	50	25	4:1

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 3	.....	O.....	16	.....	.....	.....	?	Record irregular, masked by microseisms and traffic jars.
		e_N.....	16 33 38	16	.....	.....	.....	
		L_N.....	16 39 57	20	.....	.....	.....	
		F.....	16 52 ca	.....	.....	.....	.....	
4	.....	O.....	4 29 55	.....	.....	.....	3,910	Destructive at Guatemala City.
		P_N.....	4 37 14	.....	.....	.....	.....	
		S_E.....	4 42 56	6	.....	.....	.....	
		eL_E.....	4 46 59	40	.....	.....	.....	Undamped pendulum.
		M_E.....	4 49 43	26	.....	.....	.....	
		F.....	6 16 36	.....	.....	.....	.....	
12	.....	O?.....	23 46 13	.....	.....	.....	3,914?	P masked by microseisms.
		S_E.....	23 59 07	.....	.....	.....	.....	
13		S_N.....	0 00 14	6	.....	.....	.....	
		eL_N.....	0 03 23	13	.....	.....	.....	
		L_E.....	0 03 43	6½	.....	.....	.....	
		L_N.....	0 03 46	6½	.....	.....	.....	
		L_N.....	0 05 52	6½	.....	.....	.....	
		M_E.....	0 06 12	9	.....	.....	.....	Undamped pendulums.
		M_N.....	0 06 18		.....	.....	.....	
		C_N.....	0 07 12	.....	.....	.....	.....	
		F_N?...	0 08 34	.....	.....	.....	.....	
13	.....	O?.....	1	.....	.....	.....	?	Masked by microseisms.
		L_N?...	2 02 31	16	.....	.....	.....	
		L.....	2 03 21	16	.....	.....	.....	
		L.....	2 04 20	10	.....	.....	.....	
		F?.....	2 13 27	.....	.....	.....	.....	
14	.....	OIM...	4 47 28	.....	.....	.....	0	Frost crack at station. A. of trace =0.3 mm.
		C.....	4 47 29	.....	.....	.....	.....	
		F.....	4 47 32	.....	.....	.....	.....	
14	.....	OIM...	7 22 28	.....	.....	.....	0	Frost crack at station.
		C.....	7 22 29	.....	.....	.....	.....	
		F.....	7 22 36	.....	.....	.....	.....	
15	.....	O?.....	23 35 ca	.....	.....	.....	4,900?	Doubtful record in microseisms.
		S_N?...	23 56 39	.....	.....	.....	.....	
		i.....	23 58 07	.....	.....	.....	.....	
16	.....	eL_N?..	0 03 10	16	.....	.....	.....	
		F?.....	1 42 ca	.....	.....	.....	.....	
16	.....	O?.....	13	.....	.....	.....	.....	Doubtful record in microseisms.
		e_E?...	13 17 55	.....	.....	.....	.....	
		e.....	13 18 27	.....	.....	.....	.....	
		eL_E.....	13 41 45	40	.....	.....	.....	
		L_N.....	13 43 23	20	.....	.....	.....	
		F?.....	14 30 ..	.....	.....	.....	.....	
25	.....	O?.....	1 21 38	.....	.....	.....	4,600?	Much masked by microseisms.
		S_E?.....	1 29 39	.....	.....	.....	.....	
		e_N.....	1 33 15	.....	.....	.....	.....	
		eL_N.....	1 35 26	45?	.....	.....	.....	
		eL_E.....	1 35 29	40	.....	.....	.....	
		M_E.....	1 37 54	25	.....	.....	.....	Undamped pendulum.
		M_N.....	1 41 37		.....	.....	.....	
		C_E.....	1 43 52	.....	.....	.....	.....	
		L_E?...	2 20 28	15	.....	.....	.....	
		F?.....	2 21 ca	.....	.....	.....	.....	
30	.....	O.....	21	.....	.....	.....	.....	E record lost in tangled lines of diurnal tilt.
		e_N.....	21 33 33	6	.....	.....	.....	
		e_N.....	21 40 34	16	.....	.....	.....	
		i_N.....	21 40 52	16	.....	.....	.....	
		i_N.....	21 42 19	18	.....	.....	.....	
		.....	21 43 00	16	.....	.....	.....	
		.....	21 48 31	.....	.....	.....	.....	
		L.....	21 57 42	.....	.....	.....	.....	
		F.....	23 36 ca	.....	.....	.....	.....	

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.

Missouri. *Saint Louis. St. Louis University.* Geophysical Observatory. J. B. Goesse, S. J.

Lat., 38° 38′ 15″ N.; long., 90° 13′ 58″ W. Elevation, 160.4 meters. Foundation: 12 feet of tough clay over limestone of Mississippi system, about 300 feet thick.

Instruments: Wiechert, 80 kg. astatic, horizontal pendulum.

Instrumental constants.. V 80, T_0 7, e 5:1

1918.			H. m. s.	Sec.	μ	μ	km.	
								Microseisms daily throughout the month.
Jan. 25	I.	P_E	1 26 42				1,400	
		S_E	1 30 24					
		L	1 31 18	6				N–S masked by wind disturbances.
		L	1 35 36	9				
		L	1 36 48	6				
		L	1 40 24	6				
		L	1 41 12	6				
		F	1 50 ..					
30	I.	P_N	21 40 30					
		P_E	21 40 36					
		L_N	21 43 06			*6,000		F masked by microseisms.
		L_N	21 44 00			*6,000		

* Trace amplitude.

New York. *Buffalo. Canisius College.* John A. Curtin, S. J.

Lat., 42° 53′ 02″ N.; long., 78° 52′ 40″ W. Elevation, 190.5 meters.

Instrument: Wiechert, 80 kg., horizontal.

Instrumental constants.. V 80, T_0 7, e 5:1

(Report for January, 1918, not received.)

New York. *Fordham. Fordham University.* W. C. Repetti, S. J.

Lat., 40° 51′ 47″ N.; long., 73° 53′ 08″ W. Elevation, 23.9 meters.

Instrument: Wiechert, 80 kg.

Instrumental constants.. E: V 72, T_0 5, e 1.5:1; N: V 72, T_0 5, e 3.8:1

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 25	.....	eL	1 30 00					
		F	1 44 ..					
30	.....	eP_E	21 36 24					Magnified by resonance with microseisms.
		iP_N	21 36 24					
		eL_E	21 50 ca	20				
		L_N	21 55 ca					S not discernible.

New York. *Ithaca. Cornell University.* Heinrich Ries.

Lat., 42° 26′ 58″ N.; long., 76° 29′ 09″ W. Elevation, 242 meters.

Instruments: Two Bosch-Omori, 25 kg., horizontal pendulums (mechanical registration).

Instrumental constants.. E: V 13, T_0 22, e 4:1; N: V 14, T_0 25, e 4:1

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	eL	4 46 56	30				
		F	5 02 ..					
25	.....	e_N	1 32 24	8				
		L_N	1 36 36	23				
		F	2 10 ..					
30	.....	e_N	21 35 ..					Possibly not seismic.
		i_E	21 40 54	4				
		F_N	22 22 ..					

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.

Panama Canal. *Balboa Heights.* Governor, Panama Canal.

Lat., 8° 57′ 39″ N.; long., 79° 33′ 29″ W. Elevation, 27.6 meters.

Instruments: Two Bosch-Omori, 100 kg.

Instrumental constants.. V 10, T_0 20

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	P_E	4 35 36				1,127	Probable direction NW.
		P_N	4 35 44					
		I_E	4 38 58					
		L_N	4 39 04					
		M_E	4 35 40	20	*1,500			
		M_E	4 40 22	20		*500		
		F_N	4 58 50					
		F_E	4 59 30					
8	.....	M_E	9 13 48	20	*100			
		M_N	9 14 00	20		*200		
25	.....	P_E	1 23 56				1,255	Probable direction NW.
		P_N	1 24 00					
		L_E	1 27 44					
		L_N	1 27 48					
		M_E	1 24 01	20	*4,000			
		M_N	1 24 04	20		*100		
		F_N	1 55 00					
		F_E	1 57 00					
26	.....	L_E	18 01 20					P uncertain.
		L_N	18 01 25					
		M_N	18 01 28	20		*1,200		
		M_E	18 01 30	20	*2,200			F uncertain.
29	.....	M	0 04 20	20	*100	*100		P, S, L, and F uncertain.

* Trace amplitude.

Porto Rico. *Vieques. Magnetic Observatory.* U. S. Coast and Geodetic Survey. F. L. Adams.

Lat., 18° 08′ 48″ N.; long., 65° 26′ 54″ W. Elevation, 19.8 meters.

Instruments: Two Bosch-Omori.

Instrumental constants.. E: V 10, T_0 18; N: V 10, T_0 18

1918.			H. m. s.	Sec.	μ	μ	km.
Jan. 4	.....	eP_E	4 36 53				
		eL_N	4 42 16				
		eL_E	4 42 21	18			
		M_N	4 48 05	17		20	
		M_E	4 48 50	18	60		
		C	4 54 ..	17			
		F	5 03 ..	12			
16	.....	eL	13 33 ..	14			
		M_N	13 35 20	12		10	
		M_E	13 37 15	12	20		
		F	13 57 ..				
25	.....	eP_E	1 25 20	4			
		eP_N	1 25 35				
		eS_N	1 29 35				
		eL_E	1 32 15	20			
		eL_N	1 32 20	20			
		M_E	1 35 20	18	50		
		M_N	1 36 15	15		20	
		C	1 42 ..	16			
		F	1 57 ..				

Vermont. *Northfield. U. S. Weather Bureau.* Wm. A. Shaw.

Lat., 44° 10′ N.; long., 72° 41′ W. Elevation, 256 meters.

Instruments: Two Bosch-Omori, mechanical registration.

Instrumental constants.. E: V 10, T_0 15; N: V 10, T_0 16

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	e	4 43 ..					Phases indistinct.
		eL	4 49 ..					
		F	5 10 ..					
13	.....	e	0 02 ..					
		F	0 10 ..					
25	.....	e	1 29 ..					Phases lost while changing sheet
		F	2 00 ..					
30	.....	P	21 30 52				8,490	
		S	21 40 3 ?					
		F	22 10 ..					

Canada. *Ottawa. Dominion Astronomical Observatory.* Earthquake Station. Otto Klotz.

Lat., 45° 23′ 38″ N.; long., 75° 42′ 57″ W. Elevation, 83 meters.

Instruments: Two Bosch photographic horizontal pendulums, one Spindler & Hoyer, 80 kg. vertical seismograph.

Instrumental constants: V 120, T_0 26.

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	eS?$_N$ ..	4 43 44	.....	.....	.....	.....	
		eL$_N$	4 46 30†	.....	.....	.....	.....	
		L.....	4 49 ..	24	.....	.....	.....	
		L$_N$	4 54 to	.....	.....	.....	.....	
		F.....	5 20 ..	.....	.....	.....	.....	Irregular periods mingled with microseisms.
13	.....	e$_N$	0 00 00	3	.....	.....	.....	
		e$_N$	0 00 38	4	.....	.....	.....	
		eL$_N$ ...	0 01 04	6	.....	.....	.....	
		M.....	0 03 36†	7	.....	.....	.....	
		F.....	0 10 ..	.....	.....	.....	.....	
25	.....	*O*.....	1 21 32	ca.....	.....	.....	3,600ca	Δ from eL-P. No trace of S. Heavy microseisms.
		P$_N$	1 28 20	2	.....	.....	.....	
		e.....	1 35 48†	2	.....	.....	.....	
		eL$_N$ ...	1 37 24	28	.....	.....	.....	
		L.....	1 41 ..	22	.....	.....	.....	
		F.....	2	.....	.....	.....	.....	
30	.....	*O*.....	21 18 46	.....	.....	.....	8,560	
		iP.....	21 30 36	.....	.....	.....	.....	
		iS.....	21 40 24	.....	.....	.....	.....	
		i.....	21 42 12	.....	.....	.....	.....	
		eL.....	21 56 30†	28	.....	.....	.....	
		L.....	22 05 ..	18	.....	.....	.....	
		L$_N$	22 09 ..	15	.....	.....	.....	
		L$_N$	22 20 ..	15	.....	.....	.....	
		F.....	.. .. ..	22–35	.....	.....	.....	

† Original time was in tenths of a minute.

Canada. *Toronto. Dominion Meteorological Service.*

Lat., 43° 40′ 01″ N.; long., 79° 23′ 54″ W. Elevation, 113.7 meters. Subsoil: Sand and clay.

Instrument: Milne horizontal pendulum, North. In the meridian.

Instrumental constant.. T_0 18. Pillar deviation, 1 mm. swing of boom=0.59″.

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	eL.....	4 47 36	.....	.....	.....	.....	P and S not recorded.
		eL.....	4 49 24	.....	.....	.....	.....	
		iL.....	4 50 00	.....	.....	.....	.....	
		M.....	4 50 42	.....	*1,800	.....	.....	
		F.....	5 26 18	.....	.....	.....	.....	
4	.....	eL.....	16 55 18	.....	.....	.....	.....	Distant quake. Marked gradual thickening.
		M.....	17 04 00	.....	*600	.....	.....	
		F.....	17 35 48	.....	.....	.....	.....	
12	.....	L.....	23 34 12	.....	*100	.....	.....	Air currents going on.
		.....	23 36 54	.....	.....	.....	.....	
13	.....	L.....	0 04 36	.....	*200	.....	.....	Air currents going on.
		.....	0 12 24	.....	.....	.....	.....	
16	.....	L.....	13 46 30	.....	.....	.....	.....	May not be seismic.
		eL.....	13 51 24	.....	.....	.....	.....	
		M.....	13 55 48	.....	*300	.....	.....	
		F.....	14 23 12	.....	.....	.....	.....	
21	.....	L.....	20 54 06	.....	.....	.....	.....	
		L.....	20 58 06	.....	.....	.....	.....	
		M.....	21 04 48	.....	*100	.....	.....	
		F.....	21 23 00	.....	.....	.....	.....	
24	.....	eL.....	15 42 48	.....	.....	.....	.....	Gradual thickening.
		e.....	15 46 54	.....	.....	.....	.....	
		eL.....	15 50 18	.....	.....	.....	.....	
		M.....	15 54 12	.....	*200	.....	.....	
		F.....	16 30 54	.....	.....	.....	.....	
25	.....	P?.....	1 25 36	.....	.....	.....	.....	Air currents going on.
		e.....	1 29 48	.....	.....	.....	.....	
		eS.....	1 34 00	.....	.....	.....	.....	
		eL.....	1 37 12	.....	.....	.....	.....	
		iL.....	1 37 48	.....	.....	.....	.....	
		iL.....	1 40 54	.....	.....	.....	.....	
		M.....	1 41 54	.....	*2,400	.....	.....	
		F.....	.....	.....	.....	.....	.....	"A. C."
30	.....	iS.....	21 41 36	.....	.....	.....	.....	P not definite. Amplitude of S waves gradually became less.
		M.....	21 41 48	.....	*1,700	.....	.....	
		L.....	21 59 18	.....	.....	.....	.....	
		L.....	22 07 00	.....	.....	.....	.....	
		F.....	.....	.....	.....	.....	.....	"A. C."

* Trace amplitude.

Canada. *Victoria, B. C. Dominion Meteorological Service.*

Lat., 48° 24′ N.; long., 123° 19′ W. Elevation, 67.7 meters. Subsoil: Rock.

Instruments: Wiechert, vertical. Milne horizontal pendulum, North; in the meridian.

Instrumental constant.. T_0 18. Pillar deviation: 1 mm. swing of boom=0.54″.

1918.			H. m. s.	Sec.	μ	μ	km.	
Jan. 4	.....	S?.....	4 46 01	.....	.....	.....	.....	
		L.....	4 50 02	.....	.....	.....	.....	
		L.....	4 56 22	.....	.....	.....	.....	
		M.....	5 03 08	.....	*1,000	.....	.....	
		F.....	5 29 43	.....	.....	.....	.....	
			VERTICAL.		A_Z			
		M.....	*5 01 30*	*18*	*1*	.....	.....	
4	.....	P.....	16 26 13	.....	.....	.....	.....	
		L.....	16 35 04	.....	.....	.....	.....	
		M.....	16 39 00	.....	*400	.....	.....	
		F.....	17 02 37	.....	.....	.....	.....	
12	.....	P or L	23 48 49	.....	.....	.....	.....	
		M.....	23 50 18	.....	*200	.....	.....	
21	.....	P? or L	20 30 21	.....	.....	.....	.....	
		L?.....	20 39 12	.....	.....	.....	.....	
		M.....	20 47 18	.....	*300	.....	.....	
		F.....	21 05 46	.....	.....	.....	.....	
24	.....	P?.....	15 40 12	.....	.....	.....	.....	
		M.....	15 43 39	.....	*100	.....	.....	
		F.....	15 48 04	.....	.....	.....	.....	
25	.....	P or S?	1 35 35	.....	.....	.....	.....	Trace indistinct.
		L?.....	1 40 03	.....	.....	.....	.....	
		L.....	1 45 30	.....	.....	.....	.....	
		M.....	1 48 28	.....	*500	.....	.....	
		F.....	2 18 13	.....	.....	.....	.....	
30	.....	P?.....	21 23 30	.....	.....	.....	.....	Vertical record ill-defined.
		S?.....	21 28 32	.....	.....	.....	.....	
		L?.....	21 33 59	.....	.....	.....	.....	
		i.....	21 37 16	.....	.....	.....	.....	
		M.....	21 37 46	.....	*500	.....	3,270	
		L$_{rep}$...	22 18 34	.....	.....	.....	.....	
		F.....	22 33 00	.....	.....	.....	.....	

* Trace amplitude.

SEISMOLOGICAL DISPATCHES.[1]

Geneva, January 3, 1918.

The Zurich observatory reports that a serious earthquake which was recorded recently has been located at Oberammergau, in upper Bavaria, and also in the upper valley of the Lech River. (Associated Press.)

Washington, D. C., January 4, 1918.

The entire city of Guatemala was wiped out by an earthquake shock Friday night (Jan. 4) at 10.45 o'clock. (Radio dispatch from Darien to the War Department.)

Washington, D. C., January 5, 1918.

Our manager at San Jose, Guatemala, telegraphs the following: "What was left of Guatemala City is now wiped out. Shocks at 10.35 p. m. finished everything. Steam is now coming up in the streets. Cathedral fallen; 300 killed." (Dispatch from the Central and American Telegraph Co.)

Guatemala City, January 5, 1918.

The earthquakes here continue with varying frequency and intensity. The capitol is in ruins. (Associated Press.)

Washington, D. C., January 27, 1918.

Further severe earthquake shocks in Guatemala City, capital of Guatemala, were reported yesterday to the State Department by the American legation there. No details of the extent of the damage were given.

Extensive damage was done to the city by earthquakes last month. (State Department.)

[1] Reported by the organization indicated and collected by the seismological station of Georgetown University, Washington, D. C.