SECTION V.—SEISMOLOGY.

SEISMOLOGICAL REPORTS FOR NOVEMBER, 1918.

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[Dated: Weather Bureau, Washington, D. C., Dec. 3, 1918.]

TABLE 1.—*Noninstrumental earthquake reports, November, 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.*			
Nov. 8	18 24	Calexico	32 41	115 30	4	1	20	None	Trembling, jarring	H. M. Rouse.
15	7 47	Lone Pine	36 37	118 02	4	3	Few	None	Abrupt bumping	A. F. Marsh.
19	20 15?	Port Los Angeles	34 02	118 30	5	1	4	None	Bumping from west to east	A. P. Deraga.
	20 19?	Santa Monica	34 02	118 30	5	1	3	Faint	Abrupt bump	Nelle Barker-Bates.
	20 18?	Venice	33 58	118 28	7	2	30	Yes	Like an explosion, a sudden dropping sensation. Plaster and dishes thrown to the floor.	Dr. Jas. T. Brown.
20	22 41	Mount Wilson	34 13	118 04	2	1	10		Gradual rocking in all directions.	Wendell P. Hoge.
29	23 24	Eureka	40 48	124 11						James Jones.
		Table Bluff	40 41	124 10	5	1	2	Loud	Abrupt bumping and jarring, east to west.	A. F. Peters.
		PORTO RICO.								
10	20 17	San Juan	18 29	66 07	3	1	6	None	Abrupt trembling	F. E. Hartwell.
12	12 01	San Juan	18 29	66 07	4	1	8	None	Gradual rocking	F. E. Hartwell.
	21 43	San Juan	18 29	66 07	6	1	15	None	Gradual bumping and trembling.	F. E. Hartwell.
		UTAH.								
16	12 45?	Clarkston	41 55	112 03	5	1	1 00	Yes	Gradual rocking E-W	W. J. Griffiths.
17	12 43?	Tremonton	41 42	112 10		2	3	Yes	Gradual trembling S-N	A. J. Rosa.

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

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

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

Alabama. *Mobile. Spring Hill College.* Earthquake Station. Cyril Ruhlmann, S. J.

Lat., 30° 41′ 44″ N.; long., 88° 08′ 46″ W. Elevation, 60 meters.

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

(Report for November, 1918, not received.)

Alaska. *Sitka. Magnetic Observatory.* U. S. Coast and Geodetic Survey. F. P. Ulrich.

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

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

Instrumental constants: E: V 10, T_0 18; N: V 10, T_0 17

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
Nov. 8	.....	P	4 46 22	3	.....	.....	.....	N not in good adjustment.
		eL_N	5 00 30	20	.....	.....	.....	
		eL_E	5 00 33	26	.....	.....	.....	
		M_N	5 05 25	20	.....	260	.....	
		M_E	5 05 49	18	30	.....	.....	
		C_N	5 17 ..	17	.....	.....	.....	
		F_E	5 38 ..	15	.....	.....	.....	
		F_N	6 38 ..	10	.....	.....	.....	
18	.....	eP_N	18 59 05	.....	.....	.....	.....	Phases not well defined.
		eP_E	18 59 18	4	.....	.....	.....	
		S?	19 05 22	.....	.....	.....	.....	
		M_E	19 08 49	.....	40	.....	.....	
		eL?	19 13 25	.....	.....	.....	.....	
		M_N	19 13 40	.....	.....	50	.....	
		F_E	19 43 ..	8	.....	.....	.....	
		F_N	19 46 ..	14	.....	.....	.....	

Arizona. *Tucson. Magnetic Observatory.* U. S. Coast and Geodetic Survey. William H. Cullum.

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

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

Instrumental constants: E: V 10, T_0 14; N: V 10, T_0 18

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
Nov. 8	.....	P	4 49 34	4	.....	.....	.....	Instrument not in good adjustment during November; does not show smooth regular waves.
		S	4 59 10	.....	.....	.....	.....	
		eL_N	5 13 25	.....	.....	.....	.....	
		M_N	5 14 07	.....	.....	80	.....	
		eL_E	5 15 00	.....	.....	.....	.....	
		M_E	5 22 10	18	150	.....	.....	
		C	5 27 ..	.....	.....	.....	.....	
		F_N	6 26 ..	.....	.....	.....	.....	
		F_E	7 23 ..	.....	.....	.....	.....	
12	.....	eP_E	21 54 20	5	.....	.....	.....	Nothing visible on N.
		eL_E	22 12 40	.....	.....	.....	.....	
		M_E	22 15 10	15	10	.....	.....	
		F_E	22 52 ..	.....	.....	.....	.....	
16	.....	eP_E	6 06 09	5	.....	.....	.....	
		S_N	6 09 10	.....	.....	.....	.....	
		S_E	6 09 12	.....	.....	.....	.....	
		eL_E	6 11 20	.....	.....	.....	.....	
		M	6 12 ..	10	10	10	.....	
		F	6 13 ..	.....	.....	.....	.....	
18	.....	eP_E	19 01 51	.....	.....	.....	.....	Phases doubtful; nothing definite on N.
		eP_N	19 02 20	.....	.....	.....	.....	
		eL_E	19 36 ..	.....	.....	.....	.....	
		F_N	19 42 ..	.....	.....	.....	.....	
		M_E	19 51 ..	.....	30	.....	.....	
		F_E	21 12 ..	.....	.....	.....	.....	

TABLE 2.—*Instrumental seismological reports, November, 1918*—Continued.

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.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Nov. 9					100	200		Tremors during 24 hours preceding 16h 00m on dates given.
10					100	150		
17					50	100		
20					300	300		

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

Lat., 37° 26′ 36″ N.; long., 121° 57′ 63″ W. Elevation, 27.43 meters.

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

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.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Oct. 4		L_N	20 28 ..					
		F_N	20 36 ..					
4		L_N	21 50 ..					
		F_N	22 02 00					
4		L_N	22 35 ..					
		F_N	22 41 ..					
8		P	4 59 ..					Time of first preliminary somewhat doubtful. Second preliminary not discernible.
		S	5			*250		
		L	5 15 ..	20–30	*250			
		M	5 19 ..	20	*2,250	*2,000		
		C	5 25 ..					
		F	5 39 ..					
23		L_N	21 06 ..					
		F_N	21 27 ..					

* Trace amplitude.

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. $\left\{ \begin{matrix} V & T_0 \\ 110 & 6.4 \end{matrix} \right.$

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
1918			*H. m. s.*	*Sec.*	μ	μ	*km*	
Nov. 2		e_N	10 33 12					
		L	10 34 10	12				
		F	11 00 ..					
3		e_N	11 36 00					Small amplitudes soon lost in microseisms.
		F	? ? ?					
5		P_N	22 45 48					
		S_N	22 50 58					
		L_N	22 56 15	20				
		F	23 15 ..					
8		P	4 50 40					
		S	5 01 12					
		L	5 17 30	22				
		L	5 20 00	30				
		L	5 25 00	20				
		L	5 35 00	16				
		F	8 15 ..					
9		e	0 15 30					Small amplitudes. Confused with microseisms.
		F	0 25 ..					
12		P	21 49 43					F lost in microseisms.
		S	21 53 48					
		L	21 55 40	20				
		L	22 00 00	16				
		F	22 45 ..					
18		P	19 01 00					Difficult to read: distant quake.
		$P_{rep\,1}$	19 04 05					
		L	19 44 00	35				
		L	19 56 00	20				
		F	21 10 ..					
23		e	23 17 13					
		S?	23 20 10					
		L	23 39 00	24				
24		L	0 12 00	20				
		F	0 30 ..					
30		e	7 28 00					
		L	7 32 00	18				
		F	7 45 ..					

TABLE 2.—*Instrumental seismological reports, November, 1918*—Continued.

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	ε
E	165	5.4	0
N	143	5.2	0
Z	80	5.0	0

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
1918 Nov. 2		L_N	10 34 ..	10				Microseisms.
		L_E	10 38 ..	10				
		F	11					
3		L_E	12 28 ..					Do.
		F	13 (ca)					
8		P	4 50 47					Do.
		S_N	5 01 25					
		S_E	5 01 34					
		eL_E	5 17 00	24				
		eL_N	5 17 18	27				
		M_N	5 29 12	11		*1,700		
		M_E	5 29 32	22	*1,500			
		F	8					
			VERTICAL.			*Az*		
8		*P*	*4 50 41*					*S doubtful. No distinct main.*
		i	*4 51 03*					
		eL	*5 17 24*	*19*				
		F	*7 54 ..*					
12		iP	21 49 47					Heavy microseisms. No distinct main. F surely after 23 hours.
		iS_N	21 53 52					
		iS_E	21 54 00					
		eL	21 55 48					
		F	.. .. ..					
18		P	19 01 08					Possibly overlapping quakes. F difficult because of microseisms. No distinct main.
		i_N	19 04 44					
		i_E	19 04 48					
		S_E	19 13 55					
		S_N?	19 14 10					
		i_E	19 22 28					
		L_E	19 42 40	21				
		L_N	19 44 ..	26				
		F	21					
22		e	16 30 ..					
		eL_E	16 38 ..	9				
		eL_N	16 38 24	7				
		F	16 53 ..					
30		L_E	7 26 ..	22				Heavy microseisms.
		L_N	7 31 ..	16				
		F	7 50 ..					

*Trace amplitudes.

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

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. Sensitiveness 0″.40

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	*μ*	*μ*	*km.*	
Nov. 2		L	10 02 00					Sharp earthquake reported from the island of Hawaii, with renewed activity of Kilauea.
		M	10 03 54		9.4			
		C	10 11 ..					
		F	10 48 ..					
3		e	11 53 54					P was probably obscured by the irregular motion of the paper.
		L	11 56 06					
		M	12 00 30		0.5			
		C	12 06 ..					
		F	12 55 ..					
8		P	4 45 36	17				Pen beyond limits of paper for two minutes at time of maximum. Paper not moving at a uniform rate.
		S	4 53 00	18				
		eL	5 02 48					
		M	5 05 ..		17+			
		C	6 22 ..	18				
		F	8 35 ..	17				
12		eP	21 58 30					
		L	22 25 48					
		M	22 36 18	18	0.1			
		C	22 42 ..	18				
		F	25 27 ..	19				
14		eP	16 22 06					
		L	16 33 18					
		M	16 37 00		0.1			
		C	16 40 ..					
		F	17 10 ..					
18		P	18 53 48					Paper not moving at a uniform rate.
		S	19 02 48					
		L	19 17 00					
		M	19 28 06		15.0			
		C	19 55 ..	18				
		F	21 48 ..	19				
22		P	16 03 24	17				Preceded and followed by air tremors.
		L	16 15 00					
		M	16 19 12	18	0.5			
		C	16 22 ..	17				
		F	? ? ?					
23		eP	23 10 24	18				
		S	23 19 18	18				
		L	23 33 42					
		M	23 46 06	18	1.0			
		C	24 01 ..	18				
		F	25 47 ..					
30		e	7 15 ..					
		M	7 20 ..		0.1			
		F	7 39 ..					

TABLE 2.—*Instrumental seismological reports, November, 1918*—Continued.

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.

Instrumental constants.. E: V 177, T_0 3.4, ϵ 4:1; N: V 205, T_0 3.4, ϵ 4:1

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
1918. Nov. 8	.....	iP$_E$	4 49 56	.....	.....	.....	.....	
		iP$_N$	4 49 57	.....	.....	.....	.....	
		S$_E$	4 59 49	.....	.....	.....	.....	
		S$_N$?	5 00 06	.....	.....	.....	.....	
		L$_E$?	5 09 07	.....	.....	.....	.....	
		L$_N$?	5 09 15	.....	.....	.....	.....	
		M$_E$	5 22 40	.....	8.6	.....	.....	
		M$_N$	5 27 44	.....	.....	6.8	.....	
		F	7 00 ..	.....	.....	.....	.....	
12	.....	P$_N$	21 51 09	.....	.....	.....	.....	Primary confused by clock signals. S not discernible.
		P$_E$	21 51 12	.....	.....	.....	.....	
		L$_N$?	22 00 33	.....	.....	.....	.....	
		L$_E$?	22 02 56	.....	.....	.....	.....	
		M$_E$	22 06 43	.....	3.4	.....	.....	
		M$_N$	.....	.....	.....	.....	.....	Lost.
		F	22 23 ..	.....	.....	.....	.....	
18	.....	eP$_E$	19 00 47	.....	.....	.....	.....	
		eP$_N$	19 00 49?	.....	.....	.....	.....	
		S	19 02 54	.....	.....	.....	.....	
		I	19 04 05	.....	.....	.....	.....	
		M	19 04 13	.....	8.8	5.6	.....	
		F$_E$	20 59 ..	.....	.....	.....	.....	

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.

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

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
1918 Nov. 2	.....	eL$_N$	10 38 30	.....	.....	.....	.....	
		M$_N$	10 40 30	11	.....	10	.....	
		F$_N$	10 43 ..	10	.....	.....	.....	
8	.....	P	4 51 00	3	.....	.....	.....	
		S$_N$	5 01 37	4	.....	.....	.....	
		eL$_N$	5 19 10	.....	.....	.....	.....	
		eL$_E$	5 23 40	.....	.....	.....	.....	
		M$_E$	5 32 35	18	40	.....	.....	
		C$_E$	5 38 ..	15	.....	.....	.....	
		M$_N$	5 40 48	14	.....	210		
		C$_N$	5 49 ..	15	.....	.....	.....	
		F$_E$	5 52 ..	.....	.....	.....	.....	
		F$_N$	6 57 ..	15	.....	.....	.....	
12	.....	P	21 49 37	3	.....	.....	.....	No long waves on E.
		S$_N$	21 53 42	.....	.....	.....	.....	
		L$_N$	21 55 46	23	.....	.....	.....	
		M$_N$	21 59 52	.....	.....	60	.....	
		C$_N$	22 04 ..	18	.....	.....	.....	
		F$_E$	22 17 ..	.....	.....	.....	.....	
		F$_N$	22 36 ..	.....	.....	.....	.....	
18	.....	e$_N$	19 01 07	.....	.....	.....	.....	Phases doubtful.
		e$_E$	19 01 10	.....	.....	.....	.....	
		S?	19 04 52	.....	.....	.....	.....	
		eL$_N$	19 15 ..	.....	.....	.....	.....	
		M$_N$	19 45 18	.....	.....	40	.....	
		F$_E$	20 06 ..	.....	.....	.....	.....	
		F$_N$	20 55 ..	.....	.....	.....	.....	
23	.....	e$_N$	23 20 ..	.....	.....	.....	.....	
		e$_E$	23 20 50	.....	.....	.....	.....	
		F$_E$	23 29 ..	.....	.....	.....	.....	
24	.....	eL$_N$	0 12 30	.....	.....	.....	.....	
		M$_N$	0 17 ..	20	.....	10	.....	
		F$_N$	0 27 ..	.....	.....	.....	.....	

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).

Instrumental constants.. E: V 80, T_0 23, ϵ 0; N: V 50, T_0 25, ϵ 4:1

(Report for November, 1918, not received.)

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.

Instrument: Wiechert 80 kg. astatic, horizontal pendulum.

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

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
1918. Nov. 8	.....	P$_N$	4 50 12	.....	.....	.....	8,700	
		S$_N$	5 00 18	.....	.....	.....	.....	
		L$_N$	5 15 12	.....	.....	.....	.....	
	.....	L$_E$	5 16 09	.....	.....	.....	.....	
		M$_N$	5 21 12	24	.....	*30,000	.....	
			5 25 06	21	.....	*36,000	.....	
		M$_E$	5 21 12	24	*24,000	.....	.....	
		F	6 34 ..	.....	.....	.....	.....	
12	.....	eP?	21 50 42	.....	.....	.....	3,300?	P difficult to determine on account of microseisms.
		S	21 55 48	.....	.....	.....	.....	
		L	21 58 18	.....	.....	.....	.....	
		L	22 03 24	18	.....	*12,000	.....	
		L	22 04 24	12	.....	9,000	.....	EW not working satisfactorily.
		F	23 00 00	.....	.....	.....	.....	
17	.....	eL	22 59 09	.....	.....	.....	.....	17th and 18th impossible to decipher on account of high wind influence.
		F	23 25 00	.....	.....	.....	.....	
18	.....	IS?	19 04 21	.....	.....	.....	.....	Nov. 19–20; 25–26; and 26–27, record full of microseisms.

*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, ϵ 5:1

(Report for November, 1918, not received.)

New York. *Fordham. Fordham University.* Daniel H. Sullivan, 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 5.0, ϵ 0; N: V 72, T_0 5.0, ϵ 0

(Report for November, 1918, not received.)

TABLE 2.—*Instrumental seismological reports, November, 1918*—Continued.

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

Lat., 42° 26′ 58″ N.; long. 76° 29′ 09″ W. Elevation, 242.6 meters.

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

Instrumental constants..

	V	T_0	ε
E	13	22	4:1
N	14	25	4:1

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
1918. Nov. 3		eL_E	12 27 ..	20				
		F_E	12 58 ..					
8		P_E	4 50 45	3				
		P_N	4 50 46	3				
		$P_{rep\,1}$	4 54 08	5				
		S_N	5 01 06	7				
		S_E	5 01 14	9				
		L_E	5 16 05	30				
		L_N	5 16 35	30				
		M_E	5 28 11	18	*1,900			
		F_E	8 26 ..					
12		eP_N	21 50 13	3				Microseisms.
		eP_E	21 50 15	3				
		S_E	21 54 39	7				
		S_N	21 54 41	5				
		L_E	21 56 26	25				
		L_N	21 56 44	20				
		F_E	22 45 ..					
18		eP_N	19 02 07	7				
		eP_E	19 02 09	6				
		i_N	19 05 52	8		*500		
		i_E	19 05 53	7				
		eS_E	19 14 07	8				
		eS_N	19 14 44	10				
		eL_E	19 38 40	32				
		F_E	21 37 ..					

* Trace amplitude.

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	T_0
35	20

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
1918. Nov. 5		P_E	22 42 16				910	
		P_N	22 42 18					
		L_E	22 44 16	20				
		L_N	22 44 18	20				
		M_E	22 44 52		*500			
		M_N	22 44 54			*700		
		F_E	22 49 ..					
		F_N	22 51 ..					
8		P	4 57 00	20	*300	*200		
		F	6 34 ..					
12		P_E	21 48 02				990	
		P_N	21 48 06					
		L_E	21 51 00	20				
		M_N	21 51 14			*1,700		
		L_N	21 51 18	20				
		M_E	21 51 34		*500			
		F	22 12 ..					
18		P_E	19 01 28					
		P_N	19 01 36					
		L_E	19 24 18?	20				
		L_N	19 24 42?	20				
		M_E	19 ? ?		*700			
		M_N	19 24 48			*1,000		
		F	20 33 ..					
23		P	23 18 00	20				Faint tremors.
		F	23 26 ..					
29		P_E	4 23 02				330	
		P_N	4 23 04					
		L_E	4 23 44	20				
		L_N	4 23 52	20				
		M_E	4 24 26		*500			
		M_N	4 24 28			*400		
		F_N	4 29 ..					
		F_E	4 30 ..					
29		P_E	18 11 12				90	Direction probably southerly.
		P_N	18 11 13					
		L_E	18 11 19	20				
		L_N	18 11 20	20				
		M_N	18 11 21			*1,300		
		M_E	18 11 23		*1,400			
		F_N	18 13 11					
		F_E	18 14 00					

* Trace amplitude.

Porto Rico. *Vieques. Magnetic Observatory.* U. S. Coast and Geodetic Survey. Wallace M. Hill.

Lat., 18° 09′ N.; long., 65° 27′ W. Elevation, 19.8 meters.

Instruments: Two Bosch-Omori.

Instrumental constants..

	V	T_0
E	10	17
N	10	20

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
1918 Nov. 7		P_N	9 33 56	1				Not far distant.
		P_E	9 33 59	1				
		M_N	9 34 14			10		
		M_E	9 34 23		20			
		F	9 38 ..					
8		eP	4 56 59	5				This may be $P_{rep\,1}$.
		eS	5 12 36					This may be $S_{rep\,1}$.
		eL	5 35 28					On E there are two regular waves, period 28 sec., beginning at 5h. 22m. 10s., and four waves, period about 40 sec., beginning at 5h. 26m. 30s.
		M_E	5 36 08	22	40			
		M_N	5 46 48	20		70		
		C	5 53 ..	17				
		F_N	6 01 ..	17				
		F_E	6 15 ..	17				
12		iP	12 02 26	1				Not far distant.
		L	12 02 50					
		M	12 03 05	6	80	200		
		F	12 12 ..	4				
12		iP	21 45 14	3				Not far distant. Felt at Vieques.
		eL	21 45 34					
		M	21 46 02	16	6,380	3,340		
		C	21 49 ..	12				
		F	22 19 ..	10				
18		iP_N	19 01 50	6				
		eP_E	19 02 25	6				This may be P_{rep1}
		eL_E	19 47 10					
		eL_N	19 58 00					
		M_E	20 03 08	30	30			
		M_N	20 05 12	30		10		
		C	20 08 ..	28				
		F_N	20 34 ..	20				
		F_E	20 42 ..	22				
23		P_N	7 21 44	2				Not far distant.
		eP_E	7 21 57					
		M_E	7 22 15		30			
		M_N	7 22 20			20		
		F_E	7 24 ..	3				
		F_N	7 28 ..	3				

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..

	V	T_0
E	10	15
N	10	16

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
1918. Nov. 8		P	4 50 32					
		S	5 00 57					
		L	5 16 00	20				
		L	5 20 30	24				
		L	5 25 30	20				
		L	5 34 30	16				
		F	7 00 ..					
12		P	21 50 38					
		S?	21 54 42					
		L	21 58 00	16				
		F	22 30 ..					
18		P	19 00 59					Distant quake. Record apparently confused.
		S	19 04 38					
		eL?	19 26 00					
		L	19 37 00	60				
		F	20 45 ..					
23		e?	23 16 10					
		F	23 16 40					

TABLE 2.—*Instrumental seismological reports, November, 1918*—Continued.

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

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Nov. 2		e_N?....	10 28 24					
		e_N....	10 33 30	10				
		e.....	10 35 00	10				
		L.....	10 38 ..	8				
		L.....	10 40 ..	7				
		L.....	10 44 ..	6				
		F.....	11					
3		e.....	11 36 30	7				Early phases on NS confused in heavy micros. Beautiful sinusoidal L waves.
		e?.....	11 55 ..	12				
		e_N.....	12 15 ..	40?				
		eL_E...	12 21 ..	30				
		L.....	12 29 to	18	to			
			12 38 ..	15				
		L.....	12 42 ..	15				
		L_E....	13 00 ..	14				
		F.....	13 15 ..					
5		i.....	22 48 29	3				
		eL....	22 59 ..	20				
		F.....	23 15 ..					
8		*0*.....	*4 38 50*				8,180	Very long period of the S_{repl} waves. First read as L, which they closely resemble.
		iP.....	4 50 20					
		eP_{repl} .	4 53 25					
		eS.....	4 59 49					
		eS_{repl} .	5 05 54	36				
		eL....	5 14 30	32				
		L.....	5 25 ..	18				
		L.....	5 45 ..	17				
		L.....	6 00 ..	12				
		L.....	6 25 ..	12				
		L.....	6 40 ..	12				
		L.....	6 50 ..	10				
		L.....	6 55 ..	10				
		L.....	7 06 ..	10				
		F.....	8 00 ..					
		HALIFAX RECORD.						
8		*0*.....	*4 38 36*				9,380	Halifax record furnished by Ottawa.
		P.....	4 51 08					
		S.....	5 01 37					
		L?....	5 14 30	45				L waves arrive too soon by about 7 minutes, appearing at the time SR should appear, but with a period of 45s.
		SASKATOON RECORD						
8		*0*.....	*4 38 49*				7,100	Saskatoon record furnished by Ottawa.
		P.....	4 49 22					
		S.....	4 57 56					
		L?....	5 06 ..					L waves arrive 4 minutes too soon. They may be S_{repl}, but there is no break between them and the true L.
9		e.....	0 17 to					
		F.....	0 30 ..	8				May not be seismic.

Canada. *Ottawa. Dominion Astronomical Observatory*—Continued.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
		SASKATOON RECORD—Con.						
1918.			*H. m. s.*	*Sec.*	F	F	*km.*	
Nov. 10		e.....	13 00 to					
		F.....	13 05 ..	6				May not be seismic.
10		e.....	15 47 to	22				Very small amplitude. NS is confused with wind and micros.
		F.....	15 50 ..					
11		eL....	8 04 to					
			8 10 ..	15				
12		*0*.....	*21 45 00*				2,880	
		eP....	21 50 45					
		eS.....	21 55 19					
		eL....	21 58 ..	24				
		L.....	22 05 ..	14				
		L.....	22 22 ..	14				
		F.....	22 45 ..					
16		eL_E...	6 15 to					Very slight indication. NS record is lost in microseisms.
		F.....	6 25 ..					
18		i.....	19 01 01					Phases confused. No readings obtained. Halifax and Saskatoon records equally unreadable. The records indicate that the disturbance came from the east. Tidal wave at Newfoundland on same date and was probably connected with this earthquake, according to reports received from Halifax.
		i.....	19 03 40					
		i.....	19 04 32					
		e?$_E$....	19 23 18	25				
		eL....	19 39 ..	60				
		L.....	19 50 ..	30				
		L.....	20 00 ..	20				
		L.....	20 20 ..	18				
		L.....	20 35 ..	18				
		L.....	21 01 ..	16				
		F.....	21 30 ..					
22		e.....	16 31 ..					Heavy micros.
		eL....	16 38 ..	17				
		L.....	16 44 ..	17				
		F.....	17 10 ..					
23		i.....	23 20 20					
		i.....	23 20 35	4				
		i.....	23 21 14	7				
		e_N.....	23 31 30	10				
24		L?....	0 05 ..	28				
		L.....	0 20 ..	16				
		F.....	0 50 ..					
25		e_N.....	2 27 18	6				Very small amplitude. Record barely discernible.
		eL_E...	2 30 30					
		L_E....	2 33 ..	18				
		L_N....	2 35 ..	13				
		F.....	2 40 ..					
30		eL....	7 17 18					Seismograph out of commission from 14h. 30m. Nov. 25 to 18h. 00m. Nov. 28.
		L_E....	7 22 ..	19				
		L.....	7 25 ..	17				
		L.....	7 30 ..	14				
		L.....	7 34 ..	9				
		F.....	7 55 ..					

TABLE 2.—*Instrumental seismological reports, November, 1918*—Continued.

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..18 T_0. Pillar deviation, 1 mm. swing of boom=0.45″.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	r	r	*km.*	
Nov. 2		L	10 45 24					
		L	10 54 24		*50			
3		L	12 25 12					Time doubtful.
		L	12 28 36					
		M	12 30 48		*700			
		F	13 44 12					
5		L	22 58 30					
		iL	23 00 48					
		M	23 02 30		*200			
		F	23 23 06					
8		eP	4 50 48				8,560	Clear record. Epicenter, lat. 51° 26′ N, long. 145° East.
		iP	4 54 00					
		eS	5 00 36					
		iS	5 05 54					
		iL	5 11 00					
		iL	5 14 24					
		iL	5 24 36					
		M	5 29 00		*14,000			
		iL	5 33 42					
		iL	5 37 24					
		iL	5 46 54					
		L	6 14 00					
		F	9 18 42					
11		L	7 57 24					
		L	8 02 48		*100			
		F	8 17 36					
12		P	21 50 54				2,990	
		S	21 55 36					
		L	21 57 48					
		L	22 00 00					
		eL	22 01 06					
		M	22 05 12					
		F	23 17 30		*3,300			
16		L	6 14 48					Small micros.
18		P	19 00 00?				3,070?	May be a dual 'quake. S waves large.
		iS	19 04 48					
		eL	19 15 06					
		M_1	19 24 18		*2,000			
		iL	19 47 36					
		eL	20 02 42					
		M_2	20 06 48		*3,000			
		eL	20 45 54					
		F	Micros.					
22		L?	16 33 30					
		L	16 37 36					
		M	16 43 30		*300			
		F	16 56 36					
23		P?	23 25 42					
		S?	23 36 18					
		L	23 46 36					
24		eL	0 17 54					
		M	0 22 30		*300			
		eL,repl	1 04 30					
		eL	1 08 54					
		F	1 38 42					
25		L	2 27 18					
		eL	2 35 18					
		M	2 36 18		*300			
		F	3 12 12					
26								Heavy micros. began after 22 hours, continuing to 15 hours of the 27th.
30		eL	7 23 48					Disturbance abruptly became smaller at 7h 31m 24s.
		M	7 28 24					
		L	8 16 24		*400			
		F	8 18 24					

*Trace amplitudes.

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

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E.	Amplitude. A_N.	Distance.	Remarks.
Nov. 3		P	11 43 34				9,310	
		S	11 54 00					
		L	12 06 31					
		eL	12 19 02					
		M	12 24 03		*500			
		F	12 32 04					
8		P	4 47 25				4,180	Kamchatka.
		S	4 53 22					
		L	5 03 47					
		M	5 20 29		*6,000			
		F	8 48 01					
		VERTICAL.				*Az.*		
		P	*4 47 00*	*2–3*			*5,050*	*Kamchatka.*
		S	*5 53 45*	*8*				
		L	*5 04 40*	*24*				
		M	*5 22 08*	*24*		*14*		
12		P	21 54 14				6,330	May be West Indies.
		S	22 02 08					
		L	22 12 52					
		M	22 20 28		*1,000			
		eL	22 27 20					
		F	23 05 06					
16		P	6 14 04?					
		L	6 18 59					
		M	6 20 27		*200			
		F	6 27 50					
18		P	18 55 14				2,770	S waves well defined.
		S	18 59 40					
		L	19 08 02					
		M	19 44 25		*9,000			
		eL	20 57 33					
		eL	21 01 09					
		M,repl	21 05 09		*1,000			
		eL	21 13 45					
		F	22 01 09					
		VERTICAL.				*Az.*		
		S	*19 00 18*	*3–4*				
		L	*19 07 38*	*14*				
		M	*19 44 34*	*36*		*4*		
		F	*? ? ?*					
20		M	6 57 19		*100			
22		P	16 05 00?					
		M	16 29 30		*200			
		F	17 01 30					
23		P	23 21 36				7,400?	
		e	23 28 14					
		S	23 30 27					
		L	23 41 45?					
		L	23 46 11?					
24		M	0 06 51		*500			
		F	1 33 24					
30		S	7 09 03					Disturbance abruptly became less at 7h 24m 04s.
		L	7 16 44					
		M	7 22 07		*400			
		F	7 41 02					

*Trace amplitudes.

SEISMOLOGICAL DISPATCHES.[1]

San Juan, P. R., October 25, 1918.

Another heavy earthquake shock was felt at 11.15 o'clock last night. The disturbance is reported to have caused further property loss at Mayaguez and Ponce, and small loss of life and property at Aguadilla. (Assoc. Press.)

Honolulu, Hawaii, November 4, 1918.

Spouting lava a hundred feet from new cracks in the old floor Saturday morning, the crater Kilauea entirely buried the old resthouse. The eruption followed severe earthquakes throughout the island of Hawaii Friday night at 11.33 o'clock. The Kilauea fire pit has been rising for three days, and lava is flowing continuously in several directions. (Assoc. Press.)

Rome, Italy, November 11, 1918.

Heavy earth shocks, accompanied by property damage and loss of life occurred Sunday in the provinces of Florence and Forli.

The villages of Santa Sofia, Bagnodiromaga and Mordane particularly suffered. At Santa Sofia a church collapsed, eight persons being killed and several injured. (Assoc. Press.)

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

San Juan, P. R., November 14, 1918.

Two earthquakes occurred in Porto Rico yesterday, the first at 8 o'clock in the morning, and the second at 6 o'clock in the evening. Both shocks caused some damage in cities reporting losses in the earthquake of last October, but there was no additional loss of life. (Assoc. Press.)

Guatemala, November 16, 1918.

Four earthquake shocks were felt at this place between the hours of 8 and 10 o'clock a. m., local time. (Special observer.)

Guatemala, November 18, 1918.

A shock was felt at 10 o'clock a. m. (Special observer.)

Los Angeles, Cal., November 19, 1918.

An earthquake, sharp enough to rattle windows and jar dishes from shelves, was felt to-day in the southwestern part of Los Angeles and along the ocean as far as Santa Monica. The tremor, which lasted more than half a minute, seemed to be most pronounced at Santa Monica. (Assoc. Press.)