SEISMOLOGY.

W. J. HUMPHREYS, Professor in Charge.

[Dated: Weather Bureau, Washington, D. C., Sept. 2, 1919.]

TABLE 1.—*Noninstrumental earthquake reports, July, 1919.*

Day.	Approximate time, Greenwich Civil.	Station.	Approximate latitude.	Approximate longitude.	Intensity Rossi-Forel.	Number of shocks.	Duration.	Sounds.	Remarks.	Observer.
	H. m.	CALIFORNIA.	° ′	° ′			*Sec.*			
July 13	12 13½	Corona	33 52	117 35	2	1	2 or 3	None	Felt by several	Thomas C. Sias.
20	4 15	Oak Grove	33 26	116 51	5	1	2	Loud	Felt by many	A. J. Berg.
31	21 30	Idria	36 24	120 42	3	2	1	None	Felt by several	O. M. Sherburne.
		KANSAS.								
26	12 55	Wichita	37 41	97 20	4	2	2	Loud rumbling	Felt by several	Mrs. J. B. Daze.

TABLE 2.—*Instrumental seismological reports, July, 1919.*

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

[For significance of symbols see REVIEW for January, 1919, p. 59.]

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 July, 1919, 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..		V	T_0
	E	10	17.7
	N	10	16.6

(No earthquake recorded during July, 1919.)

Arizona. *Tucson. Magnetic Observatory.* U. S. Coast and Geodetic Survey. Wm. 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..		V	T_1
	E	10	15
	N	10	18

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
Arizona. *Tucson. Magnetic Observatory.* U. S. Coast and Geodeti Survey. Wm. 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..					V	T_0		
					E	14		
					10	18		
1919. July	1	P_N	21 55 16					
		eP_E	21 55 22					
		L_N	21 57 21					
		M_N	21 57 32	8		10		
		C_N	21 57 48					
		F_E	21 59 ..					
		F_N	22 00 ..					
	6	P_N	7 09 22					
		S_N	7 13 33					
		eL_N	7 16 38					
		P_E	7 20 33					
		C_N	7 21 ..					
		F_E	7 28 ..					
		F_N	7 32 ..					
	9	eP_N	19 23 14					eP_N faint.
		eS_E	19 27 14					
		S_N	19 27 20					
		eL_E	19 28 50					
		eL_N	19 29 51					
		M_N	19 30 14					
		C_N	19 33 55	5				
		F_E	19 35 ..					
		F_N	19 41 ..					

Period of pendulum: E. 17 sec., N. 20 sec.

TABLE 2.—*Instrumental seismological reports July, 1919*—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.

1919.	Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
July	3			*H. m. s.*	*Sec.*	*μ* 50	*μ* 50	*Km.*	
	15					100	100		

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.

(*No earthquakes reported for July, 1919.*)

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 110, T_0 6.4

1919.	Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
July	6		P	7 10 ca.				3540?	Time correction uncertain.
			S	7 15 20ca					
			L	7 19 30ca	25				
			F	7 50					
	8		P	21 25 15					
			S	21 34 48					
			L	21 56 ..	28				
			L	22 05 ..	20				
			L	22 10 ..	18				
			F	22 40 ..					
	9		P?	19 26 16				3700?	
			S	19 31 45					
			L	19 38 10	12				
			F	20 30 ..					
	10		e	2 42 40					
			F	2 52 ..					
	11		P	0 36 57					
			S	0 44 00					
			eL	0 50 45					
			F	1 15 ..					
	14		eL	14 26 20	16				
			F	14 45 ..					
	17		P	16 25 57				3280	
			S	16 31 00					
			L	16 35 50	20				
			L	16 40 ..	14				
			F	16 50 ..					
	18		e?	13 43 50					
			L	13 58 00					
			F	14 10 ..					
	22		iP	22 07 10				2920	
			iS	22 11 47					
			L?	22 14 20					
			F	22 30 ..					
	24		e	2 27 56					
			F	2 32 ..					
	25		e	19 05 00					
			S?	19 09 14					
			F	19 30 ..					
	31		eP	22 02 42				8220	
			S	22 12 13					
			F	22 30 ..					

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*	*3.0*	*0*

1919.	Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
July	1		e_E	21 36 27					
			eL_E	21 49 30					
			eL_N	21 49 36					
			F	22 46 ..					
	6		eP_N	7 10 05					
			eP_E	7 10 15					
			S	7 15 35					
			eL	7 18 30	10				
			F	7 50 ..					
				Vertical.					
			eP	*7 10 04*					
			S	*7 15 35*					
			F	*8 00* ..					
	7		e_E	14 48 ..					N-S does not show, microseisms.
			F	15 20 ..					
	8		e	21 25 52					Heavy microseisms
			eS_N?	21 34 42					
			eL_E	21 47 ..	11				
			eL_N	21 47 06	11				
			F	23 25 ..					
	9		e	19 26 ..					Do.
			eS_N?	19 31 40					
			eL_E	19 38 ..	11				
			eL_N	19 38 ..	15				
			L_N	19 42 ..	11				
			L_E	19 43 ..	9				
			F	20 15 ..					
	10		e_N	2 41 26					Microseisms.
			e_E	2 41 30					
			L_N	2 44 19	10				
			F	3 (ca.)					
	11		e	0 37 ..					Do.
			S_E?	0 42 12					
			S_N?	0 42 13					
			eL	0 44 30	8				
			F	1 30 ..					
	14		e_E?	14 16 17					
			e_N?	14 16 28					
			eL	14 26 36	12				
			F	14 48 ..					
	17		iP	16 25 58					
			eS	16 31 04					
			eL	16 36 00	16				
			L_E	16 41 ..	14				
			L_N	16 41 ..	11				
			F	16 55 ..					
	22		iP_N	22 07 12					
			iP_E	22 07 13					
			S	22 11 48					
			eL	22 13 48	6				
			F	22 55 ..					
			iP	*22 07 11*					
			S	*22 11 53*					
			eL	*22 13 30*					
			F	*22 55* ..	6				
	25		e_E	17 13 ..					Does not show on N-S component.
			F	17 21 ..					
	31		e_E?	22 05 43					Heavy microseisms.
			S_E?	22 12 16					Does not show on N-S component.
			F	22 27 ..					

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 18.1. Sensitiveness 0.40 arc tilt″=1 mm.

(Report for July not received.)

TABLE 2.—*Instrumental seismological reports, 1919*—Continued.

Illinois. *Chicago. University of Chicago.* U. S. Weather Bureau.

Lat., 41° 47′ N.; long., 87° 37′ W. Elevation, 180.1 meters.

Instruments: Two Milne-Shaw horizontal pendulums, 0.45 kg.

Instrumental constants: E: V 150, T_0 12, e 20:1, Sensitivity 1″ arc tilt=26.6 mm.; N: V 150, T_0 8, e 20:1, Sensitivity 1″ arc tilt=13.2 mm.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
July 1		e	17 21 30					
		L	17 29 15	15				
		F	17 50 ca					
1		P	21 36 26				2,990	
		S	21 41 08					
		L?	21 43 50					
		F	22 30 ..					
2		e	8 08 18					
		eL	8 14 ..					
		L	8 16 ..	15				
		F	8 45 ..					
4		e	8 39 07					
		L	8 46 ..	18				
		F	9 10 ..					
6		P	7 09 55				3,300	
		iS	7 15 ..					
		L	7 18 10	26				
		F	8 40 ..					
7		eL	14 47 ..					May not be seismic.
		L	14 50 ..	24				
		L	14 56 ..	18				
		F	15 30 ..					
8		P	21 26 00				8,800	
		S	21 36 ..					
		eL	21 51 ..					
		L	22 03 ..	26				
		M_E	22 12 ..		*100			
		L	22 14 ..	20				
		L	22 22 ..	15				
9		F	0 30 ..					
9		P	19 25 38				3,200	
		iS	19 30 30					
		L	19 33 15	10				
		M_E	19 37 30			*2,500		
		F	20 40 ..					
10		e	2 37 28					
		F	3 15 ..					
11		iP	0 37 50				3,875	
		iS	0 43 30					
		SR_1	0 46 15					
		L	0 48 08	24				
		L	0 54 ..	20				
		M	0 55 ..		*200			
		F	1 50 ..					
11		P	4 16 43					
		S	4 22 30					
		SR_1	4 25 15					
		L	4 30 30	15				
		F	4 55 ..					
12		P?	22 35 45					
		S?	22 41 38					
		L	22 47 30	15				
		F	23 20 ..					
14		L	14 25 ..	15				Beginning not recorded. Adjusting instrument.
		F	15 40 ..					
16		e	18 51 ..					
		L	18 58 ..	15				
		F	19 50 ..					
17		eL	10 48 ..					
		F	11 20 ..					
17		P	16 26 05				3,300	
		S	16 31 10					
		L	16 38 ..	16				
		F	17 30 ..					
18		eL	2 53 ..	16				
		F	3 05 ..					
18		P	13 42 44				3,630	
		S	13 48 10					
		L	13 53 10					
		F	14 45 ..					
20		P?	8 30 20					
		S?	8 35 13					
		L	8 38 15	16				
		F	8 55 ..					

* Trace amplitude.

Illinois. *Chicago. University of Chicago.*—Continued.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
22		iP	22 07 14				2,930	
		PR_1	22 08 44					
		iS	22 11 52					
		L	22 14 30	15				
		F	23 20 ..					
24		P	2 27 41				5,870?	
		S?	2 35 10					
		L?	2 46 40	25				
		L	2 59 ..	16				
		F	4 10 ..					
24		P?	4 52 18					
		S?	4 58 04					
		L?	5 02 20					
		F	5 50 ..					
25		P	19 03 10				3,840	
		S	19 08 48					
		L?	19 14 45					
		F	20 00 ..					
31		P?	7 29 15					
		S?	7 35 40					
		L	7 48 ..	18				
		L	7 57 56	22				
		L	8 10 ..	15				
		F	9 30 ..					
31		P	22 01 11				5,770	
		S	22 08 35					
		eL?	22 18 ..					
		F	22 40 ..					

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, e 4:1; N: V 205, T_0 3.4, e 4:1

(Report for July, 1919, 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.

Instrumental constants: E: V 10, To 15; N: V 10, To 15

1919			H. m. s.	Sec.	μ	μ	km.	
July 6		eP_E	7 10 15					First appearance of long waves rather abrupt.
		eP_N	7 10 30					
		S_N	7 15 00					
		S_E	7 15 17					
		L_E	7 20 49					
		L_N	7 20 56					
		M_E	7 21 20	10	40			
		M_N	7 22 30	9		50		
		C_N	7 24 ..					
		C_E	7 26 ..					
		F_N	7 35 ..					
		F_E	7 37 ..					
8		eL_N	21 59 00					L_N is faint until 22:07.
		eL_E	22 01 50	24				
		L_N	22 07 00					
		M_E	22 07 04	20	50			
		M_N	22 10 40	17				
		M_N	22 15 50	17				
		C_E	22 15 ..	18				
		F_N	22 21 ..					
		F_E	22 26 ..	18				
9		eP_N	19 31 41					E–W not in operation.
		L_E	19 38 17	14				
		M_N	19 39 00	12		80		
		C_N	19 39 55	9				
		F_N	19 58 ..	8				

TABLE 2.—*Instrumental seismological reports, 1919*—Continued.

Maryland. *Cheltenham. Magnetic Observatory*—Continued.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1929			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
July 17	.....	eP_E	16 30 42	.....	.....	.....	.....	
		eP_N	16 31 11	.....	.....	.....	.....	
		L_N	16 35 55	.....	.....	.....	.....	
		L_E	16 36 42	.....	.....	.....	.....	
		M_N	16 39 00	15	10	.....	.....	
		C_N	16 42 40	13	.....	.....	.....	
		F_E	16 43 ..	.....	.....	.....	.....	
		F_N	16 47 ..	.....	.....	.....	.....	
18	.....	L_N	13 57 50	.....	.....	.....	.....	
		L_E	13 58 35	.....	.....	.....	.....	
		M_N	14 00 20	11	.....	10	.....	
		M_E	.. .. ..	.....	10	.....	.....	
		C_N	14 02 30	8	.....	.....	.....	
		F_E	14 07 ..	.....	.....	.....	.....	
		F_N	14 09 ..	.....	.....	.....	.....	
22	.....	P_E	22 07 21	3	.....	.....	.....	
		P_E	22 07 25	4	.....	.....	.....	
		S_N	22 11 57	5	.....	.....	.....	
		S_E	22 11 57	.....	.....	.....	.....	
		eL_N	22 14 00	.....	.....	.....	.....	
		L_E	22 14 06	.....	.....	.....	.....	
		M_E	22 14 36	8	30	.....	.....	
		C_E	22 16 15	6	.....	.....	.....	
		M_N	22 23 45	.....	.....	10	.....	
		F_E	22 25 ..	.....	.....	.....	.....	
		F_N	22 28 ..	.....	.....	.....	.....	
31	.....	iP_E	22 12 43	4	.....	.....	.....	
		iP_N	22 12 45	4	.....	.....	.....	
		eL_N	22 16 05	.....	.....	.....	.....	
		M_E	.. .. ..	.....	10	.....	.....	
		F_E	22 17 ..	.....	.....	.....	.....	
		F_N	22 19 ..	.....	.....	.....	.....	

Period of pendulum: E. 15 sec., N. 15 sec.

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: T wo Bosch-Omori 100 kg. horizontal pendulums (mechanical registration

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

(Report for July, 1919, nor 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.

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

(Report for July, 1919, not received.)

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)

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

(Report for July, 1919, not received.)

New York. *New York. 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.

		V	T_0	e
Instrumental constants..	E	72	5.0	0
	N	72	5.0	0

(Report for July, 1919, not received.)

Panama Canal Zone. *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.

	V	T_0
Instrumental constants..	35	20

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1914.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
July 10	.....	P_E	19 32 44	.....	.....	.....	825	Direction uncertain.
		P_N	19 33 04	.....	.....	.....	.....	
		S_N	19 34 04	.....	.....	.....	.....	
		S_E	19 34 08	.....	.....	.....	.....	
		L_N	19 34 44	20	.....	.....	.....	
		L_E	19 34 48	20	.....	.....	.....	
		M_N	19 34 59	.....	.....	*5,000	.....	
		M_E	19 36 28	.....	*3,500	.....	.....	
		F	19 53	.....	.....	.....	.....	
11	.....	M_E	4 11 35	20	.....	.....	.....	Trace, indistinct.
		M_N	4 13 13	20	.....	.....	.....	
		F	4 20 ..	.....	.....	.....	.....	
17	.....	P_E	16 22 04	.....	.....	.....	1,140	Direction uncertain.
		P_N	16 22 14	.....	.....	.....	.....	
		S_E	16 23 52	.....	.....	.....	.....	
		L_E	16 25 32	20	.....	.....	.....	
		L_N	16 25 36	20	.....	.....	.....	
		M_N	16 25 44	.....	.....	*1,200	.....	
		M_E	16 25 50	.....	*1,000	.....	.....	
		F_N	16 33 ..	.....	.....	.....	.....	
		F_E	16 33 24	.....	.....	.....	.....	
22	.....	P_E	22 02 24	.....	.....	.....	685	
		P_N	22 02 26	.....	.....	.....	.....	
		L_E	22 02 26	20	.....	.....	.....	
		L_N	22 03 54	20	.....	.....	.....	Do.
		M_E	22 02 37	.....	*2,200	.....	.....	
		M_N	22 04 02	.....	.....	*1,800	.....	
		F_E	22 13 ..	.....	.....	.....	.....	
		F_N	22 14 ..	.....	.....	.....	.....	

*Trace amplitude.

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

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

Instruments: Two Bosch-Omori.

		V	T_0
Instrumental constants..	E	10	17
	N	10	19

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1919.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
July 6	.....	eP_E	7 13 05	.....	.....	.....	.....	
		L_N	7 16 18	.....	.....	.....	.....	
		eL_E	7 18 15	.....	.....	.....	.....	
		M_N	7 16 34	.....	.....	10	.....	
		M_E	.....	.....	10	.....	.....	
		F_N	7 22 ..	.....	.....	.....	.....	
		F_E	7 25 ..	.....	.....	.....	.....	
8	.....	eL_E	21 54 10	.....	.....	.....	.....	Not recognizable on N component.
		M_E	21 59 10	20	20	.....	.....	
		C_E	22 01 15	20	.....	.....	.....	
		F_E	22 09 ..	.....	.....	.....	.....	
11	.....	eP_N	0 35 57	.....	.....	.....	.....	Both P and L difficult. Only a trace on N component.
		eP_E	0 36 31	.....	.....	.....	.....	
		L_E?	0 37 38	.....	.....	.....	.....	
		L_E	0 38 48	.....	.....	.....	.....	
		M_E	0 38 58	19	10	.....	.....	
		C_E	0 41 ..	.....	.....	.....	.....	
		F_E	0 45 ..	.....	.....	.....	.....	
		F_N	0 50 ..	.....	.....	.....	.....	
17	.....	P_E?	16 27 50	.....	.....	.....	.....	P faint and difficult. No trace on N component.
		L_E	16 35 43	.....	.....	.....	.....	
		M_E	16 36 53	17	10	.....	.....	
		C_E	16 40 ..	14	.....	.....	.....	
		F_E	16 45 ..	.....	.....	.....	.....	
22	.....	iP_N	22 06 06	.....	.....	.....	.....	No long waves on N component.
		iP_E	22 06 08	.....	.....	.....	.....	
		L_E	22 10 48	.....	.....	.....	.....	
		M_E	22 12 43	13	10	.....	.....	
		C_E	22 14 ..	.....	.....	.....	.....	
		F_N	22 13 ..	.....	.....	.....	.....	
		F_E	22 21 ..	.....	.....	.....	.....	

Period of pendulum: E. 17 sec., N. 20 sec.

TABLE 2.—*Instrumental seismological reports, 1919*—Contined.

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. Aa	Amplitude. An	Distance.	Remarks.
1919.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
July 6		e	7 12 10					
		L	7 18 30					
		F?	7 30 ..					
9		eL	19 43 ..					
		F	20 00 ..					
22		P	22 08 01				3,540	
		S	22 13 21					
		eL?	22 17 ..					
		F	22 25 ..					
31		e	22 10 50					
		F	22 17 ..					

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 & Hoye 80 kg. vertical seismograph.

Instrumental constants.. V 120, T_0 26

Date.	Character.	Phase.	Time.	Period T.	Amplitude. Aa	Amplitude. An	Distance.	Remarks.
1919.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
July 1		e	21 37 35					Amplitudes small. Note small periods on the L waves.
		i	21 43 16					
		eL?	21 52 40					
		L	21 54 12 to 22 22	8 / 7.5				
		F	22 40					
2		e?N	7 54					
		eN	8 09 30					
		eL?	8 14	7				
		L	8 18	17				
		L	8 30	8				
		F	8 45					
6		O	7 04 17				3460	
		P	7 10 54					
		S	7 16 08					
		eLE	7 19 24	22				
		L	7 25	20				
		L	7 45	8				
		F	8 15					
7		eL	14 50 to 15 00					
8		0?	21 13 42				(8080)	
		iP?	21 25 04					
		e?	21 31 54					
		eS?	21 34 30	10				
		e	21 40 24					
		eL?N	21 55					
		eL	21 58	35				
		L	22 10	18				
		L	22 21	16				
		LN	22 41	17				
		L	23 03	15				After 23 hours the amplitudes are so small as to be barely readable.
		F	23 40					
9		i	19 28 16					End of record very faintly marked, irregular periods.
		i	19 32 44					
		iN	19 35 34					
		eL?	19 39 48					
		L	19 42	9				
		L	20 00	8				
		F	20 30					
10		eL?N	2 38 48					
		L	2 40 30	8				
		L	2 44	8				
		F	3 05					
11		iN	0 38 11					Very irregular. Wind tremors make record difficult to read.
		iN	0 39 33					
		i	0 44 20					
		eL?	0 50 30					
		L	0 58	15				
		F	1 20					

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

Date.	Character.	Phase.	Time.	Period T.	Amplitude. Aa	Amplitude. An	Distance.	Remarks.
1919.			*H. m. s.*	*Sec.*	μ	μ	*Km.*	
July 12		e	22 38 30					Very small amplitudes; barely discernible.
		eL	22 43 30	18				
		F	22 55					
14		eL?	14 16	28				No indication of P. or S. Local blasting interferes on NS during this record.
		L	14 25	15				
		F	14 50					
17		L	10 52 to 11 10	16				
17		O	16 19 46				3,840	
		iPN	16 26 52					
		PR1N	16 28 04					
		PR2N	16 28 24					
		S	16 32 40					
		eL	16 38					
		L	16 40	23				
		F	17 00					
22		O	22 01 25				3,500	
		iP?	22 08 05					
		i	22 08 37					
		e	22 09 10					
		iS?	22 13 22					
		e	22 14 20					
		i	22 16 06					
		eL?	22 17 30 to 22 25	6				
		F	22 40					
24		eN	2 16 38					
		eN	2 20 24					
		eN	2 27 12					
		eL?E	2 45 30					
		LE	2 50					
		L	2 55	23				
		L	3 00	18				
		L	3 05					
31		e	22 05 12					May not be seismic.
		iN	22 06 17					
		e	22 09 24					
		eL?	22 12 00					
		F	22 25					

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=0.45″.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. Aa	Amplitude. An	Distance.	Remarks.
1919.			*H. m. s.*	μ	μ			
July 1		L	21 49 24					Times doubtful.
		L	21 58 54		*200			
		F	22 23 ..					
2		L	8 01 36		*50			
4								Micros after 10h of the 4th to morning of the 5th.
6		P	7 11 00?					Micros before P.
		S	7 15 36					
		eL	7 17 36					
		M	7 23 54		*200			
		F	7 38 30					
7		L?	14 57 30?					
		eL	15 00 54					
		M	15 04 54		*200			Gradual thickening.
		F	15 12 54					
8		iL	22 01 00					
		eL	22 10 42					Earlier phases masked by heavy micros.
		M	22 16 06		*5,000			
		F	Micros.					Lost in microseisms.
9								Heavy micros going on when quake was recorded at other stations.

* Trace amplitude.

TABLE 2.—*Instrumental seismological reports, 1919*—Continued.

Canada. *Toronto. Dominion. Meteorological Service*—Continued.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. Aa	Amplitude. An	Distance.	Remarks.
10		L	2 40 30		*200			Micros going on.
11		L	0 46 18					
		L	0 49 00					
		M	0 56 18		*100			
		F	1 26 30					
12		L	22 42 06		*100			Small micros going on.
14		e	14 13 54?					
		eL	14 23 00					
		eL	14 31 48					
		M	14 38 30		*200			
		F	15 03 30					
17		iP	16 26 30					
		iP	16 30 24					
		eS	16 33 54					
		L	16 39 24					
		L	16 40 36					
		M	16 48 42		*300			
		F						
18		e(or)L	13 25 00?					Small quake 13_h 40_m 36_s phases interiered with, while inspecting instrument.
22		P	22 08 06?					
		iP	22 11 30					
		S	22 14 00					
		eL	22 19 48					
		M	22 22 12		*200			
		F						Lost in microseisms.
24		e	2 47 42					
		e	2 57 06					
		eL	3 01 00					
		M	3 02 06		*200			
		eL?	3 15 48					
		F	3 27 18?					
25		L	19 13 48?					Marked micros going on.
		L	19 19 36		*200			
31		eL	8 06 36					
		M	8 10 30 / 8 12 24		*200			Gradual thickening.
		F	8 18 18					
31		L	22 05 54					
		L	22 12 30		*100			
		F						Lost in microseisms.

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

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

Instrument: Wiechert, vertical; Milne horizontal pendulum, North. In the meridian

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

Date.	Character.	Phase.	Time.	Period T.	Amplitude. Aa	Amplitude. An	Distance.	Remarks.
1919. July 1		P	21 50 29					
		M	21 51 58		*500			
		F	22 01 19					
1		P	22 05 15					
		L	22 06 14					
		M	22 07 13		*500			
		F	22 12 08					
2		L	8 25 12		*50			
		F	8 29 36					
6		P?	7 15 53				1,940?	
		S	7 19 11					
		L	7 24 49					
		M	7 28 47		*200			
		F	7 41 09					

* Trace amplitude.

Canada. *Victoria*, B. C.. *Dominion Met eorological Service*—Contd.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. Aa	Amplitude. An	Distance.	Remarks.
7		P?	14 21 47					
		L	14 35 17					
		M	14 43 47		*400			
		F	14 59 47					
8								Quake missed, light off the paper.
9		P	19 35 18				1,410?	
		S?	19 37 46					
		L	19 38 44					
		M	19 01 22		*400			
		F	19 48 34					
10		P	2 23 03					
		L	2 23 33					
		M	2 24 02		*300			
		F	2 33 23					
11		L?	1 06 56					
		M	1 14 18		*200			
		F	1 30 02					
17		S?	16 49 48					
		L	16 53 14					
		M	16 57 10		*400			
		F	17 18 49					
18		P	13 38 20					
		M	13 40 18		*300			
		F	13 45 03					
			Vertical.		A_s			
		P	*13 38 16*	*7*			*600*	
		L	*13 39 46*	*6*				
		M	*13 40 36*	*6*	*7*			
		F	*13 49 46*					
22		L?	22 35 02					
		M	22 38 58		*200			
		F	22 42 54					
24		P	2 45 16?					
		L	2 50 13					
		M	3 04 07		*400			
		F	3 23 22					
25		L	19 16 37?					
		M	19 20 35		*400			
		F	19 25 03					
31		M	7 50 57		*200			
		F	8 25 52					
31		L	21 58 25					
		M	22 00 43		*50			
		F	22 06 19					

* Trace amplitude.

SEISMOLOGICAL DISPATCHES.[1]

Guatemala City, Guatemala, July 24, 1919.

A dispatch sent to La Republica, a local paper, states that in the neighborhood of the city of St. Mark, Haiti, a rising of the earth had occurred, forming a small hill. This took place on July 22.

Guatemala City, Guatemala, July 24, 1919.

A communication received to-day at this city reports that on the afternoon of July 22 a strong shock was felt. Also that the Santa Ana volcano had become active. In the Fonseca Bay a small island has appeared.

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