SECTION V.—SEISMOLOGY.

SEISMOLOGICAL REPORTS FOR JUNE, 1918.

W. J. HUMPHREYS, Professor in Charge.

[Dated: Weather Bureau, Washington, D. C., Aug. 1, 1918.]

TABLE 1.—*Noninstrumental earthquake reports, June, 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.*			
June 3	16 05	Bishop Creek	37 23	118 23	3-5	2	15	Rumbling	Abrupt bumps and trembling	E. M. Nordyke, Wm. Barth, E. L. Herzinger.
5	4 33	Calexico	32 41	115 30	3	1	01	Faint	Rumbling, single bump, NE-SW.	H. M. Rouse.
6	22 32	Beaumont	33 55	117 00	4	1	15	None	Rapid rocking, NE-SW	F. D. Campbell.
		Corona	33 53	117 34	3	2		None		Thomas C. Sias.
		Escondido	33 07	117 06	4	1		None		A. R. Moon.
		Hemet	33 44	116 58	5	2	04	Rumbling	Gradual twisting, S-E	C. E. McManigal.
		Indio	33 43	116 13	5	1		Rumbling	Gradual rocking and trembling	Fred N. Johnson.
		Riverside	33 59	117 23	4	1		None		John H. D. Cox.
		San Bernardino	34 06	117 18	4	1		None		Mrs. Sarah W. Frantz.
		San Diego	32 43	117 10	2	1	02	None	Rapid trembling, N-S	H. F. Alciatore.
		San Diego (Camp Kearny, 15 miles north).	32 56	117 10	2	1		None		San Francisco Examiner.
		Warner Springs	33 17	116 39	4-5	1	30	None		J. A. Ream.
12	8 47	Calexico	32 41	115 30	4	1	05	None	Gradual rocking N-S	H. M. Rouse.
	14 19	Calexico	32 41	115 30	3	1	01	Loud	Rumbling, rapid trembling, E-W.	H. M. Rouse.
14	10 24	Hemet	33 44	116 58	5	2	06	Loud	Abrupt bumping, NE	C. E. McManigal.
16	22 10	Hemet	33 44	116 58	3	1	03	Rumbling	Abrupt bumping, NE	C. E. McManigal.
20	12 10	Hemet	33 44	116 58	3	1	03	Loud	Abrupt bumping, NE	C. E. McManigal.
21	19 37	Hemet	33 44	116 58	3	1	03	Faint	Abrupt bumping, NE	C. E. McManigal.
22	5 52?	Barrett (6 miles north)	32 42	116 41	5	1	03	Faint	Abrupt bumping, N	L. Watts.
	6 00?	Mesa Grande	33 10	116 46	3	1	01	Loud	Rumble from west 4-5 seconds before shocks, then an abrupt bump, W-E; rumble ended in 9 seconds, in E.	Edward H. Davis.
	5 57?	Warner Springs	33 17	116 39	3-4	1	30	None	Gradual rocking and trembling	J. A. Ream.
29	16 17	Salinas	36 41	121 39	4	1	02	None	Abrupt bumping, SE-NW	Dr. Earl D. Eddy.
		Spreckels	36 38	121 36	3	1	01	None	Gradual rocking, N-S	Dr. M. A. Klein.
		TENNESSEE.								
22	1 00?	Clinton	36 05	84 08	4	1	05	Rumbling	Gradual trembling, NE	J. E. Weaver.
		Kingston	35 52	84 32	3	1	03	Rumbling	Rapid trembling, SW	Sallie Littleton.
		Knoxville	35 56	83 58	3	3	09	Faint	Rumbling, rapid rocking	J. F. Voorhees.
		Lenoir City	35 47	84 17	6			Loud	Rumbling like a pair of heavy trucks rolling over the floor, gradual trembling.	W. N. Lacy.
		Loudon	35 44	84 21	5	1	15	Loud	Like rumbling thunder; abrupt bump, then rapid trembling, NW.	Robert W. Clark.
		McGhee	35 35	84 14	5?	1	1 00	Rumbling	Gradual onset with bumping, NE.	John O. Woods.
		Philadelphia	35 41	84 25	5	1	05	Faint	Abrupt bump, then gradual rocking and trembling, NE.	Will C. Cannon.
		Sweetwater	35 36	84 29	5	2	04	None	Abrupt trembling, N-S	Hulah C. Browder.
		WASHINGTON.								
21	5 47	Longmire	46 46	121 50	5	1	02	Faint	Rumbling, gradual swaying, N-S.	John B. Flett.

TABLE 2.—*Instrumental reports, June, 1918.*

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

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

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: {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. June 17		P	16 28 25	2				Probably local.
		M_E	16 28 42		30			
		C_N	16 29 40					
		F_E	16 33 ..					

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... {E V 10, T_0 14; N V 10, T_0 18}

(Report for June, 1918, not received.)

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.
			H. m. s.	*Sec.*	*μ*	*μ*	*Km.*	
1918. June 6					300	300		Tremors during 24 hours preceding 15 hours on dates given.
14					250	300		
17					100	100		
19					200	200		
20					200	200		
22					200	300		
25					50	50		

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.
			H. m. s.	*Sec.*	*μ*	*μ*	*km.*	
1918. June 5								Apparent activity at intervals during day.
7		P	21 34 ..					
		S	21 ? ?					
		L_E	21 36 ..	4	*5,000			
		L_N	21 36 ..	6		*5,000		
		M_E	21 36 ..	4–6	*10,000			
		M_N	21 37 ..	4–6		*9,000		
		C	21 42 ..					
		F	21 44 ..					
16–17								Visible waves of long period, more noticeable on N–S.

* 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.. {V 110, T_0 6.4}

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
			H. m. s.	*Sec.*	*μ*	*μ*	*km.*	
1918 June 3		P	0 14 04					
		S	0 22 48					
		L	0 30 20					
		L	0 35 ..	20				
		F	0 50 ..					
4		eL_N	5 12 40	20				
		F_N	5 25 ..					
4		L	18 04 30	20				
		F	18 45 ..					
7		eP	21 33 28					
		S	21 38 33?					
		L?	21 41 50					
		L	21 47 57	12				
		F	22 45 ..					
11		P	12 41 44					
		S	12 45 41					
		L	12 48 30	18				
		F	13 15 ..					
12		P?	4 37 09					
		S?	4 42 20					
		L	4 46 22					
		F	4 55 ..					
13		P	9 04 19					
		S	9 08 46					
		L	9 10 47					
		F	9 30 ..					
16		P	12 33 27					
		S	12 37 57					
		L?	12 40 30					
		F	12 55 ..					
17		e	16 45 37					Phases indistinguishable.
		F	16 55 ..					
22		S?	22 11 53					
		L?	22 17 27					
		L	22 22 50	20				
		F	22 45 ..					

TABLE 2.—*Instrumental reports, June, 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*	*3.0*	*0*

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
June 3	.....	e.....	0 14 05	.....	.....	.....	.....	Microseisms. e possibly 50 seconds sooner. No distinct M.
		S.....	0 22 51	.....	.....	.....	.....	
		eL_E...	0 30 18	16	.....	.....	.....	
		eL_N...	0 30 18	22	.....	.....	.....	
		F.....	1 00 ..	.....	.....	.....	.....	
4	.....	e_E.....	17 40 07	.....	.....	.....	.....	Microseisms.
		e_N.....	17 40 24	.....	.....	.....	.....	
		L_E....	18 06 14	24.5	.....	.....	.....	
		L_N....	18 06 14	22	.....	.....	.....	
		F.....	18 30 ..	.....	.....	.....	.....	
7	.....	eP_E...	21 34 07	.....	.....	.....	.....	S very doubtful.
		eP_N...	21 34 11	.....	.....	.....	.....	
		S_N?...	21 38 31	.....	.....	.....	.....	
		S_E?...	21 38 50	.....	.....	.....	.....	
		eL_N...	21 44 00	4	.....	.....	.....	
		eL_E...	21 44 06	5.5	.....	.....	.....	
		M_{E1}...	21 45 15	.....	*2,500	.....	.....	
		M_{E2}...	21 47 22	.....	*1,500	.....	.....	
		M_N....	21 48 18	.....	.....	*900	.....	
		F.....	22 50 ..	.....	.....	.....	.....	
11	.....	eP_N...	12 41 42	.....	.....	.....	.....	
		eP_E...	12 41 44	.....	.....	.....	.....	
		S.....	12 45 58	.....	.....	.....	.....	
		eL.....	12 48 06	13	.....	.....	.....	
		F.....	13 16 ..	.....	.....	.....	.....	
12	.....	e_N.....	4 35 24	.....	.....	.....	.....	Microseisms.
		eL_N...	4 44 30	.....	.....	.....	.....	
		L_N....	4 47 04	10	.....	.....	.....	
		L_E....	4 48 02.	10	.....	.....	.....	
		F.....	4 59 ..	.....	.....	.....	.....	
13	.....	iP.....	9 04 20	.....	.....	.....	.....	
		S.....	9 09 57	.....	.....	.....	.....	
		eL.....	9 13 18	.....	.....	.....	.....	
		F.....	9 26 ..	.....	.....	.....	.....	
16	.....	.....	12 ? ?	.....	.....	.....	.....	Quake lost in changing sheets. Bosch photographic shows: P-S 4m. 32s., S-eL 1m. 30s.
17	.....	e.....	16 43 15?	.....	.....	.....	.....	Microseisms. Time of phases uncertain because of loss of clock correction.
		S_E?...	16 45 50?	.....	.....	.....	.....	
		S_N?...	16 45 54?	.....	.....	.....	.....	
		F.....	16 57 ..	.....	.....	.....	.....	
22	.....	e.....	22 12 00	.....	.....	.....	.....	Heavy microseisms. e possibly 24 seconds sooner. S very doubtful.
		S_N?...	22 16 23	.....	.....	.....	.....	
		eL_N?..	22 18 12	.....	.....	.....	.....	
		L_E....	22 21 23	23	.....	.....	.....	
		L_N....	22 22 07	16	.....	.....	.....	
		F.....	22 40 ..	.....	.....	.....	.....	

*Trace amplitude.

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 29.4

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
June 4	.....	P.....	4 14 12	.....	.....	.....	.....	
		L.....	4 29 48	.....	.....	.....	.....	
		M.....	4 34 12	30	*1,900	.....	.....	
		C.....	4 36 06	.....	.....	.....	.....	
		F.....	4 57 ..	.....	.....	.....	.....	
4	.....	P.....	17 26 36	.....	.....	.....	.....	
		L.....	17 29 24	.....	.....	.....	.....	
		M.....	17 32 36	29	*1,500	.....	.....	
		C.....	17 35 42	32	.....	.....	.....	
		F.....	17 59 ..	.....	.....	.....	.....	
7	.....	e.....	21 50 48	.....	.....	.....	.....	
		M.....	21 52 06	29	*100	.....	.....	
		F.....	21 56 ..	.....	.....	.....	.....	
14	.....	e.....	21 45 48	.....	.....	.....	.....	Local 'quake. Motion irregular.
		M.....	21 47 00	.....	*600	.....	.....	
		C.....	21 49 36	.....	.....	.....	.....	
		F.....	21 55 ..	.....	.....	.....	.....	
16	.....	P.....	5 28 12	.....	.....	.....	.....	
		L.....	5 35 12	32	.....	.....	.....	
		M.....	5 36 54	26	*400	.....	.....	
		F.....	5 48 ..	.....	.....	.....	.....	
21	.....	P.....	4 28 54	.....	.....	.....	.....	
		eS?....	4 34 12	.....	.....	.....	.....	
		L.....	4 36 54	29	.....	.....	.....	
		M.....	4 37 30	.....	*100	.....	.....	
		F.....	4 40 ..	.....	.....	.....	.....	
24	.....	P.....	14 56 18	.....	.....	.....	.....	
		S.....	15 04 00	27	.....	.....	.....	
		L.....	15 11 30	32	.....	.....	.....	
		M.....	15 14 00	30	*500	.....	.....	
		C.....	15 15 42	.....	.....	.....	.....	
		F.....	15 37 ..	.....	.....	.....	.....	
26	.....	P.....	21 46 06	31	.....	.....	.....	
		L.....	21 52 12	32	.....	.....	.....	
		M.....	21 53 42	29	*400	.....	.....	
		C.....	21 55 00	.....	.....	.....	.....	
		F.....	22 01 ..	.....	.....	.....	.....	
27	.....	P.....	21 36 18	.....	.....	.....	.....	
		L.....	21 42 36	27	.....	.....	.....	
		M.....	21 46 00	.....	*200	.....	.....	
		F.....	22 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.

Instrumental constants..

	V	T_0	ε
E	177	3.4	4:1
N	205	3.4	4:1

(Report for June, 1918, not received.)

TABLE 2.—*Instrumental reports, June, 1918*—Continued.

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.
1918.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
June 7		eP_E?	21 34 06	5				P phases doubtful.
		eP_N?	21 34 18	10				
		P_E?	21 44 21	4				
		P_N	21 44 31	4				
		eL_N	21 46 11	12				
		eL_E	21 47 25	10				
		M_E	21 48 10	12	60			
		M_N	21 48 25	12		50		
		C_N	21 51 ..	10				
		C_E	21 53 ..	10				
		F	22 06 ..	9				
11		P_N	12 41 41	3				
		P_E	12 41 43	3				
		S_E	12 45 53	3				
		S_N	12 45 54	3				
		eL_N	12 48 37					
		eL_E	12 49 00					
		M_E	12 53 45	10	10			
		M_N	12 55 09	9		10		
		F_E	12 57 ..					
		F_N	13 04 ..					
12		e	4 44 09					
		eL_N	4 47 03	12		10		
		eL_E	4 48 09	12	10			
		F	4 54 ..					
13		P	9 04 20	3				
		Me	9 11 50	3	10			
		M_N	9 12 00	3		20		
		F	9 31 ..					
17		e	16 46 02					
		M_N	16 46 46	3		10		
		M_E	16 46 47	3	10			
		F	16 50 ..	3				
22		eP_N	22 12 09	4				Phases doubtful, barely perceptible on E.
		eS_N	22 17 09	4				
		eL_N	22 23 12					
		M_N	22 25 20	18		10		
		F_N	22 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

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
June 3		*O*	*0 03 07*				7120	E damped by magnet. N undamped: T_o=25 sec.
		iP_E	0 13 41	4				
		P_N	0 13 45					
		S_E	0 22 16	6				
		S_N	0 22 19					
		eL_E	0 28 59	9				
		eL_N	0 29 44	23				
		M_N	0 31 04	17				
		F_N	1 13 ..					
4		*O*	4 postea				3600-6000	L_N? deformed by local vibrations. M_N?
		e_N	5 00 10					
		L_N?	5 09 39	26?				
		L_E	5 11 08	24				
		L_N	5 15 38	20				
		F	5 28 ..					
4		*O*?	17 05 ca				13000+?	Difficult to decipher.
		eP_E?	17 20 38					
		S_E?	17 27 51	6				
		eL_N	18 09 30	20				
		L_N	18 15 08	16				
		F?	18 50 ..					
7		*O*	*21 16 12*				7040	Epicenter computed from S_N-P_E. eL_N-S_N gives 7035.
		P_E	21 26 42					
		S_N	21 35 13	6				
		S_E	21 35 39	6				
		i_E	21 40 06	6				
		e_E	21 43 06					
		P_N?	21 47 03					A new P?
		eL_N	21 47 03	28				
		L_E	21 48 41					
		M_N	21 51 03	13				
		M_E	21 51 31	12				
		M_N	21 54 19	14				N ran down at 22h, 05m.
		F_E	22 39 ..					

Massachusetts. *Cambridge. Howard University Seismographic Station*—Continued.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
11		*O*	*12 postea*				?	
		e_E	12 39 37	4				
		eP_N	12 40 08					
		eL_N?	12 44 26	12				
		e_E	12 44 59	6				
		L_E	12 50 04	10				
		F	13 20 24					
12		*O*?	*4 21 ca*				5610?	
		e_N?	4 30 34					
		e_E	4 32 34	6				
		e_N	4 36 28	4				
		e_N	4 44 30	7				
		L_N	4 46 05	12				
		L_E	4 46 48	14				
		F_N	4 56 43					
13		O_N?	*8 58 26*				3410?	Time uncertain on North component, on account of broken driving spring.
		O_E	*8 58 35*					
		iP_N	9 04 59?	2				
		iP_E	9 05 08	2				
		S_N	9 10 08?	6				
		S_N	9 10 17?	5				
		eL_N	9 13 37?	8				
		F_E	9 23 ..					
16		O_E	*12 27 44*				3330	Press reports prolonged shock at St. Vincent, W. I., eL uncertain, also L_E and of very short period. Time on N component uncertain. Compare with record of March 25, 1915, Δ=3440? *O*, 9h. 03m. 43s.?
		O_N	*12 27 45?*				3170?	
		iP_N	12 33 57?	2-4				
		iP_E	12 34 11	2-4				
		S_N	12 38 58?	6				
		S_E	12 39 17	6				
		i_N	12 40 08?					
		i_E	12 40 35	8				
		i_N	12 41 26?					
		F	12 55 ..					
17		*O*	*16 postea*					Possibly local and nonseismic. L microseismic. N (out of order) gives: e 16 45 16; L 16 45 49 to 16 46 15; L 16 48 10 to 16 48 45; F 16 53 ..
		e_E	16 45 38	2				
		to	16 45 56	4				
		L_E	16 46 02	6				
		to	16 46 49					
		L_E	16 49 25	6				
		to	16 50 12					
		F	16 56 ..					
22		*O*?	*21 56 51*				6000?	Δ and *O* very uncertain. e in microseisms.
		e_N	22 12 33					
		iS?	22 13 58	8				
		i_N	22 18 24	10				
		eL_N?	22 23 09	20				
		L_E	22 28 29					
		F_N	23					
26		*O*?	*22 48 53*				10050?	Δ and *O* very uncertain.
		S_E?	23 12 58	6				
		L_E	23 32 56	20				
		L_N	23 34 12	20				
		F_E?	23 41 ..					
27		*O*	*21 postea*					Masked by microseisms.
		L_N	22 00 54?	20				
		L	22 01 46?	20				
		L_E	22 06 31	15				
		L	22 12 16	14				
		F_N?	22 16 ..					

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.
1918.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
June 7		eP?	21 32 30?				2,980?	Time uncertain because of local disturbances.
		S	21 37 06?					
		L	21 38 30?					
		M_N	21 42 24?	12		*4,500		
		F	22 18 ..					

*Trace amplitude.

TABLE 2.—*Instrumental reports, June, 1918*—Continued.

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

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.. E: V 13, T_0 22, ϵ 4:1; N: V 14, T_0 25, ϵ 4:1

(Report for June, 1918, not rceeived.)

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 35, T_0 20

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1918			*H. m. s.*	*Sec.*	μ	μ	*km.*	
June 16		P_E	12 29 34				630	Direction probably NW.
		P_N	12 29 51					
		L_E	12 30 58	20				
		M_E	12 31 05		*2,000			
		L_N	12 31 15	20				
		M_N	12 31 19			*1,800		
		F_E	12 43 16					
		F_N	12 43 26					
20		P_E	5 24 00					Faint tremors. Very faint trace on N–S.
		F_E	5 36 00	20				
22		P_E	22 06 44				300	Direction uncertain.
		P_N	22 06 50					
		L_N	22 07 26	20				
		L_E	22 07 52	20				
		M_N	22 08 28			*11,400		
		M_E	22 08 44		*8,000			
		F_N	22 24 14					
		F_E	22 26 28					
28		P_E	8 01 41				385	Direction uncertain.
		P_N	8 01 42					
		L_N	8 02 30	20				
		L_E	8 02 33	20				
		M_N	8 02 34			*500		
		M_E	8 02 36		*500			
		F_N	8 10 14					
		F_E	8 10 30					

* Trace amplitude.

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

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

Instruments: Two Bosch-Omori.

Instrumental constants.. E: V 10, T_0 18; N: V 10, T_0 20

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1918			*H. m. s.*	*Sec.*	μ	μ	*km.*	
June 7		e_E	21 50 35					Only a few L waves.
		M_E	21 51 20	18	10			
		F_E	21 52 ..					
11		e	12 ? ?	5?				Began while sheet was being changed. New sheet started at 12h. 39 m. 03s.
		M_N	12 39 17			90		
		M_E	12 39 41		170			
		F	12 50 ..					
22		e_N	22 10 17	6				Only a few waves.
		e_E	22 10 28	6				
		F	22 27 ..					

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

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1918			*H. m. s.*	*Sec.*	μ	μ	*km.*	
June 7		e	21 45 25					
		L	21 50 30					
		F	22 15 ..					
11		P?	12 41 58					
		S?	12 46 30					
		L	12 49 20					
		F	13 10 ..					
16		P?	12 33 40					
		S?	12 38 55					
		L	12 42 ..					
		F	12 55 ..					

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.*	
June 3		e_E	0 23 06†					
		eL_M	0 30 ..					
		F	1 30 ..					
4		e	4 23 36†					
		e	4 33 42†					
		e	4 43 48†					
		e	4 59 ..					
		eL	5 02 ..					
		F	5 20 ..					
4		e	17 29 44	6			12,000	
		e	17 40 30†	6				
		e	18 05 ..	8				
		eL	18 08 ..	18				
		L	18 15 ..	17				
		L	18 37 ..	15				
		F	19					
7		*0*	*21 27 10*				3,780	
		eP	21 34 12					
		P_{repl}	21 35 30					
		S	21 39 46					
		S_{repl}	21 41 42					
		eL	21 43 56					
		L	21 48 ..	12				
		L	21 55 ..	8				
		L	22 04 ..	7				
		L	22 23 ..	7				
		F	22 45 ..					
11		e	12 41 54††					
		eL	12 49 24††					
		F	13					
12		e	4 37 30††					
		eL	4 45 48††					
		F	5					
13		*0*	*8 58 34*				3,460	
		P	9 05 11					
		S	9 10 25					
		L?	9 13 30†	7				
		L	9 15 ..	7				
		F	9 40 ..					
16		eL	6 10 to 6 35 ..	25 to 18				
16		*0*	*12 27 48*				3,410	
		iP	12 34 21					
		i	12 35 48					
		eS_N	12 39 30					
		S_{repl}	12 40 36					
		eL	12 42 30††					
		F	13					
17		i	16 43 20	2				
		e	16 43 32	5				
		e	16 44 52	6				
		e	16 45 54††	6				
		F	17					
22		i	22 15 12††					From Deformation Instrument. Seismograph clock stopped. i may not be seismic.
		i	22 18 36††					
		eL	22 26 ..					
24		ii?	15 41 54††					
		eL	15 46 ..	21				
		F	16					
26		eL	22 29 ..	28				
		L	22 34 ..	18				
		L	22 38 ..	17				
		F	22 50 ..					

† Original time given intenths of a minute.

TABLE 2.—*Instrumental reports, June, 1918*—Continued.

Canada. *Toronto. Dominion Meteorological Survice.*

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. A_E	Amplitude. A_N	Distance.	Remarks.
1918.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
June 2		L	13 41 18†		*50			
		F	13 44 ..					
3		S?	0 23 42					Microseisms.
		L_m	0 31 48					
		L_m	0 39 54					
		M	0 44 12		*1,300			
		F	1 57 42?					
4		L	4 59 42					P, S, & F, masked by microseisms.
		L_m	5 11 24					
		L_m	5 15 30					
		M	5 18 54		*800			
		F	5 ? ?					
4		L	18 02 18					Microseisms going on before L.
		L_m	18 08 00					
		M	18 12 42		*1,600			
		F	? ? ?					
		L?	19 36 36					
5–6								Heavy microseisms during night and morning.
7		iP	21 34 54				3,610	Microseisms before and after quake. Boom suddenly moved to west at beginning of L.
		S_m	21 40 18					
		iL	21 48 24					
		M	21 53 24		*1,300			
		F	? ? ?					
11		L	12 48 18					
		L_m	12 49 30					
		M	12 54 48		*800			
		F	13 28 30					
12		L_m	4 46 18					
		M	4 46 48		*300			
		F	5 06 48					
13		L	9 10 48		*50			
		F	9 38 12					
16		L	6 19 00					Thickening.
		L_m	6 25 36		*200			
		F	6 47 30					
16		S_m	12 37 18					
		L or S	12 39 24					
		L	12 42 18					
		M	12 46 42		*200			
		F	13 05 06					
17			16 43 ?					Light off. Small quake missed.
21		L?	4 45 12					Microseisms going on.
		L	4 58 12		*100			
22		L	22 21 00					
		L_m	22 24 42					
		M	22 25 54		*600			
		F	22 43 48					
24		L?	15 50 12					
		L_m	15 58 06					
		M	16 02 30		*100			
		F	16 34 48					
26		L_m	22 32 06					Very gradual thickening.
		M	22 39 18		*400			
		F	23 15 06?					
27		L	22 01 18					Microseisms going on before L.
		L	22 05 42					
		M	22 07 24		*200			
		F	22 37 42					

* Trace amplitude.
† All readings originally given in tenths of a minute.

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. A_E	Amplitude. A_N	Distance.	Remarks.
1918			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
June 2		P or L	13 22 25					
		M	13 22 47		*100			
		F	13 27 22					
3		P	0 31 34					
		L	0 49 16					
		M	0 57 38		*500			
		F	1 31 34					
4		P	4 29 24					
		L	4 46 15?					
		or	4 51 52					
		M	4 59 08		*400			
		F	5 15 01					
4		P	17 34 35					
		L	17 49 35					
		M	18 00 10		*400			
		F	18 50 19					
5		M	23 18 33		*100			
7		P	21 33 58				4,170	
		S	21 39 55					
		L	21 45 23					
		M	21 47 51		*2,000			
		F	22 44 23					
			VERTICAL		*Az*			
		P	*21 33 48*	*5*				
		S	? ? ?					
		L	*21 47 48*	*9*				
		M	*21 49 20*	*12*	*4*			
		F	? ? ?					
11		M	13 13 57		*400			
		F	13 31 39					
12		L	4 27 45					
		M	4 28 44		*400			
		F	4 41 51					
13		M	9 22 30		*100			
16		P	5 46 33?				4,120	
		S	5 52 27					
		L	6 00 20					
		M	6 05 45		*200			
		F	6 14 06?					
16		L	12 56 43		*50			
		F	13 01 37					
21		P	4 37 03				1,440	
		L	4 39 32					
		M	4 42 00		*200			
		F	4 49 27					
22		L	22 31 53					
		L	22 36 48					
		M	22 44 10		*100			
		F	22 54 57					
24		P	15 29 30				2,040	
		S	15 32 57					
		L	15 38 51					
		M	15 44 15		*200			
		F	15 59 00					
26		L	22 10 33					
		M	22 20 57		*400			
		F	22 30 57					
27		P	21 40 28					
		M	21 52 22		*200			
		F	22 13 11					

*Trace amplitude.

SEISMOLOGICAL DISPATCHES.[1]

St. Vincent, B. W. I., June 16, 1918.

A severe and protracted earthquake shock was felt here Saturday morning (June 15). (Assoc. Pr.)

Managua, Nicaragua, June 16, 1918.

Three strong shocks of earthquake were experienced early this morning. No serious damage has been reported. The wires are down to some points in the republic. (Assoc. Pr.)

London, June 16, 1918.

Violent earth shocks were felt in two widely separated parts of Italy, Saturday, June 15, in the town of Salerno, Province of Campania, and in Sicily.

Considerable material damage was caused in both, but no deaths have been reported so far. (Int. News Serv.)

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

LATE REPORTS.

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).								
Instrumental constants..					V	T_0	ϵ	
					E 80	23	0	
					N 50	25	4:1	
1918. May 25	.....	*O*	*H. m. s.* *19 29 34*	*Sec.*	μ	μ	*km.* 8050	Omitted in May report.
		eP_E	19 40 58	4	.....	.....	.....	
		P_N	19 40 59	.....	.....	.....	.....	
		S_E	19 50 20	10	.....	.....	.....	
		S_N	19 50 33	.....	.....	.....	.....	
		eL_E	20 03 56	30	.....	.....	.....	
		L_N	20 04 13	26	.....	.....	.....	
		F_E	21 27 ..	.....	.....	.....	.....	