SECTION IV.—RIVERS AND FLOODS.

RIVERS AND FLOODS, NOVEMBER, 1917.

By ALFRED J. HENRY, Professor in Charge.

Flood stages were not reached in the rivers in any part of the country during November, 1917.

Hydrographs for typical points on several principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

MEAN LAKE LEVELS DURING NOVEMBER, 1917.

By UNITED STATES LAKE SURVEY.

[Dated: Detroit, Mich., Dec. 5, 1917.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes.*			
	Superior.	Michigan and Huron.	Erie.	Ontario.
Mean level during November, 1917:	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Above mean sealevel at New York	602.46	581.16	572.97	246.69
Above or below—				
Mean stage of October, 1917	−0.21	−0.20	+0.16	+0.01
Mean stage of November, 1916	−0.99	+0.52	+1.30	+1.04
Average stage for November, last 10 years	−0.05	+1.02	+1.26	+1.17
Highest recorded November stage	−1.05	−1.76	−0.70	−1.13
Lowest recorded November stage	+0.96	+1.98	+2.27	+3.28
Average relation of the November level to—				
October level	−0.2	−0.3	−0.4	−0.3
December level	+0.2	+0.1	+0.1	+0.2

* Lake St. Clair's levels: October, 575.77; November, 575.76 feet.

MEAN LAKE LEVELS DURING OCTOBER, 1917.*

By UNITED STATES LAKE SURVEY.

[Dated: Detroit, Mich., Nov. 5, 1917.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes.			
	Superior.	Michigan and Huron.	Erie.	Ontario.
Mean level during October, 1917:	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Above mean sealevel at New York	602.67	581.36	572.81	246.68
Above or below—				
Mean stage of September, 1917	−0.06	−0.32	−0.47	−0.25
Mean stage of October, 1916	−0.97	+0.76	+0.92	+0.62
Average stage for October, last 10 years	−0.01	+0.96	+0.74	+0.88
Highest recorded October stage	−0.89	−1.58	−0.89	−1.13
Lowest recorded October stage	+1.09	+1.76	+2.01	+3.01
Average relation of the October level to—				
September level	±0.0	−0.2	−0.3	−0.4
November level	+0.2	+0.3	+0.4	+0.3

* This report was not received in time for the October issue of the REVIEW.

SECTION V.—SEISMOLOGY.

550.34

SEISMOLOGICAL REPORTS FOR NOVEMBER, 1917.

W. J. HUMPHREYS, Professor in Charge.

[Dated: Seismological Investigations, Weather Bureau, Jan. 3, 1918.]

TABLE 1.—*Noninstrumental earthquake reports, November, 1917.*

Date.	Approximate time Greenwich Civil.	Station.	Approximate latitude.	Approximate longitude.	Intensity Rossi-Forel.	Number of shocks.	Duration.	Sounds.	Remarks.	Observer.
		CALIFORNIA.								
1917.	*H. m.*		° ′	° ′			*M. s.*			
Nov. 1	13 50	Calexico	32 41	115 30	2	1		None		Ivan R. Ralston.
5	9 04	Cloverdale	38 46	123 00	3	2	4	Faint		John O. Ogle.
		Lakeport	39 04	122 56	2	2	10	Rumbling		A. S. Riggs.
13	7 50	Calexico	32 41	115 30	3	1	2½	Rumbling		H. M. Rouse.
19	17 30	El Cajon	32 48	116 58	2	1		None		H. H. Kessler.
		Indio	32 43	116 12	4	1	30	None		Bruce Drummond.
		Indio	32 43	116 12	4	1		Rumbling		Fred N. Johnson.
		Mecca	33 35	116 05	4	2	30	Rattling	Shook buildings	E. A. Palmer.
		WASHINGTON.								
12	10 47	Cedar Lake	47 24	121 43	4	1	4	None		D. A. Brown.
		Longmire	46 45	121 50	5	3	6	Rattling		John B. Flett.
		Summit Inn	47 28	121 26		2	40	Rumbling		J. P. Holden.
14	2 57	Longmire	46 45	121 50	5	1	3	Rumbling		John B. Flett.

TABLE 2.—*Instrumental reports, November, 1917.*

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

[For significance of symbols see REVIEW for July, 1917, p. 373.]

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 16; N: V 10, T_0 15

(Report for November, 1917, 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: E: V 10, T_0 19; N: V 10, T_0 19

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
			H. m. s.	*Sec.*	μ	μ	*km.*	
1917. Nov. 7		e_N	1 36 31					E-W component not working during entire month.
		M_N	1 38 01	7		20		
		F	1 47 ..					
8		e_N	5 34 16					
		M_N	5 52 16	7		20		
		F	6 07 ..					
16		eF_N	3 32 20					
		eL_N	3 56 ..	30				
		M_N	4 20 58	16		20		
		F	5 15 ..					

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, 1,221.7 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.*	
1917. Nov. 3					*50	*100		Tremors recorded during the 24 hours preceding 13h 00m on dates given.
5					*50	*100		
6					*50	*100		
7					*100	*100		
9					*50	*100		
11					*100	*200		
22					*50	*100		

*Amplitude on instrument.

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.)

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.*	
1917. Nov. 1		L_N	23 30 ..					Very strong activity.
2		F_N	1 40 ..					
6		L_N	9					Distinct wavelets at intervals on N-S.
		F_N	12					
7		L_N	6 30 ..					Distinct wavelets appear at intervals on N-S.
		F_N	9 15 ..					
16		L	5 31 ..					Times somewhat doubtful. P and S not discernible.
		M_N	5 33 ..	30		*750		
		M_E	5 33 ..	40	*750			
		C_N	5 34 ..					
		F_N	5 36 ..					
		C_E	5 38 ..					
		F_E	5 43 ..					
16		L	5 48 ..	20	*500	*500		Seems to be new quake. P and S not discernible.
		F	5 53 ..					

* 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.*	
1917. Nov. 4		e_N	12 25 40					
		L	13 18 40	24				
		L	13 30 00	18				
		F	13 50 00					
7		e	1 49 01					
		L	1 50 08					
		F	2 00 00					
8		e	5 46 00					Phases not defined.
		IR?	6 06 00					
		F	6 20 00					
14		eL	9 54 30					
		L	9 58 30	16				
		F	10 10 00					
15		eL_N	1 56 30					
16		P	3 38 49				9,025	
		PR?	3 45 05					
		S	3 49 01					
		L	4 06 50	20				
		L	4 08 10	45				
		L	4 17 00	24				
		L	4 26 00	18				
		F	5 50 ..					
16		eL_N	23 27 00					
18		P?	3 17 16					
		L	4 02 00					
		L	4 16 40	20				
		F	4 35 00					

TABLE 2.—*Instrumental reports, November, 1917*—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.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Nov. 4		e_N	12 25 08					Interpretation difficult; heavy microseisms present.
		e_E	12 25 27					
		L	13 08 13	30				Sheet taken off at 13h 22m, quake still on.
7		S_E?	1 49 11					Microseisms present.
		S_N?	1 49 18					
		L_N	1 50 12	10				
		L_E	1 51 20	10				
		F	2 06 ..					
14		e_E	9 37 56					Heavy microseisms present.
		e_N	9 37 58					
		L	9 58 30	22				
		F	10 31 00					
15		e	1 52 06					Only N-S component shows.
		F	2 20 ..					Heavy microseisms present.
16		e	3 39 01					Do.
		S_E?	3 49 03					S difficult.
		S_N?	3 49 20					Recorded on vertical instrument.
		eL_N	4 07 00	30				
		eL_E	4 10 48	32				
		M_E	4 18 24	25	*600			
		M_N	4 26 37	25		*400		
18		eL	3 56 12					F lost in microseisms.
		L	4 07 50	30				

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, E-W component.

Instrumental constant....T_0 18.6

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Nov. 4		e	12 22 ..					
		M	13 01 36		*300			
		F	14 46 ..					
7		e	1 52 00					
		M	1 56 00	22	*100			
		F	2 01 ..					
8		e	18 46 30					
		M	18 50 12	18	*100			
		F	18 54 ..					
14		eP	9 29 36					
		eL	9 31 36	21				
		M	9 38 06	18	*300			
		C	9 44 00					
		F	10 38 ..					
15		e	1 30 51					
		M	1 37 50	18	*100			
		F	1 43 00					
15		e	17 58 00					
		M	18 10 00	18	*100			
		F	18 16 ..					
16		P	3 28 18					
		S	3 36 12					
		eL	3 49 30	20				
		M	3 51 48	20	*5200			
		C	3 57 ..					
		F	7 21 ..					

*Trace amplitude.

Hawaii. *Honolulu. Magnetic Observatory*—Continued.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Nov. 16		P	22 38 06					
		eL	22 51 36	28				
		M	22 58 54	23	*600			
		C	23 06 ..					
		F	23 30 ..					
17		e	8 34 54					
		M	8 49 12	17	*100			
		F	9 05 ..					
18		eP	3 12 30					
		S	3 21 00					
		eL	3 34 12	25				
		M	3 46 54	17	*1200			
		C	3 56 ..					
		F	4 47 ..					
21		e	0 28 42					
		M	0 33 18	18	*100			
		F	0 38 ..					
22		eP	6 30 ..					
		M	6 44 00	19	*100			
		F	6 47 ..					
22		e	23 45 30					
		M	23 57 06	19	*100			
23		F	0 02 ..					
24		eP	11 20 48					
		S	11 28 42					
		eL	11 36 18	26				
		M	11 43 00	19	*300			
		C	11 49 ..					
		F	12 15 ..					
24		e	20 10 30					
		M	20 16 54	19	*200			
		F	20 21 ..					
28		e	2 53 48					
		M	3 01 54	20	*100			
		F	3 16 ..					
29		eL	22 35 18					
		M	22 45 00	20	*400			
		C	22 48 30					
		F	23 00 00					
30		eP	17 24 18					
		S	17 28 00					
		eL	17 30 48	20				
		M	17 35 00	18	*900			
		C	17 38 ..					
		F	18 23 ..					

* 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 November, 1917, 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..

	V	T_0
E	10	15
N	10	15

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917			*H. m. s.*	*Sec.*	μ	μ	*km.*	
Nov. 16		eP_E	3 49 ..					Just perceptible on N—S component at 4h 27m.
		eL_E	4 14 ..	24				
		M_E	4 27 ..	16	100			
		C_E	5 17 ..					

TABLE 2.—*Instrumental reports, November, 1917*—Continued.

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

Lat., 42° 22′ 36″ N.; long., 71° 06′ 55″ 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 e
E 80 23 0
N 50 25 4:1

(Report for November, 1917, 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 T_0 e
80 7 5:1

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			H. m. s.	Sec.	μ	μ	km.	
Nov. 7	.....	P_N	2 04 30	.....	.....	.....	.....	Barely perceptible.
		F_N	2 05 30	.....	.....	.....	.....	
7	.....	eP_N	9 41 00	.....	.....	.....	.....	
		M_N	9 46 30	.....	.....	.....	.....	
		M_E	9 46 30	.....	.....	.....	.....	
		F_N	9 53 ..	.....	.....	.....	.....	
16	.....	eP_E	3 43 30	.....	.....	.....	.....	
		eP_N	3 44 30	.....	.....	.....	.....	
		S_N	4 03 ..	.....	.....	.....	.....	
		S_E	4 10 ..	.....	.....	.....	.....	
		M_N	4 23 ..	.....	.....	.....	.....	
		M_E	4 25 ..	.....	.....	.....	.....	
		F	5 00 ..	.....	.....	.....	.....	

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 T_0 e
80 7 5:1

(Report for November, 1917, 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. V T_0 e
E 72 6.6 1.5:1
N 72 7.1 3.8:1

(Report for November, 1917, 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).

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

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			H. m. s.	Sec.	μ	μ	km.	
Nov. 7	.....	e_N	1 49 15	4–10	.....	.....	.....	
		F	1 59 ..	.....	.....	.....	.....	
8	.....	e_N	6 05 ..	4–10	.....	.....	.....	
		F	6 16 ..	.....	.....	.....	.....	
16	.....	e_E	3 48 55	20	.....	.....	.....	
		L_N	4 08 48	52	.....	.....	.....	
		F_N	5 40 ..	.....	.....	.....	.....	

Panama Canal Zone. *Balboa Heights.* Isthmian Canal Commission.

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.
1917.			H. m. s.	Sec.	μ	μ	km.	
Nov. 13	.....	P	8 59 02	.....	.....	.....	300	Direction probably north.
		L_E	8 59 43	.....	.....	.....	.....	
		L_N	8 59 48	.....	.....	.....	.....	
		M_E	9 00 01	.....	*500	.....	.....	
		M_N	9 00 05	.....	.....	*1,000	.....	
		F	9 05 00	.....	.....	.....	.....	
16	.....	L_N	4 05 09	.....	.....	.....	.....	Very distant. Time not working on N-S component.
		M	4 17 09	.....	*1,500	*500	.....	
		F	4 35 09	.....	.....	.....	.....	

* 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.. V T_0
E 10 17.5
N 10 18.0

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			H. m. s.	Sec.	μ	μ	km.	
Nov. 16	.....	eP_N	3 48 ..	.....	.....	.....	.....	
		eL_E	4 15 ..	30	.....	.....	.....	
		eL_N	4 17 ..	25	.....	.....	.....	
		M_E	4 18 30	22	40	.....	.....	
		M_N	4 19 30	24	.....	60	.....	
		C	4 38 ..	.....	.....	.....	.....	
		F	5 01 ..	.....	.....	.....	.....	

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.
1917.			H. m. s.	Sec.	μ	μ	km.	
Nov. 16	.....	S?	3 49 28	.....	.....	.....	.....	Beginning occurred while sheets were being changed.
		SR	3 55 32	.....	.....	.....	.....	
		eL	4 10 00	.....	.....	.....	.....	
		L	4 16 00	35	.....	.....	.....	
		L	4 22 20	20	.....	.....	.....	
		F	5 30 00	.....	.....	.....	.....	

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 80k. vertical seismograph.

Instrumental constants.. V T_0
120 26

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.
1917.			H m. s.	Sec.	μ	μ	km.
Nov. 4	.....	eL_E	13 07 .. / 13 40 ..	16	.....	.....	.....
7	.....	e	1 50 34	.....	.....	.....	.....
		eL?	1 51 12 / 1 53 ..	9	.....	.....	.....
		F	1 59 ..	.....	.....	.....	.....
8	.....	e	5 49 ..	6	.....	.....	.....
		e_E	5 51 42	6	.....	.....	.....
		e_E	6 05 47	2	.....	.....	.....
		e_E	6 06 13	2	.....	.....	.....
		e	6 06 56	6	.....	.....	.....
		e_E	6 09 .. / 6 10 30	8	.....	.....	.....
		F	6 15 ..	.....	.....	.....	.....

†Dr. Klotz, since assuming the directorship of the observatory, will be unable to read all the seismograms, probably only those of tectonic origin. All the grams will be read by Ernest A. Hodgson, seismologist in charge.

TABLE 2.—*Instrumental reports, November, 1917*—Continued.

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

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Nov. 14		eL	9 49 ..	20				
			9 56 ..					
		iL$_N$	9 57 ..	16				
		L	10 02 ..	16				
		F	10 10 ..					
15		eL$_N$	1 51 ..	14				
			1 59 ..					
16		*O*	*3 26 09*				9,560	
		P	3 38 50					
		I	3 47 35	8				
		S	3 49 28	10				
		SR1	3 55 50					
		eL	4 09 ..	50				
		L	4 13 ..	26				
		L	4 25 ..	17				
		L	4 35 ..	17				
		L	4 48 ..	15				
		L	4 55 ..	14				
		L	5 05 ..	14				
		I R1	5 26 ..	26				
		F	6 00 ..					
		eL$_N$	23 22 ..	24				
			23 29 ..					
18		e$_N$	3 17 40	5				N-S component masked considerably by microseisms.
		eL$_N$	3 57 ..	30				
		L	4 10 ..	24				
			4 15 ..					
		L$_N$	4 25 ..	16				
		F	4 35 ..					
24		eL$_N$	12 10 ..	24				N-S masked by microseisms.
			12 18 ..					

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=0.50″.

Date.	Character.	Phase.	Time.	Period. T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Nov. 4		L	13 04 54					Markings at 12^h 43^m 06^s and 12^h 52^m 36^s may be due to air currents.
		L	13 14 36					
		L	13 19 48					
		M	13 49 06		*300			
		F?	14 57 30					
7		L	1 49 48					
		M	1 51 00		*300			F in air currents.
8		L	6 04 48		*100			Air currents going on.
14		L	9 51 48					
		eL	9 57 18					
		M	9 58 00		*300			
		F	10 31 42					
15		L	1 58 12					Doubtful as to being seismic.
		M	1 58 30		*200			
16		eP	3 38 36				10,310	
		iS	3 49 48					S waves well defined.
		iS	3 50 30					
		L	4 09 36					
		L	4 23 12					
		M	4 25 36	18	*9,200			
		iL	4 32 30	12-18				
		L	5 45 54					
		F?	7 01 00					
16		L	23 21 12					
		L	23 41 18		*100			
		F	23 56 54					
18		L	3 36 30		*50			
		F	3 42 24					
18		L?	4 01 06					
		L	4 10 48					
		M	4 21 36		*200			
		F	5 02 06					
24		L	12 11 24		*50			
			12 16 26					
29		L?	22 56 18					
		L?	23 03 54		*50			
30		L	18 05 06					
		L	18 08 30		*50			
		F?	18 25 36					

* Trace amplitude.

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.
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Nov. 4		P	12 33 02				13,000	
		S?	12 46 48					
		L	12 53 41					
		M	13 20 14		*600			
		F	13 49 45					
7		P?	0 49 12					
		M	1 48 18		*400			
14		P or S.	9 30 26					
		L	9 39 22					
		M	9 46 18		*100			
		F	9 35 15					
16		P	3 32 27				9,290	
		S	3 42 52					
		L	3 57 15					
		M	4 11 08		*3,000			
		F	6 33 27					
			VERTICAL		A_E			
		P	*3 32 00*	*3-4*				
		L	*4 02 00*	*24*				
		M	*4 05 00*	*30*	*10*			
16		L	23 19 01		50			
18		L?	3 22 35					
		M	3 30 30		*100			
18		P?	3 41 54					
		S?	3 46 22					
		L?	3 54 48					
		M	4 02 04		*200			
		F	4 44 23					
28		P?	15 21 31					May not be a 'quake.
		M	15 23 29		*100			
		F	15 26 28					
29		L	23 00 09					
		M	23 04 09		*300			
		F	23 09 30					
30		S?	17 44 43					
		L?	17 48 42					
		M	17 55 38		*500			
		F	18 05 01					

* Trace amplitude.

TABLE 3.—*Late reports (instrumental).*

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								
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Oct. 6	.....	eP....	13 02 00	.....	.....	.....	.....	
		eL....	13 06 24	19	.....	.....	.....	
		M.....	13 07 00	.....	*200	.....	.....	
		C.....	13 09 00	.....	.....	.....	.....	
		F.....	13 30 00	.....	.....	.....	.....	
7	.....	eP....	15 21 54	.....	.....	.....	.....	
		eL....	15 49 00	26	.....	.....	.....	
		M.....	15 57 12	18	*200	.....	.....	
		C.....	16 02 00	.....	.....	.....	.....	
		F.....	16 09 00	.....	.....	.....	.....	
14	.....	eP....	3 26 00	.....	.....	.....	.....	
		eL....	3 38 54	20	.....	.....	.....	
		M.....	3 43 54	19	*500	.....	.....	
		C.....	3 49 00	.....	.....	.....	.....	
		F.....	3 58 00	.....	.....	.....	.....	
17	.....	eL....	15 09 36	26	.....	.....	.....	
		M.....	15 18 42	18	*400	.....	.....	
		C.....	15 24 00	.....	.....	.....	.....	
		F.....	15 37 00	.....	.....	.....	.....	
22	.....	eP....	7 42 06	.....	.....	.....	.....	
		eL....	7 59 00	20	.....	.....	.....	
		M.....	8 01 12	18	*200	.....	.....	
		C.....	8 03 00	.....	.....	.....	.....	
		F.....	8 48 00	.....	.....	.....	.....	
23	.....	eP....	1 21 06	.....	.....	.....	.....	
		L.....	1 24 00	18	.....	.....	.....	
		M.....	1 24 30	18	*300	.....	.....	
		C.....	1 33 00	.....	.....	.....	.....	
		F.....	1 49 00	.....	.....	.....	.....	
24	.....	e.....	3 03 06	.....	.....	.....	.....	
		M.....	3 04 54	17	*100	.....	.....	
		F.....	3 07 00	.....	.....	.....	.....	
25	.....	eP....	20 06 00	.....	.....	.....	.....	
		eL....	20 15 18	18	.....	.....	.....	
		M.....	20 24 18	19	*200	.....	.....	
		C.....	20 27 00	.....	.....	.....	.....	
		F.....	20 51 00	.....	.....	.....	.....	
27	.....	e.....	6 55 12	21	.....	.....	.....	
		M.....	7 00 00	19	*100	.....	.....	
		C.....	7 03 00	.....	.....	.....	.....	
		F.....	7 21 00	.....	.....	.....	.....	
28	.....	eL....	13 57 36	23	.....	.....	.....	
		M.....	14 02 24	18	*200	.....	.....	
		C.....	14 05 00	.....	.....	.....	.....	
		F.....	14 35 00	.....	.....	.....	.....	
31	.....	eP....	2 27 00	.....	.....	.....	.....	
		eL....	2 35 00	20	.....	.....	.....	
		M.....	2 39 42	19	*200	.....	.....	
		C.....	2 44 00	.....	.....	.....	.....	
		F.....	2 57 00	.....	.....	.....	.....	
*Trace amplitude.								
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..				V	T_0	ε		
				E 13	22	4:1		
				N 14	25	4:1		
1917.			*H. m. s.*	*Sec.*	*μ*	*μ*	*km.*	
Oct. 19	.....	eLN ..	16 53 45	.....	.....	.....	.....	
		FN...	17 16 --	.....	.....	.....	.....	
22	.....	eLN ..	7 42 08	22	.....	.....	.....	
		FN...	8 10 --	.....	.....	.....	.....	

SEISMOLOGICAL DISPATCHES.[1]

Portland, Oreg, Nov. 16, 1917.

Mount Rainier has been shaken twice this week by earthquakes, according to Prof. John Plett, who has been in the Government service at Rainier National Park for many years. He declares rocks have come hurtling down the mountain side, and his office severely shaken. (Associated Press).

Melbourne, Australia, Nov. 18, 1917.

An earthquake of unusual intensity was recorded here to-day and also at Sydney. The disturbance was located approximately in the Kermadec Islands, a small British archipelago off the east coast of Australia. (Associated Press.)

550.341 (776)

MINNESOTA'S EARTHQUAKE OF SEPTEMBER 3, 1917.

By Prof. C. J. POSEY.

[Dated: Department of Geology, University of Minnesota, Minneapolis, Nov. 28, 1917.]

It is well known that earthquakes occur much more frequently in some parts of the world than in others. In some regions a shock must be rather severe in order to receive more than passing notice, while in others even a slight tremor arouses general interest, so infrequently are earthquakes experienced. It is to this latter class that the upper Mississippi valley belongs.

About 3:30 on the afternoon of September 3, 1917, a slight earthquake was felt in central Minnesota, which is of interest not so much on account of its severity, or lack of it, as of the fact of its occurrence. So far as the writer has been able to learn there are no written accounts of earthquakes within the limits of the State since its settlement. That they have occurred here we know from the testimony of old settlers. The Long Prairie Leader of September 6, 1917, quotes Hon. Wm. E. Lee, of that city, as saying that "the vicinity experienced a harder shock in 1860, one that would have done damage had the country been more thickly settled at that time." In a recent letter to Mr. Warren Upham, Mr. Ora J. Parker, of Le Sueur, writes of an earthquake there on a Sunday afternoon between 1865 and 1870, a shock that was generally talked about the next day. It is not likely that these gentlemen refer to the same disturbance, for the dates do not coincide, and the two localities referred to are so far apart that a quake severe enough to be felt at the two places would have been more generally remembered.

The shock of September 3, 1917, was most severe at Staples, notheastern Todd County; at Lincoln, some 15 miles to the southeast in Morrison County; and at Brainerd, about 30 miles to the east, in Crow Wing County. Along a line running north of east and slightly oblique to this east-west line, the disturbance was felt at places approximately 110 miles apart; and along a line connecting Brainerd and Minneapolis it was felt for a maximum distance of about 120 miles. The total area over which the shock was felt was probably not more than 10,000 square miles. The distance it was felt east of Brainerd was about the same as that west of Staples; but along the northwest-southeast line it was felt several times as far to the south of Brainerd as to the north, thus showing that the disturbance was damped more rapidly northward.

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