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THE REGISTRATION OF EARTHQUAKES
AND
PRESS DISPATCHES ON EARTHQUAKES
FROM

JANUARY 1st, 1916, TO JANUARY 1st, 1917

BY

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at the

GEORGETOWN UNIVERSITY
STATION

and

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INSTALLATION AND EQUIPMENT OF THE SEISMOLOGICAL OBSERVATORY OF GEORGETOWN UNIVERSITY.

On the basis of a gift from Patrick H. O'Donnell, A.B. '92, A.M. '93, LL.B. '94, the foundation of the Georgetown University Seismological Observatory became possible. The original equipment consisted of an horizontal and vertical seismograph after Wiechert, each carrying a stationary mass of 80 kilos. These instruments were tentatively located in January, 1911, at the base of the South Tower of the Healy building. It was soon ascertained that this position was unfortunate because of the rocking of the tower, 212 ft. in height, under heavy wind conditions. A cave was promptly excavated beneath the quadrangle, measuring 12 ft. 4 in. in width, 30 ft. 10 in. in length and 11 ft. high. Care was taken to make this new home of the seismographs heat and damp proof. A new Wiechert horizontal seismograph of 200 kg. mass was purchased to take the place of the smaller one, which was thereupon loaned to the Croker Land Expedition for observations in the far North. The cave also houses the vertical seismograph after Wiechert, two Bosch-Omori pendulums of 25 kilos each and two conical pendulums after Mainka of 135 kg. mass. A concrete building, situated on observatory hill, at an altitude of 159 feet above sea level, shelters a Bosch-Omori photographic instrument with pendulums of 200 grams each. The time is automatically registered on these instruments by four contact clocks, noting minutes and hours. These clocks are corrected by wireless signals received from the United States Radiographic Station, Arlington, Va.

CONSTANTS

CONSTANTS OF THE STATION.

Latitude and longitude of the seismograph room:

$\phi = 38^{\circ} 54' 25''$ N. Lat.

$\lambda = 77^{\circ} 04' 24''$ W. from Greenwich.

TIME. All determinations are reduced to Greenwich mean civil time.

ALTITUDE, 42.4 meters above mean sea level.

GEOLOGY, subsoil of piers: decayed diorite.

CONSTANTS OF THE SEISMOGRAPHS.

BOSCH-OMORI TROMOMETERS (25 Kilos).

	<i>Period.</i>	<i>Magnification.</i>	<i>Damping.</i>
N-S Component.....	8.6	13.5	0
E-W Component.....	8.8	13.7	0

WIECHERT HORIZONTAL SEISMOGRAPH (200 Kilos).

	<i>Period.</i>	<i>Magnification.</i>	<i>Damping.</i>
N-S Component.....	5.2	143	2.6*
E-W Component.....	5.4	165	3.4

MAINKA CONICAL PENDULUM (135 Kilos).

	<i>Period.</i>	<i>Magnification.</i>	<i>Damping.</i>
N-S Component.....	5.4	70	0
E-W Component.....	4.0	93	0

WIECHERT VERTICAL SEISMOGRAPH (80 Kilos).

<i>Period.</i>	<i>Magnification.</i>	<i>Damping.</i>
3.0	80	0

*Dampers not in commission after June 30th.

SYMBOLS AND NOTATIONS.

1. *Character of the Earthquake.*

ROSSI-FOREL SCALE OF EARTHQUAKE INTENSITIES:

- I. *Microseismic shock*: recorded by a single seismograph or by seismographs of the same model, but not by several seismographs of different kinds; the shock felt by an experienced observer.
- II. *Extremely feeble shock*: recorded by several seismographs of different kinds; felt by a small number of persons at rest.
- III. *Very feeble shock*: felt by several persons at rest; strong enough for the direction or duration to be appreciable.
- IV. *Feeble shock*: felt by persons in motion; disturbances of movable objects, doors, windows; creaking of ceilings.
- V. *Shock of moderate intensity*: felt generally by everyone; disturbance of furniture, beds, etc., ringing of swinging bells.
- VI. *Fairly strong shock*: general awakening of those asleep; general ringing of house bells; oscillation of chandeliers; stopping of pendulum clocks; visible agitation of trees and shrubs; some startled persons leave their dwellings.
- VII. *Strong shock*: overthrow of movable objects; fall of plaster; ringing of church bells; general panic, without damage to buildings.
- VIII. *Very strong shock*: fall of chimneys, cracks in walls of buildings.
- IX. *Extremely strong shock*: partial or total destruction of some buildings.
- X. *Shock of extreme intensity*: great disaster, buildings ruined, disturbance of the strata, fissures in the ground, rock-falls from mountains.

d (terrae motus domesticus)	Local s h o c k (origin nearby, perceptible at the station).
v (terrae motus vicinus)	Near shock (origin less than 1,000 kilometers distant).
r (terrae motus remotus)	Distant s h o c k (origin from 1,000 to 5,000 kilometers distant).
u (terrae motus ultimus)	Very distant shock (origin more than 5,000 kilometers).

2. *Phases of the Seismogram.*

P (undae primae)	First phase, or first preliminary tremors.
PR_n	Waves n -times reflected at the earth's surface.
S (undae secundae)	Second phase, or second preliminary tremors.
SR_n	Waves n -times reflected at the earth's surface.
PS	Waves changed from longitudinal to transverse oscillation, or vice versa, through reflection at the earth's surface.
L (undae longae)	Long waves, chief phase, or principal part.
M (undae maximae)	Greatest motion in the chief phase.
C (cauda)	Tail or end portion.
F (finis)	End of discernible movement.

3. *Nature of the Motion.*

i (impetus) Sudden beginning of the motion.

e (emersio) Gradual beginning of the motion.

T (period) Time of one complete oscillation.

A amplitude of the motion, measured from the median line in millimeters. Instrumental trace.

A_N E-W component of *A*.

A_E N-S component of *A*.

A_Z Vert. component of *A*.

REGISTRATION OF EARTHQUAKES AT THIS STATION

From January 1, 1916, to January 1, 1917.

DATE.	CHARACTER.	PHASE.	TIME.	PERIODS.	AMPLITUDE.*			REMARKS.
					A _N	A _E	A _Z	
Jan. 1†	III _r	eP _E	H. M. S. 13 41 07					Microseisms. Very doubtful. Mainka shows P later. No distinct Main. Recorded on Vertical Seismograph.
		eP _N	13 41 13					
		S _N ?	13 50 00					
		L _E	13 58 44					
		L _N	13 58 49					
		F	15 46 00					
Jan. 13	III _r	eE	7 26 03					
		eN	7 25 16					
		L _E	7 28 20					
		L _N	7 27 18					
		F	7 56 00					
Jan. 13	III _r	eP _E	8 40 18					Microseisms. Recorded on Vertical Seismograph.
		eP _N	8 40 22					
		S _E	8 43 49					
		S _N	8 43 52					
		L _E	9 00 21					
		L _N	9 00 24					
		M _{E1}	9 22 32	30		0.57mm		
		M _{N1} ?	9 22 36	30				
		M _N	9 29 04	30		0.93mm		
		M _{E2}	9 29 52	30	0.72mm			
		M _{E3}	9 38 47	20		0.83mm		
		M _{N3}	9 38 02	20	0.72mm			
		F _E	10 35 00					
		F _N	10 42 00					
Jan. 24	II _r	eE	6 19 12					
		eN	6 19 07					
		S _E ?	6 24 15					
		S _N ?	6 24 18					
		F	6 42 00					

* Instrumental Trace.

† All records, unless otherwise noted, are from grams on Wiechert Horizontal (200 kg.)

REGISTRATION OF EARTHQUAKES—Continued.

Intern
Seismo
Centre

DATE.	CHARACTER.	PHASE.	TIME.	PERIODS.	AMPLITUDE.			REMARKS.
					A _N	A _E	A _Z	
Jan. 24	III _r	eP _E eP _N eL _E eL _N F	H. M. S. 7 07 01 7 07 00 7 31 06 7 31 06 8 27 00	 30 30				Series of long waves from 7h. 32m. to 7h. 55m. No distinct Main.
Jan. 31	III _r	eP _E eP _N S _E S _N R _E R _N L _E L _N F	18 09 39 18 09 33 18 20 03 18 20 03 18 28 20 18 28 20 18 30 25 18 33 17 19 39 00	 20 20				No distinct Main.
Feb. 3	III _r	e _E e _N P _E P _N L _E L _N F	4 17 23 4 17 23 4 18 31 4 18 32 4 20 56 4 20 54 4 29 00					Light microseisms at time of quake. Microseisms become heavier later. No distinct Main.
Feb. 3	III _r	e _E e _N i _N	5 08 30 5 08 15 5 09 29					F lost in microseisms.
Feb. 6	III _r	eP _E eP _N S _E S _N ? eL _E M _E M _N F	22 02 36 22 02 54 22 11 53 22 11 36 22 25 14 22 36 47 22 35 20 00 40 00	 20 25	0.7mm	1.1mm		
Feb. 7								
VERTICAL COMPONENT.								
Feb. 6	III _r	e L F	22 17 48 22 32 02 23 00 00					

REGISTRATION OF EARTHQUAKES—Continued.

DATE.	CHARACTER.	PHASE.	TIME.			PERIODS.	AMPLITUDE.			REMARKS.
							A _N	A _E	A _Z	
Feb. 8	III _r or IV _r	eP _E	H.	M.	S.					
			15	43	14					
		eP _N	15	43	22					
		S _E	15	48	52					
		S _N	15	49	14					
Feb. 11	II _r	F	16	31	00					
		eE	14	50	20					Microseisms present.
		eN	14	50	20					
		F	15	50	00					
		(et postea)								
Feb. 15	V _r	eP _E	11	43	35					
		eP _N	11	43	30					
		S _E	11	51	20					
		S _N	11	51	19					
		L _E	12	00	19	8				
		L _N	12	00	19	8				
		M _E	12	01	04	10				
		M _N	12	01	06	10	1.7mm	2.7mm		
		F	13	12	00					
Feb. 20	III _r or IV _r	eP _E	17	57	52					Microseisms present. No distinct Main.
		eP _N	17	57	55					
		S _E	18	06	17					
		S _N	18	06	22					
		eL _E	18	15	58					
		eL _N	18	15	28					
		F	19	30	00					
Feb. 21	III _r	eP _E	23	40	50					Microseisms.
		eP _N	23	40	47					
		S _E	23	41	50					
		S _N	23	41	50					
		eL _E	23	41	56	10				
		eL _N	23	41	56	10				
		M _E	23	42	02	10				
		M _N	23	42	02	10	3.6mm	2.7mm		

REGISTRATION OF EARTHQUAKES—Continued.

DATE.	CHARACTER.	PHASE.	TIME.	PERIODS.	AMPLITUDE.			REMARKS.	
					A _N	A _E	A _Z		
Feb. 21	III _r		MAINKA MACHINE.						
		eP _E	H. M. S.						
		eP _N	23 40 44						
		S _E	23 40 44						
		S _N	23 42 02						
		eL _E	23 42 03						
		eL _N	23 42 07						
		M _E	23 42 09						
		M _N	23 42 44						
		F	23 42 13	5.5mm	5.1mm				
	F	23 59 00							
Feb. 21	III _r		VERTICAL COMPONENT.						
		e	23 40 42						Microseisms heavy
		S	23 41 56						
		eL	23 42 03	6					
		M	23 42 08	6			1.6mm		
		F	23 58 00						
Feb. 27	IX _r	P _E	20 27 15						
		P _N	20 26 55						
		S _E	20 32 19						
		S _N	20 32 27						
		eL _E	20 33 52	12					
		eL _N	20 33 52	12					
		M _E	20 38 22	15		4.3mm			
		M _N	20 39 00	15	5.9mm				
		F	22 00 00					F lost in wind markings.	
			(et postea.)						
Feb. 27	IX _r		VERTICAL COMPONENT.						
		P	20 27 03						Heavy wind markings.
		S	20 32 30						
		L	20 34 12	9					
		M	20 39 29	17			3.0mm		
		F	22 00 00						
Feb. 27		MAINKA MACHINE.							
	P _E	20 27 15							
	P _N	20 27 33							
	S _E	20 32 29							
	S _N	20 32 25							

REGISTRATION OF EARTHQUAKES—Continued.



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DATE.	CHARACTER.	PHASE.	TIME.	PERIODS.	AMPLITUDE.			REMARKS.
					A _N	A _E	A _Z	
			MAINKA MACHINE.					
March 12	III _r	eP _E	H. M. S.					Wind markings. No distinct Main. Wiechert does not show P. eL shows at 7h. 46.4m.
		eP _N	7 37 01					
		S _E	7 37 25					
		S _N	7 42 49					
		eL _E	7 42 58					
		eL _N	7 46.3	6				
		F _E	7 46.2	6				
		F _N	8 02 09					
March 16	III _r	eP _E	8 02 04					No distinct Main. Microseisms due to wind.
		eP _N	22 54 13					
		S _E ?	22 54 13					
		S _N ?	22 58 26					
		eL _E	22 58 32					
		eL _N	23 02 10					
		L _E	23 02 05					
		L _N	23 04 08	10				
		F _E	23 04 10	9				
		F _N	23 17 00					
March 29	II _r	eP _E ?	23 20 00					eL _E not discerni- ble.
		eP _N	19 05 00					
		S _E	19 05 22					
		S _N	19 09 32					
		eL _N ?	19 09 36					
		F	19 13.9					
March 29	IV _r	e	19 28 00					Microseisms pres- ent.
		i	21 16 22					
		F	21 17 11					
March 31	IV _r	eP _E	21 18 00					Microseisms pres- ent.
		eP _N	11 23 03					
		S _N ?	11 23 24					
		L _E	11 28 31					
		L _N	11 31 03					
		M _E	11 31 03					
		M _N	11 34 14	12		1.5mm		
		F	11 34 09	12	0.9mm			
			11 58 00					

REGISTRATION OF EARTHQUAKES—Continued.

DATE.	CHARACTER.	PHASE.	TIME.	PERIODS.	AMPLITUDE.			REMARKS.
					A _N	A _E	A _Z	
March 31	III _r		H. M. S.					
		e	16 54 44					Microseisms present.
		eL _E ?	17 00 11					
		eL _N ?	17 00 02					
		L _E ?	17 01 16					
		L _N ?	17 01 07					
		F	17 38 00					
March 31	III _r	e	18 19 18					Microseisms present.
		F	19 10 00					
April 2	III _r	e _E	8 36 27	30				N-S scarcely discernible. Gram on Weichert lost in microseisms. Bosch-Omori shows L 8h. 41m. 35s. to 8h. 53m. 29s.
		P _E ?	8 42 06					
		L _E	8 45 43					
		F	9 15 00					
April 7	III _r	e _E	9 33 20					No distinct Main.
		e _N	9 33 54					
		L	10 22 10					
		L	10 59 30					
		F	12 00 00 (et postea.)					
April 11	III _r	e _E	3 55 25					All phases rather doubtful. S _N not discernible. Microseisms present. Mainka shows eL _E 3h. 58m. 17s. eL _N 3h. 58m. 30s.
		e _N	3 53 17					
		S _E ?	3 57 39					
		eL _E	3 58 57					
		eL _N	3 58 39					
		L _N	3 59 17					
		F	4 10 00					
April 16	III _r	e _E	22 45 27					Heavy microseisms. Phases not clear.
		e _N	22 45 09					
		S _N ?	22 49 33					
		F	23 14 00					

REGISTRATION OF EARTHQUAKES—Continued.



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DATE.	CHARACTER.	PHASE.	TIME.	PERIODS.	AMPLITUDE.			REMARKS.
					A _N	A _E	A _Z	
April 18	VII _r		H. M. S.					
		iP _E	4 11 50					Wind markings. Mainka shows P at 4h. 11m. 53s. S at 4h. 20m. 04s. No distinct Main. N-S Component.
		iP _N	4 11 50					
		S _E	4 20 00					
		S _N	4 20 01					
		eL _E	4 28 56	9				
		eL _N	4 28 32	9				
		M _{E1}	4 34 32	8		1.4mm		
		M _{E2}	4 36 16	8		1.2mm		
		F	5 17 00					
WIECHERT MACHINE.								
April 21		e	11 51 50					
		e	11 51 56					
		L	12 04 09					
		L	12 04 09					
MAINKA MACHINE.								
April 21	III _r	eE	11 50 39					No distinct Main. S _N doubtful.
		eN	11 50 26					
		S _E	11 55 56					
		eL _E	11 57 00					
		L _E	12 04 03	20				
		L _N	12 02 36	15				
		F	13 03 00					
April 24	VII _r to VIII _r	iP _E	4 31 26					No decided Main. P-S on Mainka 3m. 57s.
		iP _N	4 31 25					
		iS _E	4 35 25					
		iS _N	4 35 28					
		eL _E	4 37 00	10				
		eL _N	4 36 39	10				
		F	5 20 00					
		VERTICAL COMPONENT.						
April 24	VII _r to VIII _r	iP	4 31 37					No decided Main.
		iS	4 35 33					
		eL?	4 36 34					

REGISTRATION OF EARTHQUAKES—Continued.

DATE.	CHARACTER.	PHASE.	TIME.			PERIODS.	AMPLITUDE.			REMARKS.
							A _N	A _E	A _Z	
April 24	VII _r to VIII _r	eP _E	H.	M.	S.					
		iP _N	8	08	11					
		S _E	8	08	17					
		S _N	8	13	30					
		eL _E	8	13	33					
		eL _N	8	16	03	20				
		M _E	8	16	36	15				
		M _N	8	20	49	15		3.7mm		
		F	8	20	21	20	3.6mm			
April 26	VII _r	eP _E	9	16	00					
		eP _N	2	27	34					
		eS _E	2	27	28					
		iS _N	2	32	34					
		eL _E	2	32	37					
		eL _N	2	34	48	15				
		M _E	2	34	51	15				
		M _N	2	40	18	20		2.8mm		
		F	2	39	05	18	1.5mm			Mainka shows P at 2h. 27m. 27s. S at 2h. 32m. 40s.
April 26	III _r	eE	3	35	00					
		eN	6	32	34					
		eL _E ?	6	32	51					
		eL _N ?	6	39	48					
		L _E	6	42	29	20				
		L _N	6	42	29	17				
		F	6	43	34					Microseisms pres- ent. No distinct Main.
April 26	III _r	F	6	56	00					
		eE	7	24	32					
		eN	7	24	32					
		L _E	7	33	34					
		L _N	7	34	24					
May 10	III _r	F	8	14	00					
		eE	21	42	25					
		eN	21	42	25					
		S _E	21	48	08					
		S _N	21	48	11					
		L _E	21	52.7		28				
		L _N	21	53.8		17				No distinct Main.
		F	22	40	00					

REGISTRATION OF EARTHQUAKES—Continued.



DATE.	CHARACTER.	PHASE.	TIME.	PERIODS.	AMPLITUDE.			REMARKS.
					A _N	A _E	A _Z	
May 11	III _r	iP _E	H. M. S. 10 16 44					No distinct Main. Microseisms. i for P seems quite certain. Vertical shows e _Z at 10h. 18m. 16s.
		iP _N	10 16 44					
		S _E	10 21 05					
		S _N	10 21 01					
		eL _E	10 22 29	12				
		eL _N	10 22 23	12				
		F	10 38 00					
May 13	III _r	e _E	2 33 12					Heavy microseisms. Possibly S with P lost.
		e _N	2 33 02					
		e _E	2 41 50					
		e _N	2 41 50					
		F	2 58 00					
June 2	III _r	e _E	13 59 29					Microseisms present. No distinct Main.
		e _N	13 59 28					
		eP _E	14 05 13					
		eP _N	14 05 14					
		S _E	14 10 32					
		S _N	14 10 32					
		L _E	14 13 31	9				
		L _N	14 13 22	8				
		F	14 50 00					
June 6		e _E	21 04 12					Microseisms present. Gram difficult of reading. Possibly mechanical disturbance.
		e _N	21 04 12					
		i _E	21 08 19					
		i _N	21 08 21					
		F	21 22 00					
June 8	II _r	e	21 14 27					Microseisms present.
		F	21 20 00					
June 21	III _r	eP _E	21 42 39					Microseisms present. No distinct Main.
		eP _N	21 42 39					
		S _E	21 50 48					
		S _N	21 50 48					
		eL _E	21 58 54	15				
		eL _N	21 59 12	15				
		F	22 15 00					

REGISTRATION OF EARTHQUAKES—Continued.

DATE.	CHARACTER.	PHASE.	TIME.			PERIODS.	AMPLITUDE.			REMARKS.
							A _N	A _E	A _Z	
June 25	III _r	e _E	H.	M.	S.	12				S _N and L _N not discernible. No distinct Main.
		e _N	18	37	45					
		S _E	18	37	30					
		L _E	18	40	42					
		F	18	43	10					
June 27	III _r	F	18	50	00					
		e _N	13	41	55					
		S _N ?	13	45	28					
June 30	V _r	F	14	20	00					E-W simply showed thickening of line.
		eP _N	3	07	49					
		S _E	3	13	47					
		S _N	3	13	58					
		eL _E	3	20	42					
		eL _N	3	20	49					
		L _E	3	24	05					
		L _N	3	23	51					
July 28	III _r	F	4	24	00					Microseisms present. P _E lost. No distinct Main. Mainka shows e _E at 3h. 07m. 18s. S _E at 3h. 13m. 02s.
		e	17	28	52					
		eL _N	17	55	14					
		L	17	56	22					
Aug. 3	III _r	F	18	11	00					Microseisms present. Phases not defined. Mainka shows L at 17h. 54m. 56s. No distinct Main.
		e _E	1	46	49					
		e _N	1	46	16					
		eL _E ?	2	03	23					
		eL _N ?	2	03	23					
Aug. 25	III _r	F	3	12	00					Mainka shows e at 1h. 46m. 24s. S? 1h. 52m. 56s.
		eP _E	9	53	20					
		eP _N	9	53	14					
		iS _E	10	03	51					
		S _N	10	03	51					
		eL _E	10	13	4					
Aug. 26	IV _r	eL _N	10	13	4					Sheet removed by mistake at 12h. 15m. Tremors still on. F doubtful. No distinct Main. Shows on Vertical.
		e _E	19	36	26					
		e _N	19	36	26					
		S _E	19	38	18					
		S _N	19	38	18					
		F	19	44	00					

REGISTRATION OF EARTHQUAKES—Continued.

DATE.	CHARACTER.	PHASE.	TIME.	PERIODS.	AMPLITUDE.			REMARKS.
					A _N	A _E	A _Z	
Aug. 27	III _r	e _E	H. M. S. 21 07 43					
		e _N	21 07 43					
		eP _N ?	21 22 22					
		eP _N ?	21 22 22					
		F	22 04 00					
Aug. 28	III _r	e _E	6 59 38					Bosch-Omori shows e at 6h. 58m. 51s. S very doubtful.
		e _N	6 59 38					
		i _R	7 04 38					
		S _E ?	7 07 35					
		S _N ?	7 07 35					
		eL _E ?	7 22.3	18				
		eL _N ?	7 22.3	18				
		F	9 04 00					
Sept. 21	III _r	eP _E	19 01 30					Microseisms present. P difficult to concern. L doubtful.
		eP _N	19 01 36					
		S _E	19 05 33					
		S _N	19 05 33					
		L _E ?	19 08 51	11				
		eL _N	19 07 09	11				
		F	19 45 00					
Sept. 23	V _r	eP _E	5 48 44					
		eP _N	5 48 49					
		i _{S_E}	5 54 10					
		S _N	5 54 12					
		eL _E	5 58 30	20				
		eL _N	5 58 58	20				
		M _E	6 00 58			0.2mm		
		M _N	6 01 22		0.6mm			
		F	6 15 00					
Sept. 24	III _r	e _E	19 54 38					Phases not discernible. Bosch-Omori shows e at 19h. 54m. 53s.
		e _N	19 54 30					
		F	20 18 00					
Sept. 28	III _r	e _E	15 57 31					Questionably of seismic origin. Microseisms present.
		e _N	15 57 28					
		F	16 18 00					

REGISTRATION OF EARTHQUAKES—Continued.

DATE.		PHASE.	TIME.	PERIODS.	AMPLITUDE.			REMARKS.
					A _N	A _E	A _Z	
Oct. 3	V _r		H. M. S.					
		eP _E	1 35 39					P possibly sooner. Heavy micro- seisms present. No distinct Main.
		eP _N	1 35 39					
		S _E	1 43 13					
		S _N	1 43 24					
		eL _E	1 51 41					
		L _{E1}	1 55 25	30				
		L _{N1}	1 55 14	30				
		L _{E2}	2 03 00	30				
		L _{N2}	2 02 02	30				
		F	2 40 00					
Oct. 3	III _r	S _E	5 04 03					P lost in micro- seisms. eL diffi- cult.
		S _N	5 04 00					
		eL _E	5 07 27					
		eL _N	5 07 35					
		F?	5 16 00					
Oct. 18	V-VI _r	eP _E	22 05 26					P very doubtful. Microseisms.
		eP _N	22 05 26					
		S _E	22 07 51					
		S _N	22 07 52					
		eL _E	22 08.4					
		eL _N	22 08.4					
		F	22 17 00					
Oct. 20	III _r	eL _E	17 55.8	30				F lost in micro- seisms. Heavy micros- seisms present. N-S Component hardly shows.
		L _E	17 58.2	30				
		M _E	18 02.3	20		0.2mm		
		F	18 05 00					
Oct. 31	III _r	eP _E	15 43 02					Microseisms pres- ent. No distinct Main.
		eP _N	15 43 04					
		iS _E	15 52 57					
		S _N	15 53 00					
		eL _E	16 09.4	30				
		eL _N	16 09.4	24				
		F	17 32 00					

REGISTRATION OF EARTHQUAKES—Continued.

DATE.	CHARACTER.	PHASE.	TIME.			PERIODS.	AMPLITUDE.			REMARKS.
							A _N	A _E	A _Z	
Nov. 10	VI _r		H.	M.	S.					Heavy wind markings. P and S very doubtful.
		e _E	9	24	19					
		e _N	9	24	33					
		eL _E	9	28	43					
		eL _N	9	28	35					
		M _{E1}	9	31	54	9		1.3mm		
		M _{N1}	9	29	40	9	1.1mm			
		M _{E2}	9	33	45	9		0.6mm		
		M _{N2}	9	30	37	9	0.8mm			
		M _{N3}	9	31	18	8	0.6mm			
Nov. 13		F	9	50	00					
		L?	12	26.7						
		F	12	41	00					
Nov. 18										Of doubtful seismicity. Heavy microseisms present.
		eL _E ?	12	26.4						
		L _E	12	29.2						
		F	12	50	00					
Nov. 21	V _r									Heavy microseisms present. Sheets changed by mistake at 7h. 32m., at which time traces were still apparent. F doubtful.
		eP _E	6	31	32					
		eP _N	6	31	33					
		S _E	6	36	24					
		S _N	6	36	27					
		eL _E	6	39.6						
		eL _N	6	39.5						
		L _E	6	43	21					
		L _N	6	44	18					
Nov. 21										VERTICAL COMPONENT.
		e	6	31	27					
		eL	6	39.6						
		L	6	45	00	9				
		F	7	16	00					

REGISTRATION OF EARTHQUAKES—Continued.



DATE.	CHARACTER.	PHASE.	TIME.			PERIODS.	AMPLITUDE.			REMARKS.
							A _N	A _E	A _Z	
Nov. 30	VI _r	e _E	H.	M.	S.					Vertical shows e at 3h. 22m. 33s.
		e _N	3	22	41					
		s _E	3	26	29					
		s _N	3	26	31					
		eL _E	3	27	26	8				
		eL _N	3	27	24	8				
		M _E	3	33	59					
		M _N	3	33	45					
		F	4	40	00		0.5mm	0.9mm		
Dec. 14	III _r	eP _E	17	03	41					Heavy micro-seisms due to wind. No distinct Main.
		eP _N	17	03	41					
		eS _E	17	12	47					
		eS _N	17	12	45					
		eL _E	17	23	39					
		eL _N	17	23	44					
		L _E	17	33	30	36				
		L _N	17	33	44	36				
		F	18	03	00					
Dec. 23	III _r	eP _E	9	34	52					Heavy wind markings. No distinct Main. F lost in heavy wind markings.
		eP _N	9	34	40					
		iS _E	9	43	05					
		s _N	9	43	08					
		eL _E	9	53	27					
		eL _N	9	53	25					

DISPATCHES OF EARTHQUAKES AT THIS STATION FROM JANUARY 1, 1916, TO JANUARY 1, 1917.

PLACE.	DATE.	LOCAL TIME.	CHARACTER.	SOURCE OF INFORMATION.	REMARKS.
Schenectady, N. Y., U. S. A.	Feb. 2.	11h. 25m. P. M.	Distinctly felt.	Associated Press.	No damage.
Panama.	Feb. 8.	11h. 14m. A. M.	Severely felt.	" "	Center in vicinity of Los Santos Prov- ince.
Fort De France, Mar- tinique.	Feb. 12.	11h. 13m. P. M.	Heavy.	" "	No damage.
Stuttgart.	Feb. 13.	Not given.	Severe.	International News Service.	Damage severe.
Chattanooga, Tenn., U. S. A.	Feb. 21.	6h. 45m. P. M.	Pronounced.	Associated Press.	Felt also in Atlanta, Ga.; Columbia, S. C.; Knoxville, Tenn.
San Jose, Costa Rica.	Feb. 27.	2h. 33m. P. M.	Severe.	" "	
Quebec, Canada.	Feb. 29.	12h. 15m. A. M.	Slight.	" "	
Rome, Italy.	March 12.	Not given.	Slight.	" "	Observatory at Flor- ence estimates epi- center in Adriatic Sea.
Panama.	March 29.	First, 5 A. M.; second, afternoon.	Distinctly felt.	" "	No damage.
Fuerteventura, Cana- ries.	April 15.	Not given.	Severe.	" "	Damage slight.
Santo Domingo, Do- minican Republic.	April 24.	11h. 30m. P. M.	Severe.	" "	No damage.
San Juan, Porto Rico.	April 24.	12h. 30m. A. M.		" "	No damage.
Boise, Idaho, U. S. A.	April 29.	8h. 18m. P. M.	Distinct.	" "	
Costa Rica.	April 30.	Not given.		" "	Slight damage.
Los Angeles, Cal., U. S. A.	May 2.	6h. 30m. A. M.	Slight.	" "	
Boise, Idaho, U. S. A.	May 12.	7h. 26m. P. M.	Distinct.	" "	
Anaconda, Mont., U. S. A.	May 12.	7h. 30m. P. M.	Distinct.	" "	No damage.
Rimini, Italy.	Night of May 16-17.	Not given.	Severe.	" "	Serious damage.
Willemsted, Curacao.	May 27.	2h. 30m. P. M.	Heavy.	" "	No damage.
Baker, Ore., U. S. A.	May 28.	Not given.	Slight.	" "	
Hudson Valley, N. Y., U. S. A.	June 8.	Shortly after 4 o'clock P. M.	Slight.	Local dispatch.	
Rome, Italy.	June 16.	3h. 25m. A. M.	Heavy.	Associated Press.	No casualties.
Caltanissetta, Sicily.	July 6.	Not given.	Violent.	" "	
Region of Fiume, Aus- tria.	July 18.	Not given.		International News Service.	Great damage.
Ancona, Tesara, Ri- mini, Italy.	Aug. 16.	Not given.		Stefani News Agency.	Houses wrecked.
Hickory, Statesville, N. C., U. S. A.	August 26.	2h. 45m. P. M.	Sharp.	Associated Press.	No damage.
Santiago, Chile.	August 26.	Not given.	Severe.	" "	Dispatch delayed, hence date uncer- tain.
San Juan Del Sud, Nicaragua.	Sept. 23.	Early in day.	Heavy.	" "	
Imperial Valley, Cal., U. S. A.	Sept. 29.	Not given.	Slight.	" "	Several quakes.

DISPATCHES OF EARTHQUAKES RECEIVED—Continued.

PLACE.	DATE.	LOCAL TIME.	CHARACTER.	SOURCE OF INFORMATION.	REMARKS.
Atlanta, Ga., U. S. A.	Oct. 18.	Shortly after 4 o'clock P. M.	Slight.	Associated Press.	Damage slight.
Unionville, Nevada, U. S. A.	Oct. 20. Oct. 21.	9h. 40m. P. M. 8h. 50m. A. M. 11h. 10m. A. M.	Sensible.	Local Observer.	
Los Angeles, Cal., U. S. A.	Oct. 22.	6h. 45m. P. M. 6h. 55m. P. M.		Associated Press.	No damage.
Glen Falls, N. Y., U. S. A.	Nov. 1.	Not given.	Slight.	" "	
Birmingham, Ala., U. S. A.	Nov. 4.	6h. 15m. A. M.	Distinct.	" "	Possibly explosion felt.
Kobe, Osaka, Kyoto, Japan.	Nov. 29.	Not given.	Severe.	" "	Considerable damage.
Kobe, Japan (second dispatch).	Nov. 25.	Not given.	Most severe in 25 years.	" "	Japanese seismologists believe the disturbance attributable to subsidence of subterranean fissures below sea bottom, off the city of Kobe. (Note change of date)
Lower Verapaz, Guatemala.	Dec. 20.	Not given.	Sensible.	" "	Fifteen persons killed. Cause, volcanic explosion.
Unionville, Nevada, U. S. A.	Dec. 17. Dec. 18.	6:45 A. M. Pacific Time. 9:00 P. M.	Slight. Slight.	Local Observer. " "	