

No. 1

From January 1

to January 31,

1915

HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

RECORD OF THE SEISMOGRAPHIC STATION

DEPARTMENT OF GEOLOGY AND GEOGRAPHY

$\phi = 42^\circ 22' 36''$ N. $\lambda = 71^\circ 06' 59''$ W. Gr. h = 5.367 M. FOUNDATION: Glacial sand over clay.

TIME: Mean Greenwich, midnight to midnight.

INSTRUMENTS: Two Bosch-Omori 100 kg. horizontal pendulums (mechanical registration).

No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
434	1915 Jan. 5	O	23	37	39			3950	N.B. Pendulums undamped. O equals time at origin, calculated from Brit. Assoc. Tables after Galitzin and Walker.
		eP _N	23	44	56				
		S _E	23	50	40				
		eL	23	54	01	10-15			
		M _E	0	18	22	24			
		L _N	0	32	35	20-			
		F	0	56					
435	10	O?	indeterm.						e in microseisms. Time interpolated because of failure of minute ticks.
		eL?	23	24	26	20-15			
		F	23	45	ca				
436	13	O	6	52	29			6750	All phases superposed on microseisms. P to S on N component illegible. Maximum ill-defined. Destructive earthquake reported about Lago di Fucino in Central Italy. Origin near 42°N, 13°E. A by undamped pendulum.
		eP _E	7	02	45				
		S _E	7	04	17	4			
		S _E	7	11	01	15			
		eL _E	7	19	21	35			
			7	22	24	25			
			7	26	25	20			
		M _E	7	27	48	20	(1.1 mm.)		
F	8	05	ca						
437	27	O?	bet. 1h & 2h.						No decided maximum.
		eN?	1	37	44				
		L _E	1	40	30	40			
			1	41	14	22			
			1	43	37	16			
			1	45	42	20			
		to	1	48	18				
		L _E	1	49	04	20-16			
		L _N	1	51	33				
		F _E	2	12					

J. B. Woodworth

No. 2:

From February 1

to

Feb

1911

HARVARD UNIVERSITY, CAMBRIDGE, MASS., U.S.A.

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No.	Date	Phase	Time			Periods	Amplitudes		Δ	REMARKS
			h.	m.	s.		s.	μ .		
438	1915 Feb. 7	O	5	16	30			15	Local shock: Not reported by persons.	
		iP _N	5	16	32					
		iM	5	16	34					
		F	5	16	50					
439	Feb. 16	O	17	05	26			85	Not heard from.	
		iP	17	05	38					
		M	17	05	48					
		F	17	05	54					
440	Feb. 16	O	19	24	39			100	Not heard from.	
		P	19	24	53					
		M	19	25	35					
		F	19	25	18					
441	Feb. 19	O	22	24	58			90	Not heard from.	
		P	22	25	10					
		M	22	25	20					
		F	22	26	52					
442	Feb. 20	O	15	36	37		10	20	Not reported as felt.	
		iP	15	36	40					
		M	10	36	42					
		C	10	36	50					
		F	10	37	06					
443	Feb. 20	O	19	54	13			95	Not heard from.	
		iP	19	54	18					
		L	19	54	37					
		C	19	55	02					
		F	19	55	18					
444	Feb. 20	O?	--	--	--			?	Not heard from. Deflection N. No M.	
		P _N	23	08	38					
		F	23	09	48					

J. B. Woodworth

HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

RECORD OF THE SEISMOGRAPHIC STATION

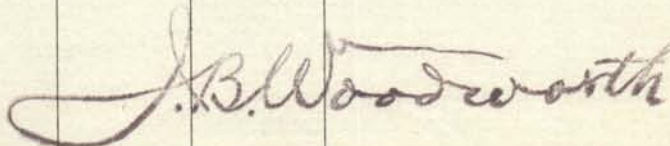
DEPARTMENT OF GEOLOGY AND GEOGRAPHY.

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No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
445	1915 Feb. 21	○	0	39	08	6	6	?	Not heard from.
		iP _N	0	39	15				
		L	0	39	21				
		M	0	39	34				
		F	0	39	42				
446	Feb. 21	O	--	--	--			70?	Not heard from.
		P	1	20	11				
		L	1	20	19				
		F	1	21	01				
447	Feb. 21	O	1	56	58			40	Felt in Haverhill, Mass. (45 kms.) at "8.55".
		P	1	57	06				
		L	1	57	10				
		M	1	57	12				
		F	1	57	22				
447a	Feb. 21	O	1	57	49			45	Cf. 447.
		P	1	57	57				
		L	1	58	05				
		F	1	58	16				
448	Feb. 21	O?	--	--	--			?	Phases indistinct. No M. Lowell, Mass. reported shock felt at 9.05 p.m.
		P	2	02	46				
		F	2	03	46				
449	Feb. 21	O	2	20	53			20	Felt at Andover, Mass. Lowell reported shock felt at 9.30 p.m. (2. 30) G.M.T.
		P	2	20	55				
		L	2	20	58				
		F	2	21	17				
449a	Feb. 21	O	2	35	14	5	5	30	Felt at Andover, Mass (30 kms.). Another at 9.35 p.m. of which there is a trace on records (N). Also 9.45 at Andover (trace on N).
		P	2	35	18				
		L	2	35	21				
		F	2	35	38				
450	Feb. 21	O?	--	--	--			?	Phase indistinct.
		P _N	3	09	30				
		F	3	09	36				


 J. B. Woodworth

No. 4 From February 22 to February 28, 1915

HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

RECORD OF THE SEISMOGRAPHIC STATION

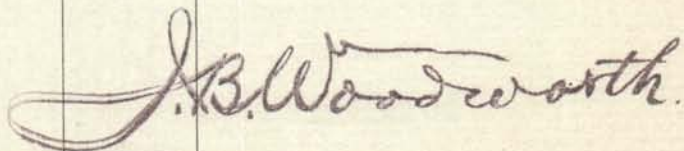
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No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
452	1915 Feb. 23	O	23	13	05		6	145	
		P	23	13	25				
		L	23	13	42				
		F	23	14	10				
452a	Feb. 25	O?	9	03	41			3440?	O from S-P?
		P _E ?	9	10	19	3			Phases masked by micro-
		S	9	15	32	6			seisms.
		L _E	9	25	19	12			0.25 on record.
		L _N	9	26	06	16			A 0.25 mm. on record.
		M	9	28	53				
452b	Feb. 25	O	20	47	07			9200	
		P?	20	59	42				Phases masked by micro-
			21	01	34				seisms.
		iS	21	10	02	6			
		eLN	21	23	36	13			
			21	24	38	20			
		L _N	21	46	07	20			
F	21	48							
452c	Feb. 25	O	22	14	06			260	Unheard from.
		P	22	14	48				
		L	22	15	17				
		F	22	15	49				
453	Feb. 28	O?	--	--	--			?	
		e	19	38	20	7			
			19	39	30	6			P and S in micros.
		L _E	19	49	34	40			
		L	19	54	02	30			
			19	58	03	26			
		M	19	59	20	22			A 0.5 mm. on record.
F	20	49	ca						



From March 1

to Ma

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HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

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No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
UNDAMPED PENDULUMS									
454	March 5	e _N	4	36	26	7			
		L _E	4	37	43				
		L _N	4	37	58				
		F	4	49	28				
455	March 12	e _N	15	53	12	18			Masked by micros.
		L _N	15	56	35				
			16	01	59				
		F	16	05					
456	March 20	e?	22	--	--	18			F? lost in micros.
		L _N	22	51	12?				

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No.	Date	Phase	Time	Periods	Amplitudes	Δ	REMARKS
			h. m. s.	s.	μ .	Kms.	
457	1915 Mar. 31	e	17 53 16				UNDAMPED PENDULUM
		L _E	17 54 36				Masked by microseisms.
		F?	18 01 --				

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No.	Date	Phase	Time		Periods	Amplitudes	Δ	REMARKS
			h. m. s.	s.				
458	1915 Apr. 3	L _E	21 04 46				4300?	Undamped pendulums 0 = time at origin. Masked by Microseisms
		F	21 07 43	18				
			21 25 ca	16-18				
459	Apr. 7	O?	15 58 ca				4300?	O? from eL-S? Masked by microseisms. N comp. restrained by friction.
		e?						
		S? E	16 11 57					
			16 13 46	8				
			16 15 17	13				
			16 15 59	10				
460	Apr. 23	eL	16 20 44	16			4670	P and S strong; LL weak
		L	16 37					
		F						
		O	15 29 10					
461	Apr. 28	P _E	15 37 23				4670	F lost in microseisms. N record faint.
		S _E	15 43 45	6				
		S _N	15 43 46	6				
		S _R ^{1?}	15 46 04					
		L _N	15 48 42	16				
		F?						
		eE	4 10 04					
		L	4 13 28	20				
			4 17 38	20				
		F	4 41 ca					

J. B. Woodworth.



OF THE
Seismographic Station, Department of Geology and Geography
HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

LATITUDE 42° 22' 56" N., LONGITUDE 71° 06' 59" W. Greenwich; ALTITUDE 5.367 M.

TIME: Mean Greenwich, midnight to midnight.

INSTRUMENTS: Two Bosch-Omori horizontal pendulums (mechanical registration).

From

to

No.	Date	Comp.	Phase	Time			Periods	Amplitudes	REMARKS
				h.	m.	s.			
462	1915 May 1	O	4	59				8980	Undamped Pendulums: O :: time at origin. Kurile Islands ?
		eP _N	5	12	16				
		eP _E	5	12	21				
		S _E	5	22	25	32			
		SR ₁ ?	5	28	14				
		SR ₂	5	28	39				
		eLE	5	37	29				
		M _{1N}	5	46	15		(57)	(mm.)	
		M ₂	5	50	07		(67)	(mm)	
		CN	5	53	41				
F	5	57	29						
		F	8	17					
463	May 1	e?	9	29	17			3850?	e? = S?. Possibly part of last. No trace N.
		LE	9	32	31	20			
			9	34	06	16			
			9	36	40	15			
		F	9	38	ca				
464	May 5	O?	11	17				8730?	O? from eL-S? P in micros.
		S?	11	39	31	8			
		eL	11	53	50	18			
		L _E	12	19	07				
		L _N	12	19	31				
		L _E	12	20	49	20			
			12	33	31	20	15		
		F?	12	50					

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to

No.	Date	Comp.	Phase	Time			Periods	Amplitudes	REMARKS
				h.	m.	s.			
465	1915 May 6	O	12 08 02					4820	
		eP _E	12 16 26						
		? _E	12 19 55			6			
		S	12 22 58						
		eL	12 33 44						
		M	12 33 59						
		to F	12 35 14 13 20						
466	May 8	e	14 44 42			var.		Disturbances of uncertain origin.	
		to	15 10						
467	May 12	O	10 29 42					6075	O from eL-P. S ill-defined.
		eP _E	10 39 29						
		eE	10 42 14						
		eN	10 43 02			8			
		eL _E	10 55 23						
		L _E	10 57 04						
		L _E	10 59 26			24			
		F?	11 10 17			15			
468	May 21	O?	4 27 46					8800?	S uncertain.
		eP _N	4 40 00						
		eL _E	5 04 36						
		L _e	5 08 09			16			
			5 10 30			24			
			5 14 00			16			
		F	5 30 20						

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RECORD

OF THE

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From June 1,

to June 15,

No.	Date	Comp.	Phase	Time			Periods	Amplitudes	REMARKS		
				h.	m.	s.					
469	1915 June 1	O			14	43	50	5100	N damped 4:1. 0:time at origin.		
				eP _{EN}	14	52	29				
				S _N	14	59	13				
				S _E	14	59	17				
				SR _{1N}	15	02	37			15	
				SR _{1E}	15	02	41			15	
				eL _E	15	05	08			26	Sinusoidals sets in,
				L _N	15	07	09				
				L _E	15	08	47				
				M _E	15	12	33				
				C _E	15	17	03				
		F	16	15							
470	June 6		O?	--	--	--	30-20	P and S in microseisms, S _N ? 20-33-54,			
				P _E ?	20	16			26		
				L _E	20	38			07		
				F	20	50			ca		
471	June 6	O		21	29	37	6450	S _E undamped of large amplitude, Undamped pendulum gave MM at 24-47-53; 21-49-31; 21-50-32. No decided ML,			
				P _N	21	39			32		
				P _E	21	39			34		
				S _N	21	47			32		
				S _E	21	47			34		
				eL _E	21	54			14		
				eL _N ?	21	54			30		
		22	58	30							
June 7		F _E	0	20	ca	E comp. undamped					



RECORD

Seismographic Station Department of Geology and Geography
 HARVARD UNIVERSITY, CAMBRIDGE, MASS. U.S.A.

June 15

June 1, 1918

Year	Month	Date	Time	Station	Remarks
1918	June 1	14	43 30		
		14	52 37		
		14	59 17		
		14	59 37		
		14	59 41		
		14	59 41		
		14	59 47		
		14	59 47		
		14	59 47		
		14	59 47		
		14	59 47		
		14	59 47		
1918	June 6	19	16 30		
		19	16 30		
		19	16 30		
		19	16 30		
		19	16 30		
		19	16 30		
		19	16 30		
		19	16 30		
		19	16 30		
		19	16 30		
		19	16 30		
		1918	June 7	19	16 30
19	16 30				
19	16 30				
19	16 30				
19	16 30				
19	16 30				
19	16 30				
19	16 30				
19	16 30				
19	16 30				
19	16 30				

Station name in
 Wamped A.I. 0:time 27
 2100
 2100

P and R in microscope
 20-23-24
 20-23-24
 21-50-52. No observed H.
 21-50-52. No observed H.
 21-50-52. No observed H.
 21-50-52. No observed H.
 21-50-52. No observed H.

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HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

RECORD OF THE SEISMOGRAPHIC STATION DEPARTMENT OF GEOLOGY AND GEOGRAPHY

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No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
472	June 22	O	3	24	22			6790	N comp. Damped 4:1 E comp. Undamped. LL indistinct
		eP	3	34	40				
		S _E	3	42	58	6			
		L	3	43	42	10			
		F?	3	50	48				
473	23	O	4	00	21			4110	O from eL-S deciphered in light of published data. Vd. U.S. Monthly Weather Rev. June, 1915. pp. 289-294. So. California. Local obs- ervers give time 4:00
		eP _N	4	06	28				
		S	4	13	45	6			
		eL	4	17	31	10			
		F	4	54	ca				
474	23	O	4	58	34			3850	Secund shock So. Calif. Reported 4:56. Vd. loc/cit. E comp. gives different but more doubtful read- ngs. Short per. phases.
		eS?	5	11	20				
		eL	5	14	31				
		M _N	5	14	38				
		F	5	35					
475	27	O?	15	35	10			3525?	O from Honolulu P15-48-54 L 15-58-54; whence Δ 3250 kms.; O as given; and on this argument Harvard Δ 3525 kms.
		L _E	15	51	16				
		F	16	22					

J. B. Woodworth

Issued Oct. 27, 1915

HARVARD UNIVERSITY, CAMBRIDGE, MASS., U.S.A.

RECORD OF THE SEISMOGRAPHIC STATION
 THE STATION OF NEWBY AND GEOGRAPHY

Station No. 1111, Newby and Geography, Harvard University, Cambridge, Mass., U.S.A.
 Date of recording: June 22, 1915. Time of day: 10:00 AM.

Time	Phase	Amplitude	Direction	Remarks
10:00	Y	4 04 04		Record from So. Calif. error due time 4:00
10:00	Y	4 18 08		So. California local error
10:00	Y	4 17 31		Weather Rev. June, 1915, p. 202-204.
10:00	Y	4 13 48		data. Vd. U.S. Monthly
10:00	Y	4 00 21		in light of published
10:00	Y	3 80 46		from also deciphered
10:00	Y	3 43 48		IL indicator
10:00	Y	3 48 56		N comp. Undamped.
10:00	Y	3 34 58		N comp. Damped 4:1

Handwritten signature

Index Oct. 27, 1915

No. 12

From July 1, 1915 to July 29, 1915

1915

HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

 RECORD OF THE SEISMOGRAPHIC STATION
 DEPARTMENT OF GEOLOGY AND GEOGRAPHY

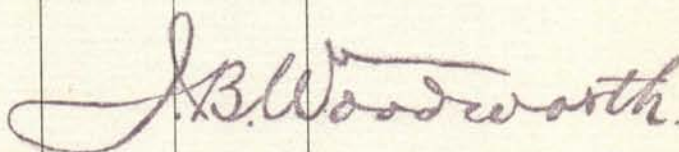
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No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
476	1915 July 8	O	22	30	48				E undamped. N damped 4:1 O from Honolulu P 22-36-36; Δ 2910; 0:22-30-48. Vd. LaPaz iP22-40-00. With Harvard eL? 23-08-41, Δ comes out ca. 7700. Barcelona eL 23-02-18. North Pacific?
		L _E	23	08	41	15			
			23	12	27	28			
		F	23	14	45	24			
			23	25	56				
477	22	O?	4	06	08			7140	Readings doubtful. See Ottawa and Washington, D.C.
		eP _N	4	16	44				
		S _N	4	25	20				
		S _E	4	25	36				
		eL _E	4	30	02				
		L _N	4	32	52				
		F	4	46	00				
478	25	O?	20	47	26			7400?	eP doubtful. Compare Ottawa and Wash- ington. Not legible on N comp. Cf. LaPaz L21-55-00
		S?	21	06	56	7			
		L _E	21	18	12	28			
		F	21	49	00				
479	29	O?	10	--	--				Cf. Ottawa L10-55.5 La Paz eL 10-57-00; F 11-45.
		L _E	10	55	58	20			
			10	59	46	15			
		F	11	04	22				

Issued Nov. 30, 1915



HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

 RECORD OF THE SEISMOGRAPHIC STATION
 DEPARTMENT OF GEOLOGY AND GEOGRAPHY

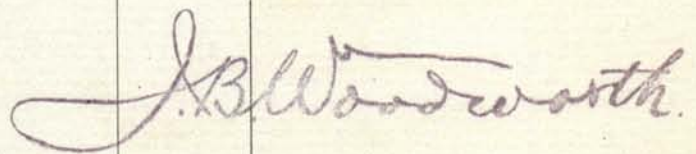
 $\phi = 42^{\circ} 22' 36''$ N. $\lambda = 71^{\circ} 06' 59''$ W. Gr. h = 5.367 M. FOUNDATION: Glacial sand over clay.

TIME: Mean Greenwich, midnight to midnight.

INSTRUMENTS: Two Bosch-Omori 100 kg. horizontal pendulums (mechanical registration).

No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
480	1915 July 31	Op	1	31	26			8200	Compare Sitka Δ 3660; 0: 1-31-26 Honolulu Δ 4340; 0: 1-31- 26 Ottawa Δ 7700; 0: 1-31-26.8 Northfield Δ 7990; 0: 1-31-26 Barcelona Δ 9290; 0: 1-31-26 St. Louis Δ 7600; 0: 1-31-30 Aleutians off Kamschatka, Near 168° E., 53° N.
		P _E	1	42	58				
		P _N	1	43	00				
		PR _E	1	45	48				
		PR _E	1	47	20				
		PR _N	1	52	28				
		S _E	1	52	28				
		SN	1	52	40				
		SR _E	1	58	26				
		eL _E	2	03	02	60			
		L _N	2	03	56				
		L _E	2	10	10	22			
		L _N	2	19	54	14			
		F _E	4	21	00				

Issued November 30, 1915.


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No.	Date	Phase	Time			Periods	Amplitudes		Δ	REMARKS
			h.	m.	s.		s.	μ .		
481	1915 Aug. 3	O	13	04	27				O from Honolulu Δ 8920. Sydney Δ 2500; O 13-04-59; reports origin in Dutch New Guinea 5° S. λ 138° E. (LR)L = 20,000 - 201) ----- { ca. 2 (
		L _E	14	16	04			14,900		
		LR ₁	15	06	10					
		F	15	47	12					
482	6	O	13	12	03			9000	O from mean of Ottawa Δ 9150; O:13-12-27 Honolulu Δ 8440; O:13-11-34 Barcelona Δ 10030; O:13-12-D Sydney Δ 7030; O:13-12-03 Harvard eP in micros.	
		eP?	13	23	25					
		S	13	35	09					
		eL _N	13	55	18	20				
		L _E	14	00	53	24-22				
F	14	55								
483	7	O	15	04	16				O from Barcelona Δ 1510. Heidelberg Δ 1420; O:15- 04-27. But cf. Sydney Δ 7930; O:15-10-27. Ottawa Δ 5600; O:15-14-51.	
		e	15	31	09					
		L	15	39	27	20				
		F	15	46	05	16				
484	19	O	?	?	?				La Paz iP O-07-33, Δ 5360, gives O:18d.23h.56m.42s. Sydney P Δ 0-21-36; Δ 9250; O:0-19-11. Ottawa P? O-16-32; Δ ? 5550; O? O-05-28.8	
		e?B	0	21	15?					
		eL?	0	30	20					
		L	0	40	23	15				
		L	0	53	03	24				
		L	1	19	04	16				
		F	1	25	ca					
485	Sept. 6	O	17	20	36			10,300?	O from Sydney iP 17-32.7 Δ 3840. Cf. La Paz Δ 9750; O:17-26-36. Harvard Δ from L-O (Sydney), when (L-O) 201 kms. = Δ .	
		e	17	53	59					
		L	18	16	55					
		L	18	22	15	15				
		F	19	22						

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No.	Date	Phase	Time			Periods	Amplitudes		Δ	REMARKS
			h.	m.	s.		s.	μ .		
486	1915 Sept. 7	Q	1	20	30			3580	N damped 4:1. E undamped. Q from S-P. Cf. Ottawa and Georgetown 0:1-20-27.5 La Paz Δ 4120; 0:1-20-27. Destructive quake in Guatemala and Salvador.	
		iP _E	1	27	19	2				
		N	1	27	21	2				
		iR	1	27	51					
		iR	1	27	56					
		iR	1	28	33					
		iR	1	28	40					
		iS _N	1	32	41					
		iS _E	1	33	54					
		eL _E	1	34	23	26				
		M _E	1	35	54					
		eL _N	1	37	01					
		M _E	1	38	07					
			1	38	35					
		M _N	1	39	42					
		E	1	39	44					
			1	40	01					
		M _N	1	40	53					
			1	40	58					
		M _E	1	41	03					
			1	42	58					
		M _N	1	43	20					
		M _E	1	44	25					
C _N	1	45	03							
M _E	1	45	22							
	1	46	11							
	1	47	14							
C _E	1	50	02							
LR _N	2	35	03	12-14						
FN	2	59	56							

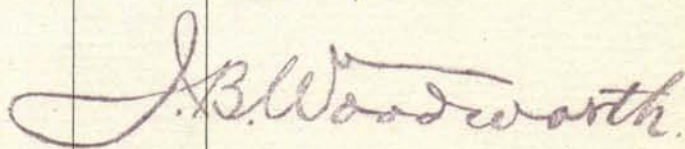
 Stylus off drum.
do

 Stylus on drum again.
 Off drum 2d time.
 On drum again.
 Off drum 2d time.
 On drum again.
 Off drum 3d time.
 On 2d time.
 On 3d time.
 Off 4th time.

On drum 4th time.

 7th M on E.
 8th M on E.

 Damped pendulum.
 Pendulum undamped. F in
 next.



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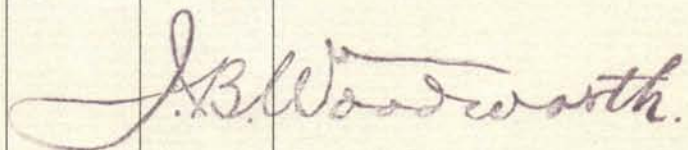
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No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
487	1915 Sept. 7	<u>O</u>	4	28	42			3610	O from S-P. Cf. Ottawa Δ 3650 0:4-28-25. Cernell Δ 3620?; 0?4-28-08 Off west coast Central America? Set off by reflected L returning to epicentre? Interval 3h 8m \pm 1.
		eP _N	4	35	31				
		S	4	40	50				
		L	4	44	25				
		F	5	05					
488	7	<u>O</u>	5	--	--			10	
		eP	5	10	30				
		SL? _B	5	15	34				
		L	5	20	19				
		F	5	37	ca				
489	7	<u>O</u>	7	--	--				Vd. Ottawa. L & F lost in changing records.
		P?	7	54	59				
		S?	7	59	43				
490	7	<u>O?</u>	20	39	52			3040?	P, S, O uncertain. Times doubtful from uncertain setting of time-ticker.
		eP?	20	45	53				
		S?	20	49	39	7			
		L	20	53	44				
			20	59	12				
		F	21	02	47				
		21	33						

N.B. For Sydney in Remarks read "Riverview".

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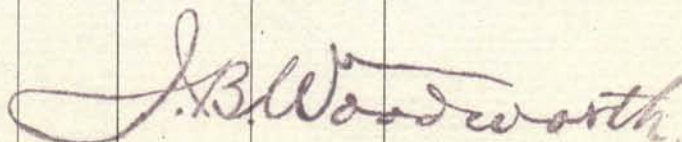
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No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
	1915								
		Q?	--	--	--		?	e in microseisms.	
	Oct. 2	e	23	58	12				
		S _E	23	59	55	6		Undamped comp. N comp. out of commission.	
	3	L	00	01	22	8,10			
		F	00	05	52				
	Oct. 3	Q?							
		e _E	2	03	17			e in micros.	
		S	2	06	35				
		L	2	08	50	10,12			
		F	2	25	22				
	3	Q	6	53	12		3780	0 from S-P by tables furnished by Dr. Klotz.	
		e _{P_E}	7	00	06				
		S	7	05	40	22			
		e _L	7	10	36				
		M-1	7	12	11			Undamped pendulum N comp. out of commission.	
		F	8	57	ca				
	11	Q	19	33	23		2450	Press reports slight shock felt at San Juan, Puerto Rico at "3.35" p.m. Oct. 11th.	
		e _{P_N}	19	38	25	3			
		P _E	19	38	44				
		S	19	42	24	10			
		e _L	19	45	22				
		L _N	19	48	51	11.12		e _S and e _L same on N and E	
		F _E	20	40					
	12	-	--	--	--				
		e _E	22	19	38			e in microseisms.	
		e _L ?	22	22	00	17-24			
						20			
		L	22	28	10	15		No trace on N, damped 4:1.	
		F	22	43	ca				

Issued Nov. 3, 1915


 J. B. Woodworth

No. 18

From November 1

to November 1915

HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

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INSTRUMENTS: Two Bosch-Omori 100 kg. horizontal pendulums (mechanical registration).

No.	Date	Phase	Time	Periods	Amplitudes	Δ	REMARKS
496	1915 Nov. 1	e	7 24 ^s 31	s.	"	9590	From S-P. eP in micros. Cf. Berkeley Δ 7570; 0:7-24-29. Earthquake in Imperial Valley, Southern California.
		eP	7 37 13				
		SE	7 47 06				
		SN	7 47 52	6			
		eL _E	8 09 59				
		ML	8 20 28				
		Lr ^F	9 50 36	18-20			
497	21	F	10 33				From eL-S.S-eP gives Δ 3850; 0:0-13-39. But eL may be taken too early! A = trace on 'gram. Stylus left drum, returning at 1-35-34. Maxima of E undamped less than M _N damped 4/1.
		Q	0 13 35			3900	
		eP _E	0 20 46				
		SN	0 26 33				
		SE	0 26 35				
		eL _E	0 29 54				
		eL _N	0 30 00				
		M _N	0 33 58	16	(30mm)		
		ME	0 33 58				
		ME	0 35 57				
		C _N	0 36 03				
C _E	0 39 50						
F	1 45 ca						
498	26	e?	19 27 34				e to F masked by micro-seisms.
		L	19 31 46	29			
		L	19 36 14				
			to 19 39 14	16-13			

Issued December 4, 1915.



No. 19

From December 1, 1915 to

191

HARVARD UNIVERSITY, CAMBRIDGE, MASS., U. S. A.

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No.	Date	Phase	Time	Periods	Amplitudes	Δ	REMARKS
499	1915 Dec. 6	O?	20 26 ca.	s.	16,000?	Kms.	N damped 4:1. E, 9. Δ ? from $L_{pl}-L$: 30.75 mins. $\Delta = 20,000 - 30.75/2 \times 202$ km. P and S masked by microseism.
		e?	21 30 35				
		eL	21 49 15				
		L	21 50 30				
			to	20			
			21 52 28				A decreases suddenly.
		L	22 20 00				N.B. A.M. Minimum of atmospheric pressure intersects
		RL	to	12			Δ curve near $\lambda 110^{\circ}$ E. $\phi 10^{\circ}$ S.
			22 22 22				
		F	22 59				
500	7	O	10 38 26		4500		
		PE	10 46 20				N.B.P.M. Maximum of atmospheric pressure intersects
		S	10 52 37	6			Δ curve between $\lambda 75^{\circ}$ W. and
		L	10 57 08	20			100° W. between $\phi 3^{\circ}$ S. and
		F	11 28				10
501	7	O?	12 30 25		2460?		
		iP	12 35 28	2			
		S?	12 39 30				
		eL	12 41 36				P? 12 41 36! another quake.
		L	12 53 34	16			
			13 10 02				
			to	10			
			13 11 39				
		F?	- - -				Lost in microseisms. Changed records at 13h 35m 30s.
501a	7	O?	18 40 ca.				O from St. Louis records.
		iP	18 43 35				Reported near Cairo, Ill. by St. Louis Observatory.
		L	18 47 50				
		L	18 48 14	4			
		F	18 50 ca.				
502	8	e?	18 25 53	11			Record of doubtful character. Preceded and followed by similar disturbances.
			18 33 46	70			
				36			
				62			
			18 39 05	26			
			18 44 34				
			to	15			
			18 45 24				P is determinate.

Issued Jan. 11, 1916

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No.	Date	Phase	Time			Periods	Amplitudes	Δ	REMARKS
			h.	m.	s.				
	1915								
503	Dec 12	O	21	02	01			4000	iP steady-pass thrown south. Except P _N , record much masked by microseisms.
		P _N	21	09	19	3			
		iP	21	09	35	44			
		eP _P ?	21	10	34				
		S _N	21	15	06				
		S _E	21	15	23				
504	17	L _N	21	18	20			F masked. Masked by microseisms.	
		L _E	21	18	22				
		F _E	21	35	30				
		L	5	57	29	16			
505	17	Q?	7	40	21		4345?	e+S? Δ from L - S?	
		e?	7	54	11				
		L	7	58	30	20			
		F _E	8	15	12			Not registered on N.	
506	18	L _E	---	---				Between 14h and 21h a group of long waves beginning about 4 mins. past the hour; undeterminable because of entangled lines.	
507	19	L _E ?	21	23	ca.				
		F _E	21	44	ca.				

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			h.	m.	s.		μ .	Kms.		
508	1915 Dec 29	L _E ?	0	12	34				4810	e earlier? Much masked by micro-seisms. O from eL-S. Readings for P and S unreliable. F lost in changing records. Issued January 11, 1916.
		F?	0	17	58					
509	31 2	O?	12	19	23					
		eP?	12	37	38					
		R	12	28	57					
		S _E	12	33	53					
		S _N	12	34	00					
		eL _N	12	40	25					
		L _E	12	41	13	10-12				
		M _E	12	45	03	16-14				
F?	13	42								

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