SECTION V.—SEISMOLOGY.

REPORTS FOR JANUARY, 1915.

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[Dated Weather Bureau, Mar. 1, 1915.]

The following extract from the instructions issued by the Weather Bureau, for the noninstrumental observation of earthquakes may interest those unacquainted with this portion of the bureau's seismological work.

Request for cooperative observers.

Although each of the Weather Bureau's regular stations, approximately 200, will report all earthquakes felt, yet the territory covered is so great that its seismic disturbances can not adequately be recorded without the aid of a large number of voluntary assistants. Hence it is earnestly hoped that, so far is possible, all the bureau's numerous cooperative observers will assist also in the collection of seismological data, by reporting, on cards that will be furnished for that purpose, the date, etc., of each earthquake that they may experience. To each observer the labor will be exceedingly light, and the time consumed only a few minutes in a whole year, but the collected results will be permanent and extremely valuable—absolutely essential to the construction of the maps in question [viz, maps that locate geologic faults and indicate their activity in the production of earthquakes] and exceedingly helpful in the explanation of many obscure earthquake phenomena.

Instructions for the collection of earthquake data.

The particular earthquake data desired is indicated on the question cards that will be supplied to all who take part in this work, but the method of collecting and forwarding this information to the Central Office for classification and study is explained by the following instructions:

1. Regular Weather Bureau stations will be communicated with directly from the Central Office; cooperative stations entirely by, or, when necessary, through section centers.
2. All routine communications on seismology directed to the Central Office will be inclosed in penalty envelopes marked "Seismology."
3. Each regular Weather Bureau station and each cooperative station that agrees to assist in this work will be furnished with a supply of question cards [as published last month].
4. Each station, regular and assisting cooperative, will promptly fill out and forward in a penalty envelope one question card for each earthquake felt.
5. The regular stations at Boston, Atlanta, St. Louis, Denver, and San Francisco will also send to the Central Office such newspaper clippings in regard to earthquakes in the United States as may come to their notice.
6. Each section center may supply question cards to other reliable persons in addition to the cooperative observers. This is especially desirable in those portions of the country which are either subject to earthquake shocks or sparsely inhabited.
7. An earthquake that produces any appreciable damage will be made the subject of a special investigation determined upon at the time.
8. All question cards collected by section centers recording the occurrence of an earthquake will be promptly forwarded to the Central Office.

TABLE 1.—*Noninstrumental earthquake reports, January, 1915.*

Day.	Approximate time Greenwich Civil.	Station.	Approximate latitude.	Approximate longitude.	Intensity Rossi-Forel.	Number of shocks.	Duration.	Sounds.	Remarks.	Observer.
	h. m.	CALIFORNIA.	° ′	° ′			m. s.			
12	4 33	Bakersfield	35 22	119 0	5	2	5			Santa Fe Co.
	4 33	Lonoak	36 20	120 0	2	2	2			Martin L. Griffin.
	4 33	Nordhoff	34 35	119 14	3	1		Faint		W. H. Duncan.
	4 33	Ozena	34 53	119 16	5	1	6	Faint		J. D. Reyes.
	4 33	Paso Robles	35 34	120 40	4	2	5			Dr. F. W. Sawyer.
	4 33	San Luis Obispo	35 18	120 39	5	4	30			U. S. Weather Bureau.
	4 33	Santa Barbara	34 23	119 40	5	1	5	Faint	Lamps swung	G. W. Russell.
	4 33	.....do	34 23	119 40	6	1	5			Forest Service.
12	14 15	Aguanga	33 26	116 51	4	2	4	Rumbling		Forest Service.
	14 15	Mesa Grande	33 11	116 42	2	1	2	Rumbling		E. H. Davis.
14	15 30	Rohnerville	40 33	124 11	4	1	2			W. D. Gray.
	15 30	Shively	40 25	123 56	3	2	2	Faint		Frank Essig.
17	4 53	Coyote	37 14	121 44	3	1	1			Stanley Sharp.
20	19 30	Brawley	32 59	115 40	3	2	1			M. D. Witter.
26	10 30	.....do	32 59	115 40						M. D. Witter.
28	15 00	.....do	32 59	115 40	2	1		Rumbling		M. D. Witter.
31	8 30	Branscomb	39 40	123 40	3	4	4			A. J. Haun.
		OREGON.								
19		Summerville	45 27	118 05	5					Press at La Grande Oreg.
		TENNESSEE.								
14	9 20	Bristol	36 36	82 12	3–4	1	20		Rattled windows	B. F. Sperow.
		WASHINGTON.								
26	0 55	Longmire	46 48	121 56	4	1	½	Loud		Forest Service.

TABLE 2.—*Instrumental reports, January, 1915.*

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

[For significance of symbols see REVIEW for December, 1914, p. 689.]

District of Columbia. Washington. U. S. Weather Bureau.

Lat., 38° 54′ N.; long., 77° 03′ W. Elevation, 21 meters.

Instrument: Marvin (vertical pendulum).

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Jan. 5-6	II_r	eP_N	23 45 17	4			3,960	Phases not distinct.
		S_N	23 51 32	7				
		L_N	23 55 25	16				
		M_N	23 56 37			16		
		F	0 53 00					
13	II_u	P?	(?)					P, L_N, and F lost in strong microseisms. Destructive earthquake in Italy.
		S_N	7 11 35	10				
		L_N	(?)					
		L	7 28 00		16	14		
		F	8 (?) 00					

District of Columbia. Washington. Georgetown University. F. L. Tondorf, S. J.

Lat., 38° 54′ 25″ N.; long., 77° 04′ 24″ W. Elevation, 42 meters. Subsoil: decayed diorite.

Instruments: Astatic pendulums after Wiechert, 200 kgm. (horizontal).

Instrumental constants..		V	T_0	ε
	A_N	143	5.2	3.4
	A_E	165	5.4	2.6
	A_Z			

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Jan. 5	III_r	iP_N	23 52 45.4				1,800?	E-W not discernible. Vertical instrument in repair.
		S_N	23 57 18					
		L_N	23 57 40.6	10	161*			
13	I_r	L_N	7 28 40	15	500*	290*	?	Phases not discernible, lost in microseisms. Reported in Rome.
		L_E	7 23 20	15				
		F_N	7 36 40	?				
		F_E	7 33 00	?				

* Trace amplitudes.

Massachusetts. Cambridge. Harvard University. J. B. Woodworth.

Lat., 42° 22′ 36″ N.; long., 71° 06′ 59″ W. Elevation, 5 meters.

Instruments: Two Bosch-Omori.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Jan. 5-6		O	23 37 39				3,950	N. B.—Pendulums undamped. *O* equals time at origin calculated from Brit.
		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 36	20				
		F	0 56 00					
10		O?	Indeterm.					e in microseism Time interpolated because of failure of minute ticks.
		eL?	23 24 26	20-15				
		F	23 45 00					
13		O	6 52 29				6,750	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.
		eP_E	7 02 45					
			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 00					
27		O						Between 1h and 2h.
		eN?	1 37 44					No decided maximum.
		L_E	1 40 30	40				
			1 41 14	22				
			1 43 37	16				
			1 45 42	20				
			1 48 18					
		L_E	1 49 04	20-16				
		L_N	1 51 33					
		F_E	2 12 00					

Missouri. St. Louis. Geophysical Observatory, St. Louis University. J. B. Goesse, S. J.

Lat., 38° 38′ 15″ N.; long., 90° 15′ 58″ W. Elevation, 160 meters. Foundation: 12 feet of tough clay over limestone of Mississippi System, about 300 ft. thick.

Instrument: Weichert 80 kgm., astatic, horizontal pendulum.

Instrumental constants: $\begin{cases} V & T_0 & \varepsilon : 1 \\ 80 & 7 & 5 : 1 \end{cases}$

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Jan. 13	I_r	eS_E	7 11 15				6,600	No P on either component. Reported from Italy. This disturbance was preceded and followed by almost continuous microseisms, which at times were of unusual character; the records show such on Jan. 12, 13, 14, and 15. Jan. 29 and 30 the records show frequent microseisms of the usual kind.
		L	7 20 02					
		L	7 28 to					
			7 42 05					
		M_E	7 36 40	22				
		F	7 45 00					

Vermont. Northfield. U. S. Weather Bureau.

Lat., 44° 10′ N.; long., 72° 41′ W. Elevation, 256 meters.

Instruments: Two Bosch-Omori.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1914.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Dec. 20	I_u	P_E	14 27 36				8,875	All phases uncertain.
		PR_E	14 34 35					
		PR_N	14 35 32					
		S_N	14 37 40					
		L_N	14 54 35					
		F	15 50 00					
25	I_r	P_N?	3 47 45				2,690	All phases uncertain.
		S_N	3 52 05					
		L_N	3 54 35					
		M_E	3 57 00					
		M_N	3 59 00					
		F	4 10 00					
1915.								
Jan. 5-6		M_N	23 54 56					P, S, and L lost in process of changing sheet.
		F	1 00 00					
13	II_u	P_E	7 02 52				6,945	Phases indistinct, strong microseisms prevailed. Earthquake in Italy.
		S_N	7 11 18					
		L_N	7 19 15					
		F	8 00 00					
27		L_N	1 57 00					Faint.

Canada. Ottawa. Dominion Astronomical Observatory. Otto Klotz.

Lat., 45° 23′ N.; long., 75° 43′ W. Elevation, 83 meters.

Instruments: Two Bosch photographic pendulums.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Jan. 5-6		P	23 45 07				4,220	
		S	23 51 07					
		L_N	23 54 04	20				
		L_E	23 54 05	20				
		L	24 01 00					
		L	24 06 00	18				
			24 28 00					
		F	24 45 00					
13		P	7 02 57	2			6,860	Destructive earthquake in Italy. No marked maximum. Strong microseisms prevailed.
		S	7 11 19					
		SR_3	7 18 08	12				
		L	7 20 05	32				
		L	7 24 00	20				
		L	7 29 00	16-14				
			7 42 00					
		F	8 00 00					

TABLE 2.—*Instrumental reports, January, 1915*—Continued.

Canada. Toronto. 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.

T_0, 18. Pillar deviation, 1 mm. swing of boom=0″.59.

Date.	Character.	Phase.	Time.	Period T.	Amplitude. A_E	Amplitude. A_N	Distance.	Remarks.
1915.			*H. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Jan. 4		L	10 07 42					Gradual thickening.
		M	10 10 12			200		
		F?	10 24 00					
5		P	14 59 36					M not defined.
		Pi	15 02 48					
		S	15 09 00					
		L	15 16 54					
		L	15 35 12					
		L	15 41 30					
		M	15 44 24			300		
		Li	15 46 36					
		F?	16 17 24					
5		P	16 45 00					Doubtful as being seismic.
		L	16 51 42			200		
		F	17 04 24					
5		L	17 28 42			100		Uniform thickening.
		F	17 32 06					
5		P	23 45 48					Marked disturbance.
		L	23 55 06					
		Li	23 56 00					
6		M	0 12 42			700		
		L	0 21 30					
		F	1 27 36					
7		P	12 37 00			500		
		F	12 54 48					
11		P	0 02 30 }					P doubtful.
		P	0 07 06 }					
		S	0 11 18					
		Li	0 24 12					
		M	0 28 03			800		
		F	0 51 24					
12		P	4 39 54			50		
		F	4 42 54					
13		P	7 12 12					Disastrous Italian quake. Registered at Rome, 6h 52m 55s, G. M. T.
		S	7 19 54 }					
		S	7 21 54 }					
		L	7 25 06					
		Li	7 30 42					
		M_1	7 32 24			2,800		
		M_2	7 34 12			2,600		
		C_1	7 38 12			1,300		
		C_2	7 38 48					
		L	7 46 12					
		F	8 34 00					
14		P	14 16 12					Doubtful as to being seismic.
		L	14 36 42			100		
		F	14 39 24					
17		P	7 57 06					Marked thickening. Doubtful as to being seismic.
		L	8 02 48			100		
		F	8 06 54					
22		L	5 45 18			50		
		F	5 48 00					
22		P	6 03 00			50		
		F	6 04 00					
26		P?	1 24 54					
		S?	1 30 36					
		L	1 49 36			100		
		L	1 54 30					
		F	2 27 00					
30		L	8 47 00			200		
		F	8 53 12					

Canada. Victoria, B. C. Meteorological Service.

Lat., 48° 21′ N.; long., 123° 19′ W. Elevation, 67.7 meters. Subsoil: rock.

Instrument: Milne horizontal pendulum, North. In the meridian.

Instrumental constants: 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.
1915.			*h. m. s.*	*Sec.*	*μ*	*μ*	*Km.*	
Jan. 4		P	1 15 42					
		L	1 19 42					
		M	1 24 42			200		
		F	1 37 42					
5		P	14 56 06					
		S	15 01 36					
		L	15 19 36					
		M	15 23 36			500		
		F	15 52 36					
5		P	23 39 24					
		S	23 43 24					
		L	23 49 24					
		M	23 51 06			1,000		
6		F	0 48 36					
7		P	12 35 30					
		L	?					
		M	12 42 30			100		
		F	12 49 30					
11		P	0 01 12					
		L	0 09 12					
		M	0 11 12			200		
		F	0 23 12					
12		P	4 35 00					
		L	4 40 30					
		M	4 41 00			100		
		F	4 47 00					
13		P	7 15 48					Disastrous Italian earthquake.
		S	7 21 48 }					
		S	7 26 24 }					
		L	7 31 36					
		Li	7 36 48					
		L	7 39 30					
		M	7 42 30			1,900		
		M	7 45 24			2,000		
		M	7 48 36			1,750		
		L	7 50 36					
		F	8 57 48					
22		P	5 56 06					
		M	5 57 06			200		
		F	6 01 06					
27		L	1 43 36?					
		L	1 57 36					
		M	2 03 06			200		
		F	2 17 36					
30		P	8 24 48					
		L	8 29 48					
		M	8 32 48			200		
		F	8 40 18					