From August 1 to August 31, 1922

WASHINGTON, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\varphi = 38° \ 54' \ 25''$ N $\lambda = 77° \ 4' \ 24''$ W h = 42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_O	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	E	165	5.0	
	AZ	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	AE	11	13.7	

Date	Character	Phase	Time			Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
August 11		eP_E	8	31	27						Rest lost in heavy micros.
		iS_E	8	41	52						
		iS_N	8	41	52						
August 11		e_E	13	56							Very heavy micros.
		e_N	13	56	29						No distinct M.
		L_E	13	17	40	19					
		L_N	13	21	34	21					
		F	15	(ca)							
August 13		P_E	0	21	16						Very heavy micros.
		P_N	0	21	16						Sheets off 1 hr. 23 m.
		iS_E	0	31	55						Quake still on.
		iS_N	0	31	55						
		eL_N?	0	45.3							
		L_E	0	48		26					
		L_N	0	48		26					
August 16		eP_E	16	08	13						Very heavy. micros.
		iP_N	16	08	13						No distinct M.
		eS_E	16	18	13						
		eS_N	16	18	13						
		L_E	16	35	28	21					
		L_N	16	41	38	21					
		F	17	10							
August 18		e_E	5	29	27						Very heavy micros.
		F	5	41							N-S does not show.
August 29		e_E	17	22	22						Rather heavy micros.
		e_N	17	22	22						
		S_N?	17	28	51						
		F	18	(ca)							
August 30		e_N	22	58	49						Difficult. Heavy micros.
		F	23	20							

F. A. Tondorf, S. J.,
Director.

No. 90. *From September 1 to September 30, 1922*

WASHINGTON, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\Phi = 38° 54' 25''$ N $\lambda = 77° 4' 24''$ W h = 42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Weichert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε : 1
	A_N	143	5.0	
	A_E	165	5.0	
	AZ	80	4.0	

Bosch Photographic Pendulums		V	T_0	ε : 1
	A_N	133	5.0	
	A_E	133	5.0	

		V	T_0	ε : 1
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time			Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
September 1		eP_N	19	34	41						P_E does not show.
		eS_E	19	45	35						No distinct M. on E-W, comp.
		S_N	19	45	35						
		eL_E?	19	57.3		27					
		eL_N?	19	57.3		27					
		L_E	20	12		33					
		L_N	20	13		38					
		M_N	20	28	18		1.7 mm				
		F	21	15							
September 1		eP_Z	19	34	52						Heavy micros.
		S_Z	19	44	38						
		L_Z	20	22		22					
		F	21	15							
September 3		eP_E?	3	51	19						Difficult.
		S_E?	3	54	06						
		S_N?	3	54	07						
		eL_N?	3	57.1							
		F	Not apparent								
September 4		e_E	17	12							
		e_N	17	12	16						
		i_N	17	14	14						
		i_E	17	18	40						
		i_N	17	18	40						
		F	18	35							
September 14		e_N	19	48							Heavy micros.
		S_N?	19	57	21						
		eL_N?	20	15.4							
		L_E	20	29	27	32					
		L_N	20	30	27	32					
		F	21	45							
September 29		e_E	21	40	48						Very heavy. micros.
		e_N	21	40	48						
		eL_E?	21	57.0							
		F	22	10							
September 30		e_E	23	47	11						Heavy micros.
		e_N	23	46	08						
		F	23	58							

F. A. TONDORF, S. J.,
Director.

From October 1 *to* October 31, 1922.

WASHINGTON, D. C.
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Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Comp.	V	T_0	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	AZ	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
October 6		eP_E	5 51						P is very uncertain Heavy micros
		eP_N	5 51						
		iS_E	5 54 55						
		S_N	5 54 55						
		F	6 15						
October 11		eP_E	14 59 27						
		iP_N	14 59n 27						
		iS_E	15 07 11						
		eS_N	15 07 11						
		eL_E	15 13.6						
		eL_N	15 13.0						
		L_E	15 18 08	27					
		L_N	15 18 33	16					
October 15		e_N	0 33						Heavy micros
		eL_E?	0 48.3						
		L_E	0 49	27					
		L_N	0 53 22	16					
		F	1 15						
October 16		e_N?	16 43						Very heavy micros
		e_E	16 48						
		eL_N?	16 51.7						
		F ?							
October 24		eP_E	21 33 38						Heavy micros
		eP_N	21 33 36						
		iS_E	21 43 44						
		S_N	21 43 44						
		eL_E	21 58.8	15					
		L_E	22 01	14					
		L_N	22 09 25	16					
		F	22 40						
October 30		e_N	2 10						E*W comp. does not show Heavy micros
		F	2 20						

F. A. TONDORF, S. J.,
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From Nov. 1 *to* Nov. 30, 1922.

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Weichert Horizontal (200 kg.) Vertical (80 kg.)		V	T_O	ε : 1
	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	

Bosch Photographic Pendulums		V	T_O	ε : 1
	A_N	133	5.0	
	A_E	133	5.0	

		V	T_O	ε : 1
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
Nov. 4		e_N	3 29 26						E-W does not show. Heavy micros.
		eL_N	3 39 48						
		L_N	3 42 29						
		F	4 (ca)						
Nov. 7		eP_E	23 11 07						
		iP_N	23 11 07						
		eS_E	23 19 57						Heavy micros. No distinct M.
		iS_N	23 19 58						
		eL_E	23 31						
		L_E	23 41	21					
		L_N	23 40	27					
		F	00 10						
Nov. 11		eP_E	4 43 41						
		iP_N	4 43 37						
		iS_E	4 52 32						
		eS_N	4 52 32						
		eL_E	5 0.7	31					
		eL_N	5 1.5	30					
		M_{E_1}	5 04 27			4.8 mm.			
		M_{N_1}	5 10		2.7 mm.				
		M_{E_2}	5 10 24			10.1 mm.			
		M_{N_2}	5 12 11		4.0 mm.				
		F	8 50						
		e_E?	7 37 44						E-W comp. obscure. Rest lost in cauda of preceding quake
		e_N	7 37 44						
		S_N?	7 46 40						

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Instrument	Component	V	T_O	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	AZ	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Nov. 11		eP_E	18 20 21						Heavy micros. No distinct M.
		iP_N	18 20 23						
		iS_E	18 29 16						
		eS_N	18 29 15						
		eL_E	18 50.3						
		eL_N	18 50.4						
		F	19 10						
Nov. 17		eP_E	11 13 02						Heavy micros. No distinct M.
		eP_N	11 13 02						
		S_E	11 22 00						
		S_N	11 22 02						
		$eL_{N?}$	11 40.6						
		L_N	11 42 30	21					
		F	12 15						

F. A. Tondorf, S. J.,
Director.

No. 93 From January 1, to January 31, 1923

WASHINGTON, D. C.
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Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Weichert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε : 1
	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	

Bosch Photographic Pendulums		V	T_0	ε : 1
	A_N	133	5.0	
	A_E	133	5.0	

		V	T_0	ε : 1
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Jan. 11		L_N	4 35 44						Heavy micros.
		F	4 40						
Jan. 22		iP_E	9 11 27						Heavy micros.
		eP_N	9 11 27						
		iS_E	9 17 12						
		iS_N	9 17 12						
		SR_N	9 20 53						
		eL_E	9 23.0						
		eL_N	9 22.7						
		M_E	9 27 07			11.5 mm.			
		M_N	9 24 40		24.4 mm.				
		F	12 (postea?)						
Jan. 27		eP_E?	8 12 41						Heavy micros.
		eP_N?	8 12 41						
		S_E?	8 14						
		S_N?	8 14 02						
		F	8 40						

Francis A. Tondorf, S. J.,
Director.

No. 94 bis. *From* *to*

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Instrument	Component	V	T_0	ε:1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 3		eP_E	18 54 40						Sheets off at 20 hrs. Quakes still on, first and third.
		eP_N	18 54 37						
		iS_E	19 02 22						
		iS_N	19 02 24						
		eL_E	19 10.5						
		eL_N	19 10.5						
		L_E	19 21	22					
		L_N	19 21	26					
Feb. 3		eP_E	17 51 52						The rest of this quake is within the cauda of first and so no more phases are discernible.
		eP_N	17 51 54						
		eS_E	18 02 10						
		eS_N	18 02 05						
Feb. 8		iP_E	0 39 33						All phases except P doubtful. Heavy micros.
		eP_N	0 39 33						
		eS_E?	0 44 05						
		eS_N?	0 45 59						
		eL_E?	0 50.0						
		F?	1 20						
Feb. 11		e_E	22 57						Gram difficult to read because of heavy micros.
		e_N	22 56 49						
		eL_E	23 27.5	16					
		eL_N	23 30.2	16					
		L_E	23 34 11	16					
		L_N	23 34 11	16					
		F	0 (ca).						
Feb. 12		eP_E	2 10 14						Heavy micros.
		eP_N	2 10 14						
		eS_N?	2 19 22						
		eL_E?	2 37.3	21					
		L_E	2 44 11	16					
		L_N	2 45 26	16					
		F	3 00						

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Instrument		V	T_o	ε:1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	AZ	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 12		e_E	13 47 13						Very heavy micros Possibly not of seismic origin.
		e_N	13 47 29						
		eS_E	13 53 13						
		eS_N	13 53 13						
		F	14 05						
Feb. 24		eP_E	7 46 12						Heavy micros.
		iP_N	7 46 12						
		S	7 55 33						
		S	7 55 34						
		eL_E	8 8.0						
		eL_N	8 8.0						
		L_E	8 13 16	26					
		L_N	8 13 16	26					
		M_{E_1}	8 14 20	18		2.2 mm.			
		M_{N_1}	8 18 41	17	1.7 mm.				
		M_{E_2}	8 19 26	16		2.4 mm.			
		M_{E_3}	8 21 43	15		1.7 mm.			
		F	9 35						
Feb. 27		eP_N	20 44 22						P is difficult. All phases on E-W too difficult to interpret. Heavy micros.
		S_N	20 49 43						
		F	21 10						

F. A. Tondorf, S. J.,
Director.

No. 95 From March 1 to March 31, 1923.

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Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_o	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	AZ	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
March 1		e^{L}_{E}?	8 51.0						Heavy micros. Gram not well defined.
		e^{L}_{N}?	8 51.0						
		L_E	9 03 09	16					
		L_N	9 03 09	16					
		F	9 35						
March 2	Quake on March 2nd at about 17 hours was lost in the changing of sheets. Noticed in part.								
March 11		e_E	23 26 00						e_E might be taken for L but e_N surely not. Very heavy micros.
		e_N	23 26 16						
		F	23 50						
March 15		e^{P}_{E}	6 08 11						Very heavy micros.
		e^{P}_{N}	6 08 06						
		S_E?	6 12 10						
		S_N?	6 12 14						
		e^{L}_{E}	6 17.4						
		e^{L}_{N}	6 16.1						
		F	6 50						
March 16		e_E	22 23 11						Difficult. Very heavy micros.
		e_N	22 23 33						
		L	23 22 06	18					
		L	23 30 05	16					
		L	23 34 05	20					
		F?	In micros.						
March 18		e_E	20 44						Difficult. Heavy micros.
		e_N	20 44						
		F	20 55						

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Instrument	Component	V	T_0	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
March 19		e_E	11 22 24						Heavy micros N-S poorly fined.
		S_E?	11 28 14						
		eL_E?	11 30.2						
		L_E	11 31 00	19					
		L_N	11 31 29	19					
		F	12 (ca.)						
March 24		e_E	12 59						Very heavy micros.
		e_N	12 59						
		S_E	13 06 26						
		S_N	13 06 26						
		eL_E	13 18.4						
		eL_N	13 18.0						
		L_E	13 41 00	22					
		L_N	13 41 00	22					
		M_E	13 47 38	18		1.5 mm.			
		F	14 45						

Francis A. Tondorf, S. J.
Director.

No. 96 *From* April 1 *to* April 30, 1923.

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Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Weichert Horizontal (200 kg.) Vertical (80 kg.)		V	T_o	ε:1
	A_N	143	5.0	
	A_E	165	5.0	
	AZ	80	4.0	

Bosch Photographic Pendulums		V	T_o	ε:1
	A_N	133	5.0	
	A_E	133	5.0	

		V	T_o	ε:1
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
April 13		P_E	15 42 27						Very heavy micros.
		P_N	15 42 27						F in micros.
		S_E?	15 51 52						
		eL_E	16 0.4						
		L_E	16 09	29					
		L_N	16 09	18					
		M_E	16 20	17		1.3 mm.			
		F	17 (ca)						
April 23		eL_E?	4 18.7						Heavy micros
		L_E	4 23 27	16					
		F	4 40						
April 24		P_E?	23 00						Heavy micro.
		P_N?	23 00 38						
		S_E	23 07 05						
		S_N	23 07 05						
		F	23 35						
April 25		e_E	19 50						There seems to be little doubt regarding two quakes.
		e_N	19 50						P of second in cauda of first.
		S_E?	19 54 29						Heavy micros
		S_N?	19 54 29						
			Second quake						
		S_E	20 10 31						
		S_N	20 10 31						
		F	20 50						

Francis A. Tondorf, S. J.
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From May 1, 1923 *to* May 31, 1923.

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Instrument	Component	V	T_0	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Bosch-Omori	A_N	59	9.0	
	A_E	47	9.0	
Mainka	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 1		e_E	10 54						H. M.
		e_N	10 54						
		eS_E ?	11 00 49						
		eS_N ?	11 00 49						
		F	11 30 (ca)						
May 2		e_E	16 41						
		e_N	16 41						
		eL_E ?	16 43						
		eL_N ?	16 43						
		L_E	16 45						
		L_N	16 46 44	11					H. M.
		F	17 20						
May 4		eP_E	16 36 02						Micros.
		eP_N	16 36 03						
		S_E	16 43 34						
		S_N	16 43 34						
		eL_E	16 51.4	7					
		eL_N	16 51.4	7					
		M_E	16 57 04			5.8 mm.			
		M_N	16 57 29		3.7 mm.				
		F	19 (ca)						
		e_E	22 37 26						
		e_N	22 37 36						
		S_E	22 47 11						
		S_N	22 47 11						
		F	0 20 (ca)						
May 5		e_N	9 58						
		F	10 10						
		e_N	15 18						V.H.M.
		eL_N	15 24.4						E-W obscure.
		F_N	16 (ca)						
May 12		eP_E	1 39 44						Very heavy micros.
		iP_N	1 39 44						
		S_E ?	1 49 54						
		S_N?	1 49 54						
		F	3 (ca)						

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Weichert Horizontal (200 kg.) Vertical (80 kg.)		V	T_O	ε : 1	Bosch Photographic Pendulums		V	T_O	ε : 1			V	T_O	ε : 1
	A_N	143	5.0			A_N	133	5.0		Mainka	A_N	59	9.0	
	A_E	165	5.0			A_E	133	5.0			A_E	47	9.0	
	AZ	80	4.0							Bosch-Omori	A_N	11	13.5	
											A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 23		eP_N	22 48 47						Heavy micros.
		S_E?	22 57 04						P on E-W
		S_N?	22 57 04						does not
									show No
		eL_E	23 7.5						distinct M.
		L_E	23 14 19	27					
		L_N	23 14 30	22					
		F	0 54						
May 28		e_E	1 48 53						Heavy micros.
		e_N	1 48 30						
		F?							
May 30		e_E	16 07 24						Heavy micros.
		e_N	16 07 20						
		eL_E?	16 27.3	19					
		L_E	16 33 24	19					
		L_N	16 34						
		F	16 55						
May 31		e_E?	22 11 38						Very heavy
		e_N?	22 11 38						micros.
		eL_E	22 21.6	21					Difficult.
		F	22 35						

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Instrument		V	T_0	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Bosch-Omori	A_N	59	9.0	
	A_E	47	9.0	
Mainka	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
June 1		e_E	17 40 37						Very heavy micros.
		e_N	17 41 24						
		S_E	17 48 58						
		S_N	17 48 58						
		eL_E	17 56.3	16					
		eL_N	17 56.3	16					
		L_E	18 16 47	19					
		L_N	18 16 31	14					
		M_E	18 23	19		0.2 mm			
		F	In 2d quake						
		eP_E?	20 29 31						Heavy micros.
		eP_N?	20 29 34						No distinct M.
		eS_E	20 39 58						
		iS_N	20 39 58						
		L_E	21 09 08	20					
		L_N	21 18 08						
		F	23 50						
June 6		e_E	18 00						Difficult. E-W does not show.
		F	20						
		e_E	23 17						Very heavy micros.
		e_N	23 17						e possibly sooner.
		F	23 40						Heavy micros.
June 18		eP_E	8 34 12						
		eP_N	8 34 06						
		iS_E	8 40 44						
		eS_N	8 40 44						
		i_E	8 41 38						
		i_N	8 42 11						
		eL_E	8 49.0	15					
		L_N	9 03 37	26					
		L_E	9 11 16	26					
		M_E	9 15 16	16		0.3 mm			
		F	9 53						

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Weichert Horizontal (200 kg.) Vertical (80 kg.)		V	T_o	ε : 1
	A_N	143	5.0	
	A_E	165	5.0	
	AZ	80	4.0	

Bosch Photographic Pendulums		V	T_o	ε : 1
	A_N	133	5.0	
	A_E	133	5.0	

		V	T_o	ε : 1
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
June 19		iP_E	22 52 33						
		iP_N	22 52 33						
		S_N	22 59 40						
		eL_E	23 6.5						
		eL_N	23 6.5						
		M_{E_1}	23 09 53	6		3.5 mm.			S_N not defined.
		M_{N_2}	23 10 14	6	2.1 mm.				
		N_{E_2}	23 12 14	8		2.9 mm.			
		M_{E_3}	23 14 08	6		1.6 mm.			
		F	23 55						
June 22		e_E	4 02 27						
		eL_E?	4 7.0						
		eL_N?	4 6.7						
		F	4 35						
		eP_N	7 04 43						
		eS_N	7 10 22						
		eL_N?	7 13.0						
		L_E	7 43	32					
		L_N	7 47 30	27					
		F	8 50						E-W does not show.
		e_N	21 18 36						Very heavy micros.
		eL E??	21 33.3						
		eL_N??	21 33.3						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	To	ε:1
A_N	143	5.0	
A_E	165	5.0	
A_Z	80	4.0	

Bosch Photographic Pendulums	V	To	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	To	ε:1
Bosch-Omori	A_N	59	9.0	
	A_E	47	9.0	
Mainka	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
July 4		e_N	8 21						Difficult.
		F	8 40						
July 7		e_E	6 31 56						e possibly sooner.
		e_N	6 31 56						Heavy micros.
		L_E	6 35 29	11					
		F	6 40						
July 10		eP_N	0 40 16						P_E does not show.
		iS_E	0 49 20						Very heavy micros.
		eS_N	0 49 20						
		F	?						
July 11		e_N	11 31						E-W time off.
		S_N	11 38 25						Heavy micros.
		eL_N ?	11 52.4						
		L_N	12 15	27					
		L_N	12 19						
		F	13 10						
July 12		e_N	9 38 58						
		F ?							
July 12		eL_N	4 5.0						
		L_E	4 13	22					Very heavy micros.
		L_N	4 17	22					
		F	4 37						
July 16		L_N	16 05 04	16					Very heavy micros.
		F	16 30						
July 16		e_N	23 46						Possibly not of seismic origin.
		F	0 04						
July 17		e_E	1 10 49						Difficult.
		e_N	1 27 14						E-W time off.
		F	1 45						
July 18		e_N	1 18 47						Very faint.
		F?							
July 20		e_N	15 16						
		eS_N?	15 23 13						Very heavy micros.
		F	15 30						

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Weichert Horizontal (200 kg.) Vertical (80 kg.)	V	To	ε : 1	Bosch Photographic Pendulums	V	To	ε : 1	Bosch-Omori / Mainka	V	To	ε : 1
A_N				A_N				A_N (Bosch-Omori)			
A_E				A_E				A_E (Bosch-Omori)			
A_Z								A_N (Mainka)			
								A_E (Mainka)			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
July 23		eP_E?	7 38 00						Very heavy micros.
		eP_N?	7 38 00						
		iS_E	7 47 13						No other phases.in evidence.
		iS_N	7 47 23						
		F	8 30						
July 22		P_E	14 29 25						
		P_N	14 29 25						
		S_E	14 38 35						
		S_N	14 38 35						
		eL_E	14 52.5	27					
		eL_N	14 53.2	26					
		L_E	15 01 43	16					
		L_N	15 00 29	16					
		M_E	15 04 05	16		0.9 mm.			
		F	16 46						

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Weichert Horizontal (200 kg.) Vertical (80 kg.)	V	To	ε : 1	Bosch Photographic Pendulums	V	To	ε : 1	Bosch-Omori / Mainka	V	To	ε : 1
A_N	143	5.0		A_N	133	5.0		Bosch-Omori A_N	59	9.0	
A_E	165	5.0		A_E	133	5.0		Bosch-Omori A_E	47	9.0	
A_Z	80	4.0						Mainka A_N	11	13.5	
								Mainka A_E	11	13.7	

Date	Character	Phase	Time	Period	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Aug. 1		i_E	8 38 06						
		i_N	8 38 08						
		F	9 (ca.)						
Aug. 8		e_E	12 26 21						Heavy micros.
		e_N	12 26 21						
		e_N	12 27 13						
		i_N	12 35 32						
		F	12 45						
Aug. 8		iP_E	12 07 43						Very heavy micros.
		iP_N	12 07 43						
		S_E	12 12 38						
		S_N	12 12 38						
		eL_E	12 14.9						
		eL_N	12 14.7						
		F	In second quake.						
Aug. 11		e_N?	1 06 46						
		eS_N	1 17 24						
		F	1 50						
Aug. 11		e_N	1 15 35						Very heavy micros. E-W does not show.
		e_N	1 18 13						
		eL_N	1 37.6						
		F	2 (ca.)						
Aug. 28		iP_E	23 21 31						S uncertain
		eP_N	23 21 35						
		eS_E	23 25 44						
		eS_N	23 26 00						
		eL_E	23 30.3	9					
		eL_N	23 29.6	6-7					
		M_N	23 32 16	12	12.2 mm.				
		M_E	23 35 16	8		13.0 mm.			
		F	2 (ca.)						

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Instrument	Component	V	T_0	ε:1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Bosch-Omori	A_N	59	9.0	
	A_E	47	9.0	
Mainka	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Sept. 1		eP_E	3 11 33						
		eP_N	3 11 44						
		S_E	3 23 00						
		S_N	3 23 03						
		eL_E	3 41.9	43					
		eL_N	3 41.9	28					
		M_{E_1}	3 57 20	21		3.7 m.m.			
		M_{E_2}	4 00 15	16		5.2 m.m.			
		M_{E_3}	4 03 03	16		3.6 m.m.			
		M_{N_1}	4 05 30	19	3.7 m.m.				
		F	7 (ca.)						
Sept. 2		eP_E	3 04 25						
		eP_N	3 03 59						Very heavy micros.
		S_E	3 10 58						
		S_N	3 10 53						
		eL_N	3 16.7	17					
		L_E	3 34 02	25					
		L_N	3 36 03	25					
		M_E	3 41 47	22		1.0 m.m.			
		F	4 56						
Sept. 2		e_N	9 51 24						
		F	10 04						
Sept. 2		e_N	22 47 31						Marked micros. E-W component not pronounced.
		iS_N	22 55 08						
		eL_E	23 02						
		eL_N	23 02						
		L_N	23 05 30	11					
		F	23 25						
Sept. 9		e_N	22 22 46						No distinct M. Marked micros.
		S_E?	22 29 16						
		S_N	22 29 16						
		L_E	23 00 07	39					
		L_N	23 13 24	19					
		L_E	23 14 12	18					
		F	24 10						
Sept. 16		eP_E	16 55 56						Very heavy micros.
		eP_N	16 55 56						
		F	17 10						

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		V	To	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N			
	A_E			
	A_Z			
Bosch Photographic Pendulums	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			
Mainka	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Sept. 22		eL_E?	21 36						
		eL_N?	21 36.6						Very heavy micros.
		L_N	21 39 11	32					P and S not indicated.
		L_N	21 48	18					
		L_E	21 50 32	16					
		F	23						
Sept. 23		e_N	17 40 52						
		e_E	17 41 10						
		eL_N?	17 50						
		L_E	17 55.1	16					
		L_N	18 01	11					
		F	18 40						
Sept. 26		L_N	9 20 44	27					Other phases not discernible.
		L_N	9 30 06	16					
		F	9 50						Very heavy micros.
Sept. 30		iP_E	1 27 30						Very heavy micros.
		eP_N	1 27 33						
		iS_E	1 33 000						
		iS_N	1 33 02						
		eL_E	1 36.2	17					
		eL_N	1 36.2	11					
		M_{N_1}	1 38 34	19	5.7 mm.				
		M_{E_1}	1 40 22	16		7.2 mm.			
		M_{E_2}	1 41 26	16		6.8 mm.			
		M_{N_2}	1 41 37	14	6.7 mm.				
		F	3 (ca.)						

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Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
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	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Bosch-Omori	A_N	59	9.0	
	A_E	47	9.0	
Mainka	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Oct. 7		eP_E?	3 46						P_E very uncertain
		P_N	3 46						P_N more so. Very heavy micros. No distinct M.
		iS_E	3 52 37						
		iS_N	3 52 37						
		eL_E	3 58.4	18					
		L_E	4 10 10	22					
		L_N	4 15	22					
		L_E	4 28	45					
		L_N	4 35 14	23					
		F	5 50						
Oct. 10		eP_E	7 19 47						
		iP_N	7 19 47						
		S_E	7 26 48						
		S_N	7 26 48						
		eL_E	7 32.6	27					
		eL_N	7 32.6	27					
		L_E	7 36 38	13					
		L_N	7 37	26					
		F	8 56						
Oct. 13		e_E	4 42						Very difficult. e possibly sooner.
		e_N	4 42						Very heavy micros.
		eL_N	4 48.8						
		L_E	4 52 09	10					
		L_N	4 52	8					
		F	5 10						
Oct. 28		e_E?	5 13						Very heavy micros.
		e_N?	5 13						Gram difficult
		S_E	5 17 33						
		S_N	5 17 33						
		F ?	5 30						

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Instrument	Component	V	To	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	AN	143	5.0	
	AE	165	5.0	
	AZ	80	4.0	
Bosch Photographic Pendulums	AN	133	5.0	
	AE	133	5.0	
Bosch-Omori	AN	59	9.0	
	AE	47	9.0	
Mainka	AN	11	13.5	
	AE	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude AN	Amplitude AE	Amplitude AZ	Δ	Remarks
Nov. 1		eE	20 15 24						Very heavy micros. e possibly S.
		eN	20 15 24						
		LE	20 16 29	9					
		LN	20 16 29	9					
		e	20 21						
		F?	20 40						
Nov. 2		eE	21 28 56						Very heavy micros Sheet off 0hr.20m. Quake still on
		eN	21 29 02						
		SN?	21 37 23						
		eLE	21 46.3	38					
		eLN	21 46.3						
		LE	22 09 10	30					
		LN	22 10 02	26					
		ME	22 23 05	19		1.1mm			
Nov. 3		ePE	8 42 21						
		iPN	8 42 21						
		SE	8 46 03						
		SN	8 46 03						
		eLE?	8 47						
		LN	8 48 55	19					
		LE	8 49 34	16					
		F	10 (ca)						
Nov. 3		eN?	16 44						Very heavy micros. Beginning very uncertain
		eLE?	16 18.0						
		eLN?	17 17.4						
		LE	17 18 11	21					
		LN	17 18 16	26					
		LN	17 28	11					
		F	17 58						
Nov. 4		ePE?	0 24 22						Very heavy micros. Possibly sooner. Difficult.
		ePN?	0 24 00						
		eSE?	0 37 00						
		eSN?	?0 37 00						
		SER	0 42 00						
		eLE	1 1.0						
		eLN	1 1.0						
		LE	1 03 05	28					
		LN	1 03 25	31					
		ME	1 07 35	25		0,5mm.			
		MN	1 07 15	25	0.8mm.				
		F	1 55						
Nov. 5		eE	21 52 31						N-S bound by damper
		eLE	22 18.2						
		LE	22 28 35	20					
		F	23 10						
		LEN	21 18 42 to 21 25						

Nov. 8	$eS_E?$	0	13	35		Very heavy micros.
	iS_N	0	13	25		P o bscured in micros.
	$eL_N?$	0	19.5			possibly at 0 hr.07m.00s.
	F	0	40			
Nov. 9	e_N	3	28	30		S possibly sooner.
	$eS_N?$	3	32	10		E-W poorly defined.
	$eL_N?$	3	34.7			
	L_N	3	39			
	L_E	3	43			
	F	4	30 et postea.			
Nov. 11	e_E	6	04			
	e_N	6	04			
	$S_E?$	6	11	48		
	$S_N?$	6	11	48		
	F	6	20			
Nov. 11	e_E	14	06			
	e_N	14	06			Difficult
	e_E	14	14	00		
	e_N	14	14	20		
	F	15 (ca.)				
Nov. 16	e_E	4	33	00		e possibly sooner.
	e_N	4	33	00		Very heavy micros.
	$S_E?$	4	36	24		
	$S_N?$	4	36	24		
	$eL_E?$	4	38.0			
	$eL_N?$	4	38.0			
	L_E	4	39		8	
	L_N	4	40	39	8	
	F	5				
Nov. 16	e_E	7	28	25		Very heavy micros.
	e_N	7	28	25		
	L_E	7	31	35		
	L_N	7	32	23		
	F	7	40			
Nov. 17	eP_N	3	03	41		
	$S_E?$	3	12	57		
	$S_N?$	3	12	57		
	L_E	3	31	07	15	
	L_N	3	36			
	F	4	10			
Nov. 18	L_E	9	16	39		Very heavy micros.
	L_N	9	17	32		
	F	9	40			

Francis A Tondorf, S. J.,
Director.

From December 1 *to* December 31, 1923

WASHINGTON, D. C.
Seismological Bulletin
of the Georgetown University Department of Geology

$\phi = 38°\ 54'\ 25''$ N $\lambda = 77°\ 4'\ 24''$ W h = 42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument		V	To	ε : 1
Weichert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Bosch-Omori	A_N	59	9.0	
	A_E	47	9.0	
Mainka	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Dec. 5		e_E?	21 06 21						Very heavy micros.
		e_N?	21 06 27						
		S_N	21 18 08						
		F	in micros						
Dec. 13		e_E	17 05 17						Very heavy micros
		e_N	17 05 17						
		eL_N	17 10.3	14					
		L_E	17 19 08						
		F	in micros						
Dec. 14		e_E	10 44 46						Rest lost in heavy micros.
		e_N	10 44 49						
Dec. 21		eL_N?	8 15.3						Very heavy micros.
		F	in micros						

Very heavy microseisms during the entire month made readings very difficult and uncertain.

Francis A. Tondorf, S. J.,
Director.

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_0	ε : 1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Jan. 1		i_N	3 10 47						i_N is possibly S_N
		eL_N?	3 14.2						
		F	3 25						E-W does not show
Jan. 4		e_E	22 01 16	10					Very heavy micros.
		e_N	22 01 10						
		eL_E	22 3.3	10					
		eL_N	22 3.4	10					
		L_E	22 05 06	10					
		L_N	22 05 26	10					
		F	in micros						
Jan. 5		e_E	18 45						Very heavy micros.
		e_N	18 45						
		i_E	18 46						
		i_N	18 46						
		F	19 (ca.)						
Jan. 14		eP_N?	21 01 49						Very heavy micros.
		i_E	21 08 00						P possibly sooner.
		i_N	21 08 00						E-W shows no P
		eS_E	21 14 31						
		eS_N	21 14 31						
		L_E	21 53 23	18					
		L_N	21 56 16	21					
		F	21 30						
Jan. 21		eP_E	2 05 24						Rest of phases masked in micros
		iP_N	2 05 24						
		eS_E	2 13 19						
		L_E	2 31 57						
Jan. 25		e_E	6 12 40						Very Heavy micros.
		e_N	6 12 40						
		eL_E?	6 26.4						
		eL_N?	6 26.4						
		F	in micros						

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Jan. 29		eP_E	2 05 47						
		iP_N	2 05 47						
		eS_E	2 14 40						
		iS_N	2 14 43						
		eL_E	2 36.3	16					
		eL_N	2 36.1						
		F	2 52						
Jan. 30		eP_E	20 59 11						Very heavy micros.
		iP_N	20 59 07						
		S_E	21 04 57						
		S_N	21 04 57						
		eL_E	21 8.2	9					
		eL_N	21 8.2	9					
		F	21 25						
Jan. 31		e_E	1 16 37						Very heavy micros.
		i_N	1 16 38						
		F	1 26						P possibly at 1-08-56

Francis A. Tondorf, S. J.,
Director.

No. 106 *From* Feb. 1 *to* Feb. 29 *19*24

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W   h=42.4 m   Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	11	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 18		eE	7 23 21						Very heavy micros.
		eN	7 22 59						No other phases indicated.
Feb. 24		eL_E	6 6.0						Very heavy micros.
		eL_N	6 6.0						
		L_E	6 9.0						
		L_N	6 9.0						
		F	6 20						

Francis A. Tondorf, S. J.,
Director.

No. From March 1 to March 31, 1924

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1	Bosch Photographic Pendulums		V	T_0	ε:1			V	T_0	ε:1
	A_N	143	5.0			A_N	133	5.0		Mainka	A_N	59	9.0	
	A_E	165	5.0			A_E	133	5.0			A_E	47	9.0	
	A_Z	80	4.0							Bosch-Omori	A_N	14	13.5	
											A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
March 4		eP_E	10 13 49						
		eP_N	10 13 51						
		eS_E	10 18 50						
		iS_N	10 18 58						
		eL	10 21	27					
		M_{E_1}	10 24 58	22		9.2 mm.			
		M_{N_1}	10 26	11	4.0 mm.				
		M_{E_2}	10 30	20	3.0 mm.				
		F	In second quake.						
March 4		eL_E	11 59.2						All preceding lost in changing of sheets.
		eL_N	11 59.2						
		F	14 (ca.)						
March 4		e_E	17 31						Very heavy micros.
		e_N	17 31						
		L_N	17 34 41						
		F	17 50						
March 5		eL_E?	12 23.4	16					Very heavy micros.
		F?	13 (ca.)						
March 6		e_N	12 36 45						Rest doubtful. Heavy micros.
March 7		e_N?	18 20 40						Very heavy micros.
		F	in micros.						
March 11		eP_N	10 46 45						P and S uncertain. Very heavy micros.
		eS_N?	10 52 23						
		eL_E?	10 55.0						
		eL_N?	10 55.0						
		L_E	10 57 33	16					
		L_N	10 58	16					
		M_E	10 58 35			1.8 mm.			
		F	12 50						
March 13		e_E	11 05						Sheets off at 11 hrs. 31 m. Seismic indications then continuing. Very heavy micros.
		e_N	11 03						

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Instrument		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N			
	A_E			
	A_Z			
Bosch Photographic Pendulums	A_N			
	A_E			
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	A_N	A_E	A_Z	Δ	Remarks
March 15		eP_N	10 44 05						
		eS_N	10 54 29						
		eL_E?	11 11.6	16					
		L_E	11 19 28	16					
		F	11 55						
March 20		L_E	10 13 to						
			10 18	16					Very heavy micros.
March 24		eP_N	20 36						
		S_N?	20 40 36						
		eL_E?	20 43.3	10					Phases very difficult.
		L_E	20 45						Very heavy micros.
		L_N	20 47 27	16					
		F	21 15						
March 25		eP_E?	14 13 10						S_N uncertain
		eP_N	14 13 10						
		S_E?	14 20 27						
		eL_E	14 23.2	22					
		eL_N	14 23.2						
		L_E	14 25 06	11					
		L_N	14 26 11	15					
		F	in following quake						
March 25		eP_E?	15 09 27						Very heavy micros.
		eP_N	15 09 38						
		eS_E?	15 17 13						
		eL_E	15 19.9	17					
		eL_N	15 19.9	17					
		L_E	15 21 11	11					
		L_N	15 22 27	11					
		F	16 (ca.)						
March 30		e_E?	0 25						
		e_N?	0 25						Very heavy micros.
		S_E?	0 29 26						Gram pronounced but very difficult.
		S_N?	0 29 22						
		F	1 30						

Francis A. Tondorf, S. J.,
Director.

No. 108 From April 1 to April 30, 1924

Washington, D. C.

Seismological Bulletin

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ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
April 13		e_E	15 11						
		e_N	15 11						
		L_E	15 38						
		L_N	15 40						
		F	15 45						
April 13		e_E	14 09						
		e_N	14 10						Very heavy micros.
		eL_E?	14 25.8						
		eL_N?	14 25.8						
		L_E	14 54 21						
		L_N	14 56 34						
		F	15 (ca.)						
April 14		eP_E	16 39 47						
		eP_N	16 39 47						
		P_{N_R}	16 42 03						
		S_E	16 43 27						
		S_N	16 43 28						
		eL_E?	16 52						
		eL_N?	16 52						
		L_E	17 00 03	38					
		L_N	17 00 14	32					
		F	20 (ca.)						
April 21		eP_E	20 07 10						
		eS_E	20 12 26						No record on the N-S copm. Possibly bound. through damper. Micros.
		eL_E	20 14.4						
		L_E	20 19 15						
		F	21 10						

Francis A. Tondorf, S. J., Director.

No. 109 *From* May 1 *to* May 31 *19*24

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 1		eP_E	20 00 10						No distinct
		eP_N	20 00 14						M_N.
		S_E	20 05 12						Micros.
		S_N	20 05 02						
		eL_E	20 7.4						
		eL_N	20 7.3						
		M_E	20 13 33			4.3	mm.		
		F	21 10						
May 4		e_E	17 10						
		e_N	17 10						No distinct
		eL_E	17 22.4						M.
		eL_N	17 22.4						Heavy micros.
		L_E	17 30 27	9					
		L_N	17 31 21	11					
		F	17 55						
May 6		L_E	17 08						N-S does not
		L_E	17 15 23	21					show
		L_E	17 30 13	16					Heavy micros.
		F	17 50						
May 17		e_E	4 21 17						L waves of exceedingly small amplitude.
		L_E	4 43 28						N-S does not show.
		F	4 56						
									No records on the 18th. Machines stopped to be oiled.

No. 109 bis. *From* *to* *19*

Washington, D. C.

Seismological Bulletin

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Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1	Bosch Photographic Pendulums		V	T_0	ε:1			V	T_0	ε:1
	A_N					A_N				Mainka	A_N			
	A_E					A_E					A_E			
	A_Z									Bosch-Omori	A_N			
											A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 21		eP_E	10 18 54						
		eP_N	10 18 54						
		eS_E?	10 24 55						
		eL_E	10 28.4						
		eL_N	10 28.4						
		F	10 54						
May 21		e_E	1 45 07						No other phases sure.
		e_N	1 44 30						
		F	1 55						
May 28		eP_E	10 03 48						Heavy micros.
		eP_N	10 03 48						
		iS_E	10 13 36						No L or M apparent.
		eS_N	10 13 36						
		eL_E	10 26.5	11					
		F	10 55						

Francis A. Tondorf., S. J.
Director.

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No. 161 *From* June 1 *to* June 30, 1924.

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	A_N	A_E	A_Z	Δ	Remarks
June 4		e_E?	10 21 11						Very heavy micros.
		e_N?	10 21 11						
		L_E	10 31 47	11					
		L_N	10 36 11	11					
		F	10 43						
June 14		e_E	12 31						N-S does not show.
		F	12 45						Very faint record.
June 18		e_E	17 46 11						E-W very dif-ficult.
		e_N	17 46 11						
		eS_N?	17 47 17						
		eL_E?	17 49.8						
		F	17 55						
June 26		eP_E	1 56 57						Difficult.
		eP_N	1 56 57						
		i_E	2 00 37						
		i_N	2 00 32						
		S_E?	2 10 13						
		S_N?	2 10 10						
		S_{ER_1}	2 19						
		S_{NR_1}	2 19						
		L_E	2 45 12	30					
		L_N	2 45 12	25-26					
		M_N	2 46 35		0.7mm.				
		M_E	2 47 12			1.0mm.			
		F	4 44						
June 30		iP_E	15 57 01						No distinct micros.
		iP_N	15 57 01						
		iS_E	16 07 28						
		iS_N	16 07 28						
		eL_E	16 23.4	14					
		L_N	16 27 24	30					
		L_E	16 32 06	20					
		F	17 29						

Francis A. Tondorf, S. J.,
Director.

No. 111 *From* July 1, *to* July 31, 1924.

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\phi=38°\ 54'\ 25''$ N $\lambda=77°\ 4'\ 24''$ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1	Bosch Photographic Pendulums		V	T_0	ε:1			V	T_0	ε:1
	A_N	143	5.0			A_N	133	5.0		Mainka	A_N	59	9.0	
	A_E	165	5.0			A_E	133	5.0			A_E	47	9.0	
	A_Z									Bosch-Omori	A_N	14	13.5	
											A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
July 1		L_E	3 49 35	20					
		L_N	3 50 01	11					
		F	4 10						
July 2		eP_E	18 12						eP_E possibly at 18 hr. 11 m. 42 s.
		eP_N?	18 12						
		eS_E?	18 17 02						
		eS_N?	18 17 02						
		eL_E?	18 22.3						Very difficult.
		eL_N?	18 21						
		L_E	18 24 35	11					
		L_N	18 24 35	11					
		F	18 40						
July 3		eS_E?	5 04 52						
		eS_N	5 04 52						P impossible.
		eL_E	5 18.6	9					
		L_E	5 29 31	37					
		L_N	5 30 30	34					
		M_E	5 39 12	20		1.0 mm.			
		M_N	5 43 10	16	0.6 mm.				
		F	6 37						
July 6		L_N	19-24 to 19-34						Very small amplitude.
July 6		iP_N	14 25 12						P hardly shows.
		eS_E	14 30 23						No distinct M_N.
		eS_N	14 30 23						
		eL_E	14 33.7						
		eL_N?	14 33.2						
		L_E	14 35 52	22					
		L_N	14 37 12	16					
		M_E	14 37 47	16		0.7 mm.			
		F	14 56						

No. 111 bis. From to 19

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1	Bosch Photographic Pendulums	V	T_0	ε:1	Mainka / Bosch-Omori	V	T_0	ε:1
A_N				A_N				Mainka A_N			
A_E				A_E				Mainka A_E			
A_Z								Bosch-Omori A_N			
								Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
July 11		e_E	20 05 30						
		eS_E?	20 09 18						
		eS_N	20 09 18						
		eL_E?	20 31.2						
		eL_N?	20 31.3						
		L_E	20 43	17					
		L_N	20 42 17	17					
		M_E	20 49 34	18		1.0 mm.			
		M_N	20 52 05	17	1.0 mm.				
		F	22 (ca.)						
July 12		eP_E??	15 24						Micros.difficult. F-?.
		eP_N??	15 24 42						
		S_E?	15 36 44						
		S_N	15 36 44						
July 15		eP_E?	0 11 53						N-S barely shows but for P.
		eP_N	0 11 52						
		S_E	0 13 58						
		eL_E	0 14.1						
		F	0 18						
July 22		P_N	4 11 42						P does not show. No distinct M.
		P_{NR}	4 13 26						
		iS_E	4 17 34						
		iS_N	4 17 39						
		eL_E	4 20.7	12					
		L_E	4 22 26	11					
		L_N	4 25 38	11					
		F	5 (ca.)						
July 24		e_E	5 14 50						E-W barely shows. Heavy micros. Record difficult.
		eS_E?	5 24 18						
		L_E	5 54 28						
		F	7 10						

Francis A. Tondorf, S. J.,
Director.

No. 112 From August 1, to August 31, 1924.

Washington, D. C.

Seismological Bulletin

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Instrument	Component	V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
August 13		e_E	13 45 28						
		L_E	14 04 24	13					N-S does not show. Heavy micros.
		L_E	14 15 07	13					
		F	14 40						
August 14		eP_E?	18 15 26						
		eS_E	18 27 39						N-S comp. possibly bound. Very heavy micros
		S_{E_R}	18 34 23						
		eL_E	18 46.3	21					
		L_E	18 55 17	19					
		M_E	19 05 22	19		0.4 mm.			
		F	22 (ca.)						
August 21		L_E	19 29 49 to 19 40	18					N-S does not show. Ampl. small. Micros.
August 25		eP_E?	14 44 07						
		eP_N?	14 44 07						Very heavy micros.
		eS_E	14 54 00						
		eS_N	14 54 00						
		L_N	15 21 03						
		L_E	15 24						
		L_E	15 28 50	17					
		L_N	15 28 24	10					
		F	in micros.						
August 25		e_E?	23 14 47						
		e_N?	23 14 47						Difficult.
		L_E	23 50 16						Very heavy micros.
		L_N	23 50 20	16					
		F?	0 30						

No. 112 bis. *From* *to* *19*

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		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N			
	A_E			
	A_Z			

		V	T_0	ε:1
Bosch Photographic Pendulums	A_N			
	A_E			

		V	T_0	ε:1
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
August 25		e_E	2 44						Other phases not clear. Very heavy micros.
August 30		eP_E??	3 26						Difficult
		eP_N?	3 25 57						Very heavy micros.
		eS_N?	3 36 24						
		eL_N?	3 43.2	10					
		L_E	4 03 13	22					
		L_N	4 04 10	26					
		L_E	4 12 11	22					
		L_N	4 13 13	22					
		F	5 10						

Francis A. Tondorf, S. J.,
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Instrument		V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Sept. 6		e_E	3 15 27						Very heavy micros.
		e_N	3 15 05						
		F ?	In micros						
Sept. 13		eP_E	14 46 48						S_N somewhat doubtful.
		eP_N	14 46 48						S_E possibly sooner than S_N.
		S_E	14 57 11						
		S_N	14 57 21						
		SR_E	15 02 32						
		eL_N	15 13.7	21					
		L_N	15 18 10	26					
		L_E	15 19 56	27					
		M_E	15 25 54	22		0.3mm.			
		F	17 12						
Sept. 14		L_E	13 52.4	16					Sheets changed. Pen down at 13hrs 34m.
		L_N	13 58.9	16					
		L_E	14 03 54	19					
		L_N	14 03 42	19					First part of quake lost.
		F	15(ca.)						
Sept. 17		P_E	7 08 57						
		P_N	7 08 57						
		S_E	7 12 25						Very heavy micros.
		S_N	7 12 27						
		eL_E	7 13.0	8					
		L_E	7 17 27	9					
		F	7 30						
Sept. 30		eP_E??	8 56 06						Very heavy micros.
		eP_N??	8 56 06						
		eS_E ?	8 57 48						
		eS_N?	8 57 48						
		eL_E ?	8 58.2						
		eL_N?	8 58.2						
		M_E	8 58 22			0.89mm.			
		M_N	8 58 24		0.97mm.				
		F	9 05						

Francis A. Tondorf, S.J.,
Director.

No. 114 *From* Oct. 1 *to* Oct. 31, *19*24

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Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
Oct. 5		e_E	13 31 57						Sheets down at 13hrs.31m
		e_N	13 31 57						
		F	14(ca.)						Quake apparently before. Very heavy micros.
Oct. 12		L	19 52 19	26					Very difficu[illegible] Does not sh[illegible] on N-S. Heavy micros.
Oct. 13		e_N	12 45 02						Very difficu[illegible] All phases doubtful
		eL_E??	12 53.0						Very heavy micros.
Oct. 14		iP_E	5 06 39						Very heavy micros.
		eP_N	5 06 39						
		eS_E?	5 11 58						
		eS_N	5 11 58						
		eL_N	5 14.1	22					
		L_E	5 15 03	19					
		L_N	5 19 52	11					
		L_E	5 20 52	9					
		F	5 50						
Oct. 17	Grams on this date could not be read because of clock difficulties.								
Oct. 18		eP_N	23 12 25						P_E-. ?
		eS_E	23 18 00						
		eS_N	23 18 00						Very heavy micros.
		eL_E	23 22.2	11					
		L_E	23 24 04	16					
		L_N	23 30 03	15					
		F?	23 50						
Oct. 19		eP_E?	15 49 43						Very heavy micros.
		eP_N?	15 49 43						
		S_E	15 54 09						
		S_N	15 54 09						
		eL_E	15 57.2						
		eL_N	15 57.2						
		F	16 10						

No. 114 bis. From to 19

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1	Bosch Photographic Pendulums		V	T_0	ε:1			V	T_0	ε:1
	A_N					A_N				Mainka	A_N			
	A_E					A_E					A_E			
	A_Z									Bosch-Omori	A_N			
											A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Oct. 20		eP_E	20 04 06						
		iP_N	20 04 06						Very heavy micros.
		iS_E	20 13 24						
		iS_N	20 13 24						
		L_E	20 31 06	24					
		L_N	20 36 12	21					
		M_N	20 36 22	21	0.5mm.				
		M_E	20 37 17	20		0.5mm.			
		F	21 10						
Oct. 23		L_E	12 24						
		L_N	12 25						Simusoidal type. Period about 6-7 seconds.
		F	12 30						Very heavy micros.

Francis A. Tondorf, S.J.,
Director.

No. 115 From Nov. 1 to Nov. 30, 1924.

Washington, D. C.

Seismological Bulletin

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Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Nov. 1		eP_E	5 01 46						
		iP_N	5 01 46						
		S_E	5 08 30						S is very doubtful. Very heavy micros.
		eL_E	5 12.2						
		eL_N	5 12.7						
		L_N	5 13 57	16					
		L_E	5 14 58	16					
		F	5 30						
Nov. 28		L_N	12 53 44	9					
		L_E	13 13 27	22					Very heavy micros.
		L_N	13 17 21	16					
		F	In micros.						

Francis A. Tondorf, S. J.,
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No.115 From Dec. 1 to Dec. 31, 1924

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Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument		V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Dec. 17		e_E	6 08(ca)						e is very uncertain
		e_N	6 07(ca)						Very singu-
		L_E	6 14 05	11					lar gram.
		L_N	6 14 21	7					Difficult
		F	6 25						Very heavy micros.
Dec. 27		iP_E	11 34 42						
		iP_N	11 34 42						
		eS_E	11 44 46						
		iS_N	11 44 46						
		SR_E	11 45 22						
		SR_N	11 45 22						
		eL_N	12 0.1						
		F	12 20						
Dec. 28		eP_E	23 07						P possibly
		eP_N	23 07						sooner.
		iS_E	23 18 38						Very heavy
		eS_N	23 18 38						micros.
		eL_E	23 37.7	33					
		L_E	23 44 11	27					
		L_N	23 48 11	21-22					
		L_N	23 55 29	22-23					
		F	0 30(ca)						

Francis A. Tondorf, S.J.,
Director.

No. 117 *From* Jan. 1, *to* Jan. 31, *19*25

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Instrument	Component	V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Jan. 5		e_N	21 56						E-W poorly
		eL_N	21 57.5						defined.
		L_N	21 59 17	8-9					
		L_E	22 00 17	9-10					
		F	22 11						
5		e_E	22 14	6					It is possible that e_{EN}
		e_N	22 14	6					marks
		F	22 30						eL_{EN} Difficult.
Jan. 5		eP_E	13 54 34						Possibly $iP_N = P_{R_N}$
		iP_N	13 54 51						
		S_E	14 02 18						
		S_N	14 02 18						Other phases not discernibl
		eL_N?	14 11.7						
Jan. 18		eP_E	12 18 17						
		eP_N	12 18 19						
		iS_E	12 28 27						
		iS_N	12 28 27						
		eL_E	12 40.2	11					
		eL_N	12 42.2	11					
		L_E	12 54 30	23					
		M_{E_1}	12 56 18	22		0.58mm.			
		M_{E_2}	13 00 48	21		1.04mm.			
		M_N	13 02 22	19	0.72mm.				
		F	15 10						
Jan. 26		eP_N	19 08 38						
		i_E	19 10 05						
		i_N	19 10 05						
		S_E	19 13 47						
		eS_N	19 13 46						
		eL_E?	19 16.1						
		L_E	19 19 05	20					
		L_N	19 19 49	19					
		M_E	19 21 10	16		0.67mm.			
		M_N	19 21 42	18-19	1.02mm.				
		F	20 30						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N			
A_E			
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N			
A_E			

	V	T_0	ε:1
Mainka A_N			
Mainka A_E			
Bosch-Omori A_N			
Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Jan. 28		eP_N?	4 18 27						P_E does not show.
		S_E	4 28 09						
		S_N	4 28 59						
		L_E	4 54	22					
		L_N	4 54 05	22					
		L_E	5 02 22	17					
		L_N	5 05 09	16					
		M_N	5 07 21	16	0.40mm.				
		F	6 (ca.)						
Jan. 28		eL_E	11 15.0	21					
		eL_N	11 16.0	21					P and S not ascertained.
		L_E	11 16 19	19					Heavy micros.
		L_N	11 17 14	19					
		M_E	11 16 15	14		0.31mm.			
		M_N	11 18 00	11	0.34mm.				
		F	12(ca.)						
Jan. 30		L_E	18 05 11	11					P and S cann[ot] be recognize[d] because of micros which are exceeding-ly heavy. No distinct M.F. doubtful.
		L_N	18 09 31	19					
		L_E	18 13 03	19					
		F?	18 35						
Jan. 30									
Jan. 30		L_E	18 05 11	16					P and S in micros which are very heav[y] E-W does not show in any phase.
		L_E	18 06 32	19					
		F	18 25						

Francis A. Tondorf, S. J.,
Director.

No. 118 From Feb. 1 to Feb. 28 1925

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Instrument	Component	V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 1		e_E	21 11 05						Initial wave sinusoidal. Difficult.
		e_N	21 11 05						
		S_E?	21 17 21						
		S_N?	21 17 21						
		L_N	21 27 32	16					
		L_E	21 30 20	16					
		F	22 (ca.)						
Feb. 1		e_E	5 37						
		e_N	5 36 54						
		S_E	5 47 38						
		S_N	5 47 38						
		eL_E?	6 1.8						$_eL$ shows a trifle early.
		eL_N?	6 1.5						
		F	6 40						
Feb. 2		e_E	13 52 47						
		e_N	13 52 30						
		L_E	14 17 44	22					
		L_N	14 30	16					
		F	14 45						
Feb. 2		e_E	12 02						No other phases show. Heavy micros.
Feb. 2		eP_E	19 59 45						
		eP_N	19 59 45						
		iS_E	20 10 27						
		iS_N	20 10 27						
		L_E	20 35 22	22					
		L_N	20 35 41	22					
		L_E	20 46	17					
		L_N	20 49	17					
		F	21 25						
Feb. 9		eL_E	15 10 08						First phases do not show.
		L_N	15 12 08	21-22					
		L_E	15 13 14	21					
		M_E	15 15 17	17		0.38mm.			
		L_E	15 22 04	16					
		L_E	15 29	16					
		F	15 50						

No. 118 bis *From* *to* *19*

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\phi = 38° 54' 25''$ N $\lambda = 77° 4' 24''$ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1	Bosch Photographic Pendulums	V	T_0	ε:1	Mainka / Bosch-Omori	V	T_0	ε:1
A_N				A_N				Mainka A_N			
A_E				A_E				Mainka A_E			
A_Z								Bosch-Omori A_N			
								Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 9		e_E	6 00						Seconds of first e ambiguous because in hour mark. Slightly before 6 hrs.
		e_N	6 00						
		e_E	6 06 20						
		e_N	6 06 20						
		e	18 08 14						
Feb. 16		e_E	18 08 14						e may be S.
		e_N	18 08 20						
		eL_N	18 14.5	22					
		L_N	18 37 14	27					
		L_E	18 37 25	27					
		F	18 52						
Feb. 20		eP_E	1 15 08						No distinct M.
		eP_N	1 15 08						
		iS_E	1 25 30						
		eS_N	1 25 17						
		eL_E	1 41.4						
		L_N	1 58 56	19					
		L_E	1 59 02	16					
		F	2 10						
Feb. 24		iP_E	0 02 20						
		iP_N	0 02 20						
		iS_E	0 09 14						
		iS_N	0 09 16						
		eL_E	0 15.4						
		M_E	0 19 03			71.0mm			
		M_N	0 19 11		25.2 mm.				
		F	1 (ca.)						
Feb. 25		e_E	19 16						Very heavy micros.
		e_N	19 16						
		F	19 20						

Francis A. Tondorf, S. J.,
Director.

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Instrument		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Mar. 1		eP_E	2 21 46						Sheet was taken off before end of quake to give data to press.
		eP_N	2 21 46						
		iS_E	2 23 38						
		iS_N	2 23 38						
		M_E	2 24 40			128mm.			
		M_N	2 24 56		117mm.				
		F?							
Mar. 7		e_E	18 37						Other phases do not show. Very heavy Micros.
		e_N	18 37						
Mar. 16		eL_E	15 43 22						Very heavy micros. N-S hardly shows
		L_E	15 47	26					
		M_E	15 50 21	19		0.38mm.			
		F	16 20						
Mar. 19		eL_E	16 49.4						Very heavy micros. N-S hardly shows.
		L_E	17 07 26						
		F	17 15						
Mar. 21		iP_E	15 25 06						Gram difficult.
		eP_N	15 25 00						Traffic interference.
		eS_E?	15 28 26						S not very reliable.
		F	15 40						Very heavy micros.
Mar. 22		e_N	15 07						
		L_E	15 12 43	8					
		L_N	15 12 43	8					
		F	15 20						
Mar. 22		L_E	12 14 16	16					Heavy micros.
		L_N	12 15 33	11					
		F	Lost in changing of sheets.						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_o	ε:1	Bosch Photographic Pendulums		V	T_o	ε:1			V	T_o	ε:1
	A_N					A_N				Mainka	A_N			
	A_E					A_E					A_E			
	A_Z									Bosch-Omori	A_N			
											A_E			

Date	Character	Phase	Time			Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Mar. 22		e_E	9	02							
		e_N	9	02							
		eL_E?	9	12.1		16					
		L_E	9	19	37	24					
		M_{E1}	9	48	25	19		0.55mm.			
		M_{E2}	9	50	26	17		0.73mm.			
		M_{E3}	9	56	37	18		0.80mm.			
		F	11	55							
Mar. 24		e_E	13	07	39						e_E possibly sooner
		e_N	13	07	39						Very difficult.
		eS_E?	13	12	32						Heavy micros.
		F	13	20							
Mar. 29		eP_E	21	18	54						Heavy micros.
		iP_N	21	18	54						N-S shows no distinct M.
		iS_E	21	23	57						
		eS_N	21	23	57						
		eL_E	21	26		11					
		M_E	21	31	06	15-16		0.96mm.			
		F	22	20							

Francis A. Tondorf, S. J.,
Director.

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ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W   h=42.4 m   Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument		V	T_o	ε : 1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	18.5	
	A_E	11	15.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
April 5		L_E	21 59 26	20					No other phases. Very heavy micros.
		L_E	22 00 00	21					
		L_N	22 01 21	21					
		F?							
April 7		e_E	18 26 44						No other phases clear. Very heavy micros.
		e_N	18 26 44						
April 11		iP_E	11 01 37						eL_{EN} possibly at 11h.23.8m.
		eP_N	11 01 42						
		R	11 05 22						
		L_E	11 19 40	11					Heavy micros.
		L_N	11 24 00	11					
		L_E	11 54 38	22					
		L_N	12 00 00	22					
		M_E	12 04 27	17		0.5mm.			
		M_N	12 05 17	17	0.4mm.				
		F	14 30(ca.)						
April 16		eP_E?	20 12 33						
		eP_N?	20 12 33						
		eS_E?	20 22 17						
		eS_N?	20 22 17						
		L_E	20 51 22	32					
		L_N	20 54 27	21					
		M_E	21 01 12	21		1.36mm.			
		M_N	21 04 29	24	0.4mm.				
		F	22 56						
April 29		e_E	22 47						
		e_N	22 47						
		L_E	22 51 45	10					
		F	23(ca.)						

Francis A. Tondorf, S. J.
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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	143	5.0	
A_E	165	5.0	
A_Z	80	4.0	

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 3		eP_E	17 41 11						
		eP_N	17 41 11						
		i_E	17 43 11						
		i_N	17 43 41						
		i_E	17 44 37						
		i_N	17 44 39						
		L_N	18 07 21	37					
		L_N	18 15 22	22					
		L_E	18 22 27	32					
		L_N	18 22 33	27					
		M_N	18 36 22	22	0.4mm.				
		M_E	18 40 37	24		0.4mm.			
		F	19 20						
May 3		iP_E	23 18 40						
		iP_N	23 18 41						S?
		eL_E?	23 40.7	16					Micros.
		L_E	23 43 22	16					
		L_E	0 09 37	23					
		L_N	0 17 16	20					
		M_E	0 21 41	16		0.3mm.			
		M_N	0 22 43	20	0.4mm.				
		F	0 50(ca.)						
May 5		e_E	10 28						
		e_N	10 28						First phases uncertain.
		eS_E?	10 37 22						
		L_E	11 08 27	27					Micros.
		L_N	11 09 40	16					
		M_E	11 17 11	21		0.6mm.			
		M_N	11 25 21	20	0.7mm.				
May 6		i_E	0 39 13						
		i_N	0 39 13						No other phases appear.

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1	Bosch Photographic Pendulums	V	T_0	ε:1	Mainka / Bosch-Omori	V	T_0	ε:1
A_N				A_N				Mainka A_N			
A_E				A_E				Mainka A_E			
A_Z								Bosch-Omori A_N			
								Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 15		eP_E	12 07 38						
		iP_N	12 07 40						
		iS_E	12 16 14						
		eS_N	12 16 12						
		i_E	12 16 40						
		eL_E?	12 26.1						
		eL_N?	12 26.7						
		F?							S is very doubtful.
May 19		eP_E	5 43 23						No distinctM.
		eP_N	5 43 23						
		eS_N?	5 57 41						
		L_E	6 43 40	22					
		L_N	6 45 45	22					
		L_N	6 48 03	16					
		L_E	6 51 10	18					
		F	7 10						No other phases discernible.
May 20		e_E	23 53 21						VeryheavyMicros.
		F?							VeryheavyMicros.
May 26		eP_E	8 26 06						
		eP_N	8 26 06						
		eS_E	8 30 56						
		eS_N	8 30 56						
		eL	8 33.7						
		L_N	8 35 22	6					
		L_E	8 35 25	6					
		F	9 (ca.)						
May 27		e_E	6 14 43						VeryheavyM icros
		e_N	6 14 43						
		i_E	6 18 44						
		F?							No other phases.Very heavy micros.
May 28		e_N	17 26						

Francis A. Tondorf, S. J., Director.

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	To	ε:1	Bosch Photographic Pendulums		V	To	ε:1			V	To	ε:1
	A_N					A_N				Mainka	A_N			
	A_E	143	5.0			A_E	133	5.0			A_E	59	9.0	
	A_Z	165	5.0				133	5.0		Bosch-Omori	A_N	47	9.0	
		80	4.0								A_E	14	13.5	
												11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
June 2		L_E	2 02	6					No other phases apparent.
		L_N	2 02	6					
		F	2 06						
June 3		eP_E?	4 53 15						Gram difficult.
		eP_N?	4 53 15						
		S_E?	4 56 49						
		S_N?	4 57 00						
		L_E	5 06						
		L_N	5 06 40						
		L_N	5 19						
		F	5 30						
June 4		e_E	12 10 27						
		S_E	12 16 00						
		S_N	12 16 00						
		L_N	12 25 00	12					
		L_E	12 25 10	12					
		F	12 50						
June 4		L_E	1 39 17						No other phases.
		F	2 ca.						
June 7		eP_E	23 48 37						
		iP_N	23 48 36						
		PR_N	23 49 11						
		S_E?	23 53 49						
		S_N	23 53 52						
		eL_E	23 56.1						
		i_{EN}	23 59						
		F	0 50						
June 9		eP_E	14 02 16						
		eP_N	14 02 17						
		PR_{EN}	14 03 29						
		S_N?	14 12 24						
		L_E	14 46	23					
		L_N	14 47	21					
		M_N	14 48 43	21	0.7mm.				
		M_E	14 50 47	21		0.9mm.			
		F	15 47						
June 12		e_E	22 58 10						Heavy micros.
		e_N	22 58 10						No other phas

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N			
A_E			
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N			
A_E			

		V	T_0	ε:1
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
June 14		eP_N	22 33 12						
		iP_N	22 33 12						
		iS_E	22 37 11						
		eS_N	22 37 17						
		eL_E	22 39.9						
		eL_N	22 40.3						
		M_E	22 40 59	12		1.9mm.			
		M_N	22 42 13	10	0.9mm.				
		F	0 05						
June 18		e_E	21 50						No phases clear. e possibly sooner.
		e_N	21 50						
		F	22 05						
June 20	There seems to have been some seismic activity between 13 hrs. and 14 hrs. but owing to some work going on in cave this can not be evaluated.								
June 23		iP_N	16 54 15						
		iS_E	17 00 09						P_E does not show.
		eS_N	17 00 09						
		F	In heavy micros.						
June 28		iP_E	1 26 47						S on E-W not legible because of injury to gram.
		eP_N	1 26 47						
		PR_E	1 27 25						
		iS_N	1 31 14						
		SR_N	1 31 48						
		eL_E	1 32 14						
		eL_N	1 32 14						
		M_N	1 35 04	8	123mm.				
		M_e	1 35 24	10		140mm.			
		M_{N_2}	1 36 43	5	67mm.				
		M_{E_2}	1 37 15	9		75.3mm.			
		F	In second quake.						
June 28		eP_E	2 10 48						P_N?
		iS_E	2 15 58						
		eS_N	2 15 58						
		SR_E	2 17 11						
		M_E	2 19 36	6		16.2mm.			
		M_N	2 19 36	6	17.2mm.				
		F	3 (ca.)						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_o	ε:1
A_N			
A_E			
A_Z			

Bosch Photographic Pendulums	V	T_o	ε:1
A_N			
A_E			

		V	T_o	ε:1
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
June 28		e_E	22 44 40						No phases clear.
		e_N	22 44 40						
		F	23 (ca.)						
June 29		eP_E	14 49 12						
		eP_N	14 49 12						
		eS_E	14 54 54						
		eS_N	14 54 52						
		M_{N_1}	18 00 58	6	11.8mm.				
		M_{E_1}	15 01 46	9		2.4mm.			
		M_{N_2}	15 03 22	10	4.2mm.				
		M_{E_2}	15 03 26	10		3.9mm.			
		M_{E_3}	15 05 43	6		8.3mm.			
		F	17 10						
June 29		e_E	19 14						
		e_N	19 13 52						No other phases apparent.
		F	19 30.						
June 30		e_N	9 36 44						Difficult.
		F	9 45.						
June 30		e_N	6 41 34						E-W shows nothing.
		F	6 51						

Francis A. Tondorf, S. J.,
Director.

NO. 123 FROM July 1 to July 31, 1925.

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SEISMOLOGICAL BULLETIN
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		V	T_0	:1			V	T_0	:1			V	T_0	:1
Wiechert Horizontal (200kg.) Vertical (80kg.)	A_N	143	5.0		Bosch Photographic Pendulums	A_N	133	5.0		Mainka	A_N	59	9.0	
	A_E	165	5.0			A_E	133	5.0			A_E	47	9.0	
	A_Z	80	4.0							Bosch-Omori	A_N	14	13.5	
											A_E	11	13.7	

DATE	CHARACTER	PHASE	TIME	PERIODS	Amplitude A_N	A_E	A_Z	Δ	REMARKS
July 3		e_E	16 51 36						
		e_N	16 51 36						e_{EN} possibly is $P_{R_{EN}}$
		eS_E?	16 55 25						Difficult
		eS_N?	16 55 34						
		F	17 10						
July 3		e_E	18 34 26						
		e_N	18 34 22						
		e_N	18 38-						
		L_E	18 42	8					
		L_N	18 42	9-10					
		F	19 (ca.)						
July 4		L_E	10 14 18	21					Heavy micros.
		L_N	10 17 19	20					
		F	11 (ca.)						
July 6		eP_E	12 27 32						
		eP_N?	12 27 29						Heavy micros.
		eS_E??	12 36 10						
		eS_N?	12 36 44						
		eL_E	12 38 09						
		F?							
July 6		e_E	21 36 00						
		e_N	21 36 00						
		F	21 40						
July 7		eP_E?	15 10 49						
		eP_N	15 10 49						
		eS_E?	15 15 27						
		eS_N?	15 15 27						
		eL_E	15 17.0						
		eL_N	15 17.0						
		L_E	15 19 32	11					
		L_N	15 20 33	16					
		F	17 30						

NO. 123 bis.

WASHINGTON, D. C.

SEISMOLOGICAL BULLETIN
of the Georgetown University, Department of Geology,

ϕ= 38° 54' 25" N λ= 77° 4' 24" W h= 42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omoro pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument		V	T_o	:1
Wiechert Horizontal (200kg.)	A_N	143	5.0	
Wiechert Horizontal (200kg.)	A_E	165	5.0	
Wiechert Vertical (80kg.)	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
Bosch Photographic Pendulums	A_E	133	5.0	
Mainka	A_N	59	9.0	
Mainka	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
Bosch-Omori	A_E	11	13.7	

DATE	CHARACTER	PHASE	TIME	PERIODS	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	REMARKS
July 7		eP_E	14 18 54						S possibly is read 4-5 seconds too soon.
		eP_N	14 18 54						
		eS_E	14 24 16						
		eS_N	14 24 16						
		eL_N	14 27 11						
		L_E	14 30 33	16					
		L_N	14 30 41	16					
		M_N	14 31 32	14	3.0mm				
		M_E	14 31 38	9		1.2mm.			
		F	In second quake.						
July 7		eP_E	17 49 09						
		eP_N	17 49 10						
		iS_E	17 53 45						
		iS_N	17 53 45						
		eL_E	17 55 48						
		eL_N	17 55 48						
		L_E	17 57 27	16					
		L_N	17 57 54	16					
		M_E	18 04 06	11		0.6mm.			
		F	19 30						
July 8		e_E	14 44						e possibly sooner. Very heavy micros.
		e_N	14 44						
		eS_N?	14 48 35						
		F	Doubtful						
July 10		e_E	14 55 09						
		e_N	14 55 20						
		F	15						

NO. 123 ter.

WASHINGTON, D. C.

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of the Georgetown University, Department of Geology,

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Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omoro pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_0	:1
Wiechert Horizontal (200kg.)	A_N	143	5.0	
	A_E	165	5.0	
Vertical (80kg.)	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

DATE	CHARACTER	PHASE	TIME	PERIODS	Amplitude A_N	A_E	A_Z	Δ	REMARKS
July 17		e_E	21 21 19						No other phases.
		e_N	21 21 20						F in heavy
		e_E	21 30 29						micros.
		e_N	21 30 29						
		F?							
July 27		e_E	12 25						
		e_N	12 25						
		F	12 30						
July 30		e_E	12 24 19						
		e_N	12 24 20						e_{EN} may be
		S_E	12 26 27						sooner.
		S_N	12 26 27						
		F	12 50						
July 31		e_E	9 02 11						
		eL_E	9 05 27						N-S does not
		L_E	9 09 13	18					show. Heavy
		F	9 30						micros.

Rev. Francis A. Tondorf, S. J.,
Director.

No. 124 *From* August 1, *to* August 31, *19*25

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N			
A_E	143	5.0	
A_Z	165	5.0	
	80	4.0	

Bosch Photographic Pendulums	V	T_0	ε:1
A_N			
A_E	133	5.0	
	133	5.0	

		V	T_0	ε:1
Mainka	A_N			
	A_E	59	9.0	
Bosch-Omori	A_N	47	9.0	
	A_E	14	13.5	
		11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Aug. 7		eP_E	7 54 17						
		eP_N	7 54 11						
		PR_{E_1}	7 54 52						
		S_E	7 59 17						
		eS_N?	7 59 22						
		eL_E	8 00 46						
		eL_N?	8 01 01						
		M_N	8 08 10	6	0.4mm.				
		M_E	8 08 48	8-9		0.3mm.			
		F	10 (ca.)						
Aug. 9		e_E	11 33 28						Difficult.
		e_N	11 33 28						HeavyMicros.
		L_E	11 51 34						
		F?							
Aug. 11		e_E	20 02 35						Sinusoidal waves.
		F?							Difficult.
Aug. 12		P_E	7 04 58						N-S does not show.
		S_E	7 10 08						HeavyMicros.
		eL_E	7 14.9	16					
		L_E	7 18 03	16					
		F	7 35						
Aug. 13		e_E	3 01 19						No other phases.
		e_N	3 01 19						
		F?							
Aug. 14		e_E	4 28 21						
		e_N	4 28 15						
		F?							No other phases.
Aug. 19		e_E	5 44 45						No other phases.
		F	5 52						N-S does not show.

No. 124 bis. *From* *to* *19*

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\phi = 38° \ 54' \ 25''$ N $\lambda = 77° \ 4' \ 24''$ W h=42.4 m Sub-Soil, Decayed Diorite

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1
	A_N			
	A_E			
	A_Z			

Bosch Photographic Pendulums		V	T_0	ε:1
	A_N			
	A_E			

		V	T_0	ε:1
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Aug. 19		eP_E	12 18 48						
		iP_N	12 18 49						
		iS_E	12 28 04						
		eS_N?	12 28 05						
		$S_{R_{E_2}}$	12 36 20						
		$S_{R_{N_2}}$	12 36 30						
		eL_E	12 41						
		eL_N	12 41						
		L_E	12 43 16	16					
		L_N	12 43 16	16					
		M_E	12 45 47	21		1.4mm			
		M_N	12 48 07	17	0.7mm				
		F	14 20						
Aug. 29		eP_E	22 43 15						S_{EN} does show. HeavyMicros
		eP_N	22 43 15						
		eL_E	22 52 55	6					
		eL_E	22 52 55	6					
		M_E	22 53 38	6		1.1mm			
		M_N	22 53 38	6	2.0mm				
		F	24 (ca.)						

Francis A. Tondorf, S. J.,
Director.

No. 125 From September 1, to September 30, 1925.

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
Sept. 4		eP_E	10 41 50						
		iP_N	10 41 50						
		eS_N	10 47 17						
		SR_E?	10 48 17						S_E does not show.
		eL_N?	10 57						
		F?							Difficult.
Sept. 5		eP_E	16 41 33						
		eP_N	16 41 35						
		eS_E	16 50 44						
		eS_N	16 50 44						
		L_E	17 04 05	11					
		L_N	17 08	11					
		F	18 (ca.)						
Sept. 12		L_E	9 41 40						
		F?							
Sept. 29		P_E	17 39 00						
		P_N	17 39 00						P_{E_N} possibly sooner.
		iS_E	17 43 19						
		eS_N	17 43 15						
		eL_E	17 45.0						
		eL_N	17 45.0						
		L_E	17 48 04	17					
		L_N	17 48 04	17					
		F	18 30.						

Francis A. Tondorf, S. J.,
Director.

No. 120 *From* October 1, *to* October 31, 1926.

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Oct. 5		iP_E	4 14 51						Long waves do not show clearly.
		iP_N	4 14 51						
		i_E	4 16 00						i_{EN} may be P_E of another quake. Some overlapping apparent
		i_N	4 16 00						No distinct M
		iS_E	4 19 21						
		iS_N	4 19 25						
		eL_E	4 20 22						
		eL_N	4 20 22						
		F	5 30						
Oct. 13		iP_E	17 47 31						
		iP_N	17 47 30						
		PR_E	17 49 00						
		PR_N	17 49 00						
		iS_E	17 53 49						
		iS_N	17 53 54						
		eL_E	17 57.0	8					
		eL_N	17 57 13	7					
		L_E	17 59 00	21					
		L_N	17 59 10	21					
		M_E	17 59 58	21			2.75mm.		
		F	19 45						
Oct. 15		e_E	13 00						Difficult. Sheets put on at precisely 13hrs.
		e_N	13 00						No other phases.
		F	?						
Oct. 19		e_E	11 00						
		e_N	11 00						
		L_N	11 02 02						
		L_E	11 02 34						
		F	11 30						
Oct. 21		i_E	17 44 16						
		eL_E	17 52	8-9					N-S difficult
		L_E	17 57 26	9					Heavy micros.

Washington, D. C.

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		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N			
	A_E			
	A_Z			
Bosch Photographic Pendulums	A_N			
	A_E			
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
Oct. 22		e_N	17 21 23						Difficult.
		e_E	17 21 27						N-S hardly shows.
		L_E	18 15	27					
		L_E	18 34 17	31					
		F	19 (ca.)						
Oct. 30		e_E	15 16						No other phases. Very heavy micros.

Francis A. Tondorf, S. J.,
Director.

No. 127 From Washington, D. C. to Nov. 30, 19 25

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\phi = 38°\ 54'\ 25''$ N $\lambda = 77°\ 4'\ 24''$ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument		V	T_0	$\varepsilon:1$
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N			
	A_E	143	5.0	
	A_Z	165	5.0	
		80	4.0	
Bosch Photographic Pendulums	A_N			
	A_E	133	5.0	
		133	5.0	
Mainka	A_N			
	A_E	59	9.0	
Bosch-Omori	A_N	47	9.0	
	A_E	14	13.5	
		11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Nov. 1		e_E	15 23 55						
		e_N	15 24 27						Very heavy micros.
		i_E	15 28 27						No other phases.
		F?							
Nov. 6		e_E	14 14 27						
		e_N	14 14 29						
		L_E?	14 32	7					
		F	14 40						
Nov. 9		e_N	20 10						Very heavy micros.
		e_N	20 10						e_{EN} may be sooner. Very difficult.
		eL_E?	20 13 49						
		eL_N?	20 13 49						
		F?	20 25						
Nov. 13		eP_E	12 35(ca.)						P is read approximately because badly masked in micros.
		eP_N	12 35(ca.)						
		eS_E	12 45 51						
		iS_N	12 45 51						
		L_E	13 24 26	26					
		L_N	13 29 27	26					
		M_E	13 34 26	18		0.8mm			
		F	14 50						
Nov. 14		eP_E?	14 13 16						First phases difficult.
		eP_N?	14 13 09						Very heavy micros.
		PR_{N_1}	14 13 34						
		S_E	14 23 45						
		S_N	14 23 45						
		eL_E	14 45.7	21					
		L_E	14 49 39	32					
		L_N	14 50 51	43					
		M_N	15 04 58	22	.9mm				
		M_{E_1}	15 05 10	22		1.7mm			
		M_{E_2}	15 25 06	19	0.7mm				
		F	16 45						

Washington, D. C.

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_o	ε:1
	A_N			
	A_E			
	A_Z			

Bosch Photographic Pendulums		V	T_o	ε:1
	A_N			
	A_E			

		V	T_o	ε:1
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Nov. 16		iP_E	12 01 29						
		eP_N	12 01 34						
		PR_{E_2}	12 02 47						
		iS_E	12 06 51						
		iS_N	12 06 51						
		i_E	12 12 05						
		i_N	12 12 06						
		M_{N_1}	12 13 34	7	4.4mm				
		M_{E_1}	12 13 38	7		2.7mm.			
		M_{N_2}	12 15 03	7	4.1mm				
		M_{E_2}	12 16 23	12		2.6mm.			
		M_{N_3}	12 17 38	9	2.6mm				
		F	13 50(ca.)						
Nov. 17		iP_N	0 26 41						E-W so marked.
		eS_N	0 34 24						in micros impossible to read.
		L_N	0 57	7					Very heavy micros.
		F?							
Nov. 28		L_E	17 17 05	22					No other phases.
		L_E	17 24 05	16					
		F	18 30						
Nov. 28		iP_E	12 39 55						Very heavy
		iP_N	12 39 55						P may be PR_1
		iS_E	12 43 23						
		eS_E?	12 46.2						
		L	12 50 45						
		F	13 15						

Francis A. Tondorf, S. J.,
Director.

No. 128 *From* Dec. 1, *to* Dec. 31, *19* 25.

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

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Instrument	Component	V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Dec. 6		e_E	16 28(ca.)						Very heavy micros. Difficult.
		e_N	16 28(ca.)						
		iS_E?	16 29 36						
		iS_N?	16 29 36						
		S_{RN_1}	16 30 19						
		eL_E?	16 30.5						
		F	17 (ca.)						
Dec. 7		L_E	9 23						No other phases.
		F?							
Dec. 9		L_E	11 53 to 12 30						A series of long waves with periods approximating 6 seconds.
Dec. 10		eP_E	14 20 41						
		eP_N	14 20 41						
		iS_E	14 25 43						
		iS_N	14 25 41						
		S_{RE_1}	14 26 18						
		S_{RN_1}	14 26 18						
		eL_N	14 27.3	15					
		M_{E_1}	14 31 51	18		4.3mm.			
		M_{E_2}	14 33 03	18		6.1mm.			
		M_{N_1}	14 33 35	17	4.7mm.				
		M_{N_2}	14 34 27	14	3.9mm.				
		M_{E_3}	14 35 55	16		3.2mm.			
		F	17 (ca.)						
Dec. 11		e_E	1 40 04						Very heavy micros.
		e_N	1 42 32						
		eL_E	1 45.4	10					
		eL_N	1 45.4	10					
		L_N	1 46 30	10					
		L_E	1 47 06	10					
		F	2 30						

Washington, D. C.

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		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N			
	A_E			
	A_Z			
Bosch Photographic Pendulums	A_N			
	A_E			
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Dec. 19		eP_E	16 21 29						
		iP_N	16 21 32						
		iS_E	16 31 20						
		eS_N	16 31 23						
		eL_E	16 44.0	20					
		L_E	16 49 40	21					
		L_N	16 51	28					
		F	17 (ca.)						
Dec. 22		L_E	6 11	26					
		L_E	6 14	27					N-S does not show.
		F	6 27						
Dec. 23		e_E	11 16						Very heavy micros.
		e_N	11 16						e_{EN} possibly read too soon or too late.
		iS_N?	11 25 31						S_{EN} may be some other phasedepending on interpreta-tion of e_{EN}. No other phas-es show.
		F?							
Dec. 27		L_E	11 31 to 11 45	6					No other phases Heavy micros.
Dec. 27		e_N	17 53 34						Very heavy micros
		e_E	17 56 39						
		L_E	18 08						
		L_N	18 08						
		F?							
Dec. 29		e_N	16 39						
		e_E	16 44 17						
		e_N	17 40						Very heavy micros
		F?							

Francis A. Tondorf, S. J.,
Director.

No. 129 From Jan. 1 to Jan. 31, 1926.

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\phi = 38° 54' 25''$ N $\lambda = 77° 4' 24''$ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Jan. 1		eP_E	21 47 40						Very small amplitude throughout.
		eP_N	21 47 40						
		iS_E	21 56 00						
		eS_N	21 56 00						
		eL_E	22 7.7						
		F	Doubtful.						
Jan. 7		e_E?	14 37 38						Heavy micros. N-S does not show.
		eL_E?	14 42 40						
		L_E	14 46	22					
		F	15 (ca.)						
Jan 25.		eP_E?	0 57 02						
		eP_N?	0 57 02						
		i_E	0 59 57						
		eL_E	1 26.0	11					
		eL_N	1 25.4	11					
		L_N	1 30 00	19					
		L_E	1 37 57	27					
		M_{E_1}	1 40 05	23		2.2mm			
		M_{E_2}	1 43 55	17		1.6mm			
		M_N	1 53 18	17	0.7mm.				
		F	3 30						
Jan. 26		L_E	8 09 08	22					N-S does not show. Heavy micros.
		M_E	8 18 13			0.2mm			
		F	9 15						

Francis A. Tondorf, S. J.,
Director.

No. 130 *From* Feb. 1, *to* Feb. 28, *19* 26

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Instrument		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
Feb. 1		i_E	1 32 37						
		i_E	1 34 28						
		L_E?	1 40 17						
		F?							
Feb. 8		eP_E	15 23 44						P_{EN} time very doubtful.Micros.
		eP_N	15 23 44						
		iS_E	15 28 52						
		iS_N	15 28 52						
		$S_{R_{E1}}$	15 30 40						
		eL_E	15 31.9	20					
		eL_N	15 31.9	26					
		M_{N_1}	15 33 10	29	1.5mm.				
		M_{E_1}	15 35 01	15		4.7mm.			
		M_{N_2}	15 35 10	14	2.0mm.				
		M_{E_2}	15 35 45	12		6.7mm.			
		M_{E_3}	15 39 43	12		3.6mm.			
		M_{E_4}	15 43 11	14		3.3mm.			
		F	After 18:30 when sheets were taken off.						
Feb. 9		eP_E?	0 33 31						No main phase.
		eP_N	0 33 26						
		iS_E	0 42 41						
		iS_N	0 42 41						
		eL_N	0 51.5	10					
		F	Doubtful						
Feb. 10		eL_E?	15 7.2	10-11					
		L_E	15 32	10					
		L_N	15 42	10					
		F	15 42						
Feb. 13		L_E	10 13 10 to 10 13 22	16					No other phases. Amplitude very small.N-S does not show. Heavy micros.

No. 131 From March 1 to March 31, 19 26

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Instrument		V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Mar. 4		e_N	9 52 18						
		L_E	10 53 03	16					
		L_N	10 54 04	16					
		F?							
Mar. 7		iP_N	20 41 37						P_E does not show. No other phases.
		eS_E	20 48 53						
		eS_N	20 48 47						
		F?							
Mar. 8		e_{EN}	20 28 15						Possibly not seismic.
Mar. 10		e_{EN}	15 24 30						e possibly sooner.
		i_E	15 32 10						Very heavy micros.
		F	15 40						No other phases.
Mar. 11		e_{EN}	10 55						
		S_{EN}	10 58 43						
		F?							
Mar. 17		eP_E	11 59 22						
		eP_N	11 59 23						
		PR_{N_1}	12 00 01						
		PR_{N_2}	12 00 12						
		iS_E	12 04 03						
		iS_N	12 04 03						
		eL_E	12 05 28	17					
		eL_N	12 05 18	17					
		M_{N_1}	12 09 12	17	2.7mm.				
		M_{E_1}	12 09 21	15		9.8mm.			
		M_{N_2}	12 10 19	12	2.4mm.				
		M_{E_2}	12 10 36	11		3.6mm.			
		M_{N_3}	12 11 56	11	3.0mm.				
		M_{E_3}	12 12 23	11		2.6mm.			
		M_{N_4}	12 13 24	11	1.7mm.				
		M_{E_4}	12 13 38	19		2.4mm.			
		M_{N_5}	12 14 12	11	1.9mm.				
		M_{E_5}	12 14 48	11		1.1mm.			
		F	14 (ca.)						

 From April 1 *to* April 30, *19* 26

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Instrument		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Apr. 5		L_E	0 01 09						
		F?							
Apr. 12		eP_E	8 51 08						Sensitivity in N-S component evidently lacking.
		eP_N	8 51 08						
		eS_E	9 58 22						
		eL_E	9 9.3	19					
		L_E	9 14 05	19					
		L_E	9 33 14	24					
		M_{E_1}	9 36 12	21		0.6mm			
		M_{E_2}	9 43 22	16		0.8mm			
		M_{E_3}	9 58 22	17		0.4mm			
		F	11 55						
Apr. 16		e_E	0 54 14						
		F?							
Apr. 28		eP_E	11 24 03						Heavy micros.
		iS_E	11 32 09						No trace onN-S.
		eL_E	11 39.3	17					
		L_E	11 41 03	23					
		F	13 (ca.)						

Rev. Francis A. Tondorf, S. J.,
Director.

From May 1, *to* May 31, 1926

Washington, D. C.

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Instrument	Component	V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude Az	Δ	Remarks
May 5		iP_E	6 28 53						
		iP_N	6 28 53						
		PR_{1E}	6 30 24						
		PR_{1N}	6 34 53						
		eS_E	6 34 53						
		eS_N	6 34 53						
		eL_E	6 39 52						
		F	7 10						
May 11		e_E	11 35 28						
		eL_E	11 38 09						
		eL_N	11 38 09						
		L_N	11 39 17						
		L_E	11 40 18	11					
		F	12 (ca.)						
May 12		e_E	15 15 08						
		L_N	15 17 08						
		L_E	15 18 51	9					
		L_E	15 19 52	9					
		F	15 30						
May 20		e_E	7 24 47						
		e_N	7 24 47						
		F?							
May 21		e_E	19 18 41						
		e_N	19 18 41						
		F?							
May 26		eP_E	17 59 25						F lost in micros.
		eP_N	17 59 25						
		eS_E	18 04 03						
		eS_N	18 04 03						
		eL_E	18 06 08						
		F?							
May 26		e_E	20 09 14						
		F?							
May 31		e_E	13 55 28						
		e_N	13 55 38						
		L_E	14 56 38						
		F?							

Francis A. Tondorf, S. J.,
Director.

No. 134 *From* June 1, *to* June 30, 1926

Washington, D. C.

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
Mainka	A_E	51	9.0	4.3
Bosch-Omori	A_N			
Bosch-Omori	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
June 3		e_E	5 07 01						
		e_N	5 07 12						
		e_E	5 12 43						
		e_N	5 12 43						
		eL_E	5 27 23	17					
		L_E	5 39 19	13					
		L_E	5 45 01	32					
		L_E	6 04 07	17					
		F	6 30						
June 4		e_E	0 50 01						
		e_N	0 50 01						
		i_E	0 56 12						
		i_N	0 56 12						
		i_E	0 58 01						
		F	1 10						
June 5		e_E	1 34 32						
		e_N	1 34 32						
		e_E	1 39 07						
		e_N	1 39 09						
		L_N	1 52 26						
		F	?						
June 5		P_E	19 57 50						
		S_E	20 03 51						
		S_N	20 03 51						
		i_E	20 04 19						
		eL_E	20 7.4						
		eL_N	20 7.4						
		L_E	20 12 16	10					
		L_N	20 12 16	10					
		L_E	20 14 00	13					
		L_N	20 14 20	9					
		F	21 05						
June 20		i_E	7 18 49						
		i_N	7 18 49						
		eL_N	7 28.0	16					
		F	?						

No. 134 bis. *From* *to* *19*

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	To	ε:1	Bosch Photographic Pendulums	V	To	ε:1	Mainka / Bosch-Omori	V	To	ε:1
A_N				A_N				Mainka A_N			
A_E				A_E				Mainka A_E			
A_Z								Bosch-Omori A_N			
								Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
June 26		eP_E	19 58 21						Slight indication at 19-58-13. Possibly not seismic.
		eP_N	19 58 22						
		PR_{1_E}	20 01 29						
		iS_E	20 08 11						
		iS_N	20 08 14						
		SR_{1_E}	20 13 21						Micros.
		eL_E	20 23.0	18					
		eL_N	20 22.8	20					
		L_N	20 29 38	21					
		L_E	20 30 07	19					
		F	21 (ca.)						
June 29		e_N	14 50 47						Micros.
		e_E	14 55 10						
		e_N	14 55 14						
		eL_E	15 10.0						
		eL_N	15 10.2						
		L_E	15 15 26	14					
		L_E	15 19 36	21					
		L_E	15 24 00	27					
		L_N	15 32 24	21					
		F	16 20						
June 29		e_E	19 10						
		eL_E	19 14 04	11					
		eL_N	19 14 58	11					
		L_E	19 15 11	11					
		F	20 (ca.)						
June 29		e_E	13 38 58						
		e_N	13 38 58						
		eL_E?	13 41 58						
		eL_N?	13 41 58						
		F	13 51						
June 30		L_E	23 14 53						
		F	?						

Francis A. Tondorf, S. J.,
Director.

135 - 1926

GEORGETOWN UNIVERSITY
SEISMOLOGICAL OBSERVATORY
West Washington
District of Columbia

Constants of the Galitzin Vertical Seismograph.

Stationary Mass------------------25 kilos.
Equivalent length of Pendulum---41.09
Period of Pendulum (undamped)--- 9.10
$(mu)^2$--------------------------- 0.032. This represents combined damping of pend. and galv.

A (distance from galv. to recording sheet) 177.5cm.

F. A. Tondorf
Director.

No. 135 *From* Jan. 1 *to* Jan. 31, *19* 28

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Instrument	Component	V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Jan. 1		iP_Z	9 32 02						
		PR_{1Z}	9 33 40						
		S_Z	9 37 54						
		M_{1Z}	9 48 09				15.5 mm		
		M_{2Z}	9 49 48				13.2 mm		
		M_{3Z}	9 52 10				14.7 mm		
		M_{4Z}	9 56 08				19.3 mm		
		M_{5Z}	9 57 23				13.0 mm		
		F	11 30						
Jan. 2		e_Z	15 03 26						Heavy Micros.
		eL_Z	15 22 22						
		L_Z	15 25 10						
		F	15 45						
Jan. 4		e_Z	21 23 36						
		eL_Z	22 29 38						eL_Z may be sooner. Heavy micros.
		M_{1Z}	22 35 21				5.0 mm		
		M_{2Z}	22 40 00				4.8 mm		
		M_{3Z}	22 49 28				4.4 mm		
		F	24 30						
Jan. 5		iP_Z	21 55 20						No distinct M
		iS_Z	22 02 44						Very heavy M.
		eL_Z	22 10 21						
		F	22 50						
Jan. 6		eP_Z?	19 46 22						S is very uncertain.
		iPR_{1Z}	19 50 48						
		S_Z?	19 59 22						
		eL_Z	20 22 16						
		M_{1Z}	20 34 00				16.0 mm		
		M_{2Z}	20 38 31				22.0 mm		
		F_Z	23 (ca.)						

No. 135 bis. *From* *to* *19*

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N			
A_E			
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N			
A_E			

		V	T_0	ε:1
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
Jan. 9		e_Z	13 53						e_L is uncertain
		e_Z	13 56						
		eL_Z?	13 59 19						
		M_Z	14 02 14				4.7 mm		
		F_Z	14 30						
Jan. 10		e_Z	17 01 28						
		S_Z?	17 09 58						Difficult
		L_Z	17 22 40						
		M_Z	17 28 06				3.8 mm		
		F_Z	18 15						
Jan 10.		e_Z	6 06 19						e_Z may be as early as 6:01.
		eL_Z	6 12						Micros are heavy.
		L_Z	6 16 25						
		F	6 30(postea?)						
Jan. 10		e_Z?	2 49 17						Micros are heavy.
		i_Z	2 54 21						
		e_Z	2 55 59						
		eL_Z	3 27 23						
		M_Z	3 31 09				4.3 mm		
		F	4 07						
Jan. 12		iP_Z	13 17 44						
		S_Z	13 26 48						
		SR_{1Z}	13 32 10						
		eL_Z	13 37 19						
		M_Z	13 51 08				3.9 mm		
		F	14 20						
Jan. 19 & 20									Driving clock under repair.
Jan. 22		e_Z	17 28 30						Heavy micros.
		e_Z	17 45 08						
		F	18(postea?)						

No. 130 *From* Feb. 1 *to* Feb. 29, 1928

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 1		L_Z	0 08 09						Sheet down at 0 hrs.08 min.
		L_Z	0 14 02						
		F	0 48						Heavy micros.
Feb. 1		e_Z	11 23 01						
		eL_Z?	11 38 33						
		L_Z	11 53 37						
		L_Z	12 03 29						
		F	12 15						
Feb. 2		eP'	0 30 26						
		PR_{1Z}	0 33 39						
		L_Z	0 58 32						
		F	doubtful						Mixed with heavy micros.
Feb. 3		iP_Z	13 58 45						
		PR_{1Z}	14 01 26						Doubtful
		eL_Z	14 25 27						
		$M1_Z$	14 30 20				5.1mm.		
		$M2_Z$	14 36 26				6.9mm.		
		$M3_Z$	14 37 46				13.5mm.		
		F	mixed with heavy micros.						
Feb. 4		L_Z	7 20 31	10					Heavy micros prevailing.
		L_Z	7 22 15	18					
		F	7 33						
Feb. 5		e_Z	23 40 26						Sheets off at 0 hrs.04 m.
		L_Z	23 47 06	10					
		L_Z	23 52 08	15					Quake still on
		L_Z	23 55 18	17					Micros extra-ordinarily heav
Feb. 7		P'_Z	0 23 39						P' not certai
		PR_{1Z}	0 27 05						May be read earlier.
		i_Z	0 45 23						Micros very heavy.
		L_Z	1 28 19	19					
		$M1_Z$	1 31 15	16			10.mm.		
		$M2_Z$	1 32 13	26			8.1mm.		
		$M3_Z$	1 35 56	16			9.4mm.		
		$M4_Z$	1 38 47	16			8.6mm.		
		F	3 (ca.)						
Feb. 7		i_Z	6 24 44						
		i_Z	6 25 10						
		i_Z	6 27 30						
		F	6 31						
Feb. 10		i_Z	6 08 37						No other phases show.
		F	Not clear.						Micros heavy

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1	Bosch Photographic Pendulums		V	T_0	ε:1			V	T_0	ε:1
	A_N					A_N				Mainka	A_N			
	A_E					A_E					A_E			
	A_Z									Bosch-Omori	A_N			
											A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 10		iP_Z	4 44 16						
		i_Z	4 44 40						
		S_Z	4 49 37						
		$M1_Z$	4 59 13	8			11.9mm.		
		$M2_Z$	4 59 53	8			11.0mm.		
		$M3_Z$	5 01 35	9			12.0mm.		
		F	6 05						
Feb. 12		e_Z	16 03 41						
		i_Z	16 04 41						
		L_Z	16 39 10	5-6					
		F	16 45						
Feb. 13		e_Z	5 57 38						
		eL_Z	6 15 19						eL_Z is doubtful
		F	Deep in micros.						
Feb. 21		iP_Z	19 58 31						Micros very heavy. Sheets taken off at 23 hrs. Quake still on.
		i_Z	19 59 33						
		$PR1_Z$	20 00 53						
		$PR2_Z$	20 02 08						
		iS_Z	20 06 18						PR_2 is doubtful.
		eL_Z	20 11 15	13					
		L_Z	20 16 01	11					
		$M1_Z$	20 19 42	8			61.mm.		
		$M2_Z$	20 20 26	8			38.mm.		
		$M3_Z$	20 23 52	11			92.2mm.		
		$M4_Z$	20 25 28	9			56.7mm		
		$M5_Z$	20 27 42	12			55.7mm.		
		F	23 (et postea)						
Feb. 22		i_Z	13 03 19						Micros moderate.
		eL_Z	13 57 13	11					
		L_Z	14 04 10	16					
		M_Z	14 07 14	14			3.3mm.		
		F	14 47						
Feb. 24		P_Z?	14 20 12						
		eL_Z	14 37 29	8					
		$M1_Z$	14 41 04	8			18.3mm.		Heavy micros.
		$M2_Z$	14 42 31	6			10.5mm.		
		$M3_Z$	14 45 04	10			16.7mm.		
		$M4_Z$	14 47 46	12			16.0mm.		
		$M5_Z$	14 54 14	12			9.6mm.		
		F	15 55						
Feb. 25		e_Z	1 20 59						Heavy micros.
		L_Z	1 25 10						
		M_Z	1 35 04						
		F	1 40						
Feb. 25		i_Z	11 17 52						
		i_Z	11 34 38						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1	Bosch Photographic Pendulums	V	T_0	ε:1	Mainka / Bosch-Omori	V	T_0	ε:1
A_N				A_N				Mainka A_N			
A_E				A_E				Mainka A_E			
A_Z								Bosch-Omori A_N			
								Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 25		i_Z	11 17 52						
		i_Z	11 34 38						
		F	Doubtful.						
Feb. 26		e_Z	1 28 04						
		S_Z	1 35 03						
		eL_Z	1 40 54						
		$M1_Z$	1 48 41	7			19.6mm.		
		$M2_Z$	1 49 48	9-10			61.0mm.		
		$M3_Z$	1 50 41	13			32.8mm.		
		$M4_Z$	1 53 11	13			22.6mm.		
		$M5_Z$	1 54 12	17			61.3mm.		
		$M6_Z$	1 56 35	9-10			44.0mm.		
		$M7_Z$	1 57 41	10			43.3mm.		
		$M8_Z$	1 59 02	8			31.1mm.		
		F	Difficult						Heavy micros.
Feb. 26		e_Z	3 21 11						May be P_Z
		S_Z	3 28 36						S doubtful.
		eL_Z	3 33 17						Heavy micros.
Feb. 28		i_Z	2 23 39						
		i_Z	2 30 08						
		eL_Z	2 51 20	11					
		L_Z	2 53 51	14					
		M_Z	2 56 15	13			3.0mm.		
		F_Z	3 07						
Feb. 28		e_Z	8 56 58						Heavy micros.
		i_Z	8 58 31						
		L_Z	9 56 33	8-9					
		F_Z	10 30						
Feb. 29		i_Z	22 16 56						Have appearance of L waves from nearby quake. Micros heavy.
		i_Z	22 51 20						
		L_Z	23 18 05	9					
		L_Z	23 22 21	18					
		L_Z	23 33	14					
		F_Z	24 12						

Francis A. Tondorf, S. J.,
Director.

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Instrument	Component	V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Mar. 7		e_Z	23 10 24						
		e_Z	23 12 06						Heavy micros.
		e_Z	23 23 20						
		L_Z	23 45 54	20					
		M_{1Z}	23 47 36	16			3mm.		
		M_{2Z}	23 50 17	14			3.2mm.		
		F	00 40						
Mar. 7		e_Z	23 12 00						Micros fairly heavy.
		eL_Z	23 41 18	16					
		L_Z	23 46 14	17					
		M_Z	23 47 37	18			3.3mm.		
		F	0 30						March 8
Mar. 8		e_Z	18 48 44						
		eL_Z	18 51 19	6-7					
		L_Z	19 00 49	5					
		L_Z	19 09 29	5					
		L_Z	19 10 39	4					
		F	19 20						
Mar. 9		i_Z	1 21 19						Heavy micros.
		L_Z	1 32 07	8					
		L_Z	1 37 11	4-5					
		L_Z	1 39 00	4					
		F	1 58						
Mar. 9		eP_Z	11 12 39						?
		PR_{1Z}	11 15 02						?
		S_Z	11 22 31						
		L_Z	11 38 07	10					
		L_Z	12 02 20	5-6					
		L_Z	12 16 35	8					
		F	12 35						
Mar.13		i_Z	18 49 15						Possibly P
		i_Z	18 50 41						
		i_Z	18 52 20						
		S_Z	19 01 13						Questionable
		L_Z	19 34 40	14					
		M_{1Z}	19 41 22	19			4.0mm.		
		M_{2Z}	19 47 31	16			5.2mm.		
		F	21 14						Heavy micros.
Mar. 9		e Z	18 20 05						e may be sooner. Heavy Micros.
		PR_{1Z}	18 25 00						
		PR_{2Z}	18 27 59						
		S_Z?	18 40 06						
		eL_Z	19 07 28	15					

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1
	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			

Bosch Photographic Pendulums		V	T_0	ε:1
	A_N	133	5.0	
	A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
		M_{I_Z}	19 27 20	21			33.9mm.		The other main phases are so large in amplitude as not to permit the following.
		F	23 (ca.)						
Mar.13		P'_Z	18 49 15						
		i_Z	18 50 41						
		PR_{1_Z}	18 52 22						
		S_Z	19 01 13						?
		SR_{1_Z}	19 03 14						?
		eL_Z	19 31 10	13					
		L_Z	19 36 47	15					
		M_{1_Z}	19 41 20	18			3.8mm.		
		M_{2_Z}	19 47 14	16			3.9mm.		
		F	21 (ca.)						
Mar.16		i_Z	5 20 00						
		PR_{1_Z}	5 22 22						
		i_Z	5 28 43						
		i_Z	5 32 27						
		eL_Z	5 52 49	9					
		L_Z	5 59 00	40					
		M_{1_Z}	6 03 47	21			79.0mm.		
		M_{2_Z}	6 07 24	18			137.0mm.		
		M_{3_Z}	6 10 13	16			77.0mm.		
		M_{4_Z}	6 14 17	14			116.4mm.		
		M_{5_Z}	6 19 06	14			51.8mm.		
		M_{6_Z}	6 21 32	16			47.0mm.		
		M_{7_Z}	6 23 06	15			53.0mm.		
		M_{8_Z}	6 25 43	16			79.5mm.		
		M_{9_Z}	6 30 46	15			50.0mm.		
		M_{10_Z}	6 35 46	17			62.5mm.		
		M_{11_Z}	6 42 16	11			39.8mm.		
		M_{12_Z}	7 09 49	11			24.0mm.		
		M_{13_Z}	7 16 19	18			27.8mm.		
		M_{14_Z}	7 22 07	17			24.7mm.		
		F	8 45						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
Mainka	A_E	31	9.0	4.3
Bosch-Omori	A_N			
Bosch-Omori	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Mar.17		e_Z	3 52 38						Heavy micros.
		eL_Z	4 04 42						?
		F	4 25						
Mar.18		e_Z	3 25 04						
		e_Z	3 28 08						
		e_Z	3 38 06						Very heavy mi
		e_Z	3 47 53						Difficult
		eL_Z	4 02 11						
		M_{1Z}	4 07 08				5.2mm.		
		M_{2Z}	4 10 57				5.0mm.		
		M_{3Z}	4 13 54				4.8mm.		
		F	5 35						
Mar.18		i_Z	15 16 04						
		F	15 35						Heavy micros.
Mar.18		i_Z	20 48 56						
		F	20 57						Heavy micros.
Mar.18		eL_Z	13 01 09						
		L_Z	13 04 12	18					Sheets put on 12 hrs. 51 m.
		M_{1Z}	13 09 37	14			3.4mm.		
		M_{2Z}	13 13 31	10			3.8mm.		Heavy Micros.
		F	14 (ca.)						
Mar.22		iP_E	4 22 58						iP_Z 4 hrs. 22m 56s. The rest of the gram is of such amplitude as to make a careful and so reliable reading impossible. The amplitudes of the initial phases brought the gram off of the sheets.
		iP_N	4 22 58						
		PR_{1E}	4 23 38						
		PR_{1N}	4 23 38						
		S_E	4 27 45						
		S_N	4 27 45						
		eL_E	4 29 12	12					
		eL_N	4 29 12	15					
		M_{1E}	4 34 14	6		10.8mm.			
		M_{1N}	4 34 19	10	6.4mm.				
		M_{2N}	4 35 41	17	5.7mm.				
		M_{2E}	4 36 40	7		7.8mm.			
		M_{3E}	4 37 42	6		7.3mm.			
		M_{3N}	4 38 18	13	6.8mm.				
		F	5 30						

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Instrument	Component	V	T_o	$\varepsilon:1$
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Mar. 22		iP_{EN}	4 23 03						
		PR_{1N}	4 23 35						
		PR_{2EN}	4 23 48						
		iS_{EN}	4 27 49						
		SR_{1EN}	4 28 36						
		eL_{EN}	4 29 37						
		M_{1E}	4 34 11	5-6		14.4mm.			
		M_{1N}	4 34 15	10	5.3mm.				
		M_{2N}	4 34 53	18	5.7mm.				
		M_{2E}	4 35 00	5		10.0mm.			
		M_{3E}	4 35 39	5		10.3mm.			
		M_{3N}	4 36 19	13	11.3mm.				
		M_{4E}	4 37 00	6		7.9mm.			
		M_{4N}	4 37 41	10	7.5mm.				
		M_{5N}	4 38 19	7	6.5mm.				
		M_{5E}	4 39 08	7	8.4mm.				
		M_{6N}	4 39 29	5	6.8mm.				
		M_{6E}	4 41 30	11		5.8mm.			
		M_{7E}	4 42 51	5		8.0mm.			
Mar. 23		e_Z	20 30 31						Heavy Micros. Many long waves of very small amplitude and very irregular period.
		e_Z	20 40 46						
		e_Z	20 44 48						
		eL_Z	20 54 00	6					
		F	22 10						No distinct M.
Mar. 23		i_Z	22 17 42						
		L_Z	22 25 00	7					
		L_Z	22 32 31	8					Heavy micros.
		F	Lost in micros.						
Mar. 26		e_Z	5 49 13						Heavy micros.
		L_Z	6 44 38	19					
		M_{1Z}	6 45 36	22			5.0mm.		
		M_{2Z}	6 53 18	14			3.4mm.		
		F	9 (postea)						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1	Bosch Photographic Pendulums		V	T_0	ε:1			V	T_0	ε:1
	A_N	99	4.6	3.7		A_N	133	5.0		Mainka	A_N	55	8.3	5.3
	A_E	89	5.1	5.7		A_E	133	5.0			A_E	31	9.0	4.3
	A_Z									Bosch-Omori	A_N			
											A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
Mar.27		i_Z	14 57 17						May be P
		i_Z	14 57 52						May be P_R
		eS_Z?	15 01 48						
		F	15 08(postea?)						Heavy Micros.
Mar. 27		iP_Z	5 15 06						
		PR_{1Z}	5 15 41						
		S_Z	5 19 33						
		eL_Z	5 21 06						
		M_{1Z}	5 26 03	7			12.3mm.		
		M_{2Z}	5 30 54	10			14.0mm.		
		M_{3Z}	5 32 14	7			10.6mm.		
		F	6 (ca.)						
Mar.27		i_Z	19 26 22						Difficult
		e_Z	19 29 40						
		i_Z	19 34 23						
		L_Z	20 27 24						
		M_Z	20 29 29	17			3.5mm.		
		L	21 50						
		F	In micros.						
Mar.27		eL_Z	9 08 43						
		L_Z	9 11 23	16					Very heavy micros.
		F	9 31						
Mar.29		iP_Z	5 19 12						
		PR_{1Z}	5 23 46						
		i_Z	5 25 58						
		eL_Z	5 59 44	8					
		L_Z	6 06 16	11					
		M_Z	6 19 36	13			5.0mm.		
		F	7 10						
Mar.31		iP_Z	00 41 47						Doubtful
		PR_Z	00 44 31						
		eS_Z	00 51 35						
		eL_Z	01 05 37						
		L_Z	01 10 17	21					
		M_{1Z}	01 16 31	12			11.2mm.		

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	3.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
Mainka	A_E	31	9.0	4.3
Bosch-Omori	A_N			
Bosch-Omori	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
		M_{2Z}	01 18 57	13			7.8mm.		
		M_{3Z}	01 20 17	14			7.7mm.		
		M_{4Z}	01 24 25	23			7.0mm.		
		M_{5Z}	01 27 24	12			5.9mm.		
		F	03 30						
Mar.31		e_Z	0 13 13						Sheets down at 0 hrs. 12 m.
		e_Z	0 16 13						
		i_Z	0 20 15						
		i_Z	0 30 29						
		F	In second quake.						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_o	ε:1
	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			

Bosch Photographic Pendulums		V	T_o	ε:1
	A_N	133	5.0	
	A_E	133	5.0	

		V	T_o	ε:1
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
Apr. 3		e_Z	1 40 20						?
		i_Z	1 52 50						
		eL_Z	1 57						?
		M_Z	1 58 29	8			4.3mm.		
		F	3 (ca.)						
Apr. 3		e_Z	15 54 37						
		e_Z	16 05 07						
		eL_Z?	16 18 33						
		L_Z	16 20 02	23					
		$M1_Z$	16 23 21	22			3.8mm.		
		$M2_Z$	16 24 21	19			4.3mm.		
		$M3_Z$	16 25 24	19			3.8mm.		
		$M4_Z$	16 30 26	18			2.6mm.		
		F	18 55						
Apr. 7		eL_Z?	20 51 46						Very heavy micros.
		L_Z	20 56 21	7-8					
		M_Z	21 04 06	7-8			2.0mm.		
		F	22 (ca.)						
Apr. 9		iP_Z	17 43 18						
		$PR1_Z$	17 44 43						
		iS_Z	17 50 59						
		eL_Z	17 58 25						
		$M1_Z$	18 04 53	25			33.0mm.		
		$M2_Z$	18 06 22	19			29.9mm.		
		$M3_Z$Z	18 08 45	13			25.1mm.		
		$M4_Z$	18 11 21	13			15.8mm.		
		$M5_Z$	18 16 26	13			10.2mm.		
		$M6_Z$	18 17 25	18			12.2mm.		
		$M7_Z$	18 20 50	16			11.4mm.		
		F	20 55						
Apr. 10		e_Z	6 16 47						? Fairly heavy micros.
		e_Z	6 23 07						
		eL_Z	6 30 22	9					?
		L_Z	6 31 44	11					
		$M1_Z$	6 40 21	12			3.0mm.		
		F	6 59						

No. 138 bis.

DATE	CHARACTER	PHASE	TIME	PERIOD	AMPLITUDE A_N	A_E	A_Z	Δ	REMARKS
Apr. 10		e_Z	16 40 03						Heavy micros.
		i_Z	16 49 10						
		S_Z?							
		M_{1Z}	17 01 29	10-11			7.6mm.		
		M_{2Z}	17 03 03	9			7.2mm.		
		F	17 51						
Apr. 10		i_Z	21 38 45						Heavy micros.
		i_Z	21 40 30						
		M_Z	21 52 22	8			3.7mm.		
		F	22 01						
Apr. 12		i_Z	18 19 22						
		i_Z	18 37 20						
		L_Z	18 48 15	7-8					
		F	19 (ca.)						
Apr. 13		eP_Z	23 22 11						This gram not reliable because of binding of Galvanometer mirror.
		S_Z?	23 27 20						
		M_{1Z}	23 38 55	9			4.2mm.		
		F	0 45						
Apr. 14		P_Z	9 11 22						
		S_Z	9 20 14						
		L_Z	9 35 22	8					
		M_{1Z}	9 44 40	12			0.9mm.		
		M_{2Z}	9 50 28	12			1.0mm.		Galvanometer mirror not satisfactorily free as yet.
		F	11 20						
Apr. 17		eP_E	3 31 01						
		eP_N	3 31 01						
		P_{R1E}	3 31 37						
		P_{R1N}	3 31 38						
		P_{R2E}	3 31 58						
		P_{R2N}	3 31 58						
		iS_E	3 35 42						
		iS_N	3 35 42						
		S_{R1E}	3 36 41						
		S_{R1N}	3 36 41						
Apr. 17		iP_Z	3 30 59						
		P_{R1Z}	3 31 38						
		iS_Z	3 35 43						
		eL_Z	3 37 52						
		M_{1Z}	3 44 36	19			61.8mm.		
		M_{2Z}	3 47 01	12			55.8mm.		
		M_{3Z}	3 48 05	10			39.0mm.		
		M_{4Z}	3 50 23	12-13			33.8mm.		
		M_{5Z}	3 56 46	12			33.7		
		F	5 54						

No. 139 From May 1 to May 31, 1928

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	A_N	A_E	A_Z	Δ	Remarks
May 1		e_Z	00 24						Sheet changed at 00 hrs 24m. Quake then on.
		iS_Z	00 32 39						
		eL_Z	00 44 27	9-10					
		M_Z	01 00 01	19			2.4mm		
		F	01 45						
May 1		e_Z	02 28 45						Difficult
		e_Z	02 36 24						
		e_Z	02 43 21						
		F	02 50						
May 1		e_Z	09 53 43						
		L_Z	09 58 42	10					
		F_Z	10 04						
May 1		i_Z	19 04 29						May be P.
		i_Z	19 06 07						
		eL_Z	19 16 16						
		$M1_Z$	19 25 23	6			11.9mm		
		$M2_Z$	19 26 27	6			12.0mm		
		$M3_Z$	19 29 48	13			20.2mm		
		$M4_Z$	19 30 52	13			21.5mm		
		F_Z	21 15						
May 2		e_Z	12 05 06						Difficult.
		e_Z	12 13 06						
		eL_Z	12 18 58						
		L_Z	12 20 24	18					
		F_Z	12 38						
May 2		L_Z	14 00 32						
		F_Z	14 06						
May 2		eL_Z	15 40 15						Doubtful. Heavy micros.
		L_Z	15 44 16						
		F_Z	16 (ca.)						
May 2		iP_Z	22 06 25						
		iS_Z	22 16 13						?
		eL_Z	22 29 59						
		L_Z	22 34 40	21-22					
		$M1_Z$	22 38 48	18			4.4mm		
		$M2_Z$	22 40 54	14			5.3mm		
		$M3_Z$	22 47 33	14			6.3mm		
		F_Z	23 30 (ca.)						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	△	REMARKS
May 7		eL_Z	22 08 10						
		L_Z	22 14 22	8					
		F_Z							?
May 8		i_Z	04 57 29						Possibly P'
		i_Z	05 00 29						
		i_Z	05 03 35						
		eL_Z	05 11 11	8					?
		L_Z	05 17 12						
		F_Z	06 16						
May 10		e_Z	02 45 57						
		e_Z	02 53 38						
		e_Z	02 58 47						
		e_Z	02 59 31						
		F_Z	03 (ca.)						
May 10		e_Z	08 39 58						
		eL_Z	08 48 22	11					
		F_Z	09 05 (ca.)						
May 12		e_Z?	20 35 40						
		i_Z	20 38 44						
		e_Z	20 50 22						
		L_E	21 00 47	14					
		M_{1Z}	21 05 06	9			2.2mm.		
		M_{2Z}	21 07 50				2.0mm.		
		F_Z	21 50						
May 14		iP_Z	22 22 57						
		eP_E	22 23 02						
		iP_N	22 22 59						
		iS_Z	22 29 38						
		iS_E	22 29 46						
		IS_N	22 29 39						
		eL_E	22 36 41						
		eL_N	22 36 41						
		M_{1Z}	22 37 44				57.0mm.		Other maxima in Z are of such amplitude as to be off the sheets
		M_{2Z}	22 38 50				74.0mm.		
		F ENZ	In next quake						Z component difficult to read because of large amplitude in all phases.
May 15		iP_Z	02 44 32						
		PR_{1Z}	02 46 10						
		iS_Z	02 51 07						
		SR_{1Z}	02 54 31						
		M_{1Z}	03 03 07	12-13			12.3mm.		
		M_{2Z}	03 03 42	14-15			8.7mm.		
		M_{3Z}	03 04 19	15			7.0mm.		
		M_{4Z}	03 07 53	16			8.0mm.		
		M_{5Z}	03 11 40	15			7.1mm.		
		F_Z	04 58						
May 16		P_Z	05 24 13						
		S_Z	05 33 22						
		M_Z	05 57 57	9			3.8mm.		
		F_Z	07 10						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	△	Remarks
May 16		iP_Z	08 05 00						
		$P_{R_1 Z}$	08 06 31						
		S_Z	08 11 27						
		eL_Z	08 15 26	15					
		M_Z	08 23 22	17			3.2mm.		
		F_Z	09 05						
May 17		e_Z	11 02 35						
		i_Z	11 14 45						
		i_Z	11 17 12						
		i_Z	11 22 43						
		M_Z	11 29 30				2.0mm.		
		F_Z	12 40						
May 17		e_Z	23 43 52						No distinct M.
		L_Z	23 48 24	10					
		F_Z	24 05						
May 18		e_Z	02 25 06						Possibly P
		e_Z	02 35 09						
		L_Z	02 55 09	14					
		M_Z	02 58 02	14			3.2mm.		
		F_Z	In following quake						
May 18		e_Z	03 24 02						
		eL_Z	03 50						
		M_Z	03 58 11	18-19			2.2mm.		
		F_Z	04 16						
May 19		e_Z	04 08 47						Doubtful.
		eL_Z	04 39 20	9					
		L_Z	04 44 25	18					
		M_Z	04 47 42		14				
		F_Z	05 33						
May 19		e_Z	09 49 (ca.)						?
		eL_Z	10 26 25	13					?
		F_Z	11 27						Difficult.
May 20		e_Z	17 03 46	10					Possibly eL_Z
		F_Z	17 20						
May 21		e_Z	02 24 40						
		L_Z	02 28 13	10					
		M_{1Z}	02 35 14	9			3.3mm.		
		M_{2Z}	02 36 43	11			3.7mm.		
		F_Z	03 10						
May 21		e_Z	13 53 47						
		L_Z	14 14 38	9					
		F_Z	14 25						
May 21		i_Z	17 10 41						Possibly P.
		i_Z	17 17 17						
		eL_Z	17 26 21						
		M_Z	17 30 28	11			1.8mm.		
		F_Z	18 45						
May 24		eP_Z	05 44 51						?
		S_Z	05 52 04						
		eL_Z	05 58 13						?
		L_Z	05 59 06	11					
		M_Z	06 06 42	11			3.6mm.		
		F_Z	06 50						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A	A	A	Δ	REMARKS
May 26		iP_Z	08 39 08						
		i_Z	08 39 43						
		S_Z	08 47 19						?
		eL_Z	08 54 23						?
		L_Z	09 07 54	14					
		F_Z	09 17						
May 26		i_Z	14 11 34						
		e_Z	14 13 22						
		i_Z	14 18 42						
		L_Z	14 29 18	13					
		M_Z	14 30 14	13			2.6mm.		
		F_Z	15 20						
May 27		iP_Z	10 03 42						Sheets off 13 hrs.12m. Quake still recording heavily.
		i_Z	10 08 10						
		S_Z	10 14 35						
		SR_{1Z}	10 20 56						
		eL_Z	10 32 45						
		L_Z	10 39 00	27					
		M_{1Z}	10 44 02	23			24.5mm.		
		M_{2Z}	10 51 51	18			43.0mm.		
		M_{3Z}	10 54 26	17			57.3mm.		
May 28		e_Z	07 01 16						?
		i_Z	07 10 26						
		eL_Z	07 25 17						
		M_{1Z}	07 40 43	09			2.3mm.		
		M_{2Z}	07 47 14	17			4.8mm.		
		M_{3Z}	07 54 01	11			4.0mm.		
		F_Z	09 02						
May 28		eL_Z?	07 12 05						
		L_Z	07 17 (ca.)						
		L_Z	07 19 (ca.)						Very heavy micros.
		F_Z	07 42						
May 28		e_Z	15 58 37						
		eL_Z	16 19 16						?
		M_{1Z}	16 34 46	16			3.1mm.		
		M_{2Z}	16 37 08	9			3.6mm.		Gram very difficult. Heavy micros.
		F_Z	17 28						
May 31		e_Z	07 27 10						
		e_Z	07 34 14						
		eL_Z	07 50 35						?
		L_Z	08 24	18					
		L_Z	08 32	14					
		F_Z	09 (ca.)						
May 31		e_Z	14 16 20						Possibly $_eL$
		i_Z	14 18 54						
		L_Z	14 59	15					
		F_Z	15 30						
May 31		i_Z	23 43 07						Possibly P
		i_Z	23 50 22						
		eL_Z	23 59 51	9					
		F_Z	Lost						Sheets off at 00 hrs. 28 m. Quake still recording.

Francis A. Tondorf, S. J.,
Director.

trouble

No. 140 From June 1 to June 30, 19 28

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
June 1		e_Z	12 51						Sheets on at 12hrs.51m. Quake then on.
		i_Z	13 15 09						
		i_Z	13 21 36						
		F_Z	In following quake						Heavy micros.
June 1		iP_Z	13 25 31						
		eS_Z	13 36 17						?
		eL_Z	13 55 17						
		$M1_Z$	14 06 14	13			4.3mm.		
		$M2_Z$	14 11 16	14			7.3mm.		
		$M3_Z$	14 12 54	14			9.6mm.		
		$M4_Z$	14 21 14	15			7.1mm.		
		F_Z	15 50						
June 3									Throughout this day the galvanometer was out of order on the Galitzin machine. No quakes on other instruments.
June 4		i_Z	02 14 46						
		i_Z	02 19 51						S_Z possibly.
		eL_Z	02 29 06						
		M_Z	02 36 15	7			3.8mm.		
		F_Z	02 51						
June 5		e_Z	07 01 08						
		F_Z	07 17						Difficult.
June 6		e_Z	19 47 17						Possibly sooner.
		L_Z	20 04 13	18					Heavy micros.
		M_Z	20 06 25	18			5.0mm.		
		F_Z	20 47						
June 6		e_Z	16 38 03						Possibly sooner.
		L_Z	16 40 00						
		L_Z	16 49 57						
		M_Z	17 07 32	8			2.0mm.		
		F_Z	17 15						
June 7		eL_Z ?	03 31 02						
		L_Z	03 31 17	12					
		F_Z	03 45						

June 1 to June 30, 1928

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	Δ	REMARKS
June 8		eP_Z	14 53 52						
		eS_Z	15 04 47						S possibly 3 sec. sooner,
		eL_Z	15 22 40						
		M_{1Z}	15 34 40	20			10.0mm.		
		M_{2Z}	15 36 38	19			10.5mm.		
		F_Z	15 57						
June 8		e_Z	06 01 25						
		e_Z	06 10 27						
		i_Z	06 12 10						
		M_Z	06 14 35	12			3.2mm.		
		F_Z	06 40						
June 9		eP_Z	02 43 26						
		eS_Z	02 48 32						
		eL_Z	02 52 49						
		M_{1Z}	02 57 14	6			4.9mm.		
		M_{2Z}	03 00 16	18			10.6mm.		
		F_Z	03 54						
June 9 & 10	Galvanometer trouble. Any quakes having occurred were in consequence lost.								
June 15		i_Z	06 31 40						Difficult.
		iPR_{1Z}	06 33 37						
		iPR_{2Z}	06 38 08						
		iS_Z	06 45 04						?
		eL_Z	07 07						
		M_{1Z}	07 30 33	19			29.1mm.		
		M_{2Z}	07 32 30	18			30.6mm.		
		M_{3Z}	07 36 13	14			25.8mm.		
		F_Z	08 57						
June 15		i_Z	17 37 13						
		i_Z	17 46 52						P_{R_1} ?
		eL_Z	18 09 10						
		M_{1Z}	18 33 31	20			12.8mm.		
		M_{2Z}	18 37 52	17			19.0mm.		
		F_Z	20 (ca.)						
June 17		iP_E	03 25 20						Amplitudes so great as to make all readings difficult especially on Z component.
		iP_N	03 25 19						
		iP_Z	03 25 18						
		iPR_{1E}	03 26 08						
		iPP_{1N}	03 26 08						
		iS_E	03 30 21						
		eS_N	03 30 21						
		eL_E	03 32 26						
		M_E	03 36 58	6			14.6mm.		
		F_{EN}	05 30						
		F_Z	10 04						
June 17		iP_Z	22 27 05						
		eS_Z	22 31 50						??
		M_Z	22 39 53				5.3mm.		
		F_Z	In following quake						
June 17		iP_Z	23 30 49						
		SR_{1Z}	23 37 05						Micros very heavy.
		M_{1Z}	23 43 36	8			5.3mm.		
		M_{2Z}	23 46 21	12			16.6mm.		
		M_{3Z}	23 48 24	10			14.6mm.		
		F_Z	01 (ca.)						

140 ter. June 1 to June 30, 1928

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	Δ	REMARKS
June 18		i_Z	15 46 26						Very Heavy micros Difficult.
		L_Z	16 00 43						
		M_Z	16 10 16	8			7.2mm.		
		F_Z	17 et postea.						
June 19		e_Z	19 12 33						
		i_Z	19 15 37						
		L_Z	19 17						
		F_Z	19 38						
June 21		iP_E	16 35 52						
		eP_N	16 35 51						
		iS_E	16 42 46						
		iS_N	16 42 46						
		SR_{1_E}	16 45 44						
		SR_{1_N}	16 45 44						
		eL_E	16 47 36						
		eL_N	16 47 36						
		M_E	16 52 46			192mm.			
		M_N	16 52 46		9.9mm.				
		F_{EN}	17 54						
June 21		i_Z	04 43 45						eL_Z ?
		L_Z	04 50 04	19					Heavy micros.
		F_Z	05 54						
June 21		i_Z	10 56 25						P_Z ?
		i_Z	10 59 25						PR_1 ?
		eS_Z	11 06 26						
		i_Z	11 09 32						
		L_Z	11 32	27					
		M_Z	11 36 16	21			27.0mm.		
		F	Sheets off at 13hrs. 20m. with quake still running heavily.						
June 21		iP_Z	16 35 53						No other phases can be read because of obliteration of time due to large amplitudes.
		iS_Z	16 42 52						
June 22		i_Z	22 04 45						
		i_Z	22 11 37						
		eL_Z?	22 19 36						
		F_Z	22 25						
June 23		e_Z	06 24 53						
		e_Z	06 27 04						eL_Z ?
		F_Z	06 39						
June 23		e_Z	07 02 10						
		e_Z	07 18 43						
		e_Z	07 25 22						
		M_{1_Z}	07 43 23	8			5.4mm.		
		M_{2_Z}	07 44 50	8			4.3mm.		
		M_{3_Z}	07 46 40	8			4.3mm.		
		F_Z	08 20						
June 25		i_Z	07 30 57						
		S_Z	07 39 00					?	
		eL_Z	07 53 19						
		M_Z	08 04 47				5.0mm.		
		F_Z	08 50						

140 quar. June 1 to June 30, 1928

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	Δ	REMARKS
June 27		e_Z	00 50 27						
		e_Z	00 57 24						
		e_Z	01 06 07						
		eL_Z	01 11 03						
		L_Z	01 17 47	8-9					
		M_Z	01 20 50	10			2.2mm.		
		F_Z	03 05						
June 29		P_Z	23 04 45						
		PR_{1Z}	23 09 23						
		i_Z	23 19 34						
		eL_Z	23 39 11						
		M_{1Z}	23 50 44	20			27.0mm.		
		M_{2Z}	23 57 00	18					
		F_Z	02 58						
June 30		e_Z	09 52 17						
		e_Z	09 53 12						
		e_Z	10 03 04						eL_Z ?
		F_Z	10 12						
June 1		e_Z	08 39 06						Very heavy micros.
		i_Z	08 48 34						
		L_Z	09 07 36	11					
		F_Z	09 10						

Francis A. Tondorf, S. J.,
Director.

double

No. 141 *From* July 1 *to* July 31, *19* 28

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_o	ε:1
A	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_o	ε:1
A_N	133	5.0	
A_E	133	5.0	

	V	T_o	ε:1
Mainka A_N	55	8.3	5.3
Mainka A_E	31	9.0	4.3
Bosch-Omori A_N			
Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
July 1		e_Z	09 23 48						
		e_Z	09 29 44						
		eL_Z	09 34 46						
		L_Z	09 39 49						
		M_Z	09 45 08	11			9.2mm.		
		F_Z	10 40						
July 2		e_Z	02 23 38						
		e_Z	02 25 07						
		eL_Z	02 35 14						
		M_Z	02 39 42						
		F_Z	03 16						
July 2		e_Z	09 40 05						
		eL_Z	09 52 26						
		F_Z	10 55						
July 4		i_Z	20 16 30						P_Z?
		i_Z	20 17 11						P_{R_1}
		S_Z?	20 20 29						
		M_Z	20 26 32				2.4mm.		
		F_Z	21 10						
July 6		M_Z	01 43 00	10			5.0mm.		
		F_Z	01 56						
July 7		eP_Z	03 40 07						Sheets d[illegible] at 1hr.3[illegible]m. Early pha[illegible]-es lost.
		S_Z	03 44 22						
		eL_Z	03 46 34						
		M_Z	03 55 32	10			13.3mm.		
		F_Z	04 45						
July 7		e_Z	18 58 16						Heavy micr.
		F_Z	19 11						
July 8		iP_Z	12 02 11						
		eS_Z	12 07 18						
		eL_Z	12 10 10						
		L_Z	12 17 12	12					
		$M1_Z$	12 18 35	15			4.3mm.		
		$M2_Z$	12 24 37	11			3.7mm.		
		F_Z	12 56						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	Δ	REMARKS
July 9		e_Z	21 26 42						
		e_Z	21 34 28						
		i_Z	21 43 55						
		i_Z	21 53 54						
		eL_Z	22 18 33						
		L_Z	22 22 05						?
		$M1_Z$	22 25 35	25			13.0mm.		
		$M2_Z$	22 26 50	23			17.0mm.		
		$M3_Z$	22 31 19	19-20			20.0mm.		
		$M4_Z$	22 33 29	18			26.5mm.		
		F_Z	01 (ca.)						
July 10		iP_Z	02 08 40						
		$PR1_Z$	02 09 20						
		S_Z	02 13 35						
		eL_Z	02 14 55						
		$M1_Z$	02 21 34	21			8.0mm.		
		$M2_Z$	02 24 29	16			11.0mm.		
		$M3_Z$	02 25 31	15			15.7mm.		
		$M4_Z$	02 26 46	15			14.5mm.		
		F_Z	03 44						
July 10		e_Z	10 04 40						
		e_Z	10 10 24						
		i_Z	10 16 27						
		e_Z	10 28 45						
		eL_Z	10 35 23						
		M_Z	10 45 44	11			2.7mm.		
		F_Z	12 (ca.)						
July 11		e_Z	03 10 44						
		e_Z	03 18 07						
		e_Z	03 20 43						
		e_Z	03 33 09						
		eL_Z	03 51 15						
		L_Z	03 56 10	31					eL_Z possibly
		$M1_Z$	03 57 25	18			2.8mm.		much sooner.
		$M2_Z$	04 03 30	16			3.3mm.		
		$M3_Z$	04 05 39	18			3.4mm.		
		$M4_Z$	04 12 57	16			3.2mm.		
		F_Z	05 30 (ca.)						
July 12		e_Z	01 32 33						Very difficult
		L_Z	01 34 56	7-8					
		F_Z	02 20						
July 13		e_Z	09 45 36						
		e_Z	10 00 14						
		e_Z	10 05 46						
		e_Z	10 16 50						
		L_Z	10 25 14	19					
		M_Z	10 30 31	14-15			2.4mm.		
		F_Z	12 (ca.)						
July 13		L_Z	20 55 to 21 02	21					e_Z ? 20hrs. 45m. Heavy Micros.
July 15		e_Z	09 56 20						
		eL_Z	10 14						
		F_Z	10 48						
July 15		e_Z	13 57 45						
		eL_Z ?	14 36 37						
		L_Z	14 41 12						
		M_Z	14 46 46						
		F_Z	14 55						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	Δ	REMARKS
July 18		P_Z	19 13 15						
		PR_1Z	19 15 05						
		PR_2Z	19 15 39						
		S_Z	19 20 08						
		SR_{1_Z}	19 23 32						
		SR_{2_Z}	19 24 29						
		eL_Z?	19 27 21						
		$M1_Z$	19 31 59	13			93.0mm.		
		$M2_Z$	19 33 30	17			107.8mm.		
		$M3_Z$	19 36 17	16			106.0mm.		
		$M4_Z$	19 38 59	14			75.0mm.		
		$M5_Z$	19 40 26	15			73.6mm.		
		F_Z	23 30 (ca.)						
July 19		e_Z	06 04 00						
		e_Z	06 07 32						
		F_Z	06 20						
July 19		e_Z	23 59 50						
		i_Z	00 10 10						
		eL_Z	00 32 10	10					
		F_Z	01 53						
July 21		e_Z	02 28 07						
		$PR1_Z$	02 31 04						
		S_Z?	02 36 41						
		M_Z	02 59 51	7			2.7mm.		
		F_Z	04 (et postea)						
July 21		e_Z	06 07 57						
		eL_Z	06 52 18						
		F_Z	07 10						
July 22		P_Z	07 34 17						
		S_Z	07 39 51						
		eL_Z	07 43 40						
		L_Z	07 47 27						
		$M1_Z$	07 50 09	11			6.0mm.		
		$M2_Z$	07 52 28	11			7.1mm.		
		F_Z	09 (ca.)						
July 23		P_Z?	08 03 05						
		e_Z	08 06 32						
		e_Z	08 08 15						
		e_Z	08 14 07						
		e_Z	08 16 24						
		e_Z	08 17 32						
		eL_Z?	08 34 42						
		L_Z	08 53 08						
		M_Z	09 00 38					1.9mm	
		$M1_Z$	09 02 48					1.5mm.	
		F_Z	10 05						
July 23		e_Z	15 35 00						
		eL_Z?	15 40 04	9					
		L_Z	15 45 49	19					
		$M1_Z$	15 46 45	15			4.0mm.		
		$M2_Z$	15 48 46	9			4.0mm.		
		F_Z	16 28						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	Δ	REMARKS
July 25		e_Z	06 50 29						Possibly sooner at 6hrs.46m.
		L_Z	06 20 33	11					
		M_Z	06 21 41	11			5.0mm.		
		F_Z	06 26						
July 25		e_Z	18 54 25						Difficult.
		eL_Z	19 03 36						
		L_Z	19 08 40	14					
		M_Z	19 09 58	12			4.2mm.		
		F_Z	20 12						
July 26		e_Z	00 49 09						
		F_Z	01 56						
July 27		e_Z	16 36 21						
		eL_Z?	16 41 37						
		L_Z	16 46 12						
		F_Z	17 14						
July 28		e_Z	02 37 10						
		L_Z	02 42 14	12-13					
		F_Z	02 55						
July 28		L_Z	07 26 19	19					
		F_Z	07 43						
July 28		e_Z	19 55 28						e possibly sooner.
		iS_Z?	20 01 28						
		eL_Z?	20 10 36						
		L_Z	20 20 00	11					
		i_Z	20 29 34						May be in other quake.
		F_Z	20 59						
July 30		e_Z	02 37 15						
		i_Z	02 49 53						
		i_Z	02 51 03						
		eL_Z	02 53 06	7					
		M_Z	03 02 13	18			19.6mm.		
		F_Z	04 15						
July 30		e_Z	07 20 34						
		eL_Z	07 25 11	17					
		F_Z	07 37						

Francis A. Tondorf, S. J.,
Director.
Raphael Goberns, S. J.,
Assistant Seismologist.

No. 142 From August 1 to August 31, 1928

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.7
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Aug. 1		e_Z	01 09 46						
		L_Z	01 12 14						
		F_Z	01 14						
Aug. 1		e_Z?	08 04 40						
		L_Z	08 08 35	8					
		F_Z	08 15						
Aug. 1		e_Z	09 07 36						
		L_Z	09 08 19	12					
		F_Z	09 14						
Aug. 2		eP_Z?	06 51 44						
		eL_Z	07 06 09						
		L_Z	07 08 44	14					
		M_Z	07 10 19	11			6.5mm.		
		F_Z	08 (ca.)						
Aug. 3		P_Z	11 56 02						
		S_Z?	12 03 26						
		eL_Z	12 13 22						
		L_Z	12 19 09	13					
		M_Z	12 22 38	16			5.3mm.		
		F_Z	13 05						
Aug. 4		P_E	18 32 19						
		P_N	18 32 19						
		P_Z	18 32 17						
		PR_{1E}	18 33 05						
		PR_{1N}	18 33 04						
		PR_{2E}	18 33 28						
		PR_{2N}	18 33 29						
		S_E	18 37 23						
		S_N	18 37 23						
		eL_E	18 39 23						
		eL_N	18 39 24						
		M_{1E}	18 45 36			7.1mm.			
		M_{1N}	18 39 34		6.5mm.				
		M_{2E}	18 48 14			5.4mm.			
		M_{2N}	18 49 08	11	4.3mm.				
		M_{3E}	18 55 43	9		4.6mm.			
		M_{3N}	18 55 08	12	5.5mm.				
		F_E	20 05						
		F_N	20 05						
		F_Z	22 40						
Aug. 5		e_Z	14 49 46						
		i_Z	15 02 29						
		eL_Z?	15 34 19	9					
		L_Z	15 55 15	17					
		F_Z	16 41						No distinct M.

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	AMPLITUDE A_E	AMPLITUDE A_Z	REMARKS
Aug. 8		iP_Z?	02 34 51					Possibly P'
		i_Z	02 38 10					
		eL_Z?	03 28 40					
		L_Z	03 35 01	14				
		M_Z	03 38 41				2.0mm.	
		F_Z	04 (ca.)					
Aug. 9		e_Z	05 35 30					
		e_Z	05 49 13					
		eL_Z	06 15 38					
		F_Z	07 (ca.)					
Aug. 10		e_Z	15 53 19					Possibly sooner.
		e_Z	15 57 35					
		eL_Z?	16 19 17					
		F_Z	17 30 (ca.)					
Aug. 12		i_Z	08 27 54					P possibly.
		i_Z	08 30 50					P_{R1}?
		i_Z	08 43 08					
		eL_Z?	09 13 09					
		M_Z	09 28 13					
		F_Z	10 55					
Aug. 15		e_Z	15 45 03					
		L_Z	15 53 14	29				
		M_Z	15 55 14	19			5.3mm.	
		F_Z	16 51					
Aug. 15		iP_Z	17 25 48					
		eP_E	17 25 46					
		iP_N	17 25 47					
		iS_Z	17 34 04					
		iS_E	17 34 05					
		iS_N	17 34 05					
		eL_Z	17 42 07	12				
		$M1_Z$	17 51 26	13			3.7mm.	
		$M2_Z$	17 53 23	17			4.0mm.	
		F_Z	19 (ca.)					
Aug. 16		e_Z	08 10 04					Possibly eL_Z
		L_Z	08 18 25	20?				
		F_Z	08 35					
Aug. 18								Light cut off from 17th day at 19hrs.7ms. to 18th day at 1hr.25ms.
		e_Z	05 43 11					
		e_Z	05 50 41					
		e_Z	05 59 58					
		eL_Z	06 25 16					
		L_Z	06 29 24	18				No distinct M.
		F_Z	07 25 (ca.)					
Aug. 19		e_Z	03 04 42					
		eL_Z	03 10 00					
		F_Z	03 35					
Aug. 20		e_Z	02 41 50					
		eL_Z	02 57					
		F_Z	03 15					
Aug. 20		P_Z	17 54 02					
		$PR1_Z$	17 55 43					
		$PR3_Z$	17 56 33					
		S_Z	18 00 36					
		$SR1_Z$	18 03 37					
		eL_Z	18 06 41					
		L_Z	18 09 24	11				
		$M1_Z$	18 14 30	11			2.6mm.	
		$M2_Z$	18 17 19	11			3.2mm.	
		F_Z	19 10					
Aug. 22		eL_Z	06 54 59					
		L_Z	06 58 09	16				
		M_Z	06 59 21	20			2.0mm.	
		F_Z	07 10					
Aug. 22		e_Z	20 22 14					Difficult. Possibly at 20hrs.20ms.
		L_Z	20 36 54	13				
		F_Z	20 51					

August 1 to August 31, 1928.

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Aug. 23		e_Z	04 23 29					
		e_Z	04 51 22					
		L_Z	05 00 29	8				eL_Z?
		F_Z	05 02					
Aug. 24		e_Z	02 17 09					Absolute time uncertain by several seconds.
		F_Z	02 32					
Aug. 24		e_Z	09 54 24					
		eL_Z	10 14 12	14				
		L_Z	10 15 38	20±				No distinct M.
		F_Z	10 53 (ca.)					
Aug. 24		P_Z	22 02 06					P'?
		i_Z	22 03 21					
		i_Z	22 04 04					
		S_Z?	22 12 43					
		i_Z	22 16 18					
		i_Z	22 16 56					
		eL_Z?	22 29 34					
		M_{1Z}	22 46 43	18-20			5.0mm.	
		M_{2Z}	22 52 09	18			4.4mm.	
		M_{3Z}	22 58 43	15-16			5.0mm.	
		F_Z	24 25					
Aug 25		eL_Z?	00 23 20					The earlier part of this quake is included in the cauda of last quake.
		M_{1Z}	00 28 07	16			2.9mm.	
		M_{2Z}	00 39 16	16			2.9mm.	
		F_Z	01 35					
		e_Z	20 52 25					
		e_Z	20 54 10					
		i_Z	20 58 22					S_Z?
		eL_Z?	21 04 13	15				
		F_Z	21 25					
Aug. 26		e_Z?	04 15 19					
		e_Z	04 32 05					
		eL_Z?	04 55 07					
		M_Z	05 06 17	13			1.8mm.	
		M_{2Z}	05 09 15				1.6mm.	
		L_Z	06 01 16	11				Probably another quake.
		F_Z	06 55 (ca.)					
Aug. 28		eL_Z?	09 31 53					
		L_Z	09 40 52	16				
		L_Z	09 49 59	14				
		F_Z	10 05 (ca.)					
Aug. 29		eL_Z	03 30 28					
		L_Z	03 35 53	16				
		M_{1Z}	03 37 21	15			1.9mm.	
		M_{2Z}	03 45 20	14			1.5mm.	
		F_Z	04 15					
Aug. 29		e_Z	07 40 29					Gram very difficult of interpretation.
		e_Z	07 44 19					
		eL_Z?	07 46 26					
		F_Z	08 10					
Aug. 29		e_Z	10 08 39					
		e_Z	10 13 12					
		e_Z	10 16 13					
		L_Z	10 20 16	18				
		M_Z	10 21 33	11			2.5mm.	
		F_Z	10 45					
Aug. 30		e_Z	22 13 05					
		eL_Z	22 17 42					
		L_Z	22 19 00	11				
		M_Z	22 20 20	10			10.5mm.	
		F_Z	22 38					
Aug. 31		e_Z	05 30 27					
		eL_Z	05 42 31					
		F_Z	06 (ca.)					
Aug. 31		eL_Z	10 12 20					
		M_Z	10 13 39	13			2.0mm.	
		F_Z	10 20					
Aug. 31		eL_Z	11 07 32					
		M_Z	11 09 52	9			2.4mm.	
		F_Z	11 20					

Francis A. Tondorf, S. J., Director:
Raphael Goberns, S. J.,
Assistant Seismologist.

No. [illegible] *From* Sept. 1 *to* Sept. 30, *19* 28

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ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
Mainka	A_E	31	9.0	4.3
Bosch-Omori	A_N			
Bosch-Omori	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Sept. 1		eZ	06 23 30						
		eZ	06 27 50						
		iZ	06 37 13						
		eLZ	06 50 46						
		M1Z	07 11 44	16			8.6mm.		
		M2Z	07 14 12	18			11.0mm.		
		M3Z	07 16 50	14			8.3mm.		
		M4Z	07 18 14	14			9.0mm.		
		FZ	08 21						
Sept. 2		ePZ	00 00 00						
		eSZ	00 04 38						
		SR1Z	00 05 43						
		eLZ	00 06 25						
		M1Z	00 12 35	18			10+mm.		Off scale.
		M2Z	00 13 20	10-11			25+mm.		Off sheet.
		M3Z	00 14 06	9			27+mm.		
		FZ	In next quake						
Sept. 2		eZ	01 42						
		FZ	02 05						
Sept. 2		eZ	24 47						
		eLZ	17 53 40						
		LZ	17 54 13	18					
		FZ	18 43						
Sept. 3		eZ	04 19 04						
		eLZ	04 21 09						
		FZ	04 30						
Sept. 3		eZ	05 55 41						
		eLZ?	05 58 42						
		LZ	05 59 28	8					
		LZ	06 09 24	8					No distinct M.
		FZ	06 50						
Sept. 5		eLZ	05 48 34						
		LZ	05 50 00	9					
		M1Z	05 50 45	5			2.9mm.		
		M2Z	05 53 45	9			3.1mm.		
		FZ	06 11						
Sept. 5		PZ?	14 48 12						
		SZ?	14 50 45						
		SR1?	14 55 35						
		LZ	14 59 16	4					
		MZ	15 02 50	6			5.5mm.		
		FZ	15 25						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	◿	REMARKS
Sept. 6		e_Z	07 28						Masked in very heavy micros.
		F_Z	07 57						
Sept. 6		e_Z	09 53						Possibly sooner.
		F_Z	10 07						Very heavy micros. May not be seismic.
Sept. 7		e_Z?	03 08 25						Difficult. Very heavy micros.
		i_Z	03 13 02						P_R?
		e_Z	03 20 57						
		e_Z	03 32 20						
		eL_Z	03 55 11						
		M_Z	04 05 12	15			5.0mm.		
		F_Z	In next quake.						
		e_Z	04 29 32						
Sept. 7		e_Z	04 33 46						
		eL_Z	04 44 02						
		M_Z	04 52 26	17-18			3.0mm.		
		F_Z	05 32						
Sept. 9		eL_Z	02 44 39						
		L_Z	02 48 24	9					
		M_Z	02 51 47	9			2.2mm.		
		F_Z	03 15						
Sept. 9		L_Z	12 13 to						Periods irregular.
			12 23						
Sept. 11		e_Z	01 22 17						
		eL_Z?	01 43 24						
		L_Z	01 48 16	8					No distinct M.
		L_Z	02 03 23	17					
		F_Z	02 20						
Sept. 11		P_Z?	12 37 06						There appears to be no little ambiguity in the reports of several Observatories on this quake. Possibly the ambiguity is to be found in the overlapping of two quakes.
		PR_{1Z}?	12 39 47						
		PR_{3Z}?	12 41 03						
		i_Z	12 43 55						
		S_Z?	12 44 47						
		PS_Z?	12 45 16						
		eL_Z	12 52 31						
		M_Z	13 01 24	9			88.5+mm.		Off of sheet.
		F_Z	15 50						
Sept. 12		e_Z	01 39 25						P'?
		e_Z	01 41 31						
		e_Z	01 48 32						
		e_Z	01 51 46						
		eL_Z	02 07 24	9					No distinct M.
		L_Z	02 16 18	14					
		L_Z	02 23 11	11					
		F_Z	03 07						
Sept. 13		P'_Z	03 45 10						
		PR_{1Z}	03 48 25						
		PR_{2Z}	03 51 37						
		i_Z	03 58 52						
		i_Z	04 00 20						
		L_Z	04 33 15						
		M_{1Z}	04 37 26	23			4.5mm.		
		M_{2Z}	04 41 21	23			4.8mm.		
		M_{3Z}	04 43 44	21			5.5mm.		
		F_Z	05 45						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z		REMARKS
Sept. 14		e_Z	07 53 09						
		eL_Z	08 09 38	9					
		M_Z	08 19 51	15			4.6mm.		
		F_Z	09 (ca.)						
Sept. 18		e_Z	17 33						Very difficult
		e_Z	17 40 09						Very heavy micros of amplitudes approximately 9mm. at times.
		eL_Z?	17 47 49	9					
		F_Z?							
Sept. 19		L_Z	03 05 19	8					Very heavy micros.
		F_Z	03 08						
Sept. 21		e_Z	13 28 43						
		i_Z	13 36 12						
		eL_Z	13 43 14	8-9					
		M_Z	13 53 44	15			1.7mm.		
		F_Z	14 25 (ca.)						
Sept. 22		L_Z	06 47 56						
		M_{1Z}	06 51 29	21			2.5mm.		
		M_{2Z}	07 01 59				2.0mm.		
		F_Z	In next quake						
Sept. 22		i_Z	07 51 29						P'?
		i_Z	08 01 25						Some phase in S? Possibly PS.
		i_Z	08 03 04						
		i_Z	08 08 28						
		eL_Z	08 16 57	19					
		L_Z	08 30 03	23					
		M_Z	08 36 03	19			120.0mm.		
		F_Z	11 (ca.)						
Sept. 22		e_Z	22 13 18						
		e_Z	22 35 30						
		eL_Z	22 46 57						
		L_Z	22 49 54	13					
		F_Z	23 20 (et postea).						
Sept. 23		eP_Z?	13 43 02						
		S_Z	13 48 59						
		eL_Z	13 52 52	9					
		L_Z	13 55 46	6					
		M_{1Z}	14 00 18	13			8.8mm.		
		M_{2Z}	14 01 19	10			11.0mm.		
		F_Z	15 10						
Sept. 23		L_Z	17 52 to 18 01						
Sept. 24		e_Z	01 54						Difficult.
		F_Z	02 05						Very heavy micros masking gram.
Sept. 25		e_Z?	08 04 22						
		e_Z	08 08 24						Difficult.
		i_Z	08 15 10						
		eL_Z	08 45 24						No distinct M.
		L_Z	08 51 39	10					
		L_Z	09 05 08	13					
		F	Lost in micros.						
Sept. 27		P_Z	00 50 10						Heavy micros.
		PR_{1Z}	00 50 53						
		i_Z	00 52 09						
		S_Z	00 55 23						
		eL_Z	00 59 09	20					Possibly sooner.
		M_Z	01 03 12	19			16.0mm.		
		F_Z	02 20 (ca.)						

Francis A. Tondorf, S. J., Director:

Raphael Goberns, S. J.,
Assistant Seismologist.

No. 144 From October 1 to October 31, 1928

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Oct. 2		S_Z?	19 17 22						
		eL_Z	19 20 36						
		F_Z	19 40 (ca.)						
Oct. 4		e_Z	18 41 15						
		e_Z	18 47 27						
		e_Z	18 52 03						
		eL_Z?	19 12 06						
		L_Z	19 15 14						
		M_{1Z}	19 18 44	22			3.4mm.		
		M_{2Z}	19 22 37	20			3.5mm.		
		M_{3Z}	19 28 49	18			3.9mm.		
		M_{4Z}	19 37 33	14			3.1mm.		
		F_Z	20 15 (ca.)						
Oct. 7		e_Z	11 14 01						Heavy micros.
		L_Z	11 17 00						
		F_Z	11 27						
Oct. 8		e_Z	01 44 42						
		L_Z	01 45 31						
		F_Z	01 50						
Oct. 8		e_Z	02 45 35						
		eL_Z	02 46 15						
		F_Z	02 51						
Oct. 9		iP_Z	03 07 10						The amplitudes of the initial phases were so large as to eliminate any possibility of reading the time on vertical component. P_Z is indicated.
		iP_E	03 07 12						
		iP_N	03 07 12						
		PR_{1E}	03 07 54						
		PR_{1N}	03 07 54						
		PR_{2E}	03 08 05						
		iS_E	03 11 57						
		eS_N	03 11 58						
		SR_{1E}	03 13 23						
		SR_{1N}	03 13 15						
		SR_{2E}	03 13 34						
		SR_{2N}	03 13 25						
		SR_{3E}	03 13 45						
		eL_E	03 14 18						
		eL_N	03 14 25						
		L_E	03 17 10						
		M_{1E}	03 19 20			8.0mm.			
		M_{1N}	03 20 23	11	2.6mm.				
		M_{2E}	03 22 48	11		11.0mm.			
		M_{2N}	03 23 40	13	4.1mm.				
		M_{3E}	03 24 37	16		7.2mm.			
		F_E	05 05						
		F_N	04 50						
		F_Z	08 (ca.)						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	Δ	REMARKS
Oct. 9		eL_Z	15 36 26						Earlier phases lost in heavy micros.
		L_Z	15 40 06						
		M_Z	15 50 29	17			2.8mm.		
		F_Z	16 30						
Oct. 10		eL_Z	21 31 09						No distinct M.
		L_Z	21 40 38	15-16					
		F_Z	22 (ca.)						
Oct. 11		e_Z	04 31						Very heavy micros.
		F_Z	04 41						
Oct. 12		e_Z	00 33						Possibly sooner.
		eL_Z	00 36 24						
		L_Z	00 39 05	11					
		L_Z	00 47 00	15					
		F_Z	00 58						
Oct. 12		e_Z	07 42 00						Heavy micros.
		e_Z	07 53 18						
		eL_Z	08 11 06						
		L_Z	08 22 06	9					
		M_{1Z}	08 30 11	17			5.0mm.		
		M_{2Z}	08 38 16	20			6.3mm.		
		F_Z	09 (ca.)						
Oct. 12		eL_Z	09 08 26						
		L_Z	09 13 14	17					
		M_Z	09 14 21	15-16			6.3mm.		
		F_Z	09 58						
Oct. 12		e_Z	23 23 43						Very heavy micros.
		L_Z	23 24 21						
		F_Z	23 31						
Oct. 13		e_Z	13 28 05						Very heavy micros.
		eL_Z	13 30 10						
		F_Z	13 48						
Oct. 13		L_Z	16 34 16						
		F_Z	Lost in heavy micros.						
Oct. 15		e_Z	09 03 01						
		e_Z	09 17 51						
		eL_Z	09 31 33						
		L_Z	09 35 00	21					
		M_{1Z}	09 37 04	21			4.7mm.		
		M_{2Z}	09 39 29	16			6.0mm.		
		M_{3Z}	09 41 47	19			4.2mm.		
		F_Z	10 45						
Oct. 15		e_Z	14 33 53						
		$PR_1?_Z$	14 38 11						
		PS?	14 47 29						
		e_Z	14 48 31						
		i_Z	15 03 27						
		eL_Z	15 08 17						
		L_Z	15 12 00	37					
		M_{1Z}	15 20 21	22			23.0mm.		
		M_{2Z}	15 22 33	21			35.0mm.		
		F_Z	17 10						
Oct. 17		e_Z	06 46						Very irregular movement throughout.
		L_Z	07 22 12	17					
		L_Z	07 28 13	9					
		F_Z	08 09						
Oct. 17		e_Z	15 33 13						
		e_Z	15 37 20						
		e_Z	15 45 28						
		eL_Z?	15 59 13						
		L_Z	16 04 54	20					
		M_{1Z}	16 12 12	22			4.9mm.		
		M_{2Z}	16 16 17	19			4.7mm.		
		M_{3Z}	16 20 35	18-19			7.3mm.		
		F_Z	18 33						
Oct. 19		e_Z	06 15						Heavy micros.
		eL_Z?	06 21 09						
		F_Z	06 40						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	◿	REMARKS
Oct. 19		e_Z	10 39 13						
		i_Z	10 48 39						
		eL_Z	11 16 34						
		L_Z	11 21 24	22					
		M_{1Z}	11 26 08	16			10.0mm.		
		M_{2Z}	11 33 14				15.2mm.		
		F	13 28 (ca.)						
Oct. 19		e_Z	15 45 40						
		e_Z	15 49 45						
		eL_Z	15 54 12						
		L_Z	15 55 35	8-9					No distinct M.
		F	16 20						
Oct. 20		e_Z	13 08 19						
		e_Z	13 14 35						
		eL_Z	13 45 27						
		L_Z	13 52 08	11					
		M_Z	13 54 36	21			4.6mm.		
		F_Z	14 50 (ca.)						
Oct. 23		iP_Z	18 04 15						
		S_Z?	18 14 31						
		e_Z	18 19 20						
		eL_Z	18 31 19						
		M_{1Z}	18 41 29	21-22			3.8mm.		
		M_{2Z}	18 44 16	13			4.0mm.		
		M_{3Z}	18 47 00	17			4.0mm.		
		M_{4Z}	18 50 09	15-16			4.0mm.		
		F_Z	19 42						
Oct. 25		iP_Z	12 39 04						
		PR_{1Z}	12 39 54						
		PR_{2Z}	12 40 05						
		S_Z	12 44 14						
		SR_{1Z}	12 45 24						
		M_Z	12 50 06				63.0mm.		Other Maxima off sheet. Time obliterated.
		F_Z	14 56						
Oct. 28		e_Z	14 43 23						
		eL_Z	14 53 08						
		L_Z	14 56 39	9-10					
		M_Z	15 04 39	9			2.8mm.		
		F_Z	15 15						
Oct. 30		eL_Z	00 10 24						
		F_Z	00 35						
Oct. 30		P_Z	04 29 18						
		PR_{2Z}	04 30 28						
		S_Z?	04 34 08						
		$SR?_{1Z}$	04 35 30						
		$SR?_{2Z}$	04 35 45						
		eL_Z	04 38 26						
		L_Z	04 39 16	18					
		M_{1Z}	04 42 52	17			7.2mm.		
		M_{2Z}	04 45 08	14			11.0mm.		
		F_Z	06 05						
Oct. 30		e_Z	06 43 13						
		L_Z	06 48 39						
		F_Z	07 05						
Oct. 30		e_Z	07 21 17						
		e_Z	07 25 38						
		e_Z	07 35 33						
		i_Z	07 41 27						
		L_Z?	07 44 14	10					
		M_Z	07 44 47	11			3.9mm.		
		F_Z	08 (ca.)						
Oct. 31		e_Z	20 16						Very heavy micros.
		eL_Z?	20 56						
		L_Z	21 01 26	16					
		F_Z	Lost in micros						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Nov. 1		iP_Z	04 18 34						Rest of phases in the vertical component impossible to be read because of too great amplitude and obliteration of time
		P_E	04 18 34						
		eP_N	04 18 35						
		$iPR1_Z$	04 19 13						
		$PR1_E$	04 19 07						
		$iPR2_Z$	04 19 27						
		$PR2_E$	04 19 28						
		$PR3_E$	04 19 31						
		S_Z	04 23 11						
		iS_E	04 23 22						
		S_N	04 23 15						
		eL_E	04 25 18						
		eL_N	04 25 31						
		L_E	04 26 07	5					
		L_N	04 26 15	5					
		M_E	04 27 18	5		25.4mm.			
		M_N	04 27 08	5	14.7mm.				
		F_Z	06 22						
Nov. 1		eP_Z	16 15 23						Difficult.
		$PR1_Z$	16 16 53						
		S_Z?	16 21 49						
		eL_Z	16 25 23	12					
		$M1_Z$	16 31 19	14		7.9mm.			
		$M2_Z$	16 32 41	16		7.8mm.			
		$M3_Z$	16 38 00	14		7.0mm.			
		F_Z	17 10						
Nov. 3		P_E	04 04 23						
		iS_E	04 05 34						
		S_N	04 05 35						
		eL_Z	04 05 37						
		M_E	04 06 08						
		M_N	04 06 00						
		M_Z	04 06 07	4-5		22.5mm.			
		F_Z	04 10						
Nov. 6		P'_Z	04 25 10						Very heavy micros. Possibly PS.
		i_Z	04 38 02						
		eL_Z	05 04 36						
		$M1_Z$	05 10 18	21		26.9mm.			
		$M2_Z$	05 15 16	19		19.0mm.			
		$M3_Z$	05 22 44	17		24.3mm.			
		F_Z	07 20 (et postea).						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	AMPLITUDE A_E	AMPLITUDE A_Z	REMARKS
Nov. 7		eL_Z	15 55 25					Very heavy micros masks all earlier phases
		L_Z	15 58 03	19				
		M_{1Z}	15 59 34	11-12			12.2mm.	
		M_{2Z}	16 00 24	11			14.2mm.	
		M_{3Z}	16 01 51	14			17.6mm.	
		F_Z	16 32					
Nov. 10		e_Z	13 10 32					Very heavy micros.
		e_Z	13 17 35					
		eL_Z?	13 31 22					
		L_Z	13 32 45	17				
		M_{1Z}	13 34 01	20			6.5mm.	
		M_{2Z}	13 41 26	13			5.4mm.	
		M_{3Z}	13 45 57	16			8.5mm.	
		F_Z	15 25 (ca.)					
Nov. 11		e_Z	23 58					Very heavy micros. e_Z possibly sooner.
		L_Z	00 03 46	14				
		L_Z	00 09 31	14				
		F_Z	00 35					
Nov. 15		P_Z	13 28 25					
		eS_Z	13 37 06					
		PS_Z	13 37 40					
		eL_Z	13 49 50					
		M_{1Z}	13 58 26	15			5.0mm.	
		M_{2Z}	13 59 30	13			5.0mm.	
		F_Z	15 10					
Nov. 18		e_Z	18 48 16					Very heavy micros.
		eL_Z	18 59 49					
		F_Z	19 20 (ca.)					
Nov. 19		e_Z	16 12					
		i_Z	16 32 49					eL_Z?
		L_Z	16 38 08	8				
		L_Z	16 40 49	9				
		F_Z	17 30					
Nov. 20		iP_Z	20 45 27					
		iP_N	20 45 30					
		eP_E	20 45 30					
		PR_{1Z}	20 48 19					
		PR_{2Z}	20 49 49					
		iS_Z	20 53 56					
		iS_N	20 53 56					
		iS_E	20 53 55					
		iPS_Z	20 54 18					
		iPS_E	20 54 17					
		iPS_N	20 54 16					
		SR_{1Z}	21 01 12					
		SR_{1E}	21 01 17					
		eL_Z	21 04 19					
		L_Z	21 07 29	22				
		M_{1Z}	21 10 07	23			28.6mm.	
		M_{2Z}	21 12 52	21			64.1mm.	
		M_{3Z}	21 15 06	17-18				
		F_Z	23 50 (ca.)					
Nov. 22		e_Z	08 51 46					Very heavy micros.
		e_Z	08 54 11					
		e_Z	08 55 11					
		eL_Z	09 25 21					
		M_{1Z}	09 28 51	22			8.8mm.	
		M_{2Z}	09 36 42	18			8.1mm.	
		F_Z	11 30					
Nov. 27		e_N	09 30 56					Quake can not be read on the vertical component because of time not marking evenly.
		e_E	09 30 52					
		L_N	09 43 43	4				
		L_E	09 43 43	3-4				
		M_N	09 44 25	3	0.2mm.			
		M_E	09 44 15	3		0.4mm.		
		F_N	09 55 (ca.)					
		F_E	10 05 (ca.)					

No. 140 *From* Dec. 1, *to* Dec. 31, 1928

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A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
Mainka	A_E	31	9.0	4.3
Bosch-Omori	A_N			
Bosch-Omori	A_E			

Date	Character	Phase	Time			Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Dec. 1		iP_Z	04	17	47						
		eP_E?	04	17	56						
		P_N	04	17	49						
		$PR1_Z$	04	21	01						
		$PR1_E$	04	21	16						
		$PR1_N$	04	21	14						
		$PR2_Z$	04	22	42						
		$PR2_E$	04	22	35						
		$PR2_N$	04	22	36						
		$PR3_Z$	04	23	13						
		$PR3_E$	04	23	12						
		iS_Z	04	27	21						
		S_E	04	27	22						
Dec. 1		S_N	04	27	22						
		PS_N	04	28	01						
		eL_E	04	38	18						
		eL_N	04	39	06						
		$M1_E$	04	47	09	19		1.8mm.			
		$M1_N$	04	50	30	18-19	1.0mm.				
		$M2_E$	04	50	33	23-24		1.5mm.			
		$M2_N$	04	52	30	20	1.3mm.				
		$M3_E$	04	52	41	21		1.6mm.			
		$M3_N$	04	55	41	17	1.1mm.				
		$M4_E$	04	54	52						
		F_Z	09	22							
Dec. 1		P_Z?	09	31	04						
		e_Z	09	36	38						
		S_Z?	09	41	12						Heavy micros.
		L_Z	10	04	31						No distinct M.
		F_Z	11	05	(ca.)						
Dec. 1		iP_Z	18	44	00						
		S_Z	18	53	28						
		PS_Z	18	54	08						
		eL_Z	19	07	10						
		L_Z	19	17	50	10-11					
		F_Z	19	54							
Dec. 2		e_Z	03	21	23						
		L_Z	03	27	46	6					
		F_Z	03	38							
Dec. 2		iP_Z	04	32	00						Heavy micros.
		$PR1_Z$	04	35	14						
		S_Z	04	41	24						
		eL_Z	04	54	38						
		$M1_Z$	05	06	59	20			27.4mm.		
		$M2_Z$	05	08	22	20			34.0mm.		
		$M3_Z$	05	09	52	18			19.3mm.		
		F_Z	07	55							

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Dec. 10		i_Z	13 47 09					Very difficult. Heavy& irregular micros mask the gram.
		e_Z	13 59 27					
		e_Z	14 02 04					
		e_Z	14 28 47					
		L_Z?	14 39 28					No distinct M.
		L_Z?	14 43 09					
		F_Z						Overlapping in following quak
Dec. 10		e_Z	15 17 55					Beginning very uncertain. Heavy and irregular micros
		e_Z	15 30 57					
		e_Z	15 46 55					
		e_Z	15 59 29					
		L_Z?	16 01 56					No distinct M.
		F_Z	16 45 (ca.)					
Dec. 11		e_Z	19 36 14					Heavy micros.
		L_Z	19 41 47	8				
		F_Z	19 50					
Dec. 12		e_Z?	20 37 18					Heavy micros.
		i_Z	20 39 27					P'_Z?
		e_Z	20 49 00					S_Z?
		e_Z	20 50 10					PS_Z?
		eL_Z?	21 15 15					Possibly much sooner.
		L_Z	21 18 00	18-19				
		M_{1Z}	21 22 07	18			25.4mm.	
		M_{2Z}	21 27 41	17			19.3mm.	
		M_{3Z}	21 31 29	16-17			18.0mm.	
		M_{4Z}	21 36 39	15-16			28.7mm.	
		F_Z	23 50					
Dec. 14		e_Z	01 24 48					
		eL_Z	01 32 07					
		F_Z	01 50					
Dec. 14		L_Z?	03 16 20	9				
		F_Z	03 26					
Dec. 14		e_Z	23 59 48					Heavy micros.
		e_Z	00 08 14					
		e_Z	00 16 35					
		eL_Z	00 21 46					Possibly soone
		L_Z	00 24 32	18-19				No distinct M.
		F_Z	01 25 (ca.)					
Dec. 15		e_Z	20 13 06					
		e_Z	20 26 42					Possibly sooner Irregular micr
		L_Z	20 27 46					
		M_Z	20 28 45	9			6.5mm.	
		F_Z	20 51 (ca.)					
Dec. 16		e_Z	02 18 06					Very irregular micros. Possibly not seismic.
		e_Z	02 24 28					
		L_Z	02 26 30	8-9				
		F_Z	02 30					
Dec. 16		eL_Z	19 44 03					
		L_Z	19 48 11	8				
		F_Z	19 54					
Dec. 17		eL_Z	04 59 42					Irregular micr
		eL_Z	05 10 16					
		F_Z	05 24					
Dec. 17		e_Z	06 34 47					Irregular micr
		L_Z	06 36 44	7-8				
		F_Z	06 41					
Dec. 19		eP_Z	11 56 26					
		eP_N?	11 56 43					
		eP_E?	11 56 46					
		i_Z	11 58 39					
		i_Z	12 00 00					
		i_Z	12 00 53					
		PR_{1Z}	12 01 20					
		eS_E?	12 11 00					
		eL_E	12 35 22					
		eL_Z	12 38 00					
		L_Z	12 43 29	29-30				

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Dec. 3		e_Z	12 33 28					
		S_Z?	12 42 16					
		M_{1Z}	12 47 24	8			5.7mm.	
		M_{2Z}	12 48 32	6			6.2mm.	
		M_{3Z}	12 52 36	10			6.0mm.	
		M_{4Z}	12 53 28	10			6.2mm.	
		F_Z	13 51					
Dec. 4		e_Z	01 59 46					Very irregular micros.
		L_Z	02 03 27	9				
		F_Z	02 09					
Dec. 5		e_Z?	02 47 05					Very difficult. Heavy and irregular micros.
		e_Z	02 52 29					
		e_Z	02 59 36					
		e_Z	03 06 41					
		F_Z	03 18					
Dec. 5		e_Z?	11 03 06					Very difficult. Irregular micros mask the gram.
		e_Z	11 16 05					
		e_Z	11 21 20					
		e_Z	11 24 42					
		e_Z	11 27 00					
		F_Z	11 48					
Dec. 7		e_Z	09 33 26					P'?
		e_Z	09 36 57					
		i_Z	09 42 22					
		e_Z	09 46 09					
		i_Z	09 57 39					
		e_Z	10 04 28					
		eL_Z	10 19 22					
		L_Z	10 22 02	28-29				
		M_{1Z}	10 33 19	21-22			10.1mm.	
		M_{2Z}	10 37 46	18			10.2mm.	
		M_{3Z}	10 40 34	19-20			10.5mm.	
		M_{4Z}	10 44 27	17-18			9.7mm.	
		M_{5Z}	10 48 48	16-17			7.5mm.	
		F_Z	12 05 (ca.)					
Dec. 9		e_Z	00 28 42					Very difficult. Possibly sooner. Heavy and irregular micros mask the gram.
		e_Z	00 33 43					
		e_Z	00 45 42					
		e_Z	00 56 01					
		e_Z	01 09 46					
		L_Z	01 21 15	16-17				No distinct M.
		F_Z	02 15 (ca.)					
Dec. 9		e_Z	05 35 23					Very difficult. Heavy and irregular micros all through.
		e_Z	05 47 17					
		e_Z	05 51 12					
		eL_Z?	06 09 02					
		L_Z	06 19 55	15-17				No distinct M.
		F_Z	07 40 (ca.)					
Dec. 9		e_Z	12 06 28					
		eL_Z	12 12 05					
		L_Z	12 15 21	10				
		F_Z	12 26					
Dec. 9		e_Z	13 09 05					Possibly sooner. Heavy and irregular micros.
		e_Z	13 17 09					
		e_Z	13 21 17					
		F_Z	13 26 (ca.)					
Dec. 9		e_Z	18 37 24					P' ? Heavy and irregular micro
		e_Z	18 41 22					PR_{1Z}?
		e_Z	18 50 07					PS_Z?
		eL_Z	19 16 08					
		M_Z	19 33 23	16-17			5.7mm.	
		F_Z	20 30 (ca.)					
Dec. 10	No record from 00 o'clock to 13 hrs. 15 ms. Galvanometer out of commission.							

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
	cont'd.							
Dec. 19		M_{1E}	12 55 54	20		0.7mm.		
		M_N	12 57 16	21	0.5mm.			
		M_{1Z}	12 57 18	21			51.7-mm.	Off sheet.
		M_{2E}	12 57 27	19		0.8mm.		
		M_{2Z}	13 00 38	18			38.5-mm.	Off sheet.
		M_{3Z}	13 03 36	17			45.0-mm.	Off sheet.
		M_{4Z}	13 05 25	17-18			43.0-mm.	Off sheet.
		F_Z	14 43					
Dec. 26		P_Z	21 40 23					
		eP_{NE}	21 40 28					
		PR_{1_Z}	21 41 48					
		$PR_{1_{NE}}$	21 42 01					
		iS_Z	21 46 24					
		eS_N?	21 46 35					
		eS_E?	21 46 27					
		SR_{1_Z}	21 49 16					
		SR_{2_Z}	21 49 51					
		eL_Z	21 52 00					
		M_Z	21 55 08					
		F_Z	22 46					
Dec. 28		e_Z	14 41 07					P_Z?: P'_Z?
		e_Z	14 46 21					PR_{1_Z} ?
		e_Z	14 50 14					PR_{2_Z} ??
		PS_Z	14 58 11					
		eL_Z	15 22 52					
		L_Z	15 30 55	19-20				
		M_{1Z}	15 40 16	19-20			13.0mm.	
		M_{2Z}	15 43 03	20			13.9mm.	
		F_Z	17 (ca.)					

Francis A. Tondorf, S. J.,
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No. 147 From January 1 to January 31, 1929

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\phi=38° 54' 25''$ N $\lambda=77° 4' 24''$ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_O	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Jan. 6		P_Z?	00 07 43						
		S_Z?	00 14 55						
		eL_Z	00 21 24						
		M_Z	00 30 06						
		F_Z	01 (ca.)						
Jan. 8		i_Z	08 40 08						Very heavy micros.
		eL_Z?	08 41 02	9					
		F_Z?							
Jan. 11		e_Z	14 15 48						
		e_Z	14 23 16						
		eL_Z	14 44 35						No distinct M.
		F_Z	15 05						
Jan.13		iP_Z	00 15 11						
		eP_E	00 15 12						
		eP_N	00 15 14						
		iS_E	00 25 05						
		eS_N	00 25 08						
		S_Z	00 25 08						
		PS_E	00 25 50						
		SR_{2E}	00 34 30						
		eL_E	00 39 17						
		L_E	00 41 49	15					
		L_N	00 41 52	14-15					
		M_E	00 48 10	15-16		3.6mm.			
		M_N	00 52 09	17	1.2mm.				
		F	02 40						
Jan. 13		e_Z	15 08 33						
		e_Z	15 26 12						
		e_Z	15 33 44						
		e_Z	15 55 04						
		e_Z	16 00 06						
		eL_Z?	16 03 29						
		L_Z	16 09 56	13					
		M_{1Z}	16 11 06	13		7.0mm.			
		M_{2Z}	16 12 08	13		6.0mm.			
		F_Z	16 46						
Jan. 13		e_Z	19 06 38						Difficult - Very small movements masked by irregular micros.
		e_Z	19 14 24						
		e_Z	19 29 46						
		e_Z	19 34 07						
		e_Z	19 43 36						
		eL_Z?	19 46 15						No distinct M.
		F_Z	20 00 (ca.)						
Jan. 13		e_Z	21 38 56						Difficult. Small movements masked by troublesome micros.
		e_Z	21 46 48						
		e_Z	21 53 36						
		e_Z	21 55 49						
		i_Z	21 57 22						M_Z?
		F	22 11 (ca.)						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Jan. 16		P'_Z	08 26 32					
		$PR1_Z$?	08 29 09					
		PS_Z?	08 37 25					
		L_Z	09 16 58					
		$M1_Z$	09 23 38	14-15			5.4mm.	
		$M2_Z$	09 25 38	13-14			7.8mm.	
		F_Z	10 25					
Jan. 16		e_Z	15 21 38					Possibly sooner. Heavy micr
		e_Z	15 27 26					
		e_Z	15 59 50					
		eL_Z	16 08 22	12				
		M_Z	16 11 31	10-11			3.0mm.	
		F_Z	16 55 (ca.)					
Jan. 17		P_Z	11 51 56					
		eP_N	11 51 56					
		eP_E	11 51 58					
		$PR1_N$	11 52 43					
		$PR1_E$	11 52 44					
		$PR2_Z$	11 52 58					
		$PR2_N$	11 52 59					
		$PR2_E$	11 53 01					
		$PR3_Z$?	11 53 11					
		e_Z	11 56 00					
		S_Z	11 57 05					
		S_E?	11 57 01					
		e_Z	11 57 46					
		e_N	11 57 50					
		e_E	11 57 56					
		$SR1_Z$	11 58 22					
		$SR2_Z$	11 58 48					
		eL_Z?	11 58 58					
		$M1_Z$	12 04 25	19-20			50.0mm.	
		$M2_Z$	12 07 25	17-18			49.5mm.	
		$M3_Z$	12 09 41	16			51.2mm.	
		$M4_Z$	12 10 40	15			57.5mm.	
		$M5_Z$	12 13 28	15			60.0mm.	
		$M6_Z$	12 13 41	15			56.0mm.	
		$M7_Z$	12 14 35	16-17			58.5mm.	
		F_Z	15 48 (ca.)					
Jan. 17		e_Z	22 34 51					Very troublesome micros.
		e_Z	22 48 46					
		e_Z	23 00 25					
		e_Z	23 15 59					
		e_Z	23 23 54					
		eL_Z ?	23 29 46					
		L_Z	23 33 53	17-18				
		M_Z	23 41 23	17			4.5mm.	
		F_Z	Lost in following quake.					
Jan. 18		e_Z	00 25 53					Beginning masked by F of preceding quake. Very troublesome micros.
		e_Z	00 37 32					
		e_Z	00 46 46					
		e_Z	01 09 21					
		L_Z	01 12 49	10				
		M_Z	01 15 45	9			4.6mm.	
		F_Z	01 42 (ca.)					
Jan. 19		P_Z	03 24 08					
		eP_{EN}	03 24 09					
		$PR1_Z$	03 24 39					
		$PR2_Z$	03 25 53					
		S_Z	03 28 26					
		eS_E?	03 28 34					
		$SR1_Z$	03 29 19					
		$SR2_Z$	03 29 34					
		eL_Z	03 30 17					

cont'd on next page.

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	AMPLITUDE A_E	AMPLITUDE A_Z	REMARKS
Jan. 19	cont'd.	L_Z	03 34 36	20-21				
		M_Z	03 37 30	17			48.8mm.	
		F_Z	05 10 (ca.)					
Jan. 21		e_Z?	04 57 16					Heavy micros.
		L_Z	05 15 40					
		L_Z	05 28 00					
		L_Z	05 33 28					
		F_Z	Lost in microseisms.					
Jan. 21		P_Z	10 39 37					
		PR_{1Z}	10 41 29					
		PR_{2Z}	10 41 59					
		PR_{3Z}	10 42 33					
		S_Z?	10 46 45					
		SR_{1Z}	10 50 22					
		eL_Z	10 51 57					
		M_{1Z}	10 56 47	5-6			67.7mm.	
		M_{2Z}	10 59 28	4-5			108.0-mm.	Off sheet.
		F_Z	13 (ca.)					
Jan. 22		e_Z	19 44 00					Heavy micros.
		L_Z	19 49 14					
		F_Z	19 54					
Jan. 24& 25	From 22 hs. to 12 hs. G.M.T. pendulum checked by spider web. Gram therefore lost.							
Jan. 24		P_Z	20 42 39					
		P_{EN}?	20 42 49					
		PR_{1EN}	20 43 13					
		S_Z	20 47 12					
		S_E?	20 47 09					
		S_N	20 47 13					
		SR_{1N}	20 47 52					
		SR_{1E}	20 47 55					
		SR_{2N}	20 48 15					
		SR_{2E}	20 48 16					
		eL_Z	20 48 20					
		eL_N	20 48 25					
		eL_E	20 48 28					
		M_{1N}	20 53 02		2.5mm.			
		M_{1E}	20 53 49			4.8mm.		
		M_Z	20 54 00				150.0mm.	Off scale.
		M_{2N}	20 55 08		3.2mm.			
		M_{2E}	20 55 40			3.9mm.		
		F_Z?						Sheet off at 21 hs. 45 ms., quake still o
Jan. 26		e_Z?	01 47 45					Very difficult Very heavy micros mask all phases.
		e_Z	01 55 41					P'_Z?
		e_Z	02 05 22					PS_Z?
		e_Z	02 11 32					SR_{1Z}?
		e_Z	02 25 30					
		e_Z	02 31 47					
		eL_Z?	02 43 48					
		L_Z	02 47 34	18-19				
		M_Z	02 49 52	13			9.0mm.	
		F_Z	03 50 (ca.)					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Jan. 26		e_Z	13 44 41					P'_Z? Heavy
		e_Z	13 48 55					$PR1_Z$?
		e_Z	13 58 52					PS_Z?
		e_Z	14 04 54					$SR1_Z$?
		e_Z	14 19 08					
		e_Z	14 25 03					eL_Z?
		M_Z	14 40 24				5.7mm.	
		F_Z	15 47 (ca.)					
Jan. 26		e_Z?	20 01 56					Heavy micros.
		e_Z	20 15 40					
		e_Z	20 31 26					
		e_Z	20 52 49					
		eL_Z?	20 59 20					
		L_Z	21 04 52	14				
		M_Z	21 06 06	12-13			6.6mm.	
		F_Z	21 45 (ca.)					
Jan. 27		e_Z	16 23					Very difficul Extraordinary heavy micros, their ampli- tudes reachin 15 & 20 mm. No distinct M
		e_Z	16 27					
		eL_Z	16 29					
		L_Z	16 31					
		F_Z	17 12					
Jan. 28		e_Z?	21 50					Very difficul' Gram masked b extraordinary heavy micros.
		e_Z?	21 53					
		e_Z	22 10					
		L_Z	22 15					
		M_Z	22 16 04	11			15.8mm.	
		F_Z	22 55 (ca.)					
Jan. 31		eP_Z	18 11 36					
		eP_{EN}	18 11 39					
		$PR1_Z$	18 12 21					
		eS_Z	18 16 54					
		eS_Z	18 16 58					
		eS_N	18 16 59					
		i_Z	18 17 20					
		$SR1_Z$	18 18 44					
		$SR1_E$	18 18 51					
		$SR2_Z$	18 19 14					
		$SR2_E$	18 19 20					
		eL_Z	18 21 00					
		L_Z	18 22 34	17-18				
		M_Z	18 24 49	12-13			42.5mm.	
		F_Z	19 45 (ca.)					

Francis A. Tondorf, S. J., Director;

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Assistant Seismologist.

No. 148 From February 1 to February 28, 1929

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ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_o	ε:1	Bosch Photographic Pendulums	V	T_o	ε:1	Mainka	V	T_o	ε:1
A_N	99	4.6	3.7	A_N	133	5.0		A_N	55	8.3	5.3
A_E	89	5.1	5.7	A_E	133	5.0		A_E	31	9.0	4.3
A_Z								Bosch-Omori A_N			
								Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Feb. 1		e_Z	17 27 51						
		i_Z	17 31 50						
		i_N	17 31 51						
		i_E	17 31 54						
		i_Z	17 32 48						
		i_Z	17 34 04						
		S_Z	17 38 10						
		eS_{EN}	17 38 11						
		M_E	18 02 32						Drum of vertical component stopped since 17 hs. 55 ms. till 00 hs. 20 ms.
Feb. 2		P_{EN}	00 11 03						Vertical lost in changing sheet.
		S_N	00 19 45						
		S_E	00 19 46						
		PS	00 20 20						
		eL_{NE}	00 30 00						Possibly at 00.27
Feb. 3		e_Z	03 08 00						Heavy and very troublesome micros.
		e_Z	03 16 50						
		e_Z	03 21 55						
		e_Z	03 33 17						
		e_Z	03 39 52						
		L_Z	03 49 55						No distinct M.
		F_Z?							Lost in micros
Feb. 3		e_Z	18 06 35						P_Z? Heavy micros.
		e_Z	18 07 09						PR_{1Z}?
		e_Z	18 11 21						S_Z?
		eL_Z?	18 13 48						
		L_Z	18 18 00						
		M_{1Z}	18 19 05	13			11.2mm.		
		M_{2Z}	18 20 15	10			12.7mm.		
		F_Z	19 -5 (ca.)						
Feb. 4		eL_Z	06 55 59						
		F_Z	07 07						
Feb. 4		e_Z	10 25 25						Heavy micros.
		e_Z	10 26 16						
		e_Z	10 31 47						
		eL_Z?	10 33 54						
		L_Z	10 36 45						
		M_Z	10 40 00	11			10.0mm.		
		F_Z	11 12 (ca.)						
Feb. 5		eL_Z	03 59 13						Heavy micros.
		M_Z	04 01 46	13			7.7mm.		
		F_Z	04 22						
Feb. 6		e_Z	02 15 15						
		e_Z	02 35 02						
		e_Z	02 45 30						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Feb. 6	continued	e_Z	02 15 15					
		e_Z	02 35 02					
		e_Z	02 45 30					
		e_Z	02 58 27					
		eL_Z?	03 02 00					Possibly sooner.
		L_Z	03 18 35					
		F_Z	04 05 (ca.)					No distinct M.
Feb. 6		P_Z?	07 02 00					
		i_Z	07 11 24					
		eL_Z	07 22 10					No distinct M.
		F_Z	08					
Feb. 8		e_Z	01 29 53					P'_Z? Very troublesome. micros.
		e_Z	01 31 40					PR_{1_Z}?
		e_Z	01 33 40					
		ve_Z	01 45 01					PS?
		eL_Z	02 16 19					
		M_{1Z}	02 23 55	14-15			16.4mm.	
		M_{2Z}	02 25 20	11-12			15.9mm.	
		F_Z	03 20 (ca.)					
Feb. 10		e_Z	03 43 21					
		eL_Z	03 50 00	9				
		M_{1Z}	03 55 46	17			9.0mm.	
		M_{2Z}	03 57 48	11			10.3mm.	
		F_Z	04 48					
Feb. 10		iP_Z	15 45 07					
		eP_{NE}	15 45 15					
		PR_{1_Z}	15 46 07					
		$PR_{1_{EN}}$	15 46 13					
		PR_{2_Z}	15 46 28					
		S_Z	15 50 22					
		S_{EN}	15 50 23					
		SR_{1_Z}	15 51 58					
		SR_{2_Z}	15 52 13					
		SR_{2_E}	15 52 15					
		eL_Z	15 53 06					
		M_Z	15 58 12	11-12			140.0+mm.	Off sheet.
		F_Z	18 37					
Feb. 11		e_Z	14 06 09					
		e_Z	14 19 54					
		L_Z	14 31 04	11				No distinct M.
		F_Z	14 55					
Feb. 13		e_Z	17 21 01					
		e_Z	17 23 45					
		e_Z	17 39 10					
		L_Z	18 06 18					
		L_Z	18 07 54	19				
		F_Z	18 37					
Feb. 13		P_Z	22 19 27					
		PR_{1_Z}	22 20 19					
		PR_{2_Z}	22 20 25					
		S_Z	22 24 07					
		SR_{1_Z}	22 25 17					
		SR_{2_Z}	22 25 42					
		eL_Z	22 26 19					
		M_Z	22 32 29	13			17.8mm.	
		F_Z	23 33 (ca.)					
Feb. 15		i_Z	06 02 10					
		i_Z	06 03 04					
		eL_Z?	06 13 11	8				
		F_Z	06 34					
Feb. 15		P_Z	08 10 42					
		PR_{1_Z}	08 11 26					
		S_Z	08 15 52					
		SR_{1_Z}	08 17 25					
		SR_{2_Z}	08 18 05					
		eL_Z	08 18 23					
		M						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	AMPLITUDE A_E	AMPLITUDE A_Z	REMARKS
	continued							
Feb. 15		M_{1Z}	08 24 05	13			35.3mm.	
		M_{2Z}	08 27 33	12-13			39.4mm.	
		F_Z	10 (ca.)					
Feb. 19		e_Z	05 51 17					
		eL_Z?	05 55 13					
		L_Z	05 59 53					
		F_Z	06 16					
Feb. 22		P_Z	20 49 44					
		P_{EN}	20 49 46					
		$PR_{1_{EN}}$	20 51 22					
		PR_{2_E}	20 51 47					
		PR_{2_N}	20 51 49					
		S_Z	20 56 07					
		S_{EN}	20 56 10					
		SR_{2_Z}	20 59 34					
		SR_{3_Z}	20 59 54					
		eL_{EN}	21 00 20					
		eL_Z?	21 01 31					
		M_{1Z}	21 05 44	13			131.0+mm.	Off scale.
		M_{2Z}	21 08 49	15			120.0+mm.	Off scale.
		F_Z	00 08					
Feb. 26		e_Z?	03 40 58					Heavy micros.
		e_Z	04 01 57					
		e_Z	04 21 35					
		eL_Z	04 31 16					
		L_Z	04 36 08					No distinct M.
		F_Z	05 07					
Feb. 26		P_Z	09 10 35					
		P_{EN}	09 10 39					
		i_Z	09 12 43					
		PR_{1_Z}	09 14 27					
		S_Z	09 18 23					
		i_Z	09 23 47					
		eL_Z	09 29 13					
		M_{1Z}	09 36 33	11			24.5mm.	
		M_{2Z}	09 39 00	13-14			43.5mm.	
		F_Z	12 (ca.)					
Feb. 27		e_Z	20 09 15					
		eL_Z	20 11 25					
		F_Z	20 35 (ca.)					

Francis A. Tondorf, S. J.,
Director:
Raphael Goberna, S. J.,
Assistant Seismologist.

No. 149 *From* March 1 *to* March 31, 1929

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
March 1		P_{EN}	07 38 42						
		P_Z	07 38 44						
		$PR1_{EN}$	07 40 06						
		$PR1_Z$	07 40 16						
		S_Z?	07 44 25						
		S_{EN}	07 44 35						
		$SR1_Z$	07 47 10						
		$SR1_{EN}$	07 47 13						
		$SR2_Z$	07 47 50						
		$SR2_{EN}$	07 47 59						
		$SR3_Z$	07 48 33						
		eL_{EN}	07 49 15						
		eL_Z	07 50 09						
		$M1_Z$	07 52 31	9-10			70.0+mm.		Off scale.
		$M2_Z$	07 56 16	12-13			140.0+mm.		Off scale.
		F_Z							Lost in next quake.
March 1		e_Z	09 09 46						Earlier phases included in cauda of precedent quake.
		eL_Z	09 11 11						
		$M1_Z$	09 14 53	8-9			15.0mm.		
		$M2_Z$	09 16 50	11-12			74.5mm.		
		F_Z	10 38						
March 1		P_Z	15 46 20						
		S_Z	15 51 39						
		$SR1_Z$	15 53 36						
		$M1_Z$	15 59 35	11-12			9.8mm.		
		$M2_Z$	15 60 32	11			19.2mm.		
		F_Z	17 00 (ca.)						
March 1		e_Z?	19 37 15						
		eL_Z	19 39 19						
		F_Z	20 10						
March 1		P_Z	21 03 10						
		S_Z	21 08 52						
		$SR1_Z$	21 11 08						
		eL_Z	21 14 44						
		M_Z	21 17 54	10			8.4mm.		
		F_Z	21 55						
March 3		P_Z?	09 20 30						Heavy micros.
		$PR1_Z$?	09 21 23						
		$PR2_Z$	09 21 47						
		S_Z	09 26 06						
		$SR1_Z$	09 27 32						
		$SR2_Z$	09 28 03						
		eL_Z	09 29 08						No distinctM.
		F_Z	10 10 (ca.)						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Mar. 3		e_Z	16 59 39					P_Z? Heavy micros.
		e_Z	17 02 21					
		S_Z	17 04 40					
		eL_Z?	17 10 33					Possibly sooner.
		M_Z	17 11 40				13.0mm.	
		F_Z	17 57 (ca.)					
Mar. 3		e_Z	18 49 22					Heavy micros.
		eL_Z	18 54 52					
		F_Z	19 26 (ca.)					
Mar. 7		iP_Z	01 45 04					Rest of phases in vertical are so heavy that their reading is impossible
		iP_{EN}	01 45 06					
		$PR1_{EN}$	01 47 55					
		$PR2_N$	01 49 11					
		$PR2_E$	01 49 12					
		$PR3_N$	01 49 33					
		$PR3_E$	01 49 34					
		S_E	01 53 30					
		S_N	01 53 33					
		$SR1_N$	01 58 38					
		$SR2_N$	02 00 51					
		$SR3_N$	02 01 42					
		eL_{EN}	02 04 33					
		$M1_N$	02 07 29					
		$M2_N$	02 09 31					
		$M3_N$	02 10 49					
		$M4_N$	02 12 19					
		$M5_N$	02 15 12					
		$M6_N$	02 19 00					
		F_Z	08 00 (ca.)					
Mar. 9		e_Z	02 19 08					Heavy micros.
		e_Z	02 55 35					
		e_Z	02 37 02					
		e_Z	02 45 15					
		eL_Z?	02 58 39					
		L_Z	03 09 00	15				
		M_Z	03 13 00				7.5mm.	
		F_Z	04 30 (ca.)					
Mar. 9		P'_Z?	11 09 08					
		i_Z	11 12 32					
		i_Z	11 14 06					
		PS?	11 22 05					
		$SR1_Z$?	11 27 55					
		eL_Z	11 47 36					
		$M1_Z$	11 57 47	21			52.0mm.	
		$M2_Z$	11 58 50	20-21			52.8mm.	
		$M3_Z$	12 07 27	17-18			46.7mm.	
		F_Z	14 30 (ca.)					
Mar. 10		P'_Z	14 49 38					Possibly at 14-48-50.
		$PR1_Z$	14 53 33					
		PS?	15 02 43					
		eP_Z?	15 28 12					
		L_Z	15 40 42					
		F_Z	16 32 (ca.)					No distinct M.
Mar. 10		e_Z?	22 27 45					
		e_Z	22 47 12					
		e_Z	22 56 41					
		e_Z	23 01 11					
		eL_Z?	23 16 08					
		L_Z	23 23 24					
		F_Z	00 05 (ca.)					No distinct M.
Mar. 11		e_Z?	13 21 43					
		e_Z?	13 31 45					
		e_Z	13 38 09					
		eL_Z	13 40 51					
		F_Z	14 29 (ca.)					No distinct M.

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Mar. 12		e_Z	02 45 29					
		e_Z	02 49 33					
		i_Z	02 56 48					
		M_{1Z}	03 02 08	11-12			6.5mm.	
		M_{2Z}	03 03 09	8-9			7.8mm.	
		F_Z	04 50					
Mar. 13		e_Z	17 53 20					
		e_Z	17 55 12					
		eL_Z?	18 11 21					
		L_Z	18 15 36					
		F_Z	18 54					No distinctM.
Mar. 15		e_Z?	17 52 06					Very trouble-some micros.
		e_Z	17 59 05					
		e_Z	18 04 09					
		eL_Z	18 10 48					
		M_Z	18 15 51	10-11			6.7mm.	
		F_Z	18 54					
Mar. 18		eL_Z?	02 44 10					Heavy micros.
		L_Z	02 50 44	9				
		F_Z	03 17					
Mar. 18		e_Z	14 40 47					Very trouble-some micros.
		e_Z	14 45 36					
		e_Z	15 07 12					
		e_Z	15 22 24					
		e_Z	15 31 55					
		eL_Z?	15 41 31					Possibly much sooner.
		L_Z	15 46 14					No distinct M
		F_Z	16 15 (ca.)					
Mar. 18		L_Z	00 23 42	8				Sheet down at 00- 00 - 01. Early part of quake possi-bly lost.
		F_Z	00 41					
Mar. 19		e_Z?	09 42 25					
		e_Z	09 45 08					
		i_Z	09 46 07					
		eL_Z?	09 47 36					
		M_Z	09 47 58	11			6.7mm.	
		F_Z	10 25 (ca.)					
Mar. 19		P_Z	20 59 43					
		eP_N	20 59 46					P_E does not show.
		$PR1_E$	21 00 42					
		$PR2_N$	21 01 01					
		S_Z	21 04 58					
		S_N	21 05 04					
		$SR1_Z$	21 06 31					
		$SR2_Z$	21 07 18					
		eL_Z	21 07 53					
		eL_N	21 08 09					
		eL_E	21 08 12					
		M_Z	21 11 21	18			48.5mm.	
		M_{2Z}	21 12 31	13			37.0mm.	
		M_{3Z}	21 13 14	11			35.3mm.	
		F_Z	23 05					
Mar. 21		iP_Z	02 42 57					
		P_N	02 43 01					
		P_E	02 43 02					
		$PR1_Z$	02 43 51					
		iS_Z	02 48 12					
		S_{EN}	02 48 16					
		$SR1_E$	02 49 37					
		$SR1_Z$	02 49 48					
		$SR2_N$	02 50 20					
		$SR2_Z$	02 50 31					
		eL_Z	02 50 46					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE			REMARKS
					A_N	A_E	A_Z	
Mar. 21	continued	eL_E	02 50 57					
		eL_N	02 51 16					
		M_{1Z}	02 55 37	13-14			69.0+mm.	Off scale.
		M_{2Z}	02 56 11	12			75.0+mm.	Off scale.
		M_{3Z}	02 57 41	12-13			82.0+mm.	Off scale.
		F_Z	05 55					
Mar. 22		e_Z?	03 59 41					
		e_Z	04 05 09					
		e_Z	04 11 17					
		eL_Z	04 15 47					No distinctM.
		F_Z	04 32.					
Mar. 23		e_Z	11 48 06					
		i_Z	11 48 39					
		eL_Z	11 50 12					
		M_Z	11 51 36	11			15.4mm.	
		F_Z	12 20					
Mar. 23		P'_Z?	20 19 10					
		PR_{1Z}	20 21 42					
		e_Z	20 33 08					
		eL_Z?	21 05 24					
		L_Z	21 10 16					
		M_Z	21 16 19	18			4.3mm.	
		L_Z	21 26 12					
		L_Z	21 29 36					
		F_Z	22 20 (ca.)					
Mar. 24		e_Z	06 02 49					
		e_Z	06 08 28					
		e_Z	06 21 12					
		eL_Z	06 32 39					No distinctM.
		F_Z	06 53					
Mar. 26		e_Z?	10 59 21					Very difficult
		eL_Z?	11 02 08					
		F_Z	12 11					
Mar. 26		L_Z	17 14 12					Possibly earlier phases.
		F_Z	17 22 (ca.)					Very heavy M.
Mar. 27		e_Z	22 12 53					
		e_Z	22 19 17					
		e_Z	22 26 18					
		eL_Z?	22 30 50					Possibly soon
		F_Z	23 38					No distinct M
Mar. 28		P_Z?	03 16 35					
		e_Z	03 22 35					
		eL_Z	03 26 44					
		M_Z	03 33 09	9-10			5.3mm.	
		F_Z	04 40					
Mar. 28	From 15.07 to	22.42	no record;	light off.				
Mar. 30		P_Z?	16 22 18					
		S_Z?	16 27 47					
		eL_Z	16 30 56					
		M_Z	16 34 55	10			5.6mm.	
		F_Z	16 58					
Mar. 31		e_Z?	03 06 58					
		e_Z	03 12 35					
		e_Z	03 21 12					
		eL_Z	03 41 33					
		L_Z	03 45 30					No distinct M
		F_Z	04 08 (ca.)					
Mar. 31		e_Z	05 50 45					
		e_Z	06 08 25					
		e_Z	06 17 35					
		L_Z	06 39 28	16			3.7mm.	
		F_Z	07 20 (ca.)					
Mar. 31		e_Z	20 49 38					
		e_Z	20 54 38					
		eL_Z?	21 11 27					
		L_Z	21 17 00	11				No distinct M
		F_Z	22 18					

Francis A. Tondorf, S. J., Director:
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No. 150 *From* April 1 *to* April 30, *19*29.

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ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

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		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Apr. 6		e_Z?	03 28 10						
		e_Z	03 34 38						
		e_Z	03 54 44						
		eL_Z	04 16 51						
		M_Z	04 20 04	9-10			4.9mm.		
		F_Z							In next quake
Apr. 6		e_Z?	00 50 35						
		e_Z?	00 56 01						
		e_Z?	01 09 59						
		e_Z	01 21 57						
		L_Z	01 38 27						
		M_Z	01 39 58	13			2.3mm.		
		F_Z	02 05 (ca.)						
Apr. 6		e_Z	05 04 49						
		eL_Z?	05 17 29						
		i_Z	05 21 10						
		i_Z	05 22 00						Possibly another shock
		F_Z	05 52						
Apr. 7		P_Z	19 38 08						
		PR_{1Z}	19 39 09						
		S_Z	19 43 49						
		SR_{1Z}	19 45 40						
		SR_{2Z}	19 46 07						
		SR_{3Z}	19 46 29						
		eL_Z	19 47 08						
		M_Z	19 51 40	14-15			31-9mm.		
		F_Z	21 28						
Apr. 8		P_Z	10 35 00						
		iPR_{1Z}	10 37 26						
		i_Z	10 39 14						
		i_Z	10 41 27						
		i_Z	10 43 16						
		i_Z	10 46 24						
		eL_Z?	10 48 07						
		F_Z	12 (ca.)						No distinct M.
Apr. 9		e_Z?	02 09 38						
		e_Z?	02 16 39						Very difficult. Heavy micros.
		e_Z?	02 24 17						
		e_Z	02 43 41						
		e_Z	02 51 02						
		eL_Z	02 55 21						
		M_Z	02 58 58	9-10			4.2mm.		Possibly sooner.
		F_Z	03 52						
Apr. 9		i_Z	04 12 25						
		eL_Z?	04 15 45						Heavy micros.
		L_Z	04 20 27						
		F_Z							No distinct M. In next quake.
Apr. 9		e_Z	05 01 41						
		eL_Z?	05 06 13						
		L_Z	05 12 53	9					
		F_Z	06 (ca.)						No distinct M.

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
April 10		eL_Z	06 20 37					
		F_Z	06 27					
April 10		e_Z?	09 27 15					
		e_Z	09 32 46					
		eL_Z	09 39 27					Possibly at 09-38-28
		M_Z	09 41 38	11			5.0mm.	
		F_Z	10 02					
April 10		e_Z?	13 07 33					
		eL_Z	13 34 45					
		M_Z	13 36 49	7-8			2.5mm.	
		F_Z	13 47					
April 10		e_Z?	18 06 45					
		e_Z	18 20 57					
		e_Z	18 28 48					
		L_Z	18 36 50	12				
		M_Z	18 40 13	11			2.3mm.	
		L_Z	18 50 56	10-11				
		F_Z	19 30					
April 13		e_Z?	06 38 30					
		e_Z?	06 48 47					
		e_Z	06 57 49					
		i_Z	07 02 43					
		e_Z	07 10 19					
		i_Z	07 20 06					
		eL_Z?	07 35 39					
		L_Z	07 39 55					
		M_Z	07 44 18	17			2.4mm.	
		F_Z	08 38 (ca.)					
April 16		e_Z	01 07 15					Heavy micros.
		eL_Z?	01 10 50					
		F_Z	02 (ca.)					
April 16		e_Z	05 09 18					Troublesome micros.
		e_Z	05 19 24					
		e_Z	05 35 29					
		eL_Z	05 44 11					Possibly sooner.
		F_Z	06 27					No distinct M.
April 16		e_Z	14 26 05					Possibly sooner. Very heavy micros.
		F_Z	15 (ca.)					
April 19		e_Z	04 09 36					Heavy micros.
		e_Z	04 16 35					
		e_Z	04 23 53					
		e_Z	04 36 00					
		eL_Z	04 54 06					Possibly sooner.
		F_Z	05 15 (ca.)					No distinct M.
April 19		e_Z	21 01 37					Possibly much sooner. Very troublesome micros.
		e_Z	21 07 47					
		eL_Z?	21 15 31					
		F_Z	21 58 (ca.)					
April 20		eL_Z?	01 34 10					No distinct M.
		L_Z	01 47 28					
		F_Z	01 58 (ca.)					
April 21		e_Z	12 30 37					
		e_Z	12 44 22					
		eL_Z	12 52 53					Possibly at 12-50-41
		M_Z	12 57 29	8			4.1mm.	
		F_Z	13 48					
April 22		e_Z?	00 28 01					
		e_Z	00 40 40					
		e_Z	00 46 16					
		e_Z	00 49 59					
		eL_Z?	00 59 16					No distinct M.
		L_Z	01 11 50					
		F_Z	01 41					
April 22		e_Z	21 16 12					
		e_Z	21 20 38					
		eL_Z	21 21 44					
		F_Z	21 29					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
April 23		e_Z?	00 28					
		eL_Z	01 07 26					
		L_Z	01 10 18					
		F_Z	01 30					
April 23		e_Z	17 58 26					
		eL_Z	18 06 40					Possibly some seconds sooner.
		M_Z	18 08 53	9			4.0mm.	
		F_Z	18 32 (ca.)					
April 24		e_Z	02 06 13					
		e_Z	02 11 02					
		e_Z	02 22 11					
		e_Z	02 32 17					
		eL_Z?	02 51 52					Possibly sooner.
		L_Z	02 56 08					No distinct M.
		F_Z	03 24 (ca.)					
April 25		e_Z	09 02 21					Heavy micros.
		eL_Z	09 03 56					
		F_Z	09 08					
April 25		e_Z	09 52 59					Heavy micros.
		eL_Z	09 59 51					
		F_Z	10 05					
April 27		P_Z	11 47 27					
		$PR1_Z$	11 48 23					
		$PR2_Z$	11 48 43					
		S_Z	11 52 49					
		$SR1_Z$	11 54 40					
		$SR2_Z$	11 55 25					
		eL_Z	11 55 59					
		$M1_Z$	12 00 05					
		$M2_Z$	12 01 30					
		F_Z	13 15 (ca.)					
April 27		e_Z	21 23 46					Difficult.
		e_Z	21 26 44					
		e_Z	21 46 18					
		e_Z	21 54 49					
		eL_Z	22 10 24					
		M_Z	22 18 18					
		F_Z	23 33					
April 29		e_Z	12 47 21					Very difficult.
		e_Z	12 51 16					
		e_Z	12 56 55					
		e_Z	13 02 58					
		e_Z	13 12 26					L_Z?
		e_Z	13 20 25					
		eL_Z?	13 25 17					
		L_Z	13 33 17					
		F_Z	14 09					
April 29		e_Z	19 05 29					
		eL_Z	19 12 50					No distinct M.
		F_Z	19 25					
April 30		e_Z	18 51 36					
		M_Z	18 55 08	9			5.2mm.	
		F_Z	19 16					
April 30		e_Z	20 02 07					
		eL_Z	20 11 11	12				
		F_Z	20 35 (ca.)					
April 30		e_Z?	23 55 55					
		eL_Z	00 06 09					
		F_Z	00 22					

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of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1
A_N	99	4.6	3.7
A_E	89	5.1	5.7
A_Z			

Bosch Photographic Pendulums	V	T_0	ε:1
A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
Mainka	A_E	31	9.0	4.3
Bosch-Omori	A_N			
Bosch-Omori	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 1		eZ?	07 58 10						
		eZ?	07 59 17						
		eZ	08 03 44						
		eZ	08 07 47						
		eZ	08 08 57						
		eL_Z	08 34 52						
		M_Z	08 41 03	21			3.8mm.		
		$M2_Z$	08 45 15	19			4.5mm.		
		F_Z	09 48						
May 1		iP_Z	15 50 49						
		eP_E	15 50 51						
		$PR1_Z$	15 54 25						
		$PR2_Z$	15 56 25						
		$PR2_E$	15 56 25						
		eS_E	16 01 18						
		iS_Z	16 01 18						
		i_Z	16 03 07						
		i_E	16 03 11						
		$SR1_Z$	16 07 24						
		i_E	16 08 18						
		$SR2_Z$	16 10 59						
		$SR2_E$	16 11 04						
		eL_Z?	16 15 52						
		eL_E	16 16 31						
		$M1_E$	16 26 11	22-23		86.0mm.			
		$M2_E$	16 29 22	19-20		56.5mm.			
		$M1_Z$	16 29 34	21			44.5mm.		
		$M3_E$	16 30 44	17-18		60.6mm.			
		$M4_E$	16 31 53	20		96.0+mm.			Off sheet.
		$M2_Z$	16 32 40	17-18			51.1mm.		
		$M3_Z$	16 35 02	18			87.5+mm.		Off scale.
		$M5_E$	16 35 12	16-17		88.7+mm.			Off sheet.
		$M4_Z$	16 36 55	15-16			79.0+mm.		Off scale.
		$M6_E$	16 36 55	15-16		78.0mm.			
		F_Z	20 15						
		F_E	20 27						
May 1		eP_Z	22 11 58						
		iS_Z	22 18 41						
		$SR1_Z$	22 22 13						
		eL_Z	22 24 46						
		M_Z	22 31 22	17			2.4mm.		
		F_Z	22 25 (ea.)						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
May 2		iP_Z	14 38 46					
		PR_{1Z}	14 42 41					
		S_Z?	15 49 55					
		eL_Z?	15 08 05					
		M_Z	15 21 55	18			3.6mm.	
		F_Z	16 25					
May 3		e_Z?	01 00 02					
		e_Z	01 29 40					
		eL_Z?	01 43 07					Possibly sooner.
		F_Z						In next quake.
May 3		e_Z	01 59 57					
		e_Z	02 03 08					
		eL_Z?	02 30 55					
		M_Z	02 40 13	8			2.3mm.	
		F_Z	03 05					
May 3		eL_Z?	09 25 10					Heavy micros.
		L_Z	09 31 00					
		F_Z	09 40					
May 3		i_Z	14 29 52					Heavy and troublesome micros.
		e_Z	14 38 17					
		i_Z	14 48 38					
		e_Z	14 57 05					
		eL_Z	15 12 14					No distinct M
		F_Z	16 20 (ca.)					
May 5		e_Z	05 52 14					
		e_Z	05 59 05					
		eL_Z	06 05 54					
		F_Z	06 12 (ca.)					
May 5		e_Z	17 19 23					
		e_Z	17 24 38					
		e_Z	17 28 16					
		e_Z	17 36 11					
		eL_Z	18 05 35					
		M_Z	18 16 24					
		F_Z	19 00 (ca.)					
May 6		eP_Z	05 28 16					
		iP_Z	05 28 23					
		PR_{1Z}	05 31 07					
		i_Z	05 32 02					
		eS_Z	05 41 11					
		iS_Z	05 41 23					
		SR_{1Z}	05 44 15					
		eL_Z	06 07 10					
		M_{1Z}	06 21 51	17			2.8mm.	
		M_{2Z}	06 28 38	19			3.2mm.	
		F_Z	07 48					
May 7		eP_Z	16 53 43					Possibly at 16-51-44.
		i_Z	16 57 13					
		PR_{1Z}?	16 58 02					
		eL_Z?	17 36 02					Possibly at 17-32-35.
		L_Z	17 40 29					
		M_Z	17 45 00	22-23			15.5mm.	
		F_Z	19 45 (ca.)					
May 8		e_Z	13 23 00					
		eL_Z?	13 44 48					
		F_Z	14 40					
May 9		e_Z	16 44 36					Possibly sooner.
		eL_Z	17 25 33					
		L_Z	17 29 49	16				
		F_Z	18 10					
May 10		e_Z	12 42 46					Rest of quake lost in changing of sheets off at 12-44.
May 10		e_Z	17 38 52					
		eL_Z?	17 50 35					
		F_Z	19 (ca.)					
May 11		e_Z	19 34 42					
		M_Z	20 00 11	14			2.4mm.	
		F_Z	20 13					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
May 25		e_Z	03 51 37					
		eL_Z	04 04 11					No distinct M.
		F_Z	04 27 (ca.)					
May 25		eP_Z	12 07 57					
		$iP_Z^{\prime}$	12 08 32					
		PR_{1_Z}	?12 09 25					
		PR_{2_Z}	12 10 12					
		PR_{3_Z}	12 10 24					
		iS_Z	12 14 37					
		SR_{1_Z}	12 17 48					
		SR_{2_Z}	12 19 09					
		SR_{3_Z}	12 19 24					
		eL_Z	12 20 46					No distinct M,
		F_Z	13 04 (ca.)					
May 26		P_Z	09 01 54					
		PR_{2_Z}	09 09 48					
		S_Z?	09 14 51					
		PS_Z	09 16 44					
		eL_Z	09 42 38					
		M_Z	09 59 02	21-22			2.6mm.	
		F_Z	11					
May 26		e_Z?	12 59 11					
		e_Z	13 06 39					
		eL_Z	13 16 19					Possibly at 13-14-28.
		F_Z	13 27 (ca.)					
May 26		eP_Z	22 47 28					
		PR_{1_Z}	22 49 13					
		PR_{2_Z}	22 49 28					
		PR_{3_Z}	22 50 00					
		eS_Z	22 53 49					
		SR_{1_Z}	22 56 36					
		SR_{2_Z}	22 57 08					
		SR_{3_Z}	22 58 50					
		eL_Z	22 58 50					
May 26		$M1_{EN}$	23 01 51					The M phases are impossible to be read from the vertical.
		$M2_{EN}$	23 02 49					
		$M3_{EN}$	23 04 48					
		$M4_{EN}$	23 05 50					
		F_Z	05 00 (ca.)					
May 27		S_Z?	05 33 17					
		eL_Z	05 38 11					
		$M1_Z$	05 42 30	22			4.5mm.	
		$M2_Z$	05 47 50	13			3.8mm.	
		F_Z						In following quake.
May 27		eL_Z	06 29 42					Earlier phases included in cauda of preceding quake.
		M_Z	06 33 27	7-8			5.0mm.	
		F_Z	07 10					
May 28		eP_Z	00 02 06					
		PR_{1_Z}	00 03 23					
		S_Z	00 07 57					
		SR_{1_Z}	00 10 20					
		SR_{2_Z}	00 11 11					
		eL_Z	00 12 13					
		M_Z	00 16 37	11			20.0mm.	
		F_Z	01 45					
May 28		eP_Z	05 01 12					
		PS_E	05 11 17					
		eL_E	05 23 33					
		M_Z	05 33 00	20-21			2.5mm.	
		F_Z	06 13					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	AMPLITUDE A_E	AMPLITUDE A_Z	REMARKS
May 28		e_Z	10 06 09					
		eL_Z	10 13 42					
		F_Z	10 29					
May 28		e_Z	17 02 21					
		eL_Z	17 08 50					
		F_Z	17 27					
May 29		e_Z?	04 53 03					
		e_Z	04 56 18					
		e_Z	04 59 39					
		eL_Z	05 01 28					No distinct M.
		F_Z	05 17					
May 29		e_Z?	13 23 05					
		i_Z	13 29 43					Possibly eL_Z.
		L_Z	13 30 37	12-13				
		L_Z	13 33 32	13				
		F_Z	13 43					
May 29		e_Z?	14 27 06					
		e_Z	14 34 28					
		e_Z	14 35 25					
		eL_Z	14 36 30					
		M_Z	14 38 43	11-12			5.8mm.	
		F_Z	15 05 (ca.)					
May 29		e_Z	17 14 18					
		e_Z	17 20 15					
		eL_Z	17 24 43					
		F_Z	17 40					
May 30		eL_Z	02 20 20					
		L_Z	02 23 13	10				
		F_Z	02 25					
May 30		iP_{ZE}	09 55 03					
		PS_{ZE}	10 04 38					
		eL_E	10 15 29					
		M_{1Z}	10 27 41	22			10.0mm.	
		M_{2Z}	10 30 21	20			13.7mm.	
		F_Z						In next quake.
May 30		iP_Z	12 22 30					
		PS_Z	12 25 16					
		M_{1Z}	12 54 51	13			1.2mm.	
		F_Z	14 45					
May 31		e_Z	00 23 22					
		eL_Z?	00 59 00					
		M_Z	01 12 31	18			2.0mm.	
		F_Z	01 54					

Francis A. Tondorf, S. J.,
Director.

No. 152 *From* June 1 *to* June 30, *19* 29

Washington, D. C.

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Instrument		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7
	A_E	89	5.1	5.7
	A_Z			
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	A_N	A_E	A_Z	Δ	Remarks
June 1		i_Z	14 13 26						Very heavy micros.
		i_Z	14 17 25						Difficult.
		eL_Z	14 21 24						?
		L_Z	14 24 20	8					
		F_Z	15 10						
June 1		e_Z	18 51 10						Possibly sooner.
		e_Z	18 59 52						Very heavy micros.
		eL_Z	19 07 28						
		L_Z	19 09 16	16					
		F_Z	19 31						
June 2		iP_Z	21 51 49						
		iP_{R_1Z}	21 56 00	13					
		PS_Z	22 05 31						?
		eL_Z	22 26 55						
		M_Z	22 36 20				3.1mm.		
		F_Z	23 50						
June 3		P_Z	20 43 03						?
		S_Z	20 55 15						?
		eL_Z	21 18 12						
		M_Z	21 20 16	13			3.7mm.		
		F_Z	23 (ca.)						
June 4		L_Z	12 55 25	?					
		F_Z	13 10						Sheets put on at 12hrs. 50 m.
June 4		i_Z	15 34 33						Heavy micros.
		i_Z	15 37 17						P_Z?
		eL_Z	15 50 33	10					P_{R_1Z}?
		L_Z	16 02 08	9					No distinctM.
		F_Z	17 15						Heavy micros.
June 6		e_Z	16 40 12						
		L_Z	16 51	26					
		M_{1Z}	16 53 14	27			1.9mm.		
		M_{2Z}	16 56 48	27			3.1mm.		
		F	17 57						
June 6		iP_{ENZ}	11 01 24						
		S_{ENZ}	11 10 39						
		PS_{EN}	11 11 16						
		S_{R_1EN}	11 16 38						
		S_{R_2EN}	11 18 41						
		S_{R_3EN}	11 19 55						
		eL_{EN}	11 22 14						
		M_Z	11 31 23	16			7.3mm.		
		F							Sheets taken off before quake had ended.

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
June 6		P_Z	14 38 28					
		$PR1_Z$	14 41 56					
		L_Z	15 33 42	9				
		F_Z	16 26					
June 7		e_Z	00 37 52					Sheets off at 00Hrs.42m. Possibly sooner.
June 8		e_Z	17 47					
		eL_Z	18 14 21					
		L_Z	18 18 21	18				
		M_Z	18 20 42	11			2.2mm.	
		F_Z	19 10					
June 9		e_Z	01 05 29					
		e_Z	01 10 01					Difficult.
		eL_Z	01 14 54					
		M_Z	01 22 23	12-13			5.6mm.	
		F	02 (ca.)					
June 9		e_Z	23 57 51					
		L_Z	00 07 22	13-14				
		L_Z	00 18 12	12				
		F						Sheets off at 00hrs.20m. Quake still on. Possibly sooner
		e_Z	00 03 19					Heavy micros.
		e_Z	07 08 54					
		e_Z	07 10 18					
		eL_Z	07 11 58					?
		L_Z	07 13 07	11				No distinct M.
		F_Z	07 35					
June 9		P_Z	08 18 02					
		$PR1_Z$	08 19 56					
		S_Z	08 25 03					
		$SR1_Z$	08 28 52					
		eL_Z	08 32 11					
		i_Z	08 34 12					Striking change in period.
		M_Z	08 37 57	9			23.0mm.	
		F_Z	In following quake.					
June 9		iP_Z	09 20 33					
		$PR1_Z$	09 24 19					
		$PR2_Z$	09 26 42					?
		S_Z	09 31 02					
		PS_Z	09 31 56					
		$SR1_Z$	09 37 07					
		$SR2_Z$	09 43 11					
		$SR3_Z$	09 48 03					
		eL_Z	09 48 03					
		L_Z	09 53 11					
		$M1_Z$	09 58 58	23			10.3mm.	
		$M2_Z$	10 00 33	16			9.9mm.	
		$M3_Z$	10 01 31	15			13.4mm.	
		$M4_Z$	10 06 03	13-14			12.2mm.	
		$M5_Z$	10 07 04	14			16.4mm.	
		$M6_Z$	10 10 46	13-14			16.4mm.	
		F_Z	Sheets off at 13 hrs. 10 m. Quake still on.					
June 10		P_Z	23 12 36					
		$PR1_Z$	23 14 47					
		$PR3_Z$	23 16 00					
		S_Z	23 20 00					
		PS_Z	23 20 23					
		$SR1_Z$	23 23 36					?
		$SR2_Z$	23 25 06					
		eL_Z	23 28 10					
		$M1_Z$	23 34 52	12-13			9.0mm.	
		$M2_Z$	23 35 50	12			12.0mm.	
		F_Z						Sheets off at 00 hrs.23m. Quake still on.

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
June 19	continued	$M2_Z$	09 04 29	12			2.3mm.	
		$M3_Z$	09 06 42	14			2.7mm.	
		F_Z	10 04					
June 20		L_Z	12 37 21	11				Sheets down at 12hrs.37m. 11 sec.Quake then on.
		F_Z	12 58					
June 20		$iP!_Z$	18 42 18					
		i_Z	18 44 37					
		L_Z	19 57 to 20 03					Very small amplitudes.
		F_Z	21 10					
June 20		e_Z	21 34 54					
		F_Z	21 53					No phases clear.
June 22		$P!_Z$	15 49 23					
		i_Z	15 51 26					
		eS_Z	16 01 37					?
		PS_Z	16 02 58					?
		eL_Z	16 23 41					
		$M1_Z$	16 37 21	19-20			5.0mm.	
		$M2_Z$	16 41 57	17			3.5mm.	
		$M3_Z$	16 45 17	16-17			5.7mm.	
		$M4_Z$	16 51 34	16			5.6mm.	
		F_Z	18 47					
June 22		e_Z	22 53 59					
		eL_Z	23 00 12					
		F_Z	23 18					
June 22		eP_Z	18 58 17					Possibly at 18hrs.57min. 42 sec.
		i_Z	19 00 23					
		PS_Z	19 11 22					
		$M1_Z$	19 47 38	19-20			1.6mm.	
		$M2_Z$	19 51 58	17-18			1.8mm.	
		$M3_Z$	19 5[illegible] 00	17			2.0mm.	
		$M4_Z$	19 5[illegible] 4[illegible]	14-15			2.4mm.	
		F_Z	21 18					
June 23		e_Z	03 59 39					
		L_Z	04 04 11	9				
		L_Z	04 07 15	10				
		F_Z	04 13					
June 23		e_Z	06 48 41					
		eL_Z	06 58 38					
		L_Z	06 59 19	13				
		F_Z	07 20					
June 23		e_Z	22 55 14					
		L_Z	23 07 04	14				
		L_Z	23 10 10	18				
		F_Z	23 44					
June 24		P_Z	18 17 15					
		S_Z	18 27 30					?
		eL_Z	18 41 40					
		L_Z	18 44 11	9				
		$M1_Z$	18 53 17	8			3.7mm.	
		$M2_Z$	19 00 21	9-10			2.8mm.	
		F_Z	19 20					
June 25		e_Z	06 40 11					Micros very heavy.
		L_Z	06 45 21	9				
		L_Z	07 04 17	9				
		F_Z	07 18					
June 25		e_Z	09 35 27					Micros very heavy.
		e_Z	09 41 15					
		eL_Z	09 47 31					?
		L_Z	09 55 32	12				
		L_Z	09 58 18	14				
		F_Z	10 30					
June 26		eP_Z	06 40 42					?
		eL_Z	07 06 37					?
		L_Z	07 10 13	16				
		M_Z	07 14 19	14			7.5mm.	
		F_Z	08 27					
June 26		e_Z	17 39 15					
		L_Z	17 55 13	8				Micros make readings uncertain.
		L_Z	18 06 13	8				

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
June 27		P_{EN}	13 01 19					
		PS_{EN}	13 14 37					Lost on vertical. Light off.
		SP_{1EN}	13 20 55					
		eL_{EN}	13 35 37					
		M_E	13 46 30	20		1.0mm.		
		M_N	13 48 26	19	0.8mm.			
		F_{EN}	17 40					
June 28		e_Z	02 04 34					
		L_Z	02 09 30	18				
		F_Z	02 31					
June 28		e_Z	09 14					
		L_Z	09 18 12	12				
		F_Z	09 25					
June 30		e_Z	03 03 57					
		PR_{1Z}	03 06 09					?
		PS	03 15 47					?
		eL_Z	03 39 15					
		L_Z	03 50 23	11				
		L_Z	04 01 34	16				
		$M1_Z$	04 08 44	17			4.4mm.	
		$M2_Z$	04 11 04	17			7.6mm.	
		$M3_Z$	04 18 01	17			6.8mm.	
		$M4_Z$	04 21 36	16			6.8mm.	
		F_Z	In next quake.					
June 30		e_Z	06 24 04					
		eL_Z	06 33 15					?
		L_Z	06 37 20	13				
		L_Z	06 39 20	16				
		F_Z	07 14					

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A_E	89	5.1	5.7
A_Z			

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A_N	133	5.0	
A_E	133	5.0	

		V	T_0	ε:1
Mainka	A_N	55	8.3	5.3
	A_E	31	9.0	4.3
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
July 1		e_Z	12 31						
		eL_Z	12 23 31						
		L_Z	12 25 19	13					
		F_Z	12 37						
July 2		e_Z	03 06 12						Micros heavy.
		eL_Z	03 17 09	12					
		F_Z	03 39						
July 2		eL_Z	01 58 16						Micros heavy.
		L_Z	02 03 13	8-9					
		F_Z	02 05						
July 2		eL_Z	16 05						
		L_Z	16 09 36	17					
		L_Z	16 15 00	17					
		F_Z	16 37						
July 3		iP_Z	01 01 40						
		iPR_{Z2}	01 04 03						
		iS_Z	01 07 27						
		eL_Z	01 13 05						
		$M1_Z$	01 18 40	9			17.0mm.		
		$M2_Z$	01 22 05	7			10.2mm.		
		$M3_Z$	01 24 31	7			8.2mm.		
		F_Z	02 05						
July 3		e_Z	18 50						Possibly sooner.
		eL_Z	18 56 03	?					
		L_Z	19 00 27	15					
		M_Z	19 06 33	19			2.6mm.		
		F_Z	19 59						
July 3		eL_Z?	21 10 07						
		L_Z	21 12 05	12					
		F_Z	21 21						
July 4		eP_Z	04 37 14						
		eS_Z	04 44 08						
		SR_{1Z}	04 47 41						
		eL_Z	04 49 47						
		$M1_Z$	04 54 10	7			34.3mm.		
		$M2_Z$	04 57 15	10			26.2mm.		
		F	05 57						
July 4		eL_Z	07 26						
		L_Z	07 32 41	19					
		M_Z	07 34 06	13			3.0mm.		
		F_Z	In next quake.						
July 4		eL_Z?	07 40 24						
		L_Z	07 50 45	11-12					
		F	08 07						
July 4		eL_Z	08 14 55						
		L_Z	08 16 28	11-12					
		F_Z	08 58						
July 4		e_Z	10 51 08						

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_0	ε:1			V	T_0	ε:1			V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	99	4.6	3.7	Bosch Photographic Pendulums	A_N	133	5.0		Mainka	A_N	55	8.3	5.3
	A_E	89	5.1	5.7		A_E	133	5.0			A_E	31	9.0	4.3
	A_Z									Bosch-Omori	A_N			
											A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
July 1		e_Z	12 31						
		eL_Z	12 23 31						
		L_Z	12 25 19	13					
		F_Z	12 37						
July 2		e_Z	03 06 12						Micros heavy.
		eL_Z	03 17 09	12					
		F_Z	03 39						
July 2		eL_Z	01 58 16						Micros heavy.
		L_Z	02 03 13	8-9					
		F_Z	02 05						
July 2		eL_Z	16 05						
		L_Z	16 09 36	17					
		L_Z	16 15 00	17					
		F_Z	16 37						
July 3		iP_Z	01 01 40						
		iPR_{Z2}	01 04 03						
		iS_Z	01 07 27						
		eL_Z	01 13 05						
		$M1_Z$	01 18 40	9			17.0mm.		
		$M2_Z$	01 22 05	7			10.2mm.		
		$M3_Z$	01 24 31	7			8.2mm.		
		F_Z	02 05						
July 3		e_Z	18 50						Possibly sooner.
		eL_Z	18 56 03	?					
		L_Z	19 00 27	15					
		M_Z	19 06 33	19			2.6mm.		
		F_Z	19 59						
July 3		eL_Z?	21 10 07						
		L_Z	21 12 05	12					
		F_Z	21 21						
July 4		eP_Z	04 37 14						
		eS_Z	04 44 08						
		$SR1_Z$	04 47 41						
		eL_Z	04 49 47						
		$M1_Z$	04 54 10	7			34.3mm.		
		$M2_Z$	04 57 15	10			26.2mm.		
		F	05 57						
July 4		eL_Z	07 26						
		L_Z	07 32 41	19					
		M_Z	07 34 06	13			3.0mm.		
		F_Z	In next quake.						
July 4		eL_Z?	07 40 24						
		L_Z	07 50 45	11-12					
		F	08 07						
July 4		eL_Z	08 14 55						
		L_Z	08 16 28	11-12					
		F_Z	08 58						
July 4		e_Z	10 51 08						
		L_Z	10 56 38	13					
		F_Z	10 59						

July 1 to July 31, 1929

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
July 5		eP_E	14 30 01					
		eP_N	14 30 02					
		iS_E	14 38 52					
		eS_N	14 38 53					
		eL_E	14 47 27					
		M_E	14 58 39	16		3.2mm.		
		M_N	14 58 54	16		1.5mm.		
		F_{EN}	Sheets off 16 hrs. 30 min.; quake still on.					
July 5		e$_Z$	19 14 22					
		e$_Z$	19 19 58					
		L_Z	19 29 09	18				
		M_Z	19 42 37	11			3.2mm.	
		F_Z	20 (ca.)					
July 5		eP_E	22 47 08					
		eP_N	22 47 08					
		eS_E	22 56 01					
		eS_N	22 56 00					
		eL_Z	23 05 02					
		L_{EN}	23 13 20	26				
		M_E	23 16 48	18		0.9mm.		
		M_N	23 17 59	17	0.7mm.			
		F	01 30 (ca.)					
July 6		iP_Z	02 14 44					
		PR_{1Z}	02 17 37					
		eS_Z	02 23 10					
		PS_Z	02 23 47					
		SR_{1Z}	02 28 06					
		eL_Z	02 32 42					
		M_{1Z}	02 44 24	16			18.0mm.	
		M_{2Z}	02 45 44	17			32.7mm.	
		M_{3Z}	02 50 30	13-14			19.8mm.	
		M_{4Z}	02 52 28	12			18.0mm.	
		F_Z	06 26					
July 6		iP_Z	09 53 31					
		PR_{1Z}	09 54 55					
		iS_Z	09 59 32					
		SR_{1Z}	10 02 02					
		eL_Z	10 03 39					
		M_{1Z}	10 06 56	11			35.6mm.	
		M_{2Z}	10 07 30	12			48.6mm.	
		M_{3Z}	10 10 28	12			53.8mm.	
		M_{4Z}	10 12 09	8-9			49.0mm.	
		M_{5Z}	10 13 41	13			42.4mm.	
		F_Z	12 24					
July 6		e$_Z$	16 34 08					
		L_Z	16 41 05	10				
		F_Z	16 50+					
July 6		e$_Z$	22 02 49					
		L_Z	22 10 32	8				
		F_Z	22 15					
July 7		e$_Z$	03 28 03					
		eL_Z?	03 30 37					
		L_Z	03 33 30	12-13				
		F_Z	03 36					
July 7		e$_Z$	05 08					
		eL_Z?	05 12 07					
		F_Z	05 18					
July 7		e$_Z$	06 27 14					
		eL_Z?	06 55 05					
		L_Z	06 56 25	20				
		M_{1Z}	06 58 09	20			2.9mm.	
		M_{2Z}	07 01 06	19			3.0mm.	
		F_Z	07 52					
July 7		e$_Z$	09 38 14					
		eL_Z?	10 05 04					
		L_Z	10 07 20	21				
		M_{1Z}	10 09 21	21			4.0mm.	
		M_{2Z}	10 14 34	14			3.6mm.	
		F_Z	11 20					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	AMPLITUDE A_E	AMPLITUDE A_Z	REMARKS
July 7		eP_{EN}	21 34 09					iP_Z 21 34 07
		S_{EN}	21 42 57					iS_Z 21 43 02
		i_{EN}	21 44 05					
		$S_{R_1 EN}$	21 48 07					
		eL_{EN}	21 54 05					
		M_{1E}	22 01 10	17		4.3mm.		
		M_{1N_1}	22 02 14	18	2.0mm.			
		M_{2E}	22 02 48	21-22		4.6mm.		
		M_{3E}	22 03 59	18		3.9mm.		
		M_{2N}	22 05 01	21-22	4.1mm.			
		F_{EN}	23 (ca.)					
July 8		e_Z	10 39 42					Possibly eL_Z
		L_Z	10 47 25	11-12				
		L_Z	10 49 16	13				
		F_Z	11 13					
July 8		e_Z	17 00 41					Very heavy micros.
		eL_Z?	17 04 15					
		M_{1Z}	17 06 40	8			20.0mm.	
		M_{2Z}	17 08 06	7				
		F_Z	17 54					
July 8		e_Z	18 38 10					Very heavy micros.
		eL_Z	18 54 36	9				
		L_Z	18 58 03	16				
		M_Z	18 59 25	14-15			2.1mm.	
		F_Z	In next quake.					
July 8		e_Z	19 28 37					
		eL_Z?	19 41.0					
		M_{1Z}	19 50 42	14			6.8mm.	
		M_{2Z}	19 51 43	13			7.0mm.	
July 8		e_Z	19 28 37					
		eL_Z?	19 41.0					
		M_{1Z}	19 50 42	14			6.8mm.	
		M_{2Z}	19 51 43	13			7.0mm.	
		M_{3Z}	20 02 53	16			5.3mm.	
		M_{4Z}	20 07 51	11-12			4.6mm.	
		F_Z	23 (ca.)					
July 9		e_Z	06 23 05					
		eL_Z	06 26 21	7-8				
		L_Z	06 32 15	15				
		F_Z	06 38					
July 9		e_Z	09 08					
		L_Z	09 19 17	17				
		L_Z	09 26 25	13				
		F_Z	09 56					
July 9		e_Z?	21 41 21					Possibly sooner or later.
		i_Z	21 44 11					
		eL_Z?	21 47 19					
		L_Z	21 50 44	10				
		L_Z	21 56 16	8				
		F_Z	22 03					
July 10		e_Z	22 38 05					
		L_Z	22 44 41	13				
		F_Z	22 56					
July 11		e_Z	13 47 32					Possibly as early as 13hrs 23 min. Very heavy micros.
		eL_Z	14 06 18					
		L_Z	14 11 32	8-9				
		M_{1Z}	14 16 33	11			2.7mm.	
		M_{2Z}	14 18 16	15			1.9mm.	
		F_Z	15 10					
July 11		eP_Z	21 07 55					
		S_Z	21 16 49					
		eL_Z	21 27 03					
		L_Z	21 35 44	9				
		M_{1Z}	21 40 47	13-14			6.7mm.	
		M_{2Z}	21 43 18	13			4.8mm.	
		F_Z	23 15					
July 12		L_Z	10 58 20	10				
		F_Z	11 07					

No. 154 From August 1 to August 31, 1929

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1	Bosch Photographic Pendulums	V	T_0	ε:1	Mainka / Bosch-Omori	V	T_0	ε:1
A_N	99	4.6	3.7	A_N	133	5.0		Mainka A_N	55	8.3	5.3
A_E	89	5.1	5.7	A_E	133	5.0		Mainka A_E	31	9.0	4.3
A_Z								Bosch-Omori A_N			
								Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Aug. 1		e_Z	05 21 16						P'?
		$PR1_Z$	05 23 23						?
		PS	05 36 34						?
		eL_Z	06 08 56						?
		L_Z	06 18 28						
		$M1_Z$	06 24 50	26			2.3mm.		
		$M2_Z$	06 31 28	17			2.3mm.		
		F_Z	07 02						
Aug. 1		eL_Z	09 11 09						
		L_Z	09 18 17	17					
		M_Z	09 25 19	15-16			2.3mm.		
		F_Z	10 04						
Aug. 2		e_Z	18 09 09						Possibly earlier.
		F_Z	18 15						
Aug. 3		e_Z	13 03 44						Possibly sooner.
		i_Z	13 08 00						
		eL_Z	13 40 30						
		L_Z	13 40 59	19					
		$M1_Z$	13 43 15	22			3.9mm.		
		$M2_Z$	13 47 40	17			5.2mm.		
		F_Z	In next quake						
Aug. 3		e_Z	15 14 34						
		i_Z	15 16 34						
		eL_Z	15 42 11						
		L_Z	15 59 11	20					
		M_Z	16 03 36	18			3.5mm.		
		F_Z	18 30						
Aug. 3		e_Z	18 56 32						
		PS_Z?	19 06 04						
		eL_Z?	19 21 02						
		L_Z	19 25 28	17					
		$M1_Z$	19 27 09	17			12.0mm.		
		$M2_Z$	19 30 46	13			6.4mm.		
		$M3_Z$	19 33 09	12-13			7.4mm.		
		$M4_Z$	19 36 29	12-13			5.5mm.		
		F_Z	21 05						
Aug. 4		e_Z	09 21 35						
		eL_Z	09 30 19						
		L_Z	09 31 08	14					
		F_Z	09 58						
Aug. 4		L_Z	14 51 to 14 57						Very small amplitudes.

		SE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Aug. 4		e_Z	15 19 54					
		$eL_{Z?}$	15 24 50					
		L_Z	15 32 31	11-12				
		F_Z	16 08					
Aug. 4		e_Z	22 41					
		eL_Z	23 04 23					
		L_Z	23 10 09	18				
		F_Z	00 15					
Aug. 6		e_Z	01 45 07					
		eL_Z	01 52 00					
		L_{Z1}	01 57 12	12-13				
		L_{Z2}	01 59 29	12-13				
		F_Z	02 20					
Aug. 7		e_Z	07 40 19					
		$eL_{Z?}$	07 45 28					
		F_Z	08 (ca.)					
Aug. 8		iP_Z	13 17 49					
		$P_{S?}$	13 27 37					
		eL_Z	13 57 10					Possibly as early as 13-52-56
		$M1_Z$	14 10 50	19			7.0mm.	
		$M2_Z$	14 13 16	15			7.7mm.	
		$M3_Z$	14 16 16	18			7.2mm.	
		$M4_Z$	14 17 43	15			9.2mm.	
		F_Z	16 (ca.)					
Aug. 9		e_{Z1}	03 04 55					
		e_{Z2}	03 07 55					
		eL_Z	03 12 34					
		F_Z	03 26					
Aug. 9		L_Z	19 34 to 19 50					Very small amplitude
Aug. 11		e_Z	18 44 09					No distinct M.
		eL_Z	19 13 24					
		L_Z	19 17 01	14				
		F_Z	19 44					
Aug. 12		iP_Z	11 26 00					
		eS_Z	11 26 54					
		eL_Z	11 27 05					
		M_Z	11 27 11					
		F_Z	12 05					
Aug. 13		e_Z	15 06 53					
		eL_Z	15 17 51					
		L_Z	15 18 02	17				
		F_Z	15 40 (et postea)					
Aug. 13		e_Z	19 27 52					
		L_Z	19 35 34	9				
		M_Z	19 35 59	13			3.1mm.	
		F_Z	19 50					
Aug. 14		e_Z	02 38 55					
		eL_Z	03 11 00					
		L_Z	03 22 00	17-18				
		F_Z	04 30					
Aug. 14		e_Z	13 37 46					Possibly sooner. Very heavy micros.
		$eL_{Z?}$	13 45 16					
		L_Z	13 49 26					
		F_Z	14 (ca.)					
Aug. 14		e_{Z1}	14 42 13					
		e_{Z2}	14 45 46					
		eL_Z	14 50 50					
		L_Z	14 53 57	8-9				
		$M1_Z$	15 03 09	10				
		$M2_Z$	15 04 53	8-9			5.8mm.	
		F_Z	17 05					
Aug. 14		eP_Z	19 11 08					Very heavy micros.
		eS_Z	19 17 09					
		eL_Z	19 20 59					
		$M1_Z$	19 28 11	11			6.5mm.	
		$M2_Z$	19 30 25	9			8.0mm.	
		$M3_Z$	19 32 23	9			10.2mm.	
		F_Z	22 06					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE			REMARKS
					A_N	A_E	A_Z	
Aug. 15		iP_Z	20 03 22					
		eS_Z	20 09 46					
		S_{R1_Z}	20 12 34					
		S_{R2_Z}	20 13 32					
		eL_Z	20 14 26					
		M_Z	20 17 38	17			17.3mm.	
		F_Z	22 09					
Aug. 16		eZ_1	10 24 48					
		eZ_2	10 28 16					
		eL_Z	10 40 08					
		L_Z	10 41 14	9				
		M_Z	10 45 50	10			3.0mm.	
		F_Z	11 09					
Aug. 16		e_Z	21 48 31					No distinct M.
		eL_Z?	22 32 04					
		L_Z	22 59 47	11-12				
		F_Z	23 43					
Aug. 17		eP_{EN}	23 46 51					Rest of phases lost in changing of sheet.
		$P_{R1_{EN}}$	23 47 44					
		S_{EN}	23 51 59					
		eL_{EN}	23 53 59					iP_Z 23-46-56
Aug. 18		e_Z	06 54 57					
		L_Z	07 00 13	12-13				
		F_Z	07 14					
Aug. 18		eZ_1	08 55 20					
		eZ_2	09 05 22					
		eZ_3	09 08 00					
		eZ_4	09 12 36					
		eL_Z	09 28 01					
		L_Z	09 34 01	14				
		$M1_Z$	09 41 31	18			10.2mm.	
		$M2_Z$	09 46 33	17			9.5mm.	
		F_Z	11 22					
Aug. 19		eZ_1	03 02 06					Possibly later.
		eZ_2	03 12 10					PS_2?
		eL_Z	03 35 24					
		L_Z	03 42 35	18				
		$M1_Z$	03 54 40	16			11.8mm.	
		$M2_Z$	03 55 59	18			14.7mm.	
		$M3_Z$	03 57 27	15			15.0mm.	
		$M4_Z$	04 01 01	15			17.3mm.	
		$M5_Z$	04 03 02	15			12.2mm.	
		F_Z	05 25					
Aug. 19		eZ_1	17 52 53					
		eZ_2	18 00 22					
		eL_Z?	18 07 43					
		$M1_Z$	18 14 47	12			3.8mm.	
		F_Z	18 40					
Aug. 19		eZ_1	20 53 07					
		eZ_2	21 07 55					
		eL_Z	21 46 09					
		L_Z	21 55 09	13				
		M_Z	21 57 32	17			2.7mm.	
		F_Z	21 29					
Aug. 20		eZ_1	16 58 04					
		eZ_2	17 06 41					
		F_Z	In following quake					
Aug. 20		iP_Z	17 43 22					
		iS	17 49 48					
		eL_Z	17 53 26					
		L_Z	17 54 38	17				
		M_Z	17 56 59	15-16			25.0mm.	
		F_Z	19 35					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Aug. 21		eZ_1	10 19 20					Very heavy micros.
		eZ_2	10 25 14					
		eL_Z	10 44 20	16				
		F_Z	11 (ca.)					
Aug. 22		eL_Z	02 11 04					Very heavy micros.
		L_Z	02 12 16	18				
		F_Z	02 24					
Aug. 22		$e_{Z?}$	07 55					
		$eL_{Z?}$	07 31 48					
		L_Z	07 43 18	15				
		M_Z	07 49 22	15			20mm.	
		F_Z	10 04					
Aug. 22		e_Z	16 47 36					
		eL_Z	17 05 15					
		L_Z	17 11 25	24				
		M_{1Z}	17 13 32	19			4.0mm.	
		M_{2Z}	17 15 39	17			4.4mm.	
		F_Z	17 44					
Aug. 28		e_Z	19 05					
		i_Z	19 12 08					PS_2
		$eL_{Z?}$	19 31 09					
		L_Z	19 50 03	18				
		M_Z	19 51 50	16			6.6mm.	
		F_Z	22 (ca.)					
Aug. 29		e_Z	20 41 51					
		eL_Z	20 57 38					
		L_Z	20 59 55	11-12				
		F_Z	21 58					
Aug. 30		e_Z	08 06 02					
		$eL_{Z?}$	08 17 13					
		L_Z	08 24 36	17				
		F_Z	08 35					
Aug. 31		e_Z	19 47 18					
		eL_Z	19 54 17					
		F_Z	20 07					

Francis A. Tondorf, S. J.,
Director

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A_E	89	5.1	5.7	A_E	133	5.0		Mainka A_E	31	9.0	4.3
A_Z								Bosch-Omori A_N			
								Bosch-Omori A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
Sept. 1		e_Z	16 14 07						Heavy micros.
		e_Z	16 24 13						
		e_Z	16 32 15						
		eL_Z	16 53 24						
		L_Z	16 58 16	14					
		L_Z	17 06 10	14					
		F_Z	18 (ca.)						
Sept. 2		i_Z	11 32 55						
		i_Z	11 35 09						
		i_Z	11 46 27						
		eL_Z	12 13 03						PS?
		L_Z	12 29 21	14					Possibly later.
		M_Z	12 39 13	17			4.2mm.		
		F_Z							Sheets off at 13hrs.10m. Quake still on
Sept. 5		e_Z	10 17 52						
		i_Z	10 19 21						eL_Z ?
		L_Z	10 20 06	12					
		M_Z	10 20 52	8			6.3mm.		
		F_Z	10 24						
Sept. 8		e_Z	10 59 09						
		i_Z	11 00 00						
		L_Z	11 02 04	10					
		M_Z	11 02 33	10			8.3mm.		
		F_Z	11 38						
Sept. 8		e_Z?	12 05						
		eL_Z?	12 08 20						
		F_Z	12 16						
Sept. 8		e_Z	14 14 15						
		eL_Z	14 16 26						
		L_Z	14 17 03	10-11					
		F_Z	14 43						
Sept. 8		e_Z	15 00 00						
		e_Z	15 08 11						
		F_Z	15 21						
Sept. 8		e_Z	20 30 53						
		eL_Z	20 33 52						
		L_Z	20 34 24	10					
		F_Z	20 50						
Sept. 9		e_Z	04 51 06						
		eL_Z	04 55 35						
		L_Z	05 02 40	12					
		F_Z	05 08						

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Sept. 9		e_Z	18 02 51					Difficult.
		e_Z	18 06 19					Heavy micros.
		eL_Z?	18 49 43					
		L_Z	18 53 11	11				
		F_Z	19 03					
Sept. 10		e_Z	19 38 58					Possibly sooner.
		eL_Z?	19 43 12					Heavy micros.
		L_Z	19 46 13	8				
		L_Z	19 51 09	9				
		F_Z	20 03					
Sept. 10		i_Z	20 42 20					P' ?
		i_Z	20 59 10					Possibly sooner?
		eL_Z	21 36 49					
		L_Z	21 42 54	14				
		M_Z	21 45 36	11			1.8mm.	
		F_Z	22 35					
Sept. 11		e_Z	22 57 11					
		eL_Z	23 20 13					
		L_Z	23 31 56	15				
		M_Z	23 35 17	15			2.5mm.	
		F_Z	23 55					
Sept. 14		i_Z	03 00 18					
		eL_Z?	03 15 30					
		L_Z	03 19 20	20				
		F_Z	04 (ca.)					
Sept. 14		e_Z	05 50					Heavy micros.
		i_Z	05 54 15					
		F_Z	06 05					
Sept. 15		eL_Z	13 44 20					
		L_Z	13 54 15					
		L_Z	14 03 20	13-14				
		F_Z	14 14					
Sept. 16		e_Z	04 00 02					
		L_Z	04 10 28	13				
		F_Z?						Difficult. Very heavy micros.
Sept. 17		e_Z	05 37 52					Possibly sooner
		L_Z	05 45 09	11				Very heavy micros.
		M_Z	05 51 53	15			6.8mm.	
		F_Z	06 50					
Sept. 17		eP_{E_N}	19 25 03					
		iS_{E_N}	19 31 16					
		eL_{E_N}	19 36 09					
		$M1_E$	19 38 28	5-6		25.6mm.		
		$M1_N$	19 38 28	5-6	12.7mm.			
		$M2_E$	19 40 32	9		39.7mm.		
		$M2_N$	19 40 31	9	20.0mm.			
		F_{E_N}	20 (ca.)					
Sept. 17		iP_Z	19 25 03					Amplitude of other phases so large that they could not be differentiated.
		iS_Z	19 31 23					
		$iSR1_Z$	19 34 06					
		F_Z	23 52					
Sept. 18		L_Z	16 08 25 to 16 16					
Sept. 18		e_Z	17 04 19					
		L_Z	17 23 30	14				
		F_Z	17 41					
Sept. 21		e_Z	16 52 00					
		i_Z	16 54 33					Heavy micros.
		L_Z	16 55 43	8				
		L_Z	16 57 07	14				
		$M1_Z$	16 58 09	9		8.0mm.		
		$M2_Z$	16 59 19	8		10.2mm.		
		F_Z	17 20					
Sept. 22		e_Z	17 00 55					
		eL_Z?	17 04 18					Heavy micros.
		F_Z	17 15					

DATE	CHARACTER	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z	REMARKS
Sept. 23		e_Z	16 21 07					
		eL_Z	16 29 32					
		i_Z	16 40 25					
		F_Z	16 50					
Sept. 24		e_Z	02 19 14					
		eL_Z	02 23 28					
		L_Z	02 37 10	14				
		L_Z	02 40 14	12-13				
		F_Z	03 10					
Sept. 24		eL_Z	17 20 26					
		L_Z	17 40 26					
		F_Z	18 (ca.)					
Sept. 26		e_Z	05 02 10					
		e_Z	05 11 24					Very heavy micros.
		eL_Z	05 22 04					
		L_Z	05 26 05	9				
		M_Z	05 31 46	9			7.0mm.	
		F_Z	07 14					
Sept. 26		e_Z	12 48 32					Heavy micros.
		L_Z	12 54 05					
		F_Z	13 (ca.)					
Sept. 26		e_Z	15 46 38					
		i_Z	15 49 11					
		eL_Z?	15 53 28					
		L_Z	15 55 19	12				
		$M1_Z$	15 56 02	11			4.0mm.	
		$M2_Z$	15 57 48	11			3.1mm.	
		F_Z	16 31					
Sept. 26		e_Z	19 35					e_Z possibly as 19hrs. 7m. 40sec.
		i_Z	19 39 52					
		L_Z	19 41 08	9				
		F_Z	19 54					
Sept. 26		e_Z	20 14 43					
		i_Z	20 17 44					
		L_Z	20 19 51	10				eL_Z?
		F_Z	20 33					
Sept. 27		eP_Z	23 22 26					
		i_Z	23 22 46					
		iS_Z	23 28 22					
		$SR1_Z$	23 30 26					
		M_Z	23 34 27	11			53.5mm.	
		F_Z	01 14					
Sept. 28		e_Z	22 42 42					
		eL_Z?	22 46 09					
		F_Z	22 54					
Sept. 29		e_Z	19 40 52					
		F_Z	19 55					

Francis A. Tondorf, S. J.,
Director.

No. 156 *From* October 1 *to* October 31, *19* 29

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_O	ε:1
	A_N	110	4.9	1.3
	A_E	106	5.2	1.3
	A_Z			

Bosch Photographic Pendulums		V	T_O	ε:1
	A_N	—	—	—
	A_E	—	—	—

		V	T_O	ε:1
Mainka	A_N	27	10.1	1.3
	A_E	53	8.5	1.2
Bosch-Omori	A_N			
	A_E			

Date October 1929	Character COMPONENT	Phase	Time	Periods	Trace Amplitude A_N	A_E	A_Z	Δ	Remarks
4.18	Z	eL	4h 12m 52s						
		M	4 14 52	15			1.5mm.		
		F	4 32						
4.23		P?	10 5 15						
		S?	10 11 42						
		eL	10 17 27	14					
		M	10 19 23	8			2.5		
		F	10 23 22						
5.16	Z	i	3 43 31	5			1.5mm.		
		eL	3 52 13	23					
		M	4 0 8	18			1.5		
		F	4 44						
5.72	Z	P	17 11 39	6			5.2		
		PR1	17 15 16	6			1.5		
		PR2	17 17 5	6			1.5		
		eS	17 21 12						
		PS	17 21 52						
		i	17 25 25						
		eSR1	17 26 27						
		eL	17 35 5						
		M	17 47 12	21			6.5		
		F	obscured.						
6.25	Z	P	5 59 55	4			0.6		
		PR1	6 1 33	5			1.0		
		eS	6 6 7	10			0.4		
		eL	6 14 37	40					
		M1	6 19 12	20			2.0		
		M2	6 24 1	15			3.0		
		M3	6 35 24	13			1.4		
		C	6 36						
		F	7 13						
6.34	Z	P	8 2 31	5			8.0		
		PR1	8 5 33	7			2.0		
		PR2	8 7 21	10			2.0		
		S	8 12 2	10			2.5		
		SR1	8 16 25	12			2.0		
		eL	8 24 5	36					
		M1	8 33 2	17			13.3		
		M2	8 39 7	14			11.0		
		C	10 4						
		W	10 27 31						
		F	11 28						
6.58	Z	iP	13 56 49	5			1.0		
		PR1	13 58 8	6			1.0		
		eS	14 2 57	12			0.5		
		eL	14 7 27	35					
		M1	14 12 8	16			2.0		
		M2	14 15 5	16			1.5		
		M3	14 21 21	17			2.0		
		M4	14 31 20	8			2.6		
		C	14 34 0						
		F	14 58						
7.66	Z	i	15 45 33	5			1.5		
		eL	16 1 34	40					
		M	16 10 29	15			2.5		
		F	17 5						

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DATE	COMPONENT	PHASE	TIME	PERIODS	TRACE AMPLITUDE			REMARKS
					A_N	A_E	A_Z	
8.74	Z	i	17h 35m 26s	8			2.5	
		i	17 45 22	11			2.0	
		i	17 55 2	10			1.5	
		eL	18 6 42	34				
		M1	18 15 15	21			3.6	
		M2	18 20 33	16			5.5	
		M3	18 25 28	16			5.5	
		M4	18 34 9	14			5.0	
		M5	18 40 28	15			2.0	
		M6	18 45 34	15			3.0	
		M7	18 47 24	15			2.7	
		M8	18 50 21	15			1.5	
		M9	18 52 26	15			2.0	
		C	18 56 0					
		F	obscured.					
14.44	Z	i	10 20 3	5			1.1	
		eL	10 40 31	20				
		M1	10 47 5	14			8.0	
		M2	10 23 52	16			9.0	
		M3	11 1 28	12			3.0	
		M4	11 3 53	14			3.6	
		C	11 21					
		F	12 33					
16.90		eL	21 30 13	25				
		M1	21 36 33	18			2.0	
		M2	21 42 30	15			2.5	
		F	22 14					
19.44	Z	P?	10 23 2					
		iP	10 23 9					
		PR1	10 25 36					
		PR2	10 29 5					
		i	10 31 27					
		i	10 31 37					
		iS	10 32 4					
		PS	10 32 20					
		i	10 32 57					
		SR1	10 35 26					
		(eL)	10 36 18	48				Very irregular.
		SR2?	10 37 2					
		(M)	10 45 46	35				greater than 12.5mm.
		eL	10 49 25	24				
		M1	10 52 20	20			19.5	
		M2	10 0 22	18			5.0	
		M3	11 2 53	18			4.5	
		M4	11 7 29	16			4.5	
		M5	11 13 12	14			4.0	
		M6	11 22 5				2.5	
		C	11 23 0					
		W	12 57 36					Record changed 12h 4m
20.69	Z	i	16 27 7	5			1.5	
		eL	16 39 27				1.0	Irregular.
		F	obscured.					
21.48	Z	eL	11 27 31	28				
		M1	11 30 34	24			1.5	
		M2	11 33 42	18			1.5	
		M3	11 37 38	17			1.6	
		M4	11 40 10	17			1.7	
		C	11 43					
		F	obscured.					
24.32	Z	eL	7 40 43	35				
		M1	7 48 45	15			1.5	
		M2	7 58 13	16			2.5	
		F	8 12 31					

F. W. SOHON, S. J.,
Director.

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_0	ε:1	Bosch Photographic Pendulums	V	T_0	ε:1		V	T_0	ε:1
A_N	110	4.9	1.3	A_N	—	—	—	Mainka A_N	27	10.1	1.3
A_E	106	5.2	1.3	A_E	—	—	—	Mainka A_E	53	8.5	1.2
A_Z								Bosch-Omori A_N	Removed to Weston		
								Bosch-Omori A_E	College, Weston, Mass.		

Date Nov. '29	COMPONENT Character	Phase	Time h	m	s	Periods s	TRACE Amplitude A_N	A_E	A_Z	Δ	Remarks
4.70	Z	e_L	16	33	15	24			1.5mm.		
		F	17	10							
5.58			13	50							Record inserted, quake already in progress.
	Z	M	14	0	20	20			1.0mm.		
		F	14	25							
8.15	Z	i	3	30	59						
		i	3	33	49						
		e_L	3	37	15	18					
		M	3	43	55	18			6.0mm.		
		F	obscured by micros.								
9.08	Z	i_P	1	50	57				2.5		
		P_{R1}?	1	52	36				1.0		
		P_{R2}	1	55	1				1.5		
		S	1	59	43				2.0		
		i	2	8	22				1.1		
		i	2	10	41				1.5		
		e_L	2	13	31	24					
		M	2	22	29	16			5.0		
		F	3	53							
13.08	Z	e_L	1	48	0	24			2.0		
		F	2	10	obscured by micros.						
15.80	Z	eP	19	4	29						
		eP'	19	8	42						
		i	19	10	52						
		P_{R1}	19	11	25						
		ScP_{cP}	19	12	49						
		$eScP_{cS}$	19	14	29						
		e	19	17	7	70.0					
		eScPcPcS	19	17	39						
		i_{PS}	19	20	55						
		P_{R2}	19	23	35						
		i	19	30	29						
		i	19	31	36						
		i	19	34	37						
		e_L	19	34	0	25					
		M_1	19	52	39	26			26.0mm.		
		M_2	19	56	21	?			50.0		
		M_3	19	57	31	20			36.5		
		M_4	20	0	29	18			24.5		
		M_5	20	22	43	17			17.0		
		M_6	20	23	45	16			20.0		
		M_7	20	12	6	17			18.0		
		M_8	20	15	13	17			20.7mm.		
		M_9	20	20	37	16			8.5		
		M_{10}	20	22	7	17			9.0		
		M_{11}	20	24	14	15			7.5		
		M_{12}	20	25	17	16			14.5		
		M_{13}	20	27	45	16			10.5		
		M_{14}	20	34	0	15			11.5		
		C	20	35							
		F	23	54							

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Dec. 30, '29		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	110	4.9	1.3
	A_E	106	5.2	1.3
	A_Z	--	- -	- -

		V	T_0	ε:1
Bosch Photographic Pendulums	A_N	--	--	--
	A_E	--	--	--

		V	T_0	ε:1
Mainka	A_N	27	10.1	1.3
	A_E	53	8.5	1.2
Bosch-Omori	A_N	Removed to Weston		
	A_E	College, Weston, Mass.		

Date December 1929	Character	Phase	Time h	m	s	Periods s	Trace Amplitude mm. A_N	A_E	A_Z	Δ	Remarks
4.28		e_Z	6	48	38	20			2.0		
		F	6	55	46						
		e_Z	8	12	22	20			3.0		
		F	8	19	2						
6.52		eL_Z	12	31	22	20			0.8		
		F	12	53	2						
6.71		e_Z	17	4	12						
		i_Z	17	14	37						
		L	17	43	53	24			3.0		
		F	obscured by micros.								
6.86		i_Z	20	38	50						
		eL_Z	21	17	43	22			3.3		
9.28		i_Z	6	48	20						
		i_Z	7	09	19						
		$?_Z$	7	12							obscured by clock.
		eL_Z	8	03	33						
		M	8	15	24	20			9.3		
		F	9	15							
13.39		eL_Z	9	21	27	22			1.7		
		F	9	44	17						
14.20		e_Z	4	49	12						
		i_Z	5	00	15						
		eL_Z	5	10	05	20			1.5		
		F	5	28	38						
14.95		e_Z	22	43	51	14			1.5		
		e_Z	23	06	29	14			1.1		
		F	23	17	49						
15.07		eP_Z	1	40	10				1.0		
		iPR_{1_Z}	1	41	16						
		S_Z?	1	45	38						
		eSR_{1_Z}	1	48	33						
		iSR_{2_Z}	1	49	31						
		eL_Z	1	52	11	18				Δ = 4600.	
		M_Z	1	53	23	16					
		F	2	13	49						
15.63		e_Z	15	11	01	12			1.6		
		F	15	16	01						
16.52		e_Z	12	28	37	24			4.0		
		F	12	46	31						
17.47		eP_E	11	9	47						200k Wiechert
		P_N	11	9	48						"
		iP_Z	11	9	53						Galitzin
		S_E	11	19	3						200k Wiechert
		S_N	11	19	4						"
		SR_1	11	24	1						"
		SR_{2_N}	11	26	31						"
		SR_{2_E}	11	27	11						"
		eL_N	11	31	26						"
		eL_E	11	31	27						"
		M_E	11	37	11	19			8.4		"

Wiechert record removed 13 h. 24 m., quake unfinished.

No. 158 bis. December 1 to December 31, 1929

DATE	PHASE	TIME h m s	PERIOD s	TRACE AMPLITUDE mm.	Δ	REMARKS
December	The readings of the 135[k] Mainka are as follows:					
	eP_N	11 9 50				
	eP_E	11 9 51				
	S_N	11 19 0				
	S_E	11 19 6				
	$SR1_E$	11 24 6				
	$SR2_E$	11 27 6				
	eL_N	11 30 52				
	eL_E	11 31 30				
	M_E	11 38 6	18	22		
	Conclusion of quake on Galitzin:					
	F_Z	15 57 24				
17.75	i_Z	17 54 51				
	$?_Z$	18 8 19				
	eL_Z	18 25 30	18	1.5		
17.90	eL_Z	21 34	17	1.0		
	F	21 44				
17.94	eL_Z	22 33 3	20	1.4		
	F	23 8 3				
18.24	e_Z	5 40 4	14	0.8		
	F	6 2 4				
18.34	eL_Z	8 8 42	18	1.6		
	F	8 32 4				
18.56	eL_Z	13 29 55	18	0.9		
	F_Z	14 12				
18.83	i_Z	19 48 9				obscure.
	eL_Z	19 57 5	20	0.9		
19.46	e_Z	10 57 24	10	0.5		
	eL_Z	11 1 46	18	3.0		
	F	11 58				
19.84	e_Z	20 10 6	18	1.0		
	F	20 25				
20.45	i_Z	10 38 32	10	1.5		
	F	10 45 00				
21.22	e	5 13 30	18	2.0		
	F	obscured.				
21.53	e_Z	12 45 22	20	2.0		
	F	12 3 obs.				
24.23	eL_Z	5 27 48	19	3.5		
	C?	5 58				
	F	obscured by micros.				
28.53	eL_Z	12 42 26	20	1.0		
	F?	13 26				
29.42	eL_Z	10 3 19	20	0.5		End of prec.?
	F	obscured.				
30.49	$?_Z$	11 40 7				
	eL_Z	11 46 46	15	4.0		
	F	obscured.				
31.09	eL_Z	2 13 34	20	3.0		
	F	2 23				
31.11	eL_Z	2 43 50	15	2.5		
	F	2 50				

F. W. Sohon, S. J.,
Director,

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ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Dec. 30, '29		V	T_0	ε:1			V	T_0	ε:1			V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	110	4.9	1.3	Bosch Photographic Pendulums	A_N	--	--	--	Mainka	A_N	27	10.1	1.3
	A_E	106	5.2	1.3		A_E	--	--	--		A_E	53	8.5	1.2
	A_Z	--	--	--						Bosch-Omori	A_N	Removed to	Weston	
											A_E	College,	Weston, Mass.	

Date January, 1930	Component ~~Character~~	Phase	Time h	m	s	Periods s	TRACE Amplitude A_N	A_E	A_Z	Δ	Remarks
5.06	Z	eP	1	31	43						Identification of phases uncertain.
		i?	1	32	24				2.6mm.		
		i_S?	1	38	19				1.6		
		e?	1	40	51						
		$i_{S_{R1}}$	1	42	25				2.0		
		$e_{S_{R2}}$	1	43	31						
		e_L	1	46	21	17			1.5		
		F	2	47							
5.80	Z	i	19	5	0				2.5		
		i	19	8	28						
		e_L	19	38	8				0.9		
		F	20	5							
7.07	Z	e_L	0	41	32	16				1.5mm	(Record dated Jan. 6)
		F	0	59							
8.60	Z	?i	14	23	21				1.1mm.		
		e_L	14	27	38	16			1.2		
		F	14	59							
12.24	Z	e	5	40							
		e_L?	5	42	36	18					
		M_1	5	43	50	8			8.5mm.		
		M_2	5	45	29	10			6.5		
		F	5	54							
13.25	Z	e_L	5	49	36	16			2.0		
		F obscured									
14.92	Z	i	21	55	1	12			2.5		
		F	21	56	22						
14.95	Z	e	22	44	53						
		i	22	45	25						
		i	22	49	5						
		e_L	22	51	41	24					
		M_1	22	56	23	23			3.0mm.		
		M_2	22	59	17	18			2.5		
		M_4	23	4	47	18			2.5		
		C	23	29							
		F	23	51							
15.50	Z	i_P	11	50	44				1.5mm.		
		i_S	11	55	28				2.0		
		e_L	11	58	30	15			1.2		
		F	12	7							
16.01	Z		0	12							A small quake concealed by micros appears to have been in progress when the record was changed.
		i	0	21	41						
		i	0	29	48						
		i	0	35	22						
16.03		e	0	38	35						
		i	0	40	11				1.0mm.		
		i	0	41	16				2.0		
		e_L?	0	42	20						
		M	0	44	14	13.5			10.0		
		F	1	0	20						
17.72	Z	?	17	2	4						
		i_P	17	3	43				3mm.		
		i?	17	8	8						
		e_S	17	10	48	12.			2		
		i?	17	11	26						
		S_{R1}	17	13	48						
		i?	17	15	33						

continued January bis.

No. 159 bis.   January 1 to January 31, 1930

DATE	Component	PHASE	TIME	PERIODS	TRACE AMPLITUDE			DISTANCE	REMARKS
			h m s	s	A_N	A_E	A_Z		
Jan. '30									
17.72	cont'd								
	Z	i?	17 16 33						
		e_L	17 17 46	18			3		
		F	obscured by micros.						
18.32	Z	i	7 34 18						Very difficult on account of micros.
		i	7 36 7						
		?i	7 37 18						
		i	7 38 44						
		e	7 39 45	26					
		i	7 43 47						
		?i	7 47 42						
		e	7 49 50	20			1.0mm.		
		e	8 1 41	40			1.5		
		e	8 13 41	18			2.5		
		F	9 25						
20.34	Z	e_L	8 13 18	22			2.0mm.		
		F	8 44 31						
25.12	Z	e_L	2 51 20	20					From the 24t to the 27th superposed period of 30 to 40s can b detected in the micros.
		F	2 57 25						
		e_L	3 0 40						
		F	obscure.						
27.66	Z	e	15 48 9						
		e_L	15 49 9						
		F	16 1						
28.30	Z	e?	7 4 33						
		e	7 7 30						
		e_L	16 16	30					
		M	7 23 34	20			2.5mm.		
		F	7 56						

F. W. Sohon, S. J.,
Director.

No. 160 From February 1 to February 28, 1930

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_0	ε:1	Bosch Photographic Pendulums		V	T_0	ε:1			V	T_0	ε:1
	A_N	110	4.9	1.3		A_N				Mainka	A_N	27	10.1	1.3
	A_E	106	5.2	1.3		A_E					A_E	53	8.5	1.2
	A_Z	----	----	----						Bosch-Omori	A_N			
Galitzin Vertical T= 9.25.					Mu = .013. $\frac{kA1T}{4\pi 1}$ = 977						A_E			

Date Feb. 1930	Character COMPONENT	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
1.80	Z	PR1?	19h 5m 10s						Heavy micros.
		eS?	19 10 13						
		?	19 15 11						
		e	19 15 33	10					
		i?	19 15 41				4.0mm.		
		i	19 15 17				5.0		
		eL	19 17 40	28					
		F	obscured.						
2.63	Z	P	15h 6m 57s	7s			4.0mm.		
		ePR1	15 9 18	8			4.0		
		ePR2	15 10 18	7			3.0		
		eS	15 15 29	15					
		PS	15 16 6						
		PPS	15 16 45				3.7		
		e	15 17 16				4.0		
		eL	15 29 53	40					
		M1	15 38 5	17			18.3		
		M2	15 40 30	15			13.2		
		M3	15 42 6	15			14.5		
		M4	15 43 25	10			7.8		
		M5	15 44 25	15			11.1		
		M6	15 46 55	15			7.6		
		M7	15 48 3	10			7.1		
		M8	15 50 35	15			8.2		
		M9	15 51 25	15			10.0		
		C	15 53						
		F	16 42 obscured.						
3.96	Z	eL	22 54 25	27					
		M	23 1 40	14					
		F	23 5 0						
7.30	Z	eL	7 12 57	27					
		M	7 18 15	17			4.0mm.		
		F	obscured.						
9.06	Z	e	1 30 ?	10					
		i	1 32 7	12			4.5		
		i	1 32 47	12			3.0		
		i	1 34	7			3.5		obscured by clock.
		F?	1 35 10						
12.28	Z	eP'	6 42 19	6					
		PR1	6 44 3	6			1.5		
		PR2	6 46 44	10			0.8		
		SKS	6 49 14	10			1.0		K (for Kernwelle) is written in place of cPc
		SKKS?	6 50 38	10			0.5		
		?	6 51 43	10			1.0		
		i	6 52 49				1.5		
		PS	6 54 3	8			1.5		
		SKSP	6 54 31	8			1.0		
		PPS	6 55	6			2.3		obscured by clock.
		PPSS	6 56 24	7			1.4		
		eSR1	7 1 50	12			0.5		
		eSR2	7 7 19	15			1.0		
		eL	7 23 1	22					
		M1	7 27 34	21			3.0		
		M2	7 31 18	18			2.5		
		M3	7 34 32	20			2.0		
		M4	7 38 32	15			2.0		
		M5	7 42 44	18			2.5		
		M6	7 47 45	15			2.0		
		M8	7 58 38	13			1.7		
		C	8 5 35						
		W2,1	8 28 51	1					
		W2,2	8 31 34						
		W2,3	8 35 20						
		W2,4	8 40 2						
		W2,5	8 42 0						
		W2,6	8 48 53						

DATE	COMPONENT	PHASE	TIME	PERIODS	TRACE AMPLITUDE A_N	A_E	A_Z	REMARKS
14.78	Z	i	18h 49m 54s	5.0			5.0	
		i	18 50 17	5.0			4.3	
		C	18 50 39	over lapping the following				
14.79	Z	i	18 59 29	7.0			4.5	
		i	19 0 04	7.0			6.0	
		i	19 0 41	8.0			3.8	
		eL	19 15 24	20				
		M	19 23 24	20			2.0	
		F	19 37					
14.875	Z	iP	20 59 50	5			1.5mm	Identification of phases based on conjecture of two shocks.
		i	21 0 24	8			2.0	
		PR1	21 3 4	8			1.1	
(14.880)		(eP)	21 6 39	5			1.5	
		(iPR1)	21 9 38				1.5	
		S	21 9 41	10			1.5	
		iPS	21 10 38	8			2.0	
		(ePR2)	21 11 13	8			1.5	
		?	21 15 22	8			1.5	
		(S)	21 16 19	12			1.5	
		(ePS)	21 17 9	8			1.5	
		PKKP	21 18 42	6			1.5	K written for $\overline{{}_cP_c}$
		SR2	21 19 16	12			1.0	
		(SR1)	21 21 4	9			1.8	
		e	21 24 28	15			1.7	
		eL	21 24 56	30				
		i	21 28 20	4			2.1	
		M	21 29 40	15			1.5	
		(eL)	21 33 16	28				
		(M1)	21 42 14	18			5.0	
		(M2)	21 55 15	15			5.5	
		(M3)	22 3 18	15			3.0	
		(M4)	22 5 46	15			2.0	
		(M5)	22 7 9	15			2.0	
		(M6)	22 6 10	15			2.5	
		(M7)	22 12 12	17			1.7	
		(M8)	22 14 42	15			1.5	
		(M9)	22 19 1	14			2.0	
		(M10)	22 23 37	15			2.0	
		(M11)	22 25 47	15			2.0	
		(M12)	22 32 34	15			1.4	
		C	22 34 54					
		F	22 31					
20.80		Circa	19 6	The pile driving began for the new building on the campus.				
23.29	Z	eL	7 3 25	20			1mm.	
		F	7 18					
23.79	Z	eL	19 0 18	20			1.5	
		F	19 18					
24.89	Z	e	21 10 32	5			1.5	
		i	21 13 10	7			1.8	
		i	21 14 19				1.5	
		eL	21 22 49	20			1.0	
		F	21 50					
24.92	Z	eL	22 1 14	20			1.0mm.	
		F	obscured.					
25.49	Z	eL	11 31 45	30			0.5	
		F	obscured.					
26.10	Z	i	2 45 57	5				
		i	2 46 35					
		i?	2 47 15	12				
		i	2 48 22	8				Overlaps the following:
26.16	Z	eP	3 38 27					Corresponds to Brawley's second main shock.
		S	3 42	obscured by clock				
		--	4 40 27					
26.24	Z	e	5 35 41					
26.33	Z	iP	7 54 36	5			1.0	
		eS	7 56 53	8			1.0	

There are also a great number of smaller shocks badly obscured by micros.

The shocks were also recorded on the EW components of the Wiechert and Mainka, but there was no sign of disturbance on the N.S. components of either instrument.

DATE	COMPONENT	PHASE	TIME	PERIODS	A_N	A_E	A_Z	REMARKS
27.31	Z	eL	7 30 1					
		M	7 33 20	12			2.0	
		F	obscured.					
28.05	Z	i	1 6 24					
		eL	1 14 14					
		F	obscured.					
28.79	Z	eL	19 0 41	35				
		M1	19 4 43	17			2.0	
		M2	19 9 30	17			3.0	
		F	19 15 47					

The readings given in these bulletins are taken from the 7 kg. vertical component of the Galitzin seismograph supplied by Cambridge and Paul. The constants as determined February 15, 1930 are as follows:

Undamped period of galvonometer $T1 = 9.14$ seconds.
Undamped period of Pendulum $T = 9.25$ seconds.
Damping $Mu^2 = .013$
Transfer factor $k = 327$
Reduced pendulum length $l = 41.09$ cm.
Distance galv. mirror to drum $A_1 = 166.5$ cm.
Synchronous Magnification* $\frac{kA_1T}{4\pi l} = 977$

Paper speed 39mm. per min. at beginning, 27mm. per min. at end of record (12 hrs.)

* By Synchronous Magnification is meant the actual magnification for a simple harmonic motion of the same period as that of the pendulum, namely, 9.25 seconds.

F. W. SOHON, S. J.,
Director.

No. 161 *From* March 1 *to* March 31, *19* 30

Washington, D. C.

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ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

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Instrument	Component	V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	110	4.9	1.3
	A_E	106	5.2	1.3
	A_Z	----	----	----
Bosch Photographic Pendulums	A_N			
	A_E			
Mainka	A_N	27	10.1	1.3
	A_E	53	8.5	1.2
Bosch-Omori	A_N			
	A_E			

Galitzin Vertical T = 9.25, Mu = .013, $\frac{kA_1T}{4\pi l}$ = 977

Date Mar. 1930	Character COMPONENT	Phase	Time h	m	s	Periods	Trace Amplitude A_N	A_E	A_Z	Δ	Remarks
2.00	Z	e	0h	0m	28s						
		i	0	3	0						
6.67	Z	e	15	55	3						
		i	15	54	39						
		e	16	4	39						
		eL	16	33	9	24					
		M1	16	41	39	18			3.0		
		M2	16	47	44	18			2.3		
		M3	16	52	7	18			2.5		
		M4	16	56	36	18			2.4		
		M5	17	4	5	17			1.8		
		F	18	9							
7.50	Z	eL	11	59	38	20					
		F	12								
8.17	Z	eP	3	51	33	6					
		i	3	31	48	5			3.0		
		PR1?	3	52	5	6			3.2		
		eS	3	56	25						
		i	3	56	41						
		(eL)	3	58	45	36					
		eL	3	59	40	30					
		M1	4	30	27				3.6		
		M2	4	7	19						
		C	4	20							
		F	4	51							
10.61	Z	eL	14	33	25	25					
		M	14	34	58	20			1.0mm.		
		F	14	46	35						
10.72	Z	iP	16	38	51				2.5		
		PR1?	16	42	10						
		iS	16	48	17				2.0		
		eL	17	5	31	20					
		M	17	14	30	20			1.1		
		F	17	27							
24.51	Z	eL	12	23	36	18			0.6mm.		
			12	42		Record changed.					
26.30	Z	P	7	28	56	5			1.0		
		P'	7	31	35	5			2.5		
		i	7	31	53	5			7.0		
		PR1	7	34	52	9			8.0		
		SKP	7	35	39	10			8.0		K written
		PR2	7	38	8	8			5.0		for $^{c}P_{c}$
		SKS	7	38	52	12			4.0		
		PR3	7	41	8	5			5.5		
		PR4	7	42	4	5			3.5		
		i	7	43	38	11			3.5		
		PSKS	7	44	52	9			2.5		
		(eL)	7	45	18	24					
		PS	7	45	40	5			2.5		
		PPS	7	47	10	9			5.0		
		ePPPS	7	48	22	14			5.0		
		i	7	49	0	12			5.0		
		SR1	7	53	4	12			3.7		
		PSSS	7	58	20	10			3.8		
		SR2	7	59	6	15					
		i	8	0	28	10			5.0		
		i	8	1	38	10			3.5		

DATE	COMPONENT	PHASE	TIME	PERIODS	TRACE AMPLITUDE A_N	A_E	A_Z	REMARKS
26.30 continued								
	Z	eSR3	8h 3m 30s	16			2.5	
		i	8 6 4	10			5.0	
		eL	8 7 52	40				Perhaps even earlier.
		PPSS'	8 8 32	15			2.5	
		i	8 10 20	?			5.0	
		M1	8 22 55	30			5.0	
		etc.						
		C	9 28					
		F	lost in micros circa 12h.					
29.36	Z	P	8h 44m 19s					
		eS	8 53 9					
		eL	9 14 9	20				Earlier?
		M1	9 20 49	20			1.5mm.	
		M2	9 29 2	18			1.5	
		F	obscured.					
29.44		eL	10 23 4	25				
		F	10 44					
30.66	Z	P	15 38 55					Identification phases uncertain.
		i	15 39 53					
		P'	15 42 5					
		i	15 43 20					
		PR1	15 44 11					
		SKS	15 49 19					
		?	15 50 34					
		eL?	15 53 27	20				
		?	15 54 6					
		PS	15 55 26					
		PPS	15 56 30					
		e	16 0 37	15				
		eL	16 27 23	41				
		M1	16 36 28	22			1.5mm.	
		M2	16 49 19	20			1.0	
		M3	17 8 6	20			1.0	
		C	17 10					
		F	17 29					
31.55	Z	eL	13 12 22	20				
		M	13 21					
		F	13 37					

F. W. SOHON, S. J.,
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., 30, 1930		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A	109	4.8	1.28
	A_E	116	5.0	1.19
	A_Z			

Synchronous Magnification

		V	T_0	ε:1
Bosch Photographic Pendulums	A_N			
	A_E			

Galitzin Vertical Apr. 26, '30
T1 = 9.14, T = 8.92
$\frac{KA_1T}{4\pi l}$ = 904, μ^2 = .06

		V	T_0	ε:1
Mainka	A_N	200	10.5	1.83
	A_E	214	10.1	3.69
Bosch-Omori	A_N			
	A_E			

Date April, 1930	Character COMPONENT	Phase	Time	Periods	Trace Amplitude A_N	A_E	A_Z	Δ	Remarks
10.64	Z	eL	15h 16m 9s	19					
		M1	15 21 9	18			1.0mm.		
		M2	15 23 10	17			0.5		
		M3	15 28 20	15			1.0		
		F	15 46						
13.05	Z	eL	1 16 49	18			1.0		
		F	obscured.						
13.17	Z	eL	3 51 45	10			1.1		
		F	3 52 48						
15.49	Z	eL	11 41 59	20			0.4		
		F	12 7 39						
16.59	Z	eL	14 4 9						
		F	14 19 --						
16.61	Z	i	14 37 6						
		i	14 39 32						
		e	14 46 52						
		i	14 48 40						
		i	14 50 59						
		i	14 51 47						
		eL	14 52 24	23					
		M1	14 55 5	13			17.5mm.		
		M2	14 57 39	9			5.5		
		M3	15 0 21	9			4.5		
		M4	15 2 15	7			4.0		
		F	15 31						
17.21 to 17.55 drum not revolving.									
17.86	Z	i	20 38 1	4					
		eL	20 50 29	20			0.6		
		M	21 1						
20.99 to 21.53									
22.50 to 23.05 Vertical Galitzin out of commission.									
23.32 to 26.72									
27.00 Quake lost in changing record.									
27.61	Z	iP	14 45 56	4			2.5		
		iS	14 49 14	8			1.1		
		eL	14 50 6	17					
		F	obscured						
27.66	Z	eL	15 39 48	24					
		M1	15 49 15	18			1.1		
		M2	15 50 54	17			1.0		
		M3	16 2 48	16			0.6		
		M4	16 4 24	15			0.5		
		F	obscured.						
28.57	Z	eL	13 44 1	20			0.5		
		F	13 57						
28.60	Z	eL	14 17 9	18			0.8		
		F	14 22 38						
28.80	Z	eL	19 19 36	30					
		M1	19 43 46	16			1.6		
		M2	19 49 31	15			2.5		
		M3	19 57 43	15			1.5		
		F	20 26						
30.70	Z	i	16 34 3						
		i	16 34 23						
		eL	16 58 48						
		M1	17 3 33	20			0.6		
		M2	17 10 49	17			0.5		
		F	obscured.						

F. W. SOHON, S. J.,
Director.

No. *From* May 1 *to* May 31, *19*30

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_o	ε:1
A_N			
A_E			
A_Z			

Bosch Photographic Pendulums	V	T_o	ε:1
A_N			
A_E			

		V	T_o	ε:1
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks

DATE 1930 May	INSTRUMENT Component	PHASE	ARRIVAL TIME	REMARKS
5.59	G-Z	PR1	14h 6.54m	preceded by two e's
		PR2	9.16	also others
		i	14.42	
		PS	16.43	
		iPPS	17.33	
		No distinct S phases		
		L tangled but legible		
		W3	14h 236.4m	
8.54	G-Z	i	13h 6.91m	dil.
		e	10.1	
		L not conspicuous		
8.66	G-Z	i	15h 48.15m	dil.
		e	58.81	
10.94	G-Z	e	22h 26.83m	
		i	27.39	
		e	28.3	
		Period of Main Phase 0.20m		
21.93	G-Z	i	22h 16.25m	
		i	17.62	
31.44	G-Z	i	10h 29.24	

Earthquakes without distinct phases:
1.04, 1.46, 2.07 overlapping 2.16, 2.29, 3.03, 3.56, 3.68, 7.02 (beginning lost) 8.58, 9.83, 11.98, 12.96, 13.37, 13.77, 14.84, 20.48, 22.72, 24.63, 24.76, 24.79.

Records lost or vitiated:
6.64 to 7.0, 16.0 to 16.5, 18.0 to 18.5, 19.0 to 19.5, 25.0 to 26.0, 26.5 to 27.0, 27.5 to 28.0, 29.5 to 30.0, 31.5 to 32.0.

G-Z is vertical Galitzin. Constants April 26, 1930
T_1 = 9.14 T = 8.92 Mu^2 = .06 Synchronous Magnification = 904.
Spindler & Hoyer Clock, corrected daily by Arlington.

Do you wish to continue to receive the Bulletin (Instrumental Readings)?
What other information do you want besides that given in this issue?
Do you wish to continue to receive the Dispatches?
Is your address correct? We are revising our mailing list. Those not heard from will not receive the September issue to be mailed Oct. 14th.

F. W. SOHON, S. J.,
Director.

No. From June 1 to June 30 19 30

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)		V	T_o	ε:1
	A_N			
	A_E			
	A_Z			

Bosch Photographic Pendulums		V	T_o	ε:1
	A_N			
	A_E			

		V	T_o	ε:1
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date June 1930	~~Character~~ Instrument	Phase	Time	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
1.57*	G - Z	e	13h 37.1m#						
		i	43.27						
		eL	55.4						
		M	67.0						
5.50	G - Z	i	12h 02.39m						
		e	11.60						
		i	12.50						
		L	36.0						
11.05	G - Z	iP′	1h 8.82M						
		P_cP_cS	12.36						
		$S_cP_cP_cS$	22.0					140°(?)	
13.05	G - Z	iP	1h 4.18M						Com-
		eS	12. 6					62°	pression
		eL	25.0						
		M	34.0						
25.44	G - Z	iP	10h 27.13m						Comp.
		i	29.16						
		eS	35.0					57°	
		eL	39.3						Over- lapng nxt q. dil.
25.51	G - Z	iP	12h.10.99m						
		i	11.31						
		iS	15.15					24°	0 (computed) 12h.5.7m
25.90	G - Z	iP	21h 31.02m						comp.
		e	32.73						
		iS	38.77					55°	0 (computed) 21h21.3?

*Date given in decimals of day. #Arrival times given in decimals of minute.

Earthquakes without distinct epochs:
12.39*, 12.46, 15.35, 15.95, 18.76, 19.55, (time marks uncertain)
21.12, 23.95, 25.85, 26.49, 26.79, 27.21.

Lacunae, due to interrupted registration:
4.12 to 5.00, 6.42 to 6.45, 21.00 to 21.54, 24.00 to 24.54.

All readings given above from Galitzin Vertical. Constants: June 21, 1930
T_1 = .153m = 9.14 sec. Mu^2 = .00
T = .168m =10.05 sec. Synchronous magnification = kA1T/4πl = 928

F. W. SOHON, S. J.
Director.

No. 165a From July 1 to July 31, 1930

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka. 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_0	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A			
	A_E			
	A_Z			
Bosch Photographic Pendulums	A_N			
	A_E			
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

*Date given in decimals of day
#Phase time given in decimals of minute.

Date July 1930	INSTRUMENT	Phase	Time#	Periods	Amplitude A_N	A_E	A_Z	Δ	Remarks
1.05*	G-Z	eP	01h.16.86m						dil.
	"	ePR1	18.4						
	"	i	29.65					41.°	
	"	L	31.0						
2.89		O	21h.03.53m						
	G-Z	eP	18.58						dil.
	"	eP'	22.36						
	"	iPR	23.38					114°	Phases after 21h.22m.also on N-S
	"	i	33.22						
	"	L	59.0						
7.57	G-Z	eP	13h.38.42m						
	G-N	e	39.13		Evidences of two quakes with				
	"	e	41.69		2d. P = 13.39.13				
	"	eS?	43.88		2d. S =		41.69 or 45.69		
	G-Z	e	44.20						
	G-N	i	45.69						
	G-Z	iL	47.94						
	G-N	L	50.5						
13.05		O	01h.04.83m						
	G-N	eP	9.50		N-S time doubtful to ± .05m.				
	G-Z	P	9.63			comp.			
	G-N	i	12.59						
	G-Z	iS	13.12					20.2°	
	G-N	iS	13.17						
	G-Z	L	14.5						
13.06	G-Z	eP	01h.35.9 m		Overlapping previous quake				
	G-N	iPR1	38.35						
	"	eS	43.8					53°?	
	"	L	53.0						
14.95	G-ZN	iP	22h.46.37m.			comp.			
	G-ZN	iS	51.60				32.8°		O = 22h.40.2m (U.S.C.G.S.)
	G-Z	L	54.0						
20.47	G-ZN	eP	11h.12.64m.						
	G-N	i	17.66						
	G-Z	i	19.35						
	G-N	L?	24.0						
	G-Z	L?	27.3						
22.82		O	19h.26.03m.			comp.			
	G-Z	iP	38.50						
	G-N	e	48.68						
	"	iS	49.00				83.8°		
	"	eL	65.5						

No. 165b.   From July 1 to July 31, 1930.

DATE	INSTRUMENT	PHASE	TIME	PERIODS	AMPLITUDE A_N	A_E	A_Z		REMARKS
July 1930									
23.01		O	00h.09.0m					Destructive, Province of Avellino, Italy	
	G-Z	(eP?)	19.58						
	G-N	eP	19.62						
	G-N	eP	19.69						
	G-Z	iP	19.74						Dil.
	G-N	iS	28.47					65.3°	
	G-E	eS	28.50						
	G-NE	eL	39.7						
25.91		O	21h.39.50m.						
	G-E	eP	46.18						
	G-EZ	e	50.50						
	G-E	eS	51.24					31.5°	
	G-E	L	52.8						
27.63	G-Z	eP	15h.07.34m						
	G-N	iS	11.95					27.6°	
	G-NZ	L	16.0						
27.80		O	18h.58.19m.						
	G-NZ	iP	19h.04.58						
	G-N	eS	09.44					29.7°	
	G-NEZ	L	15.0						
29.48		O	06h.23.71m						
	G-NEZ	iP	29.88						
	G-NE	iS	34.58					28.3°	
	"	L	37.4						

Earthquakes without distinct epochs, or with phases unidentified:
5.80, 5.92, 7.87, 9.66, 13.83, 14.87, 17.78, 19.65,
19.79, 20.55, 23.75, 27.36, 27.51, 29.89, 30.80.

Instruments

G-Z Vertical Galitizin
N-Z N-S "
E-Z E-W "
Spindler&Hoyer Clock corrected daily by Arlington.

Constants:

	Instrument	T_1	T	Mu^2	k	Synchronous Magnification
(Jun21/30)	G-Z	9.14s .153m	10.05s .169m	.00	288	928
(Jul14/30)	G-N	25.6s. .427m	26.03s .434m	.07	81	1910
"	G-E	25.75s .429m	25.9s .431m	-.1	93	2020

J. S. O'Conor, S. J.,
(Acting Director).

No. 166

WASHINGTON, D. C.

INSTRUMENTAL BULLETIN
of the Georgetown University Seismological Observatory.

Galitzin Readings of Quakes with Distinct Epochs

1930 Aug.	Phase	N-S	E-W	Vert.	Remarks
1.01	?	7h e28.0m	i28.04m		
	?	e31.6			
	eL	e37.7	e32.3	e37.8	
4.22	O	5h 4.4m computed from P and S			
	P	5h i12.32	e12.35	i12.36	dil from SW
	?	i15.34	e15.29	i15.37	very prominent
	?	e16.99		e17.03	prelude to S
	S	i18.54	i18.54	e18.5	Distance 41°. Also others.
	L_q		e25.ca.		no Raleigh waves
18.42	O	9h 53.6m adopted from Coast Survey			
	e	10h (Out of	e6.9	e 7.7	
	P	balance)		i 7.83	
	?			e11.12	
	?			i11.86	
	PR1		i12.17	i12.15	
	PR2		e14.3	e14.4	
	SKS		i18.13		Also others. E-W faint;tangled. K written for $_cP_c$
29.36	O	8h 27.3m computed from P. S and PR1.			
	P	8h i33.83		i33.84	dil. from S
	PR1			e34.75	
	S		e33.84		Distance 31°
	L	e42.ca	e40.ca	e42.ca	

Earthquakes recorded without distinct epochs: 1.93, 2.71, 3.09, 3.94, 4.67, 5.02, 5.49, 6.26, 6.53, 10.01, 11.19, 13.06, 13.24, 19.09, 19.23, 19.28, 20.89, 21.85, 23.50, 24.42, 25.56, 25.90, 30.39, 31.04.

Instrumental Constants.	N-S	E-W	Vertical
Galvonometer Period	25.6 sec.	25.7 sec.	9.1 sec.
Pendulum Period	26.0	25.9	10.0
Damping: mu square	.07	-.10	.00
Synchronous Magnification	1767	2032	928
Date 1930	Jul.14	Jul.18	Jun.21

F. W. Sohon, S. J.
Director.

menfa 160,161,162, 165,166

No. 167 September 1930

WASHINGTON,D.C.
Instrumental Bulletin
of the Georgetown University Seismological Observatory

Galitzin Readings of Earthquakes with Distinct Epochs.

1930 Sept	Phase	h	N-S	E-W	Vertical	
2.67	O	15h 50.7m				Computed from S-P
	P	15h	e57.3	e57.4	e57.4	
	S		e62.3	i62.42	e62.8	Distance 30.6°
	eL		66 ca	64 ca	67 ca	
14.14		3h	e21.0		i21.0*	*Obscured by clock
			e23.2		i23.11	
			i27.05		i26.95	
			i29.86		i30.18	
			e30.5 ca	i30.86		
			i33.15			
			e36.8	i36.76		
			i38.10	e39.7		
			i43.04	i43.06	e43.2	
	eL		50 ca	50 ca	67 ca	
	W3?		232	232		listed below as 14.29
17.14	O	3h 24.6m				Computed from S-P
	P	3h	i27.91	e27.9		
	S		e30.5	e30.5		Distance 13.4°
	eL		31.9	31 ca	30 ca	
22.08	O	1h 38.4m				
	e	1			e50.18	Prelude to P
	P		i51.57	e51.4	e51.4	
	PR1			e55 ca	e55.4	
	PR2			e57.6		
	SKS			i61.49	61.68	
	SR1		68.09	68.12		Adopted distance 90°
	SR2			72.25		Also others
	eL		80 ca	80 ca	93 ca	
	W3			290 ca	307 ca	
30.90	O	21h 28.3m				Adopted distance 90°
	e				e40.0	
	P	Horizontals not			i41.96	
	PR1				e45.4	
	SKS				e51.9	
	PS				e53.5	
	SR1				i58.35	Also others
	eL				77 ca	

Earthquakes recorded without distinct epochs (i.e. supplying only unidentified e's): 1.23, 1.82, 1.86, 4.08, 4.45, 4.16, 7.57, 7.98, 11.08, 11.55, 12.05 12.07, 12.84, 12.93, 13.06, 13.17, 13.25, 13.33, 13.45 13.99, 14.29, 14.74 14.77, 15.05, 16.00, 16.47, 18.76, 20.10, 21.32, 21.41, 21.98,22.23, 22.50 22.52, 22.59, 22.61, 22.73, 22.95, 23.18, 23.52, 23.59, 23.98, 24.36, 24.56 25.21, 25.50, 25.77, 26.19.

F.W.Sohon,S.J.

$\phi = 38° \; 54' \; 25''$ N
$\lambda = 77° \; 4' \; 24''$ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = — .758
c = + .628

Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock
corrected daily by NAA
G = Galitzin
(Cambridge & Paul)
W = Wiechert 200k
M = Mainka 135k

No.168

Earthquakes with Distinct Epochs

1930 Oct	Instr Comp	Phase	Arrival Time h	m	Remarks
8.44	G-Z	eP	10	34.4	0 10h 19.3m computed from
	Z	i		38.80	PS-PR1
	Z	iPR1		39.23	
	E	iSKS		44.97	
	EZ	iPS		49.01	Distance 118°
	E	iSR1		55.41	Also others.
	Z	eL		73 ca	
11.18		0	4	6.1	Computed from S-P
	G -NZ	iP		15.74	
	NEZ	S		21.5	Clock mark. Distance 46°
	NE	SR1		24.73	
		L			Unimportant
17.37		0	8	46.7	Computed from S-P
	G-Z	iP		57.95	
	E	iPR1		60.95	
	EZ	S		67.06	Distance 69°
		L			Irregular
19.52	G-Z	i	12	22.31	Horizontal records not legible
		PcP?		22.51	
24.85	G-Z	0	20	14.8	Computed from PR1-P
		iP		29.62	
		iPR1		34.18	Distance 111°
		PS		43.25	Also others. Horizontal records
		L		63 ca	not legible.
25.51		0	12	2.9	Computed from S-P
	G-Z	P		12.23	
		PR1		14.23	
		S		19.48	Distance 52°. Also others.
		L			Cut off
28.89		0	21	17.9	Computed from S-P
	G-NEZ	iP		29.33	
	NE	PR1		32.50	
	NEZ	S		38.75	Distance 71°. Also others.
		L			Large amplitudes, but legible.
30.	G-N	i	7	32.34	
.31	E	i		32.44	
	N	e		36.2	

Earthquakes without Distinct Epochs.

1.16, 1.64, 3.07, 5.82, 6.21, 7.15, 7.35, 8.83, 9.23, 9.44, 9.90, 10.07
10.42, 12.13, 12.46, 13.12, 15.44, 15.86, 16.20, 16.61, 16.90, 17.08, 18.19
22.37, 22.41, 26.56, 27.21, 27.5, 28.99, 29.18, 29.56, 29.64, 30.24, 31.23
31.71, 31.81, 31.9

Instrumental Constants	N-S	E-W	Z
Galvonometer Period	25.6s	25.7s	9.1s
Pendulum Period	26.0	25.9	10.0
Damping mu square	.07	-.10	.00
Synchronous Magnification	1767	2032	928
Date 1930	Jul 14	Jul 18	Jun 21

F.W.Sohon,S.J.

169, 170, - 172, 172 bis, - 174

ϕ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = — .758
c = + .628

Washington, D. C.
Instrumental Bulletin
of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock corrected daily by NAA
G = Galitzin (Cambridge & Paul)
W = Wiechert 200k
M = Mainka 135k

Earthquakes with Distinct Epochs

1930 Nov	Instrument Component	Phase	Arrival Time h	m	Remarks
9.81		O	19	8.6	Computed from PS-P'
	G-Z	eP		24.6	
	G-Z	P'		27.82	
	G-NZ	ePR1		29.9	
	G-Z	PS		40.19	Distance 126°
		eL		?	Tangled
10.59		O	13	43.5	Computed from SKS-PR1
	G-Z	iP'	14	3.42	
	G-NEZ	PR1		6.80	
	G-EZ	iSKS		10.57	Distance 150°
12.81		O	19	10.2	Computed from S-P
	G-NEZ	iP		20.54	
	G-NEZ	S		28.79	
		eL			Between 29 and 42m
24.26		O	6	6.4	Computed from S-P
	G-NZ	P		15.47	
	G-NEZ	S		20.7	
25.80		O	19	2.8	Computed from PR1-P
	G-Z	P		16.58	Horizontals not legible
		PR1		20.64	Distance 99°
		iPS		29.50	
		eL		48 ca	
28.32		O	7	32.4	Computed from S-P
	G-Z	P		39.42	Horizontals not legible
		S		44.59	Distance 32°
		eL		49 ca	
30.90		O	21	30.4	Computed from S-P
	G-NEZ	P		37.3	
	G-NEZ	PR1		38.23	
	G-NEZ	S		42.55	Distance 33°
	G-NEZ	eL		45 ca	

N.B. The times of origin and epicentral distances given in these reports are to be understood as mere memoranda to check the tentative identification of phases. For statistical use it is important that the same tables should be used in all cases. As the scientific value of the instrumental bulletin consists solely in the epochs that it supplies for the back computation of origin times and epicentral distances, and since the large errors both personal and instrumental involved in the reading of unidentified emergent phases calls for the rejection of such readings in any scientific investigation, and the fact that such earthquakes have occurred will have been sufficiently noted in the reports of nearer stations, it was decided upon consultation that earthquakes that do not supply distinct epochs should not be reported at all. With regard to earthquakes that provide distinct epochs, three or four of the best defined arrival times are given. Where a phase is listed for more than one component, the mean is reported.

F.W.Sohon,S.J.

$\phi = 38°\ 54'\ 25''$ N
$\lambda = 77°\ 4'\ 24''$ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = — .758
c = + .628

Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock
corrected daily by NAA
G = Galitzin
(Cambridge & Paul)
W = Wiechert 200k
M = Mainka 135k

No. 170

1930 Dec	Instrument Component	Phase	Arrival Time h	m	Remarks
3.80		O	18	51.6	Computed from SR1-PR1
	G-Z	iPR1	19	12.22	Horizontals not legible
		iSKP		14.50	
		ePS		22.3	
		SR1		29.13	Distance 124°
		eL		50 ca	
6.30		O	7	1.9	Computed from S-P
	G-NZ	eP		13.8	
	G-N	i		14.88	
	G-Z			23.16	
	G-N	iS		23.58	Distance 76°
	G-NZ	eL		33 ca	
9.81		O	?		
	G-Z	?	19	25.58	
	G-Z	i		30.54	
	G-NEZ	i		32.51	
	G-Z	i		34.54	Also others.
		L	inconspicuous.		
21.63		O		?	
	G-Z	i	15	9.79	
	-Z	i		11.2	Obscured by clock.
	G-NZ	-		21.7	
	G-Z	-		23.12	
		L		?	

Instrumental Constants		Wiechert		Mainka	
Mass		200		135	
Component		N-S	E-W	E-W	N-S
Period		4.8s	5.3s	11.8	Not
Static Magnification		109	98	87	in
Damping Ratio		4.7	5.5	3.9	ad-
Friction	r	.12mm	.22mm	.58	just-
	R	.005	.008	.004	ment.
Date		1931 January 18.			

The observations did not warrant a resolution of the friction into articular and tractive components.

Constants of the Vertical Galitzin.	
Period of Galvonometer	9.1 sec
Period of Pendulum	9.6 sec
Mu Square	-.09
Synchronous Magnification	868
Date	1931 January 18.

The 25kg Bosch-Omori is now in operation in Weston College, Weston, Mass., and the Bosch Photographic is being installed at Woodstock College, Woodstock, Md. Of the two Wiecherts, horizontal and vertical, each 80kg that were loaned to Guatemala, nothing has been heard since 1926, when they were said to be ready to start operation.

The horizontal Galitzins were transferred to the piers used for the Bosch Photographic, but their operation is far from satisfactory on account of the poor site.

F.W.Sohon,S.J.

$\phi = 38° \ 54' \ 25''$ N
$\lambda = 77° \ \ 4' \ 24''$ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = — .758
c = + .628

Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock
corrected daily by NAA
G = Galitzin
(Cambridge & Paul)
W = Wiechert 200k
M = Mainka 135k

No.171

1931 Jan	Instrument Component	Phase	Arrival Time h	m	Remarks
2.41		0	9	48.8	Computed from S-P
	G-Z	P	9	55.60	
		PR1		56.50	
		S		60.8	Distance 32°
		L		67	
12.86		0	20	34.6	Computed from S-P
	G-NE	eP		44.7	
	-NE	iS		54.95	Distance 80°
	-NE	PS		55.85	
		eL		66 ca	
15.08		0	1	50.7	Computed from S-P
	W-NE	iP		56.65	G-Z reads the same
	-NE	S		61.32	Distance 28°
	-NE	eL		64 ca	
16.81		0	19	19.2	Computed from S-P
	G-Z	P		25.77	
	W-NE	S		30.83	Distance 31°
	W-NE	eL		35 ca	
17.12		0	2	50.0	Computed from S-P
	G-Z	P		56.56	
	-Z	eS		61.6	Distance 30°
	-Z	i		62.26	
	M,W	eL		66 ca	
23.25		0	5	52.3	Computed from S-P
	W-E	iP		58.31	
	W-N	S		62.6	Distance 26°
	G-Z	eL		68 ca	
25.53		0	12	34.3	Computed from S-P
	G-Z	iP		41.18	
	G-NEZ	PR1		42.00	
	-NEZ	eS		46.2	Distance 32°
	-NEZ	eL		50 ca	
27.85		0	20	9.1	Computed from SR1-PR1
	G-NZ	PR1		28.92	
	-NE	SKS		34.82	
	-NEZ	PS		38.5	
	-NZ	SR1		45.00	Distance 116°
	-Z	eL		63	
28.90		0	21	24.0	Computed from PS-SKS
	G-NEZ	PR1		44.1	
	-NEZ	iSKS		49.89	
	-NEZ	iPS		54.07	Distance 116°
	-Z	eL		75 ca	
29.72		0	17	10.6	Computed from S-P
	G-NEZ	P		16.45	
	-NEZ	eS		20.9	Distance 26°
	-NEZ	eL		24.5	

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Instrumental Bulletin

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1931 Feb	Instrument Component	Phase	Arrival Time h	m	
2.96		O	22h	47.0	Computed from PS-PR1
	G-NE	P'	23	5.89	G-Z: iP' 5.80
	-NE	iPR1		7.54	G-Z: i7.59, i7.65
	-E	iPS		17.59	Dist 121°; G-Z:17.45
	Record changed during quake				
7.15		O	3	29.9	Computed from S-P
	G-NZ	iP		36.38	Com. from S
	-NEZ	PR1		37.23	
	-NE	S		41.30	Dist. 29.8°
		eL		45 ca	
8.09		O	1	44.6	Computed from PS-PR1
	G-Z	P'	2	2.79	
	-EZ	PR1		4.80	
	-E	PS		14.74	Distance 118°
	-Z	eL		47	
9.10		O	2	11.0	Computed from S-P
	G-N	P		20.41	
	-NE	S		27.73	Distance 52°
	-NE	eL		35 ca	
10.25	G-NEZ	iP'	6	54.20	
	-NZ	PR1		57.57	Many contradictory impulses
12.25		O	5	43.9	Computed from SR1-P'
	G-NZ	iP'	6	3.70	Com from S
	-Z	PR1		6.82	
	-E	SR1		25.42	Distance 143°
	-Z	eL		66	
12.34		O	8	6.7	Computed from S-P
	G-NEZ	P		12.36	
	-NEZ	S		16.77	Distance 25.3°
	-NE	eL		19.3	
13.07		O	1	27.3	Computed from PS-PR1
	G-Z	P'		46.29	
	-E	PR1		47.99	
	-EZ	PS		58.28	Distance 124°
	-Z	eL		85 ca	
14.60		O	13	58.7	Computed from PS-P'
	G-Z	P'	14	18.48	
	-Z	ePS		33.3	Distance 143°
	-Z	eL		72 ca	
16.79		O	18	48.3	Computed from PS-P
	G- Z	iP	19	1.73	
	-N	SKS		12.30	
	-N	PS		13.91	Distance 93°
		eL		33	
19.75		O	17	47.5	Computed from PR1-P
	G -NEZ	iP	18	0.16	Com from NE
	-Nz	iPR1		3.63	
	-NEZ	eS		10.4	
	-NZ	eL		26	Overlapping the following
19.78	G-Z	i	18	43.90	
	-Z	i		47.40	
	-Z	eL		61 ca	

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1931 Feb	Instrument Component	Phase	Arrival Time h	m	
20.24	G-Z	i	5	45.94	
	-NZ	i		47.29	
	-N	i		48.18	
	-NE	i		55.88	
	-N	i		57.51	Also many others
27.41		0	9	41.3	Computed from PS-PR1
	G-Z	i		56.99	
	-NZ	i		59.38	
	-NEZ	iPR1		60.42	
	-NE	PS		69.63	Distance 109°
	-NE	eL		92 ca	

Instrumental Constants:

Component	G-N	G-E	G-Z
Period of Galvonometer	25.6s	25.7s	9.1s
Period of Pendulum	26.0	25.9	9.6
Mu Square	.07	-.10	-.09
Synchronous Magnification	1767	2032	868
Date of Test	1930 Jul 14.	1930 Jul 18.	1931 Jan 18.

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No. 173

1931 Mar	Instrument Component	Phase	Arrival Time h	m	
2.11		0	2	18.3	Computed from PS-PR1
	G-E	PR1		38.61	
	-EZ	SKS		43.9	
	-EZ	PS		48.55	Distance 120°
	-Z	eL		75	
7.03		0	0	41.4	Computed from S-P
	G-NZ	P		47.88	
	-N	PR1		48.81	
	-NZ	S		52.85	Distance 30°
	-Z	eL		57	
8.12		0	1	50.5	Computed from S-P
	G-NZ	P	2	1.76	
	-N	S		11.07	Distance 70°
	-NZ	eL		22 ca	
9.17		0	3	49.7	Computed from S-P
	G-N	P	4	2.26	G-Z:i2.46
	-Z	PR1		5.86	
	-N	S		12.73	Distance 83°
	-Z	eL		30	
11.54		0	12	26.6	Computed from PS-SKS
	G-Z	PR1		45.46	
	-NE	SKS		51.66	
	-N	PS		54.74	Distance 107°
18.34		0	8	2.3	Computed from S-P
	G-NEZ	P		13.76	
	-NE	S		23.17	Distance 72°, G-Z:i23.25
18.86		0	20	13.6	Computed from PS-P'
	G-Z	iP'		32.82D	
		iPR1		35.49	Late for PR1
		i		36.09	Largest amplitude
		iSKP		36.69	Very large
		SKS		39.77	
		PS		46.52	Distance 130°
		eL		75	
19.28		0	6	25.3	Computed from PS-PR1
	G-Z	P'		44.19	
	-NZ	PR1		45.42	
	-NE	SKS		50.89	PS-SKS gives 119°, 25.0m
	-NEZ	PS		55.21	Distance 117°
	-Z	eL		87	
28.54	G-NZ	P'	12	57.90	
	-N	PR1		61.89	G-Z:i61.29. Many inconsistent
	-N	SKS		67.87	impulses on G-Z
	-N	PS		73.34	
	-N	SR1		79.8	
31.67		0	16	1.6	Computed from S-P
	G-Z	eP		8.0	
	-E	iS		12.83	
	-EZ	eL		16	

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No.174

1931 April			h	m	
3.09		O	1	55.6	From S-P
	G-Z	P	2	4.92	Com
	-Z	PR1		7.12	
	-EZ	S		11.99	Distance 50°
	-Z	eL		19	
6.30		O	6	49.8	From PS-PR1
	G-Z	iP'	7	8.60	Com
	-EZ	PR1		10.22	
	-NZ	PS		20.17	
		eL		45 ca	
9.97		O	23	1.4	From S-P
	G-Z	iP		14.10	Com
	-NZ	eS		24.7	Distance 85°
	-Z	eL		47 ca	G-N: 35ca
	-N	M		50	
12.10		O	2	18.3	From S-P
	G-N	P		29.37	
	-NE	S		37.97	Distance 65°
	-N	SR1		41.3	
	-NE	eL		50	G-Z: 58
15.71		O	16	58.6	From S-P
	G-NEZ	P	17	6.09	
	-NEZ	i		7.41	
	-NE	S		11.72	Distance 36°
	-NEZ	eL		15	
19.05		O	2	0.0	From S-P
	G-EZ	P		7.08	
	-EZ	iS		12.44	Distance 34°
	-E	SR1		14.41	
	-Z	eL		18	
20.83	G-N	e	19	55.56	New York State
	-NEZ	i		57.21	
	-Z	i		57.31	
	-Z			57.40	
	-Z			57.64	
24.74		O	17	22.0	From PR1-P'
	G-Z	P'		41.24	Com
	-Z	PR1		42.84	Distance 124°
	-Z	PS		52.64	From PS-PR1:Or. 22.9,Dist.116°
	-Z	eL		66 ca	
27.71		O	16	50.6	From S - P
	G-Z	iP	17	3.42	Dil
	-Z	PR1		6.87	
	-N	iSKS		13.77	
	-NZ	iS		14.12	Dist 86°
	-NZ	eL		28.5	

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1931 No.175

1931 May			h	m	
1.95	G-Z	P	22	43.27	
9.15		O	10	34.5	From S-P
	G-EZ	eP		41.0	
	-EZ	eS		46.1	Distance 30°
	-E	eL		49	
10.82		O	19	26.1	From PR1-P
	G-NZ	eP		36.7	
	-Z	ePR1		39.5	Distance 64°
	-Z	eS		45.2	
	-NEZ	eL		60 ca	
12.04		O	1	37.4	From S-P
	G-NZ	iP		49.23	Dil. from N
	G-NEZ	S		58.71	Distance 73°
	-NE	eL		68 ca	
16.87		O	20	47.2	From S-P
	G-NEZ	iP		53.53	Dil from SW
	-NE	iS		58.36	Distance 29°
	-NEZ	eL		61	
20.11		O	2	22.7	From S-P
	G-NEZ	iP		31.44	Dil from NE; many unidentified
	-NEZ	iPR1		33.36	impulses, suggesting more than
	-NEZ	iS		38.30	one shock. Distance 47°
	-Z	eL		45	
20.92		O	21	53.7	From S-P
	G-NZ	iP	22	4.82	Com
	-NZ	S		13.82	Distance 67°
	-Z	eL		26	
23.15		O	3	26.7	From S-P
	G-NEZ	P		31.97	
	-NE	S		35.98	Distance 23°
	-Z	eL		38	
27.26	G-E	i	6	20.96	
	-NE	eL		28	Overlapping the following
27.28	G-Z	i	6	45.88	
	-Z	eL		64	
27.44		O	10	20.1	From S-P
	G-NZ	eP		28.15	
	-NEZ	S		34.20	Distance 41°
	-NZ	eL		40	
28.14		O	3	14.7	From S-P
	G-NZ	eP		24.86	
	-ne	S		32.99	Distance 59°
	-E	eL		40	
29.23		O	5	15.8	From S-P
	G-NZ	P		25.28	
	-NE	S		32.78	Distance 53°
	-NE	eL		38	
30.50		O	11	48.5	From S-P
	G-NE	iP		54.65	
	-NE	eS		59.2	Distance 28°
	-NE	eL		69	

IDENTIFICATION POOR

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1931
Month of
June.

No.176

			h	m	
9.59	G-Z	PR1	14	10.00	
	G-E	iPS		17.23	
	G-NEZ	eL		41.0	
	G-EZ	M		45.0	Overlapping another of less intensity.
13.65					
	G-Z	PR1	15.	53.24	From PS-PR1
	-NEZ	PS		62.70	Distance 111°
	-E	SR1		68.5	
	-Z	eL		90.	
	-EZ	M		95.5	
15.47		0	11	19.5	
	G-EZ	P		29.35	From S-P
	-E	S		34.00	Distance 55°
	-Z	eL		46.0	
20.05					
		0	1	16.5	
	G-NZ	P		28.03	From S-P
	-NE	eS		37.55	Distance 73°
	NE	SR1		42,5	
		eL		50.	
20.63					
		0		15.07.2	
	G-NZ	iP		14.75	From S-P
	-EZ	iS		22.42	Distance 55°
	-E	eL		27.	
21.52					
		0	12.	22.3	
	G-NZ	iP		29.80	From S-P
	-EN	PR1		30.67	
	"	eS		35.12	Distance 32°
	"	eL		36.8	
	"	M		41.5	
23.27					
	G-EZ	PR1	6	32.42	From S-PR1
	-NE	iSKS		[illegible].08	
	"	S		39.82	(Distance 90°)
	-N	PS		40.20	
	"	eL		56.	
29.85					
		0	20	24.13	
	G-NZ	iP		35.22	From S-P
	G-NE	iS		44.28	Distance 68°
	-N	eL		61.	

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No.177

1931
July

			h	m	
11.25		O	5	55.9	
	G-ZN	iP	6	04.66	From(S?-P)
	-N	S(?)		11.40	Distance47°(?)
	"	L		16.00	
		M		22.8	
15.69	G-Z	cP	16.	38.75	From S?-P
	-E	eS?		[illegible]	Distance 73°(?)
	"	eL		59.0	
	"	M		66.7	
17.38					
		O	9	13.40	
	G-NZ	P		19.72	From S-P
	EN	S		24.54	Distance 29°
	E	L		28.1	
	N	M		29.6	
18.23		O	5	27.0	
	G-NZ	P		37.21	Dil. From N
	-NE	iS		45.43	Distance 60° (S-P)
18.48					
		O	11	23.64	
	G-NEZ	iP		35.44	Comp. From NW
	-Z	eS		44.94	Distance 75° (S-P)
	ZN	L		58.	Records on horizontal components
	Z	eM		66.	changed during progress of quake
21.15					
		O	3	36.1	
	G-Z	iP'		54.95	
	-EZ	PR1		56.42	Distance 121°(PR1-P')(?)
	N	i		64.23	
	"	i		72.8	
	" "	ii		73.85	
	"	L		86.8	
23.60		O	14	20.2	
	G-Z	P'(?)		39.27	
	"	ePR1(?)		41.01	Distance 125°(?) (PR1-P')
	-EZ	i		42.22	Horizontals obscured by wind effects
	E	SKS		45.68	
	"	M		93.	
27.30					
		O	7	15.83	
	G-NEZ	iP		21.33	Dil. From NE
	"	iS		25.54	Distance 24.2° (S-P)
	NE	L		28;1	
27.69					
		O	16	28.58	
	G-NZ	P		36.46	
	NEZ	eS		42.55	
	E	L		47.4	

J.S.O'Conor, S.J.
(Acting Director)

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1931 No.178

August			h	m	
7.09		0	2	11.5	
	G-Z	eP'		30.76	
	G-Z	iP'		30.84	
	G-Z	ePR1		30.93	Distance 131°
	G-ZN	iSKP		34.52	
	G-ZN	L		78.9	
10.89		0	21	18.45	
	G-Z	P		32.00(?)	First motion obscured by time mark
	G-N	iP		32.20	
	G-N	SKS		42.48	
	G-N			43.17	
	G-Z	PS		45.16	Distance 95°
	W-NE			67.3	
13.93					
	G-Z	P	22	29.16	
	G-Z	PS		39.02	
	G-NE	M		60.5	
16.49		0	11	40.20	Preceeded by shock:iP;11,26.62
	G-Z	iP		45.65	
	G-N	iS		49.86	Distance 23.8°
	W-NE	L		52.9	
					F overlapping with another iP at 13h 45.90m
18.60		0	14	20.88	
	GZN	P		34.34	
	G-N	iSKS		44.84	Distance 94°
	G-Z	ePS		46.54	
	G-Z	L		66.06	
	G-Z	M		72.2	
24.90		0	21	35.20	
	G-ZN	eP		49.55	
	G-N	iSKS		60.05	Distance 105°
	G-N	PS		62.9	
	G-N	L		86.9	
	G-N	M		98.3	
27.66		0	15	27.0	
	G-Z	eP		41.40	
	G-Z	PR1		45.68	
	G-Z	PS		54.83	Distance 105°
	G-Z	M		85.	

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1931 No.179

September			h	m	
6.34		0	8	02.2	
	G-Z	eP		08.9	
	G-E	iS		14.23	Distance 32°
	G-E	L		15.23	
	G-Z	M		18.3	
9.57		0	13	40.3	
	G-Z	eP		47.8	
	"	ePR1		49.0	
	"	S		53.5	Distance 37°
	"	M		61.	
9.86		0	20	37.9	
	G-Z	eP		52.60	
	"	eP'		56.44	
	"	iPS		66.40	Distance 109°
	"	L		91.	
	"	M		99.	
20.96		0	23	04.9	
	G-E	Pg		06.81	
	G-EZ	Sg		07.97	Distance 5.3°
	G-Z	M		08.55	
21.10		0	2	19.8	
	G-Z	SKS		44.30	
	"	SKKS		45.1	
	"	SR1		52.	Distance 99°(Measured)
	"	M		71.9	
	"				
25.25		0	5	59.6	
	G-ZN	iP'	6	19.52	Compression.
	G-E	iPR1		22.85	
	G-Z	SKP		23.35	
	G-E	SKS		26.60	Distance 149°(Measured)
	G-Z	M		81.6	
26.83					
	G-Z	i	20	01.90	Identification poor because of
	"	(I) iPR1		06.7	heavy micros. Undetermined loosing
	"	i		08.85	rate on G-Z clock.
	"	(I) L		14.65	JSA andUSCG indentify as two shocks.
	"	(II) M		21.6	

Exceptional microseismic activity, beginning Sept19,05hrs Continuing till Sept.23 with gradually diminishing intensity Increasing again on Sept.25,14hrs. Maximum activity on Sept. 27, and 28. Continuing through end of month.
Maximum trace range 4.5mm.
Avg. period 6 sec.

J.S.O'Conor, S.J.

$\phi = 38° 54' 25''$ N
$\lambda = 77° 4' 24''$ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = +.174
b = —.758
c = +.628

Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock corrected daily by NAA
G = Galitzin (Cambridge & Paul)
W = Wiechert 200k
M = Mainka 135k

1931 October — No.180

			h	m	
3.80		0	19	13.	
	G-NE	eP		29.2	
	G-N	iP'?		33.2	
	G-E	iPR1 ?		34.	
	G-N	SKP		42.	Distance 121° (Ca)
	W-E	L		63.45	
	W-E	M		70.4	
10.01		0	00	19.8	
	G-Z	eP		35.29	
	"	P'		38.82	
	"	PR1		40.24	
	"	PS		50.36	Distance 119° (From PS - P')
	-	L		81.	
26.18		0	04	24.6	
	G-Z	P?		31.46	
	"	L		41.39	Distance 32.1°(Measured)
	"	M		44.47	
November 2.02		0	00	31.8	
	G-Z	iP		38.03	
	"	iL		47.20	Distance 30° (measured)
	"	M		50.8	
2.42		0	10	03.02	
	G-Z	eP		17.12	
	"	iPR1		21.44	Distance 104° (PR1-P)
	"	M		66.7	
20.60		0	14	16.8	
	G-Z	ePR1		36.81	
	"	ePS		46.95	Distance 121° (PS-PR1)
	"	L		78.	

Summary of Galitizin Constants: From Jan.1931 to Aug.31, 1931

Component	N-S	E-W	Z
Gal period T_1	25.6sec	25.7 sec	9.1sec.
Pend. " T	26.0	25.9	9.6
Mu square	+.07	-.10	-.09
Synchronous Magnification $\frac{KA_1T}{4\pi l}$	= 1767	2032	868

Summary of Galitizin Constants From Aug.31, 1931 to October 15, 1931
The above values are correct except for a change in A_1 on North and East Component making the

Synchronous Magnification =	N-S	E-W	Z
	1593.	1849.	868

(J.S.O'C.S.J.)

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Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

1931
December

No.181

			h	m	
17.15					
	G-NEZ	Pg	03,	41.19	Amplitudes less than micros, distinguishable by shorter period. Press time of O = 03h. 38m. Felt in Tennessee.
	G-Z	P*		41.38	
24.16	G-NEZ	i	03	49.54	(possibly micro)
	"	iP		49.90	
	G-ZE	eS?		57.4	
	G-ZE	eSR1		60.8	
	G-E	eL		67.5	Surface waves small and irregular

1932
January

5.08		O	01	54.0	
	G-Z	iP	02	05.60	
	G-N	iS		15.15	Distance 73° (From S-P)
	"	SR1		20.0	
	GN	M		34.0	
9.43		O	10	19.+(ca)	
	G-Z	eP'		38.1	
	"	iPR1		40.00	N.B. Record reread and interpreted in view of note of JSA on probability of deep focus.
	"	iSKP		41.70	
	G-E	ePR2		43.0	
	"	eSKKS		46.4	Distance 128° ca.
	"	eSPS		58.0	No usual surface waves; continuation of motion of irregular period.
24.16		O	03	43.8	
	G-Z	ePR1	04	04.5	
	G-E	ePS		14.4	Distance 120° (Measured)
	"	SPS		21.4	
	"	L		42.0	
29.57		O	13	40.9	
	G-Z	eP'	14	00.1	
	G-EZ	ePR1		01.8	
	G-E	ePS		12.0	Distance 123° (From PS-PR1)
	"	i		19.4	
	"	eSR2		31.1	Note: Periods of PS and SR2 = .7m and .75m
	G-E	L		38.9	
	W	L		41.0	
	G-E	M		49.0	
	W	M		51.0	
AFTERSHOCK with:					
	G-NEZ	L	16.	40.0	
	"	M		52.0	

J.S.O'C.,S.J.

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Washington, D.C.
Instrumental Bulletin
of the Georgetown University Seismological Observatory

1932
February

No. 182

			h	m	
3.2'6		O	16	15.8	
	G-NZ	iP		20.38	Comp.
	G-NE	iS		23.92	Distance 18.7° (S-P)
	G-ZN	M		27.5	
16.58					
	G-Z	SR1(?)	14	23.6	
	G-E	L		39.7	
	"	M		43.5	Amplitude ratio of ME to MN 3 : 1
17.67		O	16	07.00	
	G-ZN	iP		12.70	
	G-NE	S		17.4	Distance 26° (S-P)
	G-E	L		22.1	
23.00					
	G-Z	(iSKP)	00	03.18	Identification of phases tentative,
	G-N	(iPPS)		12.76	based on similarity of characteristics
	G-E	"		12.85	to quake of Jan, 29.57
	G-NE	(iPPSS)		19.02	T=0.63m Amplitude 550microns.
	G-N	(iSR2)		23.08	
	G-N	eL		38.	

Note on earthquake of Jan.9.43, 1932.
Following the adoption of a focal depth of 0.06 and time of O= 10h21.8m it is interesting to observe that the arrival times listed in the previous bulletin(omitting the first reading,10,38.1 as micro) can all be interpreted to agree with the phases of the Scrase table, with distance from Washington taken as 118°. Viz:

Jan. 9.43	O	10h	21.8
	iP'		40.00
	iPR1		41.70
	epPR1		43.0
	SKS		46.4

J.S.O'C., S.J.

…seignement.

Note jointe au bulletin de l'Observatoire de Georgetown :

Plusieurs modifications ont été apportées au bulletin ....

.....

Le temps d'arrivée des phases "i" sera indiqué au 1/100 de minute; celui des phases "e" au 1/10 de minute.

Le système décimal a été adopté non-seulement dans le fait de la substitution des centièmes de minutes aux secondes, mais aussi dans la numérotation [identification number] des tremblements de terre eux-mêmes.

Chaque tremblement est numéroté d'après le chiffre de la date (le quantième du mois), et aussi par le nombre de centièmes de jour qui s'étaient écoulés au moment où le tremblement a pris naissance. (Lorsque le temps origine est inconnu, on y substitue le temps d'arrivée du premier mouvement.)

Lorsqu'au cours d'un tremblement de terre une nouvelle heure —

... inutes de l'heure
... prises, ainsi : 60, 70, 80 etc.

....

Les amplitudes et directions réelles ne seront données que lorsque la détermination de l'azimut peut être faite au moyen des P.

La distance épicentrale de Serfetown sera donnée en degrés des grands arcs de cercle ; 9° = 1000 km.

La notation K a été substituée à cPc du nouveau code international.

. . . .

Des modifications ont été apportées au mécanisme d'inscription du Galitzine vertical, ainsi qu'à l'emplacement et aux périodes du Galitzine horizontal ; ci-dessous les constantes.

[Prière de se reporter pour ces constantes au texte anglais. N.D.T.]

Une table ~~...~~ pour la conversion des centièmes de minute en secondes sera jointe, sur demande, au prochain bulletin.

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$\lambda = 77° \; 4' \; 24''$ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = − .758
c = + .628

Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock corrected three times daily by NAA
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NOTES
CONCERNING
THE INSTRUMENTAL BULLETIN

OF THE GEORGETOWN SEISMOLOGICAL OBSERVATORY

Several changes in the matter and form of the Instrumental Bulletin have been introduced during the past two years, and it may prove useful to summarize them at this time, for the benefit of those who have not received copies of all previous numbers.

The purpose of this Bulletin is to supply epochs for the computation of origin times and epicentral distances.

Therefore P and S, or in the absence of one or both of these, such prominent phases as might be of service, will be reported, including contradicting evidence if important.

Arrival times of 'i' phases will be reported to 1/100 minute; 'e" phases to 1/10 minute. *

The decimal system has been adopted, not only in the substitution of hundreths of minute for seconds, but also in the identification number of the earthquakes themselves.

Each quake is numbered according to the date number of the day of the month, and also by the number of hundreths of the day that has elapsed at the time the quake originated.(Arrival time of first motion is substituted when time of origin is unknown)

When a new hour occurs during the progress of a quake the minutes of the previous hour are included, thus: 60, 70, 80, etc.

Since large errors, both personal and instrumental, involved in the reading of unidentified emergent phases call for the rejection of such readings in any scientific investigation, earthquakes which supply no distinct epochs will not be reported.

Actual earth amplitudes and directions will be given only when azimuth determination can be made from P.

Epicentral distances from Georgetown will be given in degrees on great circle arcs; 9° = 1000 Kilometers.

K has been substituted for the ePc of the modified International notation.

OTHER CHANGES

Clock corrections are now facilitated by the automatic registration of Arlington time signals, three times daily, on the photographic records.

The recording mechanism of the vertical, as well as the location and periods of the horizontal Galitizins have been changed, the constants of which are subjoined.

GALITZIN CONSTANTS

Component	N-S	E-W	Z
Gal Period T_1	14.55 sec.	14.59 sec	9.08 sec
Pend. " T	14.70	14.75	9.06
Mu square	-0.07	0.0	-0.02
Transmission Factor K	93.3	95.0	304.0
Gal to Drum Distance A_1	138.5 cms	138.5 cms	138.5 cms.
Synchronous Magnification	1070.	1090.	738.5
Paper Speed	30.mm per min.	30. mm per min.	30. mm per min.
Reduced Pend. Length.	14.25 cms.	14.15 cms.	41.09 cms.
Date of test	Nov.29,1931	Nov.25,1931	Oct.26, 1931

* A table for converting hundreths of minutes to seconds will be enclosed with the next Bulletin, on request.

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λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
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Washington, D. C.

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1932 March

No.183

			h	m	
14.17		O	04	5.+	
	G-Z	e(P?)		12.05	
	G-N	eS		17.5	Distance 33° (Measured)
	"	eSR1		19.4	
	"	M		23.3	
14.95		O	22	42.53	
	G-Z	iP		49.20	
	G-N	iS		54.30	Distance 31° (S-P)
	"	iPcS		55.81	
	G-Z	M		62.1	
19.48					
	G-Z	e	11	27.6	
	G-N	i		28.5	
	"	e		43.7	
	G-NEZ	M		59.0	
25.99+		O	23	58.5	
26.01	G-ZNE	iP	00	07.50	Dil. 7.7mu N, 6mu W
	G-NE	iS		14.72	Azimuth 322°
	G-E	iSR1		18.32	Distance 50° (S-P)
	"	L		21.3	
	"	M		24.8	
27.99+					
	G-Z	i	23	55.40	
	"	M		59.0	
31.80	G-Z	e	19	14.5	
	G-ZNE	i		16.24	Short period, no L waves.

Microseismic storms: a Beginning March 6, 8hrs. Max. Mar.7, 00 to 15hrs
Ending abruptly March 11, 7h38m. (T_e=5sec. Trace range 8mm)
(Low barometer: Mar.6, 20h)
b Beginning Mar. 28, 4h.
Ending " 29, 18h.

Note: Short period waves(1.8sec) from Manistique blast (March 16, 21h 2.01m) registered at 21h 7.o5m., G-Z; 7.22m., G-E, probably S*

J.S.O'C., S.J.

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h = 42.4 m
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Washington, D. C.

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1932 No.184

April			h	m	
4.80		e	19	17.(Ca)	
	G-Z	P'		34.2	
	G-N	pPP		39.85	Distance 104°
	G-E	SKS		41.	No surface waves
14.08	G-E	i	01	50.30	
	G-E	i		50.84	
	G-Z	M		55.1	
16.13	G-Z	e	03	10.96	
	"	M		17.	
22.22	G-Z	iP	05	17.72	
	G-E	L		65.14	
	G-N	M		81.7	
24.26	G-NE	S	06	22.58	Φ = 6h 11m (JSA)
	"	L		26.2	Distance 31° (Measured)
	G-N	M		27.7	
26.33		O	07	54.8	
	G-ZN	iP	08	05.35	
	G-E	iS		13.94	Distance 63° (S-P)
	"	L		21.	
	"	M		28.9	Surface waves small
29.76		O	18	18.5	
	G-Z	iP		29.30	
	G-E	S		38.11	Distance 64° (S-P)
	"	L		50.3	
	"	M		54.6	

GALITZIN CONSTANTS

Component	N-S	E-W	Z
Gal period T_1	14.55sec	14.59sec	9.08sec
Pend " T	14.70	14.75	9.06
Mu Square	-0.07	0.00	-0.02
Transfer Factor K	93.3	95.0	304.0
Distance Gal to Drum	138.5 cms	138.5	138.5
Synchronous Magnification	1070	1090	738
Date of test	Nov.29,1931	Nov.25,1931	Oct.26,1931

J.S.O'C. S.J.

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No.185

1932 May			h	m	
14.55		O	13	11.3	
	G-Z	eP		27.64	
	"	iP'		30.32	Distance 136°(Measured)
	"	PR1		33,09	
	G-NZ	SKP		34.3	
21.42		O	10	10.18	
	G-NEZ	iP		15.91	Compression; 50 microns N
	G-N	eS		20.51	24 " E
	G-E	iS		20.59	Distance 26.4°;Azimuth 25.5° West of South
					Epicenter:14.3°N 88.5°W
22.48		O	11	29.58(Ca)	
	G-Z	eP		44.41	
	"	ePR1		48.18	Distance 105°(Ca;PR1-P)
	"	ePS		57.63	
22.95		O	22	40.+	
	G-Z	eP		45.72	
	G-N	iS		50.38	Distance 26.4°
	G-EN	M		55.1	
26.67		O	16	09.+	(USCGS O=16,09.55)
	G-Z	eP		23.88	
	"	epP		25.85	Distance 115°
	"	iPR1		28.76	(Focal depth assumed =.03)
	"	epPP		30.56	
	"	PR2		31.5	
	"	PKKP		37.8	
	G-E	SR1		44.2	
	"	sSS		47.4	
28.10		O	02	21.6	
	G-Z	PR1(?)		40.03	
	G-N	SKS		46.27	Distance 103°(?)
	"	PS		49.02	
	"	M		80.+	
31.37					
	G-N	i	08	52.88	
	G-E	M		59.3	

$\varphi = 38^\circ\ 54'\ 25''$ N
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h = 42.4 m
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No. 86

1932 June			h	m	
3.44		O	10	36.6	
	G-Z	eP		43.05	
	G-NEZ	iP		43.42	Compression; 64mu N; 81mu E.
	W-NE	eS		48.59	Azimuth 51.7° West of South
	W-NE	iS		48.88	Distance 34° (S-P)
	W-NE	M		56.2	Epicenter (GU) 13.6°N; 104°W
	W-NE	M_1		57.9	
	Aftershocks at:				
3.70	G-Z	eP	16	45.0	
3.74	"	e	17	46.35	
4.11	"	e	02	49.2	
4.91	"	eP	21	45.8	
	"	i	21	57.00	
5.38		O	09	04.35(?)	
	G-Z	P		10.97	
	G-N	eS		16.4	Distance 32.2° (S-P) But identification doubtful.
	"	M		23.9	
	"	M_1		27.1	
6.36		O	08	44.6	
	G-ZE	eP		51.48	
	G-NE	S		57.0	Distance 33.5° (S-P)
	G-Z	M		63.0	
6.49					
		O	11	49.8	
	G-Z	iP		54.37	
	G-E	iS		57.98	Distance 19.8° (S-P)
	"	M		61.7	
8.22	G-Z	e	05	09.95	
	"	i		19.80	
	"	M		24.45	
8.33	"	e	08	01.65	
	"	M		23.3	
9.20	G-N	e	04	42.75	
	"	e		47.32	
		L		53.6	
		M		55.4	
10.86	G-Z	iP	20	40.44	
	"	i		43.74	
18.43		O	10	12.5	
	G-Z	eP		18.4	
	G-NEZ	iP		18.72	Compression; 18mu N; 24mu E.
	W-NE	S		23.23	Azimuth 53° West of South
	"	M		28.7	Distance 29.8° (S-eP)
		M_1		31.8	Epicenter (GU) 18.6°N; 102.5°W.
20.38	G-Z	P	09	07.67	
	G-N	L		16.0	
	"	M		21.1	
20.40	G-Z	i	09	33.81	
	G-N	i		39.7	
	"	M		47.2	
[illegible].54					
		O	12	59.0	
	G-Z	eP	13	05.73	
	G-NE	S		11.15	Distance 33°(?)(S-P) Several degrees greater than measured distance to USCGS epicenter.
	U-NE	iM		17.29	

J.S.O'C., S.J.

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1932 No.187
July

			h	m	
7.68		O	16	15.8	Computed from S-P
	G-EZ	eP		22.21	
	-Z	P		22.24	
	-Z	PR1		23.43	
	-E	iS		27.36	Distance 30.3°
	-E	M		32.53	
12.81		O	19	24.1	Computed from S-P
	G-Z	P		30.47	
	-N	S		35.46	Distance 29.8°
	-NEZ	M		41.2	
20.85	G-Z	e	20	25.1	
	-Z	i		25.78	
	-E	i		30.73	
	-Z	i		34.80	
	-E	M		63.8	
21.54	G-Z	e	12	59.14	
	-Z	i		62.56	
	-E	i		71.78	
	-Z	M		105.0	
25.38		O	9	12.7	Computed from
	G-Z	eP		19.06	
	-Z	iPR1		19.99	Early for PR1
	-N	eS		24.29	Distance 30.6°
	-N	iS		24.42	
	-N	eL		27.4	
	-N	M		32.0	

Instrumental Constants.

	G-N	G-E	G-Z
T_1	14.55	14.59	9.08
T	14.70	14.75	9.06
Mu square	-.07	0.0	-.02
Synchronous Magnification	1070	1090	739
Date	Nov.29,1931	Nov.25,1931	)Oct.26,1931

J.S.O'C.S.J.

φ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = — .758
c = + .628

Spindler & Hoyer Clock corrected three times daily by NAA
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M = Mainka 135k

Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

1932

August			h	m	
12.15		0	3	24.2	Computed from S-P
	G-NEZ	iP		34.21	Com from NW
	-NE	iS		42.53	Distance 61°
	-NE	SR1		46.8	
	-NE	eL		53.1	
13.89	G-Z	eP	21	15.58	Identification of phases doubtful.
	-Z	iP'		18.32	
	-NEZ	PR1		19.25	
	-NE	eL		61	
14.03			0	47	Drum stopped.
14.28			6	43	Drum started.
17.37		0	8	47.6	Computed from S-P
	G-Z	e		52.5	
	-NEZ	P		52.75	
	-E	iS		57.29	Distance 25.4°; e57.1 on N, e57.2 on Z
	-NEZ	eL		59 to 63	
18.85		0	20	24.0	Computed from S-P
	G-EZ	eP		30.2	
	-NEZ	eS		35.1	Distance 30.4°
	-NEZ	eL		37 to 42	
19.76		0	18	8.9	Computed from S-P
	G-NZ	eP		13.51	
	-NE	iS		17.82	Distance 24.8°; e on Z.
	-NE	eL		20.4	
21.19		0	4	26.3	Computed from S-P
	G-Z	eP		34.7	
	-NZ	e		37.6	Late for PR1
	-NZ	eS		41.3	Distance 44°
	-NEZ	eSR1		44.7	
	-NEZ	eL		47 to 49	
24.16		0	3	48.2	Computed from S-P
	G-NE	eP		51.9	Z out of balance
	-N	iS		55.25	Distance 18°; e on E
	-NE	eL		57.5	
25.34		0	8	6.0	Computed from S-P
	G-EZ	eP		12.3	
	-NE	ePR1		13.2	
	-NEZ	iS		17.65	Distance 33°
	-NEZ	eSR1		19.8	
	-NE	eL		21.6	22.9 on Z
11.41		0	9	40.9	Computed from S-P
	G-NEZ	eP		52.1	
	-NE	iS		61.33	Distance 71
	-NE	eL		71.5	

F. W. Sohon, S. J.

φ = 38° 54′ 25″ N
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h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = − .758
c = + .628

Washington, D. C.
Instrumental Bulletin
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Spindler & Hoyer Clock corrected three times daily by NAA
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1932 Sept — No.189

			h	m	
3.51		0	11	59.6	Computed from PS - P
	G-NEZ	iP	12	12.07	
	-NEZ	PR1		15.75	
	-NE	iPS		24.04	Distance 91°
	-NE	SR1		29.1	Record removed 12h 38m
5.29		0	6	54.5	Computed from S-P
	G-N	eP	7	3.9	Identification of phases doubtful
	-NE	S		11.9	Distance 59°
	-NE	eL		23 to 26	
14.36		0	8	43.3	Computed from S-eP
	G-NEZ	eP		52.0	
	-EZ	iP		52.32	
	-N	iS		59.07	Distance 49°; eE at 58.7
	-N	eL		64.4	
15.59		0	13	54.9	Computed from PS-PR1
	G-Z	eP'	14	14.8	
	-Z	ePR1		15.5	
	-Z	iPS		25.80	Distance 123°; e on E
	-Z	eL		53.2	
23.60		0	14	22.5	Computed from S-P
	G-NEZ	iP	15	34.74	Deep focus
	-NEZ	iS		44.80	Distance 79°
		eL	inconspicuous		
26.81		0	19	21.0	Computed from S-P
	G-Z	iP		32.23	Later on N and E
	-NEZ	S		41.8	Distance 74°
	-NEZ	eL		53	
29.17		0	3	57.3	Computed from S-P
	G-NEZ	iP	4	8.82	
	-NE	iS		18.30	Distance 73°
	-NEZ	eL		30 to 34	
29.74		0	17	46.5	Computed from S-P
	G-Z	eP		59.0	
	-E	iS		69.41	Distance 83°
	-EZ	eL	difficult		(G-N not legible)

Instrumental Constants

	G-N	G-E	G-Z
T_1	14.55	14.59	9.08
T	14.70	14.75	9.06
Mu square	- .07	0.0	- .02
Synchr. Magn.	1070	1090	739
Date	Nov.29,1931	Nov.25,1931	Oct.26,1931

F. W. Sohon, S.J.

φ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = — .758
c = + .628

Washington, D. C.

Instrumental Bulletin

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1932 No 190

Oct			h	m	
2.71		0	3	59.1	Computed from S-P
	G-NEZ	iP		5.17	Com. from SW
	-N	iS		9.97	Distance 28.6°
	-NEZ	i		10.35	
	-NEZ	eL		13 ca	
16.51		0	12	7.9	Computed from S-P
	W-NE	P		17.64	
	-N	PR1		20.23	
	-NE	S		25.32	Distance 55°
	-N	PS		25.58	
	-NE	eL		35	
30.87		0	20	46.1	Computed from S-P
	G-ZN	eP		56.16	Cf. infra
	-EZ	iPcP		56.72	Clearly not beginning of quake
	-NE	iS		64.15	Distance 58°
	-NE	iScS		66.24	
	-NEZ	eL		71 ca	

If the phase listed as PcP is called P, then
0 = 20h 47.3m and distance = 53°.

In these bulletins, the best adjustment to the travel-time curves is reported, disregarding data from other stations.

Constants of the Wiechert November 5, 1932.

Component	W-N	W-E
Period	4.8 sec	4.1 sec
Magnification	191	188
Damping	3.6	3.9
Friction r''/T^2	.011	.015 mm/sec^2

Heavy microseisms have prevented a determination of constants of the Galitzin instruments.

F. W. Sohon, S.J.

φ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
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Washington, D. C.

Instrumental Bulletin

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M = Mainka 135k

1932 No.191
Nov

			h	m	
2.46		O	11	3.4	Computed from S-P
	G-Z	iP		14.58	Dil
	-Z	iPR1		17.65	
	-Z	i		23.26	
	-E	iS		23.80	Distance 70°
	-NZ	eL		37.1	
13.20		O	4	47.1	Computed from S-P
	G-NEZ	iP		59.55	Com from SW
	-N	iS		69.98	Distance 83°
	Deep focus type.				Many inconsistent impulsive phases.
17.25		O	6	2.4	Computed from S-P
	G-NZ	eP		9.20	
	-NEZ	iPR1		10.00	
	-NE	iS		14.46	Distance 32.4°
	-NEZ	eL		19 ca	
26.17		O	4	24.6	Computed from S-P
	G-Z	i?		36.91	Local?
	-NEZ	iP		37.29	
	-NEZ	iS		47.93	Distance 85°
	-EZ	eL		63	

No clock marks on G-N, but the three drums are on one shaft, and the lights are all on the same switch.

29.47		O	11	11.1	Computed from S-P
	G-Z	iP		22.27	
		ePR1		25.05	
		iS		31.35	Distance 69°
		eL		45.7	

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Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

No.192

1932 Dec			h	m	
4.17		0	4	3.9	Computed from S-P
	G-EZ	P		10.58	
	-NE	eS		15.7	Distance 31.2°
	-NEZ	eL		18	
4.34		0	8	10.9	Computed from SKKS-P'
	G-NEZ	iP'		30.61	
	-NZ	iPR1		33.27	
	-NE	iSKP		34.15	
	-NE	iSKKS		40.12	Distance 140°
		eL	uncertain		
4.44		0	10	47.9	Computed from S-P
	G-Z	iP		52.34	
	-NZ	iS		55.76	Distance 18.6°
7.68		0	16	21.5	Computed from S-P
	G-NEZ	iP		28.45	Com. from SW
	-NE	S		33.75	Distance 33.2°
	-NZ	eL		38 Or 39	
9.36		0	8	34.2	Computed from S-P
	G-NZ	iP		43.75	
	-NE	iS		51.29	Distance 53.5°
	-NZ	eL		60	Uncertain
19.27		0	6	28.7	Computed from PcS-PR1
	G-NZ	eP		35.2	
	-NEZ	iPR1		35.72	
	-Z	i		36.18	
	-NEZ	eS		39.8	Poor
	-N	iPcS		41.70	Distance 28.6°
		eL		44 but very uncertain.	
21.26		0	6	9.7	Computed from S-P
	G-NZ	iP		16.49	
	-N	S		21.64	Distance 31.8°
		L	Not legible		
25.04		0	2	4.1	Computed from PS-P
	G-NZ	eP		18.35	
	-NZ	i		18.43	
	-N	iPR1		22.48	
	-NZ	ePS		31.5	Distance 103°
		L	Not legible.		

Instrumental Constants.

	G-N	G-E	G-Z
T_1	14.6	14.6	9.1
T	15.0	15.2	8.9
Mu^2	.17	.08	.31*
V_s	1100	1120	550
Date	Dec.31,1932	Dec.31,1932	Dec.29,1932

* The magnets on G-Z, which was set up in 1923, are growing weak. They cannot be brought any closer together without binding the vane.

F.W.Sohon, S.J.

$\varphi = 38° \; 54' \; 25''$ N
$\lambda = 77° \; 4' \; 24''$ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = — .758
c = + .628

Washington, D. C.

Instrumental Bulletin

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1933 No.193

This bulletin is intended to convey only such information as may assist in the statistical determination of time of origin and co-ordinates of epicenter. The selection of material is as follows;

Unidentified emergent phases are not reported.

Identified emergent phases, if probably useful, are reported, the arrival time being given to the nearest 1/10 minute.

Unidentified distinct phases are reported to 1/100 minute. But if they are numerous, only those probably important will be reported.

Identified distinct phases are reported to 1/100 minute, and the key phases are noted. If the key phases are sure, other phases will only be enumerated if remarkable. If the identification is weak, other phases presenting confirmatory or contradictory evidence will be reported.

Where readings from more than one component are available, the observer uses his judgment as to which to accept. Arrival times credited to more than one component are always obtained by averaging the several readings.

eL appearing alone or accompanied by unidentified emergent phases will not be reported. Quakes vitiated by locals or micros are not reported except as indicated above, for the fact that an earthquake has occurred at such an approximate time will already be known to those for whom these bulletins are intended.

As the complicated symbol $\overline{{}_cP_c}$ presents difficulties in typing, it is replaced in all combinations by the symbol K.

V_s is the synchronous magnification, or dynamic magnification for a sustained simple harmonic motion of the same period as the pendulum.

1933 January			h	m	
4.17		0	3	59.3	Computed from S-P
	G-NEZ	iP	4	8.18	Dil from NW
	-NE	iS		15.12	Distance 48.2°
	-Z	eL		22	
18.36		0	8	37.9	Computed from PS-P
	G-Z	eP		50.6	
	-Z	ePR1		53.9	
	-N	eS		61.2	
	-NE	ePS		62.0	Distance 85°
	-NEZ	eSR1		67.1	
	-NZ	eL		79	
21.81		0	19	20.9	Computed from SKS-PR1
	G-Z	iP'		40.72	
	-Z	iPR1		43.61	
	-N	iSKS		47.76	Distance 144°
	-N	eSR1		63.0	
	-Z	eL		89	

Instrumental Constants

	G-N	G-E	G-Z
T_1	14.6	14.6	9.1
T	15.0	15.2	8.9
Mu^2	.17	.08	.31
V_s	1100	1120	550
Date of test	Dec.31,1932	Dec.31,1932	Dec.29,1932

F. W. Sohon, S.J.

φ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
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Washington, D. C.
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1933 No.194

Feb			h	m	
3.92		O	22	11.7	Computed from S-P
	G-NEZ	iP		24.28	Com from NW
	-NEZ	eS		34.6	Distance 82°
	-Z	eL		48 ca	
18.82		O	19	45.4	Computed from S-P
	G-NZ	iP		51.02	Dil from S
	-N	iS		55.29	Distance 24.5°
	-N	eL		57 or 58	
23.34		O	8	9.3	Computed from S-P
	G-NEZ	iP		19.30	Com from SE
	-NEZ	S		27.37	Distance 58°
	-Z	eL		37	

Instrumental Constants

Component	G-N	G-E	G-Z
Period of Galv	14.6	14.6	9.1
Period of Pend	15.0	15.2	8.9
Mu Square	.17	.08	.31
Synchr. Magn.	1100	1120	550
Date of Test	Dec.31,1932	Dec.31,1932	Dec.29,1932

IMPORTANT NOTICE

The mailing list is to be corrected and revised June 1933, and the new list is to be made up from the enclosed forms which should be corrected and returned as soon as possible to

SEISMOLOGICAL OBSERVATORY
GEORGETOWN UNIVERSITY
WASHINGTON, D.C.

F.W.Sohon, S.J.

$\phi = 38° \; 54' \; 25''$ N
$\lambda = 77° \; 4' \; 24''$ W
h = 42.4 m
Sub-Soil, Decayed Diorite
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Washington, D.C.
Instrumental Bulletin
of the Georgetown University Seismological Observatory

1933 March — No. 193

			h	m	
2.73		O	17	30.9	Computed from S-P
	G-Z	iP		44.21	
	W-E	PR1		47.82	
	-E	SKS		54.82	
	-E	S		55.54	Distance 92°
11.08		O	1	53.7	Computed from S-P
	G-Z	iP	2	0.76	
	-N	iS		6.11	Distance 33.6°
	-NZ	eL		11.5	
11.82		O	19	39.1	Computed from S-P
	G-Z	eP		50.45	
	-NEZ	iP		50.55	
	-NE	i		50.83	
	-NE	i		56.62	Also others
	-NEZ	iS		59.88	Distance 72°
	-NZ	eL		71	
12.18		O	4	25.7	Computed from S-P
	G-ZN	iP		31.32	
	-NE	S		35.61	Distance 24.7°
	-NE	eL		37	
13.57	G-NEZ	i	13	35.88	
	-E	i		35.46	
	-N	i		35.55	
	-EZ	eL		37.2	
	-EZ	M		38.2	
14.06		O	1	28.1	Computed from S-P
	G-EZ	P		40.49	
	-NEZ	S		50.72	Distance 81°
	-Z	eL		61	
17.66		O	15	55.3	Computed from S-P
	G-NZ	iP	16	7.01	
	-N	iS		16.75	Distance 75°
	-NZ	eL		29	
18.98		O	23	32.5	Computed from S-P
	G-NZ	iP		38.11	
	-NEZ	i		38.19	
	-NZ	PR1		38.60	
	-N	S		42.45	Distance 25.1°
	-NEZ	eL		44	

Constants of the Wiechert December 26, 1932.

Mass	200 Kg	
Component	W-N	W-E
Period	6.4 sec	4.8 sec
Magnification	111	123
Damping	4.1	3.1
Friction	.034	.034 mm/sec^2

If you have not done so already, please send in your corrected address immediately, if you wish to continue to receive the bulletins.

F. W. Sohon, S.J.
Director.

No. 109 bis. From to 1924

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T_o	ε:1
A_N			
A_E			
A_Z			

Bosch Photographic Pendulums	V	T_o	ε:1
A_N			
A_E			

		V	T_o	ε:1
Mainka	A_N			
Mainka	A_E			
Bosch-Omori	A_N			
Bosch-Omori	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 21		eP_E	10 18 54						
		eP_N	10 18 54						
		eS_E?	10 24 55						
		eL_E	10 28.4						
		eL_N	10 28.4						
		F	10 54						
May 21		e_E	1 45 07						No other phases sure.
		e_N	1 44 30						
		F	1 55						
May 28		eP_E	10 03 48						Heavy micros.
		eP_N	10 03 48						
		iS_E	10 13 36						No L or M apparent.
		eS_N	10 13 36						
		eL_E	10 26.5	11					
		F	10 55						

Francis A. Tondorf., S. J.
Director.

No. 109 From May 1 to May 31 1924

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W   h=42.4 m   Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_o	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
May 1		eP_E	20 00 10						No distinct M_N. Micros.
		eP_N	20 00 14						
		S_E	20 05 12						
		S_N	20 05 02						
		eL_E	20 7.4						
		eL_N	20 7.3						
		M_E	20 13 33			4.3 mm.			
		F	21 10						
May 4		e_E	17 10						No distinct M. Heavy micros.
		e_N	17 10						
		eL_E	17 22.4						
		eL_N	17 22.4						
		L_E	17 30 27	9					
		L_N	17 31 21	11					
		F	17 55						
May 6		L_E	17 08						N-S does not show Heavy micros.
		L_E	17 15 23	21					
		L_E	17 30 13	16					
		F	17 50						
May 17		e_E	4 21 17						L waves of exceedingly small amplitude. N-S does not show.
		L_E	4 43 28						
		F	4 56						
									No records on the 18th. Machines stopped to be oiled.

No. 107 bis. *From* *to* 1924

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

ϕ=38° 54′ 25″ N λ=77° 4′ 24″ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

		V	T_0	ε : 1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N			
	A_E			
	A_Z			
Bosch Photographic Pendulums	A_N			
	A_E			
Mainka	A_N			
	A_E			
Bosch-Omori	A_N			
	A_E			

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
March 15		eP_N	10 44 05						
		eS_N	10 54 29						
		eL_E?	11 11.6	16					
		L_E	11 19 28	16					
		F	11 55						
March 20		L_E	10 13 to 10 18	16					Very heavy micros.
March 24		eP_N	20 36						
		S_N?	20 40 36						
		eL_E?	20 43.3	10					Phases very difficult. Very heavy micros.
		L_E	20 45						
		L_N	20 47 27	16					
		F	21 15						
March 25		eP_E?	14 13 10						
		eP_N	14 13 10						S_N uncertain
		S_E?	14 20 27						
		eL_E	14 23.2	22					
		eL_N	14 23.2						
		L_E	14 25 06	11					
		L_N	14 26 11	15					
		F	in following quake						
March 25		eP_E?	15 09 27						Very heavy micros.
		eP_N	15 09 38						
		eS_E?	15 17 13						
		eL_E	15 19.9	17					
		eL_N	15 19.9	17					
		L_E	15 21 11	11					
		L_N	15 22 27	11					
		F	16 (ca.)						
March 30		e_E?	0 25						Very heavy micros. Gram pronounced but very difficult.
		e_N?	0 25						
		S_E?	0 29 26						
		S_N?	0 29 22						
		F	1 30						

Francis A. Tondorf, S. J.,
Director.

No. From March 1 to March 31, 1924

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

$\phi = 38° 54' 25''$ N $\lambda = 77° 4' 24''$ W h=42.4 m Sub-Soil, Decayed Diorite

Instruments: Astatic pendulums after Wiechert, 200 kg. (horizontal), 80 kg. (vertical). Astatic pendulums after Mainka, 135 kg., two Bosch-Omori pendulums 25 kg. and two Bosch Photographic pendulums (horizontal) 200 gms.

Instrument	Component	V	T_0	$\varepsilon:1$
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A_N	143	5.0	
	A_E	165	5.0	
	A_Z	80	4.0	
Bosch Photographic Pendulums	A_N	133	5.0	
	A_E	133	5.0	
Mainka	A_N	59	9.0	
	A_E	47	9.0	
Bosch-Omori	A_N	14	13.5	
	A_E	11	13.7	

Date	Character	Phase	Time	Periods	Amplitude A_N	Amplitude A_E	Amplitude A_Z	Δ	Remarks
March 4		eP_E	10 13 49						
		eP_N	10 13 51						
		eS_E	10 18 50						
		iS_N	10 18 58						
		eL	10 21	27					
		M_{E_1}	10 24 58	22		9.2 mm.			
		M_{N_1}	10 26	11	4.0 mm.				
		M_{E_2}	10 30	20	3.0 mm.				
		F	In second quake.						
March 4		eL_E	11 59.2						All preceding lost in changing of sheets.
		eL_N	11 59.2						
		F	14 (ca.)						
March 4		e_E	17 31						Very heavy micros.
		e_N	17 31						
		L_N	17 34 41						
		F	17 50						
March 5		eL_E?	12 23.4	16					Very heavy micros.
		F?	13 (ca.)						
March 6		e_N	12 36 45						Rest doubtful. Heavy micros.
March 7		e_N?	18 20 40						Very heavy micros.
		F	in micros.						
March 11		eP_N	10 46 45						P and S uncertain. Very heavy micros.
		eS_N?	10 52 23						
		eL_E?	10 55.0						
		eL_N?	10 55.0						
		L_E	10 57 33	16					
		L_N	10 58	16					
		M_E	10 58 35			1.8 mm.			
		F	12 50						
March 13		e_E	11 05						Sheets off at 11 hrs. 31 m. Seismic indications then continuing. Very heavy micros.
		e_N	11 03						

SEISMOLOGICAL DESPATCHES

Received at the

SEISMOLOGICAL STATION
GEORGETOWN UNIVERSITY

Washington, D. C.

BUENOS AIRES, July 8, 1924. A sharp earth quake was felt at Cordoba, capital of the Province of Cordoba, at 4.48 P.M. yesterday, according to advices just received. The shock lasted for five seconds, and did minor damage. A. P.

SAN SALVADOR, July 12, 1924. A seismic disturbance of some intensity was felt here today. No damage has been reported. A. P.

TASHKENT, RUSSIAN TURKESTAN, July 15, 1924. Recurrent earthquakes of great intensity have been registered at the seismographical observatory here during the last four days. The center of the shocks is believed to be in the Pamirs on the Indian border. The tremors have been so violent that the seismographical instruments were thrown out of alignment while the walls of the buildings were shaken and furniture in the homes displaced. A. P.

MOSCOW, July 17, 1924. Three persons are reported to have been killed and many houses destroyed by an earthquake at Tashkent, Wednesday. A number of villages felt the shock. A. P.

BRAWLEY, CALIF., July 18, 1924. A sharp earthquake was felt here at 1.30 o'clock yesterday afternoon and was followed by a lighter shock at 3.30. Both shocks were accompanied by a rumbling which has recurred at intervals throughout the day. A. P.

MOSCOW, July 19, 1924. It is reported that a new island has been formed at the entrance to the Sea of Azov as a result of the recent earthquake. A. P.

GUAYAQUIL, EQUADOR, July 22, 1924. An earthquake of considerable violence was felt in many sections of the country last night. Telegraphic communication from here to Quito was interrupted but no other damage was reported. A. P.

CARDIFF, WALES, July 22, 1924. Earth tremors shook several mining villages in the vicinity of Pontypridd this morning and so severely shook up the number of houses that it seemed certain they would collapse, causing the alarmed people to rush into the streets. A fall of stone in one mine killed one miner and injured another. A.P.

MANILA, July 24, 1924. The volcano Babuyan Calaro, on the Island of Babuyan, erupted again July 1, according to information brought here today by the Coast Guard vessel Pathfinder. A. P.

VALENCIA, SPAIN, July 27, 1924. Two earthquake shocks within a quarter of an hour of each other were felt at Carcagente at 11 o'clock Saturday morning. The shocks also were felt by villagers in the neighborhood of Huesca. A. P.

KINGSTON, JAMAICA, July 28, 1924. A slight earth shock was felt here shortly before 2 o'clock this morning. American visitors were somewhat alarmed. The walls of several buildings were slightly cracked. A. P.

LONDON, July 31, 1924. A slight earthquake today caused considerable alarm in the mining country near Maltby main colliery near Rotherham to withdraw for a time 1,000 miners but there was no casualties. It was at first believed that the earth tremor had been caused by an explosion in the colliery. A. P.

Francis A. Tondorf, S.J.,
Director.

SEISMOLOGICAL DESPATCHES

Received at the

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GEORGETOWN UNIVERSITY

Washington, D. C.

MANILA, P. I. (April 14, 1924 - BELATED). Earthquake South-Est of Mindanao, 16 hrs. 22 m. 48 s. G.M.T. Much destruction at Mati. Tsunami flooded low lands. No loss of life. Special Despatch.

MUNICH, BAVARIA, May 13. A slight earthquake shock was felt here yesterday. The center of the disturbance is believed to have been in the Middle Alps. The tremors were noticed only in the upper stories of houses. A. P.

CONSTANTINOPLE, May, 14. (BY THE ASSOCIATED PRESS). A violent earthquake is reported in the region of Erzerum. Several villages have been destroyed and about fifty lives lost. A. P.

CONSTANTINOPLE, May 16. Despatches received today report that further earthquake shocks have been felt at Erzerum, Hassan Kale and Kars. Entire villages in the neighborhood of Hassan Kale are reported to have been destroyed. The number of additional victims is given as 120.

A Constantinople despatch on Wednesday reported the destruction of several villages and the loss of about fifty lives in a violent earthquake in the region of Erzerum. A. P.

HILO, T. H., May 17. (BY THE ASSOCIATED PRESS). The seismograph at Kilauea registered more than one hundred slight eathquakes yesterday, although no shocks were felt in Hilo. A. P.

HILO, T. H., May 20. The volcano today was displaying the most alarming indications. The district is experiencing anumber of minor earthquakes and explosions in the crater are frequent. A. P.

HONOLULU, May 21, 1924. Four heavy earthquake shocks were felt at Naalehu station. A. P.

ROME, May 21. An earthquake was felt on Tuesday at Pievepelago, Pavullo and other places in the Frigano region southwest of Bologna. No harm was done. A. P.

HILO, T. H., May 22. (VOLCANO-BY THE ASSOCIATED PRESS). There was a great many light earthquakes in the Hilea district of this island yesterday, the tremors being almost continuous at times. A. P.

HILO, T. H., May 22, 1924. Another spectacular outbreak occurred at Kilauea volcano this morning, following a sharp earthquake which shook Volcano House. Dust and rocks were thrown for two miles, while thunder rolled and lightning played.

There also was a small explosion at 2:30 this morning after a series of earthquakes, but there was NO ejection of rocks.

HILO, T. H., May 23, 1924. The earthquakes in the Pan district have caused cracks in the earth 200 feet wide, according to Oliver Emerson, the volcanologist. The cracks run parallel to Halemamau, the hottest crater in the volcano, and there are indications that the pit may extend that far; another crack runs southwest from the fire pit to the rim of Kilauea. An inspection of the northeast side of the pit is being made today and if cracks are found there the observatory equipment will be moved. A. P.

HILO, T. H., May 23, 1924. There was an earthquake in the volcano region at nine o'clock yesterday morning. A. P.

Hilo, T. H., May 24, 1924. There were further earthquakes at 10:10 after a cessation of several hours. A severe east and west earthquake occurred in Waiakea and Hilo at one o'clock this morning. Finch fears that the quake is based on a fault line in the Kau and Puna districts and that it may shake the whole island.A.P.

PORT AU PRINCE, HAITI, May 27, 1924. An earthquake shock today wrecked a building at Port-dePaix, killing three persons and injuring several others. A church steeple was demolished and the gendarmarie barracks were badly damaged. The shocks, of ten seconds duration, were distinctly felt at the capital from which the high commissioner sent airplanes to the affected city. A. P.

MOSCOW, May 27, 1924. It is reported here that an earthquake of unprecedented intensity took place at Tashkent last Wednesday. A. P.

Francis A. Tondorf, S. J.,
Director.

$\phi = 38^\circ\ 54'\ 25''$ N
$\lambda = 77^\circ\ 4'\ 24''$ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = − .758
c = + .628

Washington, D. C.
Instrumental Bulletin
of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock corrected three times daily by NAA
G = Galitzin (Cambridge Instrument Co.)
W = Wiechert 200k
M = Mainka 135k

1933 Sept — No.201

1933 Sept			h	m	s	
2.70	G-Z	i	16	58	45	Dil
	-NE	i		64	30	
	-NE	i		65	14	
	-NE	i		67	31	
		eL difficult				
6.94		0	22	09	00	Computed from PS-PR1
	G-EZ	iPR1		29	59	Com from W.; e on G-N.
	-EZ	iPR2		30	03	
	-E	i		31	49	
	-N	iSKS		33	50	
	-EZ	iPS		35	47	Distance 99°
	-N	eL		55		
9.89		0	21	20	10	Computed from PS-PR1
	G-Z	eP'		38	35	No clock marks. Times interpolated
	-EZ	PR1		39	48	between NAA time signals.
	-E	eSKS		45	20	
	-NE	PS		49	28	Distance 114°
	-NE	eSR1		56	00	
	-NEZ	eL		75		
24.64		0	15	19	35	Computed from S-P
	G-NEZ	iP		30	22	Com from NW
	-NEZ	iS		39	06	Distance 65°
	-NEZ	eL		51		
26.79		0	18	55	00	Computed from PS-PR1
	G-NE	ePR1	19	09	32	
	-N	eSKS		15	50	
	-NE	ePS		18	45	Distance 107°
	-NE	eL		42		
30.60		0	14	29	10	Computed from PS-P
	G-NEZ	eP		42	39	
	-NE	ePR1		45	47	
	-N	eSKS		52	30	
	-NE	ePS		55	00	Distance 95°
	-E	eSR1		60	00	
	-NEZ	eL		77		

F. W. Sohon, S.J.
Director

R. J. Buckley, S.J.
Observer.

φ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = − .758
c = + .628

Washington, D. C.

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1933 No.202

October			h	m	s	
1.11		0	2	40	20	Computed from S-P
	G-NZ	iP		48	56	Dil from N S
	-NEZ	eS		55	34	Distance 45°
	-N	eL		64	ca	
2.65		0	15	29	05	Computed from S-P
	G-NEZ	iP		37	07	Com from SW
	-E	iS		43	18	Distance 41°
	-E	iSR1		46	28	
25.98		0	23	28	50	Computed from S-P
	G-NEZ	iP		38	12	Dil from SW
	-NEZ	iS		46	32	Distance 59°
	-EZ	eL		55	ca	

F. W. Sohon, S.J.
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1933 No.203

1933 November			h	m	s	
1 to 4 inclusive						instruments not in operation.
14.59		0	14	05	10	Computed from S-P
	G-Z	iP	14	16	28	Dil.; G-N out of balance.
	-Z	PcP		17	11	
	-EZ	iS		25	43	Distance 70°
	-E	iPS		28	33	
	-EZ	eSR1		30	28	
		eL	difficult.			
20.97		0	23	21	07	Computed from S-P
	G-NEZ	iP	23	28	21	Com from NE
	-Z	iPcP		30	29	
	-NEZ	iS		33	52	Distance 34.8°
	Remainder of record not legible.					
23.79		0	18	58		Computed from S-P
	G-NZ	iP	19	4	05	Com. from S.; G-E out of balance.
	-NZ	eS		8	55	Distance 28°
	-Z	eL		13		
	-Z	iScS		14	15	

Constants of the Wiechert (200 Kg)

Component	W-N	W-E
Period	4.1	3.7 sec
Magnification	63	73
Damping	2.6	1.3
Friction r/T^2	.015	.023

Date of test: December 3, 1933.

F. W. Sohon, S.J.
Director.

R. J. Buckley, S.J.
Observer.

φ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
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Washington, D. C.

Instrumental Bulletin

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No. 204

1933 Dec			h	m	s	
2.84		0	20	06	05	Computed from S-PR1
	G-NE	eP		19	34	
	-Z	ePR1		23	21	
	-NEZ	iS		30	54	Distance 95°
	-NZ	eL		52		
4.82		0	19	34	15	Computed from S-P
	G-NEZ	iP		46	04	Com from NW
	-NEZ	iS		55	55	Distance 77°
	-Z	i		56	12	
12.59		0	14	11	05	Computed from PS-P'
	G-Z	iP'		30	09	
	-EZ	iPS		42	04	Distance 125°
	-NZ	e		42	48	
	-NEZ	eL		72		
13.89		0	21	23	48	Computed from S-P
	G-NEZ	iP		30	04	Dil from SW
	-N	iS		35	12	Distance 30.3°; e later on EZ
	-NZ	eL		38		Many phases show.
14.30		0	7	16	50	Computed from S-P
	G-Z	eP		23	18	
	-NEZ	i		23	42	
	-NE	iS		28	03	Distance 29°; i 28:18 on Z
	-E	eL		32		
15.32		0	7	41	30	Computed from S-P
	G-NEZ	iP		48	42	Dil
	-NEZ	eS		54	10	Distance 34.2°
19.24		0	5	37	50	Computed from S-P
	G-NEZ	eP		48	17	
	-NE	eS		56	42	Distance 61°
	-NEZ	eL		66		
19.75		0	17	58	30	Computed from S-P
	G-E	e	18	02	10	
	-E	iP		02	34	e on N and later on Z
	-NZ	iS		09	33	Distance 16.4°; other impulses
	-NZ	eL		07	30	
	-N	i		08	55	
	-Z	i		09	01	

Instrumental Constants.

	G-N	G-E	G-Z
Period of Galvanometer	14.6	14.6	9.1
Period of Pendulum	14.1	14.6	8.9
Mu square	+.02	+.11	-.[illegible]
Synchronous Magnification	988	1024	5[illegible]
Date of test	Jan. 6, 1934	Jan. 5, 1934	Jan. 6, 19[illegible]

F. W. Sohon, S.J.
Director.

R. J. Buckley, S.J.
Observer.

φ = 38° 54′ 25″ N
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Instrumental Bulletin

of the Georgetown University Seismological Observatory

1934 No.205

January

			h	m	s	
3.40		O	9	42	37	Computed from S-P
	G-NEZ	iP		53	56	Dil from NW
	-NEZ	iS		63	19	Distance 72°
	-Z	L		80		Doubtful.
11.64		O	10	21	50	Computed from S-P
	G-NEZ	eP		32	44	
	-NE	iS		41	36	Distance 67°
	-NEZ	eL		55		
15.36		O	8	43	12	Computed from PS-PR1
	G-Z	e		57	26	
	-NEZ	eP		58	16	
	-Z	eP'		61	15	
	-NZ	iPR1		62	58	
	-NZ	iPS		72	43	Distance 115°
28.80		O	19	10	17	Computed from S-P
	G-NEZ	iP		16	10	Com. from SW
	-NEZ	iS		20	39	Distance 26.4°; W-NE 21:09, Dist. 30° O = 9m 40s.
		L	Not legible.			
30.81		O	19	23	40	Computed from S-P
	G-NZ	eP		30	30	
	-NZ	eS		35	45	Distance 32.3°
	-N	eL		40	22	
	-Z	i		40	44	
	-Z	i		43	36	
30.84		O	20	16	16	Computed from S-P
	G-EZ	eP		23	00	
	-NEZ	eS		28	08	Distance 31.5°
	-N	eL		31		

Instrumental Constants

	G-N	G-E	G-Z
Period of Galvanometer	14.6	14.6	9.1
Period of Pendulum	14.1	14.6	8.9
Mu square	+ .02	+ .11	+.10
Synchronous Magnification	988	1024	570
Date of Test	Jan.6,1934	Jan.5,1934	Jan.6,1934

	W-N	W-E
Period	4.1	3.7
Magnification	63	73
Damping	2.6	1.3
Friction r/T^2	.015	.023
Date of Test	December 3, 1933.	

F. W. Sohon, S.J.
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1934

February			h	m	s	
3.61		O	14	32	55	Computed from PS-P'
	G-Z	e		48	45	
	-Z	eP'		52	10	
	-Z	ePS		64	21	Distance 126°
	-E	iSR1		71	07	
	-Z	eL		92		
12.28		O	6	43	00	Computed from S-P
	G-Z	eP		49	22	
	-Z	i		49	28	
	-N	iS		54	21	Distance 29.5°
	-N	i		56	07	
	-N	iM		60	31	
14.17		O	4	00	00	Computed from PS-PR1
	G-Z	eP'		18	35	
	-NEZ	iPR1		20	04	Dil from NW
	-NEZ	iPS		29	57	Distance 118°
	-NEZ	eL		54		
14.94	G-NEZ	i	22	35	58	Cf. 24.04 infra
	-NEZ	i		36	52	
	-NE	i		38	09	
19.45	G-NZ	i	10	44	23	Dil from N
	-NZ	i		47	41	
24.04		O	1	01	30	Computed from S-P
	G-Z	eP		4	44	
	-NEZ	i		6	29	
	-NEZ	S		7	11	Distance 13.6°
	-Z	iL		8	35	
	-NEZ	iM		9	34	Record similar to 14.94 supra
24.22		O	5	03	10	Computed from S-P
	G-NZ	iP		39	00	Com from S
	-NEZ	iS		43	31	Distance 26.1°
	-N	eL		47		
24.27		O	6	23	40	Computed from PS-PR1
	G-Z	eP		38	07	
	-NZ	ePR1		42	30	
	-EZ	iPS		51	47	Distance 107°
	-NZ	eL		70		
28.60		O	14	25	50	Computed from SR1-SKS
	G-Z	eP		40	47	
	-EZ	eP'		44	14	
	-EZ	ePR1		45	07	
	-EZ	iSKS		51	16	
	-Z	eS		54	12	Not on horizontal records.
	-EZ	iPS		55	02	Distance 113°
	-E	iSR1		61	12	
	-E	eL		76		

F. W. Sohon, S.J.
Director

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1934 March — No. 207

			h	m	s	
1.91		0	21	45	20	Computed from S-P
	G-EZ	iP		57	21	
	-E	iS		67	13	Distance 77°
4.25		0	5	55	15	Computed from PS-PR1
	G-EZ	PR1	6	15	18	
	-NE	PS		25	08	Distance 119°
	-NZ	eSR1		31	12	
	-NEZ	eL		50		
5.51	G-N	iPR1	12	07	15	Instruments disturbed during quake.
7.95		0	22	41	30	Computed from S-P
	G-NZ	iP		47	36	
	-E	iS		52	17	Distance 27.8°
	-E	i		52	33	
	-NE	eL		55		
12.63		0	15	05	15	Computed from S-P
	G-NEZ	iP		11	24	Com from W
	-NEZ	i		11	28	
	-NE	iS		16	08	Distance 28°
	-NEZ	i		16	27	
	W-E	eL		19	17	
	-NE	iM		19	55	
12.76		0	18	19	50	Computed from S-P
	G-Z	iP		26	00	Com
	W-E	eS		30	46	Distance 28°
	-NE	M		34	25	
13.55		0	13	12	00	Computed from PS-PR1
	G-Z	eP'		31	21	
	-Z	PR1		32	03	
	-Z	ePS		41	58	Distance 117°
	-Z	eSR1		48	13	
	-Z	eL		68		
16.71		0	16	59	10	Computed from S-P
	G-Z	eP	17	10	20	
	-Z	eS		19	18	Distance 69°
	-Z	eL		32		
18.19		0	4	33	20	Distance 77°
	G-NEZ	iP		45	18	Dil from SW (!)
	-NEZ	iPR1		48	21	
	-NE	iS		55	13	
18.81	Peculiar disturbance on vertical during a violent wind storm.					
24.50		0	12	04	20	Computed from SR1-P'
	G-Z	eP'		23	26	
	-Z	PR1		24	37	
	-NEZ	iSR1		41	41	Distance 122°
	-Z	eL		61		
29.84		0	20	07	40	Computed from S-P
	G-NEZ	iP		18	27	Dil from SE
	-NEZ	iS		27	09	Distance 64°
	-NE	eL		38		

F. W. Sohon, S.J.
Director

R. J. Buckley, S.J.
Observer.

φ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .174
b = − .758
c = + .628

Washington, D. C.

Instrumental Bulletin

of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock corrected three times daily by NAA
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1934 No. 208
April

			h	m	s	
3.32		O	7	36	30	Computed from S-P
	G-NEZ	eP		43	33	
	-NE	iS		48	49	Distance 33.4°
	-Z	eL		54		
6.80		O	19	09	45	Computed from S-P
	G-Z	eP		22	53	
	-Z	iPR1		26	48	
	-N	iS		34	05	Distance 90°
	-NE	eL		56		
9.65		O	15	29	30	Computed from S-P
	G-Z	iP		41	20	Dil
	-NE	iS		51	08	Distance 76°
	-N	eL		66		
10.43		O	10	22	50	Computed from PR1-P'
	G-NEZ	iP'		42	39	Com from SW
	-NZ	iPR1		46	03	Distance 150°
	-N	i		46	20	
11.89		O	21	25	10	Computed from S-P
	G-NEZ	eP		31	54	
	-E	iS		37	12	Distance 31.8°; e on NZ.
	-NEZ	eL		42		Overlapping
11.93	G-Z	i	22	15	42	Com
	-Z	eL		25		
14.89		FELT	21	28		in Salt Lake City (AP)
	G-N	eS		38	49	Distance 28° (adopted from AP)
	G-Z	eL		39	57	

A considerable number of earthquakes similar to this have been recorded. They are charaterized by having sharply broken P-like waves with irregular period of about 5 seconds superposed on the L phase, by an exceedingly faint S phase, or none, and no sign of a true P phase. It is assumed on the basis of this report that all these otherwise unidentifiable earthquakes represent activity in the Salt Lake Region.

15.13	G-E	i	3	00	30	e later on NZ; felt in Vermont
15.93		O	22	15	10	Computed from SR1-PR1
	G-Z	e		32	39	
	-NEZ	iP'		34	27	Com
	-NEZ	iPR1		36	52	Com from NW
	-N	iSKP		38	17	
	-N	ePS		46	56	
	-NE	iSR1		53	51	Distance 130°
	-Z	eL		75		
24.73		O	17	35	30	Computed from PS-PR1
	G-Z	ePR1		55	07	
	-E	iSKKS		61	47	
	-Z	ePS		64	47	Distance 114°
	-Z	eL		88		

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Instrumental Bulletin

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1934 — No.208 bis

April			h	m	s	
26.23		O	5	32	45	Computed from PS--PR1
	G-EZ	ePR1		52	04	
	-E	eSKS		57	39	
	-E	ePS		61	32	Distance 111°
	-EZ	eL		90		
26.33		O	7	57	30	Computed from PS--PR1
	G-NZ	ePR1	8	17	08	
	-NEZ	ePS		26	50	Distance 114°
	-NEZ	eL		54	ca	
26.87		O	21	00	00	Computed from PS-P'
	G-Z	eP'		19	01	
	-Z	PR1		20	39	
	-E	iSKS		26	06	e later on Z
	-NEZ	ePS		30	22	Distance 121°
	-NEZ	eSR1		38	57	
	-NEZ	eL		58		

Instrumental Constants

	G-N	G-E	G-Z
Period of Galvanometer	14.6	14.6	9.1
Period of Pendulum	14.1	14.6	8.9
Mu square	+.02	+.11	+.10
Synchronous Magnification	988	1024	570
Date of Test	Jan. 6,1934	Jan 5,1934	Jan 6, 1934

Wiechert 200 Kg	W-N	W-E
Period	4.1	3.7
Magnification	63	73
Damping ε	2.6	1.3
Friction r/T^2	.015	.023
Date of Test	December 3, 1933.	

F. W. Sohon,S.J.
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1934 May

No.209

			h	m	s	
1.29		0	7	04	24	Computed from PR1-P'
	G-Z	iP'		24	06	Com
	-Z	iPR1		26	52	Distance 141°
	-Z	iSKP		28	06	
2.41		0	9	45	15	Computed from S-P
	G-EZ	eP		51	49	
	-E	eS		56	49	Distance 30°
	-EZ	eL		61		
4.19		0	4	35	50	Computed from S-P
	G-NEZ	iP		44	42	Dil from NW; also on W-NE
	-N	iS		51	29	Distance 47.6°
	-EZ	i		51	38	S? Also on W-NE
	W-NE	eL		60	51	
6.34		0	8	09	25	Computed from S-P
	G-Z	eP		15	33	
	-N	eS		20	15	Distance 27.9°
	-E	e		20	29	
	-EZ	eL		23	30	
13.38						
		0	9	02	50	Computed from PS-PR1
	G-Z	eP'		21	25	
	-NEZ	ePR1		22	36	
	-NE	iSKKS		29	30	
	-EZ	ePS		32	18	Distance 115°
	-NE	iSR1		39	15	
	-Z	eL		59		
14.55		0	13	14	35	Distance 31.8°
	G-Z	eP		21	21	
	-N	eS		26	30	
	-E	e		26	45	
	-NZ	eL		31	50	
14.93		0	22	12	40	Computed from S-P
	G-NEZ	iP		21	48	Dil from NW
	-NE	iS		28	58	Distance 50°
15.64		0	15	20	20	Computed from S-P
	G-NE	eP		27	06	
	-E	eS		32	11	Distance 31.2°
	-NEZ	eL		35		
19.45		0	10	47	20	Computed from S-P
	G-NEZ	iP		53	18	Com from SW
	-NEZ	iS		57	52	Distance 27°
21.42		0	10	07	00	Computed from S-P
	G-NZ	eP		16	08	
	-NEZ	eS		23	18	Distance 49.8°
	-NEZ	eL		30		
22.46		0	11	01	50	Computed from S-P
	G-NEZ	iP		11	29	
	-NE	iS		19	30	Distance 57°
	-Z	eL		27	50	

F. W. Sohon, S.J.
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φ = 38° 54′ 25″ N
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Sub-Soil, Decayed Diorite
a = + .1742
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c = + .6280

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Instrumental Bulletin
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1934 June — No.210

1934 June			h	m	s	
2.25		0	5	54	00	Computed from PS-SKS
	G-N	iSKS	6	19	39	
	-NZ	iPS		23	34	Distance 115°
	-NE	eSR1		29	55	
	-E	eL		44		
2.57		0	13	42	20	Computed from S-P
	G-NEZ	iP		50	36	
	-NE	iS		57	00	Distance 43°
	-Z	eL		63	30	
2.70		0	16	44	55	Computed from S-P
	G-NZ	iP		54	03	
	-Z	S		61	16	Distance 50°
	-NZ	eL		68		
8.20	G-NEZ	eL	4	48	32	
	-EZ	i		51	42	
	-E	i		60	25	Also e on NZ
	-EZ	i		63	24	
	-N	e		63	47	
	-EZ	i		65	54	
9.54		0	12	58	25	Computed from PS-P'
	G-Z	iP'	13	17	40	Com
	-NEZ	iPR1		19	43	Com from NW
	-E	iPS		30	18	Distance 129°
	-Z	eL		61		
12.40		0	9	32	00	Computed from S-P
12.40	G-NEZ	eP		38	26	
	-NE	eS		43	17	Distance 29.2°
	-NE	eL		47	12	
13.08		0	1	57	10	Computed from S-P
	G-NZ	iP	2	03	37	Dil from N
	-N	iS		14	06	Distance 83°
	-Z	eL		29		
13.92	G-N	iSR1	22	43	06	Beginning lost
15.27		0	6	34	15	Computed from S-P
	G-NZ	eP		39	56	
	-NE	eS		44	21	Distance 25.4°
	-NZ	eL		46	20	
18.38		0	9	13	40	From S-P. No minute marks
	G-NEZ	iP		22	35	Measurements from NAA time signals.
	-NEZ	S		29	33	Distance 48°
22.77		0	18	33	40	Computed from S-P
	G-NEZ	eP		40	18	
	-NE	eS		45	20	Distance 30.8°
	-NZ	eL		49	30	
23.07		0	1	39	40	Computed from S-P
	G-Z	eP		48	48	
	-NE	eS		56	01	Distance 50°
	-NE	eL		65		

ϕ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
a = + .1742
b = − .7584
c = + .6280

Spindler & Hoyer Clock corrected three times daily by NAA
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1934 No.210bis

June			h	m	s	
24.25		0	5	59	30	Computed from S-P
	G-NEZ	iP	6	09	45	Dil from S
	-NZ	i		10	11	
	-E	iS		18	03	Distance 60°
	-E	eL		28	30	
29.36	W-NE	i	8	43	36	
29.52		0	12	33	30	Computed from PR1-P'
	G-NEZ	iP'		53	08	Dil from NW
	-Z	iPR1		55	46	Distance 139°
	-NE	iSKP		56	49	
	-NE	ePS		67	25	
	-NE	eSR1		74		

Instrumental Constants

	G-N	G-E	G-Z
Period of Galvanometer	14.6	14.6	9.1
Period of Pendulum	14.1	14.6	8.9
Mu square	+.02	+.11	+.10
Synchronous Magnification	988	1024	570
Date of Test	Jan.6,1934	Jan.5,1934	Jan.6,1934

Constants of 200 Kg Wiechert December 3, 1933

Component	W-N	W-E
Period	4.1 sec	3.7 sec
Magnification	63	73
Damping	2.6	1.3
Friction	.015	.023 mm/sec^2

F. W. Sohon, S.J.
Director

R. J. Buckley, S.J.
Observer.

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1934 July

No.211

			h	m	s	
4.07		0	1	42	35	Computed from PS-PR1
	G-EZ	ePR1	2	00	14	
	-NE	SKS		07	04	
	-NE	PS		09	14	Distance 99°
	-NEZ	eL		31		
6.95		0	22	48	30	Computed from S-P
	G-NEZ	iP		56	05	Com from SW
	-NE	iS		61	53	Distance 37.4°
10.04		0	1	01	40	Computed from S-P
	G-NZ	eP		06	40	
	-NEZ	S		10	25	Distance 21.2°
	-NEZ	eL		13		
16.35		0	8	18	30	Computed from S-P
	G-NEZ	iP		25	11	
	-NE	iS		30	15	Distance 31.0°
	-NE	eL		36		
18.07		0	1	35	53	Computed from S-P
	G-NEZ	iP		42	44	Com from SW
	-E	S		47	57	Distance 32.2°
		L	Tangled			
18.67		0	16	09	30	Computed from S-P
	G-N	P		16	11	
	-NE	S		21	16	Distance 31.2°
	-Z	eL		25		
18.71		0	16	58	55	Computed from S-P
	G-NEZ	iP	17	06	04	Com from SW
	-N	i		11	16	
	-EZ	iS		11	28	Distance 34.2°
18.82		0	19	40	10	Computed from PS-P'
	G-Z	e		55	26	
	-NEZ	iP'		59	07	
	-EZ	PS		70	05	Distance 117°
	-Z	eL		96		
19.07		0	1	34	00	Distance 85°
	G-Z	iP		46	46	
	-E	iS		59	26	
	-Z	eL		81		
19.33		0	7	50	10	Computed from S-P
	G-Z	e		55	56	
	-NE	iP	8	02	36	
	-NE	ePR1		06	40	
	-NE	eS		13	03	Distance 83°
	-EZ	eL		30		

$\phi = 38° 54' 25''$ N
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1934 August — No.212

1934 August			h	m	s	
2.30		0	7	13	00	From S-P
	G-NEZ	eP		21	47	
	-NE	iS		28	43	Distance 47.4°
	-NEZ	eL		34		
6.51		0	12	07	00	From S-P
	G-NZ	iP		14	12	D from N
	-NE	iS		19	43	Distance 34.8°
	-NE	eL		24		
7.15		0	3	40	00	From PS-PR1
	G-Z	ePR1	4	00	13	NE later
	-N	iPS		10	23	Distance 120°
	-EZ	eL		36		
12.99		0	23	49	45	From PS-PR1
	G-Z	eP'	24	08	38	
	-Z	iPR1		10	29	
	-N	iPS		20	42	Distance 125°
	-Z	eL		52		
15.46		0	11	03	45	From S-P
	G-NEZ	eP		10	10	
	-NEZ	i		10	48	C from NW
	-NEZ	iS		15	02	Distance 29.4°
	-NEZ	eL		18		
20.04	G-EZ	e	0	52	15	
	-NZ	i		52	24	
	-NEZ	i		53	18	
26.06		0	1	30	40	From S-P
	G-E	eP		37	28	Z 37:47
	-NE	iS		42	51	Distance 32.3°
	-NEZ	eL		46		
28.47		0	11	23	05	From S-P
	G-EZ	eP		29	40	
	-E	eS		34	40	Distance 30.4°
	-EZ	eL		42		
31.21		0	5	02	30	From S-P
	G-NZ	iP		09	35	C from N
	-EZ	iS		14	58	Distance 33.7°
	-NEZ	eL		19		

F. W. Sohon, S.J.
Director.

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No.213

1934
September

			h	m	s	
15.29		O	6	56	50	From S-P
	G-NZ	iP	7	3	04	No East record
	-N	e		6	57	
	-N	e		7	30	
	-N	eS		7	47	Distance 26.3°
	-N	e		10	02	
	-NZ	M		13	47	

No.214

1934
October

			h	m	s	
10.65		O	15	41	55	From SR1-PR1
	G-NEZ	iPR1		59	54	
	-E	iSKS		66	59	
	-NEZ	iSKKS		67	49	
	-NZ	ePS		69	42	
	-N	iSR1		76	11	Distance 108°
26.61		O	14	43	20	From PR1-P'
	G-NEZ	iP'	15	2	53	Dil from NW
	-NZ	ePR1		5	16	Distance 137°
	-NE	iSKP		6	36	
	-N	iSKS		8	59	

Constants of the Galitzin Instruments

	T_1 sec	T sec	mu^2	$\frac{k A_1}{2n_1 l}$	Date of Test
G-N	14.55	14.05	+.06	1027	Aug 10, 1934
G-E	14.59	15.46	+.02	1150	Aug 10, 1934
G-Z	9.08	9.10	much under	940	Aug 10, 1934

Constants of the 200 Kg Wiechert

	T	V	ϵ	r/T^2	Date of Test
W-N	4.1	63	2.6	.015	Dec 3, 1933
W-E	3.7	73	1.3	.023	Dec 3, 1933

N.B. The synchronous magnification of the Galitzin instruments will hereafter be given as

$$\frac{k A_1}{2n_1 l} = \frac{k A_1 T_1}{4 \pi l}$$

F. W. Sohon, S.J.
Director.

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No.215

1934 November			h	m	s	
5.96		O	23	03	25	From S-P
	G-NEZ	iP		14	05	Com from NW
	-EZ	iS		22	45	Distance 64°
	-NEZ	eL		34		
27.26		O	6	13	55	From PR1-P'
	G-Z	eP'		33	26	
	-NEZ	iPR1		35	52	Distance 136°
	-NE	iSKP		37	26	
	-NE	iSKS		40	28	
	-E	iSR1		54	07	
	-NZ	eL		81		
30.09		O	2	04	35	From S-P
	G-NEZ	eP		11	35	
	-NEZ	iPR1		12	34	Com from SW
	-NEZ	eS		16	56	Distance 33.5°
		L tangled				

Constants of the Galitzin Instruments

	T_1 sec	T sec	mu^2	$\frac{kA_1}{2n_1 l}$	Date of Test
G-N	14.55	14.05	+.06	1027	Aug 10, 1934
G-E	14.59	15.46	+.02	1150	Aug 10, 1934
G-Z	9.08	9.10	much under	940	Aug 10, 1934

Constants of the 200 Kg Wiechert

	T	V	ε	r/T^2	
W-N	4.2	99	1.23	.020	November 23, 1934
W-E	3.2	122	1.13	.059	

F. W. Sohon, S.J.
Director.

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1934 No.216

December			h	m	s	
3.07		0	1	45	15	From S-P
	G-NEZ	iP		41	12	Dil from SW
	-E	S		45	45	Distance 26.7°; 45:57 on G-N
	-NEZ	eL		50		
3.11		0	2	38	05	From S-P
	G-NEZ	iP		44	06	Dil from S
	-Z	iPRl		44	51	
	-NEZ	iS		48	41	Distance 26.5°
	-NZ	eL		52		
4.73		0	17	24	25	From S-P
	G-NZ	iP		34	27	Com from S
	-E	iS		42	24	Distance 58°
	-NEZ	eL		53		
15.08		0	1	57	30	From PS-PRl
	G-Z	ePRl		16	41	G-E out of balance
	-N	PS		26	02	Distance 109°
	-Z	PPS		27	01	
	-N	SRl		31	16	
	-N	eL		49		
22.60		0	14	29	40	From S-P
	G-NZ	iP		35	34	Com from S
	-NEZ	iS		40	49	Distance 32.4°
	-NEZ	eL		44		
23.41		0	9	52	20	From S-P
	G-NZ	P	10	02	27	
	-NEZ	S		10	37	Distance 59°
	-NE	PS		11	19	
	-NE	SRl		15	20	
	-NEZ	eL		22		
30.58		0	13	52	04	From S-P
	G-NEZ	eP		58	43	Heavy micros
	-N	iS		63	48	Distance 35°
		L not legible; other impulses.				
31.78		0	18	45	40	From S-P
	G-NEZ	iP		52	22	Com from SW
	-E	iS		57	30	Distance 31.4°
		L not legible.				

Constants of the Galitzin Instruments

	T_1 sec	T sec	μ^2	$\frac{kA_1}{2n_1 l}$	Date of Test
G-N	14.55	14.05	+.06	1027	Aug 10, 1934
G-E	14.59	15.46	+.02	1150	Aug 10, 1934
G-Z	9.08	9.10	much under	940	Aug 10, 1934

F. W. Sohon, S.J.
Director.

$\phi = 38° 54' 25''$ N
$\lambda = 77° 4' 24''$ W,
h = 42.4 m
Sub-Soil, Decayed Diorite,
a = + .1742
b = − .7584
c = + .6280

Washington, D.C.
Instrumental Bulletin
of the Georgetown University Seismological Observatory

Spindler & Hoyer Clock corrected three times daily by NAA
G = Galitzin (Cambridge Instrument Co.)
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M = Mainka 135k

1935 No.217

January			h	m	s	
1.56		0	13	21	10	From PS-P
	G-NE	iP		35	15	Difficult on account of heavy micros
	-E	iPR1		39	07	
	-E	i		44	54	Strong impulse
	-E	iSKS		45	47	
	-N	iSKKS		46	19	
	-E	i		47	05	Strong impulse
	-NE	iPS		48	28	Distance 103°
2.95		0	22	41	00	From S-P
	G-EZ	iP		48	13	D from E
	-N	eS		53	44	Distance 35°
	-NEZ	eL		58		
3.08		0	1	49	40	From PS-PR1
	G-NZ	iPR1	2	09	10	
	-NE	ePS		18	37	Distance 112°
	-NE	SR1		24	14	
	-NEZ	eL		39		
4.61		0	14	41	55	From S-P
	G-Z	iP		53	27	
	-NE	iS		63	01	Distance 73°
	-NE	iSR1		67	38	
	-NEZ	eL		76		
4.68		0	16	20	15	From S-P
	G-EZ	iP		31	50	C
	-N	S		41	18	Distance 73°
	-NZ	eL		56		
23.31		0	7	24	00	From S-P
	G-NEZ	eP		34	20	C from NW
	-E	PR1		36	41	
	-NEZ	iS		42	38	Distance 61°
	-Z	eL		52		

Constants of the Galitzin Instruments

	T_1 sec	T sec	mu^2	$\frac{kA_1}{2n_1 l}$	Date of Test
G-N	14.55	14.05	+.06	1027	August 10, 1934
G-E	14.59	15.46	+.02	1150	August 10, 1934
G-Z	9.08	9.10	much under	940	August 10, 1934

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1935 No.218
February

			h	m	s	
6.08		O	1	53	23	From S-P
	G-EZ	P	2	00	06	
	-NE	S		05	13	Distance 31.5°
	-NEZ	eL		07	ca	
13.72		O	17	22	05	From S-P
	G-NZ	iP		32	28	e on E 32:25?
	-NEZ	S		40	56	Distance 63°
	-Z	eL		52		
20.47		O	11	22	05	From S-P
	G-Z	eP		30	53	
	-NZ	ePR1		32	49	
	-NEZ	eS		37	46	Distance 47.6°
	-NZ	eL		45	ca	
22.71		O	17	06	00	From S-P
	G-NZ	eP		17	02	
	-NZ	iPcP		17	27	
	-NZ	iPR1		20	00	Many unidentified impulses
	-N	iS		26	06	Distance 68°
	-Z	iPS		26	38	
		L not legible				
25.12		O	2	51	35	From S-P
	G-NEZ	eP	3	03	13	
	-NEZ	iPcP		03	43	
	-E	iPR1		06	19	
	-NEZ	iS		12	51	Distance 74°
	-NE	iSR1		17	30	
	-NZ	eL		24 to 27		

Constants of the Galitzin Instruments

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G-E	14.59	15.46	+.02	1150	August 10, 1934
G-Z	9.08	9.10	much under	940	August 10, 1934

F. W. Sohon, S.J.
Director

L. C. McHugh, S.J.
Observer.

φ = 38° 54′ 25″ N
λ = 77° 4′ 24″ W
h = 42.4 m
Sub-Soil, Decayed Diorite
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No.219

1935 March			h	m	s	
17.90		0	21	33	21	From ½(S+sS) − ½(P+pP)
	G-NZ	iP		39	00	C from S
	-Z	ipP		39	29	(P+pP)/2 = 39:15
	-NEZ	S		43	34	Distance 28.0°
	-NZ	isS		44	37	(S+sS)/2 = 44:05
30.89		0	21	19	30	From PR1-P
	G-NEZ	eP		33	07	
	-NEZ	ePR1		37	01	Distance 95°
	-NE	iSKS		43	17	
	-NZ	S		43	25	
	-NE	iPS		45	46	
	-NEZ	eL		67		

No.220

1935 April			h	m	s	
10.94		0	22	32	10	From S-P
	G-NEZ	iP		38	45	C from SW
	-NEZ	S		43	47	Distance 30.7°
	-NEZ	eL		48		
11.97		0	23	14	31	From PS-P
	G-Z	iP		27	58	Dil
	-N	iPR1		33	45	
	-NE	iSKS		38	28	
	-NE	ePS		40	12	Distance 94°
	-NEZ	eL		57		
19.64		0	15	23	30	From S-P
	G-NEZ	iP		34	57	Dil from NW !
	-NEZ	iS		44	19	Distance 72°
	-NZ	eL		56		
20.22		0	5	11	00	From S-P
	G-NE	eP		22	25	
	-NE	i		22	34	
	-NE	iS		31	52	Distance 72°
	-NE	eL		44		
20.92		0	22	03	09	From SKS-eP'
	G-NE	eP'		21	48	
	-NE	iSKS		28	39	Distance 115°
	-E	eSR2		43	18	
	-E	eL		53		

F. W. Sohon, S.J.
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L. C. McHugh, S.J.
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1935 May No. 221

			h	m	s	
1.43		0	10	24	22	From SR1-S
	G-E	eP		37	10	No vertical record
	-NE	iS		47	35	
	-E	eSR1		53	10	Distance 84°
	-NE	eL		64		
14.97		0	23	23	00	From PS-PR1
	G-Z	e		37	22	
	-N	eP'		40	25	
	-NZ	ePR1		41	32	
	-NE	iSKS		47	35	
	-NZ	iPS		50	36	Distance 104°
	-NEZ	eL		65		
18.74		0	17	42	12	From S-P
	G-NE	eP		45	50	But G-Z e 46:04
	-NEZ	eS		49	02	Distance 16°
		L difficult. Horizontals disturbed by wind.				
21.39		0	6	59	40	From PS-P
	G-NZ	eP		12	51	
	-E	eSKS		22	46	
	-NEZ	ePS		24	53	Distance 91°
	-NE	eSR1		30	25	
	-NEZ	eL		50		Identifications weak
23.75		0	17	58	50	From S-P
	G-Z	iP	18	05	28	Com
	-EZ	ePR1		06	16	
	-E	eS		10	30	Distance 30.8°
	-NEZ	eL		14		
24.23		0	5	36	50	PS-PR1
	G-Z	eP'		55	32	
	-NEZ	ePR1		57	26	
	-NE	ePS		67	43	Distance 123°
	-NEZ	eSR1		74	08	
		L not legible				
30.90		0	21	32	55	Distance 102°
	G-Z	e		46	59	
	-NEZ	ePR1		51	14	
	-E	ePS		60	11	
	-NEZ	SR1		66	29	
	-Z	eL		82		

When iP occurs on all three components the trace amplitudes will be given.

Constants of the Galitzin Instruments

	T_1 sec	T sec	mu^2	$\frac{kA_1}{2n_1 l}$	Date of Test
G-N	14.55	14.05	+.06	1027	August 10, 1934
G-E	14.59	15.46	+.02	1150	August 10, 1934
G-Z	9.08	9.10	much under	940	August 10, 1934

F. W. Sohon, S.J.
Director

L. C. McHugh, S.J.
Observer

$\phi = 38° 54' 25''$ N
$\lambda = 77° 4' 24''$ W
h = 42.4 m
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b = − .7584
c = + .6280

Washington, D. C.

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1935 No.222
June

			h	m	s	
11.91		0	21	55	45	From S-P
	G-NZ	eP	22	02	57	
	-NE	eS		08	26	Distance 34.4°
	-NEZ	eL		12		
24.97		0	23	22	35	From PS-PR1
	G-EZ	iPR1		42	42	
	-E	iSKKS		49	39	
	-NE	i		50	59	
	-E	iPS		52	39	Distance 117°; i 52:59 on G-N
	-Z	iPPS		53	45	Strongest phase on all components
	-EZ	SR1		59	22	
	-Z	eL		79		
25.52		0	12	34	00	From S-P
	G-NEZ	eP		46	15	
	-N	eS		56	25	Distance 80°; e 56:33 on G-E
	-NE	eL		73		
28.08		0	2	00	30	From S-P
	G-NZ	iP		12	08	Trace amplitudes: 1.2 N, 1.4 C
	-NZ	iS		21	43	Distance 74°
	-N	eL		35		(G-E disturbed by spider?)
29.28		0	6	48	07	From S-P
	G-NEZ	iP		55	09	Trace amplitudes: 1.6 N, 2.0 E, 1.6 C
	-NE	iS		60	29	Distance 33.3°
		L difficult				

Trace amplitudes of iP will be given in mm and marked N,S,E,W,C = up, D = down, according to the direction of earth thrust.

At the Ottawa meeting it was suggested that ordinary travel time curves might be used for deep focus earthquakes, if $\frac{1}{2}$(P + pP) were taken instead of P, and if $\frac{1}{2}$(S + sS) were taken for S. Taking Wadati's travel times as published in the Geophysical Magazine Vol VII, No.1, pages 280, 281, 285 and 288, the arithmetic mean was found to differ from the arrival time corresponding to zero depth by more than one second only in the following cases:

320 Km at 26°, $\frac{1}{2}$(P + pP) is 1.5 sec early
500 Km " 32° " 1.5 "
" 34° and 36° 2.5 "
160 and 240 Km at 24°, $\frac{1}{2}$(S + sS) is 1.5 sec early
320 Km.: at 24°, 3.5 sec; at 26° and 28°, 2.5 sec early for $\frac{1}{2}$(S + sS)
400 Km.: at 28°, 3.5 sec early; at 30°,1.5 sec early; at 32°,2.5 sec late
500 Km.: at 32°, 2.5; at 34°,1.5; at 36°,2.0; at38°,1.5 sec early.

The method would therefore seem to give a very good approximation.

F. W. Sohon,S.J.
Director.

SEISMOLOGICAL DESPATCHES

GEORGETOWN UNIVERSITY
WASHINGTON, D. C.

By courtesy of the Associated Press

Ramal Hal, Portugal, May 1 - Slight earth shocks were felt here this morning.

San Salvadore, Republic of Salvador, May 1 - Earth tremors were felt here yesterday. The population was alarmed but no casualties were reported.

Tokyo, May 1 - An earthquake of unusual strength and duration, shaking Tokyo shortly after midnight, did no great damage. There were no reports of casualties.

The tremor's epicenter was reckoned as probably at sea, 75 miles north of Tokyo. At 12.58 A.M. residents felt it for a full five minutes.

Scientists attributed the disturbance to activity in the "Outer Miuscartra earthquake belt."

Buenos Aires, May 5 - Severe earthquake shocks were felt at 8:20 A.M. today in the Province of Mendoza. Their epicenter was placed in the Andes. No casualties or damage were reported.

Rangoon, Burma, May 6 - The ancient seaport of Pegu, one of the most important in British India, lay desolate tonight from an earthquake and tidal wave that overwhelmed it during the night. It was estimated that between 400 and 1000 persons had perished. Southern Burma suffered in the disaster.

Fire following the earthquake and the tidal wave destroyed what few vestiges of habitations were left in this Pegu whose history goes back to 537 A.D.

The immense tidal wave overwhelmed the city without time for warning; dead and wounded were still being taken from the ruins tonight, and a makeshift hospital camp was giving first aid.

Broken communications and disorganization of public services made accurate information meagre. Few buildings escaped damage. Even the roof of the famous Shwe-Maw-Daw Pagoda, an ancient temple rising to a height of 324 feet, was wrecked. The pagoda is one of the holiest places in all Burma.

Virtually the entire population of Pegu, normally about 18,769, was homeless and shelterless tonight. The municipal building, the banks, the government school, the police commissioner's office and the market were destroyed. The fire still smouldered in the evening.

Great numbers of natives were buried in the collapse of a motion picture theatre, overwhelmed while the show was going on. A rice mill was engulfed completely. All rail communication beyond the town was halted because of the collapse of a bridge two miles north of Pegu.

Rangoon, Burma, May 7 - A check of casualties in the District of Southern Burma devastated by an earthquake and a tidal wave on Monday, today gave 400 dead and hundreds injured at the Seaport of Pegu and 200 dead or injured at Rangoon.

In the large centers the death totals rose slowly, but fell far short of earlier estimates that between 5000 and 7000 persons had perished. Many outlying sections could not be reached at all, however.

Though the greatest damage in the Pegu division, which includes the city of Rangoon, was at Pegu itself, Rangoon suffered terribly in the earthquake. Many buildings in the European residential quarter collapsed and the high court buildings were badly damaged. The inhabitants, fearing further shocks, fled to the streets and remained out of doors. The offices of the Rangoon Times were badly damaged.

The earthquake was one of the worst ever known in a district that has frequently suffered from them. Scarcely a building in the city escaped damage and many collapsed entirely. Towns near Rangoon and Pegu were badly shaken and communications were cut, so that casualties elsewhere could not be verified. One report said that Thomgwa Island, in the Hanthawaddy District had disappeared entirely.

Beirut, Syria, May 8 - A strong seismic disturbance about 150 miles north of the city was recorded here today. No damage was reported and it was believed likely that it was a submarine earthquake.

Teheran, Persia, May 9 - The newspaper Iran said today that there was an earthquake Monday at Salmasg. Many buildings were damaged and the bulk of the population camped outside the city during the remainder of the night, when a second and more severe shock occurred. Most of the buildings in the town collapsed during the second shock, burying those who had remained.

Teheran, Persia, May 10 - Late reports trickling in here from Azerbaijan show that the earthquakes reported the last few days have done terrific damage, 2000 being reported killed and 5000 injured in the Salmas District. The town of Salmas itself was almost destroyed, reliable dispatches say.

Many tremors were felt in Tabriz, culminating yesterday in a severe earth shock which lasted a minute and a half.

SEISMOLOGICAL DESPATCHES

GEORGETOWN UNIVERSITY
WASHINGTON, D. C.

J U N E - 1 9 3 0

Through courtesy of the Manila Observatory. Belated dispatches for May, 1930:
May 20 - Earthquake at 15:05 G.M.T. about 660 km north of Manila. Felt at Basco in the Batan Islands with intensity VI.
May 28 - Earthquake felt with intensity IV at Aparri, Northern Luzon, Philippine Islands, at 12:30 G.M.T. May 27, 1930.
Through courtesy of the Associated Press:
Tokyo, June 11 - A heavy fall of ashes and stones from Asama Volsa No, 90 miles to the northwest, was reported today from the villages to the northward of Karuizawa, and considerable damage was feared.

The lava started fires in the forests on the lower slopes of the mountains which were still burning late today.

Considerable falls of ash were reported in Takasaki and other towns up to a radius of 30 miles from the volcano.

Guatemala, June 14 - Earthquakes of considerable intensity, preceded by alarming noises, were reported tonight to be continuing in Santa Rosa Province. The government has sent a group of experts to the volcanoes, known at Tecuamburro and Jumay, to determine whether they show signs of activity, and if they do, to recommend what precautionary measures should be taken.
Teheran, Persia, June 15 - A severe earthquake shock was felt on the Plain of Salmas yesterday. The tremors also were felt at Tabriz.
Guatemala City, June 21 - The mountainous Santa Rosa Province country has been shaking slightly at rather frequent intervals for the last ten days. Many of the inhabitants, fearing there will be a violent earthquake, have left their homes.
Athens, June 21 - In the past few days a number of houses at the town of Canea collapsed under strong earth shocks. No casualties were reported.
Lima, Ohio, June 26 - A slight earth tremor was reported here at 3:55 p.m. today. It lasted only a few seconds.
Lima, Peru, June 26 - The National Telegraph Lines today said that strong earthquake shocks were felt Wednesday at 5:30 a.m. and 4:30 p.m. at Ica. They were of long duration and damaged many walls. The inhabitants were panic stricken, and left their dwellings to take refuge in the streets and parks.

The second tremor was the stronger, and was felt also at Fort Pisco and lightly at Lima, where it was almost unnoticed. Another strong tremor was felt at Huancavelica.

The shock was felt as far south as Bellefontaine, according to reports made to the Telephone Company here. Radiators in buildings were shaken but no damage was reported.
Guatemala City, June 28 - Frequent earthquakes of some intensity have continued for several days in the eastern part of the Department of Santa Rosa. Some of the tremors have been felt here. The focus of the seismic zone appears to be east of the volcano Tecaumburro.
Tokyo, June 28 - Fifteen persons were believed to have perished when a landslide buried two coaches of a railway train 50 miles northeast of Shimonoseki today.

Railway authorities said 36 persons were trapped in the coaches and 21 of these had escaped. Five hundred coolies were rushed to the scene and three bodies were recovered. Heavy rains caused the slide.

F. W. SOHON, S. J.
Director

SEISMOLOGICAL DESPATCHES

GEORGETOWN UNIVERSITY
WASHINGTON, D. C.

AUGUST, 1 9 3 0.

Through courtesy of Associated Press.

Porto do Lima, Portugal, Aug. 4 - A sharp earthquake tremor was felt here this afternoon. No damage to property or loss of life was reported.

Gironald Italias, Potenza, Italy, Aug. 4 - A new earthquake was felt ten minutes after noon today at Melfi and Rio Nero, producing a great panic.

Ancona, Italy, Aug. 5 - Light earthquake shocks lasting ten seconds were felt this evening at Macerata, Astoli, Fabriano, Fermo and Porto San Giorgio. There was no damage and nobody was injured.

Ventura, Calif., Aug. 5 - Residents of this community were awakened at 3:27 a.m. today by two earthquake shocks, which broke windows and cracked walls in several downtown buildings. The first quake, a mild one, was followed by a second severe shock a moment later, which lasted for one minute.

The most serious damage was reported by the owners of the Palace Hotel, where plate glass windows were broken. The proprietor of an undertaking establishment said several lateral cracks appeared in his building. Santa Barbara reported a slight shock with no damage.

Lima, Peru, August 5 - Strong earth tremors were felt here at 12:40 p.m. today. No damage was done, but the populace became panic stricken and scurried to streets, squares and open places.

Madrid, Aug. 7 - Belated dispatches from the town of Albox, between Murcia and Almerta, on the Mediterranean, report a strong earthquake at four o'clock yesterday morning.

Some houses were damaged and the people ran into the streets panicstricken but nobody was injured.

Alcoy, Spain, Aug. 8 - An earthquake, lasting three seconds, shook this city at 5:20 o'clock this afternoon. There was panic among the residents and great crowds rushed into the streets, but none was reported injured. There was some slight property damage.

Ascoli Piceno, Italy, Aug. 9 - A succession of light earthquake shocks, preceded by rumbling, were noted yesterday at Montemonaco. Natives, and a number of foreign visitors fled to the streets. There were no damages and no one was injured.

Batavia, Java, Aug. 9 - The island of Krakatao, or, translated into English, - Child of Krakatao, which yesterday had a height of 170 feet, today disappeared beneath the surface of the sea during intense activity of nearby Krakatao which is throwing out fountains of fire.

Madrid, Aug. 11 - Sharp earth shocks were felt at 1:00 p.m. today at Montiel, Albacete Province, and five minutes later, at Valdepenas, in Ciudad Real Province. There was no damage or loss of life in either town but the people were thrown into a panic. The earth movements in each case lasted less than a minute.

Pozzuoli, Italy, Aug. 13 - A slight earthquake shock of undulatory nature was felt here at 1:35 a.m. today. Residents rushed into the streets. There were no casualties and no damage.

Guatemala City, Guatemala, Aug. 14 - Earth shocks of some intensity were felt here today and caused much alarm among the inhabitants.

Reggio, Calabria, Italy, Aug. 22 - A slight undulatory earthquake shock was felt here at 2:30 a.m. bringing about a panic among the populace. There was no damage. Roccella, Jonica, and Cantanzaro also felt the tremor.

Sobreira Formosa, Portugal, Aug. 24 - Sharp earthquake shocks early today caused a panic among the people of this village. The village suffered little damage.

Swansea, Wales, Aug. 26 - Several earth tremors were felt here last night but there were no reports of any damage. All South Wales experienced the tremors.

Dar-Es-Salaam, Tanganyika, British East Africa, Aug. 26 - Many buildings were slightly damaged this morning when an earthquake shook this district. There were no casualties.

Ventura, Calif. Aug. 30 - An earthquake caused buildings to sway here at approximately 4:40 p.m. today. No damage was reported.

Teheran, Persia, May 12 - The death toll in recent earthquakes in Persia today was stated to be nearing 3000 persons.

The earthshocks are continuing but have lessened in their intensity at Tabriz. They still are very severe around Salmas. A rift in the earth two miles wide has opened between Urumyah and Salmas. Black water is running into Urumyah Lake from subterranean channels.

Teheran, Persia, May 21 - Latest reports state that two thousand bodies thus far had been recovered from the ruins left by the earthquake of May 10. The earthquake was most severe in Salmas and Azerbaijan.

Vatanzaro, Italy, May 16 - A strong earth shock, followed by a smaller one, was felt here early today. Similar tremblors alarmed the populations of Nicastro, Soveria, Simeri and Taverna.

Temuco, Chile, May 17 - The volcano Llaima, near here, has entered an eruptive stage. Unconfirmed advices say the nearby village of Huenivales has been destroyed by Lava.

Jerusalem, May 21 - Slight earth tremors were felt in Jerusalem shortly before 1:00 P.M. today. No damages or casualties were reported.

Hilo, Hawaii, May 21 - A strong earthquake which was felt on Hawaii, at 6:52 P.M. (local time) yesterday was said by Professor Thomas J. Jaggar today to have had its center in the area of the Hualalai Volcano. It was the second shock within twenty four hours. Hawaiian time is 5½ hours earlier than eastern time.

The shocks were felt strongly both on the Hilo, or eastern side of the island and in the Kona District, its western side.

Jaggar said the quakes were of the same character as those of last September and October when hundreds of shocks occurred. These were assigned by Jaggar to lava movements within the dormant volcano Hualalai.

Hilo, Hawaii, May 26 - A sharp earthquake shook Hilo at 8:17 o'clock last night (10:47 P.M., Pacific Standard Time). There was no damage. The Kilauea Volcano Observatory reported the quake but no volcanic activity. The quake also was felt in the Kona District on the opposite side of the island.

Tokyo, June 1 - An earthquake today heavily shook an area within a radius of 60 miles of Tokyo but only minor damages and no casualties were reported. A Tokyo central meteorological observatory communique stated that the quake's magnitude was twelve millimeters and that the disturbance was centered in the Pacific Ocean eastward from Tokyo and lasted twenty five minutes, starting at 2:58 A.M.

The quake was perceptible to humans for six or seven minutes. It was the longest and strongest of this year.

Clocks were stopped and frightened people ran from their houses here and in surrounding communities including Choshi, Mito, Ununomiya, Maebashi and Kofu.

F. W. Sohon, S. J.
Director

SEISMOLOGICAL DESPATCHES

GEORGETOWN UNIVERSITY
WASHINGTON, D. C.

bis.

Los Angeles, Aug. 30 - An earthquake shook Los Angeles at 4:39 p.m. today, rocking buildings for almost 30 seconds. The quake was general throughout Los Angeles, Pasadena, Inglewood and Santa Monica. In the latter city there were three distinct shocks. The tremor seemed to travel from Ventura to Los Angeles. Imperial Valley reported no shocks, nor did Santa Barbara.

A chimney was shaken from Berendo Junior High School. The quake also caused a bridge connecting two buildings and spanning the speedway, Main Highway, to cave in.

Some of the cornice work on St. Marks Hotel in Venica, a replica of St. Marks Palace in Venice, Italy, fell.

San Luis, Obispo, Calif. Sept. 2 - An earth shock of moderate intensity lasting about a second and a half, was felt here at 5:30 a.m. today. No damage was reported.

Murcia, Spain, Sept. 3 - A strong earthquake was felt here at 10:05 a.m. today, and was followed by another of less intensity at 2:30 p.m. The first lasted eight seconds. The quake in the morning sent the populace scurrying panic-stricken into the streets, but no deaths or injuries have been reported. Buildings swayed distinctly rattling chandeliers and paintings.

F. W. Sohon, S. J.
Director.

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SEISMOLOGICAL DESPATCHES

GEORGETOWN UNIVERSITY
WASHINGTON, D. C.

July, 1930

Through Courtesy of the Associated Press

London, July 2, 1930 - An earthquake was reported in Calcutta early this morning but no details were immediately available.

Gauhati, Assam, July 3 - Nine severe earthquake shocks were recorded here within a period of six minutes early today. Many persons were injured, several buildings were demolished and telegraph wires were broken. Slight shocks continued long after the heavier ones.

Shillong, Capital of Assam, reported an earthquake of great intensity at 2:36 a.m. with moderate shocks following at intervals of a few minutes. Train service was interrupted on the eastern Bengal railway because of damage to bridges and tracks, while telegraphic service was entirely out.

Rangoon, Burman capital, learned that an earthquake in the Akyab district had brought on a tidal wave. Reports said much property was damaged, with communications cut off.

The quakes, accompanied by a rumble that frightened the inhabitants, were felt in Calcutta and were so strong that the seismograph of Alipore University was thrown out of order. Observatory officials said the region of their greatest intensity was in West Assam, but some damage was done here.

Calcutta, Bengal, July 4 - Reports today from Jalpaivurt, near Bengal, said earth shocks still were occurring in that vicinity, having been intermittent since the heavy quake of yesterday.

Several persons were reported injured and one large building collapsed at Rangpur. The town hall was damaged seriously. At Malda several buildings were damaged.

Seville, Spain, July 5 - An earthquake of four seconds duration shook Seville tonight. It was intense enough to move furniture and cause pictures to fall off walls. The quake was also felt at Cordoba and Granada but no serious damage was reported.

Wellington, New Zealand, July 5 - A sharp and fairly prolonged earthquake was felt here and at Christ Church at 4:30 p.m. today. No damage was reported.

Wellington, N.Z., July 6 - The second earthquake shock within two days was felt at Welling at 4:30 o'clock this morning. No damage was done. A sharp and fairly prolonged shock was felt yesterday afternoon.

Naples, Italy, July 7 - Mount Vesuvius today burst into a state of active eruption developing three fountains of burning lava that invaded the whole northwest section of the vast platform of its crater. The eruptive cone fell ninety five feet down into the crater. Alessandro Malladra, Director of the Vesuvius Observatory, said the eruptive activity would continue for several weeks.

Dhubri, Assam, India, July 8 - An unconfirmed report reached here today that the Sahki hills had been cleft asunder by an earthquake and a village in Kanchigaon completely swallowed up. The quake which caused the tragedy was among the first of 112 shocks registered in the last few days.

Calcutta, India, July 9 - Dispatches from Dhubri, Coalpara, and Assam, state that earthquakes continue. To date 118 shocks have been reported. Practically every building in Dhubri has been damaged more or less.

Shocks of milder intensity are also felt every few hours in the Rangpur district and at Coochbehar.

Guatemala, July 9 - Earthquakes which have been shaking eastern Guatemala intermittently for a month were more serious today. So widespread were the quakes that they were felt in Guatemala's Capital. Twenty-one homes and several public buildings were reported destroyed at Guazacapan.

Marion, Ohio, July 10 - A number of small buildings were shaken perceptibly by an earthquake here tonight.

The tremor, apparently a localized disturbance, was of slight intensity, and lasted only a few seconds, starting about 6:15 o'clock. No damage was reported. Many residents reported the shaking of buildings, jolting of furniture and rattling of dishes.

Naples, Italy, July 11 - The lava that has been flowing for five days in the crater of Mt. Vesuvius, today had invaded the whole western zone of the vast crater which has a diameter of about a half mile. The flow, issuing from two great fountains, has been, however, so tranquil as to cause only slight uneasiness at the Vesuvian Observatory. There have been few explosions and only a small quantity of gas.

SEISMOLOGICAL DESPATCHES

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bis.

Guatemala City, July 15 - An earthquake shook eastern Guatemala yesterday. The shocks were severe in Santa Rosa and Jutipa Provinces where a few buildings were destroyed, and were strongly felt in the Capital but caused no damage.

Three Forks, Mont. July 17 - The fourth light earthquake in four days was felt last night. The movement, lasting four seconds, was reported from Bozeman, Lombard and Gateway. No damage was reported.

San Salvador, Republic of Salvador, July 17 - Thirteen buildings in the city of Anuachapan, El Salvador, were demolished by an earthquake today. The quake was the latest of a series of tremors which have been felt in that region for the past few days.

Rangoon, Burma, July 18 - Fifty persons were believed today to have been killed or severely injured in a severe earthquake 60 miles north of Rangoon in the Tharrawaddy District of Burma. Many houses collapsed. The villages of Letpadan was badly shaken.

Alcano, Sicily, July 22 - Two earthquake shocks, one of four seconds' duration and one of two, terrified the population here yesterday but no damage was done.

Naples, Italy, July 23 - A strong earth shock, lasting 14 seconds, was felt here and at Potenza and other villages in the region early this morning.

Several persons were reported killed or injured at the village of Barile, where a good deal of damage also was done. Naples felt the shock, which was undulating in character, at 1:06 a.m. Portenza, Matera and other towns felt the shock at 1:12 a.m.

The violence of the three fatal shocks -- grade seven on the Mercalli Scale -- was indicated by the calculations of seismographers that if it had reached grade ten on the same scale, the whole city of Naples would have been destroyed. The United States Consulate had no notice of any American victims in Naples or any of the nearby resorts.

Three violent shocks were felt shortly after one o'clock this morning and a lesser shock added to the horror at 6:35 a.m. The hamlet of Melfi in Apulia was the hardest hit.

All of the city's church bells pealed forth at the moment of the first quake as if to warn the inhabitants to flee for their lives. This was explained by the fact that undulating earth tremors set the bell towers to oscillating.

Town and church clocks throughout all the province were running again this evening. The quake had stopped them as if automatically at the moment of the chock, 1:10 a.m., thus giving the clearest evidence of the time of appearance of the subterranean upheaval.

Veterans of frequent earthquakes in this region said they could not remember any shocks more severe than those of this morning. The center of the seismic movement appeared to have been between Melfi, Ariano and Apuglia.

The center of the disturbance appeared to be at Visciano, Avellino Province.

Professor Alessandro Malladra, Director of the Vesuvian Observatory, said three shocks came in quick succession, lasting in all, about one minute. He said there was a violent agitation of the laboratory and the recording needles flew out of the seismographic zone, preventing exact calculation of the epicentre.

The Institute of Terrestrial Physics at the University of Naples, reported that there were three shocks, reaching an intensity between grades 6 and 7 on the Mercalli Scale, with maximum acceleration between 12.5 and 18 millimeters a second.

Rome, - An official recount of casualties was issued this morning, placing the dead from Wednesday's earthquake at 2,142 and the injured at 4,551.

The towns most seriously affected by the earthquake as reported authoritatively were as follows: Naples, Barile, Atella, Venosa, Buonalbergo, Rapolla, Rionero, Benevento Province, Salerno Province, Foggia Province. Other reports said casualties were recorded in Avellino and Potenza.

The tremors shook buildings and casualties resulted from the collapse of walls, church steeples and the like. The shocks were felt as far away as Ancona on the Adriatic Coast, and at Chieti, Teramo and Aquila in the Abruzzi region.

Thirty towns in Avellino were ruined, 21 in Benevento, 13 in Foggia and 19 in Potenza, making a total of 83 towns for which figures had been compiled at midday. There were a few scattered deaths on the rim of the intense quake zone in addition to those contained in the report.

ter.

Of the 3,188 houses wrecked in the quake, 2,066 were in the Province of Avellino. Communes more heavily stricken were Ariano, Aquilonia, Montecalvo, Bisaccia, Lacedonia, Villanova and Accadia.

Rome - The earthquakes which shook southern Italy this morning were felt in Rome at 1:11 a.m. No damage was reported.

Refugees from Ariano, the population of which before yesterday's earthquake was 9,000, today described that town as a heap of ruins. Houses that were left standing, they asserted, must be town down because they were tottering and unsafe.

Avellino - There were fissures in the open ground near the Ofanto River today and it was believed that if the river overflowed its banks these would be transformed into lakes of considerable size.

Southern Italy was rocked by a steady procession of minor quakes throughout the day following upon the tremendous shocks an hour after midnight. The quake centered at Melfi

Portenza - A slight earthquake shock was felt in this region at 3 p.m. This was the fifth since an hour after midnight, when the great quake occurred.

The number of deaths for Avellino Province was subdivided among the larger towns as follows: Lacedonia 600; Aquilonia 400; Villanova 400; Montecalvo 300; Ariano 300; Sannicola 120; Rochetta 120.

Ariano - A new earth shock at about 10 o'clock here yesterday morning added another death to the long list.

Avellino - Slight undulatory earth shocks were felt in this vicinity at 1:10 p.m. and at 7:40 p.m. yesterday.

Potenza - Five new earthquake shocks were felt today in the zone devastated by Wednesday's upheaval. They damaged many weakened buildings but no injuries or loss of life from them were reported.

Two shocks occurred about 10 a.m. and three other brief ones followed at about three in the afternoon. They were felt throughout the whole wasted district.

In Melfi, one of the communities that suffered worst, the Pacchioli Palace crumbled. Many houses developed large and dangerous fissures.

Mexico City, July 24 - Special dispatches today reported that an earthquake last night shook the town of Pinotepa, State of Oaxaca. It was preceded by subterranean rumblings and accompanied by torrential rain. No casualties were reported.

Wellington, New Zealand, July 25 - A sharp earthshock, lasting one minute, was felt at Westport in the Karamea area today. The shock was preceded by a loud rumbling sound. The earthquake was felt here in a slight degree. No damage and no casualties were reported.

Duisburg, Altstaden, Germany, July 26 - Residents of this city were thrown into a panic by an earthquake here this forenoon which rocked furniture and shook pictures from walls. No casualties were reported.

Sofia, Bulgaria, July 26 - Numerous earth shocks were felt throughout the seismic region of Bulgaria today. No damage was reported but the population of several country villages was alarmed. The shocks were felt at intervals of nearly an hour and were accompanied by underground rumblings.

Panama City, Panama, July 30 - Two earthquakes visited the Canal Zone this afternoon, causing consternation in both terminals of the canal, but inflicting, so far as reported late tonight, only trifling damage.

Officials said the disturbance centered 50 miles southeast of Balboa, probably between Aguadulce and Penomone, in the interior of the Panama Republic.

The disturbance started with first a slight and then a stronger tremblor. Both lasted only about 20 seconds, although the seismograph at Balboa Heights indicated that there had been activity for approximately six minutes in that immediate section. Numerous reports ssid the disturbance was accompanied by deep rumblings.

Cristobal, Canal Zone, July 30 - The Canal Zone administration building at Balboa was severely shaken by today's tremblor. The Pacific side of the Isthmus received the most severe shock. The disturbance probably was in a known fault south westward of Balboa

The quake disturbances also were felt at Panama City.

Colon, Panama, July 30 - A single earthquake tremor along the Atlantic coast of the Isthmus of Panama was felt at 1:52 p.m. today. No damage was reported.

Vienna, July 31 - The seismographic institute today reported an earth tremor at Semmering, near Vienna. The shock occurred at 2;30 a.m., stopping clocks and rattling windows but causing no damage.

Salsberg, Austria, July 31 - Because of an earthquake in this vicinity on Saturday many wells have gone dry.

New Bedford, Mass. July 31 - Earth tremors that rattled windows and shook dishes from their shelves, were felt here tonight shortly before 9 o'clock, E.S.T. The tremors, according to reports, were exceptionally strong in Nonquit and Salter's Point and the south and southwest sections of the city.

Tegucigalpa, Honduras, July 31 - Strong earthquake shocks were felt here at 12:25 a.m. today, causing great alarm but doing no damage.

J. S. O'Conor, S. J.
(Acting Director.)

Of the 3,169 houses wrecked in the quake, 2,986 were in the province of Avellino. Casualties were heaviest in [illegible], Aquilonia, [illegible], [illegible], Lacedonia, [illegible] and Bisaccia.

Bari - The earthquake which shook Southern Italy this morning was felt at about 1:10 a.m. No damage was reported.

[illegible], the population of which before yesterday's earthquake was 9,000, today [illegible] that [illegible] of ruins. Those that were left standing, they [illegible], must be torn down because they are tottering and unsafe.

Avellino - There were [illegible] in the open ground near the [illegible] today and it was believed that in the [illegible] the shock would be [illegible] into loose or [illegible].

Southern Italy was shaken by a steady procession of minor shocks throughout the day following upon the tremendous quake an hour after midnight. The quake centered at Melfi.

[illegible] - A slight earthquake shock was felt in this region at 6 a.m. This was the third since an hour after midnight, when the first quake occurred.

The number of deaths for Avellino Province was [illegible] in the larger towns as follows: Lacedonia 600; Aquilonia 400; Villanova 400; Montecalvo 300; Ariano 300; Scampitella 150; Rocchetta 100.

[illegible] - A new earth shock at about 10 o'clock this yesterday morning added another death to the long list.

Avellino - Slight undulatory earth shocks were felt in this province at 2:10 p.m. and at 7:40 p.m. yesterday.

Potenza - Five new earthquake shocks were felt today in the zone devastated by Wednesday's upheaval. They damaged many weakened buildings but no injuries or loss of life from them were reported.

Two shocks occurred about 11 a.m. and three other brief ones followed at about three in the afternoon. They were felt throughout the whole stricken district.

In Melfi, one of the communities that suffered worst, the Bishop's Palace cracked. Many houses collapsed again but no persons [illegible].

Mexico City, July 23 - Special dispatches today reported that an earthquake last night shook the town of Pinotepa, State of Oaxaca. It was preceded by [illegible] rumblings and accompanied by torrential rain. No casualties were reported.

[illegible] at Stuttgart in the [illegible] today. The shock was preceded by a [illegible] rumbling sound. The earthquake was felt here in a slight degree. No damage and no casualties were reported.

Schwenningen, Wurttemberg, Germany, July 28 - Residents of this city were thrown into a panic by an earthquake here this forenoon which rocked furniture and shook [illegible] from walls. No casualties were reported.

Sofia, Bulgaria, July 28 - Numerous earth shocks were felt in the [illegible] region of Bulgaria today. No damage was reported but the population of several country villages was alarmed. The shocks were felt at intervals of nearly an hour and were accompanied by underground rumblings.

Panama City, Panama, July 30 - Two earthquakes visited the Canal Zone this afternoon, causing consternation in both terminals of the Canal, but inflicting, so far as reported late tonight, only trifling damage.

Officials said the disturbance centered 50 miles southwest of Balboa, probably between Aguadulce and Santiago, in the interior of the Panama Republic.

The [illegible] started with [illegible] a slight and then a [illegible] tremor, which lasted only about 20 seconds, although the seismograph at Balboa Heights indicated that there had been activity for approximately six minutes in [illegible]. [illegible] reports said the disturbance was accompanied by deep rumblings.

Cristobal, Canal Zone, July 30 - The Canal Zone [illegible] earthquake [illegible]. The [illegible] side of the Isthmus experienced the most severe shocks. The disturbance probably was in a [illegible] south-west of Balboa.

The [illegible] disturbances were more felt at Panama City.

Colon, Panama, July 30 - A slight earthquake tremor along the Atlantic coast of the Republic of Panama was felt at 4:45 p.m. today. No damage was reported.

Manila, July 31 - The seismograph [illegible] reported an earthquake at [illegible], near Manila. The shock occurred at 8:30 a.m., strongly [illegible] the buildings but [illegible] no damage.

Salzburg, Austria, July 31 - [illegible] of an earthquake in the vicinity of Salzburg were felt here last night.

[illegible], July 31 - Earth tremors that rattled windows and shook dishes [illegible] were felt [illegible] shortly before 2 o'clock, a.m. The [illegible], lasting 10 seconds, were particularly strong on [illegible] Point and the north and western sections of the [illegible].

[illegible], July 31 - Seven earthquake shocks were felt [illegible] today, causing great alarm but no damage.

[illegible]

[illegible]

SEISMOLOGICAL DESPATCHES

GEORGETOWN UNIVERSITY
WASHINGTON, D. C.

Courtesy of Rev. Antonio Due, S. J.,
Estacion Sísmológica de Cartuja, GRANADA, SPAIN:

CARTUJA, GRANADA (SPAIN), Nov. 12. An earthquake IV F.M. was felt this night at Cartuja; it was felt in the city as V F.M. with alarm. Recorded in the Seism. Station at 21-13-16.

HUÉRCAL OVERA (ALMERÍA), Nov. 16. A slight earth tremor was reported as III F.M.; unregistered at Cartuja Seism. Stat. 11-32-47.

GRANADA, SPAIN, Nov. 23. A small shock was felt as II F.M. in the city. Recorded at Cart. 5-4-49.

GRANADA, SPAIN, Dec. 1. Intensity III F.M. in the city. Recorded at Cartuja Seism. Station: 16-50-31.

Courtesy of ASSOCIATED PRESS:

NEW ORLEANS, Oct. 19. Distinct earthquake tremors today shook thirteen or more towns and cities of southeastern Louisiana, including New Orleans, but no damage of any consequence was reported.

The earthquake occurred about 6:15 A.M., literally shaking some residents of New Orleans and surrounding regions out of their beds.

Doubt existed as to whether two tremors occurred, or only one. Some narrators were positive that there were two shocks, about five minutes apart. It was definite that the first tremble lasted a full thirty seconds.

In Plaquenines, La., about 85 miles northwest of New Orleans, the quake was severe enough to shake the glass from street lights.

Today's earthquake is the first ever felt in New Orleans, according to older inhabitants and no historical record has ever been found of any previous similar shock.

FIASTRA, ITALY, Nov. 1. Eighteen earth shocks were felt here last night and continued intermittently until 1:20 o'clock this morning. The population of the town, which is near Macerata, on the fringe of the zone shaken earlier this week, was thrown into panic but no injuries or damage were reported.

COPENHAGEN, Nov. 1. A slight earth tremor lasting two seconds was experienced here shortly after midnight today. No damage was reported.

PUTBUS, GERMANY, Nov. 1. A light earthquake was felt here and elsewhere on the island of Rueben, last night. No damage resulted.

MALONE, N. Y., Nov. 1. A slight earthquake shook Malone and vicinity at 9:40 o'clock tonight. No damage was reported. The tremors were felt throughout a considerable area.

SOFIA, BULGARIA, Nov. 6. Earth shocks of considerable intensity were felt this morning along the Bulgaria-Jugoslavian border. The tremors caused a panic at Godec and at Berkovitza. Walls of several houses were wrecked but there were no casualties.

PUERTO MONTT, CHILE, Nov. 6. Cabulco volcano today was reported in eruption.

BUCHAREST, RUMANIA. Nov. 11. Earth shocks of short duration were felt in Bucharest this morning. No damage was reported.

ISTANBUL, TURKEY, Nov. 18. The city of Smyrna which is just recovering from disastrous floods was thrown into panic at 10:00 A.M. by a sharp earthquakn.

No loss of life or property was reported.

PAVIA DO ALENTEJO, PORTUGAL, Nov. 18. Earth shocks were felt here today. No damage reported beyond fallen tiles.

PONTIAC, MICH., Nov. 19. A large section near Oxbow Lake was shaken tonight by what was believed to be an earthquake. The shocks were most severe in the regions of Oxbow, Union, Green, Cass, Orchard and Straits Lakes, near here. There were no reports of damage.

At Kego Harbor, houses were shaken so violently that many persons ran into the streets; dishes were rattled and scores of persons, aroused from sleep, telephoned the police and fire departments.

The shocks apparently covered a radius of 12 miles. They were first reported about 11 P.M. but were first attributed to an explosion.

PONTIAC, MICH., Nov. 20. Last night's "earthquake" which shook the lake district of Oakland County turned out to have been a dynamite explosion.

Sheriff's deputies today discovered that 50 pounds of the explosive had been stolen from a county gravel pit near the "quake" area, and their theory is that it exploded while being carried away in an automobile.

HILO, HAWAII, Nov. 20. The Kilauea volcano continued to fling lava and flame today twenty-four hours after it began erupting, but the pyrotechnic display was diminishing.

A single fountain shooting 200 feet above the floor of the huge Halemaumau pit cast a glare 1200 feet to the rim surrounding the caldron of boiling rock. Scientists at the observatory predicted the eruption would last another full day.

Several other fiery fountains which burst through the lava floor when an earthquake shocked the volcano into action yesterday had ceased playing.

HILO, HAWAII, Nov. 21. Activity continued today with the great fire bowl of the Kilaueau volcano but the fountains of lava had almost subsided after shooting flames 200 feet wednesday.

The glow from the pit, 1200 feet deep, was visible last night in Hilo, 30 miles away.

TIRANA, ALBANIA, Nov. 21. Thirty persons were reported killed during a violent earth shock at 3 o'clock this morning at the Valona region. Most of the damage occurred in the towns of Messaplik, Palase, Terkcei and Dermi. Many others were injured and nimerous houses were destroyed.

VIENNA, Nov. 21. A government dispatch from Tirana reported tonight that a violent earthquake had showed thirty deaths in the Albanian village of Telgac, District of Valona.

The dispatch added that great numbers were injured in the collapse of numerous houses, with heavy material losses.

The entire population was made homeless.

TIRANA, ALBANIA, Nov. 22. Seven villages were destroyed and more than 50 persons killed in the earthquake which yesterday at 3 p.m. shook the Valona District, on the shore of the Adriatic.

More than 200 persons were injured. The villages to suffer destruction were Terbac, Brataj, Thermi, Dukat, Lepenio, Vranisht and Llogara. The tremor lasted 20 seconds.

TIRANA, ALBANIA, Nov. 23. Slight earth tremors were felt today at Terbatch and Dukar, in the same region of southern Albania where an earthquake caused more than 50 deaths Friday.

Most of the houses in the two towns have been destroyed by the previous shocks.

BATVIA, JAVA, Nov. 26. The volcano Merapi, in Java, has been showing a greatly increased activity since Sunday. Subterranean rumblings can be heard at a great distance, and a stream of red hot lava is slowly pouring down the mountain slope.

TOKYO, Nov. 26. At least 215 persons were killed and several hundred injured today in eastern Japan's most destructive earthquake since the disaster of 1923.

Striking a score of towns and villages of northern Iqu Peninsula, the playground of Japan, at 4:03 A.M., (2:03 P.M. E.S.T. Tuesday) the quake destroyed or seriously damaged 4,500 buildings according to an official estimate.

The quake apparently was the climax of a series which have been felt recently through the northern part of the peninsula. The region experienced an average of 300 minor shocks daily since November 10, including a severe quake yesterday afternoon.

The quake was felt over a wide area. Tokyo and Yokohama felt the shock, but no serious damage was done in these two cities.

Fire followed the quake in many places, adding materially to the damage. Homes, bridges and railroads were destroyed.

Fires burst from ruins, the earth cracked open, land slid from the mountains and water loosed by broken reservoirs added to the havoc and confusion.

Warned, however, by sixteen days of preliminary tremors, most people had extinguished fires in their homes before sleeping and therefore escaped a conflagration such as that which, adding its horror to the earthquake of 1923, destroyed 10,000 buildings in Toyko and killed approximately 100,000 persons.

Reports indicated the heavies blow fell upon the area extending from Mishima to Numazu, a region about fifteen miles long and five to ten miles wide.

SEISMOLOGICAL DESPATCHES

GEORGETOWN UNIVERSITY

WASHINGTON, D. C.

Year 1939

January

MANILA, JAN.5 -(AP)- A fairly heavy earthquake of 10 seconds duration shook Manila at 11:25 A.M. today (10:25 P.M., Jan,4, EST). There were no reports of damage or casualties.

OMETEPEC, MEXICO, JAN.16 -(AP)- An earthquake rocked this town, near the Pacific Coast in GUERRERO STATE, southwestern Mexico, yesterday afternoon. No damage was apparent.

SANTIAGO, CHILE, JAN.25 -(AP)- A series of earthquakes shortly before midnight rocked this capital and a large section of central Chile and early today communications were disrupted with the large cities of Concepcion and Talca. The shocks spread panic through a 400 mile strip along the Chilean coast and eastward 75 miles across the country. The first of the series of quakes was felt in Santiago at 11:35 P.M. No damage was done here. In other cities the shocks lasted more than a minute.

The state railways office had reports before communications went out at Talca that at least two were killed at CORDILLERA. Big flashes preceded the temblor there, possibly caused by eruption of the Quizapu volcano. First reports said the majority of houses were destroyed in RENAICO, small town 50 miles south of Concepcion, and the railway disrupted in numerous places.

Reports from TALCA said eight persons were killed and 20 injured there, but little damage was caused by the quake. An aviator flying over CHILLAN, a city of 40,000 population, 220 miles south of Santiago, reported the almost complete destruction of that historic town. The dead were being buried in trenches in the street, he declared, and only three houses in 144 blocks appeared habitable.

CAUQUENES, a city of 6,500 population, noted for its mineral springs, 200 miles south of Santiago, was officially reported largely destroyed. Its inhabitants were camping in the streets, but the number of casualties was not known. ANGOL - five dead. CAUTIN - many victims; serious damage. VALPARAISO 60 miles northwest of Santiago and the northernmost point to report damage - minor surface cracks in buildings. CURICO - many buildings were damaged. Several walls collapsed. Hundreds of worried inhabitants slept in streets. TRAIGUEN - several buildings were damaged.

BUENOS AIRES, JAN,25 -(AP)- La Nacion's correspondent in Santiago, Chile, said tonight Lieut. Yanez, an aviator, had landed at Chillan and returned with the information that 5,000 persons perished in the quake there last night.

Violence of the shock opened fissures in CHILLAN streets 12 feet wide, and huge ditches were being dug to bury the dead as quickly as possible. The roof and walls of a theater collapsed crushing 300 persons to death. The aviator confirmed reports that the towns of PARRAL and CAUQUENES were destroyed and that a great part of SAN CARLOS was in ruins.

CHILLAN, CHILE, JAN.29 -(AP)- A series of minor earth shocks today jarred the ruins of this ancient city of 40,000 population which was virtually wiped off the map in Tuesday's (Jan.24) devastating earthquake. Several landslides resulting from the earthquake forced suspension today of service on the trans-Andean Railway. A government official said a survey had disclosed that only 20 houses remained standing in Chillan.

SANTIAGO, CHILE, JAN.30 -(AP)- New panic was reported today among survivors of Chile's disastrous earthquake after more shocks, described as "very strong", in the same region where between 25,000 and 30,000 already had died. The new temblors, lasting more than two minutes, rocked Chillan and Concepcion shortly before last midnight, injuring 20 persons and spreading terror among the homeless sleeping in the public plaza at Chillan.

Some sources said the new shocks were almost as strong as those of Jan,24 which destroyed Chillan and left an estimated 15,000 dead. There was little property left to be damaged, however. At CONCEPCION, several more walls caved in. A tabulation of the latest conservative estimates of deaths by localities follows:

CHILLAN, 15,000; NUBLE PROVINCE and CONCEPCION, 2,500; BULNES, 2,5000; CAUQUENES, 2,000; PARRAL, SAN CARLOS and LINARES, about 2,000; scattered farming areas, 2,000.

CAUQUENES, one of the latest of the towns to report on the disaster, had a population of 5,000. Its authorities advised Santiago that every house in the community was destroyed and that severe shocks were felt for two days after the violent earthquake of Jan. 23. Virtually every farmhouse in the Cauquenes area was said to have been destroyed.

Up to last night, 1,040 bodies had been buried at concepcion and the small town of Bulnes, where the population was 5,000, had buried 2,004.

SAN SALVADOR. SALVADOR, JAN.30 -(AP)- The western portion of Salvador was shaken by an earthquake today. Only minor damage was reported.

February

SANTIAGO, CHILE, FEB.1 -(AP)- Observatories around Santiago reported today that more than 300 earth shocks had been recorded in the past week since the devastating earthquake which took perhaps 30,000 lives. Many of the shocks were so slight they were unfelt, but one of moderate intensity was reported Monday night (Jan.30) at LA SERENA, 600 miles north of the disaster zone and another strong tremor was felt at CHILLAN which was demolished last week.

TILLAMOOK, OREGON, FEB.15 -(AP)- Slight earth shocks were felt along the Oregon coast in this region between 5 and 6 A.M. (8 and 9 A.M., EST) yesterday. Dishes danced on shelves and windows rattled but no damage was reported. Towns in a 25 mile strip of shore from Tillamook north to WHEELER reported feeling the quakes.

March

TOKYO, MARCH 20 -(AP)- An earthquake described by the Central Meterological Observatory as the strongest in five years rocked southern Japan today, destroying communications and power lines and damaging hundreds of homes. The number of casualties, if any, was not known. The original shock came at 12:23 P.M. (10:23 P.M.,Mar.19,EST) after which settling shocks were felt throughout the islands of KYUSHO and SHIKOKU. Broken windows and chimneys were reported as the bulk of the damage to homes, thousands of persons ran into the streets and sought the safety of open spaces during the shocks.

EL CENTRO, CALIFORNIA, MARCH 21 -(AP)- The second sharp earthquake of the day jarred portions of the Imperial Valley at 5:51 A.M. (PST) today accompanied by a clearly audible roar. The tremor lasted five seconds, rattled dishes but did no damage. It also was felt strongly in CALEXICO, to the south on the Mexican border, but not in Brawley, 14 miles north. A one-second "jarring" quake was felt at 12:35 A.M. (3:35 A.M.,EST).

BUDAPEST, MARCH 23 -(AP)- Earth shocks were felt in the region near the Rumanian frontier today. The shocks continued intermittently for 40 minutes. Several chimneys toppled. Plaster fell from ceilings and pictures from walls. Reports from the region said the earthquake had caused but slight damage.

RUCUMAN, ARGENTINA, MARCH 24 -(AP)- This northern Argentina city was rocked by a strong earthquake at 9 P.M. last night. Residents were badly frightened. The temblor cracked many walls, but there were no victims.

April

EL CENTRO, CALIFORNIA, APRIL 15 -(AP)- A light earthquake, causing no damage, rocked El Centro at 2:42 A.M. (5:42 A.M.,EST) today. Two weeks ago a series of minor temblors were felt here and in nearby Mexico.

NEW MADRID, MISSOURI, APRIL 15 -(AP)- An earth tremor shook New Madrid and vicinity at 11:25 A.M. today. It lasted two minutes. Buildings swayed noticeably but there was no damage of consequence.

SANTIAGO, CHILE, APRIL 18 -(AP)- A heavy earth shock was recorded at 2:30 today in the area around COQUIMBO and ATACAMA PROVINCE.

SAN DIEGO, CALIFORNIA, APRIL 19 -(AP)- A sharp earthquake which lasted half a minute shook San Diego at 11:42 last night (2:42 A.M., Apr.19, EST) and aroused residents throughout the city. Transbay Coronado residents said a dull rumble preceded the temblor. No damage was reported.

May

AKITA, JAPAN, MAY 1 -(AP)- Sixty thousand terror-stricken residents of this northern Japanese coastal city fled to the open spaces today during a series of earth shocks described as the most severe in 25 years. The Quake shook widespread sections of Northern Japan. The town of FUNAKOSHI was burning and known damage in AKITA included the collapse of homes and the shattering of nearly all glass showcases in the stores.

SAN DIEGO, CALIFORNIA, MAY 1 -(AP)- The fifth in a series of light earthquake shocks rattled windows, swayed ceiling lamps and rocked downtown buildings at 3:50 P.M. (6:30 P.M., EST) today. No damage was reported.

TOKYO, MAY 2 -(AP)- A police survey disclosed today that 1,500 dwellings were destroyed or damaged and at least 19 persons were killed by earthquakes and ensuing fire and floods in villages 300 miles North of Tokyo monday.
The number of missing persons remained undetermined. The entire population of Akita Prefecture huddled together in open spaces as recurrent shocks brought new landslides and toppled weakened walls. Nine houses of the village fo AIKAWA were swallowed by the sea.

SANTIAGO, CHILE, MAY 6 -(AP)- Two temblors today demolished a few already damaged walls at CHILLAN and CONCEPCION, cities wrecked by the January earthquake.

MANILA, MAY 7 -(AP)- An earthquake of moderate intensity shook the Manila region at 1:01 A.M. today, and lasted 20 seconds. No casualties or damages were reported.

PONTA DELGADA, AZORE ISLANDS, MAY 8 -(AP)- An earth shock was felt here today at 1:45 A.M. (8:45 P.M.,Sunday,EST) but no damage resulted.

HILO, HAWAII, MAY 8 -(AP)- An earthquake at 7:03 A.M. today rattled windows in Hilo and was registered as slight on the volcano observatory seismograph.

INDIO, CALIFORNIA, MAY 12 -(AP)- A short, jerky earthquake was felt in the COACHELLA VALLEY at 11:26 A.M. (PST) today. It had an East-West motion.

SANTIAGO, CHILE, MAY 12 -(AP)- A strong earth temblor was felt tonight in LA SERENA, northern Province of COQUIMBO. No casualties were reported.

TAIHOKU, FORMOSA, MAY 16 -(AP)- An earthquake of moderate intensity shook the whole island of FORMOSA today but early reports indicated there were no casualties and no serious damage.

HILO, HAWAII MAY 16 -(AP)- Scientists watched Kilauea Volcano for possible signs of eruption today after an earthquake which caused minor damage to some buildings here yesterday.
The quake, described as "moderate to strong" occurred at 10:27 A.M. (12:57 P.M., PST) and caused cracks in several office buildings, loosened a beam in a newspaper plant and precipitated a large landslide in Kilauea's Crater.

MANILA, MAY 19 -(AP)- Tiny VERDE ISLAND, some 100 miles south of Manila, with a population of 4,000. was reported tonight to be quaking and sinking fast into the sea. Governor Vicente Caedo of Batangas Province reported to government headquarters here that persons on the island, only 15 kilometers square, were being evacuated.

ARICA, CHILE, MAY 19 -(AP)- An earthquake caused a panic in this town of 15,000 at 2:45 P.M. today. Although many walls crumbled, no persons were reported injured.

MANILA, MAY 20 -(AP)- Refugees fleeing Verde island's earthquakes said today tremors during the last two weeks had opened fissures on the island causing a portion of its surface to settle. They said the quakes became more numerous Thursday, tumbled rocks from hillsides and caused a one meter depression in one plot of ground. There was no evidence, however, that the entire Island was sinking, they reported.

MEXICO CITY, MAY 23 -(AP)- Two earthquakes -of one minute and three minutes respectively and of light intensity- were registered by the government seismograph last night. They centered somewhere along the Pacific Coast.

HILO, T.H. MAY 23 -(AP)- An earthquake sharp enough to dismantle seismographs and start a huge landslide in KILAUEA was felt in Hilo and throughout the Kilauea Volcano region at 2:14 P.M. (7:44 P.M.,EST) today. Residents said the quake seemed sharper than one May 15 which also dismantled seismographs and started a landslide. No damage was reported.

MEXICO CITY, MAY 30 -(AP)- A light earthquake, its epicenter about 200 miles southwest of here, was recorded today. No damage was reported.

PERRYVILLE, ALASKA, MAY 30 -(AP)- Inhabitants of this Alaska Peninsula settlement had to keep their lamps lighted again today as ashes and thick, sulphurous smoke from erupting Mount Veniaminof, 15 miles away, darkened the sky. Residents have kept themselves in readiness to flee since May 23, when the volcano became active after a slight earthquake.

ATHENS, MAY 31 -(AP)- A strong earth shock was felt at 2:20 A.M. today (May 30, 7:20 P.M., EST). In PATRAS, the walls of several buildings were cracked and the terrified population poured into streets in night-clothes but there was no loss of life.

JUNE

TULSA, OKLAHOMA, JUNE 1 -(AP)- Several eastern Oklahoma cities felt earth tremors strong enough to jar buildings early today but no damage was reported. Scores of Tulsans were awakened shortly before 2 A.M. by a tremor one observer said lasted "six or seven seconds," It was noticeable in apartment buildings and upper floors of houses.

A shock in OKMULGEE of sufficient intensity to rattle windows, was reported to have lasted ten minutes. MUSKOGEE and HOLDENVILLE also felt the quake. A HOLDENVILLE police sergeant said it shoved his desk about six inches.

SAN JOSE, COSTA RICA, JUNE 13 -(AP)- A violent temblor shook San Jose today. There were no reports of damage or casualties.

LITTLE ROCK, ARKANSAS, JUNE 19 -(AP)- Little Rock was shaken by a slight earth tremor at 3:44 P.M. (CST) today. No damage was reported immediately. PINE BLUFF, 42 miles southeast of here, also reported feeling the tremor. The Little Rock Weather Bureau, where a stack of books was dislodged by the movement, said the tremor was apparently of not more than two secods duration.

AMSTERDAM, JUNE 19 -(AP)* The volcanic island of KRAKATOA erupted today, flinging lava to a height of 30,000 feet reports from nearby Java said.

LONDON, JUNE 23 -(AP)- An earthquake killed 11 natives and injured 28 in GOLD COAST, British West African Colony, last night, the Colonial Office was informed today in a telegram from Accra.

ATHENS, JUNE 27 -(AP)- Severe earth tremors yesterday and today destroyed several houses in the AGRINION DISTRICT, 150 miles west of Athens. No loss of life has been reported.

SAN FRANCISCO, JUNE 24 -(AP)- Earth tremors were recorded from west central California south into Mexico today, but reported damage was nominal. There were no deaths or injuries.

One shock centered approximately 85 miles southeast of SAN FRANCISCO. It broke dishes, toppled chimneys and overturned furniture at CIENEGA, cracked brick walls at HOLLISTER and caused a winery wall to crumble at SAN BENITO. GILROY and SALINAS also felt the temblor. At HOLLISTER it was described as the most violent since 1906.

The second tremor swayed chandeliers and shook chairs at SAN DIEGO and was felt south with varying degrees to TIJUANA, MEXICO. The first shock was timed at 5:01:40 A.M. (8:01:40 A.M., EST). The second at 8:28:03 A.M.

JULY

PASADENA, CALIFORNIA, JULY 5 -(AP)- An earthquake "strong enough to do damage" was recorded at 2:52 P.M. (5:52 P.M., EST) today.

PALENA, ITALY, JULY 12 -(AP)- A strong earthquake in this region, about 50 miles east of Rome, brought people hurrying from their beds early today as houses shook and chimney bricks fell. No injuries or serious damage were reported.

SAN FRANCISCO, JULY 17 -(AP)- A slight earthquake was felt here about 1:25 A.M. (4:25 A.M., EST) today. Police said they received several calls telling of the shock. No damage was reported.

MENDOZA, ARGENTINA, JULY 27 -(AP)- Double earth shocks caused a widespread panic today. No damage was caused, but hundreds of persons, fearing the world was coming to an end, ran from their homes, prayed, screamed and fired guns into the air. The first shock at 6:36 A.M. lasted about 50 seconds, the second came 24 minutes later.

PORT OF SPAIN, TRINIDAD, AUG. 11 -(AP)- A severe earthshock, said to be the worst felt in this West Indian Island for years, caused residents of the lower part of the city to flee from their houses early today. No casualties or serious damage were reported immediately.

HAVANA, AUG. 15 -(AP)- An incomplete report of an earthshock felt several places in SANTA CLARA PROVINCE said today a hospital at REMEDIOS had been damaged and many persons injured. The tremor was recorded as one of moderate intensity, lasting two seconds. It came at 11:45 P.M., EST yesterday.

SEPTEMBER

ISTANBUL, TURKEY, SEPT. 22 -(AP)- A heavy toll of lives and property was taken by an earthquake today at SMYRNA, reports received here said.

The PERGANE, KOTCHILI and FOTCHA districts were said to be the hardest hit, with more than two-thirds of the number of buildings there destroyed.

ISTANBUL, TURKEY, SEPT. 23 -(AP)- More than 200 persons were reported killed today in an earthquake said to have caved in more than 1,000 buildings in the SMYRNA region. The shocks were said to be continuing, accompanied by thunderous underground noises causing panic among the population. The temblors were felt here and at ANKARA, but in neither place was there loss of life or property damage.

ISTANBUL, TURKEY, SEPT. 27 -(AP)- Earthquakes of increasing intensity today shook the region around ANKARA. Eighteen shocks have been felt in the past 24 hours. First reports said many houses had been destroyed, but no loss of life was reported.

Many small Aegean Islands also were severely affected by the quakes. Considerable damage was reported on the Islands of SANTORINI and MYTILENE.

KRISTIANSAND, NORWAY, OCT. 9 *(AP)- An earthquake shook southern Norway with such rumbling roars today that the lighthouse keeper at Oksoe thought mines were exploding. No damage was reported.

MANCHESTER, N.H.,OCT. 11 -(AP)* Three earthquakes, the third lasting a "little more than a minute", shook southern New Hampshire today. Residents of TILTON, NORTHFIELD and SANBORNTON reported a tremor in their communities early yesterday.

Reports from DERRY, EAST MANCHESTER and GOFFSTOWN today told of houses shaking and a dull roar at times which coincided with recordings at the Harvard University Seismograph station.

SANTIAGO, CHILE, OCT. 17 -(AP)- A violent earthquake at CONCEPCION at 2:40 P.M. today caused a panic. People fled their homes fearing a repetition of last January's disaster.

BOSTON, OCT. 19 -(AP)- Earth tremors, described by seismologists as "severe" were felt today in several sections of Northern New England but no serious damage was reported. The shocks were felt from shortly before 7 A.M. until about 7:05 A.M. Communities reporting that buildings shook and dishes rattled were: WORCESTER, SPRINGFIELD and LAWRENCE, MASS., NASHUA and KEENE, N.H., and PORTLAND and AUGUSTA, ME., and ST. JOHNSBURY, VT.

Automobilists said their cars swayed; one PORTLAND householder said coffee spilled over on a stove, and a resident of KEENE said he experienced what he thought was a dizzy spell.

ALBANY, N.Y. also felt the shock as did cities and towns in eastern Canada, including MONTREAL and TORONTO.

MANILA, OCT. 31 -(AP)- An earthquake strong enough to cause theater patrons to rush into the streets shook the summer capital, BAGUO, last night for ten seconds. No damage was reported.

NOVEMBER

SANTIAGO, CUBA, NOV. 3 -(AP)- Slight earth tremors were felt here tonight, causing considerable alarm but resulting in no damage.

GRASS VALLEY, CALIF., NOV. 7 -(AP)- An earthquake accompanied by a report resembling an explosion rocked this densely populated mining area at 10:25, EST tonight, alarming townsfolk and startling miners working as far as two miles underground. The tremor sent huge steel head frames of NEVADA COUNTY'S famous gold mines into violent vibrations. Many householders were astonished when the doors of their homes flew open, dishes rattled from shelves, and bricks fell from chimneys. As far as was known, no one was injured, and no buildings were seriously damaged.

PORT-AU-PRINCE, HAITI, NOV.7 -(AP)- An earthquake of fairly severe intensity shook

Port Au Prince at 10:43 A.M. today. Only minor property damage was reported but a few persons were injured in excitement following the tremor.

SEATTLE, WASH., NOV.12 -(AP)- An earthquake felt in many sections of OREGON, WASHINGTON and BRITISH COLUMBIA caused minor damage in Seattle and other cities last night but no one was injured. Damage consisted mostly of cracked walls, broken water mains and broken power lines.

In all parts of SEATTLE residents rushed to the streets in their night attire and many spent the remainder of the night in auto camps. A corner section of the National Bank of Washington in TACOMA, weighing approximately 250 pounds, crashed six floors into an alley. Some plaster damage was reported in the State Capitol at OLYMPIA. N.M.Breck, Capitol watchman, said it felt as "though the whole building was jumping up and down." He said it broke some glass bud did no serious damage. OLYMPIA reported hundreds of persons fled into the streets.

In SEATTLE the quake was strong enough to upset the needle on the seismograph at the University of Washington. A high tension wire fell in TACOMA TIDEFLATS causing a flash seen several miles. In the Grays Harbor Area which includes ABERDEEN, HOQUIAM and RAYMOND, several water mains were broken and several telephone lines were disrupted.

The quake appeared to extend over an area from Portland, north through Longview, Aberdeen and the Grays Harbor district, Tacoma, Seattle, Everett and Vancouver, B.C. and then east almost to Spokane.

PHILADELPHIA, PENNA.,NOV.15 -(AP)- A ten-second earthquake shook the eastern seaboard from BALTIMORE to TRENTON,N.J., just before 10 o'clock last night (EST) but apparently caused no serious injuries or property damage. The shocks hit an area about 130 miles long and 30 miles wide, and frightened residents on Northern Maryland, Delaware, Southern New Jersey and Eastern Pennsylvania.

Jolted from a doze, a Philadelphian exclaimed "It felt just like two fellows picked up the davenport and shook it back and forth like a baby's cradle."

The greatest alarm was felt in WILMINGTON,DEL., and GIBBSTOWN,PENNSVILLE and DEEPWATER,N.J., sites of powder and chemical plants. Residents rushed into the streets crying; "which plant blew up?" Rumbling like distant thunder, the shock knocked down pictures, overturned furniture and brought out emergency guards against fire.

DECEMBER

SAN SALVADOR, EL SALVADOR, DEC.13 -(AP)- Earth shocks were reported from many sections of El Salvador last night but no damage resulted.

A strong shock was felt at SAN VICENTE, which was partly destroyed by an earthquake three years ago.

SAN JOSE, COSTA RICA, DEC.21 -(AP)- A violent earthquake shook this central American Republic today, but caused no great damage.

BATAVIA, JAVA, DEC.22 -(AP)- Strong earthquake shocks today wrecked 108 houses and demolished a bridge in the Province of MENADO, in the northern part of Celebes Island. Several Persons were injured slightly. The shocks occurred about 4:30 P.M.,EST,DEC.21.

MANAGUA, NICARAGUA, DEC.26 -(AP)- An earthquake shook the Pacific Coast of Nicaragua today starting about 7A.M.,EST and lasting about 12 seconds. Houses swayed in the towns of LEON, CHINANDEGA and CORINTO, but this city was not seriously shaken. No damage was reported immediately.

SAN SALVADOR, SALVADOR, DEC.26 -(AP)- strong earthquake tremors were felt tonight in several provinces in the Republic of Salvador but no damage was reported.

SAN SALVADOR, EL SALVADOR, DEC.27 -(AP)- A fairly heavy earthquake shook San Salvador today at 6:55 A.M.,EST, frightening inhabitants but causing no damage locally. Whether the shock caused damage in the provinces is not yet known.

LOS ANGELES, CALIF. DEC.27 -(AP)- An earthquake was felt in Los Angeles at 11:29 A.M.,PST, today. It rocked the Associated Press Office, located on the fourth floor of the Herald-Express building. In the 33-story Los Angeles City Hall, chandeliers swayed for a few seconds and pictures on some walls went awry.

In Long Beach today's quake was said to be the hardest since the big one of 1933. Employes in large buildings in LONG BEACH scurried for safety. Some took positions under beams and others ran into the streets

GLENDALE and ALMAMERA, lying northeast of Los Angeles proper, also reported "sharp shocks." ANAHEIM said it was the sharpest shock felt there in several years. No damage was reported. Riverside, 60 miles east of Los Angeles, barely felt the disturbance

ANKARA, TURKEY, DEC.27 -(AP)- Four severe shocks were felt in Western Turkey between 2 A.M. and 5 A.M., today (7 and 10 P.M., EST, Dec.26). The center of the shocks was believed to be in the JANIK MOUNTAIN range whose peaks reach 10,000 feet. But the entire slope from the main range to the Black Sea suffered, with several good sized towns almost wholly levelled and hundreds of villages wiped out.

Dwellings were shaken down. Minarets toppled from Mosques and domes crashed down upon roofs which fell in upon sleepers sheltered beneath them. Walls tumbled into streets. Water and gas mains were ripped asunder as the earth bulged in some places and burst open in gaping crevices in others. Railway tracks and bridges were twisted and broken and power lines in the more populated places were snapped. Fear maddened cattle stampeded in farming communities.

Fragmentary reports from ERZINCAN PROVINCE said virtually every one of the 16,000 inhabitants of the ancient town of that name were killed or injured. They were trapped in their beds by the first shocks. The walls of just one building -The Great Barracks- was left standing in the town, which was destroyed by another quake in 1784.

In SIVAS VILAYET, the little town of ZARA had 1,500 inhabitants killed and 1.000 houses destroyed.

The quakes caused frightful destruction in HAFIK, BAYBURT, SUSEHRI, SHARKISHLA, KUYULUHISSAR, TERDGAN, TRABZON, VAKFIKEBIR, MACHKE, and KIRASUN. Heavy damage was also reported at SAMSUN, ORDU, TOKAT, AMASIA, YOSGAD and other places. Whole villages were buried under the steep cliffs of the Janik Mountains. Bursting gas mains and overturned oil lamps set fire to collapsed buildings in almost every corner of the wide disaster area

ANKARA, TURKEY, DEC.28 -(AP)- Three additional tremors, sub-zero weather and blizzard winds which spread ravaging fires added to the damage and panic of the Anatolian Earthquake today. The new shocks last night were accompanied by awesome rumblings under Anatolia, "landbridge" between the continents of Europe and Asia.

ORDU, SIVAS and AMASIA were scenes of widespread havoc. The districts of ERZINCAN and KEMAN were hardest hit in the latest disaster.

The mounting death toll in the stricken area led officials to express belief the total dead might reach 50,000 as starvation, cold and disease created new perils for survivors of the catastrophe. Officials had put the dead and injured in Erzincan Province alone at 42,000.

LONDON, DEC.28 -(AP)- An Exchange Telegraph (British News Agency) dispatch from CAPETOWN today said there had been 25 earth tremors during the past 24 hours in the RAND, in TRANSVAAL. Two tremors were severe, jarring buildings and alarming residents.

SALINAS, CALIF., DEC.28 -(AP)- An earthquake was felt here at 7:15 A.M.,EST. Many persons were awakened. No damage was reported.

BUDAPEST, DEC.28 -(AP)- Two new earthquake shocks estimated to be about 1,200 miles from here were recorded by the Budapest National Observatory at 10:28 A.M., EST. The second was of considerable force.

Simultaneously all telephonic communications to Istanbul were suspended due to an unexplained break in the lines.

F.W.Sohon, S.J.
Director

SEISMOLOGICAL DESPATCHES
GEORGETOWN UNIVERSITY
WASHINGTON, D. C.

1938

January

MEXICO CITY, JAN. 2 -(AP)- A severe earthquake shook Mexico City today at 4:28 P.M. (5:28 P.M. EST). There were no reports of serious damages within the capital immediately. Thirty thousand bullfight fans were in an arena when the huge concrete and steel structure swayed from the shock.

HELENA, MONTANA, JAN.22 -(AP)- Two "weak" earthquakes were felt here yesterday. Each lasted about one second. The second shock was the 2,441st in a series which began in the fall of 1935. No damage was reported.

HONOLULU, JAN. 23 -(AP)- The Hawaiian Islands, shaken last night by the "worst earthquake in eleven years," found today damage was limited to a little cracked or loose plaster.

The temblor, which began at 10:05 P.M. (3:35 A.M., Jan.23, EST) and continued for two minutes, was felt throughout the islands. Its intensity varied. Volcanoes on the island of Hawaii showed no signs of disturbance. Reports from the seven islands today mentioned no injuries.

February

QUITO, ECUADOR, FEB.5 -(AP)- Delayed dispatches from the southern part of Colombia reported today that a severe earthquake shook the city of MANIZALES and the surrounding region late last night, causing at least two deaths. Numerous buildings were damaged, lamp posts were thrown into the street and a wireless tower fell down.

TOKYO, FEB.7 -(AP)- Tokyo and the surrounding district was shaken by a comparatively severe earthquake at 11:45 P.M. tonight (9:45 A.M., EST). Clocks were stopped by the shock. Early reports did not mention casualties or serious damage.

GUAYAQUIL, ECUADOR, FEB.8 -(AP)- A fairly heavy earthquake shook most of Ecuador's coastal provinces at 12:42 A.M. today and a lighter shock at 2:16 A.M. Early reports did not mention casualties or damage. (Ecuador time is the same as EST)

BRAWLEY, CALIFORNIA,

April

BRAWLEY, CALIFORNIA, APRIL 12 -(AP)- Three light earth shocks were felt here today but no damage was reported. The shocks occurred between 6 and 8:25 A.M. (9 and 11:25 A.M., EST).

EL CENTRO, CALIFORNIA, APRIL 12 -(AP)- Six earth shocks today cracked plaster in two buildings here and toppled over displays in some stores. The quakes came between 6:40 and 8:16 A.M.,PST (9:40 and 11:16 A.M.,EST). Tremors were felt elsewhere in IMPERIAL.

EL CENTRO, CALIFORNIA, APRIL 13 -(AP)- An earthquake severe enough to stop some clocks occurred in this region at 11:30 A.M. today. No damage was reported. A series of six shocks occurred in Imperial Valley yesterday. Today's quake also was felt at YUMA, ARIZONA.

ANKARA, TURKEY, APRIL 21 -(AP)- The Anatolia earthquake toll of dead and missing soared to at least 800 today after a night of continuing shocks which 50,000 homeless spent in mad terror. Terrific underground rumblings were accompanied by intermittent earthshocks over a wide area of western Asia bordering the Aegean Sea, and especially about KIRSHEHR, YOZGAD and TCHORUM. Panic stricken refugees fled from crevices full of boiling water.

Eighteen villages were utterly destroyed, and 22 others were badly damaged. Whole families were buried under mountainous debris. The quakes first were felt about 1 P.M. April 18 and lasted until nightfall. They were renewed last night.

May

MEXICO CITY, MAY 2 -(AP)- A short, sharp quake shocked Mexico City at 8:15 P.M. (CST) this evening, bud did the city no damage of any consequence. Blue light flared over uptown buildings as power cables swung together and parts of the city were plunged into temporary darkness.

PLYMOUTH, MONTSERRAR, MAY 6 -(AP)- An earthquake of moderate intensity was felt in this West Indian Island of Montserrat today. No damage was reported.

TOKYO, MAY 23 -(AP)- A severe 10-minute earthquake shook northeastern Honshu, main island of Japan, starting at 4:19 P.M. (2:19 A.M., EST) today, with considerable property damage. No casualties were reported. Train service about FUKUSHIMA, 150 miles north of Tokyo, was suspended because of road-bed displacement. Elsewhere walls were cracked, some roofs fell and windows were broken.

MANILA, MAY 23 -(AP)- A sharp earthquake shook a major portion of Luzon Island at 4:30 P.M. (3:30 A.M., EST) today. No damage or casualties were reported.

June

MANILA, JUNE 7 -(AP)- Mayon Volcano, in a turbulent mood after a 10-year nap, bellowed angrirly tonight. Homes of more than 16,000 villagers stood vacant near the base of the great mountain, their inhabitants having sought safety in the country and towns distant from Mayon, Libog, a town of 7,000 was deserted. Earthquakes which accompanied eruptions the first five days, ceased today and the period between bursts of flames, lava and smoke from the crater lengthened to nearly five hours. Earlier the eruptions came at 30-minute intervals. Their intensity decreased. At nightfall, the 7,900 foot peak 200 miles southeast of Manila wore a plume of smoke a mile and a half high. Flashes of flame split the dark pillar at frequent intervals. Lava rolled slowly down the mountain. Over the three provinces forming the southeastern tip of Luzon Island, the largest in the archipelago, ashes floated in the air.

MEXICO CITY, JUNE 10 -(AP)- A slight earthquake was felt in some sections of Mexico City today, but there was no damage.

BRUSSELS, JUNE 11 -(AP)- A sharp earthquake considered the severest in the nations History today tumbled chimneys, cracked walls and frightened the populace throughout Belgium. Shocks lasting ten to 20 seconds were reported from all parts of the nation. Numerous persons were cut by flying glass. A dull rumbling accompanied the shocks. The Brussels observatory was jarred out of order

LONDON, JUNE 11 -(AP)- Sharp earth shocks were felt today in central London and in Brussels. No serious damage was reported.

BRUSSELS, JUNE 12 -(AP)- A new earthquake, considerably weaker than that which jolted a corner of Europe from England to the Rhineland yesterday, was recorded today in Belgium. The tremor lasted three seconds.

Although yesterday's disturbance was felt in four other nations - England, France, Germany and the Netherlands- Belgium suffered most severely with the death of three persons and injury of about 20 attributed to the shocks. There was scattered damage to buildings in Belgium and southern France.

LONDON, JUNE 15 -(AP)- Slight earth tremors rattled furniture in central London today for the second time in five days. Shocks were recorded at 2:35 and 2:40 P.M. (8:35 and 8:40 A.M., EST). No damage was reported. Previous shocks occurred Saturday.

SANTIAGO, CHILE, JUNE 15 -(AP)- A strong earth shock was felt all along Chile's coast at 3:45 A.M. today. The temblor was strongest around VALPARAISO. It also was felt at IQUIQUE, ANTOFAGASTA and COPIAPO. No reports of damage have been received.

MEXICO CITY, JUNE 20 -(AP)- A slight earthquake was felt tonight at COATEPEC, Vera Cruz state, according to dispatches received here. No damage was reported. The quake started at 9:00 P.M.,EST and lasted but a few seconds.

ATHENS, JUNE 21 -(AP)- A severe earthquake shook parts of Greece today. Old buildings collapsed at GALAXIDI, on the Gulf of Corinth, 100 miles west-northwest of Athens. Thus far loss of life has not been reported. Shocks were felt at such widely separated points as TREVEZA, in EPIRUS, and the Island of SAMOS, just off the Asia Minor coast.

MOSCOW, JUNE 21 -(AP)- Strong earthquakes during the night around lake Issyk Kul, in Kirghizia, Soviet Middle Asia, were reported tonight. The first shock was at 11:51 P.M., GMT June 20 (6:51 P.M., EST). Lasting one minute, it cracked buildings and stopped clocks at FRUENZE, capital of KITGHIZIA, where the tremor was recorded as the strongest in ten years. A second shock was felt five minutes later. A number of buildings were reported destroyed in two villages in the TIEN SHAN MOUNTAIN region, along the border between the Soviet Union and China, where tremors were felt for three minutes.

SANTIAGO, CHILE, JUNE 23 -(AP)- Prolonged, strong earth shocks were reported today from COQUIMBO, Chilean seaport, and the village of LA SERENA, a copper mining center in the same province. There was no known damage.

MEXICO CITY, JUNE 28 -(AP)- Mexico City was rocked by a heavy earthquake today at approximately 1:25 P.M. (2:25 P.M., EST). Reports of damage or casualties were not immediately available.

August

LOS ANGELES , AUG. 30 -(AP)- A strong earthquake shook Los Angeles at 7:21 (PST) tonight. The shock, a swaying east-west motion lasting several seconds, was felt in downtown Los Angeles and more heavily in the harbor district and beach cities. No damage was reported.

September

EUREKA, CALIFORNIA, SEPT. 12 -(AP)- A moderate earthquake was felt over the Humboldt Bay area shortly after 10 o'clock last night. No damage was reported.

October

SIOUX FALLS, S.D., OCT. 11 -(AP)- A sharp earth tremor jarred Sioux Falls early this morning but caused no damage. Residents reported a "rumble like thunder" from the heavy initial shock which was followed by a series of lighter motions. Estimates of the duration of the shock ranged from 10 to 20 seconds.

Sharp tremors also were reported at HUDSON, BERESFORD, SPENCER, HUMBOLDT and a dozen nearby towns south and west of here. Light earth shocks were reported at CHAMBERLAIN and WESSINGTON SPRING last week.

November

TOKYO, NOV. 5 -(AP)- An earthquake jarred Tokyo today but no damage or casualties were reported.

TOKYO, NOV.7 -(AP)- The fifth earthquake in three days shook Tokyo today. All were of mild intensity and caused no casualties or serious damage. The last shock was felt here at 10:45 A.M. today (8:45 P.M., EST, Nov.6) Minor landslides temporarily halted traffic on two railroads and one warehouse collapsed.

VIENNA, NOV. 8 -(AP)- Numerous houses of villages southeast of Vienna were damaged today by an earthquake lasting ten seconds. Damage in Vienna was slight.

HONOLULU, NOV.10 -(AP)- Lieut. Commander J.H.Peters of the U.S.Coast and Geodetic Survey, reported the Honolulu harbor water level rising late today at a rate of three-quarters of a foot every 20 minutes following a severe earthquake, apparently centered near the Aleutian Islands.

Maui Island, southwest of Oahu, on which Honolulu is situated, reported a two and one-half foot rise above normal at 3:05 P.M. (8:35 P.M., EST) following an 18 inch drop below normal.

Commander Peters said the rise in Honolulu harbor started at 3 P.M. (8:30 P.M. EST) about five hours after the first shocks were recorded.

ANCHORAGE, ALASKA, NOV. 10 -(AP)- Light earthquake shocks were felt here at 10:25 A.M. (3:25 P.M.,EST) today, and the Woodley Airways radio station received a report of a severe quake at Naknek station on BRISTOL BAY. The shocks here had an east-west swaying motion, gentle but noticeable.

TOKYO, NOV. 16 -(AP)- An earthquake of moderate intensity shook eastern and central Japan tonight. Early reports told of no damage.

UNALASKA, ALASKA, NOV. 28 -(AP)- An earthquake of 20 seconds duration shook buildings at 9:29 P.M. (PST) last night in Unalaska and vicinity. No damage was reported.

SEISMOLOGICAL DESPATCHES
GEORGETOWN UNIVERSITY
WASHINGTON, D. C.

The Seismological Despatches are excerpts taken with as few alterations as possible from the special dispatches received at Georgetown as showing date, place, time, duration, character of motion, region affected extent of damage in various regions and to various structures, and other circumstances of scientific interest. Earlier dispatches are replaced by later ones when the latter correct the former, but the evidence is kept strictly non-instrumental, no corrections being applied in view of subsequent information derived from instrumental sources. The times are given as received, no attempt being made to conjecture whether Eastern Standard Time or some other time is being used. When the day of the week is given, the day of the month is inserted. Press dispatches of instrumental reports, cited opinions of seismologists, geologists and others (except as witnesses), historical backgrounds, geological and scientific collateral information, political and human interest coloring matter, all of which forms a large bulk of the dispatches, are deleted as far as possible, making the necessary grammatical changes.

YEAR 1937

January

ASBURY PARK, NEW JERSEY, JANUARY 8 -(AP)- A tremor, apparently a slight earthquake shook this area today. Furniture was moved, but apparently no damage was done.

HILO, HAWAII, JANUARY 11 -(AP)- An earthquake was felt strongly at 10:55 last night (4:25 A.M., E.S.T., Jan. 11) by Hilo residents. It was believed to have originated in the Kilauea volcano region.

TOKYO, JANUARY 23 -(AP)- An earthquake stopped clocks and toppled household articles to the floor in Eastern Japan today. No casualties or serious damage were reported.

CHILPANCINGO, MEXICO, JANUARY 26 -(AP)- An earthquake continuing for ten seconds today rang church bells here and cracked walls and roofs of several buildings.

FUKUOKA, JAPAN, JANUARY 28 (Thursday)-(AP)- Strong Earthquakes threw the populace of Northern KYUSHU ISLAND into panic today in widely scattered areas. The epicenter of the tremors, first felt at 9 44 A.M. today (Thursday) (7:44 P.M., E.S.T Wednesday), was reported west of MOUNT SAO, an active volcano.

February

HILO, HAWAII, FEBRUARY 1 -(AP)- Two strong earthquakes in less than 24 hours were felt on Hawaii Island. No damage was reported. The first, at 7:34 last night (1:04 A.M., E.S.T., Feb.1) shook the entire island. Its origin was believed to be 50 miles westward of the HUALALAI crater, one time volcano. The other quake was vigorous in the KONA section in the western part of the island, and less so in the rest of the island. It was at 12:23 A.M., today (5:53 A.M., EST).

SAN SALVADOR, SALVADOR, FEBRUARY 7 -(AP)- The National Observatory reported tonight a light temblor was felt in ZACATECLUCA, Capital of the Province of LA PAZ. Neither damage nor casualties were reported.

WALLA WALLA, WASHINGTON, FEBRUARY 8 -(AP)- An earth tremor, with rumbling noise, was reported in the FERNDALE district on the Oregon side of Walla Walla, six miles south of here, at 12:16 P.M. today. No damage was reported.

March

GUAYAQUIL, ECUADOR, MARCH 2 -(AP)- A strong earth tremor was felt today in the City of LATACUNGA, capital of the Province of LEON. No damage or casualties were reported.

COLUMBUS, OHIO, MARCH 2 -(AP)- An upthrusting rock crust in the old glacial region of Northwest Ohio caused earth tremors today from the Canadian border south into KENTUCKY. Five states recorded the movement. No injuries were reported.
Some plate-glass windows were broken, chimneys toppled and plaster knocked from walls in WAPAKONETA. From as far north as Windsor, ONTARIO, across the border from DETROIT, to LOUISVILLE, Ky., on the south, residents reported quivering walls and other like phenomena. INDIANA, MICHIGAN and WEST VIRGINIA were included in the area. COLUMBUS, DAYTON, ZANESVILLE, SPRINGFIELD, LIMA, AKRON, TOLEDO, CANTON, FINDLAY and many other points in Ohio reported upset furniture and swaying homes.

SALINAS, CALIFORNIA, MARCH 5 -(AP)- A sharp earthquake was felt here at 4.30 A.M. today. No damage was reported.

SANTIAGO, CHILE, MARCH 6 -(AP)- A strong earth tremor, perceptible for four seconds, was felt here at 9:20 P.M., EST. First reports made no mention of damage or casualties.

SAN FRANCISCO, MARCH 8 -(AP)- Residents of the San Francisco Bay region were shaken from sleep by an earthquake at 2:32 A.M. today, which knocked articles from shelves in EASTBAY cities.
Police at ALBANY and the sheriff's office in MARTINEZ said the movement there was the sharpest they had felt since the 1906 San Francisco disaster. Street lights were put out of commission in some EASTBAY sections. One resident of RICHMOND reported he was shaken out of his chair. The earthquake, which lasted

two or three seconds. came with a rolling motion in San Francisco and jolting shocks in the Eastbay.

A check by OAKLAND police indicated principal damage was in stores, where stock was tumbled from shelves. Three windows were broken in a large BERKELEY market.

ST. THOMAS, ONTARIO, MARCH 9 -(CANADIAN PRESS)- A distinct earth shock was felt here at 12:45 A.M., today. No damage from the tremor was reported.

CHICAGO, MARCH 9 -(AP)- Shortly before midnight, a series of tremors were distinctly felt, but caused negligible damage in OHIO, INDIANA, KENTUCKY, ILLINOIS, WEST VIRGINIA, MICHIGAN, WISCONSIN and ONTARIO, CANADA.

CHICAGO residents told of vibratory shocks. Buildings were shaken in CLEVELAND, COLUMBUS and other Ohio cities. At ANNA, Ohio, chimneys toppled by the quake of last Tuesday and since repaired, were felled by the shocks of last night

TALTAL, CHILE, MARCH 14 -(AP)- An earthquake at 7:50 A.M. today sent Taltal's population scurrying into the streets in a panic. There were no casualties but a number of buildings were damaged partially and several old walls collapsed. Communications with the interior were interrupted.

RENO, NEVADA, MARCH 17 -(AP)- Light earthquake shock was felt here at 5:19 A.M. (8:19 A.M. EST) today. No damage was reported.

LOS ANGELES, MARCH 25 -(AP)- Southern California shook this morning with a heavy earthquake.

Los Angeles and its environs were swayed by a long and continuously increasing motion. LONG BEACH reported it was quite unlike the heavy 1933 shock, which came as a jolt. Today's movement was a sort of rythmic shimmy, with an East West motion.

Buildings shook in downtown Los Angeles, GLENDALE, SANTA MONICA and ANAHEIM reported the strong tremor immediately, but observers said it was not enough to cause damage in those areas. SAN DIEGO felt it as a sharp quake. At EL CENTRO the jolt was heavy but no immediate damage was reported. WARNER SPRINGS reported that the quake was strongly felt but that no damage was caused.

In RIVERSIDE the quake was felt sharply, and at HEMET and SAN JACINTO, near there, crockery rattled. Today's shock was the heaviest experienced there since 1918. COLTON, about 50 miles east of Los Angeles, reported that dishes rattled and chandeliers swung, but there was no damage

April

RIVERSIDE, CALIFORNIA, APRIL 20 -(AP)- A light earthquake was felt here at 7:25 A.M. today. The movement was so slight that many residents did not notice it. HEMET and SAN JACINTO also reported feeling the tremor.

June

LISBON, PORTUGAL, JUNE 30 -(AP)- A violent earth tremor was reported to have shaken AGRAHEROISMO, in the AZORES, today, spreading panic through the population. No casualties were reported.

July

SAN FRANCISCO, JULY 18 -(AP)- A 20-second earthquake awakened many San Franciscans at 3:59 A.M. today but no damage was reported.

NEW YORK, JULY 19 -(AP)- Many residents of LONG ISLAND complained last midnight their homes had trembled for three minutes

FAIRBANKS, ALASKA, JULY 22 -(AP)- Frame buildings swayed and merchandise tumbled to floors as a strong earthquake struck Fairbanks and the Alaskan interior today.

The quake began about 7:09 A.M. (12:09 P.M., EST) and lasted more than a minute. Tremors were re-current throughout the day. A second severe shock came at 7:55 A.M., a third at 8:01. A stronk quake at 3:53 P.M. (8:53 P.M. EST) broke stock in the liquor stores and various drug stores. The shock was also reported at HOT SPRINGS and TANANA.

FAIRBANKS, ALASKA, JULY 23 -(AP)- For nine hours yesterday many shocks, four of them severe, occurred over the interior from Fairbanks, 300 miles south, to

ANCHORAGE. Telephone lines broken during the first shocks were hastily repaired. Total damage was estimated at a maximum of $5,000, mostly to the liquor store stock. An unconfirmed report said several houses were demolished and one person injured when a giant earth slide swept across 2,000 feet of the Richardson Highway.

The U.S. Weather Bureau said the shocks were more severe south of here along the highway, which was cracked in some places from four to 12 inches. The Bureau said the disturbance was "greatest on record."

FAIRBANKS, ALASKA, JULY 24 -(AP)- Earth tremors were felt in the vicinity of Fairbanks again today.

KING COVE, ALASKA, JULY 25 -(AP)- Mount Pavlov, one of the most active volcanoes on the Alaska Peninsula, spread a thin layer of ash over this region today. The ash settled as far distant as 50 miles from the peak. Residents said several slight earthquakes have been felt recently, but no damage was reported.

MEXICO CITY, JULY 25 -(AP)- A slight earthquake tremor tonight at 9:50 (10:50 EST) frightened theatre patrons and others but did no apparent damage. The shock lasted for several seconds.

MEXICO CITY, JULY 26 -(AP)- A heavy earthquake shook much of central Mexico last night and disrupted communication lines today prevented a survey of the damage.

VERA CRUZ CITY reported two dead and several buildings collapsed. Unconfirmed reports listed casualties at JALAPA and other towns northwest of Vera Cruz.

EL CENTRO, CALIFORNIA, JULY 26 -(AP)- A minor earthquake was felt in El Centro at 11:37 o'clock last night but no damage was reported.

August

SHANGHAI, AUGUST 1 -(AP)- Reports from Hsuchow, in the Province of Kiangsu, today said an earthquake last night killed 20 persons and destroyed houses. The quake was felt slightly at TIENTSIN.

PONTA DELGADA, AZORES, AUGUST 2 -(AP)- An earthquake was felt today in SAN ROQUE parish, island of ST. MICHAEL. The only damage reported was collapse of several walls.

LONG BEACH, CALIFORNIA, AUGUST 16 -(AP)- Residents of this city reported a sharp earth shock at 9:02 o'clock (PST) tonight. No damage was caused.

MANILA, P.I., AUGUST 20 -(AP)- Two sharp earthquakes threw Manila into darkness tonight. Many fires were started by the shocks, the worst in 40 years. Several large buildings and a number of churches were damaged. Other major structures swayed noticeably. Many injuries but no deaths were reported during the confusion following the first shock about 8 P.M. The second tremor added new terror 20 minutes later. The shocks were felt at least 200 miles away.

FAIRBANKS, ALASKA, AUGUST 22 -(AP)- A strong earthquake was felt here at 6:03 A.M. today (11:03 A.M., EST) but no damage was reported. The quake followed several lesser shocks beginning at 6:26 o'clock last night.

September

PONCE, PUERTO RICO, SEPTEMBER 6 -(AP)- A fairly strong earthquake was felt here today but, so far as could be determined, there was no damage.

SANTIAGO, CUBA, SEPTEMBER 19 -(AP)- A strong earthshock was felt here today at 4:10 P.M., EST. It caused a panic among residents, but no damage was reported.

BATAVIA, JAVA, SEPTEMBER 27 -(AP)- Two were killed and one injured today in a severe earthquake which shook eastern and central Java. There was widespread property damage. Many roofs and walls, and in some cases whole houses, collapsed. There was considerable property damage at JOKJOKARTA, on the southern coast, but no loss of life was reported.

TOKYO, SEPTEMBER 29 -(AP)- A moderate but lengthy earthquake shook a wide area of Japan this morning. No deaths and no damage were reported. The quake aff[illegible] the cities of TOKYO and YOKOHAMA and NORTHEASTERN and CENTRAL HONSHU PREFECTURE.

SAN SALVADOR, EL SALVADOR, SEPTEMBER 29, -(AP)- A strong earth temblor was felt here today, and at the same time the volcano Santa Ana in northern El Salvador became active.

MANILA, SEPTEMBER 30 (Thursday) -(AP)- Three earthquakes of moderate intensities were felt in Manila the past 24 hours. There were no reports of casualties or damage. Two shocks occurred yesterday morning and the third this morning.

October

MEXICO CITY, OCTOBER 6 -(AP)- An earthquake today shook wide areas in GUERRERO, PUEBLA and VERA CRUZ, dispatches indicated. Reports of damage were not given immediately. Buildings were shaken, dishes fell and many persons were awakened from their early morning sleep here. All telegraph lines in Querrero escaped damage. CHILPANCINGO, capital of Guerrero, reported strong vibratory shocks.

TOKYO, OCTOBER 17 -(AP)- An earthquake of heavy intensity rocked Tokyo at 1:50 P.M. (11:50 P.M., Oct.16, EST). The extent of damage was not known immediately.

MENDOZA, ARGENTINA, OCTOBER 19 -(AP)- A slight earthquake was reported today in the Andes Mountains about 60 miles west of here. Tremors were felt in numerous villages, but no damage was reported.

SIMLA, INDIA, OCTOBER 20 -(AP)- A severe earthquake jarred the Simla hills today. Chimneys toppled and roofs collapsed on houses over a wide area of the interior. The shock was felt in DELHI. Damage was slight.

HILO, HAWAII, OCTOBER 25 -(AP)- A strong earthquake shook Hilo and volcano areas at 5:43 A.M. (11:13 A.M., EST today. It was believed to have originated in the Maunaloa volcano.

November

WATSONVILLE, CALIFORNIA, NOVEMBER 10 -(AP)- A sharp earthquake was felt here at 9:29 A.M., (EST) today but no damage was reported.

OLYMPIA, WASHINGTON, NOVEMBER 11 -(AP)- Two brief earth shocks were felt here at 11:25 A.M. (EST) today. No damage was reported.

PALM SPRINGS, CALIFORNIA, NOVEMBER 16 -(AP)- Residents of this winter resort were awakened at 4:30 A.M., (PST) today by two sharp earthquakes which shook furniture, rattled windows and dishes but apparently caused no material damage.

CARLIN, NEVADA, NOVEMBER 18 -(AP)- An earth shock which lasted about 10 seconds was felt here at 4:53 P.M. (7:53 P.M., EST) but no serious damage was reported.

HELENA, MONTANA, NOVEMBER 27 -(AP)- A light earthquake, which lasted about two seconds, was felt here at 7:12 P.M. (9:12 P.M., EST) tonight. No damage was reported.

December

MEXICO CITY, DECEMBER 23 -(AP)- A heavy earthquake shook Mexico City and most of southern Mexico today from nine seconds to more than five minutes. Three persons were known dead.

A survey of the capital showed the walls of many buildings with gaping cracks, sidewalks and streets with large crevices and a few water mains broken. One aged woman was killed here when the roof of her adobe house fell in and crushed her. Two men were electrocuted by broken high tension wires.

A dispatch from CHILPANCINGO said the quake lasted five minutes there. Workmen, suspended in slings to repair the tower of a parochial church, screamed in fright as it rocked back and forth ringing the bells.

Duration of the principal shock in Mexico City was 52 seconds, but lesser tremblings continued for some time. The business section of Mexico City was almost undamaged. Dispatches from southern states said several houses had collapsed as well as many walls and fences.

SAN SALVADOR, SALVADOR, DECEMBER 27 -(AP)- One person was killed and five were injured in an earthquake that shook the towns of AHAUCHAPAN and ATUQUIZAYA near the Guatemalan border last night. Considerable property damage was reported in both towns and the shock disrupted electric light and telegraph services. Less severe earthquakes had been felt since Christmas night. No unusual volcanic activity was reported but the region is packed with small volcanic craters. (Dispatches from Guatemala said three persons were killed in the Salvador quake and 20 houses destroyed).

MEXICO CITY, DECEMBER 31 -(AP)- An earthquake of moderate intensity jarred Mexico city at 11:44 today

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