

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	Bosch Photographic Pendulums	V	T _O	1	Mainka Bosch-Omori	V	T _O	ε:1
	A _N	143	5.2		A _N	133	5.0		A _N	59	9.0
	A _E	165	5.4		A _E	133	5.0		A _E	47	9.0
	A _Z	80	3.0						A _N	13.5	8.65
									A _E	13.7	8.84

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
Jan. 1		ePE ePN eL? LE LN F	1 56 19 1 56 18 2 25.1 2 33 19 2 33 00 In second quake						Microseisms. No distinct main.
Jan. 1		ePE ePN SE iN eLE eLN iE iN iN F	3 17 57 3 18 17 3 24 37 3 26 39 3 28.4 3 28.7 3 30 20 3 34 20 3 38 30 5 46						
Jan. 5		eE eN SE? SN? F	20 03 00 20 03 00 20 10 11 20 10 11 20 35						Little value can be set on these data because of some local dis- turbances.
Jan. 8		eE eLE F	1 58 17 2 01 2 09						Scarcely visible on N. S. component.
Jan. 17		ePE ePN SE SN LE LN F?	11 53 41 11 54 00 12 01 07 12 01 08 12 16 55 12 17 55 12 50	11 11					Heavy microseisms. F difficult.
Jan. 17		ePZ LZ FZ	11 53 46 12 18 12 12 43	10					
Jan. 27		iE eE eLE? F?	21 59 25 21 59 11 22 16.9						
Jan. 31 Feb. 1		eN eLE? eLN? LE LN F	23 58 22 0 3.5 0 3.5 0 05 43 0 07 25 0 20	11 11					Microseisms.

REGISTRATION OF EARTHQUAKES—Continued.

Date.	Character.	Phase.	Time.			Periods.	Amplitude.			Remarks.
							A _N	A _E	A _Z	
Feb. 16			H.	M.	S.					
		eE	16	15	28					Heavy microseisms.
		eN	16	15	28					
		eLE	16	18.5		11				
		F	16	35						
Mar. 2		ePE	3	39	05					Heavy microseisms. No distinct M. F' doubtful.
		iPN	3	39	05					
		iSN	3	49	18					
		eSN	3	49	18					
		eLE	4	2.4		22				
		LE	4	13	09	22				
		LN	4	18	09	21				
		F	4	50						
Mar. 2		ePE	11	57	46					Heavy microseisms. No distinct M. F difficult.
		ePN	11	57	26					
		SE	12	07	45					
		eLE	12	21.2		32				
		LE	12	28	08	22				
		LN	12	30	57	16				
		F?	13							
Mar. 9		SE	3	39	12					e is so masked in microseisms that interpreta- tion is impos- sible. F impossible.
		SN	3	39	12					
		eLE	3	59.9		22				
		F?								
Mar. 21		eLE	17	13.2		26				Heavy microseisms.
		eLN	17	13.2		26				
		LE	17	15	02	22				
		F	17	27						

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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	143	5.2		A _N	133	5.0		A _N	59	9.0
	A _E	165	5.4		A _E	133	5.0		A _E	47	9.0
	A _Z	80	3.0						A _N	13.5	8.65
									A _E	13.7	8.84

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
March 2		ePE	3 39 05						Heavy microseisms. No distinct main. F doubtful.
		iPN	3 39 05						
		iSN	3 49 18						
		eSN	3 49 18						
		eLE	4 2.4	22					
		LE	4 13 09						
		LN	4 18 09	21					
		F	4 50						
March 2		ePE	11 57 46						Heavy microseisms. No distinct main. F difficult.
		ePN	11 57 26						
		SE	12 07 45						
		eLE	12 21.2	32					
		LE	12 28 08	22					
		LN	12 30 57	16					
		F?	13						
March 9		SE	3 39 12						e is so masked in microseisms that interpreta- tion is impossibl F impossible.
		SN	3 39 12						
		eLE	3 59.9	22					
		F?							
March 21		eLE	17 13.2	26					Heavy microseisms.
		eLN	17 13.2	26					
		LE	17 02	22					
		F	17 27						
No press dispatches.					F. A. TONDORF, S.J.,			Director.	

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	V	T _O	ε:1		V	T _O	ε:1		V	T _O	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	A _N	143	5.2	Bosch Photographic Pendulums	A _N	133	5.0	Mainka	A _N	59	9.0
	A _E	165	5.4		A _E	133	5.0		A _E	47	9.0
	A _Z	80	3.0						A _N	13.5	8.65
									A _E	13.7	8.84

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
April 17		eP _E	11 41 24						N-S Component does not show. Sheets off at 13 hrs. 9 m. Quake still on.
		S _E ?	11 52 08						
		L _E	12 03 27	22					
		L _E	12 18	22					
April 17		eP _E	20 58 52						
		eP _N	20 58 53						
		S _E	21 03 38						
		S _N	21 03 38						
		eL _E ?	21 5.5						
		M _E ₁	21 08 38	6		1.9mm			
		M _N ₁	21 12 02	14	1.6mm				
		M _E ₂	21 09 21	6		1.5mm			
		M _E ₃	21 10 00	6		1.7mm			
		F	22 15						
April 18		eP _E	21 07 30						P _N hardly shows. Microseisms. F difficult.
		S _E	21 13 00						
		S _N	21 13 00						
		eL	21 16.0	6					
		L _E	21 19 10	16					
		L _N	21 18 57	19					
		M _E	21 20 31			0.9mm			
		M _N	21 20 03	11	0.8mm				
		F	22 20						
April 19		L _E	3 21 13						No other phases discernible. Microseisms.
			to						
			3 25						
April 21		P _E	11 34 34						N-S Component poorly defined. F lost in changing of sheets.
		S _E	11 41 12						
		S _N	11 41 12						
		eL _E	11 47.0	38					
		F?							
April 28		eP _E	6 51 45						Microseisms. N-S Component poorly defined.
		eP _N ?	6 51 45						
		S _E ?	6 56 25						
		eL _E	7 1.2	16					
		F	7 30						

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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				A _N				A _N		
	A _E				A _E				A _E		
	A _Z								A _N		
									A _E		

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
April 30		eP _E	7 31 20						N-S Component not well defined. Vertical compo- nent poorly de- fined.
		eP _N ?	7 31 20						
		P _{R1}	7 35 53						
		S _E	7 42 20						
		S _N ?	7 42 23						
		eL _E	8 1.1	22					
		M _{E1}	8 17 53	19					
		M _{N1}	8 20 18	16		5.2mm			
		M _{E2}	8 20 20	19	1.8mm				
		M _{E3}	8 24 20	16		4.4mm			
		F	13 23			3.8mm			

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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	143	5.2		A _N	133	5.0		A _N	59	9.0
	A _E	165	5.4		A _E	133	5.0		A _E	47	9.0
	A _Z	80	3.0						A _N	13.5	8.65
									A _E	13.7	8.84

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
May 1		L _E	6 06 11	20					N-S Component does not show.
May 2		F	6 40						
		e _E	2 36 19						Microseisms.
		eL _E	3 2.2	18					
		eL _N ?	3 2.2	18					
May 2		F	3 53						
		eL _Z	3 1.9	24					
May 3		F _Z	3 55						
		iP _Z	1 05 04						
		i _Z	1 08 46						
		S _Z	1 16 17						
		eL _Z	1 36.0						
May 3		F _Z	4 (ca.)						
		eP _E	1 05 13						Heavy
		eP _N	1 05 13						Microseisms.
		P _R _N	1 08 57						
		S _E	1 16 16						
		S _N	1 16 13						
		eL _E	1 37.2	27					
		eL _N	1 37.2	11					
		M _E	1 43 10	21			0.7mm		
May 5		F	4 (ca.)						
		L _E	5 06 11	27					
			to						N-S Component does not show.
May 6			5 12						
		eP _E	20 00 40						Heavy
		eP _N	20 00 49						Microseisms.
		eS _E	20 12 33						
		eS _N	20 12 33						
		eL _E	20 33.6	27					
		eL _N	20 34.0	22					
		M _E	20 51	16			1.8mm		
		M _N	20 43 41	14					
		F	23 et postea		0.7mm				

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				V	T _O	ε:1					V	T _O	ε:1
Wiechert Horizontal (200 kg.) Vertical (80 kg.)	{	A _N					Bosch Photographic Pendulums	{	A _N				
		A _E							A _E				
		A _Z										Mainka	

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Wiechert Horizontal (200 kg.) Vertical (30 kg.)		V	T _O	ε:1
	A _N	143	5.2	
	A _E	165	5.4	
	A _Z	80	3.0	
Bosch Photographic Pendulums		V	T _O	1
	A _N	133	5.0	
	A _E	133	5.0	
Mainka		V	T _O	ε:1
	A _N	59	9.0	
	A _E	47	9.0	
Bosch-Omori	A _N	13.5	8.65	
	A _E	13.7	8.64	

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A_N	A_E	A_Z		
June 29		eE	15 17 29						Heavy microseisms. i of doubtful seismic origin.
		eN	15 17 29						
		iE	15 21 46						
		iN	15 21 48						
		F	16 (ca)						
June 29		ePE	23 20 08						Heavy Microseisms. F very doubtful. eL on Bosch photographic machine. 23hrs., 27.6m.
		ePN	23 20 08						
		iSE	23 24 48						
		iSN	23 24 48						
		eL?	23 26.5	11					
		ME ₁	23 27 07	11		1.7mm.			
		ME ₂	23 30 41	16		1.4mm.			
		F?	1 00						
June 29		ePZ	23 20 08						Heavy microseisms.
		eSZ	23 24 49						
		eLZ	23 26.4	11					
		MZ	23 33 15	16			0.3mm		
		FZ	1 et postea.						

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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	143	5.2		A _N	133	5.0		A _N	59	9.0
	A _E	165	5.4		A _E	133	5.0		A _E	47	9.0
	A _Z	80	3.0						Under Repair.		

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
July 1		eE	21 36 27						
		eLE	21 49.5						
		eLN	21 49.6						
		F	22 46						
July 6		ePE	7 10 15						
		ePN	1 10 05						
		SE	7 15 35						
		SN	7 15 35						
		eL	7 18.6	10					
		F	7 50						
July 6		ePZ	7 10 04						
		SZ	7 15 35						
		F	8 00						
July 7		eE	14 48						N-S does not show. Microseisms.
		F	15 20						
July 8		eE	21 25 52						Heavy Microseisms.
		eN	21 25 52						
		eSN?	21 34 42						
		eLE	21 47.0	11					
		eLN	21 47.1	11					
		FN	23 25						
July 9		eE	19 26						Heavy Microseisms.
		eN	19 26						
		eSN?	19 31 40						
		eLE	19 38.0	11					
		eLN	19 38.0	15					
		LN	19 42	11					
		LE	19 43	9					
		F	20 15						
July 10		eE	2 41 30						Microseisms.
		eN	2 41 26						
		LN	2 44 19	10					
		F	3 (ca)						

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Wiechert Horizontal (200 kg.) Vertical (80 kg.)	V	T _O	$\epsilon:1$	Bosch Photographic Pendulums	V	T _O	$\epsilon:1$	Mainka	V	T _O	$\epsilon:1$
	A _N				A _N				A _N		
	A _E				A _E				A _E		
	A _Z								A _N		
									A _E		

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
July 11		eE	0 37						Microseisms.
		eN	0 37						
		SE?	0 42 12						
		SN?	0 42 13						
		eLE	0 44.5	8					
		eLN	0 44.5	8					
		F	1 30						
July 14		eE?	14 16 17						
		eN?	14 16 28						
		eLE?	14 26.6	12					
		eLN?	14 26.6	12					
		F	14 48						
July 17		iPE	16 25 58						
		iPN	16 25 58						
		eSE	16 31 04						
		eSN	16 31 04						
		eLE	16 36.0	16					
		eLN	16 36.0	16					
		LE	16 41	14					
		LN	16 41	11					
July 22		F	16 55						
		iPE	22 07 13						
		iPN	22 07 12						
		SE	22 11 48						
		SN	22 11 48						
		eL	22 13.8	6					
		F	22 55						
July 22		iPZ	22 07 11						
		SZ	22 11 53						
		eLZ	22 13.5	6					
		F	22 35						
July 25		eE	17 13						Does not show on N-S component.
		F	17 21						
July 31		eE?	22 05 43						Heavy Microseisms. Does not show on N-S component.
		SE?	22 12 16						
		F	22 27						

REGISTRATION OF EARTHQUAKES—Continued.

Date.	Character.	Phase.	Time.			Periods.	Amplitude.			Remarks.
							A _N	A _E	A _Z	
			H.	M.	S.					
		eL _E	16	36.0		16				
		eL _N	16	36.0		16				
		L _E	16	41		14				
		L _N	16	41		11				
		F	16	55						
July 22		iP _E	22	07	13					
		iP _N	22	07	12					
		S _E	22	11	48					
		S _N	22	11	48					
		eL	22	13.8		6				
		F	22	55						
July 22		iP _Z	22	07	11					
		S _Z	22	11	53					
		eL _Z	22	13.5		6				
		F	22	35						
July 25		eE	17	13						Does not show on N-S component.
		F	17	21						
July 31		eE?	22	05	43					Heavy Microseisms. Does not show on N-S component.
		S _E ?	22	12	16					
		F	22	27						
Aug. 24		eE	5	31	26					Heavy Microseisms.
		eN	5	31	26					
		eL _E ?	5	40.2		8				
		F	6	15						
Aug. 27		eE	5	39						Heavy Microseisms.
		eN	5	39						

REGISTRATION OF EARTHQUAKES—Continued.

Date.	Character.	Phase.	Time.			Periods.	Amplitude.			Remarks.
							A _N	A _E	A _Z	
			H.	M.	S.					
Aug. 29		L	6	25	25	16				Heavy Microseisms.
		F	6	47						
		eP _E	6	06	17					
		eP _N	6	06	28					
		eL _E	6	26.0		17				
		eL _N	6	26.2		17				
Aug. 29		F	8	00						Heavy microseisms.
		eZ	6	06	28					
		LZ	6	56	06	19				
		FZ	8	00						
Aug. 31		eE?	17	39	22					e difficult. Heavy microseisms.
		eN?	17	40	22					
		SE?	17	51	00					
		eL _E	18	5.4		11				
		eL _N	18	5.4		11				
		F	19	10						
Sept. 1		LE	20	06		22				Heavy microseisms.
		F	20	10						
Sept. 6		iP _E	1	45	56					Heavy microseisms.
		eP _N	1	45	56					
		ME	1	46	12	< 1/4		0.5mm		
		MN	1	46	14	< 1/4	0.3mm			
		F	1	49						
Sept. 6		eP _E	9	34	48					No distinct M.
		eP _N	9	34	43					
		iS _E	9	38	48					

REGISTRATION OF EARTHQUAKES—Continued,

Date.	Character.	Phase.	Time.			Periods.	Amplitude.			Remarks.
							A _N	A _E	A _Z	
Sept. 13			H.	M.	S.					
		iS _N	9	38	48					
		eL _E	9	40.7		14				
		eL _N	9	40.7		14				
		L _E	9	41	50	14				
		L _N	9	42		10				
		F	10	37						
		e _N	12	28	58					Interpretation difficult.
		i _E	12	36	46					
		i _E	12	41	37					
		L _E	12	54	46	17				Heavy microseisms.
		L _N	12	54	46	17				
Sept. 15		F	13	20						
		eP _E ?	17	37	24					Heavy microseisms.
		eP _N ?	17	37	24					
		S _E ?	17	47	57					
		S _N ?	17	47	59					
Sept. 15		F	18	25						
		iP _Z	17	37	27					
		S _Z ?	17	48	27					
Sept. 26		F	18	15						
		e _E	10	26	41					F lost in heavy micro- seisms.
		e _N	10	27	19					
Sept. 27		eL _E ?	3	48	41	8				Very heavy microseisms.
		L _E	3	52		27				
		F	4	00						

REGISTRATION OF EARTHQUAKES—Continued.

Date.	Character.	Phase.	Time.			Periods.	Amplitude.			Remarks.
							A _N	A _E	A _Z	
			H.	M.	S.					
Sept. 27		eE	11	33	48					N-S does not show.
		eN	11	34	00					
		F	11	43						
Oct. 1		eE	19	48	23					Very heavy microseisms.
		eN	19	48	00					
		F	20	10						
Oct. 3		eE	10	07	33					Heavy microseisms.
		eLN	10	30.4		11				
		LE	10	34	16	21				
		F	11	(ca.)						
Oct. 10		ePE	1	14	18					Heavy microseisms.
		ePN	1	14	18					
		LE	1	28	28	14				
		LN	1	28	28	14				
		F	2	15						
Oct. 10		ePZ	1	14	23					
		LZ	1	30	32	14				
		FZ	2	10						
Oct. 12		ePE	22	08	14					Very heavy microseisms. F. impossible.
		iPN	22	08	14					
		SN?	22	11	34					
Nov. 6		PE	7	19	29					Very heavy microseisms.
		PN	7	19	34					
		SE	7	25	36					
		SN	7	25	25					
		F	7	50						

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology



$\phi=38^{\circ} 54' 25''$ N $\lambda=77^{\circ} 4' 24''$ 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	143	5.2		A _N	133	5.0		A _N	59	9.0
	A _E	165	5.4		A _E	133	5.0		A _E	47	9.0
	A _Z	80	3.0						A _N	Under Repair.	
									A _E		

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
Nov. 6		P _E	7 19 29						Very heavy microseisms.
		P _N	7 19 34						
		S _E	7 25 36						
		S _N	7 25 25						
		F	7 50						
Nov. 18		e _E	4 21 44						
		e _N	4 21 44						
		F	5 00						
Nov. 18		L _E	22 37 36	22					Very heavy microseisms.
		L _N	22 33 26	24					
		F	23 (ca.)						
Nov. 18		eL _Z	22 40.6						Microseisms.
		L _Z	22 44	06 16					
		F	23 (ca.)						
Nov. 20		e _E	14 41 00						Very heavy microseisms.
		e _N	14 41 31						
		eL _E ?	15 14.6						
		L _E	15 17 00	20					
		F	15 30						

No. 56 bis

From Nov. 1st to Dec. 1st 1919

Washington, D. C.

Seismological Bulletin

of the Georgetown University Department of Geology

 $\phi = 38^{\circ} 54' 25'' \text{ N}$ $\lambda = 77^{\circ} 4' 24'' \text{ W}$
$$h=42.4 \text{ m}$$

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		V	T _O	ε:1	Bosch Photographic Pendulums		V	T _O	ε:1	Mainka		V	T _O	ε:1
Horizontal (200 kg.) Vertical (80 kg.)	A _N				Bosch Photographic Pendulums	A _N				Mainka	A _N			
	A _E					A _E					A _E			
	A _Z													
										Bosch-Omorl				
										A _N				
										A _E				

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
Nov. 20		eZ	14 41 48	16					Very heavy microseisms.
		LZ	15 14 59						
		F	15 30						
Nov. 28		eE?	14 20 00	15					Very heavy microseisms. Difficult.
		eN?	14 23 00						
		LE	14 27 50						
		LN	14 27 50						
		F	14 38						
					F. A. TONDORI, S.J., Director.				

No. 57

From Dec. 1 to Dec. 31 191 9

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	Bosch Photographic Pendulums	V	T _O	ε:1	Mainka	V	T _O	ε:1
	A _N	143	5.2		A _N	133	5.0		A _N	59	9.0
	A _E	165	5.4		A _E	133	5.0		A _E	47	9.0
	A _Z	80	5.0						Under Repair.		

Date	Character	Phase	Time	Periods	Amplitude			Δ	Remarks
					A _N	A _E	A _Z		
Dec. 5		eP _E	0 21 23						No distinct M.
		eP _N	0 21 23						
		eS _E	0 26 00						
		eS _N	0 26 00						
		eL	0 28.8						
		F	0 49						
Dec. 14		L	2 15 to						Very heavy microseisms. E-W hardly discernable.
			2 34	9					
		F	2 42						
Dec. 18		eE	1 26 37						Very heavy microseisms.
		eN	1 26 37						
		S _N ?	1 32 00						
		F	1 50						
Dec. 20		eL	21 35 00						
		L	21 44 16	16					
		F	22 14						

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