

SAINT LOUIS

SEISMOGRAPHIC STATION, ST. LOUIS UNIVERSITY, ST. LOUIS, MO., U. S. A.

One Wiechert 80 Kg., two Wood-Anderson long-period seismographs, Wiechert clock
 Bulletin for 1933

No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-O	O--Remarks
	Jan. 1	Emergent phases centering around 9 ^h 30 ^m . Quake reported in Zululand, Africa.							
	Jan. 3	Emergent phases centering around 15 ^h 37 ^m .							
1	Jan. 4	W-A W-A W-A		eP _{EN} iS _{EN} eM _{EN} F	1-38-23 1-49-13 2-21-03 3-00	10' 50"			1 ^h 27 ^m 33 ^s .
2	Jan. 4	W-A W-A W-A W-A W-A W-A W-A	I II I II II	eP _{EN} iP _{EN} iPR _{1IIEN} eS _{EN} iS _{EN} iSR _{1IIE} iL _{EN} iM _{EN} F	4-07-19 4-07-32 4-09-14 4-13-39 4-13-51 4-16-51 4-21-31 4-24 5-10	6' 20" 6' 19"	41° 40° 9'	7' 42" 7' 41"	1 ^h 35 ^m 37 ^s . 1 ^h 35 ^m 51 ^s . Second shock was main dis- turbance. Epicenter: 60°3' N. 145° W.
3	Jan. 4	W-A W-A W-A		eP _{EN} eS _N eL _N F	21-17-13 21-22-28 21-26-48 21-45	5' 15"	31° 6'		21 ^h 10 ^m 52 ^s .
4	Jan. 5	W-A W-A W-A W-A		eP _E eS iL _N iM _N F	6-55-22 6-59-30 7-02-04 7-05-01 7-30	7' 03"	49° 4'		6 ^h 46 ^m 37 ^s .
	Jan. 7	Emergent phases centering at approximately 3 ^h 30 ^m (G.M.T.).							
	Jan. 17	Emergent phases centering at 20 ^h .							
	Jan. 18	Emergent phases lasting for one hour centering around 9 ^h 30 ^m .							

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5	Jan. 21	W-A		iP ₁ EN	19-41-14		$\Delta = 156^{\circ}$ (measured). O = 19 ^h 21 ^m 21 ^s Epicenter 33.91 S. 57.95 E. Probable depth 60 km.		
		W-A		iP ₂ EN	19-41-28				
		W-A		eS ₁ P ₁ C ₁ P ₁ EN	19-44-58				
		W-A		ePR ₁ E	19-45-34				
		W-A		eS ₁ C ₁ P ₁ C ₁ S ₁ N	19-48-23				
		W-A		FR ₃	19-52-00				
		W-A		ScPcPcS					
		W-A		i(?) _E	19-55-13				
		W-A		iPR ₃ E	19-58-26				
		W-A		iPP ₁ S ₁ EN	20-00-15				
		W-A		PR ₄ EN	20-00-47				
		W-A		PScPcS'					
		W-A		SR ₂ N	20-10-25				
		W-A		PSSS _N					
		W-A		eL _{EN}	20-25				
		W-A		eM	20-47				
		W-A		iM _{EN}	20-50-03				
W-A		eW ₂ EN	21-08						
			F	22-00 \pm					
6	Jan. 24	W-A		iP ₁ EN	15-44-00		22 ^o 2		16 ^h 39 ^m 03 ^s . Arteaga, Michasean, Mexico.
		W-A		iP ₂ EN	15-44-02				
		W-A		ipP	15-44-19				
		W-A		eS _N	15-48-01				
		W-A		iS _{EN}	15-48-02				
		W-A		eM _E	15-53-25	(Very small).			
			F	16-05 \pm					
7	Jan. 27	W-A		eP _{EN}	22-49-57		88 ^o 7		22 ^h 37 ^m 03 ^s .
		W-A		eS _{EN}	23-00-26				
		W-A		eL _E	23-19-49				
		W-A		eM _E	23-27-16				
				F	24-15 \pm				

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-O	Remarks
8	Feb. 3	W-A		iP _{EN}	22-23-47	9-54	78°1		Epicenter 46°N., 151°E
		W-A		iS _N	22-33-41				
		W-A		iP _S _N	23-33-42				
		W-A		eL _{EN}	22-53-25				
		W-A		F	23-20±				
	Feb. 13	W-A		Seismic activity centering around 3h					
9	Feb. 18	W-A		eP _N	19-50-40	4-12	23°8	5-07"	19-45-33
		W-A		iS _N	19-54-52				
		W-A		F	22-20±				
	Feb. 19			Seismic activity centering at about 4h-35m.					
	Feb. 19			Seismic activity centering at about 9h					
10	Feb. 23	W-A		eP _{1EN}	8-19-32				Probably deep. - (100km) 0=8h-9m- 38s. $\Delta(P-O)=$ 60°3 Δ meas.= 60°3
		W-A		iP _{2EN}	8-19-37				
		W-A		ipP _{EN}	8-19-50				
		W-A		iPcP _{EN}	8-20-30				
		W-A		iPR _{1EN}	8-21-47				
		W-A		ipPR _{1EN}	8-22-06				
		W-A		iS _{1EN}	8-27-48				
		W-A		iS _{2EN}	8-27-53				
				i _{EN}	8-28-11				
				i _{EN}	8-28-34				
				eM _{EN}	8-41-04				
		F	10-30±						

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-O	O--Remarks
11	March 2	W-A		eP _{EN}	17-43-40				17 ^h 31 ^m 06 ^s . The above is correct if the quake is not of deep fo- cus. Ten- tative epicenter 39°5N., 143°E.
		W-A		iP _{EN}	17-43-46				
		W-A		iPcP _{EN}	17-43-58				
		W-A		i(?) _{EN}	17-44-34				
		W-A		ePR _{1EN}	17-47-16				
		W-A		eScPcS _E	17-54-19				
		W-A		iS _{EN}	17-54-24				
		W-A		eSR _{1E}	18-00-29				
		W-A		iL _{EN}	18-07-30			Δ(meas) =87.6	
		W-A		M _{EN}	18-14-50			Δ(P-O) =86.4	
		W-A		F _{EN}	21-00±				
Aftershocks at 20h-56m., 22h-38m.; (March 3) at 5h-46m. (All given in G.M.T. at arrival at St. Louis)									
12	March 9	Local W-A W-A W-A	quake	eP _{GEN} eS _{GEN} F	20-55-28 20-55-30 20-55-48				Δ{Sg-Pg(Jeffreys)} = 15 km.
13	March 9	Blast W-A W-A W-A		eP _{GEN} iS _{GEN} F	21-11-40 21-11-42.5 21-12-25				Δ{ Sg-Pg(Jeffreys) } = 20 km.
14	March 11	W-A W-A W-A W-A W-A W-A		iP _{EN} iPR _{1EN} iPR _{2EN} iPR _{3EN} ePcP _{EN} iS _{EN}	1-59-14 1-59-43 1-59-51 1-59-54 2-03-02 2-03-35	4-21	24.6		Δ(meas)=23.6 1 ^h 54 ^m 08 ^s . Destruc- tive at Long Beach California Moderate depth

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-O	O--Remarks
	March 11 (cont.)	W-A		eSR ₁ EN	2-04-36				
		W-A		iSR ₂ EN	2-04-53				
		W-A		eSR ₃ EN(?)	2-05-04				
		W-A		iL _{EN}	2-05-25				
		W-A		iM _N F _{EN}	2-06-22 4-45 \pm				
	March 11-12			Aftershocks of this quake were registered at					
				St. Louis at					
1.		W-A		P _{EN}	3-28-27				There were several other aftershocks registered here, but these were too weak to justify phase differentiation.
		W-A		S _{EN}	3-32-55				
2.		W-A		iP _{EN}	5-15-26				
3.		W-A		eP _{EN}	5-22-20				
4.		W-A		eP _{EN}	7-03-37				
		W-A		eS _{EN}	7-07-34				
5.		W-A		P _{EN}	8-59-31				
	March 13								
6.		W-A		eP _E	13-21-49				
		W-A		eS _E	13-26-02				
7.		W-A		e(?) _N	16-57-20				
		W-A		eM _{EN} F	17-33 18-10 \pm				
	March 14	W-A		Emergent phases visible centering at about the 2nd hour.					
	March 14	W-A		Emergent phases (Long waves) registering at approximately 19h-10m.					
	March 15			Emergent phases visible at approximately 5h-26m.					
15.	March 15	W-A		eP _E iM _E F	11-18-42 11-26-39 11-30				
16.	March 15	W-A		eP _{EN}	23-14 \pm				Emergent phases 5 minutes later.

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P- \bar{O}	O---Remarks
	March 17	W-A		Emergent phases visible at approximately 1h-40m (GMT)					
17.	March 17	W-A		eP	16-06-25	9-05	67°8	10-54	15 ^h 55 ^m 31 ^s Probably moderately deep. (60km) The surface waves were of the same double amplitude as the S phases Tent. epicenter 56°N., 160°E.
		W-A		iP	16-06-30				
		W-A		ePcP _{EN} (?)	16-07-00				
		W-A		eFR _{1EN}	16-08-54				
		W-A		iS _{EN}	16-16-29				
		W-A		iPS _{EN}	16-16-50				
		W-A		ePPPS _{EN}	16-17-06				
		W-A		i _{EN}	16-17-28		Δ (P- \bar{O})		
		W-A		e _{EN}	16-17-43		=68°2		
		W-A		iScS _N	16-17-57		Δ (meas)		
		W-A		e _E	16-18-17		=68°3		
		W-A		i _E	16-20-51				
		W-A		iSR _{1EN}	16-21-12				
		W-A		eL _{EN}	16-28-30				
		W-A		eM _{EN}	16-35 [±]				
		W-A		F	18-00 [±]				
	March 17			Emergent phases centering at about 20h-30m.					
	March 18			Emergent phases centering at about 3h.					
18.	March 18	W-A		eP _{EN}	23-37-20	4-10	23°3		23 ^h 32 ^m 44 ^s Epicenter 14°3N., 87°8W
		W-A		iS	23-41-30				
	March 28			Emergent phases centering at about 4h-30m.					

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7.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	O--Remarks
19.	April 9	W-A W-A W-A W-A W-A W-A W-A		ePEN eS _c P _c S _{EN} iS _{EN} eS _c P _c P _c S eSR ₁ EN eL _{EN} F (Obscured by the following)	2-59-31 3-09-40 3-10-08 3-10-15 3-16-45 3-35±	Δ(S-P)=86.2 O=2-46-52 Tentative epicenter (repetition of March 2) 39.5 N., 143.0 E.
20.	April 9	W-A W-A W-A W-A W-A W-A W-A W-A W-A		iPEN iEN (?) iS _{EN} iSR ₁ EN eSR ₂ EN iEN (?) iL _{EN} iL _{EN} F _{EN}	4-03-27 4-05-35 4-07-46 4-08-38 4-08-50 4-10-00 4-10-48 4-12-47 5-40±	O=3-58-02 Δ(S-P)=25.0 Tentative epicenter 18.7 N., 106.8 W.
21.	April 9	W-A W-A W-A W-A W-A W-A		ePEN eS _{EN} eSR ₁ EN eL _{EN} eM _{EN} F _{EN}	15-18-11 15-22-40 15-23-35 15-25-42 15-27-48 15-52±	O=15-12-44 Δ(S-P)=25.2 Probably an aftershock of the above.
22.	April 9	W-A W-A W-A W-A W-A W-A W-A		ePEN ePEN iS _N iS _N eSR ₁ EN eL _{EN} eM _{EN} F _{EN}	21-08-56 21-09-08 21-13-19 21-13-29 21-14-11 21-16-41 21-18-05 22-10±	O=21-03-36 Δ(S-P)=24.5 O=21-03-51 Δ(S-P)=24.2

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8.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	O--Remarks
	April 16	W-A		Seismic activity centering about 1h-00m. Very indistinct.		
	April 16	W-A		Seismic activity centering around 20h-15m. Very indistinct.		
	April 19	W-A		Seismic activity centering around 1h-30m. Very indistinct.		
	April 19	W-A		Seismic activity centering around 6h-45m. All phases emergent.		
23.	April 22	W-A W-A W-A		eP _{EN} eL _{EN} F _{EN}	6-58-12 7-05-30 7-15 ±	
24.	April 23	W-A W-A W-A W-A W-A W-A W-A W-A W-A		eP _{EN} iP _{EN} eS _{EN} iS _{EN} eSR _{1EN} eSR _{2EN} eL _{EN} eM _{EN} F _{EN}	6-10-03 6-10-09 6-20-26 6-20-36 6-26-10 6-29-40 6-37-00 6-42-30 8-00 ±	$\Delta(\text{meas}) = 85^\circ$ $\Delta(\text{s-p}) = 83.5^\circ$ Tentative epicenter 37° N., 27° E., near the island of Kos. Q = approx. 5h-57m-38s. Probably of the order of 50 km. deep.
25	April 23	W-A		eP _{EN} (Followed by weak emergent phases)	7-56-55	
26.	April 24	W-A W-A W-A W-A		eP _{EN} iP _{EN} iSP _{EN} iS _{EN} ePS _{EN}	13-45-11 13-45-29 13-45-39 13-49-02 13-49-32	Epicenter in the southern end of the state of VERA CRUZ; 250 miles south of Mexico City. Probably quite deep. $\Delta(\text{s-p}) = 20.9^\circ$ $\Delta(\text{meas}) = 22^\circ$

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	April 25	W-A		Seismic activity centering about 23h. Very indistinct.		
27.	April 27	W-A		iP ₁ EN	2-44-06	Tentative epicenter 60°7 N., 148°8 W. Reported from Seward Alaska. No damage. $\Delta(S-P)=41.99$ O=2-36-16
		W-A		iPR ₁ EN	2-45-34	
		W-A		iPR ₂ EN	2-46-07	
		W-A		iPR ₃ EN	2-46-21	
		W-A		iP _C S ₂ EN	2-49-49	
		W-A		iS ₁ EN	2-50-31	
		W-A		eSR ₁ EN	2-55-07	
		W-A		iSR ₂ EN	2-54-09	
		W-A		iSR ₃ EN	2-54-34	
		W-A		iL ₁ EN	2-56-30	
		W-A		iM ₁ EN	2-59-48	
		W-A		F ₁ EN	6-00 ±	
	April 29-30	W-A		Several minor seismic motions observable. There were, however, no phases distinguishable.		

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10.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	O--Remarks
	May 1	W-A		Weak emergent phases visible, centering at about 10h-30m.		
28	May 1	W-A		eP _{EN}	18-59-31	O = 18-50-02 △ _{S-P} 55°1
		W-A		iS _{EN}	19-07-19	
		W-A		ePS _{EN}	19-07-46	
		W-A		eL _{EN}	19-15-00	
		W-A		eM _{EN}	19-19-00	
		W-A		F _{EN}	(Obscured by the following)	
29	May 1	W-A		eP _{EN}	20-03-24	O = 19-51-16 △ _{S-P} 80°2
		W-A		iS _{EN}	20-13-31	
		W-A		ePS _{EN}	20-13-57	
		W-A		eL _{EN}	20-34-00	
		W-A		F _{EN}	21-00 ⁺	
30	May 3	W-A		eP _{EN}	12-40-45	O = 12-32-49 △ _{S-P} 42°6
		W-A		eS _{EN}	12-47-15	
		W-A		eL _{EN}	12-55-55	
		W-A		eM _{EN}	12-58-45	
		W-A		F _{EN}	13-30 ⁺	
31	May 5	W-A		eP _{EN}	4-20-12	O = 4-14-06 △ _{S-P} 29°2
		W-A		ePR _{2EN}	4-21-04	
		W-A		eS _{EN}	4-25-12	
		W-A		eSR _{1EN}	4-26-24	
		W-A		eL _{EN}	4-28-55	
		W-A		eM _{EN}	4-30-46	
		W-A		F _{EN}	5-20 ⁺	

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11.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	0--Remarks
32	May 6	W-A		eP _{EN}	5-39-44	0=5-33-17 Tentative epicenter 6° N., 82.5° W. △ _{S-P} 32.5
		W-A		iP _{EN}	5-39-51	
		W-A		iPR _{1EN}	5-40-50	
		W-A		iPR _{2EN}	5-41-11	
		W-A		iPR _{3EN}	5-41-17	
		W-A		iS _{EN}	5-45-13	
		W-A		iSR _{1EN}	5-47-00	
		W-A		iSR _{2EN}	5-47-22	
		W-A		eL _{EN}	5-49-10	
		W-A		eM _{EN}	5-52-13	
		W-A		F _{EN}	6-40 ⁺	
		33	May 8	W-A		
W-A				iP _{EN}	10-38-51	
W-A				iP _{EN}	10-39-05	
W-A				iPR _{1EN}	10-39-23	
W-A				iPR _{2EN}	10-40-09	
W-A				iPR _{3EN}	10-40-23	
W-A				iS _{EN}	10-43-02	
W-A				iS _{EN}	10-43-39	
W-A				iSR _{1EN}	10-47-30	
W-A				iSR _{2EN}	10-47-38	
W-A				iSR _{3EN}	10-47-49	
W-A				iL _{EN}	10-46-52	
W-A				iM _{EN}	10-48-55	
W-A				F _{EN}	12-00 ⁺	
34	May 8			W-A		eP _{EN}
		W-A		ePR _{1EN}	18-06-52	
		W-A		ePR _{2EN}	18-07-03	
		W-A		eS _N	18-10-38	
		W-A		eSR _{1EN}	18-11-14	
		W-A		eSR _{2EN}	18-11-19	
		W-A		iL _{EN}	18-14-21	
		W-A		iM _N	18-16-33	

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35	May 9	W-A W-A W-A W-A W-A		eP _{EN} eS _N eL _E eM _N F _{EN}	2-39-26 2-43-54 2-46-24 2-48-50 3-35 ⁺	0 = 2-34-00 △ S-P 25 ^o 1
	May 9	W-A		Seismic activity centering around 12h-00m., GMT		
36	May 11	W-A W-A W-A W-A W-A		eP _{EN} eS _{EN} eL _{EN} eM _{EN} F _{EN}	19-21-43 19-31-51 19-47-00 19-54-00 20-20 ⁺	0 = 19-09-40 △ S-P 80 ^o 4
	May 12	W-A		Seismic activity centering about 3-00 GMT Phases indistinguishable.		
37	May 14	W-A W-A W-A W-A W-A		eP _N eS _N eL _N eM _{EN} F _{EN}	9-18-26 9-22-32 9-26-30 9-28-40 9-40 ⁺	0 = 9-13-25 △ S-P 22 ^o 6
38	May 14	W-A W-A		eP _{EN} eS _{EN}	13-19-00 13-23-06	0 = 13-13-59 Probably an aftershock of the above. △ S-P 22 ^o 6
39	May 16	W-A W-A W-A		e _{EN} eL _{EN} F	1-35-15 2-13-00 3-30 ⁺	Very indistinct. △ S-P 80 ^o 4
	May 16	W-A		Seismic activity centering around 12h--00m (GMT). Probably of about 23 ^o epicentral distance.		
40	May 18	W-A W-A		eP _{EN} iS _{EN}	00-06-30 00-15-30	0 = 23-55-39 △ S-P 67 ^o 3

No.	Date	Inst.	C/D	Phase	G.M.C.T.	O--Remarks
41	May 19	W-A		eP _{EN}	13-08-12	O = 17-58-02 Tentative Epicenter 1 ^o .9 S., 14 ^o .3 W. △ _{S-P} 81 ^o .0 Phases quite indistinct.
		W-A		ePcP _{EN}	18-10-12	
		W-A		e _{EN}	18-11-56	
		W-A		eS _{EN}	18-20-09	
		W-A		eL _{EN}	18-31-00	
		W-A		eM _{EN}	18-37-25	
		W-A		F _{EN}	19-40 ⁺	
	May 19	W-A		Seismic activity centering about the 5h-30m. Probably an aftershock of the above.		
42	May 22	W-A		eS _{EN}	12-07-10	
		W-A		eL _{EN}	12-10-30	
		W-A		F _{EN}	12-24 ⁺	
	May 23	W-A		Seismic activity centering about 6h-30m.		
	May 23	W-A		Long waves visible at about 21h-25m. Very indistinct.		
	May 29	W-A		Long waves visible at about 11h-10m.		
43	May 30	W-A		iP _{EN}	11-50-00	O = 11-43-48 △ _{S-P} 30 ^o .0
		W-A		eS _{EN}	11-55-05	
		W-A		eL _{EN}	11-57-00 ⁺	
		W-A		eM _{EN}	11-59-24	
		W-A		F _{EN}	12-30 ⁺	

SEISMOGRAPHIC STATION, ST. LOUIS UNIVERSITY, ST. LOUIS, MO., U. S. A.

One Wiechert 80 Kg., two Wood-Anderson long-period seismographs, Wiechert clock

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-H	H--Remarks
44	June 2	W-A		ePEN	7-34-17	7-03	48°	8-37	7h.32m.43s.
		W-A		eSEN	7-41-20				
		W-A		F _{EN}	8-50 [±]				
	June 3	W-A		Seismic activity centering at about 18h-30m. (G.M.T.)					
45	June 4	W-A		ePE	13-23-52	4-23	24°5	5-20	13h.18m.32s.
		W-A		eSN	13-28-15				
		W-A		eL _{EN}	13-31-29				
		W-A		F _{EN}	13-42 [±]				
	June 6	W-A		Long waves (emersio) at approximately 3h-30m. (G.M.T.)					
	June 7	W-A		Emergent phases between 12h and 13h (G.M.T.)					
46	June 8	W-A		ePEN	18-21-54		85°8		18h.10m.48s. 40° N. 144° E.
		W-A		iSEN	18-34-00				
		W-A		F _{EN}	19-30 [±]				
47	June 10	W-A		ePEN	11-30-26	4-04			11h.27m.00s. 17° N. 85°W.
		W-A		iSEN	11-34-30				
48	June 10	W-A		ePEN	12-14-00	6-50	45°		12h.07m.10s. 64° N. 25°W.
		W-A		eSEN	12-20-50				
49	June 11	W-A		ePEN	8-37-40				
		W-A		eL _{EN}	8-45-30				
		W-A		F _{EN}	9-10 [±]				
	June 11	W-A		Emergent waves visible at about 19h-20m. (G.M.T.)					

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-H	H--Remarks
50	June 12	W-A W-A W-A W-A		eP _{EN} eS _{EN} eL _{EN} F _{EN}	15-30-15 15-40-05 15-45-00 16-30 [±]	9-50	76 ⁰ .6		15h.18m.33s.
51	June 13	W-A W-A W-A W-A W-A		eP _{EN} iP _{EN} eS _{EN} iS _{EN} F _{EN}	14-28-08 14-28-11 14-32-30 14-32-34 15-00 [±]		24 ⁰ .4 24 ⁰ .5		14h.22m.49s. 14h.22m.51s.
52	June 13	W-A W-A W-A W-A		eS _{EN} eL _{EN} eM _{EN} F _{EN}	20-56-56 21-16-00 21-30 [±] 21-50 [±]				
53	June 13	W-A W-A W-A W-A W-A W-A W-A W-A		eP _{EN} ePR _{1EN} iS _{EN} eSR _{1EN} eSR _{2EN} eL _{EN} iM _{EN} F _{EN}	22-27-50 22-29-20 22-23-57 22-37-00 22-37-52 22-40-34 22-44-00 23-40 [±]	6-26	42 ⁰	7-51	22h.20m.00s.
54	June 15	W-A W-A W-A W-A W-A W-A W-A		eP _{gE} iP _{gE} eS _{gN} iS _{gN} i(?) _N i(?) _N F _{EN}	1-16-36.7 1-16-37.8 1-18-02 1-18-03 1-18-06 1-18-07 1-21 [±]	71-25	6.5		450 miles, using Jef- frey's tables. Epicenter in Appalachians of West Vir- ginia. Hg=1h14m22s
55	June 16	W-A W-A W-A W-A		eP _{EN} iP _{EN} eS _N iS _N	1-01-56 1-02-00 1-06-57 1-07-03		29 ⁰ .4 29 ⁰ .7		00h.55m.50s. 00h.55m.51s.

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-H	H--Remarks
55	June 16 cont.	W-A		iLN	1-09-29				
		W-A		eMN	1-12-17				
		W-A		F _{EN}	1-40 ⁺				
56	June 18	W-A		eP _{EN}	4-11-55		37.1 ^o		04h.04m.43s.
		W-A		eS _{EN}	4-17-50				
		W-A		eL _{EN}	4-32-30 ⁺				
		W-A		F _{EN}	5-30 ⁺				
57	June 18	W-A		iP _{EN}	21-50-29		89.2 ^o		21h.37m.42s. Tentative Epicenter: 38 ^o N 143 ^o E. Probably about 50 km. deep
		W-A		ep _{EN}	21-50-41				
		W-A		ePR _{1EN}	21-53-59				
		W-A		ePR _{2EN}	21-55-55				
		W-A		iS _{cPcSEN}	22-00-54				
		W-A		iS _{EN}	22-01-14				
		W-A		iS _{cPcPcSEN}	22-01-23				
		W-A		i(?) _{EN}	22-01-36				
		W-A		isS _{EN}	22-01-39				
		W-A		iPS _N	22-02-27				
		W-A		iPPS _{EN}	22-02-45				
		W-A		iSR _{1EN}	22-07-16				
		W-A		i(?) _{EN}	22-14-47				
		W-A		eL _{EN}	22-15-30				
		W-A		eM _{EN}	22-23-00				
		W-A		F _{EN}	24-30 ⁺				
58	June 19	W-A		eP _{EN}	18-55-45	6-22	41.3 ^o	7-45	18h.48m.00s. (Alaska)
		W-A		eS _{EN}	19-02-07				
		W-A		eL _{EN}	19-10-30				
		W-A		F _{EN}	20-00 ⁺				
59	June 21	W-A		eP _{EN}	22-44-42	4-38	26.4 ^o	5-39	22h.39m.02s.
		W-A		eS _{EN}	22-49-20				
		W-A		F _{EN}	23-00				

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-H	H--Remarks
	June 23	W-A		Seismic activity centering at about 2h-25m. (G.M.T.)					
60	June 24	W-A		eP _{EN} ⁱ	22-14-19				Tentative Epicenter: 4° S 101° E. West of Benkulen, Sumatra.
		W-A		i(?) _{EN}	22-18-06				
		W-A		iPR _{1EN}	22-20-31				
		W-A		ePR _{2EN}	22-23-46				
		W-A		iScPcS _{EN}	22-24-26				
		W-A		iScPcPcS _{EN}	22-27-33				
		W-A		iPScPcS _{EN}	22-30-35				
		W-A		iPPS _{EN}	22-33-04				
		W-A		iSR _{1EN}	22-36-32				
		W-A		eSR _{2EN}	22-41-52				
		W-A		M _{EN}	23-10-08				
		W-A		F _{EN}	1-30 [±]				
61	June 25	W-A		eP _{EN}	20-50-27	4-05	22.4°	4-59	
		W-A		i(?) _{EN}	20-51-41				
		W-A		ePcP _{EN}	20-54-21				
		W-A		eS _{EN}	20-54-32				
		W-A		eSR _{2EN}	20-55-26				
		W-A		eL _{EN}	20-57-18				
		W-A		iM _{EN}	20-59-19				
		W-A		F _{EN}	22-10 [±]				
	June 28	W-A		Seismic activity centering around 6h-14m. (G.M.T.)					
62	June 28	W-A		eP _{EN}	10-06-56				
		W-A		e _{EN}	10-13-48				
		W-A		eL _{EN}	10-22 [±]				
		W-A		F _{EN}	10-50 [±]				
63	June 28	W-A		eP _{EN}	23-44-05	7-20	50.6°	8-57	23h.35m.11s. Tentative Epicenter: 53° N. 163° W. Probably somewhat deep.
		W-A		iSP _E	23-44-30				
		W-A		iS _{EN}	23-51-25				
		W-A		isS _N	23-51-42				

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-H	H--Remarks
63 cont.	June 28	W-A W-A		eL _{EN} F _{EN}	23-58-35 00-30 \pm				
64	June 29	W-A W-A W-A W-A		eP _E iP _E e _{EN} iS _{EN}	02-41-37 02-41-46 02-42-01 02-48-54				02h.32m.43s. Epicenter same as above.
65	June 30	W-A W-A		iP _{gEN} iS _{gEN}	17-06-44 17-06-47				Δ =15 mi. Local

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One Wiechert 80 Kg., two Wood-Anderson long-period seismographs, Wiechert clock

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-H	H--Remarks
	July 1	W-A		Emergent phases visible around 20h-50m.					
66	July 3	W-A W-A W-A		eP _{EN} eS _{EN} F	07-24-18 07-28-32 07-40 ⁺	4-14	23 ^o .5	5-10	H=07-19-08 No surface waves.
67	July 8	W-A W-A W-A W-A W-A	C	eP _{EN} iP _N iS _{EN} eM _{EN} F	22-36-56 22-36-58 22-41-23 22-50 ⁺ 23-00 ⁺	4-25	24 ^o .7	5-22	H=22-31-36
68	July 9	W-A W-A W-A W-A		eP _{EN} eS _{EN} eL _{EN} F _{EN}	01-42-12 01-52-12 02-07 ⁺ 03-00 ⁺	10-00	78 ^o .7	11-59	H=01-30-13 Tentative Epicenter: 44.5 ^o N., 152.3 ^o E.
69	July 9	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A		iP _{EN} iPR ₁ EN iPR ₂ EN e(?) _{EN} eP _c P _{EN} eS _{EN} iS _{EN} iSR ₁ EN eP _c S _{EN} eScS _{EN} eL _{EN} iM _{EN} F _{EN}	05-39-39 05-40-11 05-40-26 05-42-51 05-43-22 05-44-00 05-44-04 05-44-49 05-47-06 05-50-42 05-46-19 05-48-53 06-30 ⁺	4-25	24 ^o .7	5-22	H=05-34-17 Tentative Epicenter: 17.4 ^o N., 104.7 ^o W.

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-H	H--Remarks
70	July 9	W-A W-A W-A W-A		eP _{EN} eS _{EN} eL _{EN} F _{EN}	09-40-18 09-50-20 10-05 [±] 11-00 [±]	10-02	79 ^o .0	12-01	H=09-28-17 Tentative Epicenter: 45 ^o .3 N., 153 ^o .2 E.
71	July 9	W-A W-A W-A W-A W-A W-A W-A W-A W-A		iP _Z ePR _{1EN} iS _{EN} isS _{EN} ePS _{EN} eSR _{1EN} eL _{EN} eM _{EN} F _{EN}	12-42-51 12-45-56 12-52-57 12-53-07 12-53-39 12-58-21 13-08 [±] 13-14 [±] 15-00 [±]	10-06	80 ^o .0	12-07	H=12-30-44 Tentative Epicenter 44 ^o .5 N., 152 ^o .3 E.
72	July 9	W-A W-A W-A W-A		eP _{EN} eS _{EN} eL _{EN} F	16-19-18 16-29-20 16-57 [±] 17-30 [±]	10-02	79 ^o .0	12-01	H=16-07-17
73	July 9	W-A W-A		eP _E eS _{EN}	18-03-39 18-13-47	10-08	80 ^o .4	12-09	H=17-51-30
	July 9	W-A		Seismic activity visible at about 22h-50m.					
74	July 10	W-A W-A W-A W-A W-A		eP _{EN} eS _{cPcS} _{EN} iS _{EN} esS _{EN} F	00-04-24 00-14-45 00-15-03 00-15-21 01-30 [±]	10-39	86 ^o .8	12-41	H=23-51-43 Probably deep.

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75	July 10	W-A		eP _{EN}	03-27-09	4-25	24 ^o .7	5-22	H=03-21-47 Tentative Epicenter: 17 ^o 8 N., 104 ^o W.
		W-A		iP _{EN}	03-27-12				
		W-A		iPR _{1EN}	03-27-41				
		W-A		iPR _{2EN}	03-27-53				
		W-A		eS _{EN}	03-31-34				
		W-A		iS _{EN}	03-31-37				
		W-A		iSR _{1EN}	03-32-21				
		W-A		iSR _{2EN}	03-33-27				
		W-A		iL _{EN}	03-34-02				
		W-A		iP _C P _{EN}	03-36-00				
		W-A		iM _{EN}	03-36-25				
		W-A		iP _C S _{EN}	03-39-57				
		W-A		eS _C S _{EN}	03-43-43				
		W-A		F _{EN}	05-10 ⁺				
	July 10	W-A		Seismic activity around 9h (G.M.T.).					
76	July 10	W-A		eP _{EN}	10-54-31	9-50	76 ^o .6	11-48	H=10-42-43 Probably deep. Surface waves small.
		W-A		epP _{EN}	10-55-48				
		W-A		eS _{EN}	11-14-21				
		W-A		esS _{EN}	11-18-34				
		W-A		eL _{EN}	11-27 ⁺				
		W-A		F _{EN}	12-40 ⁺				
77	July 13	W-A		eP _{gEN}	14-43-03	00-15	1 ^o .2	24s	H=14-42-39 Felt at St. Mary's, Mo.
		W-A		eS _{gEN}	14-43-18				
		W-A		F _{EN}	14-46-00 ⁺				
78	July 14	W-A		eP _{EN}	16-15-54	9-40	74 ^o .6	11-36	H=16-04-18 Probably deep.
		W-A		eS _{EN}	16-25-34				

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79	July 18	W-G W-G		eP _Z eS _E	19-24-43 19-34-14	9-31	73 ^o	11-26	19-13-17
80	July 19	W-G W-G W-G W-G W-G		iP _{EZ} eS _E i(?) _E iM _N F	05-12-28 05-17-10 05-17-37 05-22-19 06-15 ⁺	4-42	26 ^o .8	5-43	05-06-45
81	July 19	W-G W-G W-G		iP _Z iS _{EN} F	10-55-17 10-03-15 Covered by following	7-58	56 ^o .8	9-41	10-45-36 50 ^o N., 170 ^o W.
82	July 19	W-G W-G W-G W-G		iP _Z iS _{EN} i _{EN} F	11-03-45 11-11-38 11-11-53 13-00 ⁺	7-53	56 ^o	9-35	10-54-10
83	July 19	W-G W-G W-G W-G		iP _Z i _{EN} iS _{EN} F	13-42-11 13-49-21 13-50-05 15-00 ⁺	7-54	56 ^o .1	9-36	13-32-44 Tentative Epicenter: 50 ^o N., 170 ^o W. Probably 50 km. deep.
84	July 19	W-G W-A W-G W-A W-A		iP _Z ipP _E iS _E isS _E F _E	15-09-40 15-09-57 15-17-33 15-17-51 17-00 ⁺	7-53	56 ^o	9-35	15-00-11 Tentative Epicenter: 50 ^o N., 170 ^o W. Probably 50 km. deep
85	July 19	W-A W-A		eP _{EN} eS _E	20-20-25 20-30-54	10-29	84 ^o .6	12-31	20-07-54
86	July 20	W-A W-A W-A W-A		eP _{EN} epP _{EN} eS _{EN} esS _{EN}	04-15-39 04-15-53 04-23-46 04-23-04	6-57	47 ^o	8-30	04-07-09 Probably about 50 km deep.

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87	July 20	W-A W-A W-A		eP _{EN} eS _{EN} F _{EN}	18-27-37 18-38-16 19-00 ⁺	10-39	86 ^o .8	12-41	H=18-14-56	
88	July 20	W-A W-A		eP _{EN} eS _{EN}	07-06-01 07-10-09	4-08	22 ^o .9	5-04	H=07-00-57	
89	July 20	W-A W-A		eP _N eS _{EN}	07-09-57 07-17-07	7-10	49 ^o .1	8-46	H=07-01-11	
90	July 21	W-A W-A W-A		eP _{EN} eS _{EN} F	20-24-47 20-32-25 22-40	7-38	53 ^o .8	9-19	H=20-15-28	
91	July 22	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A	C	iP _E ipP _{EN} eP _C P _{EN} ePR ₁ E eP _C S _N iS _{EN} i(?) _{EN} isS _{EN} iP _S EN iS _C S _N eSR ₁ EN eL _{EN} iM _{EN} F	21-04-39 21-04-59 21-06-24 21-07-04 21-09-48 21-12-13 21-12-26 21-12-35 21-12-46 21-14-50 21-15-59 21-20-30 21-25 ⁺ 01-00 ⁺		53 ^o		H=20-55-18 Tentative Epicenter: 51 ^o .9 N. 166 ^o .1 W.	
	July 23	W-A		Seismic activity visible at 4h-30m., and at 10h-00m.						
92	July 24	W-A W-A W-A		eP _{EN} iS _C P _C S _{EN} eS _C P _C P _C S _N	19-10-00 19-20-34 19-20-49		94 ^o .7		H=18-55-36 Tentative Epicenter: 15 ^o .2 S. 174 ^o .5 W.	

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	S-P	Δ	P-H	H--Remarks
92 cont.	July 24	W-A		eS _{EN}	19-21-14				May be somewhat deep.
		W-A		eL _{EN}	19-40-00 ⁺				
		W-A		eM _{EN}	19-47 ⁺				
		W-A		F	21 ⁺				
	July 26	W-A		Seismic activity (L) at about 5h-30m. Probably in Mexico.					
93	July 28	W-A		eP _{EN} iS _N	11-56-10 12-03-29	7-19	50 ^o .5	8-57	H=11-47-13

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One Wiechert 80 Kg., two Wood-Anderson long-period seismographs, Wiechert clock
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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
94	Aug. 4	W-A W-A W-A		iP _g EN iS _g EN F	04-35-08 04-35-19 04-35-30	$\Delta=58$ miles. Quake felt at Saint Mary's, Saint Genevieve Co., Mo. Preceded by sound like distant thunder and wound up as loud crash when buildings seemed to rise up and shake. No damage. Probably originated in Fault zone 3 Or 4 miles south of Saint Mary's.
95	Aug. 5	W-A W-A W-A		eP _g EN eS _g EN F	20-47-31 20-47-35 20-48-30	
96	Aug. 7	W-A W-A W-A W-A		ePN eN eSN F	03-09-25 03-09-47 03-14-00 03-50 ⁺ ₋	$\Delta=25^{\circ}9$ H=03-03-51 Probably somewhat deep.
	Aug. 13	W-A		Seismic acitivity centering at about 10h-30m. (G.M.T.).		
97	Aug. 15	W-A W-A		ePEN eSEN	20-07-25 20-14-05	$\Delta=44^{\circ}2$ H=19-59-16
98	Aug. 15	W-A W-A W-A W-A		ePEN eSEN eLEN F	23-37-47 23-42-08 23-45-20 00-00 \pm	$\Delta=24^{\circ}2$ H=23-32-30
99	Aug. 17	W-A W-A W-A		iP _g EN iS _g EN F	18-36-24.5 18-36-26.7 18-38-00	$\Delta_{Sg-Pg}=17.5$ km. H=18-36-20.7 Local (May be blast).

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
100	Aug. 18	W-A W-A W-A W-A		iP _g EN iS _g EN eL _{EN} F	18-39-12.2 18-39-17.2 18-39-18 18-41±	Δ _{Sg-Pg} =24 miles Δ _{Sg-Pg} =38 km. H = 18-35-12 Compressional from southwest or dilatational from northeast.
101	Aug. 24	W-A W-A W-A		iP _g N iS _g N F	22-25-17 22-25-19 22-27-00	Δ=9 miles H=22-25-14 Blast. 19,000 lbs. of dynamite set off at Ill. Powder Mfg. Co. quarry dislodging about 100,000 tons of rock.
102	Aug. 25	W-A W-A W-A W-A W-A W-A		eP _{EN} eP ₁ iPR ₂ iS _c P _c S iS _c P _c P _c S iS F	08-04-59 08-08-44 08-09-28 08-15-39 08-17-07 08-17-42 11-00±	Δ=107°2 H=07-50-36 Tentative Epicenter: 3390 N. 103°4 E.
103	Aug. 28 Aug. 29	W-A W-A W-A W-A W-A W-A W-A		eEN ePR ₁ EN iS _c P _c S _{EN} iPS _{EN} eL _{EN} iL _{EN} iM _{EN} F _{EN}	22-33-54 22-39-39 22-45-30 22-48-53 23-04± 23-08± 23-16± 02-00±	Δ _{S_cP_cS} -H=118°2 Tentative Epicenter: 23°1 N. 95°E. H=22-19-52
104	Aug. 29	W-A W-A W-A W-A W-A W-A W-A		iP _{EN} ipP _{EN} iPR ₁ EN iS _{EN} iSP _{EN} isS _{EN} F _{EN}	15-00-58 15-01-57 15-02-55 15-07-39 15-07-52 15-09-42 16-00±	Δ=50°4 Using Scrase and Stechschulte's tables. H=14-52-38 Depth equals approximately 400 km. Tentative Epicenter: 8°3 S. 70°6W.
105	Aug. 31	W-A		iL _{EN}	03-10-20	(Other phases indistinct.) Probably in Mexico).

SAINT LOUIS

SEISMOGRAPHIC STATION, ST. LOUIS UNIVERSITY, ST. LOUIS, MO., U. S. A.

One Wiechert 80 Kg., two Wood-Anderson long-period seismographs, Wiechert clock

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Bulletin for 1933

No.	Date	Inst.	C/D	Phase	G. M. C. T.	H--Remarks
106	Sept. 2	W-A W-A W-A W-A		iP ipP ePR ₁ iS	16-53-56 16-55-40 16-58-07 17-03-59	Tentative epicenter: 5° N., 178° E. H = 16h.41m.12s. 400 Km. depth. $\Delta=87^\circ$
107	Sept. 6	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A		iP ipP iP' iPR ₁ iPR ₂ iS _c P _c S iS _c P _c P _c S iS iSP iPS ipS isS iSR ₁	22-21-28 22-23-53 22-25-47 22-25-53 22-28-57 22-31-03 22-31-51 22-32-23 22-34-43 22-34-53 22-35-57 22-36-26 22-39-43	Tentative epicenter: 24° S., 178° N. H = 22h.08m.29s. Depth equals 600 Km. (See quake of May 26, 1932.) $\Delta = 103^\circ$
108	Sept. 9	W-A W-A		eP eS	05-23-23 05-27-30	H = 05h.18m.22s. $\Delta = 22.6$
	Sept. 9	Emergent phases centering at about 22h.00m. Located, using data from other stations as having the following epicenter 30° N., 141.0° E. H = 21-19-05.				
	Sept. 19	Emergent long waves centering about 23h.50m.				
109	Sept. 21	W-A		eP No other phases visible.	19-23-30	
110	Sept. 24	W-A W-A W-A W-A W-A W-A W-A		iP epP iS isS iPS iS _c S F	15-29-35 15-29-47 15-37-34 15-37-53 15-38-02 15-39-58 16-30±	Tentative epicenter: 51.9° N., 174.4° W. H = 15h.19m.50s. Probably 30-50 kms. deep. $\Delta=57.4$
	Sept. 25	Seismic activity around 19h.30m. Phases in Phases indistinct.				

Donald C. Bradford, Graduate Assistant

SAINT LOUIS

SEISMOGRAPHIC STATION, ST. LOUIS UNIVERSITY, ST. LOUIS, MO., U. S. A.

One Wiechert 80 Kg., two Wood-Anderson long-period seismographs, Wiechert clock

Bulletin for 1933

28.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
111	Oct. 2	W-A W-A W-A W-A W-A W-A W-A W-A		eP _N iP _N ipP _N iPR _{1N} i _N iS _N isS _N eSR _{1N}	15-37-12 15-37-16 15-38-02 15-38-34 15-42-39 15-43-25 15-44-05 15-46-41	H = 15-29-50 Epicenter: 2°5 S, 80° W. Δ = 42°4 Depth of focus: ca. 230 km by un- published Brunner chart. Time marking relays failed on E.
112	Oct. 14	W-A W-A W-A		iP iS L	22-27-58 22-35-12 22-43	Absolute times un- certain
113	Oct. 15	W-A W-A		iP iS	16-05-50 16-05-58	Local shock; proba- bly a blast.
114	Oct. 25	W-A W-A W-A W-A W-A W-A W-A W-A		iPEN ipPEN ePR _{2EN} iSEN iE isS iEN eL (?)	23-38-33 23-39-22 23-41-54 23-47-04 23-48-12 23-48-36 23-49-52 23-52-54	H = 23-28-28 Epicenter: 22° S, 68° W Δ(S-P) ₁₈₀ = 64° Depth of focus by Brunner chart ca. 180 km.
115	Oct. 26	W-A W-A W-A W-A		e e e eL	12-25-20 12-33-26 12-39-48 12-57-32	
Seismic activity 2d 09h, 10d 00h, 17d 13h.						

James B. Macelwane, S.J., Director

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Bulletin for 1933

29.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
116	Nov. 2	W-A W-A W-A W-A W-A		ePEN ePR ₁ N iSEN iPSN eLN	12-36-51 12-39-05 12-44-51 12-45-19 12-56-33	H = 12-27-08 $\Delta(S-P) = 57^{\circ}1$
117	Nov. 3	W-A W-A W-A W-A		ePEN epPE (?) eSEN esSE (?)	10-46-33 10-46-47 10-54-00 10-54-27	H = 10-37-31 $\Delta = 52^{\circ}4$ Seems about 80 km deep according to the Brunner chart.
118	Nov. 4	W-A W-A W-A		ePEN iSEN eLEN	08-48-03 08-53-28 08-55-52	H = 08-41-25 $\Delta(S-P) = 32^{\circ}8$
119	Nov. 14	W-A W-A W-A W-A W-A W-A		iPEN ipPEN iP _c PEN eSEN ePSN esSN	14-16-32 14-16-53 14-17-14 14-25-54 14-26-29 14-26-43	H = 14-05-13 Tentative epicenter: $32^{\circ}7$ S, 70° W Depth of focus about 100 km by the Brunner chart. $\Delta = 74^{\circ}2$
120	Nov. 16	W-A W-A W-A		iP ₁ EN i iS ₁ N	09-29-05.5 09-29-07.7 09-29-09.5	$\Delta = 32.4$ km west of Saint Louis. Epicenter near Grover, Mo. Local shock felt in Saint Louis, Franklin and Jefferson counties, Missouri, and in Saint Clair and Monroe counties, Illinois.

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30.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
121	Nov.17	W-A W-A W-A		ePN eSE iSEN	04-11-41 04-19-09 04-19-27	Probably deep
122	Nov.19	W-A W-A W-A W-A W-A		SKKS PS SR ₁ SR ₂ eL	03-37-31 03-39-46 03-45-30 03-49-35 04-02-53	$\Delta = 103^{\circ} ?$
123	Nov.20	W-A W-A W-A W-A W-A W-A		iPEN iPR ₁ N iPcPN iSEN eLEN iME	23-28-33 23-29-34 23-31-19 23-34-09 23-37-25 23-40-08	H = 23-21-42 Epicenter in Baffin Bay, 72° N, 70° W $\Delta = 34^{\circ}.3$
124	Nov.21-22	W-A W-A W-A W-A		iPN iN eSE SR ₂	23-55-05 23-56-36 00-00-20 00-02-14	$\Delta = 31^{\circ}.3$
125	Nov.22	W-A		ePN	02-01-30	
126	Nov.22	W-A		iPN iSE	04-58-21 05-03-27	$\Delta = 30^{\circ}.1$
127	Nov.22	W-A		eP	08-16-42	
128	Nov.22	W-A W-A W-A W-A W-A W-A W-A		iPR ₁ E iSKSE iSKKSE i ePS eL eM	13-01-58 13-07-46 13-09-01 13-10-51 13-11-39 13-35-51 13-41-45	$\Delta = 114^{\circ}.7$ if H = 12-42-26 of Sitka is correct. By SKS-PR ₁ , $\Delta = 116^{\circ}.1$

Saint Louis Bulletin for 1933

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
129	Nov. 23	W-A		iPN	19-04-06	H = 18-57-50 Epicenter: 8°8 N, 83°5 W $\Delta(S-P) = 30^{\circ}1$
		W-A		iPR ₁ N	19-04-57	
		W-A		iPR ₂ N	19-05-06	
		W-A		iSN	19-09-12	
		W-A		iSR ₁ EN	19-10-36	
		W-A		iEN	19-11-00	
		W-A		iEN	19-13-00	
		W-A		eL	19-14-00	
130	Nov. 29	W-A		ePN	05-09-29	$\Delta = 50^{\circ}8$
		W-A		iPN	05-09-35	
		W-A		eSE	05-16-50	
		W-A		SR ₁	05-20-04	
		W-A		eL	05-24-08	
131	Nov. 29	W-A		iPN	05-53-55	$\Delta = 49^{\circ}4$
		W-A		iE	05-56-03	
		W-A		iSN	06-00-07	
Also seismic activity Nov. 28, between 12h and 13h.						

James B. Macelwane, S.J., Director

SAINT LOUIS

SEISMOGRAPHIC STATION, ST. LOUIS UNIVERSITY, ST. LOUIS, MO., U. S. A. 32.

One Wiechert 80 Kg., two Wood-Anderson long-period seismographs, Wiechert clock

Bulletin for 1933

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
	Dec. 2	W-A		Seismic activity at 6h30m and at 22h!		
132	Dec. 4	W-A		iP _N epP _N i iS _{EN} esS i F	19-45-46 19-45-53 19-46-03 19-55-29 19-55-42 19-56-10 20-10±	H = 19-34-11 Δ = 75°2 Epicenter in the vicinity of 60° N, 132° E.
133	Dec. 12	W-A		e i F	14-30-36 14-36-36 15-00±	
134	Dec. 13	W-A		iP _{EN} iPR _{1EN} iPR _{2EN} i _{EN} iS _{EN} eSR _{1N} iL _E F	21-28-51 21-29-18 21-29-27 21-29-53 21-33-01 21-33-40 21-36-00 23-00±	H = 21-23-47 Δ = 22°9 Tentative epicenter: 18°5 N, 103°5 W.
135	Dec. 14	W-A		iP _{EN} iPR _{1EN} i _E eS _{EN} eL F	07-21-35 07-22-07 07-22-22 07-25-47 07-28-29 08-00±	H = 07-16-28 Δ = 23°2 Tentative epicenter: 18° N, 103°5 W.
136	Dec. 15	W-A		eP _{EN} iPR _{1EN} eS _E eL _E eM _E F	07-49-49 07-51-22 07-56-03 08-02-20 08-05-00 08-30±	H = 07-42-14 Δ = 40° Tentative epicenter: 54°2 N, 35° W.
	Dec. 16	W-A		Seismic activity at 14 h.		
	Dec. 19	W-A		Seismic activity at 6h.		

Saint Louis Bulletin for 1933

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
137	Dec. 19	W-A		ePN ePR ₁ N eN eSE eLE F	17-55-28 17-56-20 17-56-25 18-00-45 18-06-43 18-30 ⁺	$\Delta = 31^{\circ}6$
138	Dec. 21	W-A		eP _{EN} eS _{EN} F	04-43-08 04-52-21 04-55 ⁺	$\Delta = 69^{\circ}7$ by tables for normal earth- quakes. No other phases.
	Dec. 24	W-A		Seismic activity about 12h.		

J. B. Macelwane, S.J.
Director

C. G. Dahm
Instructor

SAINT LOUIS

SEISMOGRAPHIC STATION, ST. LOUIS UNIVERSITY, ST. LOUIS, MO., U. S. A.

One Wiechert 80 Kg., two Wood-Anderson long-period seismographs, Wiechert clock

SUMMARY

JUNE, JULY, AUGUST, 1933

Latitude $38^{\circ} 38' 18''$ North, $90^{\circ} 14' 00''$ West. Height above mean sea level equal to 160.4 metres.

Lithologic foundation: Saint Louis Limestone, Pennsylvanian

INSTRUMENTS: Two Wood-Anderson short period seismographs, photo recording, N-S and E-W.

Two long period Wood-Anderson seismographs, photo recording, N-S and E-W.

One Wiechert 80 kg., E-W and N-S components, smoked paper recording.

CONSTANTS: (Wood-Anderson)

	T_0	ϵ	V	Drum speed
E-W short period	2.0	aperiodic	?	60 mm/sec.
N-S short period	2.0	aperiodic	?	60 mm/sec.
E-W long period	6.0	aperiodic	710	30 mm/sec.
N-S long period	6.0	aperiodic	470	30 mm/sec.

Time service: (Wood-Anderson). Supplied by a Wiechert clock corrected daily by radio signals from station WEW.

CONSTANTS: (Wiechert)

	T_0	ϵ	V	r/T_0^2	Drum speed
E-W component	5.6	6.9	67	0.889	15 mm/sec.
N-S component	6.2	4.55	81	0.399	15 mm/sec.

SUMMARY

2.

JUNE, JULY, AUGUST, 1933 (continued)

The timing for the Wiechert instrument is given by a Wiechert clock, corrected manually by the operator. The Wiechert instrument is used here only in case of very strong motion where the P and the S phases would be lost on the more delicate Wood-Anderson machines.

The constants of the Wood-Anderson instruments were determined during the two days, 21 and 22 of August, 1933. The Wiechert constants were determined during the two days, 2 and 3 of December, 1932.

Monthly summary of activity during June, July, August, 1933:

June, Seismic activity was noted during the following dates: 2,3,4,6,7,8,10,11,13,15,16,18,19,21,23,24,25,28,29,30.

Twenty-eight cases of activity were noted, of which eight epicenters were located, nine times of origin and the corresponding epicentral distance determined, and eleven simply mentioned.

Local quakes were recorded on two instances:

June 15, with the center in West Virginia.

June 30, center unknown, $\Delta = 15$ miles.

July, Seismic activity was noted on the following dates: 1, 3, 8, 9, 10, 13, 14, 18, 19, 20, 21, 22, 23, 24, 26, 28, 31.

Thirty-five cases of activity were noted, of which eleven epicenters were located, seventeen times of origin and the corresponding epicentral distance determined, and seven simply mentioned.

Microseisms were far below average intensity, often being too small to measure or compare. Period=4 s.

August, Seismic activity was noted on the following dates: 4, 5, 7, 13, 15, 17, 18, 21, 24, 25, 28, 29, 31.

Fourteen cases of seismic activity were noted, of which three tentative epicenters were located, one time of origin and epicentral distance determined, three cases of activity simply mentioned, and six local disturbances noted. Of the latter, four were due to blasts.

SUMMARY

3.

JUNE, JULY, AUGUST, 1933 (continued)Local quakes were as follows:August 4, Saint Mary's, Missouri
(See final St. Louis Bulletin).August 5, Center unknown. $\Delta=20$ miles.Microseismic activity was weak, on the average, for the month, with the exception of the motion caused by the barometric conditions at the time of the great hurricane on the Atlantic Coast, from August 21-24.

FLORISSANT STATIONLatitude $38^{\circ} 48'$ North, $90^{\circ} 22'$ West.

CONSTANTS: (Wilip-Galitzin) (As of November, 1929)

	T_1	T	μ^2	ϵ	K
E-W.....	12.85	13.00	0.395	-0.0835	90
N-S.....	12.86	12.50	0.2301	-0.0759	116
Z.....	12.70	10.70	0.559	-0.3135	137.2

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