

SAINT LOUIS

SEISMOGRAPHIC STATION, ST. LOUIS UNIVERSITY, ST. LOUIS, MO., U. S. A. 1.

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

Bulletin for 1934

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
1	January 3	W-A		iP _{EN} ipP ePR _{1E} iS _{EN} iSP _{EN} isSE isSN iE F	09-53-26 09-54-30 09-56-14 10-02-21 10-03-02 10-04-17 10-04-19 10-05-06 11-00 [±]	H = 09h42m42s. Δ = 71°2 Depth of focus approximately 300 km. Tentative epicenter: 53°6 N, 157°3 E.
	January 9	W-A		Seismic activity about 7h45m to 8h.		
2	January 11	W-A		eP _{EN} eS _{EN} F	10-31-57 10-40-10 11-30 [±]	H = 10h22m00s. Δ = 59°1
	January 12	W-A		Seismic activity at about 14h30m.		
3	January 14	W-A		eP _{EN} eS _{EN} eL _{EN} iM _{EN} F _{EN}	12-05-49 12-09-46 12-11-47 12-12-26 12-45 [±]	H = 12h00m59s. Δ = 21°5
4	January 15	W-A		eP _N ePR _{1N} eScP _{cSN} eScP _{cSE} eScP _{cPcSEN} iS _E iE iPS _N iPS _E iPP _{SN} eSR _{1E} eSR _{2E} eE F	09-01-53 09-02-56 09-08-49 09-08-54 09-10-05 09-10-46 09-11-08 09-12-52 09-12-56 09-13-56 09-19-02 09-23-01 09-34-20 15-00 [±]	Provisional H = 08h43m16s. Δ = 116° Tentative epicenter: 25°6 N, 85°7 E. Destructive in Behar Province, India.
	January 19	W-A		Seismic activity at about 2h.		

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H-Remarks
5	January 19	W-A		ePEN eSEN iSE eLEN iEN iMEN F	10-00-50s. 10-04-50 10-04-55 10-06-51 10-07-19 10-07-36 11-00±	H= 9h55m57s. Δ= 21.8
	January 20	W-A		Seismic activity at about 19h.		
6	January 22	W-A		ePE iE iE eLE? eME? F	23h53m33s. 23 58 32 23 59 06 23 59 46 24 00 09 24 15±	
7	January 22	W-A		ePE eSE eLE F	10h15m34s. 10 22 09 10 31 32 11 00±	
8	January 22	W-A		ePN eSN F	18h09m37s. 18 14 02 18-20±	Δ= 24.7 Very weak. No other phases.
	January 25	W-A		Seismic activity at about 19h.		
9	January 27	W-A		ePE iSE iSR1(?) F	13h07m26s. 13 13 49 13 16 15 13-17±	Δ= 41.4 Probably somewhat deep
	January 28	W-A		Seismic activity at about 15h.		
10	January 28	W-A		iPEN iPR1EN iPcPEN iSE iSR1E iSR1N eLE iME F	19h15m11s. 19 15 39 19 19 00 19 19 24 19 20 07 19 20 18 19 21 31 19 24 00 21 15±	H= 19h10m03s. Δ= 23.3 Tentative epicenter: 16.6 N, 99.1 W.
11	January 30	W-A		ePE eSE eLE F	19h28m52s. 19 33 02 19 37 33 20 15±	H= 19h24m48s. Δ= 22.9
12	January 30	W-A		ePE ePR1E eSEN eLEN iMEN F	20h21m25s. 20 21 50 20 25 29 20 27 27 20 28 25 22 30±	H= 20h16m27s. Δ= 22.3 Western Nevada. Tentative epicenter: 37.8 N, 118.2 W.
	January 30	W-A		Seismic activity at about 23h50m.		
	January 31	W-A		Seismic activity from 10h30m to 11h30m.		

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No.	Date	Inst.	C/D	Phase	G. M. C. T.	H--Remarks
	Feb. 1	W-A		Seismic activity at 11h30m.		
13	Feb. 1	W-A		ePE eSN ? eLN eMN F	11h50m52s. 11 54 54 11 56 58 11 57 48 12 30±	$\Delta = 22^{\circ}1$
14	Feb. 3	W-A		ePR ₁ E ePS ₁ E eSR ₁ N LE F	14h52m46s. 15 02 41 15 09 07 15 30 17 00±	
	Feb. 4	W-A		Seismic activity at 14h30m and 22h30m.		
15	Feb. 9	W-A		eP eL F	09h24m37s. 09 31 15 10 00±	
	Feb. 11	W-A		Seismic activity at 10h.		
	Feb. 12	W-A		Seismic activity at 7h and also 12h45m.		
16	Feb. 14	W-A		ePKP iPR ₁ EN eSKS ₁ EN eSKKS ₁ N eSE iPS ₁ N iSR ₁ N iSR ₁ E eN eSR ₂ N eE eE eN eLEN F	04h18m26s. 04 19 37 04 25 09 04 26 27 04 27 14 04 29 18 04 35 45 04 35 51 04 37 08 04 39 08 04 40 23 04 47 05 04 49 23 04 50 23 06 45±	Provisional H = 03h59m45s. $\Delta = 117^{\circ}2$ Tentative epicen- ter: 18 ^o 5 N, 119 ^o 5 E.

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
17	Feb. 14	W-A		ePEN eSEN iLN iME F	22h23m36s. 22 28 06 22 31 03 22 33 06 23 00±	$\Delta = 25^{\circ}3$
	Feb. 19			Seismic activity from about 11h to 12h30m.		
18	Feb. 20	W-A		ePEN eSEN eLE F	03h27m12s. 03 33 52 03 37 22 04 30±	$\Delta = 44^{\circ}2$
19	Feb. 24	W-A		ePEN eME F	01h03m43s. 01 07 25 01 40±	
20	Feb. 24	W-A		iPN ipPN eSN esSN F	05h38m46s. 05 39 26 05 42 59 05 44 12 05 50±	Nicaragua. $\Delta = 25^{\circ}0$ Probably about 220 kilometers deep.
21	Feb. 24	W-A		ePKPN? ePR ₁ EN iSKSEN eSKKS _E ePSE iPPSE iSR ₁ EN eSR ₂ N eLN F	06h41m28s. 06 41 48 06 48 06 06 49 00 06 50 34 06 51 00 06 55 58 07 00 30 07 10 48 09 00±	Provisional H = 06h23m35s. $\Delta = \text{Ca } 102^{\circ}$ Marianas Islands.
	Feb. 28	W-A		Seismic activity from 14h45m to 17h30m.		

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

Bulletin for 1934

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
	Mar. 1	W-A		Seismic activity at about 21h.		
22	Mar. 1	W-A W-A W-A W-A W-A W-A W-A W-A		iPN ipPN iPR ₁ N iSE iN isSE eSR ₁ EN F	21-57-27 21-58-00 22-00-11 22-07-22 22-08-04 22-08-14 22-12-24 24-00±	H = 21h-45m-37s. Depth of focus = 140 km. by Brunner Depth Chart. Tentative epicenter: 39°7 S, 72°5 W. Δ = 79°5.
	Mar. 4	W-A		Seismic activity from about 6h20m to 7h30m.		
	Mar. 4	W-A		Seismic activity at about 12h.		
23	Mar. 5	W-A W-A W-A W-A W-A W-A W-A		iPN epPN eSN ? eE esSN esSE F	01-23-58 01-24-33 01-28-01 01-28-27 01-28-52 01-29-01 02-00±	H = 01h-19m-06s. Depth of focus about 160 km. by Brunner Depth Chart. Δ = 23°.
24	Mar. 5	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A		eN ePR ₁ EN iSKSE iSKKSE iPSE iPPSE ? iE eSR ₁ EN eLE eME F	12-05-54 12-06-12 12-11-46 12-13-00 12-16-18 12-17-52 12-20-15 12-22-45 12-41-32 12-45-02 15-30±	H = 11h-46m-04s. Off the coast coast of South Island, New Zealand. Tentative epicenter: 42°7 S, 173°7 E. Δ = 119°6.
	Mar. 6	W-A		Seismic activity at about 15h20m.		
25	Mar. 7	W-A W-A W-A W-A W-A W-A W-A W-A		ePN ipPN eSE iN isSE eLE iME F	22-47-16 22-47-38 22-51-44 22-52-02 22-52-07 22-54-03 22-55-44 24-15±	H = 22h-41m-35s. Depth of focus about 90 km. by Brunner Depth Chart. Tentative epicenter: 11° N, 86° W. Δ = 27°6.

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26	Mar. 12	W-A		iPE	15-09-41	H = 15h-05m-42s. Felt in Northern Utah. Epicenter: 41° 7' N, 113° W. Δ = 16° 9'.
		W-A		iEN	15-09-47	
		W-A		iPR ₁ EN	15-09-55	
		W-A		eSN	15-12-55	
		W-A		iL	15-14-11	
		W-A		iM	15-14-45	
		W-A		F	15-45±	
27	Mar. 12	W-A		iPE	18-16-39	Δ = 16° 4'. Utah. Covered by following quake.
		W-A		eSN	18-19-48	
		W-A		eME	18-21-40	
		W-A		F	18-21-40	
28	Mar. 12	W-A		iPE	18-24-17	H = 18h-20m-20s. Felt in Northern Utah. Δ = 17°.
		W-A		iE	18-24-21	
		W-A		iPR ₁ E	18-24-31	
		W-A		iS _{EN}	18-27-33	
		W-A		iSR ₁ N	18-27-58	
		W-A		iSR ₁ EN	18-28-03	
		W-A		eLE	18-28-32	
		W-A		iME	18-29-11	
		W-A		F	19-30±	
	Mar. 12	W-A		Minor aftershocks at approximately 23h59m.		
	Mar. 13	W-A		Minor aftershocks at approximately 00h14m, 03h26m, 10h16m, 12h07m.		
29	Mar. 13	W-A		eN	13-27-17	Δ = 110°. New Hebrides Islands.
		W-A		ePR ₁ E	13-30-58	
		W-A		eSKSE	13-37-02	
		W-A		eSKKSE	13-38-03	
		W-A		iPS _{EN}	13-40-22	
		W-A		iSR ₁ N	13-46-14	
		W-A		iSR ₁ E	13-46-26	
		W-A		iSR ₂ N	13-50-25	
		W-A		iSR ₂ E	13-50-49	
		W-A		eLE	14-02-45	
		W-A		eME	14-09-45	
		W-A		F	16-00±	
			Mar. 15	W-A		
30	Mar. 15	W-A		ePE	12-05-59	Aftershock from Utah.
		W-A		ePR ₁ E	12-06-09	
		W-A		eSN	12-09-21	
		W-A		eN	12-09-59	
		W-A		iMEN	12-11-00	
		W-A		F	12-20±	
31	Mar. 15	W-A		ePE	13-50-57	Aftershock from Utah. Covered by following quake.
		W-A		eSE ?	13-54-03	
		W-A		iMEN	13-55-57	
		W-A		F	13-55-57	

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32	Mar. 15	W-A W-A W-A		eP _E iM _E F	14-00-08 14-05-08 14-15±	Aftershock from Utah.
	Mar. 16	W-A				Seismic activity at about 18h.
	Mar. 17	W-A				Seismic activity at about 23h.
33	Mar. 18	W-A W-A W-A W-A W-A W-A		iP _{EN} ep _{PN} iS _{EN} is _{SEN} iSR _{1EN} F	04-44-45 04-45-04 04-54-12 04-54-48 04-59-06 05-45±	H = 04h33m20s. Depth equals 80 km. by Brunner Depth Chart. $\Delta = 74^{\circ}$.
	Mar. 20	W-A				Seismic activity from 3h to 4h.
	Mar. 22	W-A				Seismic activity from 23h to 24h.
34	Mar. 24	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A		ePR _{1E} iSK _{SE} iSKK _{SE} iS _N eP _{SE} ePP _{SE} eSR _{1E} eSR _{2E} eL _{EN} iM _E F	12-23-36 12-29-48 12-30-46 12-31-31 12-33-04 12-33-57 12-39-01 12-42-51 12-50-30 12-58-14 15-00±	H = 12h04m34s. Tentative epicenter: 9°3 S, 161°5 E. $\Delta = 110^{\circ}2$.
	Mar. 30	W-A				Seismic activity at about 4h30m.
35	Apr. 2	W-A W-A W-A		eP _E iM _{EN} F	23-22-33 23-27-38 23-35±	Probably an after-shock from Utah.
36	Apr. 3	W-A W-A W-A W-A W-A W-A		eP _N ePR _{1N} eS _{EN} eEN iEN iEN F	07-43-32 07-44-31 07-49-05 07-51-49 07-53-48 07-54-04 08-20±	H = 07h36m45s. South of Panama. Surface waves small. $\Delta = 33^{\circ}9$.
37	Apr. 3	W-A W-A W-A W-A W-A		e _E ePR _{1E} eS _{CP} _{SEN} eP _{SE} ePP _{SE} F	17-41-32 17-43-28 17-50-03 17-53-30 17-54-27 19-00±	$\Delta = \text{Ca } 110^{\circ}$. No surface waves.

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38	Apr. 7	W-A W-A W-A W-A		eP _{EN} eS _{EN} iM _{EN} F	02-18-27 02-21-48 02-23-31 02-38±	$\Delta = 17^{\circ}5$. Probably in Utah.
39	Apr. 9	W-A W-A W-A W-A		iP _N iS _{EN} eL _E F	15-41-07 15-50-42 16-02-15 17-00±	Surface waves very small compared with preliminaries.
40	Apr. 10	W-A W-A W-A W-A W-A W-A W-A		iP _{EN} epP _N e _N e _{EN} e _E e _N F	05-45-26 05-46-00 05-49-29 05-49-54 05-50-06 05-50-34 06-10±	Probably about 140 km. deep.
	Apr. 10	W-A		Seismic activity at about 10h45m.		
41	Apr. 11	W-A W-A W-A W-A W-A W-A W-A		ePR _{1E} eSKS _E eSKKSE e _N eS _E ePS _N F	21-30-47 21-36-32 21-37-32 21-38-18 21-38-52 21-39-24 21-30±	Probably deep.
42	Apr. 12	W-A W-A W-A W-A		e _E iS _{EN} iM _{EN} F	01-42-08 01-42-58 01-43-32 01-47±	Epicenter possibly in the neighborhood of 34° N, 96° W.
43	Apr. 14	W-A W-A W-A W-A W-A		eP _{EN} eS _E eL _N iM _{EN} F	21-30-34 21-33-46 21-34-42 21-35-38 22-10±	Felt in Utah. $\Delta = 16^{\circ}6$.
44	Apr. 15	W-A W-A W-A W-A W-A W-A W-A W-A		eP _{1E} iPR _{1E} ePR _{2E} eSKKSE ePS _{EN} eSR _{1EN} eL _E F	22-34-25 22-35-49 22-38-27 22-42-44 22-45-49 22-52-49 23-06-00 25-00±	H = 22h-15m19s. Epicenter: 11.5° N, 121.8° E, $\Delta = 122.4$.
45	Apr. 17	W-A W-A W-A		eP _E iM _{EN} F	13-49-27 13-54-31 14-10±	Probably in Utah.
	Apr. 18	W-A		Seismic activity at about 12h20m.		

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46	Apr. 18	W-A W-A W-A		iP _n N iS _n EN F	13-53-36 13-53-50 13-56 [±]	Δ = 66 miles.
	Apr. 24	W-A		Seismic activity at 18h to 19h.		
	Apr. 26	W-A		Seismic activity at 6h to 7h and 8h30m to 9h30		
47	Apr. 26	W-A W-A W-A W-A W-A W-A		ePR ₁ E eSKS _E eSKKS _E ePS _E eL _E F	21-19-30 21-25-27 21-26-23 21-28-53 21-51-30 22-50 [±]	
	Apr. 27	W-A		Seismic activity at 21h30m to 23h.		
48	May 1	W-A W-A W-A		eP _{EN} iS _{EN} F	07-24-08 07-27-41 08-00 [±]	Deep.
49	May 2	W-A W-A W-A W-A W-A		eP _{EN} eS _{EN} ? eE eE F	09-50-43 09-55-06 09-55-16 09-59-12 10-20 [±]	
50	May 4	W-A W-A W-A W-A W-A		eP _{EN} e _N eS _N ? iM _N F	00-43-53 00-44-03 00-47-49 00-50-17 01-10 [±]	
51	May 4	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A		eP _{EN} i _{EN} i _E iPR ₁ E i _E iS _{EN} iSR ₁ E eL _E iM _E F	04-43-52 04-43-53 04-44-10 04-45-09 04-45-45 04-50-07 04-53-05 04-55-15 04-57-15 07-30 [±]	H = 04h-36m-15s. Tentative epicenter: 61° N, 145°1 W. Δ = 40°1.
52	May 5	W-A W-A W-A W-A W-A		e _{EN} e _{EN} e _{EN} eE F	01-25-14 01-25-55 01-30-05 01-26-50 02-10 [±]	

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53	May 6	W-A W-A W-A W-A		iP _E eS _E iM _{EN} F	08-13-50 08-17-05 08-18-57 09-10 [±]	Probably in Utah. $\Delta = 16^{\circ}9$.
54	May 13	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		ePR _{1E} eSKS _{EN} eSKKS _{EN} e _E eP _{SE} i _E ePP _{SE} ? e _E eSR _{1E} iSR _{EN} eL _E eM _E F	09-21-32 09-27-15 09-28-25 09-29-10 09-30-55 09-31-11 09-31-38 09-33-35 09-37-03 09-37-12 09-54-00 09-58-00 11-00 [±]	
55	May 14	W-A W-A W-A W-A W-A W-A W-A		eP _{EN} i _{EN} epP _E eS _{EN} esS _{EN} eL _E iM _N F	13-19-44 13-19-48 13-19-54 13-23-46 13-24-00 13-25-40 13-26-02 14-20 [±]	H = 13h-14m-59s. Tentative epicenter: 28° N, 113° W. Depth of focus = 40 km. by Brunner Depth Chart. $\Delta = 21^{\circ}5$.
56	May 14	W-A W-A W-A W-A W-A W-A W-A		iP _{EN} ipP _{EN} iS _{EN} i _{EN} isS _N isS _E iL _{EN} F	22-20-56 22-21-11 22-27-23 22-27-43 22-27-50 22-27-52 22-30-42 23-30 [±]	H = 22h-13m-02s. Tentative epicenter: 56°2' N, 150°7' W. Depth of focus about 70 km. by Brunner Depth Chart. $\Delta = 43^{\circ}$.
57	May 15	W-A W-A W-A		eP _N iS _{EN} F	02-31-46 02-31-49 02-32-30	Local quake. $\Delta =$ about 15 miles.
58	May 15	W-A W-A W-A W-A W-A		eP _{EN} eS _{EN} eL _{EN} eM _{EN} F	15-23-52 15-27-53 15-29-47 15-31-09 16-00 [±]	$\Delta = 22^{\circ}$.
	May 15	W-A		Seismic activity at about 23h30m.		

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59	May 19	W-A		iP _{N(E)}	10-52-47	H = 10h-47m-28s. Tentative epicenter: 13°3 N, 92° W. Depth of focus = 100km. by Brunner Depth Chart. Δ = 2593.
		W-A		ipP _{N(E)}	10-53-08	
		W-A		iEN	10-54-45	
		W-A		eS _E	10-56-58	
		W-A		iS _E	10-57-01	
		W-A		iE	10-57-22	
		W-A		isS _{E(N)}	10-57-49	
		W-A		F	11-30 [±]	
60	May 22	W-A		eP _E	11-12-31	Δ = 65°5.
		W-A		iS _E	11-21-23	
		W-A		eL _E	11-33-10	
		W-A		F	11-50 [±]	
61	May 26	W-A		iP _N	20-33-40.6	Δ = about 15 miles. Local.
		W-A		iS _N	20-33-43.6	
		W-A		iM _N	20-33-44.5	
		W-A		F	20-35 [±]	
62	May 27	W-A		iP _{EN}	18-53-59	
		W-A		eS _N	18-01-30	
		W-A		F	19-10 [±]	
	May 28	W-A		Seismic activity at 23h35m.		

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12.

Bulletin for 1934

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
63	June 1	W-A W-A W-A		eN eM _{EN} F	16-42-54 16-46-00 16-55 [±]	
64	June 2	W-A W-A W-A W-A W-A W-A W-A W-A W-A		eP _N iPR _{1N} eS _E iS _N iSR _{1E} iSR _{2E} eL _E eM _E F	13-51-22 13-53-20 13-58-23 13-58-29 14-01-50 14-03-13 14-06-11 14-08-16 Lost in changing records.	H = 13h-42m-46s. Tentative epicenter: 65° N, 20° W. Δ = 47.6.
65	June 2	W-A W-A W-A W-A W-A W-A W-A		iP _N ePR _{1EN} eS _{EN} eSR _{1E} eL _N eM _E F	16-53-13 16-55-04 16-59-40 17-02-37 17-06-23 17-07-46 17-50 [±]	
	June 5	W-A		Seismic activity about 22h.		
66	June 8	W-A W-A W-A		iN eN F	04-43-14 04-45-12 Covered by following quake.	
67	June 8	W-A W-A W-A W-A W-A W-A		eP _E e _E eS _E iL _N iM _{EN} F	04-53-05 04-53-12 04-57-28 05-00-34 05-02-54 06-00 [±]	H = 04h-47m-53s. Δ = 24.4.
68	June 9	W-A W-A W-A W-A W-A		iPR _{1E} ePR _{2E} iPS _N eL _E F	13-18-37 13-21-10 13-28-22 13-54-20 Lost in changing record.	Probably deep.
69	June 12	W-A W-A W-A W-A W-A W-A		iP _{EN} iN ipP _{EN} iS _{EN} isS _{EN} F	09-37-43 09-38-02 09-38-16 09-42-04 09-43-06 10-15 [±]	H = 09h-32m-20s. Depth of focus about 170 km. by Brunner Depth Chart. Δ = 269.2.

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70	June 13	W-A W-A W-A W-A W-A		iP _{FN} ip _{FN} iS _{FN} is _{SE} F	02-03-10 02-03-34 02-13-18 02-13-55 02-30 [±]	H = 01h-51m-09s. Depth of focus equals 95 km. by Brunner Depth Chart. $\Delta = 81^{\circ}1$ Tentative epicenter: 45° N, 149.5° E.
	June 13	W-A		Earthquake beginning about 22h29m. No time marks on records.		
	June 14	W-A		Seismic activity at about 20h45m.		
	June 15	W-A		Seismic activity from about 5h30m to 6h15m.		
71	June 18	W-A W-A W-A W-A W-A		iP _{EN} iS _E is _{SE} iSR _{1E} F	09-21-45 09-28-06 09-28-33 09-31-12 10-15 [±]	H = 09h-13m-59s. Depth of focus about 70 km. $\Delta = 42^{\circ}1$ Tentative epicenter: 59.2° N, 149.5° W.
72	June 22	W-A W-A W-A W-A W-A		eP _{EN} eS _E eSR _{1E} ? eM _E F	18-39-06 18-43-28 18-44-20 18-48-53 19-10 [±]	H = 18h-33m-48s. Tentative epicenter: 18° N, 105° W. $\Delta = 24^{\circ}3$.
73	June 24	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A		iP _{EN} ep _{PN} i _{EN} iPR _{1EN} i _{SN} is _{SN} i _N i _N eSR _{1N} F	06-09-59 06-10-23 06-10-35 06-12-23 06-18-29 06-19-16 06-19-43 06-20-32 06-22-48 08-30 [±]	H = 05h-59m-39s. Depth about 100 km. by Brunner Depth Chart. Tentative epicenter: 22° S, 68° W. $\Delta = 64^{\circ}$.
74	June 29	W-A W-A W-A W-A W-A W-A W-A W-A W-A		e _{EN} i _{EN} i _{EN} i _{EN} i _{EN} e _{EN} e _{EN} i _E F	08-43-14 08-43-25 08-45-55 08-46-13 08-46-58 08-48-46 08-49-27 08-50-31 09-30 [±]	Deep Earthquake.

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75	July 3	W-A W-A W-A W-A		iP _N N iS _N E iM _E F	03-11-14 03-11-41 03-11-47 03-19 [±]	H = 03h-10m-38s. Felt at Hayti, Missouri. Δ = 148 miles.
	July 6	W-A		Earthquake off coast of Southern Oregon at 22h not recorded--records temporarily removed.		
76	July 10	W-A W-A W-A W-A W-A		eP _N eS _E eL _E eM _E F	01-06-55 01-10-44 01-12-48 01-13-54 02-10 [±]	Δ = 20 ^o 6.
77	July 16	W-A W-A W-A W-A		e(P) _N e(S) _E i _E F	08-24-12 08-28-28 08-28-38 09-15 [±]	Probably somewhat deep.
78	July 18	W-A W-A W-A W-A W-A W-A W-A		iP _{NE} ip _{PN} iPR ₁ NE iS _{EN} is _{SEN} iSR ₁ N F	01-42-45 01-43-00 01-43-49 01-47-48 01-48-16 01-50-30 Covered by following quake.	H = 01h-36m-29s. Epicenter: 8 ^o 2 N, 82 ^o 5 W. Depth of focus by Brunner Depth Chart 65 km. Δ = 31 ^o . Destructive at David City, Chiriqui Province, Panama.
79	July 18	W-A W-A W-A W-A W-A W-A W-A		iP _{NE} ip _{PE} iS _{NE} es _{SN} eSR ₁ N eSR ₂ N F	04-06-57 04-07-10 04-12-02 04-12-30 04-13-45 04-14-24 06-00 [±]	H = 04h-00m-41s. Same epicenter as preceding. Depth = 65 km. Aftershock.
80	July 18	W-A W-A W-A		eP _{NE} eS _N F	06-41-53 06-46-47 07-30 [±]	Aftershock.
	July 18	W-A		Seismic activity at about 13h30m.		
81	July 18	W-A W-A W-A W-A W-A W-A W-A W-A W-A		iP _{NE} ip _{PN} iPR ₁ N iPR ₂ N i _N eS _{EN} is _{SEN} eSR ₁ N F	17-06-04 17-06-20 17-07-06 17-07-27 17-08-26 17-11-04 17-11-32 17-12-30 19-45 [±]	H = 16h-59m-49s. Aftershock. Depth = 65 km. Epicenter: 8 ^o 2 N, 82 ^o 2 W. Destructive at David City and Puerto Armuelles, Chiriqui Province, Panama.

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82	July 18	W-A		eP _E	19-54-39	H = 19h-40m-05s. Epicenter: 16°8 S, 167°E. New Hebrides. Δ = 110°1.
		W-A		iPR _{1E}	19-59-03	
		W-A		iSKS _E	20-05-10	
		W-A		iSKKS _E	20-06-04	
		W-A		iS _E	20-08-56	
		W-A		iPS _E	20-08-31	
		W-A		iPPS _E	20-08-59	
		W-A		iSR _{1E}	20-14-40	
		W-A		iSR _{2E}	20-18-29	
		W-A		iM _E	20-31-42	
						Seismic activity continued until time of next earthquake.
83	July 19	W-A		ePR _{1E}	00-25-28	Probably an aftershock of preceding. Δ = Ca 100°.
		W-A		eSKS _E	00-31-50	
		W-A		eSKKS _E	00-32-40	
		W-A		iPS _E	00-35-08	
		W-A		eSR _{1E}	00-40-48	
		W-A		eL _E	00-56-22	
		W-A		eM _E	01-09-50	
	July 19	W-A		Seismic activity from 6h to 7h30m.		
84	July 19	W-A		eSKS _E	08-02-01	
		W-A		ePS _E	08-05-10	
		W-A		ePPS _E	08-05-45	
		W-A		eSR _{1E}	08-11-05	
		W-A		eL	08-27-10	
		W-A		eM	08-31-33	
		W-A		F	11-00±	
	July 19	W-A		Seismic activity at 15-16h.		
	July 20	W-A		Seismic activity at about 00h.		
85	July 20	W-A		eP _E	02-15-54	Deep.
		W-A		eEN	02-20-31	
		W-A		eS _{EN}	02-28-22	
		W-A		esS _{EN}	02-28-40	
		W-A		F	03-10±	
	July 20	W-A		Seismic activity at about 5h, 14h, 17h45m, and from 18h30m to 21h.		
86	July 21	W-A		e(P) _E	06-33-06	H = 06h-17m-59s. Epicenter: 18°2 S, 164° E. Δ = 113°1.
		W-A		eP' _E	06-36-30	
		W-A		eSKS	06-43-20	
		W-A		eSKKS _E	06-44-00	
		W-A		eS	06-45-16	
		W-A		iPS	06-47-05	
		W-A		iPPS	06-48-21	

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
86	July 21 cont'd.	W-A W-A W-A		iSR ₁ iSR ₂ F	06-53-06 06-57-14 09-30±	
87	July 21	W-A W-A W-A W-A W-A W-A W-A W-A		iP _{EN} ip _{EN} iPR _{1N} iS _{EN} isS _{EN} iSR _{1EN} iSR _{2N} F	10-45-29 10-45-44 10-46-32 10-50-34 10-51-02 10-52-29 10-53-07 13-15±	H = 10h-39m-13s. Epicenter: 82° N, 82°5W. Destructive at David City and Puerto Armuelles Panama. Depth of focus 65 km. by Brunner Depth Chart. Δ = 31°.
88	July 21	W-A W-A W-A		eP _N eS _{EN} F	13-25-41 13-30-48 Lost in changing records	Aftershock of preceding earthquake.
89	July 22	W-A W-A W-A W-A W-A W-A		eSKS _E eSKKS _E ePS _E eSR _{1E} eL _E F	03-22-55 03-23-45 03-26-09 03-32-25 03-47-55 04-30±	Δ = Ca 110°
	July 23	W-A		Seismic activity at about 18h40m.		
90	July 27	W-A W-A W-A W-A W-A W-A W-A W-A W-A		ip _{NE} ip _{NE} i _{NE} iS _N i _{EN} isS _E i _{EN} iSR _{1EN} F	02-30-59 02-31-19 02-31-30 02-35-13 02-35-36 02-35-52 02-36-04 02-36-27 03-00±	H = 02h-25m-47s. Depth = 100 km. Δ = 24°6.
	July 27	W-A		Seismic activity 13h to 14h.		
91	July 28	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A		eP _{EN} ep _{EN} e _N iS _{EN} isS _{EN} iSR _{1EN} isSR _{1E} iL _E iM _E F	21-45-26 21-45-35 21-47-24 21-52-10 21-52-25 21-55-16 21-55-32 21-59-32 21-02-06 00-30±	H = 21h-37m-12s. Epicenter: 55°1 N, 154°8 W. Near Kodiak Island, Alaska. 30 km. deep. Δ = 45°2.
92	July 30	W-A W-A W-A W-A W-A		eP _{nE} eS _{nEN} eL _{EN} iM _N F	07-22-39 07-24-27 07-24-40 07-24-49 07-30±	Felt in Western Nebraska and Eastern Colorado. Δ = 9°3.

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93	Aug. 2	W-A W-A W-A W-A W-A		eP _N E iS _E eL _E eM _E F	07-20-57 07-27-13 07-33-18 07-35-31 08-03 ⁺	$\Delta = 40^{\circ}2$
94	Aug. 6	W-A W-A W-A W-A		eP _N e _N eS _N F	12-14-17 12-15-52 12-19-59 12-45 ⁺	$\Delta = 35^{\circ}2$
95	Aug. 7	W-A W-A W-A W-A W-A W-A W-A W-A W-A		eP ₁ ['] _E ePR ₁ _E eSKS _E iPS _E e _E eSR ₁ _E eSR ₂ _E eM _E F	03-57-36 03-58-04 04-04-02 04-07-24 04-09-04 04-13-04 04-17-04 04-32-46 06-40	Long waves of another earthquake superposed on the coda of this shock.
	Aug. 9	Seismic activity at about 20h.				
	Aug. 11	Seismic activity from about 8h45m to 10h.				
96	Aug. 11	W-A W-A W-A W-A W-A		ePR ₁ _E eSKKS _E eSR ₁ _E eM _E F	12-17-25 12-24-27 12-33-25 13-00-15 13-50 ⁺	$\Delta = \text{Ca } 114^{\circ}$
	Aug. 11	Seismic activity from about 15h30m to 16h.				
97	Aug. 13	W-A W-A W-A W-A W-A W-A		ePR ₁ _E eSKKS _E ePS _E eSR ₁ _E eL _E F	00-09-46 00-16-44 00-19-47 00-26-18 00-49-00 02-10 ⁺	$\Delta = 123^{\circ}$
	Aug. 14	Seismic activity from about 9h15m to 10h.				
98	Aug. 15	W-A W-A W-A W-A W-A W-A W-A		eP _N epP _N ? ePR ₁ _N eS _N i _N esS _N ? eSR ₁ _E F	11-09-52 11-10-16 11-10-25 11-14-20 11-14-33 11-15-10 11-15-18 12-00 ⁺	H = 11h-04m-18s. Probably about 100 km. deep $\Delta = 27^{\circ}$

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
	Aug. 16	Seismic activity at about 15h.				
99	Aug. 20	W-A W-A W-A W-A W-A		eP _n EN iP* _n EN eS _n E iS* _n E F	00-47-58.1 00-48-00.5 00-48-22.1 00-48-24.3 01-03±	H = 00h-47m-27s. Epicenter: 37° N, 89°2 W. Δ = 129 mi. Minor damage at Charleston, Mo., at Cairo, Ill., and Wickliffe, Ky.
100	Aug. 20	W-A W-A		iEN F	03-38-25 03-34±	Aftershock
101	Aug. 21	W-A W-A W-A		eP _n EN eS _n E(N) F	17-53-25 18-00-54 18-30±	Δ = 52°1
102	Aug. 24	W-A W-A W-A W-A W-A W-A		ePR ₁ E eSKS _n E ePSE eSR ₁ E eME F	00-07-37 00-13-37 00-17-01 00-23-04 00-45-25 01-30±	Δ = Ca 110°
103	Aug. 26	W-A W-A W-A W-A W-A W-A		eP _n EN eE iS _n EN eLE iM _n EN F	01-36-22 01-40-20 01-40-30 01-42-23 01-43-23 02-40±	Δ = 22°7
104	Aug. 28	W-A W-A W-A W-A		eP _n EN eS _n EN eL _n EN F	11-28-30 11-32-51 11-36-04 12-00±	Δ = 24°2
	Aug. 29	Seismic activity at about 6h30m.				
105	Aug. 31	W-A W-A W-A W-A W-A W-A W-A		iP _n EN iEN iPR ₂ N eS _n E iE iME F	05-09-45 05-09-56 05-11-07 05-15-22 05-16-56 05-21-23 07-00±	Provisional H = 05h-02m-54s. Tentative epicenter: 71°7 N, 70° W. Δ = 34°5 Repetition of earthquake of November 20, 1933.

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19.

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
	Aug. 31	Distant earthquake beginning at about 15h and ending about 16h20m. Preliminaries lost in changing record.				
106	Sept. 1	W-A W-A		eE F	7-19-01 7-40±	
107	Sept. 2	W-A W-A		iE F	11-40-36 12-00±	
108	Sept. 14	W-A W-A W-A W-A		ePEN eSEN eME F	11-15-06 11-19-19 11-23-36 11-35±	S-P = 4-13 Δ = 23°3
109	Sept. 15	W-A W-A W-A W-A W-A W-A W-A W-A		iPEN ipPEN iPR ₁ E iS _T (N) is _S E eL _E iM ₁ E iM ₂ E F	7-01-50 7-02-00 7-02-16 7-05-56 7-06-15 7-08-24 7-09-23 7-10-59 8-40-±	H = 06h-56m-50s. Tentative epicenter: 19°9 N, 104°7 W. Depth = 50 km. Δ = 23°
	Sept. 21	Small earthquake beginning at about 13h. Station clock out of order.				

Minor Seismic Movements: Sept. 2, 9h30m-9h50m; Sept. 4, 16h50m-18h40m; Sept. 6, 9h, and about 11h05m; Sept. 8, 11h55m; Sept. 23, 9h; Sept. 25, 19h40m; Sept. 26, 8h, 20h30m, 11h30m, 13h30m; Sept. 28, 6h10m.

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20.

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
110	Oct. 10	W-A W-A W-A W-A W-A W-A W-A W-A W-A		eE eE eE iFN iN iN eEN iEN F	15-55-25 15-58-39 15-59-39 16-05-51 16-06-35 16-09-09 16-13-52 16-20-10 17-00 ±	
111	Oct. 18	W-A W-A W-A W-A W-A W-A		ePR1E eSKSE iSKKS _E iPS _E iLE F	08-07-13 08-13-21 08-14-16 08-16-37 08-37-43 10-30 ±	$\Delta = \text{ca } 103^{\circ}$
112	Oct. 21	W-A W-A W-A W-A		eEN eEN eFN F	18-17-34 18-18-14 18-20-22 18-50 ±	
113	Oct. 26	W-A W-A W-A		ePEN eSEN F	15-02-45 15-06-15 15-30 ±	
114	Oct. 27	W-A W-A W-A		eS _{EN} eM _{EN} F	21-14-32 21-14-34 21-18 ±	Small local quake.
115	Oct. 29	W-A W-A W-A W-A W-A W-A W-A		eP _E ePR _{1E} eS _E eSR _{1N} eL _E eM _{EN} F	02-39-29 02-39-52 02-43-20 02-44-15 02-45-25 02-46-12 03-30 ±	$\Delta = 20^{\circ} 8$ H=02-34-47
116	Oct. 30	W-A W-A W-A		eP _E eS _E F	02-26-22 02-26-44 02-28-30	H=02-25-48 Tentative epicenter: 37° 31' N, 88° 30' W. Felt at Shawneetown, Harrisburg, Eldorado, Golconda, Illinois $\Delta = 120$ miles.

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
117	Oct. 30	W-A W-A W-A		eSN(7) eM _{EN} F	20-00-30 20-00-33 20-01-40	Felt at Erie, Penn.
118	Oct. 31	W-A W-A W-A		eN eM _{EN} F	15-53-56 15-53-58 15-53-30	Possibly a blast

Minor Seismic Movements: Oct. 5, 20^h38^m-22h; Oct. 6, 13h-14h;
 Oct. 25, at about 10 hrs; Oct 26, 17h-19h; Oct 27, 10h-30^m;
 Oct 29, 23h-32^m.

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22.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
119	Nov. 5	W-A W-A W-A W-A W-A W-A W-A W-A W-A		ePEN epPE ePR ₁ E iSEN esSEN eE eSR ₁ E eLE F	23-12-14 23-12-28 23-14-44 23-20-14 23-20-34 23-22-00 23-24-21 23-30-40 24-30±	H = 23h-02m-28s. Tentative epicenter: 53°2' N, 176°7' W. Depth of focus 50 km. by Brunner Depth Chart Δ = 57°2
120	Nov. 7	W-A W-A W-A W-A		iPN(E) eSN(E) iSE F	9-37-38 9-41-31 9-41-33 9-45±	No surface waves. Probably deep. Δ = 21°1
121	Nov. 12	W-A W-A W-A W-A W-A W-A		ePN? eN eE eSE iMEN F	14-44-58 14-45-03 14-45-34 14-45-35 14-45-37 14-47±	H = 14h-44m-00s. Felt at Davenport, Iowa and Rock Island, Illinois. Δ = 197 miles.
122	Nov. 18	W-A W-A W-A		iPEN iSEN F	9-29-41 9-38-44 9-50±	
123	Nov. 18	W-A W-A W-A W-A		ePE eSE iMEN F	15-08-26 15-12-22 15-14-53 15-35±	Δ = 21°4
124	Nov. 27	W-A W-A W-A W-A W-A W-A W-A W-A		ep'E ePR ₁ E iSKSE iSKKSE ePPSE eSR ₁ E eLE F	06-33-11 06-35-07 06-40-07 06-41-57 06-46-41 06-52-18 07-18 08-00±	Provisional H = 06h-14m-16s. Tentative epicen- ter: 2.7 N, 128° E. Δ = 125°8

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No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
125	Nov. 30	W-A		ePEN	02-10-25	Tentative Epicenter: 18° N, 105° W. Provisional H = 02h. 05m - 12s. Δ = 23.9
		W-A		iPEN	02-10-30	
		W-A		iPR ₁ E	02-10-49	
		W-A		iE	02-11-37	
		W-A		iEN	02-14-33	
		W-A		iS _{EN}	02-14-43	
		W-A		iSR ₁ EN	02-15-18	
		W-A		eLEN	02-16-30	
		W-A		iV _E (N)	02-17-56	
		W-A		F	05-00±	

Minor Seismic Movements: Nov. 4, 2h30m-3h30m, 4h-5h; Nov. 12, 8h-8h30m; Nov. 18, 23h-24h; Nov. 29, 05h30m-06h.

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24.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
126	Dec. 2	W-A W-A W-A W-A		eP _{EN} eL _E iM _E F	15-01-07 15-08-40 15-10-04 15-20±	
127	Dec. 3	W-A W-A W-A		iP _N iS _{EN} F	01-40-48 01-45-08 02-10±	$\Delta = 24^{\circ}1$ Foreshock Honduras
128	Dec. 3	W-A W-A W-A W-A W-A W-A W-A		eP _{N(E)} iN _(E) eP _{RE} eP _C P _{N(E)} iS _N iS _{R1} N _(E) iS _{R2} EN Surface waves small compared with preliminary phases. F	02-43-41 02-43-42 02-44-11 02-47-25 02-48-03 02-49-01 02-49-21 03-50±	$\Delta = 24^{\circ}1$. Tent. Ep: 14 ^o .3 N., 88 ^o .8 W. H = 02h38m23s Destructive in western Honduras
129	Dec. 4	W-A W-A W-A W-A W-A W-A		eP _{EN} ipP _N iS _{EN} ipS _{EN} esS _E F	17-34-45 17-35-33 17-42-51 17-43-23 17-44-23 18-35±	$\Delta = 61^{\circ}5$. Tentative Epicenter 19.7 S., 69 ^o .5 W. Depth of focus 300 km Brunner Depth Chart H = 17h24m53s Destructive at Zapiga in Northern Chile
130	Dec. 5	W-A W-A W-A		iP _N eS _{E?} F	21-58-14 21-02-32 21-10±	
131	Dec. 8	W-A W-A W-A W-A W-A		eP _E eS _{E?} i _E iM _{EN} F	09-40-51 09-45-32 09-48-40 09-49-20 10-15±	$\Delta = 26^{\circ}7?$

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
132	Dec. 15	W-A W-A W-A W-A W-A W-A W-A		eE eSKSN ePSE eSR ₁ E eLE eME F	02-24-26 02-26-14 02-30-08 02-36-05 02-45-10 02-54-05 04-25±	$\Delta = \text{Ca } 115^\circ$
133	Dec. 21	W-A W-A W-A		ePEN eME F	18-48-40 18-56-40 19-03±	
134	Dec. 22	W-A W-A W-A W-A W-A		ePEN eSN eLN eME F	14-35-17 14-40-26 14-43-44 14-46-22 15-30±	$\Delta = 29^\circ 7$ Tentative Epicenter $9^\circ \text{N.}, 87^\circ \text{W.}$ Provisional H = 14h 29m10s
135	Dec. 23	W-A W-A W-A W-A W-A W-A W-A		ePEN epPEN iE iSEN issEN eE F	10-02-50 10-03-18 10-03-30 10-11-06 10-11-53 10-13-18 10-40±	$\Delta = 61^\circ$ Provisional H = 9h 52m53s. Depth of focus 100 km. by Brunner Depth Chart
136	Dec. 24	W-A W-A W-A W-A W-A		ePEN epPEN iSN isse F	14-40-52 14-41-15 14-45-21 14-46-07 15-10±	$\Delta = 27^\circ$ Depth of focus 100 km. by Brunner Depth Chart
137	Dec. 30	W-A W-A W-A W-A W-A W-A		ePEN iEN iSN iMN iMEN F	13-57-04 13-57-06 14-00-58 14-03-39 14-03-53 15-00±	$\Delta = 21^\circ 2$ Tentative Epicenter $32^\circ \text{N.}, 115^\circ 5 \text{W.}$ Provisional H = 13h 52m11s. Felt in Southern California and Arizona.

No.	Date	Inst.	C/D	Phase	G.M.C.T.	H--Remarks
138	Dec. 31	W-A		ePE	18-50-33	Tentative Epicenter 31°8N., 115°W. Provisional H = 18h. 45m38s.
		W-A		iPEN	18-50-36	
		W-A		iPR ₁ EN	18-51-00	
		W-A		iPR ₂ EN	18-51-08	
		W-A		iSEN	18-54-27	
		W-A		iSR ₁ EN	18-55-17	
		W-A		eLN	18-55-50	
		W-A		iMEN	18-56-52	
		W-A		F	21-00±	

Minor Seismic Movements: Dec. 14, 14h34m-14h42m; Dec. 17, 16h30m-17h15m; Dec. 28, 12h15m-13h.

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PRELIMINARY BULLETIN

43.

EARTHQUAKE OF DECEMBER 28, 1934 (continued)Other StationsPhiladelphia, (By mail, courtesy U. S. C. and G. S.)

iP'	2h54m50s	$\Delta_{PR_1-H} = 142^{\circ}0$
iPR ₁	2 57 51	$\Delta_{SKKS-H} = 143^{\circ}2$
i	3 01 02	$\Delta_{meas} = 143^{\circ}2$
iSKKS	3 04 43	
i(SR ₁)	3 15 47	
i(SR ₂)	3 21 24	
L	3 34 22	

Charlottesville, (By mail, courtesy U. S. C. and G. S.)

eP'	2h54m58s	$\Delta_{PR_1-H} = 143^{\circ}5$
PR ₁	2 58 00	$\Delta_{meas} = 144^{\circ}8$
(PR ₂)	3 01 00	
(SKKS)	3 05 05	
PSKS	3 08 04	
	3 12 15	
(SR ₁)	3 16 00	

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