

# FLORISSANT

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

Three Galtzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

Bulletin for January, 1941

1.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
1	Jan. 3	G-W W-A G-W W-A G-W G-W G-W G-W	ePZ ePN eN eSN iSN iN iz F	9 <sup>h</sup> 21 <sup>m</sup> 14 <sup>s</sup> 9 21 15 9 25 26 9 25 45 9 25 46 9 25 55 9 26 14 10 02	$\Delta S-P = 25.05$ $H = 9^h 15^m 44^s$
2	Jan. 5	G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W	iP'Z iz iz ez iN ipPR <sub>1</sub> Z ez iN iSZ iSR <sub>1</sub> N F	19 <sup>h</sup> 06 <sup>m</sup> 06 <sup>s</sup> 19 06 08 19 06 20 19 08 20 19 08 22 19 08 36 19 09 30 19 09 33 19 18 22 19 25 43 21 13	Epicenter by J.S.A. Region of 2° N, 120° E. $H = \text{about } 18^h 47^m 04^s$ $\Delta_{\text{meas}} = \text{about } 131.0$ . No E-W control on epicenter. Felt at Jolo according to Manila Station Bulletin Focal depth about 150 km by New Zealand Station Bulletin. This determina- replaces that of J.S.A. Bulletin #1 of Jan. 5, 1941
3	Jan. 6	W-A W-A W-A W-A W-A W-A W-A G-W	iPN iN iN iN iPR <sub>1</sub> N iN iN F	9 <sup>h</sup> 54 <sup>m</sup> 17 <sup>s</sup> 9 54 48.3 9 54 52.8 9 55 00.8 9 55 07.5 9 55 11.3 9 57 59.3 10 56	Epicenter by J.S.A. $\delta = 11.5$ N, $\lambda = 86.3$ W. Focal depth about 70 Km. Record very poor. $\Delta_{\text{meas}} = 27.6$ $\Delta P-H = 27.5$
4	Jan. 11	G-W G-W G-W G-W	ePZ eSN ePSN F	8 <sup>h</sup> 51 <sup>m</sup> 04 <sup>s</sup> 9 00 24 9 00 54 10 22	$\Delta S-P = 71.0$
5	Jan. 13	G-W G-W W-A G-W W-A G-W W-A G-W G-W G-W	eE ePR <sub>1</sub> Z eE iE eN iz eSN ez iz F	16 <sup>h</sup> 44 <sup>m</sup> 13 <sup>s</sup> 16 47 13 16 47 17 16 47 28 16 47 31 16 47 58 16 54 54 16 56 58 16 57 07 20 00	Epicenter by J.S.A. Region of 5.5° S, 152° E. $H = 16^h 27^m 42^s$ Focal depth about 100 Km. by Brunner Depth Chart According to New Zealand Seismological Report felt at Rabaul, New Britain. $\Delta_{\text{meas}} = 115.03$ $\Delta PR_1-H = 116.0$
6	Jan. 16	W-A G-W G-W	iE eN F	12 <sup>h</sup> 42 <sup>m</sup> 51 <sup>s</sup> 12 46 57 13 43	Record very weak



No.	Date	Inst.	Phase	G.M.C.T.	Remarks
7	Jan. 19	W-A	eP'-PR <sub>1</sub> NE	3 <sup>h</sup> 31 <sup>m</sup> 26 <sup>s</sup>	$\Delta$ SKS-PR <sub>1</sub> = about 103°
		G-W	iz	3 31 29	
		W-A	eE	3 31 36	
		G-W	ez	3 31 41	
		G-W	eSKSN	3 37 52	
		W-A	iSKSN	3 37 53.7	
		G-W	eN	3 38 22	
		G-W	eE F	3 45 46 4 58	
8	Jan. 20	G-W	iPZ	3 <sup>h</sup> 50 <sup>m</sup> 11 <sup>s</sup>	$\Delta$ S-P = 83°7 H = 3 <sup>h</sup> 37 <sup>m</sup> 20 <sup>s</sup>
		G-W	iPR <sub>1</sub> Z	3 53 40	
		G-W	eSKSE	4 00 41	
		G-W	iSE	4 00 59	
		G-W	F	5 04	
9	Jan. 21	G-W	eN	13 <sup>h</sup> 06 <sup>m</sup> 58 <sup>s</sup>	Record very weak
		W-A	eE	13 07 03	
		G-W	eN	13 08 22	
		G-W	ez	13 10 42	
		G-W	ez	13 12 08	
		G-W	F	15 15	
10	Jan. 24	W-A	ePN	5 <sup>h</sup> 52 <sup>m</sup> 01 <sup>s</sup>	Epicenter by J.S.A. $\phi = 29.2$ S, $\lambda = 76.9$ W. H = 5 <sup>h</sup> 44 <sup>m</sup> 17 <sup>s</sup> Focal depth about 150 km. by Brunner Depth Chart. $\Delta$ P-H = 43°0 $\Delta$ meas = 43°1
		G-W	iPZ	5 52 01	
		G-W	ePZ	5 52 31	
		W-A	eSNE	5 58 23	
		G-W	iSNE	5 58 23	
		G-W	iz	5 58 26	
		G-W	esSN	5 59 16	
		G-W	F	6 20	
11	Jan. 25	G-W	iE	23 <sup>h</sup> 58 <sup>m</sup> 08 <sup>s</sup>	Record weak
		G-W	iE	23 58 40	
		G-W	F	0 06	
12	Jan. 31	G-W	i(P)Z	3 <sup>h</sup> 00 <sup>m</sup> 26.6 <sup>m</sup>	Record very weak
		G-W	ez	3 02 25	
		G-W	F	4 12	

Minor Seismic Activity

Jan. 1, 21<sup>h</sup>37<sup>m</sup> to 22<sup>h</sup>18<sup>m</sup> surface waves; Jan. 2, about 17  
Jan. 11, 3<sup>h</sup>43<sup>m</sup> to 4<sup>h</sup>23<sup>m</sup>; Jan. 24, 15<sup>h</sup>57<sup>m</sup> to 16<sup>h</sup>47<sup>m</sup>; Jan. 24,  
18<sup>h</sup>27<sup>m</sup> to 19<sup>h</sup>01<sup>m</sup>; Jan. 27, 3<sup>h</sup>33<sup>m</sup> to 3<sup>h</sup>53<sup>m</sup> mainly surface waves  
Jan. 28, 3<sup>h</sup>06<sup>m</sup> to 3<sup>h</sup>36<sup>m</sup>; mainly surface waves.

Microseisms were very active during this month and were prominent on the following days: Jan. 5 starting about 0h continuing through the 6, 7, 8 and fading out on the 9 and 10. Jan. 12, 13 strong; 14, very strong; 15 and 16, fading out. Jan. 21, growing, 22 strong; 23, 24, 25, 26, 27, 28 heavy, 29 fading out, 30 slightly larger, 31 small.



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

Three Galitzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

Bulletin for February, 1941

3.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
13	Feb. 2	W-A	ePN	23 <sup>h</sup> 45 <sup>m</sup> 24 <sup>s</sup>	Epicenter by J.S.A. $\phi = 7^{\circ}7' N$ , $\lambda = 78^{\circ}0' W$ . $H = 23^h38^m44^s$ $\Delta_{P-H} = 33^{\circ}1'$ $\Delta_{S-P} = 33^{\circ}1'$ $\Delta_{meas} = 33^{\circ}1'$
		W-A	ePN	23 45 28	
		G-W	iSE	23 50 51	
		G-W	ME	23 53.4	
		G-W	iE	23 55 43	
		W-A	eE	23 55 44	
		G-W	F	0 25	
14	Feb. 3	W-A	eP'NE	14 <sup>h</sup> 21 <sup>m</sup> 27 <sup>s</sup>	Epicenter by Manila $\phi = 10^{\circ}25' N$ $\lambda = 126^{\circ}33' E$ . Focal depth 200 Km. Felt at Butnan and Baguio $\Delta = \text{about } 120^{\circ}$
		W-A	eNE	14 27 22	
		G-W	iN	14 27 23	
		G-W	eSKS <sub>N</sub>	14 29 00	
		G-W	F	15 15	
15	Feb. 7	G-W	iPZ	15 <sup>h</sup> 24 <sup>m</sup> 21 <sup>s</sup>	Epicenter by J.S.A. $\phi = 54^{\circ}5' N$ , $\lambda = 163^{\circ}0' E$ . $H = 15^h33^m30^s$ Focal depth about 90 Km. by Brunner Depth Chart. $\Delta_{P-H} = 68^{\circ}1'$ $\Delta_{meas} = 67^{\circ}9'$
		G-W	ipPZ	15 24 31	
		G-W	eSE	15 33 14	
		G-W	isSE	15 33 46	
		G-W	ME	15 43.4	
		G-W	F	17 03	
16	Feb. 8	G-W	iP'Z	19 <sup>h</sup> 08 <sup>m</sup> 42 <sup>s</sup>	$\Delta = \text{about } 94^{\circ}$
		G-W	iPcPE	19 08 53	
		G-W	ePR1NE	19 12 28	
		G-W	iPR2N	19 14 29	
		G-W	iPR2E	19 14 30	
		G-W	F	20 59	
17	Feb. 9	G-W	iPEZ	9 <sup>h</sup> 49 <sup>m</sup> 47 <sup>s</sup>	Epicenter by J.S.A. $\phi = 41^{\circ}1' N$ $\lambda = 125^{\circ}5' W$ . $H = 9^h44^m05^s$ Depth probably normal Felt at Eureka, California. $\Delta_{meas} = 27^{\circ}0'$ $\Delta_{iS-iP} = 26^{\circ}1'$
		W-A	ePE	9 49 47	
		W-A	iPE	9 49 48	
		G-W	iz	9 49 59	
		G-W	iSE	9 54 23	
		W-A	eSN	9 54 26	
		G-W	iSE	9 54 26	
		W-A	iSE	9 54 29	
		G-W	iMN	9 58 57	
		G-W	F	13 23	
18	Feb. 9	G-W	ePR1Z	19 <sup>h</sup> 38 <sup>m</sup> 38 <sup>s</sup>	Epicenter from U.R.S.S. Bulletin by New Mecklinburg $\phi = 3^{\circ}5' S$ , $\lambda = 155^{\circ}0' E$ . Record very poor $\Delta \text{ about } 106^{\circ}$
		G-W	iz	19 38 59	
		G-W	ieZ	19 39 30	
		G-W	eE	19 45 28	
		G-W	e(SKKS) <sub>E</sub>	19 46 00	
		G-W	eSE	19 46 28	
		G-W	e <sub>N</sub>	19 54 37	
		G-W	F	22 03	

			Phase	G.C.T.	Remarks
19	Feb. 11	G-W	iPNZ	14 <sup>h</sup> 40 <sup>m</sup> 44 <sup>s</sup>	Epicenter by J.S.A. $\phi = 14^{\circ}02' N$ $\lambda = 94^{\circ}00' W$ $H = 14^h35^m23^s$ Depth slightly greater than normal. $\Delta_{eS-P} = 24^{\circ}02'$ $\Delta_{P-H} = 24^{\circ}05'$ $\Delta_{meas} = 24^{\circ}06'$
		V-A	ePN	14 40 44	
		G-W	iNZ	14 41 11	
		G-W	iE	14 44 53	
		V-A	eN	14 44 55	
		G-W	iN	14 44 57	
		V-A	eSN	14 45 05	
		G-W	iE	14 45 34	
		G-W	F	17 14	
20	Feb. 13	G-W	ePNE	14 <sup>h</sup> 54 <sup>m</sup> 13 <sup>s</sup>	Probable epicenter by J.S.A. $\phi = 24^{\circ} N$ , $\lambda = 103^{\circ}05' W$ . $H = 14^h49^m25^s$ $\Delta_{S-P} = 21^{\circ}04'$ $\Delta_{P-H} = 21^{\circ}07'$ $\Delta_{meas} = 21^{\circ}03'$
		G-W	ePZ	14 54 36	
		G-W	eSNE	14 58 13	
		G-W	iSN	14 58 14	
		G-W	iE	15 00 22	
		G-W	iE	15 00 41	
		G-W	iN	15 00 44	
		G-W	iMNE	15 00 58	
		G-W	F	15 26	
21	Feb. 13	G-W	eSN	16 <sup>h</sup> 39 <sup>m</sup> 27 <sup>s</sup>	Probable aftershock of preceding quake
		G-W	WN	16 42.4	
		G-W	F	16 47	
22	Feb. 23	V-A	ePE	11 <sup>h</sup> 37 <sup>m</sup> 04 <sup>s</sup>	Epicenter by Tacubaya $\phi = 13^{\circ}04' N$ $\lambda = 99^{\circ}55' W$ . $H = 11^h32^m14^s$ Felt strongly at Guerrero, Mexico $\Delta_{S-P} = 22^{\circ}07'$ Depth probably about 80 Km.
		G-W	ePN	11 37 04	
		V-A	ePE	11 37 05	
		V-A	ipPN	11 37 25	
		G-W	ipPZ	11 37 25	
		V-A	ipPNE	11 37 29	
		G-W	ipPE	11 37 29	
		G-W	ipPRINE	11 37 36	
		V-A	ipPRLN	11 37 52	
		V-A	eSE	11 41 05	
		V-A	eSN	11 41 06	
		G-W	iSE	11 41 10	
		V-A	eE	11 41 17	
		V-A	eE	11 41 25	
		G-W	isSE	11 41 35	
		V-A	esSE	11 41 41	
		G-W	F	11 49	
23	Feb. 24	G-W	ip'Z	5 <sup>h</sup> 56 <sup>m</sup> 59 <sup>s</sup>	Epicenter by U.R.S.S. $\phi = 13^{\circ}0' S$ , $\lambda = 127^{\circ}5' E$ . Focal depth 130 Km. $\Delta$ about 138
		G-W	ePRIZ	5 59 41	
		G-W	eSKPE	5 00 33	
		V-A	eSKPE	5 00 35	
		G-W	eSKPE	5 00 39	
		G-W	eZ	5 09 46	
		G-W	F	8 03	

Minor Seismic Activity: Feb. 6, 0<sup>h</sup>12<sup>m</sup> to 0<sup>h</sup>33<sup>m</sup> surface waves; Feb. 14, 19<sup>h</sup>24<sup>m</sup> to 20<sup>h</sup>52<sup>m</sup>; Feb. 15, 6<sup>h</sup>41<sup>m</sup> to 6<sup>h</sup>48<sup>m</sup> surface waves; 9<sup>h</sup>05<sup>m</sup> to 9<sup>h</sup>23<sup>m</sup>; Feb. 16, 17<sup>h</sup>02<sup>m</sup> to 18<sup>h</sup>17<sup>m</sup>; Feb. 27, 10<sup>h</sup>45<sup>m</sup> to 11<sup>h</sup>21<sup>m</sup> surface waves. Microseisms were very active during this month being recorded continuously. Pronounced activity was registered on the following days; Feb. 1, 2, 3, 4, heavy; 5 fading out, Feb. 15, fairly strong, 16, 17 heavy; 18, 19, 20, 21, 22, 23, 24, fading out. Feb. 27, 28.



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Bulletin for March, 1941

5.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
24	Mar. 4	W-A	iPNE	21 <sup>h</sup> 44 <sup>m</sup> 29.9 <sup>s</sup>	$\Delta S-P = 25^{\circ}3$ $H = 21^h39^m02^s$ Record weak
		G-W	eZ	21 44 31	
		W-A	iE	21 44 35.1	
		W-A	eS <sub>E</sub>	21 49 00	
		G-W	eS <sub>NE</sub>	21 49 00	
		W-A	eS <sub>N</sub>	21 49 02	
		G-W	iE	21 49 03	
		G-W	iE	21 49 13	
		G-W	M <sub>E</sub>	21 50.5	
		G-W	F	22 00	
25	Mar. 9	W-A	eP <sub>N</sub>	16 <sup>h</sup> 57 <sup>m</sup> 20 <sup>s</sup>	$\Delta S-P = 34^{\circ}8$ $H = 16^h50^m26^s$
		G-W	iS <sub>E</sub>	17 02 59	
		G-W	F	17 08	
26	Mar. 10	W-A	eP <sub>N</sub>	4 <sup>h</sup> 12 <sup>m</sup> 16 <sup>s</sup>	Approximate epicenter by J.S.A. $\phi = 9^{\circ}0$ N, $\lambda = 81^{\circ}8$ W. $H = 4^h05^m56^s$ $\Delta S-P = 30^{\circ}8$ $\Delta P-H = 30^{\circ}8$ $\Delta_{meas} = 30^{\circ}7$ Felt throughout the Panama Canal Zone. Intensity III Modified Mercalli Scale by Balboa Heights Bulletin
		W-A	eN	4 13 12	
		G-W	eN	4 13 18	
		W-A	eN	4 13 21	
		G-W	eZ	4 13 22	
		G-W	iS <sub>E</sub>	4 17 27	
		G-W	eZ	4 19 19	
		G-W	L <sub>E</sub>	4 19.1	
		G-W	F	4 53	
27	Mar. 12	W-A	eP <sub>N</sub>	14 <sup>h</sup> 29 <sup>m</sup> 27 <sup>s</sup>	Record very weak S very large Epicenter by U.R.S.S. $\phi = 39^{\circ}5$ N, $\lambda = 145^{\circ}0$ E. $\Delta_{meas} = 87^{\circ}2$ $\Delta S-P = 86^{\circ}1$
		G-W	iS <sub>E</sub>	14 40 03	
		W-A	eS <sub>E</sub>	14 40 05	
		G-W	F	15 55	
28	Mar. 12	G-W	iS <sub>E</sub>	22 <sup>h</sup> 00 <sup>m</sup> 19 <sup>s</sup>	Record very weak. S large Epicenter by U.R.S.S. $\phi = 37^{\circ}5$ N, $\lambda = 142^{\circ}5$ E. $\Delta_{meas} = 90^{\circ}0$
		G-W	F	22 44	
29	Mar. 14	G-W	eS <sub>E</sub> F lost in changing record	14 <sup>h</sup> 54 <sup>m</sup> 13 <sup>s</sup>	Epicenter by U.R.S.S. $\phi = 37^{\circ}5$ N, $\lambda = 142^{\circ}5$ E. Record very weak. $\Delta_{meas} = 90^{\circ}0$
30	Mar. 15	G-W	iP <sub>EZ</sub>	5 <sup>h</sup> 51 <sup>m</sup> 15 <sup>s</sup>	Epicenter by J.S.A. $\phi = 28^{\circ}7$ N, $\lambda = 114^{\circ}0$ W. $H = 5^h45^m17^s$ Focal depth about 50 km by Brunner Depth Chart $\Delta_{meas} = 22^{\circ}1$ $\Delta S-P = 22^{\circ}4$
		G-W	iP <sub>Z</sub>	5 51 18	
		W-A	iN	5 51 19	
		G-W	iN <sub>EZ</sub>	5 51 23	
		G-W	iP <sub>EZ</sub>	5 51 33	
		G-W	iN	5 55 15	
		G-W	eEZ	5 55 16	

## Florissant Bulletin for March, 1941

6.

No.	Date	Inst	Phase	G.M.C.T.	Remarks
	Mar. 15 (con't)	G-W G-W G-W G-W W-A	iSE iN iz essN iLNE F	5h55m20s 5 55 23 5 55 25 5 55 40 5 57 52 7 33	
31	Mar. 16	G-W W-A G-W G-W W-A G-W G-W G-W W-A G-W G-W W-A W-A G-W W-A G-W	iPZ epNE ipPZ eN iN iz iz esN esNE isN iSE iN essN essE isSE eE iE F	7h54m04s 7 54 04.8 7 54 10 7 54 11 7 54 16.3 7 54 24 7 54 35 8 03 30 8 03 31 8 03 31 8 03 32 8 03 42 8 03 47 8 03 48 8 03 48 8 04 13 8 17 40 10 20	Epicenter in the region of 48° N, 162° E. Data poor. Depth slightly greater than normal. The above determination, however, is based on normal tables $\Delta_{S-P} = 72^{\circ}2$ $\Delta_{P-H} = 72^{\circ}8$
32	Mar. 16	G-W G-W	iSN F	16h55m40s 18 11	Record very weak. Epicenter by U.R.S.S. $\phi = 37^{\circ}0$ N $\lambda = 11^{\circ}5$ E. Focal depth 100 Km. $\Delta_{meas} = 76^{\circ}3$
33	Mar. 19	W-A G-W	epNE iSE F	2h57m46s 3 08 24 3 52	Record weak. Time approxi- mately correct only. Epi- center by U.R.S.S. $\phi = 38^{\circ}5$ N, $\lambda = 142^{\circ}5$ E. $\Delta_{S-P} = 86^{\circ}5$
34	Mar. 19	W-A G-W W-A	iPN esN esN F	21h29m29s 21 33 59 21 34 01 21 53	Epicenter by J.S.A. $\phi = 13^{\circ}0$ N, $\lambda = 92^{\circ}0$ W. H = 21h24m00s. Time approximately correct. Record weak. $\Delta_{S-P} = 25^{\circ}3$
35	Mar. 21	W-A W-A G-W G-W G-W G-W W-A G-W W-A G-W	epZ iPE iPNZ iz e(PcP)Z epPZ esN isN essN F	8h08m05s 8 08 06 8 08 06 8 08 18 8 08 54 8 09 05 8 16 14 8 16 14 8 17 56.5 9 17	Epicenter by J.S.A. $\phi = 7^{\circ}0$ N, $\lambda = 31^{\circ}4$ W. H = 7h58m10s Focal depth 250 Km. by Brunner Depth Chart. $\Delta_{S-P} = 61^{\circ}4$ $\Delta_{P-H} = 61^{\circ}4$ $\Delta_{meas} = 62^{\circ}0$

No.	Date	Inst	Phase	G.M.C.T.	Remarks
36	Mar. 23	W-A	iP <sub>W</sub>	9h 05m 26s	Epicenter by J.S.A. $\phi = 17^{\circ}3' N, \lambda = 83^{\circ}8' W$ . $H = 9h 00m 27s$ $\Delta_{S-P} = 22.2$ $\Delta_{P-H} = 22.4$ $\Delta_{meas} = 22.4$
		G-W	iPN	9 05 28	
		G-W	ez	9 05 33	
		G-W	iNZ	9 05 36	
		G-W	iNZ	9 05 42	
		G-W	eSE	9 09 29	
		W-A	iS <sub>W</sub>	9 09 29.5	
		G-W	iS <sub>W</sub>	9 09 31	
		G-W	iSE	9 09 35	
		G-W	ME	9 13 22	
				F	
37	Mar. 25	G-W	eN	22h 56m 30s	Record very weak
		G-W	eN	23 04 02	
		G-W	iN	23 08 01	
		G-W	iN	23 13 44	
		G-W	MN	23 18.3	
			F	0 24	

Minor Seismic Activity

Mar. 17, 9h04m to 9h12m surface waves; Mar. 29, 9h20m to 9h41m surface waves; Mar. 31, 1h44m to 1h57m; Mar. 31, 7h29m to 7h39m.

Microseisms were very active throughout this month being recorded almost daily with more pronounced activity on the following days:

Mar. 1, heav.; 2, fading, 4, 5, 9, 11, 12, 17, 18, 19, 20, 21, 22, 23, 26, 30, 31.

J. B. Macelwane, S.J.  
Director

Edward J. Walter  
Graduate Fellow



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Bulletin for April, 1941

8.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
38	Apr. 1	G-W	ePz	10 <sup>h</sup> 49 <sup>m</sup> 12 <sup>s</sup>	Epicenter by J.S.A. $\phi = 53^{\circ}7' N.$ $\lambda = 155^{\circ}7' W.$ $H = 10^h40^m55^s$ $\Delta_{meas} = 45^{\circ}9'$ $\Delta_{P-H} = 45^{\circ}2'$
		G-W	iPNz	10 49 13	
		W-A	ePNE	10 49 13	
		G-W	iSNE	10 55 45	
		W-A	eSNE	10 55 45	
		W-A	eNE	10 56 01	
		G-W	iE	10 56 04	
		G-W	iSRINE	10 59 04	
		W-A	eSRINE	10 59 05	
		G-W	iScSN	10 59 20	
		G-W	ME	11 03.8	
				F	
39	Apr. 3	G-W	ePz	15 <sup>h</sup> 05 <sup>m</sup> 30 <sup>s</sup>	Foreshock of following quake. Epicenter by J.S.A. $\phi = 21^{\circ}5' S.$ $\lambda = 68^{\circ}1' W.$ $H = 14^h55^m27^s$ Focal depth 250 km. by Brunner Depth Chart.
		G-W	iSE	15 13 54.5	
		W-A	iSE	15 13 54.5	
		G-W	eE	15 15 04	
		G-W	eE	15 15 26	
		F	lost in main shock		
40	Apr. 3	W-A	ePN	15 31 53	Epicenter by J.S.A. $\phi = 21^{\circ}5' S, \lambda = 68^{\circ}1' W.$ $H = 15^h21^m57^s$ This quake was preceded by a foreshock 7 sec ahead of the main shock which caused some difficulty in the in- terpretation of the main shock. Focal depth 250 km. by Brunner Depth Chart. $\Delta_{S-P} = 64^{\circ}0'$ $\Delta_{P-H} = 64^{\circ}0'$ $\Delta_{meas} = 63^{\circ}8'$
		G-W	ePz	15 31 53	
		W-A	iPN	15 31 56	
		G-W	iPz	15 31 56	
		G-W	iPz	15 32 00	
		G-W	ipPz	15 32 53	
		G-W	eE	15 40 12	
		W-A	eE	15 40 18	
		W-A	eE	15 40 20	
		G-W	iSE	15 40 21	
		G-W	iZ	15 40 26	
		G-W	iE	15 40 28	
		G-W	iE	15 41 24	
		G-W	iE	15 41 29	
		G-W	iE	15 41 57	
G-W	iSSE	15 42 06			
		F	18 38		
41	Apr. 6	W-A	e(P)E	7 <sup>h</sup> 24 <sup>m</sup> 38 <sup>s</sup>	$\Delta_{S-P} = 39^{\circ}3'$ $H = 7^h17^m08^s$ Record weak.
		W-A	e(P)N	7 24 40	
		W-A	e(S)E	7 30 48	
		G-W	e(S)E	7 30 49	
		W-A	e(S)N	7 30 50	
		F	7 34		
42	Apr. 6	G-W	ePN	23 <sup>h</sup> 00 <sup>m</sup> 40 <sup>s</sup>	Epicenter by J.S.A. $\phi = 13^{\circ}3' N, \lambda = 89^{\circ}4' W.$ $H = 22^h55^m09^s$
		G-W	ePz	23 00 41	
		W-A	ePN	23 00 42	
		G-W	iPz	23 00 45	





No.	Date	Inst.	Phase	G.M.C.T.	Remarks
42	Apr. 6 (continued)	W-A G-W G-W G-W	iN iZ iSN LE F	23 00 46.2 23 00 49 23 05 09 23 08.3 23 37	According to San Salvador "Felt strongly in coastal town and through out the south central part of the country. Great scare. Extensive damage. Many fissures in southwest portion. About 10 towns affected None injured.
43	Apr. 7	G-W G-W G-W W-A G-W W-A	iPNEZ iNEZ iNE iN iPR1NZ eSE F	23 <sup>h</sup> 34 <sup>m</sup> 28 <sup>s</sup> 23 34 34 23 34 38 23 34 46 23 34 56 23 38 46 2 44	Epicenter by J.S.A. $\phi = 17^{\circ}07' N$ , $\lambda = 73^{\circ}04' W$ . $H = 23^h29^m16^s$ $\Delta_{S-P} = 23^{\circ}8$ $\Delta_{P-H} = 23^{\circ}7$ $\Delta_{meas} = 23^{\circ}7$ Record very strong.
44	Apr. 8	W-A W-A W-A W-A W-A G-W G-W	ePN ePE ePN eN eSE eSE F	3 <sup>h</sup> 52 <sup>m</sup> 20 <sup>s</sup> 3 52 22 3 52 24 3 52 34.3 3 53 37 <del>3 56 37</del> 4 06	Aftershock of preceding quake. $\Delta_{S-P} = 23.7$ Record weak.
45	Apr. 8	W-A G-W W-A W-A W-A G-W W-A W-A G-W G-W G-W	iPE ePZ ePN iPN iN eN eN eSN eE eE eE F	10 <sup>h</sup> 11 <sup>m</sup> 38 <sup>s</sup> 9 10 11 40 10 11 40 10 11 41 10 11 57.2 10 15 35 10 15 40 10 15 55 10 16 04 10 16 13 10 16 17 10 34	Aftershock of Apr. 7 at 23 h. $\Delta_{S-P} = 23^{\circ}6$
46	Apr. 9	G-W G-W G-W G-W	ePE ePZ iSE iLE F	17 <sup>h</sup> 13 <sup>m</sup> 27 <sup>s</sup> 17 13 28 17 17 36 17 20 06 18 03	Epicenter by J.S.A. $\phi = 28^{\circ}03' N$ , $\lambda = 114^{\circ}09' W$ . $H = 17^h08^m26^s$ $\Delta_{S-P} = 22^{\circ}8$ $\Delta_{P-H} = 22^{\circ}6$ $\Delta_{meas} = 22^{\circ}6$
47	Apr. 15	G-W G-W G-W	eN eE e(S)NE F	4 <sup>h</sup> 09 <sup>m</sup> 50 <sup>s</sup> 4 09 51 4 09 55 5 16	Record weak
48	Apr. 15	G-W G-W	e(S)N eN F	7 <sup>h</sup> 21 <sup>m</sup> 14 <sup>s</sup> 7 45 41 8 27	Record very weak

			Phase	G.M.C.T.	Remarks
49	Apr. 15	G-W	iP <sub>NEZ</sub>	19 <sup>h</sup> 14 <sup>m</sup> 56 <sup>s</sup>	Epicenter by J.S.A. $\phi = 18^{\circ}09' N$ , $\lambda = 103^{\circ}05' W$ . $H = 19^h10^m00^s$ Focal depth 100 Km. by Brunner Depth Chart. $\Delta_{S-P} = 23^{\circ}07'$ $\Delta_{P-H} = 22^{\circ}08'$ $\Delta_{meas} = 22^{\circ}08'$
		W-A	iP <sub>E</sub>	19 14 56.2	
		G-W	iP <sub>R1N</sub>	19 15 20	
		W-A	iS <sub>N</sub>	19 19 05	
		W-A	iS <sub>E</sub>	19 19 06.7	
		W-A	M <sub>E</sub>	19 22.0	
		W-A	M <sub>N</sub>	19 22.1	
		F	23 34		
50	Apr. 15	W-A	iP <sub>NE</sub>	23 <sup>h</sup> 48 <sup>m</sup> 04 <sup>s</sup>	Aftershock of preceding quake. $\Delta_{S-P} = 23^{\circ}06'$ $H = 23^h43^m00^s$
		G-W	iP <sub>NEZ</sub>	23 48 04	
		W-A	iN <sub>E</sub>	23 48 17	
		G-W	ip <sub>PNEZ</sub>	23 48 21	
		W-A	ip <sub>PNEZ</sub>	23 48 22	
		G-W	eS <sub>N</sub>	23 52 11	
		W-A	eS <sub>N</sub>	23 52 11	
		G-W	iS <sub>N</sub>	23 52 15	
		G-W	eN <sub>F</sub>	23 52 32	
		F	0 28		
51	Apr. 16	W-A	iP <sub>NE</sub>	1 <sup>h</sup> 43 <sup>m</sup> 24 <sup>s</sup>	Aftershock of April 15, 19 h $\Delta_{S-P} = 23^{\circ}08'$ $H = 1^h38^m18^s$
		G-W	iP <sub>NEZ</sub>	1 43 24	
		G-W	ip <sub>PNEZ</sub>	1 43 41	
		W-A	ip <sub>PNE</sub>	1 43 43	
		G-W	eS <sub>E</sub>	1 47 32	
		G-W	iS <sub>N</sub>	1 47 34	
		G-W	iN <sub>F</sub>	1 47 52	
		F	2 33		
52	Apr. 16	W-A	iP <sub>N</sub>	2 <sup>h</sup> 05 <sup>m</sup> 26 <sup>s</sup>	Aftershock of April 15, 19 h. $\Delta_{S-P} = 23^{\circ}06'$ $H = 2^h01^m22^s$ Record very small.
		W-A	eP <sub>E</sub>	2 06 26	
		W-A	iN	2 06 39	
		W-A	eE	2 06 39	
		W-A	ep <sub>PNE</sub>	2 06 44	
		W-A	eS <sub>N</sub>	2 10 33	
		W-A	eS <sub>E</sub>	2 10 34	
53	Apr. 19	G-W	eN	8 <sup>h</sup> 18 <sup>m</sup> 14 <sup>s</sup>	Record very weak.
		G-W	iE <sub>F</sub>	8 18 15	
			F	9 23	
54	Apr. 20	W-A	e(P) <sub>E</sub>	17 52 29	Epicenter by J.S.A. In region of $38^{\circ}05' N$ , $69^{\circ}00' E$ . $H = 17^h38^m30^s$ $\Delta_{SKS-H} = 100.9$ $\Delta_{meas} = 100.9$
		G-W	eSKS <sub>NE</sub>	18 02 53	
		W-A	eSKS <sub>NE</sub>	18 02 53	
		G-W	eSKKS <sub>N</sub>	18 03 29	
		W-A	eE	18 03 49	
		G-W	iE	18 03 50	
		G-W	e(S) <sub>N</sub>	18 03 53	
		W-A	e(S) <sub>E</sub>	18 03 53	
		G-W	ePS <sub>N</sub>	18 05 15	
		G-W	iPS <sub>Z</sub>	18 05 18	
		F	19 22		
55	Apr. 21	W-A	eP <sub>E</sub>	3 03 15	Epicenter by J.S.A. $\phi = 53^{\circ}00' N$ , $\lambda = 165^{\circ}05' W$ . $H = 2^h54^m08^s$ $\Delta_{S-P} = 50^{\circ}04'$ $\Delta_{P-H} = 51^{\circ}09'$ $\Delta_{meas} = 51^{\circ}08'$
		G-W	eP <sub>Z</sub>	3 03 15	
		G-W	eZ	3 03 25	
		G-W	i(S) <sub>E</sub>	3 10 32	
		W-A	e(S) <sub>NE</sub>	3 10 33	

## Florissant Bulletin for April, 1941

11.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
55	Apr. 21 (continued)	G-W	e(S)Z	3 10 33	
		W-A	e(PS) <sub>NE</sub>	3 10 54	
		G-W	i(PS) <sub>NE</sub>	3 10 55	
		G-W	eN	3 13 00	
		G-W	e(S <sub>C</sub> S) <sub>E</sub> F	3 13 33 5 38	
56	Apr. 21	W-A	eP <sub>E</sub>	18 <sup>h</sup> 41 <sup>m</sup> 20 <sup>s</sup>	Probable aftershock of preceding quake $\Delta S-P = 50^{\circ}2$ $H = 18^h 32^m 26^s$
		W-A	eP <sub>N</sub>	18 41 20	
		G-W	iS <sub>E</sub>	18 48 37.2	
		W-A	eS <sub>N</sub>	18 48 38	
		W-A	eS <sub>E</sub>	18 48 39	
		W-A	eN <sub>E</sub> F	18 48 58 19 44	
57	Apr. 24	G-W	ePZ	1 <sup>h</sup> 09 <sup>m</sup> 36 <sup>s</sup>	May be foreshock of following quake. $\Delta S-iP = 23^{\circ}5$ $H = 1^h 44^m 30^s$ Record poor
		G-W	iPZ	1 09 40	
		W-A	eP <sub>NE</sub>	1 09 40	
		W-A	eE	1 13 44	
		G-W	eN <sub>E</sub>	1 13 44	
		G-W	eS <sub>E</sub>	1 13 55	
		G-W	eE	1 14 08	
		G-W	e <sub>E</sub> M	1 14 21	
		G-W	F	1 17.1 1 26	
58	Apr. 25	W-A	iPE	12 <sup>h</sup> 17 <sup>m</sup> 10.3 <sup>s</sup>	Epicenter by J.S.A. Region of 27°0 N, 115°0 W. $H = 12^h 11^m 54^s$ $\Delta P-H = 24^{\circ}1$ $\Delta_{meas} = 23^{\circ}7$
		W-A	eE	12 17 26	
		G-W	eS <sub>E</sub>	12 21 39	
		G-W	iMZ	12 26 25	
			F	13 41	
59	Apr. 27	G-W	eP <sub>NZ</sub>	5 <sup>h</sup> 39 <sup>m</sup> 33 <sup>s</sup>	$\Delta S-P = 22^{\circ}8$ $H = 5^h 34^m 30^s$ Record weak.
		G-W	eS <sub>E</sub>	5 43 42	
		W-A	eS <sub>E</sub>	5 43 44	
		G-W	eS <sub>N</sub>	5 43 45	
		G-W	eE	5 43 57	
		G-W	eZ	5 44 02	
		G-W	M <sub>NE</sub> F	5 47.3 5 13	
60	Apr. 28	G-W	iP <sub>NZ</sub>	19 <sup>h</sup> 48 <sup>m</sup> 42 <sup>s</sup>	Epicenter by J.S.A. $\phi = 18^{\circ}9$ N, $\lambda = 103^{\circ}5$ W. $H = 19^h 43^m 42^s$ Aftershock of earth- quake of April 15, 1941 Focal depth 100 Km. by Brunner Depth Chart $\Delta P-H = 23^{\circ}1$ $\Delta_{meas} = 22^{\circ}8$
		W-A	iP <sub>NE</sub>	19 48 42	
		G-W	iMZ	19 48 48	
		G-W	iP <sub>NZ</sub>	19 48 52	
		W-A	iP <sub>NE</sub>	19 48 52	
		G-W	eS <sub>E</sub>	19 52 55	
		G-W	eS <sub>N</sub>	19 53 02	
		W-A	eS <sub>N</sub>	19 53 04	
		W-A	eS <sub>S</sub> <sub>N</sub>	19 53 23	
		G-W	eN	19 53 36	
		G-W	M <sub>NE</sub> F	19 56 32 21 01	



Seismological Bulletin for April, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
61	Apr:29	G-W	iPz	1 <sup>h</sup> 55 <sup>m</sup> 30 <sup>s</sup>	Δ about 103° Record weak
		G-W	iz	1 55 40	
		G-W	e(PRz)E	2 03 50	
		G-W	eSKSE	2 06 14	
		G-W	eN F	2 19 26 3 52	

Minor Seismic Activity:

April 1, 22<sup>h</sup>18<sup>m</sup> to 22<sup>h</sup>46<sup>m</sup> mainly surface waves  
 April 10, 20 58 21 04  
 April 15, 4 31 5 31 surface waves  
 April 19, 6 25 6 45  
 April 21, 22 56 00 12 surface waves  
 April 26, 23 57 00 29 mainly surface waves  
 April 27, 13 25 14 20 mainly surface waves  
 April 30, 10 36 10 51 surface waves

Microseisms were rather active throughout the month, particularly on the following days: April 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, starting early on 12 and continuing through to early on the 13, strong; 26, 27, 29 and 30 strong.

J. B. Macelwane, S.J.  
Director

E. J. Walter  
Graduate Fellow

# FLORISSANT

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

Three Galtzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

BULLETIN FOR 1941

13.

No.	Date	Inst.	Phase	G. M. C. T.	Remarks
62	May 1	W-A	eP <sub>E</sub>	07 <sup>h</sup> 17 <sup>m</sup> 03 <sup>s</sup>	$\Delta = 50^{\circ}4$ ; Focal depth about 40 km. by Brunner Depth Chart. H = 07 <sup>h</sup> 08 <sup>m</sup> 11 <sup>s</sup> Pasadena reports it felt at Unalaska
		W-A	ep <sub>NE</sub>	07 17 11	
		W-A	eS <sub>E</sub>	07 24 18	
		W-A	iS <sub>N</sub>	07 24 19	
		W-A	es <sub>E</sub>	07 24 39	
		G-W	F <sub>E</sub>	07 50	
63	May 1	W-A	iP <sub>1N</sub>	20 <sup>h</sup> 10 <sup>m</sup> 08 <sup>s</sup> .3	Local shock. $\Delta S_1 - P_1 = 42$ km. H = 20 <sup>h</sup> 10 <sup>m</sup> 00 <sup>s</sup> .9 This determination made using the Walter-Birkenhauer tables for local quakes in the Mississippi Valley.
		W-A	iN	20 10 08.9	
		W-A	iS <sub>1E</sub>	20 10 13.0	
		W-A	iNE	20 10 14.6	
		W-A	iN	20 10 16.0	
		W-A	iLN	20 10 16.6	
64	May 2	G-W	iP <sub>1Z</sub>	10 <sup>h</sup> 14 <sup>m</sup> 45 <sup>s</sup>	Regional Epicenter in Coral Sea. $\phi = 12^{\circ}0$ S. $\lambda = 146^{\circ}0$ E. H = 09 <sup>h</sup> 55 <sup>m</sup> 15 <sup>s</sup> $\Delta$ meas about 123.8 Wellington reports 70 - 100 km. depth
		G-W	eS <sub>E</sub>	10 24 11	
		G-W	ep <sub>SE</sub>	10 25 41	
		G-W	F <sub>E</sub>	10 20	
65	May 5	G-W	iP <sub>Z</sub>	15 <sup>h</sup> 31 <sup>m</sup> 18 <sup>s</sup>	Regional Epicenter: $\phi = 46^{\circ}0$ N. $\lambda = 131^{\circ}0$ E. H = 15 <sup>h</sup> 18 <sup>m</sup> 28 <sup>s</sup> Pasadena gives press report "Destructive Suichwa north of Harbin Manchukuo." $\Delta P - H = 88^{\circ}4$ $\Delta$ meas = 88.4
		G-W	ePR <sub>1Z</sub>	15 34 47	
		G-W	eS <sub>E</sub>	15 42 04	
		G-W	ep <sub>SE</sub>	15 43 11	
		G-W	eSR <sub>1E</sub>	15 47 53	
		G-W	eE	15 59 44	
		G-W	L <sub>E</sub>	16 01.1	
		G-W	M <sub>E</sub>	16 08.3	
		G-W	F <sub>E</sub>	16 55	
66	May 7	G-W	(e)PR <sub>1Z</sub>	12 <sup>h</sup> 39 <sup>m</sup> 33 <sup>s</sup>	Provisional epicenter from New Zealand Station Bulletin Near $\phi = 20^{\circ}0$ S. $\lambda = 165^{\circ}0$ E. Focal depth 130 km. $\Delta$ about 113° Record weak.
		G-W	eSKKSN	12 46 07	
		G-W	eS <sub>E</sub>	12 46 35	
		G-W	eN	12 46 46	
		G-W	ep <sub>SE</sub>	12 48 04	
		G-W	ePKKP-PPSE	12 48 56	
		G-W	iZ	12 50 04	
		G-W	eE	12 50 08	
		G-W	iE	12 54 59	
G-W	F <sub>E</sub>	13 46			

No.	Date	Inst.	Phase	G. M. C. T.	Remarks
67	May 8	G-W W-A G-W G-W G-W G-W G-W G-W G-W	eP <sub>Z</sub> eP <sub>FE</sub> ep <sub>Z</sub> iP <sub>Z</sub> -PR <sub>1Z</sub> iSK <sub>SE</sub> iSK <sub>SE</sub> iS <sub>FE</sub> i(Ps)E isSK <sub>SE</sub> F <sub>E</sub>	10 <sup>h</sup> 34 <sup>m</sup> 35 <sup>s</sup> 10 34 35 10 36 38 10 38 44 10 44 15 10 44 52 10 45 22 10 46 57 10 48 00 11 51	Provisional Epicenter from New Zealand Station Bulletin; Region of, 20° S., 180°  Focal Depth about 575 Km by Brunner Depth Chart. ΔP-H = 100° H = 10 <sup>h</sup> 21 <sup>m</sup> 48 <sup>s</sup>
68	May 9	G-W G-W G-W	i <sub>FE</sub> i <sub>FE</sub> i <sub>FE</sub>	09 <sup>h</sup> 56 <sup>m</sup> 02 <sup>s</sup> 10 02 03 11 20	Distant Record Weak.
69	May 11	G-W G-W G-W G-W	eP <sub>Z</sub> eS <sub>FE</sub> e <sub>FE</sub> F <sub>E</sub>	05 <sup>h</sup> 17 <sup>m</sup> 15 <sup>s</sup> 05 24 55 05 26 56 06 03	JSA Epicenter; 13°0 S., 77°0 W. H = 05 <sup>h</sup> 07 <sup>m</sup> 57 <sup>s</sup> ΔS-P = 53°9 ΔP-H = 53°6
70	May 11	G-W G-W G-W	iP <sub>Z</sub> eS <sub>FE</sub> F <sub>E</sub>	13 <sup>h</sup> 34 <sup>m</sup> 20 <sup>s</sup> 13 38 53 14 07	ΔS-P = 25°7 H = 13 <sup>h</sup> 28 <sup>m</sup> 48 <sup>s</sup> Saint Louis Station Bulletin. gives near 13°0 N., 91.0°W.
71	May 13	G-W G-W G-W G-W G-W G-W G-W G-W	iP <sub>FEZ</sub> i <sub>FEZ</sub> e <sub>NEE</sub> iS <sub>FE</sub> i <sub>NE</sub> i <sub>NE</sub> i <sub>NE</sub> i <sub>ME</sub> F <sub>E</sub>	16 <sup>h</sup> 07 <sup>m</sup> 37 <sup>s</sup> 16 07 41 16 12 19 16 12 30 16 12 36 16 12 40 16 13 38 16 16 50 18 16	JSA Epicenter, 39°8 N., 127°5 W. H = 16 <sup>h</sup> 01 <sup>m</sup> 40 <sup>s</sup> Felt at Eureka, California. ΔS-P = 28°2 ΔP-H = 28°3 Δmeas = 28°5
72	May 16	G-W G-W G-W G-W	e <sub>FE</sub> e <sub>FE</sub> M <sub>NE</sub> F <sub>E</sub>	02 <sup>h</sup> 42 <sup>m</sup> 30 <sup>s</sup> 02 47 16 02 52.1 03 21	Very weak.
73	May 16	G-W G-W G-W G-W G-W G-W	(e)P <sub>Z</sub> e <sub>NE</sub> e <sub>NE</sub> e <sub>EE</sub> i <sub>FE</sub> i <sub>NE</sub> F <sub>E</sub>	07 <sup>h</sup> 34 <sup>m</sup> 09 <sup>s</sup> 07 40 08 07 41 29 07 42 16 07 44 55 07 45 21 11 03	Distant Record weak.
74	May 16	G-W G-W G-W	e <sub>FE</sub> M <sub>NE</sub> F <sub>E</sub>	13 <sup>h</sup> 18 <sup>m</sup> 59 <sup>s</sup> 13 24.3 13 58	Record weak.





No.	Date	Inst.	Phase	G.M.C.T.	Remarks
75	May 17	G-W	ePZ	02 <sup>h</sup> 39 <sup>m</sup> 12 <sup>s</sup>	Epicenter by J.S.A. $\phi = 11^{\circ}20'S$ . $\lambda = 165^{\circ}08'E$ . $H = 02^h24^m53^s$ $\Delta P-H = 107.91$ $\Delta \text{ meas} = 108.9$
		G-W	iPR1Z	02 43 36	
		G-W	iz	02 43 51	
		G-W	iSKSE	02 49 52	
		G-W	iPSE	02 52 57	
		G-W	iE	02 58 23	
		G-W	iSR1E	02 58 57	
		G-W	FE	07 19	
76	May 19	G-W	eNE	21 <sup>h</sup> 50 <sup>m</sup> 20 <sup>s</sup>	Very weak.
		G-W	MN	21 51 15	
		G-W	FN	21 54	
77	May 25	G-W	iPNZ	02 <sup>h</sup> 08 <sup>m</sup> 52 <sup>s</sup>	Record weak and super- imposed on surface waves of a distant quake. $\Delta S-P = 24.08$ $H = 02^h03^m29^s$
		W-A	iPNE	02 08 52	
		G-W	iNZ	02 09 03	
		W-A	iNE	02 09 03	
		G-W	iz	02 09 08	
		G-W	eSN	02 13 18	
		G-W	en	02 16 12	
78	May 25	W-A	iE	07 <sup>h</sup> 34 <sup>m</sup> 40 <sup>s.0</sup>	Local shock; very weak.
		W-A	eLNE	07 35 29	
		W-A	FN	07 41	
79	May 29	W-A	iPNE	12 <sup>h</sup> 40 <sup>m</sup> 57 <sup>s</sup>	Record weak; superim- posed on surface waves of distant quake re- corded from 12 <sup>h</sup> 06 <sup>m</sup> to 13 <sup>h</sup> 00 <sup>m</sup> . $H = 12^h35^m31^s$ $\Delta(S)-P = 25.1$
		G-W	e(S)	12 45 25	
		G-W	MNE	12 48 45	

Minor Seismic Activity:

May 3, 21<sup>h</sup>06<sup>m</sup> to 21<sup>h</sup>25<sup>m</sup> surface waves; May 4, 23<sup>h</sup>09<sup>m</sup> to 23<sup>h</sup>35<sup>m</sup> mainly surface waves; May 5, 23<sup>h</sup>12<sup>m</sup> to 00<sup>h</sup>05<sup>m</sup>; May 6, 04<sup>h</sup>22<sup>m</sup> to 07<sup>h</sup>10<sup>m</sup>; May 9, 05<sup>h</sup>53<sup>m</sup> to 08<sup>h</sup>10<sup>m</sup> distant quake; May 12, 04<sup>h</sup>45<sup>m</sup> to 05<sup>h</sup>15<sup>m</sup>; May 14, 08<sup>h</sup> to 14<sup>h</sup> surface waves; May 17, 09<sup>h</sup>34<sup>m</sup> to 10<sup>h</sup>15<sup>m</sup> surface waves; May 18, 11<sup>h</sup>40<sup>m</sup> to 12<sup>h</sup>55<sup>m</sup> mainly surface waves; May 23, 11<sup>h</sup>48<sup>m</sup> to 12<sup>h</sup>23<sup>m</sup>; May 26, 18<sup>h</sup>14<sup>m</sup> to 18<sup>h</sup>37<sup>m</sup>; May 26, 21<sup>h</sup>38<sup>m</sup> to 22<sup>h</sup>10<sup>m</sup> surface waves; May 27, 01<sup>h</sup>39<sup>m</sup> to 02<sup>h</sup>02<sup>m</sup> surface waves.

Microseisms were recorded on the following days:

May 1, 2, 3, 4 small, 20, 25, 29, 30 31 large.

J. B. Macelwane, S. J., Director  
Department of Geophysics  
St. Louis, University

Edward J. Walter  
Graduate Fellow

# FLORISSANT

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

Three Galitzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

16.

### Bulletin for 1941

No.	Date	Inst.	Phase	G. M. C. T.	Remarks
80	June 4	W-A	iP <sub>1</sub> N	20 <sup>h</sup> 55 <sup>m</sup> 31 <sup>s</sup> .4	Local disturbance. $\Delta S_1 - P_1 = 45$ km. This determination made using the Walter-Birkenhauer tables for local earthquakes in the central U. S.
		W-A	iN	20 55 32.2	
		W-A	iS <sub>1</sub> NE	20 55 36.4	
		W-A	iE	20 55 37.5	
		W-A	iN	20 55 37.6	
		W-A	iLN	20 55 37.9	
		W-A	iLE	20 55 38.1	
81	June 9	W-A	eP <sub>E</sub>	06 <sup>h</sup> 23 <sup>m</sup> 13 <sup>s</sup>	Cape Girardeau gives Epicenter 42°5 N. 125°0 W. H = 06 <sup>h</sup> 17 <sup>m</sup> 30 <sup>s</sup> $\Delta eS - eP = 26^{\circ}3$ $\Delta P - H = 26^{\circ}8$
		G-W	iPZ	06 23 14	
		G-W	iPE	06 23 15	
		W-A	iE	06 23 18.5	
		G-W	iE	06 23 32	
		G-W	eS <sub>E</sub> E	06 27 51	
		G-W	iS <sub>E</sub> E	06 27 53	
		G-W	iE	06 28 19	
		G-W	iM <sub>E</sub> E	06 33 05	
		G-W	F <sub>E</sub>	08 18	
82	June 9	G-W	iP <sub>E</sub> Z	08 <sup>h</sup> 49 <sup>m</sup> 34 <sup>s</sup> .5	Aftershock of #81 $\Delta S - P = 26^{\circ}8$ H = 08 <sup>h</sup> 43 <sup>m</sup> 51 <sup>s</sup>
		W-A	iP <sub>E</sub>	08 49 34.5	
		G-W	eS <sub>E</sub> E	08 54 15	
		G-W	iS <sub>E</sub> E	08 54 17	
		G-W	iM <sub>E</sub> E	09 00 45	
		G-W	F <sub>E</sub>	09 48	
83	June 10	G-W	iPZ	10 <sup>h</sup> 45 <sup>m</sup> 50 <sup>s</sup>	Epicenter near 17°5 N., 104°2 W. H = 10 <sup>h</sup> 40 <sup>m</sup> 32 <sup>s</sup> $\Delta S - P = 24^{\circ}1$ $\Delta P - H = 24^{\circ}3$ $\Delta \mu_{cas} = 24^{\circ}3$
		W-A	iPNE	10 45 51	
		W-A	eNE	10 46 00	
		G-W	iS <sub>E</sub>	10 50 10	
		G-W	M <sub>N</sub>	10 53 47	
		G-W	M <sub>E</sub>	10 53 50	
		G-W	F <sub>E</sub>	11 15	
84	June 16	G-W	ePZ	18 <sup>h</sup> 40 <sup>m</sup> 03 <sup>s</sup>	Record very weak. $\Delta S - P = 26^{\circ}1$ H = 18 <sup>h</sup> 34 <sup>m</sup> 27 <sup>s</sup> Character indicates Central American.
		G-W	eSN	18 44 39	
		G-W	eS <sub>E</sub>	18 44 40	
		G-W	M <sub>N</sub>	18 51.3	
		G-W	F <sub>E</sub>	19 05	
85	June 16	G-W	ePZ	21 <sup>h</sup> 21 <sup>m</sup> 05 <sup>s</sup>	$\Delta S - P = 26^{\circ}8$ H = 21 <sup>h</sup> 15 <sup>m</sup> 22 <sup>s</sup> Probably from same epicenter as #84.
		G-W	ePNE	21 21 07	
		G-W	eSNE	21 25 47	
		G-W	eSNE	21 25 51	
		G-W	M <sub>N</sub>	21 32.1	
		G-W	F <sub>E</sub>	21 56	



No.	Date	Inst.	Phase	G.M.C.T.	Remarks
86	June 18	G-W G-W G-W G-W G-W G-W	(e)z iZ iN eN eZ eZ	10 <sup>h</sup> 34 <sup>m</sup> 13 <sup>s</sup> 10 36 22 10 37 39 10 47 05 10 47 42 10 48 11	Record very weak
87	June 18	G-W W-A G-W W-A G-W G-W G-W G-W G-W G-W G-W G-W	iPZ iPNE iZ iE eE iScPN iE iSN iSRIN iE MNE FE	11 <sup>h</sup> 16 <sup>m</sup> 55 <sup>s</sup> 11 16 55 11 16 59 11 17 03 11 18 39 11 23 04 11 23 07 11 23 12 11 25 45 11 25 51 11 30.3 13 38	Episcenter by J.S. A. $\phi = 52^{\circ}06' N.$ $\lambda = 35^{\circ}00' W.$ $H = 11^h09^m17^s$ $\Delta S-P = 40^{\circ}4$ $\Delta P-H = 40^{\circ}3$ $\Delta \text{ meas} = 40^{\circ}0$
88	June 18	W-A	iPNE	11 <sup>h</sup> 32 <sup>m</sup> 31 <sup>s</sup>	Superimposed on surface waves of preceding quake. Probably an aftershock.
89	June 18	G-W G-W G-W G-W G-W G-W G-W G-W G-W	e(P)z eZ eZ eZ eZ eZ eN eE eZ FZ	20 <sup>h</sup> 18 <sup>m</sup> 08 <sup>s</sup> 20 20 16 20 20 33 20 20 48 20 21 46 20 26 19 20 27 08 20 27 11 20 32 05 20 41	Very weak.
90	June 21	G-W G-W G-W G-W G-W G-W G-W G-W G-W	epPZ eSKSE eSKSE eSN eSE esSKSN esSKSN esSN eN FE	17 <sup>h</sup> 56 <sup>m</sup> 36 <sup>s</sup> 18 04 10 18 04 51 18 05 22 18 05 24 18 07 50 18 08 24 18 09 12 18 12 06 18 30	$\Delta$ about $103^{\circ}$ $H = 17^h41^m23^s$ Focal depth 500-600km. Pasadena gives $h = 550$ km. in Tonga region.



91	June 23	G-W G-W G-W G-W G-W G-W G-W G-W	iP'Z ePR <sub>1</sub> Z eSKPNE iSKPNE ePR eSKSN e <sub>F</sub> F <sub>E</sub>	09 <sup>h</sup> 48 <sup>m</sup> 06 <sup>s</sup> 09 50 29 09 51 30 09 51 32 09 53 42 09 55 24 10 00 50 11 49	Δ = 134.6 H = 09 <sup>h</sup> 28 <sup>m</sup> 46 <sup>s</sup> Epicenter in Celebes Islands.. Region of 3.0 S., 121.5 E.
92	June 26	G-W G-W G-W W-A G-W W-A W-A W-A <sup>c</sup> W-A W-A G-W G-W G-W G-W G-W G-W G-W W-A G-W	ePZ ez iP'Z iE iPR <sub>1</sub> Z en en in in in in iSKPZ iSKPN in in iSKSN iE eE FZ	12 <sup>h</sup> 08 <sup>m</sup> 08 <sup>s</sup> 12 11 13 12 11 18 12 11 29 12 13 22 12 13 23 12 13 34 12 13 39 12 13 42 12 13 48 12 14 01 12 14 32 12 14 33 12 15 38 12 18 05 12 18 21 12 21 22 12 21 28 16 52	New Regional epicenter replacing determination made in J.S. A. Pre-i- minary Bulletin #19 New: 12.8 N. 89.7 E. H = 11 <sup>h</sup> 51 <sup>m</sup> 37 <sup>s</sup> Data not so good. Δ about 131° Δ meas about 129.5 SKP Phase very large, indicating Δ about 132° near SKP focal pt According to Queens- land Station Bulletin Riverview locates this near Nicobar Islands in Bay of Bengal.
93	June 27	G-W G-W G-W G-W G-W G-W G-W	e(P <sub>1</sub> )Z eP'Z ePR <sub>1</sub> Z eSKPE eSKPZ e <sub>F</sub> F <sub>E</sub>	08 <sup>h</sup> 15 <sup>m</sup> 09 <sup>s</sup> 08 15 19 08 18 07 08 18 53 08 18 57 08 28 15 10 31	Epicenter at Finke River Central Australia by Riverview, according to Queensland station Bulletin: Δ about 140°; Δ meas 140°; H about 07 <sup>h</sup> 55 <sup>m</sup> 51 <sup>s</sup>
94	June 27	G-W W-A W-A G-W G-W G-W W-A G-W G-W G-W G-W G-W G-W	iPZ iPNE iNE iZ eZ iPPZ iSNE iSNE in iE iSSN F <sub>E</sub>	17 <sup>h</sup> 16 <sup>m</sup> 18 <sup>s</sup> 17 16 19 17 16 21 17 16 25 17 16 36 17 16 52 17 20 05 17 20 05 17 20 09 17 20 41 17 21 11 18 08	Epicenter by J.S.A. φ = 16.0 N. λ = 93.0 W. H = 17 <sup>h</sup> 11 <sup>m</sup> 30 <sup>s</sup> Focal depth by Brunner Depth Chart 200 km. ΔP-H = 22.9 Δ meas = 22.9

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
95	June 30	G-W	ePZ	16 <sup>h</sup> 53 <sup>m</sup> 56 <sup>s</sup>	Record weak.
		G-W	eN	17 04 33	
		W-A	eE	17 04 39	
		G-W	eN	17 09 36	
		G-W	eE	17 15 52	
		G-W	F E	17 46	
96	June 30	W-A	ePE	17 <sup>h</sup> 09 <sup>m</sup> 53 <sup>s</sup>	Superimposed on #95. Record weak; Character indicates Mexico.
		G-W	ePZ	17 09 57	
		G-W	eSE	17 13 51	
		G-W	iNE	17 16 17	
		G-W	LNE	17 16 45	
			F	lost in other quake.	

Minor Seismic Activity:

June 6 21<sup>h</sup>30<sup>m</sup> to 21<sup>h</sup>38<sup>m</sup> surface waves; June 8, 23<sup>h</sup>50<sup>m</sup> to 00<sup>h</sup>14<sup>m</sup> surface waves; June 11, 07<sup>h</sup>48<sup>m</sup> to 07<sup>h</sup>56<sup>m</sup> surface waves; June 11, 21<sup>h</sup>30<sup>m</sup> to 21<sup>h</sup>39<sup>m</sup>; June 12, 00<sup>h</sup>11<sup>m</sup> to 00<sup>h</sup>42<sup>m</sup> surface waves; June 12, 10<sup>h</sup>07<sup>m</sup> to 10<sup>h</sup>14<sup>m</sup>; June 15, 13<sup>h</sup>04<sup>m</sup> to 13<sup>h</sup>25<sup>m</sup>; June 16, 18<sup>h</sup>52<sup>m</sup> to 19<sup>h</sup>03<sup>m</sup> surface waves; June 18, 21<sup>h</sup>04<sup>m</sup> to 22<sup>h</sup>09<sup>m</sup> surface waves; June 20, 09<sup>h</sup>35<sup>m</sup> to 10<sup>h</sup>05<sup>m</sup>; June 21, 09<sup>h</sup>31<sup>m</sup> to 10<sup>h</sup>10<sup>m</sup> surface waves; June 23, 06<sup>h</sup>40<sup>m</sup> to 07<sup>h</sup>16<sup>m</sup> surface waves; June 24, 00<sup>h</sup>49<sup>m</sup> to 00<sup>h</sup>55<sup>m</sup>; June 24, 04<sup>h</sup>36<sup>m</sup> to 05<sup>h</sup>20<sup>m</sup> surface waves; June 28, 18<sup>h</sup>22<sup>m</sup> to 18<sup>h</sup>37<sup>m</sup>; June 29, 06<sup>h</sup>33<sup>m</sup> to 07<sup>h</sup>19<sup>m</sup> surface waves; June 29, 22<sup>h</sup>35<sup>m</sup> to 00<sup>h</sup>46<sup>m</sup> distant quake; June 30, 17<sup>h</sup>46<sup>m</sup> to 18<sup>h</sup>48<sup>m</sup> surface waves; June 30, 19<sup>h</sup>32<sup>m</sup> to 20<sup>h</sup>10<sup>m</sup> surface waves;

Microseisms: June 1 strong, 2, 5, 6, 26, 27

Errata:

Florissant Station Bulletin for January 1941  
 Earthquake #6 Date should be January 17

Florissant Station Bulletin for February 1941  
 Earthquake #14 Date should be February 14  
 Earthquake #15 H should be 15<sup>h</sup>13<sup>m</sup>30<sup>s</sup>

Florissant Station Bulletin for April 1941  
 Earthquake #57 H should be 01<sup>h</sup>04<sup>m</sup>30<sup>s</sup>

J. B. Macelwane, S. J., Director  
 Department of Geophysics  
 St. Louis University

Edward J. Walter  
 Graduate Fellow

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

Three Galtzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

Bulletin for July, 1941

20.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
97	July 1	G-W G-W G-W G-W G-W G-W	iPEZ iz iPR <sup>1</sup> EZ is iMEZ FE	07 <sup>h</sup> 56 <sup>m</sup> 11 <sup>s</sup> 07 56 17 07 56 42 08 00 39 08 05 36 11 53	Epicenter by J.S.A. $\phi = 34^{\circ}4' N$ $\lambda = 119^{\circ}5' W$ $H = 07^h50^m57^s$ Damage in and about Santa Barbara, Cali- fornia $\Delta P-H = 23^{\circ}9'$ $\Delta_{meas} = 23^{\circ}9'$
98	July 3	G-W G-W G-W	eS eME FN	01 <sup>h</sup> 31 <sup>m</sup> 55 <sup>s</sup> 01 35 07 01 55	Record weak
99	July 3	G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W	ePNZ iPNZ iNZ iNZ eN eE isE iE iE iSPN eSKSE eN eN FE	07 <sup>h</sup> 23 <sup>m</sup> 15 <sup>s</sup> 07 23 17 07 23 19 07 23 25 07 32 19 07 32 42 07 32 43 07 32 56 07 33 10 07 33 16 07 33 35 07 34 12 07 34 21 10 30	Epicenter by J.S.A. $\phi = 31^{\circ}0' S$ $\lambda = 68^{\circ}7' W$ $H = 07^h11^m51^s$ Felt in Mendoza, Argentina $\Delta S-P = 72^{\circ}4'$ $\Delta P-H = 72^{\circ}7'$ $\Delta_{meas} = 72^{\circ}9'$
100	July 9	G-W W-A G-W G-W G-W G-W	ePNZ iN eSN eE eZ iN FE	01 <sup>h</sup> 06 <sup>m</sup> 48 <sup>s</sup> 01 06 54 01 11 03 01 11 08 01 17 27 01 17 32 01 38	Record very weak
101	July 10	G-W G-W G-W G-W G-W	(e)PE ez eP' Z eNE eN FE	03 <sup>h</sup> 39 <sup>m</sup> 43 <sup>s</sup> 03 40 27 03 41 11 03 46 52 03 55 29 05 13	Near Java Record very weak



No.	Date	Inst.	Phase	G.M.C.T.	Remarks
102	July 10	G-W G-W G-W W-A G-W G-W G-W G-W	eZ eZ iPNZ eSNE iSN iPSE iE iE iE	09 <sup>h</sup> 39 <sup>m</sup> 37 <sup>s</sup> 09 39 43 09 40 07 09 47 35 09 47 35 09 48 14 09 48 29 09 49 14 10 14	Record weak $\Delta S-P = 52^{\circ}2$ H = 09 <sup>h</sup> 30 <sup>m</sup> 58 <sup>s</sup>
103	July 11	G-W G-W G-W W-A G-W G-W	iPNZ iN eE eE eSNE ME F lost	01 <sup>h</sup> 23 <sup>m</sup> 16 <sup>s</sup> 01 23 20 01 28 41 01 28 44 01 28 47 01 31.6	Epicenter by J.S.A. $\phi = 5^{\circ}6' N$ $\lambda = 83^{\circ}1' W$ H = 01 <sup>h</sup> 16 <sup>m</sup> 35 <sup>s</sup> $\Delta S-P = 33^{\circ}6$ $\Delta P-H = 33^{\circ}2$ $\Delta_{meas} = 33^{\circ}8$
104	July 11	W-A G-W W-A G-W G-W	ePN ePZ eSN eSE FE	02 <sup>h</sup> 06 <sup>m</sup> 15 <sup>s</sup> 02 06 15 02 11 40 02 11 42 03 13	$\Delta S-P = 33^{\circ}1$ aftershock of pre- ceding quake
105	July 12	W-A G-W G-W G-W G-W	ePNE ePZ eZ eSN MNE F lost	14 <sup>h</sup> 14 <sup>m</sup> 43 <sup>s</sup> 14 14 43 14 14 48 14 19 51 14 24.4	$\Delta S-P = 30^{\circ}4$ H = 14 <sup>h</sup> 08 <sup>m</sup> 27 <sup>s</sup> Record very weak
106	July 13	G-W G-W G-W G-W G-W	eE eE eE eLN FN	15 <sup>h</sup> 02 <sup>m</sup> 24 <sup>s</sup> 15 05 01 15 09 01 15 11 33 15 28	Record very weak
107	July 13	G-W G-W G-W G-W G-W G-W	ePZ iPNEZ eSE eN eN eN FE	15 <sup>h</sup> 52 <sup>m</sup> 00 <sup>s</sup> 15 52 03 16 01 25 16 02 35 16 03 48 16 03 50 17 13	Record weak $\Delta S-P = 71^{\circ}9$ H = 15 <sup>h</sup> 40 <sup>m</sup> 40 <sup>s</sup>

No.	Date	Inst.	Phase	G.M.C.T.	Remarks.
108	July 14	G-W G-W G-W G-W	eZ eZ eN eN	02 <sup>h</sup> 23 <sup>m</sup> 48 <sup>s</sup> 02 24 51 02 28 40 02 43 29	Record very weak
109	July 14	G-W G-W G-W G-W	eZ eN MN FZ	09 <sup>h</sup> 19 <sup>m</sup> 20 <sup>s</sup> 09 25 46 09 28.8 13 50	Record very weak
110	July 14	G-W G-W G-W G-W	eZ eE eN FE	13 <sup>h</sup> 02 <sup>m</sup> 55 <sup>s</sup> 13 10 50 13 11 02 13 50	Record very weak
111	July 16	G-W G-W G-W	ePNEZ eSNE iMNE	02 <sup>h</sup> 49 <sup>m</sup> 16 <sup>s</sup> 02 53 15 02 56 11	$\Delta S-P = 21^{\circ}7$ $H = 02^h44^m24^s$ Foreshock of following quake.
112	July 16	G-W G-W	eZ eZ	03 <sup>h</sup> 15 <sup>m</sup> 56 <sup>s</sup> 03 16 52	These may correspond to the distant phase recorded at Pasadena.
113	July 16	G-W G-W G-W G-W G-W G-W G-W	ePZ ePNE iNEZ iNEZ iSN iLE iMNE	03 <sup>h</sup> 18 <sup>m</sup> 12 <sup>s</sup> 03 18 14 03 18 19 03 18 28 03 22 12 03 22 53 03 24 57	Epicenter by J.S.A. $\phi = 24^{\circ}9'N$ $\lambda = 109^{\circ}0'W$ $H = 03^h13^m30^s$ $\Delta S-P = 21^{\circ}7$ $\Delta P-H = 20^{\circ}8$ $\Delta_{meas} = 21^{\circ}0$
114	July 16	W-A W-A	ePE iME	03 <sup>h</sup> 31 <sup>m</sup> 20 <sup>s</sup> 03 37 39	Aftershock superimposed on surface waves of main shock.
115	July 16	W-A G-W G-W G-W G-W	ePE eSE eN eMN FE	14 <sup>h</sup> 38 <sup>m</sup> 46 <sup>s</sup> 14 42 44 14 43 27 14 45 42 14 51	Aftershock of #113 $\Delta S-P = 21^{\circ}6$ $H = 14^h33^m55^s$ Very Weak

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
116	July 17	G-W G-W G-W G-W	ePZ eSNE e(SCS)NE FE	07 <sup>h</sup> 56 <sup>m</sup> 18 <sup>s</sup> 08 02 44 08 06 06 08 24	$\Delta_{S-P} = 42^{\circ}0$ $H = 07^h48^m27^s$
117	July 19	G-W G-W G-W G-W	iPNZ iPNE iSN FN	02 <sup>h</sup> 12 <sup>m</sup> 32 <sup>s</sup> 02 12 34 02 16 56 02 38	$\Delta_{S-P} = 24^{\circ}6$ $H = 02^h07^m11^s$
118	July 19	G-W W-A G-W G-W G-W	ePZ ePCP-RR1E eSN ME FE	09 <sup>h</sup> 32 <sup>m</sup> 37 <sup>s</sup> 09 34 28 09 39 23 09 47.2 10 17	$\Delta_{S-P} = 45^{\circ}2$ $H = 09^h24^m20^s$
119	July 19	G-W G-W W-A G-W G-W W-A G-W G-W G-W G-W G-W	ePZ ePZ-PR1Z eN eSKKSN iE e(S)E eN eE eSR1E eE FN	15 <sup>h</sup> 26 <sup>m</sup> 56 <sup>s</sup> 15 31 03 15 37 07 15 37 20 15 37 28 15 37 56 15 38 02 15 38 23 15 44 54 15 45 17 17 06	Record very weak Distant $\Delta$ about 1020
120	July 23	G-W G-W G-W G-W G-W	iPNZ eSE iN ME FN	01 <sup>h</sup> 22 <sup>m</sup> 44 <sup>s</sup> 01 27 09 01 27 16 01 30.8 02 00	Epicenter by J.S.A. $\phi = 18^{\circ}8' N$ $\lambda = 106^{\circ}7' W$ $H = 01^h17^m26^s$ $\Delta_{S-P} = 24^{\circ}7$ $\Delta_{P-H} = 24^{\circ}3$ $\Delta_{meas} = 24^{\circ}3$
121	July 23	G-W G-W G-W G-W G-W	ePZ ePNZ iSE iSSE FE	09 <sup>h</sup> 42 <sup>m</sup> 33 <sup>s</sup> 09 43 06 09 52 11 09 53 10 10 24	$\Delta = 77^{\circ}0$ Focal depth 135 km by Brunner Depth Chart $H = 09^h30^m57^s$
122	July 23	G-W G-W G-W G-W	ePZ eSE ME FE	10 <sup>h</sup> 31 <sup>m</sup> 25 <sup>s</sup> 10 37 39 10 43.5 11 01	$\Delta_{S-P} = 40^{\circ}0$ $H = 10^h23^m50^s$



			Phase	G.M.C.T.	Remarks
123	July 23	G-W G-W G-W	iPNZ eSN FN	21 <sup>h</sup> 10 <sup>m</sup> 00 <sup>s</sup> 21 14 26 22 24	Tentative Epicenter by J.S.A. $\phi = 14^{\circ}3'N$ $\lambda = 93^{\circ}2'W$ $H = 21^h04^m10^s$ $\Delta_{S-P} = 24^{\circ}8$ $\Delta_{P-H} = 24^{\circ}5$ $\Delta_{meas} = 24^{\circ}8$
124	July 24	G-W G-W G-W	ePZ eSN FN	10 <sup>h</sup> 36 <sup>m</sup> 02 <sup>s</sup> 10 40 35 11 16	Probable aftershock of preceding quake $\Delta_{S-P} = 25^{\circ}7$ $H = 10^h30^m30^s$
125	July 26	G-W G-W G-W G-W G-W G-W	ePZ ePZ ePR <sub>1</sub> Z e(PPS) <sub>E</sub> eScP <sub>E</sub> F <sub>E</sub>	20 <sup>h</sup> 25 <sup>m</sup> 28 <sup>s</sup> 20 29 31 20 29 46 20 39 19 20 40 28 22 41	Epicenter near $\phi = 15.0'N$ , $\lambda = 145.5'E$ $H = 20^h11^m21^s$ $\Delta_{P-H} = 104^{\circ}5$ $\Delta_{meas} = 105^{\circ}2$ This interpretation replaces that given in the J.S.A. Supplement for July, 1941.
126	July 26	G-W G-W G-W G-W G-W	ePNZ iN eSN eM <sub>N</sub> FN	23 <sup>h</sup> 19 <sup>m</sup> 48 <sup>s</sup> 23 20 30 23 24 01 23 27 08 23 42	$\Delta_{S-P} = 23^{\circ}3$ $H = 23^h14^m40^s$ Record weak
127	July 30	W-A G-W W-A G-W W-A G-W G-W G-W G-W G-W	iPNE iPZ iN eN eScP <sub>E</sub> e(S) <sub>N</sub> i(SP) <sub>NE</sub> iG <sub>E</sub> iM <sub>E</sub> F <sub>E</sub>	01 <sup>h</sup> 59 <sup>m</sup> 24 <sup>s</sup> 01 59 25 01 59 34 02 01 13 02 05 07 02 05 44 02 06 06 02 09 04 02 14 01 05 26	Epicenter by J.S.A. $\phi = 60^{\circ}7'N$ , $\lambda = 149^{\circ}5'W$ $H = 01^h51^m28^s$ Probably slight depth of focus $\Delta_{P-H} = 42^{\circ}6$ $\Delta_{meas} = 42^{\circ}3$

Minor Seismic Activity: July- 6, 6<sup>h</sup>23<sup>m</sup> to 6<sup>h</sup>34<sup>m</sup> s.w.; 6<sup>h</sup>46<sup>m</sup> to 6<sup>h</sup>55<sup>m</sup> s.w.  
 10, 6<sup>h</sup>32<sup>m</sup> to 6<sup>h</sup>50<sup>m</sup>; 8<sup>h</sup>31<sup>m</sup> to 9<sup>h</sup>10<sup>m</sup> 10<sup>h</sup>41<sup>m</sup> to 12<sup>h</sup>18<sup>m</sup> M.S.W.; 14, 3<sup>h</sup>3<sup>m</sup>  
 to 3<sup>h</sup>52<sup>m</sup> s.w.; 16, 22<sup>h</sup>42<sup>m</sup> to 22<sup>h</sup>45<sup>m</sup> s.w.; 17, 22<sup>h</sup>32<sup>m</sup> to 22<sup>h</sup>56<sup>m</sup> s.w.  
 18, 4<sup>h</sup>05<sup>m</sup> to 4<sup>h</sup>11<sup>m</sup> s.w.; 19, 6<sup>h</sup>18<sup>m</sup> to 6<sup>h</sup>46<sup>m</sup> M.S.W.; 20, 6<sup>h</sup>20<sup>m</sup> to  
 7<sup>h</sup>45<sup>m</sup> M.S.W.; 21, 16<sup>h</sup>47<sup>m</sup> to 18<sup>h</sup>00<sup>m</sup> M.S.W.; 21, 23<sup>h</sup>35<sup>m</sup> to 23<sup>h</sup>42<sup>m</sup>;  
 24, 5<sup>h</sup>17<sup>m</sup> to 5<sup>h</sup>51<sup>m</sup> s.w.; 24, 7<sup>h</sup>16<sup>m</sup> to 7<sup>h</sup>51<sup>m</sup> s.w.; 25, 10<sup>h</sup>42<sup>m</sup> to 11<sup>h</sup>  
 21<sup>m</sup> s.w.; 28, 16<sup>h</sup>46<sup>m</sup> to 17<sup>h</sup>39<sup>m</sup> s.w.; 28, 21<sup>h</sup>24<sup>m</sup> to 22<sup>h</sup>31<sup>m</sup>, 23<sup>h</sup>45<sup>m</sup> to  
 24<sup>h</sup>00<sup>m</sup>. Microseismic Activity: July 4, starting about 4th hour,  
 July 5, July 5, fading out July 31. s.w. = Surface waves  
 M.S.W. = Mainly surface waves



## FLORISSANT

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

Three Galtzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

Bulletin for August, 1941

26.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
128	Aug. 2	G-W G-W G-W G-W G-W G-W W-A G-W	eP <sub>E</sub> eP <sub>E</sub> ePR <sub>1</sub> e <sub>E</sub> <sup>1</sup> NE eSKS <sub>E</sub> e <sub>N</sub> eSKKS <sub>E</sub> eSKKS <sub>E</sub> F lost in changing records at 15th hr.	11 <sup>h</sup> 55 <sup>m</sup> 54 <sup>s</sup> 11 59 09 12 00 03 12 06 02 12 06 20 12 06 33 12 07 04 12 07 06	Epicenter by J.S.A. Ø = 30°3 S λ = 177°8W H = 11 <sup>h</sup> 41 <sup>m</sup> 25 <sup>s</sup> Slightly deeper than normal. Δ <sub>meas</sub> = 106.6 Δ <sub>PR<sub>1</sub>-H</sub> = 107.2 New Zealand Station Bulletin gives "Felt Kermedecs, R-F 8 <sup>+</sup> on Raoul Island"
129	Aug. 3	G-W G-W	iP <sub>NZ</sub> iS <sub>E</sub>	10 <sup>h</sup> 55 <sup>m</sup> 42 <sup>s</sup> 11 04 57	Record very weak. Regional epicenter Ø = 29.0 S λ = 73.0W H = 10 <sup>h</sup> 44 <sup>m</sup> 33 <sup>s</sup>
130	Aug. 4	G-W G-W G-W G-W G-W G-W	eS <sub>E</sub> eS <sub>N</sub> e <sub>E</sub> e <sub>N</sub> MNE FE	00 <sup>h</sup> 34 <sup>m</sup> 55 <sup>s</sup> 00 35 01 00 35 18 00 35 36 00 37.8 00 59	Probable foreshock of following quake #131.
131	Aug. 4	G-W G-W G-W W-A G-W W-A G-W G-W G-W G-W	iP <sub>NZ</sub> eP <sub>NZ</sub> iS <sub>N</sub> i <sub>N</sub> iS <sub>N</sub> i <sub>N</sub> ME FE	11 <sup>h</sup> 03 <sup>m</sup> 20 <sup>s</sup> 11 03 33 11 11 36 11 11 42 11 12 09 11 13 07 11 25.6 12 45	Epicenter by J.S.A. Ø = 54°3 N λ = 179°2E H = 10 <sup>h</sup> 53 <sup>m</sup> 17 <sup>s</sup> Focal depth about 75 km by Brunner Depth Chart Δ <sub>P-H</sub> = 60.8 Δ <sub>meas</sub> = 61.0
132	Aug. 6	G-W W-A G-W G-W W-A G-W G-W	iP <sub>Z</sub> iP <sub>E</sub> iP <sub>Z</sub> iP <sub>Z</sub> iP <sub>Z</sub> iP <sub>Z</sub> iPR <sub>1</sub> Z	06 <sup>h</sup> 23 <sup>m</sup> 44 <sup>s</sup> 06 23 44 06 23 47 06 24 16 06 24 18.7 06 24 19 06 25 44	Epicenter by J.S.A. Ø = 55°2 N λ = 161°1W h = 150 km by Brunner Depth Chart H = 06 <sup>h</sup> 15 <sup>m</sup> 14 <sup>s</sup> Δ <sub>P-H</sub> = 49.0 Δ <sub>meas</sub> = 48.8



Florissant Bulletin for August, 1941

27.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
132 (cont.)	Aug. 6	G-W	ipPR1E	06h26m19s	
		G-W	iSNE	06 30 39	
		W-A	iSNE	06 30 39	
		G-W	iSNE	06 30 43	
		G-W	isSNE	06 31 37	
		G-W	isSNE	06 31 40	
		G-W	i(SCS)E	06 33 20	
		G-W	i(SCS)NE	06 33 23	
		G-W	eSR1NE	06 34 17	
		G-W	iN	06 34 52	
		G-W	FE	08 17	
133	Aug. 9	G-W	eNE	03h42m44s	Record weak
		G-W	iN	03 49 32	
		G-W	ME	03 51.2	
		G-W	FN	04 25	
134	Aug. 10	W-A	iPNE	05h12m22s	$\Delta s-p = 34.01$ $H = 04h05m34s$ Probably in Central America Maybe several other shocks superimposed on this one.
		G-W	eNZ	05 12 23	
		G-W	iN	05 13 40	
		G-W	eSN	05 17 56	
		W-A	eSE	05 17 58	
		G-W	eE	05 20 27	
		G-W	iMNE	05 24 07	
		G-W	FN	06 23	
135	Aug. 14	G-W	iPEZ	01h54m11s	Epicenter by J.S.A. $\phi = 21.05 S$ $\lambda = 67.08 W$ $H = 01h44m02s$ $h = 200 \text{ km by Brunner}$ Depth Chart $\Delta s-p = 64.04$ $\Delta P-H = 64.04$ $\Delta_{meas} = 64.04$
		W-A	iPCPE	01 54 20	
		W-A	epPE	01 54 57	
		G-W	epPZ	01 55 00	
		G-W	eZ	01 55 24	
		G-W	iSNE	02 02 44	
		W-A	eSE	02 02 44	
		W-A	eE	02 03 36	
		G-W	iE	02 03 50	
		G-W	esSE	02 04 02	
		G-W	eN	02 04 05	
		G-W	iE	02 05 19	
		G-W	FE	02 32	



No.	Date	Inst.	Phase	G.M.C.T.	Remarks
136	Aug. 15	G-W	iP <sub>NZ</sub>	06 <sup>h</sup> 19 <sup>m</sup> 20 <sup>s</sup>	Epicenter by J.S.A. $\phi = 20^{\circ}1' N$ $\lambda = 27^{\circ}8' W$ $H = 06^h09^m35^s$ $h = 35$ km by Brunner Depth Chart $\Delta_{S-P} = 57^{\circ}6'$ $\Delta_{P-H} = 57^{\circ}6'$ $\Delta_{meas} = 56^{\circ}9'$
		G-W	ip <sub>NZ</sub>	06 19 27	
		G-W	iN	06 19 35	
		G-W	iS <sub>N</sub>	06 27 17	
		G-W	iS <sub>N</sub>	06 27 20	
		G-W	iS <sub>N</sub>	06 27 33	
		G-W	iP <sub>S</sub>	06 27 44	
		G-W	i(S <sub>CS</sub> ) <sub>N</sub>	06 29 06	
		G-W	L <sub>N</sub>	06 32.8	
		G-W	M <sub>N</sub>	06 34.3	
		G-W	F <sub>N</sub>	08 07	
137	Aug. 19	G-W	e <sub>EE</sub>	18 <sup>h</sup> 08 <sup>m</sup> 44 <sup>s</sup>	Record very weak Distant quake preceded by surface waves from 17 <sup>h</sup> 30 <sup>m</sup> - 17 <sup>h</sup> 53 <sup>m</sup>
		G-W	e <sub>EE</sub>	18 08 55	
		G-W	i <sub>EE</sub>	18 09 58	
		G-W	e <sub>EE</sub>	18 10 03	
		G-W	e <sub>EE</sub>	18 14 59	
		G-W	F <sub>EE</sub>	18 33.8	
		G-W	F <sub>EE</sub>	20 25	
138	Aug. 22	G-W	e <sub>EE</sub>	19 <sup>h</sup> 25 <sup>m</sup> 00 <sup>s</sup>	Record very weak distant
		G-W	F <sub>EE</sub>	19 48.0 <sup>+</sup>	
		G-W	F <sub>EE</sub>	20 47	
139	Aug. 25	W-A	eP <sub>N</sub>	03 <sup>h</sup> 09 <sup>m</sup> 08 <sup>s</sup>	Epicenter by J.S.A. $\phi = 16^{\circ}8' N$ $\lambda = 99^{\circ}4' W$ $H = 03^h04^m01^s$ Focal depth 50 km. by Brunner Depth chart. $\Delta_{S-P} = 22^{\circ}9'$ $\Delta_{P-H} = 23^{\circ}5'$ $\Delta_{meas} = 23^{\circ}5'$
		G-W	eP <sub>NE</sub>	03 09 08	
		G-W	iP <sub>NZ</sub>	03 09 10	
		W-A	iP <sub>NZ</sub>	03 09 10	
		W-A	ip <sub>NZ</sub>	03 09 21	
		G-W	e <sub>EE</sub>	03 10 14	
		G-W	eS <sub>N</sub>	03 13 17	
		G-W	eN	03 15 09	
		G-W	eN	03 19 40	
		G-W	eZ	03 19 42	
		G-W	F <sub>N</sub>	03 25	
140	Aug. 27	G-W	iP <sub>NZ</sub>	18 <sup>h</sup> 36 <sup>m</sup> 43 <sup>s</sup>	Epicenter by J.S.A. $\phi = 14^{\circ}8' N$ $\lambda = 98^{\circ}1' W$ $H = 18^h31^m22^s$ Focal depth about 50 km by Brunner Depth chart. $\Delta_{S-P} = 25^{\circ}0'$ $\Delta_{meas} = 25^{\circ}0'$ $\Delta_{P-H} = 25^{\circ}0'$
		G-W	ip <sub>NZ</sub>	18 36 51	
		G-W	eN	18 40 53	
		G-W	e <sub>EE</sub>	18 40 57	
		W-A	eS <sub>N</sub>	18 41 05	
		G-W	iS <sub>NE</sub>	18 41 07	
		G-W	e <sub>EE</sub>	18 41 36	
		G-W	e <sub>EE</sub>	18 41 38	
		G-W	F <sub>N</sub>	19 10	

Florissant Bulletin for August, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
141	Aug. 28	G-W G-W G-W	eSN MN FN	03 <sup>h</sup> 58 <sup>m</sup> 57 <sup>s</sup> 04 02.1 04 14	Epicenter by J.S.A. Near 19°6' N 109°1' W H = 03 <sup>h</sup> 49 <sup>m</sup> 06 <sup>s</sup> Record weak Δs-H = 24°9' Δmeas = 24°8'
142	Aug. 28	G-W G-W G-W G-W	eSN eN MN FN	06 <sup>h</sup> 55 <sup>m</sup> 10 <sup>s</sup> 06 56 54 06 58.6 07 11	Epicenter by J.S.A. Probably the same as the preceding shock H = 06 <sup>h</sup> 45 <sup>m</sup> 11 <sup>s</sup> Δs-H = 25°3' Δmeas = 24°8' Record weak
143	Aug. 28	G-W G-W G-W G-W G-W	(e)PZ iSNE e(SSE)E ePPSE FE	20 <sup>h</sup> 40 <sup>m</sup> 43 <sup>s</sup> 20 51 26 20 51 49 20 53 34 21 35	Δs-P = 87°6' H = 20 <sup>h</sup> 27 <sup>m</sup> 57 <sup>s</sup> Record weak
144	Aug. 29	W-A W-A G-W G-W G-W G-W	ePE eSE iSE iN iME FE	13 <sup>h</sup> 14 <sup>m</sup> 41 <sup>s</sup> 13 18 43 13 18 44 13 21 20 13 23 21 13 35	This epicenter appears to be near 43°0' N 123°8' W H = 13 <sup>h</sup> 09 <sup>m</sup> 05 <sup>s</sup> Due to a lack of data this location seems doubtful at best. Δp-H=26°1' Δmeas=26°0'
145	Aug. 30	G-W G-W G-W G-W G-W	iSKSNE ePPSE eSRLE eN FE	10 <sup>h</sup> 00 <sup>m</sup> 51 <sup>s</sup> 10 03 59 10 08 54 10 14 00 11 36	Regional epicenter in the vicinity of 18° N 146° E H = 09 <sup>h</sup> 36 <sup>m</sup> 24 <sup>s</sup> ΔSKS-H = 101°7' Δmeas = 102°5'
146	Aug. 30	G-W G-W G-W G-W G-W G-W G-W G-W	eZ eSKSN eN ePSE iE eE eE ME FE	13 <sup>h</sup> 25 <sup>m</sup> 12 <sup>s</sup> 13 31 22 13 31 38 13 33 55 13 34 53 13 35 23 13 38 36 13 58.0 16 03	Probably has the same epicenter as the preceding shock.

Bulletin for August, 1941 of Florissant

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
147	Aug. 31	G-W	(e)NZ	04 <sup>h</sup> 34 <sup>m</sup> 12 <sup>s</sup>	Record weak
		G-W	e <sub>N</sub>	04 38 13	
		G-W	M <sub>N</sub>	05 00 48	
		G-W	F <sub>E</sub>	05 58	
148	Aug. 31	G-W	(e)E	21 <sup>h</sup> 07 <sup>m</sup> 30 <sup>s</sup>	Record weak
		G-W	e <sub>E</sub>	21 14 50	
		G-W	e <sub>E</sub>	21 15 01	
		G-W	F <sub>E</sub>	21 21	

Minor Seismic Activity:

Aug. 3	13 <sup>h</sup> 34 <sup>m</sup>	to	14 <sup>h</sup> 20 <sup>m</sup>	surface waves
Aug. 6	00 05	to	00 55	
Aug. 8	19 57	to	20 18	surface waves
Aug. 9	23 09	to	00 21	surface waves
Aug. 12	13 18	to	13 56	surface waves
Aug. 14	10 19	to	11 09	surface waves
Aug. 16	04 26	to	05 20	mainly surface waves
Aug. 19	10 48	to	11 05	surface waves
Aug. 20	09 08	to	10 04	surface waves
Aug. 21	01 12	to	01 23	surface waves probably from Mexico or C. America
Aug. 22	12 10	to	12 49	surface waves
Aug. 22	17 51	to	19 00	surface waves
Aug. 26	18 05	to	18 46	surface waves
Aug. 28	11 43	to	12 00	surface waves

Microseisms: Aug. 13th, Aug. 15th strong but fading on 16th  
 Aug. 19th strong but fading on 20th.

J. B. Macelwane S.J.  
 Director

Ed. J. Walter  
 Graduate Fellow



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

Three Galitzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

Bulletin for September, 1941

31.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
149	Sept. 3	G-W G-W G-W G-W	iP <sub>NZ</sub> iPR <sub>1N</sub> eS <sub>N</sub> FE	04 <sup>h</sup> 27 <sup>m</sup> 20 <sup>s</sup> 04 27 47 04 31 44 05 05	Epicenter in the region of 14.8° N and H = 04 <sup>h</sup> 21 <sup>m</sup> 59 <sup>s</sup> /93.8° W $\Delta_{S-P} = 24.6$ $\Delta_{P-H} = 24.6$ $\Delta_{meas} = 24.6$
150	Sept. 4	G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W	eP <sub>Z</sub> ep <sub>Z</sub> e(P <sub>Z</sub> ) <sub>Z</sub> e(pP <sub>1</sub> ) <sub>Z</sub> iPR <sub>1Z</sub> ipPR <sub>1Z</sub> iZ e <sub>E</sub> ePR <sub>4E</sub> eSKK <sub>E</sub> e <sub>E</sub> iSPE isPE i <sub>E</sub> i <sub>E</sub> FE	10 <sup>h</sup> 36 <sup>m</sup> 21 <sup>s</sup> 10 36 42 10 39 41 10 40 05 10 41 02 10 41 27 10 41 52 10 46 59 10 47 38 10 48 09 10 48 30 10 50 39 10 51 23 10 56 51 10 57 12 13 47	Epicenter by J.S.A. in Region of $\phi = 13^{\circ}S$ $\lambda = 152^{\circ}3'E$ H = 10 <sup>h</sup> 21 <sup>m</sup> 15 <sup>s</sup> Focal depth about 100 <sup>+</sup> km by Brunner Depth Chart. $\Delta_{P-H} = 119.5$ $\Delta_{meas} = 119.5$ New Zealand Seismological Report puts epicenter in region of New Britain Focal depth 80-100km Queensland Bull. reports it felt at Rabaul, New Guinea.
151	Sept. 5	W-A W-A G-W W-A W-A G-W	iP <sub>NE</sub> iNE eS <sub>N</sub> eS <sub>NE</sub> iS <sub>NE</sub> FE	23 <sup>h</sup> 32 <sup>m</sup> 27 <sup>s</sup> 23 32 35 23 41 07 23 41 08 23 41 09 00 26	Epicenter $\phi = 54^{\circ}0'N$ $\lambda = 172^{\circ}5'E$ H = 23 <sup>h</sup> 22 <sup>m</sup> 00 <sup>s</sup> $\Delta_{S-P} = 63.7$ $\Delta_{P-H} = 63.7$ $\Delta_{meas} = 63.6$ Record weak.
152	Sept. 7	W-A G-W G-W G-W	iP <sub>N</sub> eP <sub>Z</sub> ME FE	01 <sup>h</sup> 00 <sup>m</sup> 10 <sup>s</sup> 01 00 10 01 17.8 <sup>+</sup> 01 36	Epicenter $\phi = 71.5^{\circ}N$ $\lambda = 29.5^{\circ}W$ H = 00 <sup>h</sup> 50 <sup>m</sup> 55 <sup>s</sup> Record weak $\Delta_{P-H} = 53.01$ $\Delta_{meas} = 53.02$

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
153	Sept. 7	G-W W-A W-A G-W G-W G-W G-W	ePZ ePN eSN iSNE i(PSE) eHE FE	22 <sup>h</sup> 33 <sup>m</sup> 04 <sup>s</sup> 22 33 04 22 41 13 22 41 14 22 41 26 22 42 45 23 14	Epicenter in region of 16°5 S 72°0 W H = 22 <sup>h</sup> 33 <sup>m</sup> 11 <sup>s</sup> Record weak $\Delta S-P = 58^{\circ}5$ $\Delta P-H = 58^{\circ}5$ $\Delta_{meas} = 53^{\circ}1$
154	Sept. 9	G-W G-W G-W G-W G-W G-W G-W	i(P)Z iPR <sub>1</sub> EZ iz eSKKS <sub>E</sub> ePS <sub>E</sub> iPKKP <sub>E</sub> ME FE	07 <sup>h</sup> 34 <sup>m</sup> 25 <sup>s</sup> 07 39 09 07 40 12 07 46 15 07 48 43 07 49 09 08 16 24 10 42	This interpretation replaces that of J.S.A. #34 Preliminary Bulletin. Epicenter in region of 7.3 S and 155.0 E H = 07 <sup>h</sup> 19 <sup>m</sup> 44 <sup>s</sup> $\Delta PR_1-H = 113^{\circ}5$ $\Delta_{meas} = 114^{\circ}2$ New Zealand Seismological Report indicates a slight depth of focus perhaps 75 km.
155	Sept. 10	G-W G-W G-W	eSKS <sub>FE</sub> eSKKS <sub>FE</sub> FE	22 <sup>h</sup> 17 <sup>m</sup> 34 <sup>s</sup> 22 18 07 23 41	Regional epicenter $\phi = 40^{\circ}5N$ $\lambda = 40^{\circ}3E$ H = 22 <sup>h</sup> 17 <sup>m</sup> 41 <sup>s</sup> $\Delta SKS-H = 90^{\circ}5$ $\Delta_{meas} = 89^{\circ}6$
156	Sept. 12	W-A G-W G-W G-W G-W G-W G-W G-W G-W G-W G-W	eP'E eE eSKP <sub>E</sub> eE eSKS <sub>E</sub> iE eE eE eE eSR <sub>1</sub> E FE	07 <sup>h</sup> 21 <sup>m</sup> 01 <sup>s</sup> 07 22 48 07 24 19 07 27 51 07 28 08 07 29 47 07 30 45 07 34 17 07 35 17 07 39 27 07 40 20 10 25	Epicenter in region of 2.8 S and 132.3 E H = 07 <sup>h</sup> 02 <sup>m</sup> 11 <sup>s</sup> This location was made using the nearby New Zealand and Australian Stations and replaces the determination in J.S.A. Preliminary Bull. #35 $\Delta SR_1-H = 127^{\circ}2$ $\Delta_{meas} = 127^{\circ}7$
157	Sept. 13	G-W W-A G-W G-W G-W G-W W-A G-W W-A	iPNE ePNE iPZ iNE iE eN eN iSN eSN	18 <sup>h</sup> 20 <sup>m</sup> 12 <sup>s</sup> 18 20 12 18 20 14 18 20 16 18 20 22 18 24 37 18 24 37 18 24 40 18 24 41	Epicenter by J.S.A. $\phi = 19^{\circ}0N$ $\lambda = 106^{\circ}7W$ H = 18 <sup>h</sup> 14 <sup>m</sup> 55 <sup>s</sup> $\Delta P-H = 24^{\circ}2$ $\Delta_{meas} = 24^{\circ}2$



No.	Date	Inst.	Phase	G.M.C.T.	Remarks
157 (cont.)	Sept. 13	G-W G-W G-W G-W	iE iN iSR <sub>1</sub> E ME FN	18 <sup>h</sup> 24 <sup>m</sup> 48 <sup>s</sup> 18 24 51 18 25 37 18 27 36 20 03	
158	Sept. 14	W-A G-W G-W G-W G-W	ePE ePE eSE ME FE	16 <sup>h</sup> 48 <sup>m</sup> 34 <sup>s</sup> 16 48 34 16 52 47 16 57.2 17 32	Foreshock of #160 see quake #160 for details $\Delta S-P = 23^{\circ}3$
159	Sept. 14	G-W W-A G-W G-W G-W	ePE ePE eSE ME F <sup>+</sup> lost	18 <sup>h</sup> 26 <sup>m</sup> 23 <sup>s</sup> 18 26 27 18 30 31 18 34.9	Foreshock of #160 see quake #160 for details $\Delta S-P = 22^{\circ}7$ Mainshock
160	Sept. 14	G-W W-A W-A G-W G-W G-W	iPE ePE ePE eSE ME FE	18 <sup>h</sup> 44 <sup>m</sup> 15 <sup>s</sup> 18 44 15 18 44 20 18 48 24 18 52.8 19 39	Epicenter by Pasa- dena Preliminary Bulletin #29 and 30 37°5' N, 718°5' W H = 18 <sup>h</sup> 39 <sup>m</sup> 11 <sup>s</sup> Felt widely in Owens Valley, the Sierra Nevada and San Joa- quin Valley. Some damage to mountain cabins. Many rock slides. $\Delta S-P = 22^{\circ}8$
161	Sept. 16	G-W G-W G-W G-W G-W G-W G-W G-W G-W	ePE eE eE eSKSE iSKKSE ePSE eSE ePR' <sub>2</sub> E FE	21 <sup>h</sup> 53 <sup>m</sup> 15 <sup>s</sup> 21 57 50 22 03 37 22 03 53 22 04 40 22 06 48 22 12 12 22 16 35 00 58	Provisional epicen- ter by U.S.C.G.S. 28°5' S, 178°0' W H = 21 <sup>h</sup> 39.1 <sup>m</sup> $\Delta SKS-H = 105^{\circ}7$ $\Delta_{meas} = 105^{\circ}9$
162	Sept. 17	W-A W-A G-W W-A G-W G-W G-W G-W W-A G-W G-W	e(P')E eSKP <sub>NE</sub> iSKP <sub>EN</sub> iN e(PR <sub>2</sub> ) <sub>NE</sub> eSKS <sub>NE</sub> eSKK <sub>SE</sub> iSKK <sub>SN</sub>	07 <sup>h</sup> 06 <sup>m</sup> 39 <sup>s</sup> 07 09 46 07 09 51 07 10 17 07 11 25 07 13 30 07 15 33 07 15 37	Epicenter in the re- gion of 2°2'N 124°E H = 06 <sup>h</sup> 48 <sup>m</sup> 07 <sup>s</sup> Focal depth about 90 km by Brunner Depth chart using data from New Zea- land Seismological Report.



No.	Date	Inst.	Phase	G.M.C.T.	Remarks	
162 (cont.)	Sept. 17	W-A G-W	iSKKS <sub>E</sub>	07 <sup>h</sup> 15 <sup>m</sup> 38 <sup>s</sup>	$\Delta_{\text{meas}} = 125^{\circ}08$	
		G-W	iN	07 15 59		
		G-W	iN	07 20 40		
		G-W	iE	07 20 43		
		G-W	eSR1 <sub>E</sub>	07 26 16		
		G-W	iSR1 <sub>E</sub>	07 26 17		
		G-W	iE	07 28 15		
		G-W	eSR2 <sub>E</sub>	07 31 00		
		G-W	F <sub>E</sub>	09 33		
163	Sept. 18	G-W	iPN <sub>E</sub>	13 <sup>h</sup> 23 <sup>m</sup> 35 <sup>s</sup>	Epicenter by J.S.A. $\phi = 12^{\circ}38$ $\lambda = 72^{\circ}05$ W $H = 13^{\text{h}}14^{\text{m}}24^{\text{s}}$ Focal depth 110 km. by Brunner Depth Chart $\Delta_{\text{P-H}} = 54^{\circ}00$ $\Delta_{\text{meas}} = 54^{\circ}00$	
		W-A	iPN	13 23 35		
		W-A G-W	ipPN	13 23 57		
		W-A	iSN	13 31 10		
		G-W	iSN	13 31 11		
		G-W	iSPN	13 31 39		
		G-W	iE	13 31 44		
		G-W	isSNE	13 31 51		
		G-W	iNE	13 31 58		
		W-A	iN	13 33 19		
		G-W	F lost	in changing records		
		164	Sept. 24	W-A		iPN
W-A	iPE			01 12 45		
G-W	ipNE			01 12 45		
W-A	iN			01 12 57		
W-A G-W	ippPN			01 13 06		
W-A	ipPE			01 13 07		
G-W	eE			01 13 10		
W-A	iSNE			01 22 11		
G-W	iSE			01 22 11		
G-W	iE			01 22 21		
G-W	iE			01 22 27		
W-A	eN			01 22 35		
W-A	eN			01 22 45		
G-W	isSE			01 22 53		
G-W	F <sub>E</sub>	04 02				
165	Sept. 25	G-W	ePZ	17 <sup>h</sup> 58 <sup>m</sup> 40 <sup>s</sup>	Epicenter by J.S.A. $\phi = 20^{\circ}03$ N $\lambda = 155^{\circ}01$ W $H = 17^{\text{h}}43^{\text{m}}49^{\text{s}}$ $\Delta_{\text{S-P}} = 58^{\circ}03$ $\Delta_{\text{P-H}} = 58^{\circ}02$ $\Delta_{\text{meas}} = 58^{\circ}02$	
		G-W	eSN	18 06 48		
		G-W	eN	18 08 32		
		G-W	eN	18 14 03		
		G-W	eLN	18 16 03		
		G-W	FN	18 50		

Florissant Bulletin for September, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
166	Sept. 29	G-W G-W G-W	ePR1Z e <sub>Z</sub> F <sub>E</sub>	17 <sup>h</sup> 28 <sup>m</sup> 08 <sup>s</sup> 17 32 11 19 07	Record weak, distant Epicenter according to New Zealand Seismological Report in Region of New Caledonia, focal depth 100 km.

Minor Seismic Activity:

Sept. 1	10 <sup>h</sup> 45 <sup>m</sup>	to 11 <sup>h</sup> 59 <sup>m</sup>	mainly surface waves
Sept. 4	19 38	to 19 57	
Sept. 5	00 59	to 01 26	
Sept. 8	03 25	to 03 32	
Sept. 10	17 27	to 17 55	
Sept. 14	04 35	to 06 33	distant quake
Sept. 18	02 31	to 03 47	
Sept. 21	20 06	to 20 14	
Sept. 29	03 30	to 03 56	surface waves
Sept. 30	08 46	to 10 05	mainly surface waves

Microseisms: Small microseisms starting on 2nd, continuing through 2nd, 3d, 4th, 5th; Sept. 13; Sept. 19; Sept. 25, 26, 27; Sept. 29.

J. B. Macelwane S.J.  
Director

Ed. J. Walter  
Graduate Fellow



# FLORISSANT

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

Three Galitzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

Florissant Bulletin for October, 1941

36.

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
167.	Oct. 1	W-A	eP <sub>E</sub>	19 <sup>h</sup> 55 <sup>m</sup> 49 <sup>s</sup>	Epicenter $\phi = 49^{\circ}2' N$ $\lambda = 130^{\circ}5' W$ $H = 19^h49^m31^s$ $\Delta P-H = 30^{\circ}6'$ $\Delta_{meas} = 30^{\circ}6'$ Record weak
		W-A	eN	19 55 50	
		G-W	eZ	19 55 51	
		G-W	eE	19 59 58	
		G-W	eE	20 00 13	
		G-W	eE	20 00 49	
		G-W	eS <sub>E</sub>	20 00 55	
		G-W	M <sub>E</sub>	20 07 09	
		G-W	F <sub>E</sub>	20 50	
168	Oct. 3	G-W	iPZ	16 <sup>h</sup> 18 <sup>m</sup> 47 <sup>s</sup>	Epicenter by J.S.A. $\phi = 40^{\circ}6' N$ $\lambda = 124^{\circ}8'2'' W$ $H = 16^h13^m17^s$ Strong in Humboldt County, California and damage at Eureka California $\Delta S-P = 26^{\circ}6'$ $\Delta P-H = 25^{\circ}5'$
		W-A	eP <sub>E</sub>	16 18 47	
		W-A	iF <sub>NE</sub>	16 18 49	
		G-W	iPZ	16 18 52	
		W-A	iF <sub>NE</sub>	16 19 08	
		G-W	iZ	16 19 08	
		G-W	iS <sub>E</sub>	16 23 27	
		G-W	iE	16 23 51	
		W-A	L <sub>E</sub>	16 27.5	
		W-A	eM <sub>NE</sub>	16 28 25	
		G-W	F <sub>E</sub>	19 32	
169	Oct. 4	W-A	iF <sub>LN</sub>	19 <sup>h</sup> 51 <sup>m</sup> 32.8 <sup>s</sup>	Local shock $\Delta S_1-P_1 = 49 \text{ km}$ $H = 19^h51^m24.4^s$
		W-A	iF <sub>ON</sub>	19 51 33.5	
		W-A	iS <sub>1NE</sub>	19 51 38.2	
		W-A	iS <sub>ON</sub>	19 51 38.9	
		W-A	iS <sub>OE</sub>	19 51 39.0	
		W-A	iL <sub>E</sub>	19 51 39.8	
170	Oct. 5	G-W	ePZ	10 <sup>h</sup> 24 <sup>m</sup> 33 <sup>s</sup>	Epicenter Near $173^{\circ}5' E \ 14^{\circ}0' S$ $H = 10^h11^m22^s$ $\Delta P-H = 92^{\circ}7'$ $\Delta_{meas} = 93^{\circ}7'$
		W-A	ePZ	10 24 33	
		G-W	iZ	10 24 37	
		G-W	iZ	10 24 44	
		G-W	iZ	10 24 50	
		G-W	iSK <sub>SE</sub>	10 35 07	
		W-A	eSK <sub>SE</sub>	10 35 07	
		G-W	iSKK <sub>SE</sub>	10 35 30	
		G-W	iS <sub>E</sub>	10 35 46	
		G-W	iE	10 37 03	
		G-W	i(P <sub>PS</sub> ) <sub>E</sub>	10 37 24	
		G-W	M <sub>E</sub>	10 54.3	
		G-W	F <sub>E</sub>	13 03	



No.	Date	Inst.	Phase	G.M.C.T.	Remarks
171	Oct. 6	W-A G-W G-W G-W G-W	e <sup>E</sup> <sub>E</sub> e <sup>E</sup> <sub>E</sub> L <sub>N</sub> M <sub>N</sub> F <sub>N</sub>	07 <sup>h</sup> 04 <sup>m</sup> 37 <sup>s</sup> 07 09 45 07 13.5 07 14 20 07 42	Record weak Fasadena reports this as an aftershock of quake of Oct. 3, 16hr.
172	Oct. 8	W-A W-A G-W G-W G-W G-W G-W	iP <sub>N</sub> iN ePR1 <sub>N</sub> ePR2 <sub>N</sub> eSE eN e <sup>E</sup> <sub>F</sub>	04 <sup>h</sup> 28 <sup>m</sup> 11 <sup>s</sup> 04 28 20 04 28 56 04 29 20 04 33 13 04 33 15 04 34 06	Epicenter near 9°0 N 86°0 W H = 04 <sup>h</sup> 22 <sup>m</sup> 03 <sup>s</sup> Δ <sub>S-P</sub> = 29.5 Δ <sub>P-H</sub> = 29.5 Δ <sub>meas</sub> = 29.9
173	Oct. 8	G-W G-W G-W G-W	e(SKKS) <sub>NE</sub> e <sup>E</sup> <sub>E</sub> e(S) <sub>E</sub> F <sub>E</sub>	05 <sup>h</sup> 48 <sup>m</sup> 23 <sup>s</sup> 05 48 44 05 49 02 07 31	Epicenter near Japan Record weak Δ about 93° H about 05 <sup>h</sup> 24 <sup>m</sup> 24 <sup>s</sup>
174	Oct. 8	W-A W-A W-A W-A W-A W-A W-A W-A W-A W-A	eP4 <sub>N</sub> iP3 <sub>N</sub> iP2 <sub>N</sub> iP1 <sub>N</sub> iS4 <sub>E</sub> iS3 <sub>N</sub> iS3 <sub>E</sub> iS1 <sub>N</sub> iS1 <sub>E</sub> iL <sub>E</sub>	07 <sup>h</sup> 52 <sup>m</sup> 00.2 <sup>s</sup> 07 52 01.1 07 52 04.0 07 52 06.4 07 52 33.2 07 52 35.4 07 52 35.8 07 52 40.7 07 52 41.0 07 52 42.8	Δ <sub>S1-P1</sub> = 312 km. H = 07 <sup>h</sup> 51 <sup>m</sup> 14.3 <sup>s</sup> Near earthquake. Felt in Blytheville, Arkansas.
175	Oct. 11	W-A W-A W-A W-A	iS <sub>NE</sub> iS <sub>E</sub> iS <sub>N</sub> iS <sub>E</sub>	20 <sup>h</sup> 32 <sup>m</sup> 33.2 <sup>s</sup> 20 32 34.5 20 32 34.9 20 32 35.4	Local disturbance
176	Oct. 14	G-W W-A W-A W-A W-A G-W W-A G-W G-W	ePNZ eP <sub>N</sub> iP <sub>N</sub> iPR1 <sub>N</sub> iN eS <sub>N</sub> eS <sub>N</sub> eL <sub>FE</sub> F <sub>E</sub>	10 <sup>h</sup> 32 <sup>m</sup> 00 <sup>s</sup> 10 32 00 10 32 01 10 32 27 10 32 32 10 36 13 10 36 58 10 37 06 10 41	Δ <sub>S-P</sub> = 23.3 H = 10 <sup>h</sup> 26 <sup>m</sup> 52 <sup>s</sup>

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
177	Oct. 15	W-A	eP <sub>N</sub>	09 <sup>h</sup> 44 <sup>m</sup> 47 <sup>s</sup>	Record weak Epicenter near 13°6' S 73°0' W $\Delta P-H = 55.0$ $\Delta_{\text{meas}} = 55.1$ h = 120 km. H = 09 <sup>h</sup> 35 <sup>m</sup> 30 <sup>s</sup>
		W-A	iP <sub>N</sub>	09 44 48	
		G-W	iP <sub>NZ</sub>	09 44 48	
		G-W	iN <sub>Z</sub>	09 44 49	
		G-W	iP <sub>PZ</sub>	09 45 12	
		W-A	iP <sub>PN</sub>	09 45 13	
		W-A	eS <sub>NE</sub>	09 52 25	
		G-W	iS <sub>Z</sub>	09 52 25	
		G-W	iS <sub>N</sub>	09 52 26	
		W-A	iS <sub>N</sub>	09 52 27	
		W-A	eS <sub>SNE</sub>	09 53 13	
		G-W	eZ	09 53 17	
		G-W	e <sub>N</sub>	09 53 22	
G-W	F <sub>N</sub>	10 08			
178	Oct. 16	W-A	eP <sub>N</sub>	04 <sup>h</sup> 55 <sup>m</sup> 00 <sup>s</sup>	Record weak $\Delta S-P = 85.6$ H = 04 <sup>h</sup> 42 <sup>m</sup> 24 <sup>s</sup>
		W-A	i(PcP) <sub>N</sub>	04 55 26	
		G-W	iS <sub>SE</sub>	05 05 34	
		G-W	ME	05 25.7	
		G-W	FE	06 01	
179	Oct. 18	W-A	L <sub>N</sub>	07 <sup>h</sup> 48 <sup>m</sup> 47.5 <sup>s</sup>	Felt at Clinton, Oklahoma
180	Oct. 21	W-A	iP <sub>4N</sub>	16 <sup>h</sup> 53 <sup>m</sup> 50.3 <sup>s</sup>	Near Shock H = 16 <sup>h</sup> 53 <sup>m</sup> 12.3 <sup>s</sup> Felt at Cairo, Ill. and at Wickliffe, Ky. $\Delta S_4-P_4 = 250$ km.
		W-A	iP <sub>4EZ</sub>	16 53 50.4	
		W-A	iP <sub>3N</sub>	16 53 50.7	
		W-A	iP <sub>3E</sub>	16 53 51.7	
		G-W	iS <sub>4E</sub>	16 54 17.8	
		G-W	eS <sub>ZE</sub>	16 54 18.2	
		W-A	iS <sub>3E</sub>	16 54 18.4	
		G-W	iS <sub>Z</sub>	16 54 19.1	
181	Oct. 22	W-A	e <sub>N</sub>	07 <sup>h</sup> 09 <sup>m</sup> 31 <sup>s</sup>	This is probably the shock which Pasadena reports as follows "Felt throughout the Los Angeles Metropolitan Area. Maximum Intensity VI with damage to weak structures near Epicenter 33°49' N 118°13' W; H = 06 <sup>h</sup> 57 <sup>m</sup> 19 <sup>s</sup>
		G-W	iM <sub>N</sub>	07 10 03	
		G-W	F <sub>N</sub>	07 16	
182	Oct. 28	G-W	e <sub>E</sub>	10 <sup>h</sup> 49 <sup>m</sup> 23 <sup>s</sup>	Record weak
		G-W	ME	10 50 15	
		G-W	F <sub>N</sub>	10 53	

Florissant Bulletin for October, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
183	Oct. 31	G-T	eP <sub>EZ</sub>	12 <sup>h</sup> 47 <sup>m</sup> 05 <sup>s</sup>	Epicenter near 43.3° N 129.3° E H = 12 <sup>h</sup> 40 <sup>m</sup> 50 <sup>s</sup> Δ <sub>P-H</sub> = 29.8 Δ <sub>meas</sub> = 29.8 time uncertain ± 5sec
		G-W	iP <sub>EZ</sub>	12 47 07	
		G-W	iS <sub>E</sub>	12 52 09	
		G-W	eL <sub>E</sub>	12 55 32	
		G-W	F <sub>E</sub>	13 30	

Minor Seismic Activity

Oct. 16 15<sup>h</sup> 36<sup>m</sup> to 17<sup>h</sup> 02<sup>m</sup> Mainly Surface waves  
 Oct. 21 21 41 to 22 26 Surface waves  
 Oct. 23 23 32 to 00 13 Surface waves  
 Oct. 27 12 25 to about 14<sup>h</sup>  
 Oct. 31 08 23 to 09 09  
 Oct. 31 17 41 to 18 32 Surface waves

Strong Microseisms were recorded on the following days:  
 1, 3, 9, 10, 12, 13, 14, 17 large and growing in amplitude  
 18 very large, 19 and 20 fading, 21, 22, 25 growing, 26 large,  
 27, 29.

J. B. Macelwane S.J.  
 Director

Ed. J. Walter  
 Graduate Fellow





## Florissant Bulletin for November, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
189	Nov. 10	G-W	ePZ	09 55 10	Epicenter near 21°3' S., 67°1' W. H = 09h45m02s h about 200 km. $\Delta P - H = 64^{\circ}0$ $\Delta_{meas} = 64^{\circ}0$
		G-W; W-A	iPZ:E	09 55 12	
		G-W	ep <sup>D</sup> Z	09 55 56	
		W-A	eE	10 03 31	
		W-A	iSE	10 03 33	
		G-W	iSE	10 03 34	
		W-A	eE	10 03 46	
		G-W; W-A	issE	10 04 49	
		W-A	iE	10 04 55	
		G-W	iE	10 06 15	
			F	10 24	
190	Nov. 12	G-W	iPNZ	10 17 48	$\Delta S - P = 89^{\circ}4$ H = 10h04m53s Reported destructive in eastern Turkey especially at Erzindjan according to the newspapers.
		G-W	e(SKS)E	10 28 16	
		G-W	eNE	10 28 27	
		G-W	eS <sup>NE</sup>	10 28 40	
		G-W	eS <sup>NE</sup> E	10 29 42	
		G-W	e	10 29 45	
		G-W	F	10 43	
191	Nov. 14	G-W	iPZ	07 01 14	$\Delta S - P = 78^{\circ}2$ H = 06h49m17s
		W-A	ep <sup>N</sup> N	07 01 14	
		W-A	iP <sup>N</sup>	07 01 15	
		G-W	eZ	07 01 48	
		W-A	eS <sup>N</sup>	07 11 11	
		G-W	iS <sup>NE</sup>	07 11 12	
		G-W	eE	07 11 29	
192	Nov. 14	W-A	ePE	08 46 50	According to Pasa- dena Bulletin, "Strong in whole Los Angeles Metropolitan area. Maximum Intensity VII with much damage to weak masonry struc- tures at Torrence and Gardena. 33°48' N. 118°15' W.  Record weak $\Delta S - P = 26^{\circ}1$
		W-A	eE	08 47 04	
		G-W	eSE	08 51 26	
		G-W	iN	08 54 21	
		G-W	iME F	08 55 48 09 17	
193	Nov. 15	G-W; W-A	iPNZ:N	00 36 03	$\Delta S - P = 21^{\circ}8$ H = 00h31m10s
		W-A	iP <sup>E</sup>	00 36 04	
		W-A	eS <sup>E</sup>	00 40 02	
		G-W	eS <sup>E</sup>	00 40 03	



Florissant Bulletin, November, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
194	Nov.15	G-W	iPZ	04 <sup>h</sup> 39 <sup>m</sup> 01 <sup>s</sup>	$\Delta_S - P = 72^{\circ}9$ $H = 04^h27^m35^s$
		G-W; W-A	iNZ:N	04 39 03	
		G-W	eZ	04 39 41	
		W-A	eS	04 48 32	
		G-W	eS <sup>N</sup>	04 48 33	
		G-W	ePS <sup>NE</sup>	04 49 10	
		G-W	ePS <sup>E</sup>	04 49 12	
		G-W	F	05 32	
195	Nov.16	W-A	eP <sup>N</sup>	09 45 12	Epicenter by J.S.A. $\phi = 13^{\circ}2$ N. $\lambda = 88^{\circ}5$ W. $H = 09^h39^m47^s$ $h = 100$ km. $\Delta_P - H = 25^{\circ}7$ $\Delta_{meas} = 25^{\circ}7$
		G-W	ePZ	09 45 13	
		W-A	iN	09 45 14	
		G-W	iNZ	09 45 31	
		G-W	iN	09 45 42	
		G-W; W-A	iPR <sub>1</sub> Z:N	09 45 44	
		G-W	ePR <sub>2</sub> <sup>N</sup>	09 45 58	
		G-W; W-A	iPR <sub>2</sub> Z:N	09 45 59	
		W-A	eS <sup>N</sup>	09 49 33	
		G-W	iS <sup>N</sup>	09 49 35	
		W-A	iS <sup>N</sup>	09 49 37	
		G-W	iN	09 50 22	
		G-W	LN	09 51.9	
		F	10 17		
196	Nov.24	G-W	ePZ	22 00 29	Epicenter by J.S.A. $\phi = 29^{\circ}5$ S. $\lambda = 177^{\circ}5$ W. $H = 21^h46^m15^s$ $\Delta_P - H = 106^{\circ}1$ $\Delta_{meas} = 106^{\circ}1$
		G-W	ePR <sub>1</sub> Z	22 04 48	
		G-W	eZ	22 05 05	
		G-W	eSKS <sup>E</sup>	22 11 05	
		G-W	eSKS <sup>E</sup>	22 11 49	
		G-W	e(SR <sub>1</sub> ) <sup>E</sup>	22 19 22	
		G-W	e <sup>E</sup>	22 20 33	
		G-W	eSR <sub>2</sub> <sup>E</sup>	22 24 05	
G-W	M <sup>E</sup>	22 36.2			
		F	01 05		
197	Nov.25	G-W	iPNZ	18 13 26	Epicenter by J.S.A. $\phi = 37^{\circ}3$ N. $\lambda = 19^{\circ}1$ W. $H = 18^h03^m57^s$ Felt throughout Iberian Peninsula $\Delta_P - H = 55^{\circ}1$ $\Delta_{meas} = 55^{\circ}1$
		G-W	iEZ	18 13 30	
		G-W	iN	18 13 42	
		G-W	iN	18 13 54	
		G-W	iN	18 14 04	
		W-A	iN	18 17 58	
		W-A	iS <sup>N</sup>	18 21 06	
		W-A	iS <sup>E</sup>	18 21 09	
		W-A	i <sup>E</sup>	18 21 21	
		W-A	iSP <sup>E</sup>	18 21 43	
		W-A	e <sup>E</sup>	18 24 38	



Florissant Bulletin for November, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
198	Nov. 26	W-A	eP <sub>N</sub>	08 28 17	$\Delta_{iS} - iP = 23^{\circ}.7$ $H = 08^h 23^m 06^s$
		G-W	iP <sub>Z</sub>	08 28 18	
		W-A	iN	08 29 16	
		W-A	eS <sub>N</sub>	08 32 31	
		W-A	eS <sub>E</sub>	08 32 32	
		W-A	eS <sub>N</sub>	08 32 35	
		G-W	iS <sub>N</sub>	08 32 35	
		G-W	iF <sub>E</sub>	08 34 04	
199	Nov. 27	G-W	eZ	08 56 00	Distant $\Delta$ about $116^{\circ}$
		G-W	iz	08 56 07	
		G-W	iP <sub>Z</sub>	08 56 11	
		G-W	iz	08 58 57	
		G-W	iSKP <sub>Z</sub>	08 59 01	
		G-W	eNE	08 59 41	
		G-W	iPR <sub>2NE</sub>	08 59 45	
		G-W	eF	09 01 34	
		G-W	ePR <sub>3N</sub>	09 01 38	
		G-W; W-A	iS <sub>N</sub>	09 05 03	
		G-W	iPPS <sub>Z</sub>	09 08 15	
				F	

Minor Seismic Activity

Nov. 5	-- 13	<sup>h</sup> 31 <sup>m</sup>	to	15	<sup>h</sup> 37 <sup>m</sup>	mainly surface qwaves
6	-- 07	29	to	09	23	distant quake
12	-- 07	51	to	08	29	surface waves
14	-- 04	05	to	04	26	
18	-- 10	37	to	14	05	distant quake microseisms
22	-- 05	36	to	06	03	strong
22	-- 07	56	to	09	23	
23	-- 16	53	to	17	00	surface waves

Microseisms

November 5, starting about 2nd hour strong; Nov. 6 strong;  
November 18 strong; Nov. 19, 20 fading out; Nov. 28.

James B. Macelwane, S.J.  
Director

E. J. Walter  
Instructor

# FLORISSANT

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

Three Galitzin-Wilip, two Wood-Anderson short-period seismographs, Shortt synchronome clock

44

### Florissant Bulletin for December, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
200	Dec. 1	G-W	eZ	20 13 48	Record weak Distant
		W-A	eN	20 20 25	
		G-W	iN	20 20 28	
		W-A	eN	20 20 44	
		G-W	iN	20 20 45	
		G-W	eN	20 22 46	
		G-W	MN F	20 46.9 ± 21 21	
201	Dec. 5	W-A	ePN	20 53 14	Epicenter by J. S.A. $\phi = 9^{\circ}0' N.$ $\lambda = 83^{\circ}2' W.$ $H = 20^h 47^m 00^s$ $\Delta iP - H = 30^{\circ}3$ $\Delta_{meas} = 30.6$
		G-W	iPNZ	20 53 15	
		W-A	eN	20 53 17	
		G-W	iNZ	20 53 19	
		W-A	iN	20 54 34	
		W-A	iSN	20 58 20	
		W-A	iE M F	21 00 34 21 00 43 01 00	
202	Dec. 6	G-W	ePZ	01 30 57	Record weak. Probable aftershock of preceding quake. $H$ about $01^h 24^m 54^s$
		G-W	ePR <sub>1</sub> Z	01 31 40	
		G-W	eSN	01 35 55	
		G-W	iE	01 36 44	
		G-W	eSR <sub>1</sub> E	01 37 49	
		G-W	iE	01 37 38	
		G-W	MN F	01 42.4 03 02	
203	Dec. 6	G-W	ePZ	21 30 49	Epicenter by J.S.A. $\phi = 8^{\circ}7' N.$ $\lambda = 84^{\circ}3' W.$ $H = 21^h 24^m 36^s$ Possibly somewhat deep $\Delta iP - H = 30^{\circ}8$ $\Delta_{meas} = 30.9$
		G-W	iPNZ	21 30 56	
		G-W	iNZ	21 31 01	
		G-W	iN	21 31 56	
		G-W	iN	21 32 29	
		G-W	iSN	21 35 59	
		G-W	eE	21 36 07	
		G-W	iN	21 36 16	
		G-W	iN	21 36 54	
G-W	iE F lost in following quake	21 37 06			
204	Dec. 7	G-W	iPNZ	00 00 54	This is probably an aftershock of the quakes of Dec. 5, 20 <sup>h</sup> and Dec. 6, 21 <sup>h</sup> $H$ about $23^h 54^m 44^s$ This record seems however to indicate a focal depth of 300 km.
		W-A	eN	00 00 41	
		G-W	iPNZ	00 01 49	
		G-W; W-A	eSN	00 05 58	
		W-A	eN	00 06 03	
		G-W	eN	00 06 42	
		G-W	ess <sub>E</sub> eE F	00 07 40 00 08 20 01 14	

Florissant Bulletin for December, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
205	Dec. 7	W-A	ePN	00 31 32	Record very weak; Probable aftershock of Dec. 5, 20 <sup>h</sup> n and Dec. 6, 21 <sup>h</sup>
206	Dec. 7	G-W G-W G-W G-W G-W G-W G-W	iPNZ ipPNZ iN eSE eSE eSE isSE F	11 48 15 11 40 09 11 49 17 11 52 45 11 53 19 11 53 41 11 54 58 12 39	Aftershock of quakes of Dec. 5, 20 <sup>h</sup> and Dec. 6, 21 <sup>h</sup> H about 11 <sup>h</sup> 42 <sup>m</sup> 03 <sup>s</sup> This record seems to indicate a focal depth of 300 km.
207	Dec. 8	W-A G-W; W-A G-W W-A G-W G-W G-W G-W G-W	ePN ipPNZ:N epPNZ ipPN iN isNE iNE LNE FE	07 47 31 07 47 32 07 48 30 07 48 36 07 49 40 07 52 37 07 54 10 07 54.4 09 08	Aftershock of quakes of Dec. 5, 20 <sup>h</sup> and Dec. 6, 21 <sup>h</sup> H about 07 41 19 This record also seems to indicate a focal depth in the region of 300 km. but the phases are less prominent than in the preceding aftershocks.
208	Dec. 13	W-A G-W G-W	eN eE eZ FZ	11 09 58 11 17 08 11 19 28 11 43	Very weak
209	Dec. 14	W-A G-W	ePE isN	09 29 05 09 33 26	Record weak and obscured by large microseisms. Epicenter in region of 15° N., 96°3' W. H = 09 <sup>h</sup> 23 <sup>m</sup> 43 <sup>s</sup>
210	Dec. 15	W-A	ePNE	04 44 08	Record weak and obscured by large microseisms
211	Dec. 15	W-A G-W W-A W-A W-A G-W G-W G-W G-W G-W G-W	ePE ePNZ ePNZ iPR1E ePR1N ePR1Z isE eE eE eE FE	21 49 54 21 49 54 21 49 57 21 52 31 21 52 34 21 52 34 21 59 07 22 04 17 22 05.7 22 08.3 22 27	Record weak H = 21 <sup>h</sup> 38 <sup>m</sup> 48 <sup>s</sup> ΔS - P = 69.7



Florissant Bulletin, December, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
212	Dec.16	G-W	iz	19 <sup>h</sup> 38 <sup>m</sup> 57 <sup>s</sup>	Epicenter region of 22°5' N., 121°E. H = 19h19m50s Damage in Southern Formosa $\Delta PR_1 - H = 112.2$ $\Delta meas = 112.2$ Record weak and ob- scured by micro- seisms.
		G-W	iPR <sub>1</sub> Z	19 39 05	
		G-W	iz	19 39 21	
		G-W	iZKSN	19 45 02	
		G-W	iPSN	19 48 33	
		G-W	iz	19 49 02	
		G-W	iPPSZ	19 49 40	
		G-W	iN	19 49 45	
		G-W	iz	19 50 46	
		G-W	i(SR <sub>1</sub> )N	19 54 28	
		G-W	L <sub>N</sub>	20 17.7	
G-W	M <sub>N</sub>	20 23.2			
G-W	F	21 18			
213	Dec.20	G-W	e(S)E	15 59 44	Very weak
		G-W	M <sub>F</sub>	16 07 40	
			F	16 41	
214	Dec.21	W-A	iP N	05 48 54	Record weak Epicenter region of 29°3' S., 71°7' W. H = 05h37m43s $\Delta p - H = 70.5$ $\Delta meas = 70.5$
		G-W	iPNZ	05 48 56	
		G-W	i	05 49 04	
		G-W	iZ	05 58 11	
		G-W	iSE	05 58 12	
		G-W	iSCSN F	05 59 14 06 05	
215	Dec.24	G-W	(e)P <sub>N</sub>	03 38 21	No epicentral deter- mination could be made $\Delta S - P = 25.8$ Record weak. No epicentral determina- tion could be made.
		G-W	(e)E <sub>N</sub>	03 38 24	
		W-A	ePR <sub>1</sub> E	03 38 54	
		G-W	iSNE	03 42 55	
		G-W	iM <sub>F</sub> NE	03 45 37 04 04	
216	Dec.24	G-W	(i)PNEZ	12 06 19	No epicentral deter- mination could be made. $\Delta S - P = 25.1$
		W-A	eN	12 06 43	
		G-W	i(PR <sub>1</sub> )EZ	12 06 45	
		G-W	eSE	12 10 45	
		G-W	iSN	12 10 47	
		G-W	LNE	12 13 15	
		G-W	M <sub>F</sub> NE F	12 15 22 12 36	
217	Dec.26	G-W	eN	15 09 02	Record weak.
		G-W	eN	15 17 19	
		G-W	eZ	15 28 57	
		G-W	eE	15 29 21	
		G-W	eM	15 30 01	
		G-W	M <sub>F</sub> NE F	15 51 21 17 25	

Flouissant Bulletin for December, 1941

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
218	Dec.27	W-A	iP <sub>FE</sub>	18 <sup>h</sup> 27 <sup>m</sup> 41 <sup>s</sup>	Epicenter in the region of earthquake of Nov. 25, 1941 37°3' N., 19°1' W. H about 18 18 09 Focal depth about 75 km. Col.J.Agostinho, Azores, report the quake ad felt in Lisbon, Mercalli III $\Delta P - H = 55^{\circ}5$ $\Delta_{meas} = 55.1$
		G-W	eP <sub>NZ</sub>	18 27 42	
		G-W	iP <sub>NZ</sub>	18 27 48	
		G-W	ip <sub>NZ</sub>	18 28 05	
		G-W	eS <sub>FE</sub>	18 35 35	
		G-W	M <sub>FE</sub>	18 50.9	
			F <sub>FE</sub>	19 27	
219	Dec.31	W-A	eP <sub>FE</sub>	06 53 53	Epicenter by Pasadena near that of Sept.14, 1941, 37°32' N., 118°40' W., H = 06 <sup>h</sup> 48 <sup>m</sup> 44 <sup>s</sup> Felt in the Sierra Nevada and San Joaquin Valley $\Delta S - P = 22^{\circ}4$ Record very weak.
		G-W	eS <sub>FE</sub>	06 57 58	
		G-W	eM <sub>NE</sub>	07 00 47	
			F <sub>NE</sub>	07 17	
220	Dec. 31	W-A	cN	17 43 56	This quake probably originated in the South Pacific region. The New Zealand Station Bulletin gives a focal depth of 700 km.
		G-W	iN <sub>Z</sub>	17 44 08	
		G-W	iN <sub>Z</sub>	17 45 30	
		G-W	iZ <sub>NZ</sub>	17 45 47	
		G-W	iE	17 50 10	
		G-W; W-A	iE	17 50 30	
		G-W	eN	17 53 12	
		G-W	iN	17 53 25	
		F <sub>N</sub>	18 35		

Minor Seismic Activity:

Dec. 3.	--	09 <sup>h</sup> 46 <sup>m</sup>	to	09 <sup>h</sup> 52 <sup>m</sup>	
6	--	09 57	to	10 12	
9	--	20 58	to	21 16	surface waves
13	--	08 03	to	08 17	surface waves
15	--	09 13	to	09 32	surface waves
24	--	15 37	to	17 38	surface waves
29	--	06 14	to	06 44	mainly surface waves
29	--	07 45	to	07 53	mainly surface waves
31	--	19 56	to	20 27	mainly surface waves

Microseismic Activity-- Large microseisms were recorded on the following days: 1, 2, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, (small) 23, 24 (small), 25, (small), 26, 27, 28 (small), 29 (small), 30 (small)

ERRATUM

Earthquake Number 98 should read "July 2, 23<sup>h</sup>" instead of July 3, 01<sup>h</sup>

James B. Macelwane, S. J.  
Director

E. J. Walter  
Instructor