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 1940

No.	Date	Inst	Phase	G.C.T.	Remarks
1	Jan. 1	W-A G-W W-A G-W G-W W-A G-W	e_{ZE} i_E i_{ZE} i_E e_{ZE} F_E	$12^h37^m44^s$ 12 37 44.7 12 38 22.4 12 38 22.7 12 38 49.0 12 38 50 12 53	
2	Jan. 2	G-W W-A G-W G-W	eP_Z $e(S)_E$ $i(S)_E$ F_E	$11^h18^m48^s$ 11 27 48 11 27 50.1 12 32	Time approximate. Provisional epicenter by USC and GS. $\phi = 31.0°$ S $\lambda = 108.0°$ W. $H = 11^h07.6^m$. Δ S-P = 57°6
3	Jan. 4	G-W G-W G-W G-W	L_{EZ} M_Z M_E F_E	$02^h01.9^m$ 02 03.2 02 03.6 02 30	
4	Jan. 6	G-W G-W	e_E M_E F	$06^h51^m18^s$ 06 59.5±	
5	Jan. 6	G-W G-W G-W	i_E M_E F_E	$08^h57^m50^s$ 08 58.2+ 09 27	
6	Jan. 6	W-A W-A W-A W-A	$e(pP')_N$ $i(pP')_E$ $e(S)_N$ ePS_E F lost in change of records.	$14^h22^m47^s$ 14 22 48 14 31 11 14 32 17	Epicenter by J.S.A. $\phi = 21.8°$ S. $\lambda = 169.4°$E $H = 14^h03^m38^s$. h about 80 to 90 km. by Brunner Depth Chart. Δ meas = 111°6. Δ PS-H = 111°0
7	Jan. 7	G-W	M_E	$01^h37.5^m$	

Florissant Bulletin for 1940

No.	Date	Inst	Phase	G.M.C.T.	Remarks
8	Jan. 7	G-W	M_E	$04^h13.4^m$	
9	Jan. 10	G-W	M_E	$12^h09.7^m\pm$	
10	Jan. 17	W-A W-A G-W W-A G-W G-W W-A G-W G-W G-W	eP_E iPR_{1E} iPR_{1EZ} iPR_{1E} eN $iSKSN$ $eSKS_E$ $iSKS_E$ iPS_E F_E	$1^h28^m49^s$ 1 33 00.9 1 33 00.9 1 33 03.3 1 36 30 1 39 28.9 1 39 31 1 39 31.9 1 42 02.9 14	Epicenter by J.S.A. ϕ = 17°2 N λ = 147°3 E H = $01^h14^m57^s$ Δ_{PR} - H = 10°4 Δ_{meas} = 10°2
11	Jan.20		M_E F_E	$10^h40.9^m\pm$ 11 54	
12	Jan.26	G-W G-W G-W	L_E M_E F_E	$07^h31.1^m$ 07 34.3 08 21	
13	Jan.26	G-W G-W G-W G-W	i_E i_Z M_E F_E	$17^h22^m33^s$ 17 22 37 17 52.3± 19 26	
14	Jan.28	G-W	M_E	$07^h42.5^m$	Amplitudes very small
15	Jan.28	G-W	iM_E	$08^h48.5^m$	

Minor Seismic Activity:

January 19, 06^h12^m to 06^h22^m Surface waves
January 24, 02^h22^m to 02^h46^m Surface waves

Microscisms were active throughout this month. Large amplitudes were recorded on the following days: Jan. 2,3,4,8,15,16,17,22,23, 24,25,30.

James B. Macelwane, S.J.
Director

Edward J. Walter
Graduate Fellow

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

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
103	June 2	G–W G–W G–W G–W	iP_{NEZ} iS_N M_E F_N	$11^h47^m43.6^s$ 11 55 48.6 11 11.7 12 59	$\Delta_{S-P} = 57°.9$ $H = 11^h37^m54.6^s$ Record weak
104	June 3	W–A G–W G–W G–W G–W G–W G–W G–W	eP_E iP_Z ipP_Z iS_{NE} isS_E iL_E iM_E F_N	$18^h10^m08^s$ 18 10 11.6 18 10 20.6 18 14 03.6 18 14 19.6 18 15 31.6 18 16 49.6 19 39	Epicenter by J.S.A. $\phi = 24°.4$ N $\lambda = 110°.4$ W $H = 18^h05^m11^s$ h about 50 km. by the Brunner Depth Chart. $\Delta_{S-P} = 21°.3$ $\Delta_{P-H} = 22°.8$ $\Delta_{meas} = 22°.0$
105	June 5	G–W G–W G–W G–W G–W G–W G–W	iP_{NEZ} e_N $iPcS_{NE}$ iS_N i_E M_N F_N	$11^h08^m28^s$ 11 14 10 11 14 24 11 14 31 11 15 56 11 21.0± 13 26	Epicenter by J.S.A. $\phi = 67°.0$ N $\lambda = 138°.7$ W $H = 11^h01^m00^s$ $\Delta_{P-H} = 39°.1$ $\Delta_{meas} = 39°.5$
106	June 17	G–W G–W G–W G–W G–W G–W G–W G–W G–W G–W	eP_Z iP_Z ePR_1EZ e_{EZ} iZ eS_E $e(ScS)_E$ eL_N eM_N F_E	$10^h36^m38^s$ 10 36 41 10 38 52 10 40 20 10 40 21.3 10 44 34.3 10 46 35 10 51 03 10 55 04 13 38	Epicenter by J.S.A. $\phi = 21°.0$ N $\lambda = 153.6$ W $H = 10^h27^m00^s$ $\Delta_{S-P} = 56°.5$ $\Delta_{P-H} = 56°.4$ $\Delta_{meas} = 56°.6$
107	June 18	G–W W–A W–A G–W W–A	eP_Z eP_E iP_E iS_N iS_E	$18^h49^m34^s$ 18 49 34 18 49 34.8 18 58 08.4 18 58 08.4	Epicenter by J.S.A. $\phi = 54°.0$ N $\lambda = 175°.4$ E $H = 18^h39^m17^s$ $\Delta_{S-P} = 62°.5$

No.	Date	Inst	Phase	G.M.C.T.	Remarks
107	June 18	W-A	i_E	$18^h58^m15^s$	$\Delta_{P-H} = 62.^\circ2$
		G-W	i_N	18 58 25.8	$\Delta_{meas} = 62.^\circ1$
		G-W	eL_{NE}	19 09.1	
		G-W	eM_E	19 12.5	
		G-W	F_E	21 20	
108	June 22	G-W	e_Z	$11^h55^m34^s$	Record weak.
		G-W	iS_{NEZ}	11 58 32	
		W-A	i_E	11 58 44.5	
		G-W	i_{NE}	11 59 00	
		G-W	i_{NE}	11 59 45	
		G-W	e_{NE}	12 02 28	
		G-W	i_{NE}	12 04 29	
			F lost in changing records at 15th hour.		
109	June 23	W-A	eP_E	$21^h46^m18^s$	Epicenter by J.S.A.
		G-W	iP_{NEZ}	21 46 20	$\phi = 26.^\circ0$ N
		G-W	iS_{NE}	21 50 10	$\lambda = 110.^\circ5$ W
					$H = 21^h41^m34^s$
					$\Delta_{S-P} = 21.^\circ0$
					$\Delta_{P-H} = 21.^\circ0$
					$\Delta_{meas} = 21.^\circ0$

Minor Seismic Activity:

June 2, 00^h11^m to 00^h19^m
June 3, 21 01 to 21 07
June 7, 07 41 to 09 51
June 11, 19 03 to 19 56
June 12, 12 57 (end lost)
June 2, 21^h13^m to 22^h01^m
June 7, 03 28 to 04 26
June 8, 05 09 to 06 51 (surface waves
June 12, 09 34 to 10 23
June 14, 17 30 to 18 22

Microseismic activity was relatively slight this month. Strong microseisms were recorded at the following times: June 2, 21^h to June 4, 11^h; June 15, 00^h to June 16, 15^h.

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

Edward J. Walter
Graduate Fellow

No.	Date	Inst	Phase	G.M.C.T.	Remarks
110	July 1	G–W G–W G–W G–W G–W G–W G–W	eP_{EZ} iP_{NZ} i_E iS_N eS_E M_E F_E	$21^h38^m05^s$ 21 38 06 21 39 57 21 44 50 21 44 53 21 55.1± 22 24	Epicenter in the region of $\phi = 44.^\circ0$ N $\lambda = 28.^\circ4$ W H about $21^h29^m43^s$ $\Delta S-P = 45.^\circ1$ $\Delta p-H = 46.^\circ0$ $\Delta meas = 46.^\circ0$
111	July 6	G–W G–W G–W G–W G–W G–W G–W	iP_{NEZ} ipP_Z iS_E iS_N isS_N iSR_1N F_E	$03^h47^m07^s$ 03 48 43 03 52 35 03 52 36 03 53 39 03 55 02 05 21	Epicenter by J.S.A. $\phi = 12.^\circ3$ N $\lambda = 64.^\circ4$ W $H = 03^h40^m24^s$ Depth 160 km. by Brunner Depth Chart. $\Delta S-P = 35.^\circ2$ $\Delta p-H = 35.^\circ2$ $\Delta meas = 35.^\circ0$
112	July 10	G–W G–W G–W G–W G–W G–W G–W G–W	iP_Z ipP_Z iZ iZ $iSKS_E$ iS_E isS_E F_E	$06^h01^m55^s$ 06 03 59 06 04 56 06 05 42 06 11 30 06 12 02 06 15 32 10 27	Epicenter by J.S.A. $\phi = 45.^\circ6$ N $\lambda = 128.^\circ6$ E $H = 05^h49^m50^s$ Depth 500–600 km by Brunner Depth Chart. $\Delta S-P = 89.^\circ5$ $\Delta p-H = 89.^\circ5$ $\Delta meas = 89.^\circ3$
113	July 13	G–W G–W W–A G–W G–W G–W G–W G–W G–W	eP_N iP_Z iP_N iZ e_N iS_E i_E i_E F_E	$16^h53^m50.^s6$ 16 53 51.0 16 53 51.3 16 54 49.3 16 58 54.2 16 59 00.2 17 00 26.2 17 00 56.2 20 12	Epicenter by J.S.A. $\phi = 9.^\circ1$ N $\lambda = 82.^\circ5$ W $H = 16^h47^m35^s$ $\Delta S-P = 30.^\circ5$ $\Delta p-H = 30.^\circ4$ $\Delta meas = 30.^\circ5$
114	July 14	G–W G–W G–W	iP_{NEZ} ipP_{NEZ} iS_E	$06^h03^m06^s$ 06 03 26 06 11 12	Epicenter by J. S. A. $\phi = 52.^\circ7$ N $\lambda = 177.^\circ6$ W

No.	Date	Inst	Phase	G.M.C.T.	Remarks
114	July 14	G-W	ipS_E	06 11 28	H = $06^h53^m18^s$
		G-W	isS_E	06 11 44	Depth about 80 km. by
		G-W	iSP_E	06 11 52	Brunner Depth Chart.
		G-W	i_E	06 12 14	$\Delta S-P = 59.^\circ0$
		G-W	F_E	10 44	$\Delta P-H = 58.^\circ8$
					$\Delta meas = 59.^\circ0$
115	July 19	G-W	eP_{EZ}	$04^h57^m57^s$	Epicenter by J.S.A.
		W-A	eP_E	04 58 00	$\emptyset = 50.^\circ7$ N
		W-A	iP_E	04 58 01	$\lambda = 177.^\circ9$ E
		G-W	iP_{NZ}	04 58 02	H = $04^h47^m39^s$
		W-A	eS_E	05 06 31	$\Delta S-P = 62.^\circ4$
		W-A	iS_{NE}	05 06 32	$\Delta P-H = 62.^\circ4$
		G-W	F_E	06 48	$\Delta meas = 62.^\circ4$
116	July 20	G-W	eP_Z	$02^h07^m16^s$	Epicenter in general
		G-W	$iSKS_E$	02 17 48.1	region between Samoa
		G-W	i_E	02 18 21.1	and Tonga Islands by
		G-W	e_N	02 18 26.1	J. S. A. Felt at Apia
		G-W	$i(SKKS)_E$	02 18 28.1	H = $01^h53^m54^s$
		G-W	iSR_{1E}	02 24 59.1	$\Delta P-H = 95.^\circ1$
		G-W	M_E	02 40.5±	Record weak.
		G-W	F_E	05 29	
117	July 21	G-W	eP'_Z	$15^h57^m37^s$	Epicenter in the
		G-W	ePR_{1Z}	15 59 49	region of $\emptyset = 1.^\circ8$ N
		G-W	$iSKP_Z$	16 00 58.4	$\lambda = 120.^\circ0$ E
		G-W	i_N	16 00 59.4	H about $15^h38^m27^s$
		G-W	i_N	16 06 13.4	$\Delta P-H = 129.^\circ5$
		G-W	F_N	18 12	
118	July 27	W-A	eP_{NE}	$13^h37^m45.^s6$	Epicenter by J.S.A.
		G-W	iP_Z	13 37 46.6	$\emptyset = 13.^\circ7$ N
		W-A	iP_{NE}	13 37 46.8	$\lambda = 91.^\circ3$ W
		W-A	iP_{NE}	13 37 48.1	H = $13^h32^m30^s$
		G-W	ipP_Z	13 38 06.6	h about 100 km. by
		G-W	iS_E	13 42 01.6	Brunner Depth Chart
		G-W	isS_E	13 42 34.6	$\Delta S-P = 24.^\circ6$
		G-W	i_E	13 42 49.6	$\Delta P-H = 24.^\circ9$
		G-W	F_E	17 23	$\Delta meas = 25.^\circ0$
119	July 30	W-A	e_E	$16^h10^m34^s$	Record weak.
		G-W	e_{NEZ}	16 10 35	
		G-W	e_N	16 14 44	
		G-W	$i(S)_E$	16 14 47	
		G-W	e_Z	16 14 54	
		W-A	e_E	16 17 35	

No.	Date	Inst	Phase	G.M.C.T.	Remarks
119	July 30	G-W	i_E	$16^h17^m49^s$	
		G-W	e_Z	16 19 24	
		G-W	F_E	17 12	
120	July 30	G-W	$e(S)_E$	$18^h35^m06^s$	Record weak.
		G-W	M_E	18 38.3±	
		G-W	F_E	19 08	

Minor Seismic Activity:

July 2, 20^h23^m to 22^h53^m (mainly surface waves), July 12, 19^h12^m to 19^h27^m; July 16, 00^h24^m to 00^h33^m; July 16, 03^h30^m to 06^h41^m (mainly surface waves); July 16, 20^h07^m to 21^h54^m (mainly surface waves); July 17, 00^h12^m to 00^h54^m (surface waves); July 17, 07^h28^m to 07^h55^m (surface waves); July 21, 04^h40^m to 04^h50^m; July 30, 00^h24^m to 02^h48^m; July 30, 05^h50^m to 07^h08^m.

No prominent microseismic activity was recorded during the month of July.

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

Edward J. Walter
Graduate Fellow

ADDENDA

Florissant Bulletin for June, 1940

No.	Date	Inst	Phase	G.M.C.T.	Remarks
	June 25	G-W	iP_Z	$03^h03^m41^s$	$\Delta S-P = 70°.7$
		G-W	iS_{NE}	03 12 59	Record weak.
		G-W	i_N	03 13 23	
		G-W	i_{NE}	03 13 25	
		G-W	F_E	03 50	
	June 25	G-W	e_Z	$04^h55^m45^s$	Record weak.
		G-W	i_Z	04 55 47	
		G-W	e_E	05 00 26	
		G-W	M_E	05 06.6±	
		G-W	F_E	05 36	
	June 26	G-W	i_Z	$08^h19^m40^s$	Record weak.
		G-W	i_Z	08 22 49	
		G-W	e_E	08 41 21	
		G-W	F_E	10 11	

Minor Seismic Activity:

June 23, 16^h13^m to 16^h25^m; June 23, 19^h15^m to 19^h42^m; June 26, 08^h19^m to 10^h11^m.

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

Month of August, 1940

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
121	Aug.1	G-W	iP_Z	$15^h21^m00^s.8$	Epicenter by J.S.A.
		W-A	iP_{NE}	15 21 01.3	ϕ = 44°.0 N
		G-W	$iP_c\ P_N$	15 21 02.3	λ = 139°.6 E.
		W-A	iE	15 21 14.2	$H = 15^h08^m24^s$
		W-A	iE	15 21 19.3	$\Delta S-P$ = 86°.4
		G-W	iS_N	15 31 38.3	$\Delta P-H$ = 85°.9
		W-A	eN	15 31 44	$\Delta meas$ = 86°.0
		W-A	$iSKKS_N$	15 31 46.3	
		W-A	$iSc\ S_N$	15 32 51.3	
		W-A	L_E	15 45.4	
		W-A	M_N	15 54.4	
		G-W	F_N	19 45	
122	Aug. 3	W-A	iP_E	$15^h29^m38.7^s$	Local shock
		W-A	iS_E	15 29 40.2	Another smaller shock
		W-A	iL_E	15 29 41.1	about $12^h48.8^m$
123	Aug. 4	W-A	iP_E	1 38 39.1	Local shock
		W-A	iE	1 39 00.3	Secondaries in minute
		W-A	iE	1 39 01.7	mark.
		W-A	iE	1 39 02.4	
124	Aug. 5	G-W	eP_Z	$8^h29^m51^s$	Tentative Epicenter
		G-W	eS_N	8 37 55	by J.S.A. ϕ = 40°.5 N.
		G-W	L_N	8 47.9	λ = 168°.5 W. $H = 8^h19^m.9$
		G-W	M_N	8 55.5	Record weak. $\Delta P-H$=59°.1
		G-W	F	9 41	$\Delta S-P$ = 57°.7
125	Aug. 7	W-A	eP_{NE}	$3^h06^m26^s$	Epicenter by J.S.A.
		G-W	eP_E	3 06 26	Near 23°.0 S, 71°.5 W.
		W-A	epP_N	3 06 54	$H = 2^h56.1^m$
		G-W	epP_E	3 06 55	h about 150 km by the
		W-A	epP_E	3 06 55	Brunner Depth Chart.
		G-W	iS_E	3 11 57	$\Delta P-H$ = 64°.8
		W-A	iS_E	3 14 53	
		G-W	isS_E	3 15 41	
		W-A	isS_E	3 15 41	
		G-W	iE	3 17 02	
		G-W	F	3 43	
126	Aug. 8	G-W	iP_Z	$13^h08^m24^s$	$\Delta S-P$ = 25°.2
		G-W	eP_E	13 08 25	Record weak
		G-W	eS_E	13 12 53	
		G-W	F	13 49	
127	Aug. 9	W-A	iP_E	$10^h32^m14.3^s$	Local shock
		W-A	iS_E	10 32 16.2	
		W-A	iL_E	10 32 17	

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
128	Aug. 9	W-A	iP_N	$23^h 54^m 47.4^s$	Local shock
		W-A	iP_E	23 54 47.8	
		W-A	iS_E	23 54 48.5	
		W-A	L_E	23 54 49.3	
129	Aug.10	W-A	iP_E	$19^h 35^m 38.1^s$	Local shock
		W-A	iS_E	19 35 39.9	
		W-A	iL_E	19 35 40.8	
130	Aug.11	G-W	iP_Z	$17^h 00^m 22.7^s$	$\Delta_{S-P} = 82°.5$
		G-W	eS_E	17 10 37	Record weak
		G-W	iS_E	17 10 40.7	
		G-W	$eSKKS_E$	17 11 00	
		G-W	L_E	17 30.7	
		G-W	M_E	17 32.4	
		G-W	F	18 27	
131	Aug.12	W-A	iP_E	$17^h 31^m 22^s$	Local shock
		W-A	iS_E	17 31 23	
		W-A	i_N	17 31 23.6	
		W-A	L_E	17 31 24	
		W-A	L_N	17 31 24.1	
132	Aug.13	W-A	eP_N	$5^h 15^m 57.8^s$	Local shock
		W-A	iP_E	5 15 58.1	Two disturbances
		W-A	eP_N	5 15 58.6	about 0.6 sec. apart.
		W-A	iP_E	5 15 58.7	Best shown on the
		W-A	iS_E	5 15 59.7	E-W record.
		W-A	iS_N	5 16 00.1	
		W-A	iS_E	5 16 00.3	
		W-A	iL_E	5 16 00.7	
133	Aug.13	W-A	iP_E	$15^h 13^m 35.9^s$	Local shock
		W-A	iP_E	15 13 36.6	
		W-A	iS_E	15 13 37.8	
		W-A	L_E	15 13 38.6	
134	Aug.13	G-W	iP_Z	$15^h 50^m 14.7^s$	Tentative Epicenter
		G-W	iP_Z	15 50 17.7	by J.S.A. $\emptyset = 132°.0$ E
		G-W	i_N	15 50 18.7	$\lambda = 49°.0$ N.
		G-W	iP_cPZ	15 50 24.7	$H = 15^h 37^m 49^s$
		G-W	$e(PR_1)Z$	15 53 55.7	$\Delta_{P-H} = 84°.3$
		G-W	eS_N	16 00 49	
135	Aug.13	W-A	eS_{NE}	$16^h 00^m 51^s$	
		W-A	eP_{SE}	16 01 33	
		W-A	eP_{SN}	16 01 37	
		W-A	eP_{SE}	16 01 38	
		G-W	$iP_{SN}Z$	16 01 38.7	
		G-W	i_Z	16 03 54.7	
		G-W	F	18 09	
136	Aug.15	G-W	eZ	$21^h 42^m 00^s$	Record weak
		G-W	$i(S)_{NE}$	21 47 32	
		G-W	iZ	21 50 22	
		G-W	eNE	21 50 23	
		G-W	F	22 50	

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
137	Aug.22	G-W	eP_Z	$3^h 36^m 16^s$	Epicenter by J.S.A.
		G-W	ePZ	3 36 20	$\phi = 52°.2$ N, $\lambda = 165°.8$W.
		G-W	iP_Z	3 36 27	$H = 3^h 27^m 17^s$
		G-W	$iPcP_Z$	3 37 51	$\Delta_{S-iP} = 52°.6$
		G-W	ePR_{1Z}	3 38 16	$\Delta_{iP-H} = 52°.3$
		G-W	iS_E	3 43 47	$\Delta_{meas} = 52°.3$
		G-W	$i(PS)_E$	3 44 24	Time uncertain
		G-W	iE	7 46	
138	Aug. 22	W-A	iP_N	$20^h 00^m 44.2^s$	Local shock
		W-A	iP_N	20 00 45.3	
		W-A	iS_{NE}	20 00 49.4	
		W-A	L_N	20 00 50.9	
		W-A	L_E	20 00 51.0	
139	Aug. 24	G-W	$(e)P_Z$	$13^h 44^m 35^s$	$\Delta_{S-P} = 92°.5$
		G-W	$(e)PR_{1Z}$	13 48 11	Record weak
		G-W	$iSKS_E$	13 55 08	
		G-W	eS_N	13 55 41	
140	Aug. 26	G-W W-A	eP_{ZN}	$2^h 37^m 03^s$	$\Delta_{S-P} = 52°.6$
		G-W	ipP_Z	2 37 28	h about 100 Km by
		W-A	ipP_N	2 37 30	Brunner Depth Chart
		G-W	eS_E	2 44 29	$H = 2^h 28^m 01^s$
		W-A	eS_{NE}	2 44 29	
		G-W	isS_E	2 45 14	
		G-W	F	3 07	
141	Aug.26	G-W	eP_Z	$5^h 07^m 58^s$	Epicenter by J.S.A.
		W-A	eP_N	5 07 58	near $2°.0$ N, $90°.5$ W.
		G-W	iPR_{2Z}	5 09 31	$H = 5^h 00^m.8$
		G-W W-A	eS_E	5 13 50	$\Delta_{S-P} = 36°.6$
		G-W	iS_E	5 13 54	$\Delta_{P-H} = 36°.8$
		G-W	e_N	5 13 57	
		G-W	iSR_{2E}	5 16 39	
		G-W	F	6 43	

Minor Seismic Activity

Aug. 3, $21^h 39^m$ to $22^h 00^m$; Aug. 4, $20^h 10^m$ to $21^h 34^m$;
Aug. 5, $10^h 43^m$ to $11^h 02^m$; Aug. 15, $4^h 22^m$ to $5^h 36^m$;
Aug. 16, $16^h 38^m$ to $17^h 21^m$; Aug. 18, $6^h 40^m$ to $7^h 49^m$ surface waves;
Aug. 24, $8^h 18^m$ to $8^h 50^m$; surface waves
Aug 27, $1^h 34^m$ to $2^h 27^m$;

No prominent microseismic activity was recorded during the month.

J. B. Macelwane, S.J.
Director

E. 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

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
142	Sept. 6	W-A	iP_E	$3^h02^m13.8^s$	$\Delta S-P = 67°8$
		G-W	iP_Z	3 02 14.3	Slight depth of focus
		G-W	ipP_Z	3 02 23.3	h about 40 km by
		W-A	ipP_Z	3 02 23.3	Brunner Depth Chart
		G-W	$epPcP_Z$	3 02 54	$H = 2^h51^m22^s$
		W-A	eS_N	3 11 11	Time approximately
		G-W	eS_{NE}	3 11 12	correct only
		G-W	iE	3 11 15.3	Record weak
		G-W	esS_N	3 11 30	
		W-A	esS_N	3 11 30	
		G-W	eNE	3 12 09	
		G-W	F	3 52	
143	Sept. 8	G-W	iP_Z	$10^h25^m53^s$	$\Delta S-P = 64°0$
		G-W	eS_E	10 34 36	$H = 10^h15^m24^s$
		G-W	F	11 19	Time approximately
					true only. Record weak
144	Sept.12	G-W	$(e)_Z$	$13^h35^m25^s$	Epicenter by Dominion
		G-W	eE	13 36 35	Observatory, Welling-
		G-W	eZ	13 36 37	ton, New Zealand
		W-A	eN	13 36 39	in Solomon Islands,
		W-A	eE	13 36 40	New Guinea Region
		G-W	iP'_Z	13 36 43	Focal depth 80-100
		G-W	i_Z	13 36 55	Km., Record weak
		G-W	eZ	13 40 23	Δ about 119°
		G-W	iPR_{2Z}	13 40 38	
		G-W	$eSKS_E$	13 43 43	
		G-W	eS_E	13 46 05	
		G-W	eS_Z	13 46 28	
		W-A	L_N	14 05.1	
		W-A	M_N	14 09.3	
		G-W	M_{EZ}	14 16.6	
		G-W	F	16 35	
145	Sept.19	G-W	eP_Z	$18^h34^m19^s$	Epicenter by New
		G-W	iPR_{1Z}	18 38 57	Zealand Dominion Ob-
		G-W	i_Z	18 39 21	servatory near 23°S
		W-A	$eSKKS_E$	18 45 57	and 169° E.
		G-W	$iSKKS_E$	18 45 57	$H = 18^h19.7^m$
		W-A	eS_N	18 46 46	U.S.C.G.S. gives
		G-W	iS_N	18 46 46	23°S, 171° E
		G-W	iSP_Z	18 48 31	$H = 18^h19.8^m$
		G-W	i_Z	18 48 46	Δ = about 113°
		G-W	i_N	18 48 49	
		G-W	$iPPS_Z$	18 49 36	
		G-W	$i(SR_1)_N$	18 54 24	
		G-W	i_N	18 58 44	
		G-W	i_N	19 01 00	
		W-A	L_N	19 05.3	
		G-W	M_E	19 16.1	
		G-W	F	21 38	

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
146	Sept.22	G-W	iP'_Z	$23^h09^m44^s$	Δ = about 110°.
		G-W	ipP'_Z	23 11 39	h = 500 Km by Brunner
		G-W	$ipPR_{1Z}$	23 12 15	Depth Chart
		G-W	iPR_{2E}	23 12 58	H = $22^h52^m18^s$
		G-W	i_Z	23 13 51	According to Manila
		G-W	$iSKS_E$	23 15 41	Station Bulletin
		W-A	$eSKS_N$	23 15 43	felt slightly at
		W-A	$eSKS_E$	23 15 46	Butnan and Hinatuan
		W-A	esS_N	23 17 23	
		W-A	esS_N	23 17 26	
		W-A	iS_E	23 17 27	
		G-W	iS_E	23 17 28	
		G-W	F	1 16	
147	Sept.23	G-W	i_E	$7^h33^m10^s$	
		G-W	e_E	7 34 10	
		G-W	i_E	7 36 27	
		G-W	F	7 47	
148	Sept.26	G-W	$(e)P_Z$	$4^h11^m17^s$	Δ = 112°.
		G-W	i_E	4 21 04	Depth greater than
		G-W	$iSKS_E$	4 21 56	normal
		G-W	e_E	4 24 36	
		G-W	iPS_E	4 25 09	
		G-W	F	5 50	
149	Sept.29	G-W	iP_Z	$1^h32^m54^s$	Δ = 72°8
		W-A	iP_N	1 32 54.9	h = about 150 Km.
		G-W	epP_Z	1 33 22	by Brunner Depth Chart
		W-A	epP_N	1 33 22	H = $1^h21^m41^s$
		G-W	e_Z	1 33 31	
		G-W	eS_{NE}	1 42 21	
		W-A	eS_N	1 42 21	
		G-W	ePS_N	1 42 58	
		G-W	esS_E	1 43 08	
		G-W	F	2 01	
150	Sept.30	G-W	$(e)_Z$	$11^h31^m35^s$	Record weak
		G-W	$e(S)_N$	11 39 08	
		G-W	e_N	11 46 20	
		G-W	M_N	11 59.3	
		G-W	F	13 04	

Minor Seismic Activity

Sept. 3, 15^h42^m to 16^h18^m mainly surface waves; Sept 8, 6^h27^m to 6^h31^m; Sept. 13, 11^h58^m to 12^h09^m; Sept. 20, 0^h56^m to 1^h50^m surface waves; Sept. 21, 14^h02^m F lost in changing records at 15 ; Sept. 23, 1^h40^m to 2^h04^m; Sept. 29 5^h12^m to 5^h31^m; Sept 29, 6^h12^m to 7^h14^m mainly surface waves. Microseisms Fairly strong on Sept.16-17 with maximum amplitudes from 23^hSept. 16 to 4h Sept 17. Sept. 23, 24, 25, 26 fairly strong.

J. B. Macelwane, S.J.
Director

E. J. Walter
Graduate Fellow

FLORISSANT

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

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
151	Oct. 1	G-W	iPNZ	10h53m49s	Epicenter by J.S.A.
		G-W	iPZ	10 53 51	Near 28°5 S, 72°0 W.
		W-A	iPN	10 53 51.2	P = 10h42m52s
		G-W	ipPZ	10 54 04	Focal depth about
		W-A	ipPN	10 54 05	100 Km by Brunner
		W-A	iPcPN	10 54 10	Depth Chart
		G-W	iPcPZ	10 54 10	Δs-p = 68°4
		G-W	iPR1Z	10 56 44	
		G-W	iNZ	10 58 26	
		W-A	eSNE	11 02 51	
		G-W	eSE	11 02 53	
		W-A	ePSNE	11 03 11	
		G-W	ePSN	11 03 11	
		G-W	esSE	11 03 19	
		G-W	iN	11 04 10	
		W-A	eN	11 04 10	
		G-W	F	12 05	
152	Oct. 2	G-W	ePZ	3h21m50s	Epicenter by J.S.A.
		G-W	ipPZ	3 22 01	In vicinity of 9°0 N
		G-W	iPR1Z	3 22 54	87°0 W.
		G-W	iZ	3 23 11	H = 3h15.2m
		G-W	iZ	3 25 46	Focal depth greater
		G-W	eSN	3 27 03	than 50 km.
		G-W	i(sS)Z	3 27 35	Δs-p = 31°8
		G-W	i(sS)N	3 27 37	
		G-W	iZ	3 28 23	
		W-A	eN	3 28 54	
		G-W	iN	3 28 57	
		G-W	iZ	3 29 03	
		G-W	F	4 34	
153	Oct. 4	G-W	iPZ	8h05m03s	Epicenter by J.S.A.
		G-W	ipPZ	8 05 17	Ø = 20°8 S,
		G-W	iZ	8 05 25	λ = 70°4 W.
		G-W	iPR1Z	8 07 36.6	H = 7h54m48s
		W-A	iE	8 13 21	Focal depth about
		W-A	iE	8 13 28.6	75 Km. by Brunner
		G-W	iSE	8 13 31	Depth Chart
		W-A	iE	8 13 44.6	Δs-p = 62°8
		G-W	isSE	8 13 58	Δp-H = 62°5
		G-W	iN	8 13 59	Δmeas = 62°7
		G-W	iE	8 14 48	
		G-W	F	11 47	
154	Oct. 5	G-W	iPZ	14 44 51	Epicenter by J.S.A.
		G-W	iZ	14 45 01	Ø = 8.7 S, λ = 84.6 W.
		G-W	iZ	14 45 14	H = 14 38 30
		G-	F	17 46	Δp-H = 30.9
					Δmeas = 30.6
					Secondaries lost in
					changing record

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
155	Oct. 6	G-W G-W G-W W-A G-W W-A G-W G-W G-W	iP_Z iP_Z iZ eS_{NE} iS_E e_E e_E e_E F	$15^h48^m36^s$ 15 48 41 15 49 22 15 56 50 15 56 50 15 57 14 15 58 08 15 58 25 17 47	Epicenter by J.S.A. Near 18° S, 71° W. $H = 15^h38^m7$ $\Delta_{S-P} = 59°3$ $\Delta_{P-H} = 58°7$ $\Delta_{meas} = 59°5$
156	Oct. 11	G-W G-W G-W G-W G-W G-W G-W	iP_{EZ} iP_N iZ $iPcPZ$ eS_N e_E F	$8^h01^m08^s$ 8 01 09 8 01 28 8 03 05 8 07 37 8 11 02 8 45	Epicenter by J.S.A. Region of Ø = 61°0 N = 149°0 W. $H = 7^h53.3^m$ $\Delta_{S-P} = 48°4$ $\Delta_{P-H} = 41°8$ $\Delta_{meas} = 42°2$
157	Oct. 11	W-A G-W G-W G-W G-W W-A G-W G-W G-W G-W	eP_N iP_{NZ} $i(PcP)_Z$ iZ iS_E iS_N i_N eSR_{1N} M_E F	$18^h53^m29^s$ 18 53 31 18 53 35 18 54 03 19 03 42 19 03 43 19 03 47 19 09 18 19 28.3 ± 22 32	Epicenter by J.S.A. Ø = 40°7 S = 73°6 W. $H = 18^h41^m17^s$ $\Delta_{S-P} = 81°1$ $\Delta_{P-H} = 81°2$ $\Delta_{meas} = 81°2$
158	Oct. 22	W-A G-W W-A W-A G-W W-A G-W G-W W-A G-W G-W G-W	$(e)P_N$ $(e)P_Z$ eP_E epP_E ipP_Z eS_E iS_N iS_E eSP_N iSP_{NE} isS_N F	$6^h48^m48^s$ 6 48 48 6 48 50 6 49 20 6 49 20 6 58 31 6 58 31 6 58 32 6 59 18 6 59 18 6 59 33 7 56	Epicenter by J.S.A. In Roumania near epicenter of the shock of Nov. 10, 1940. Perhaps in vicinity of 46° N, 27° E. $H = 6^h37.1^m$ Depth at least 130 Km. $\Delta_{S-P} = 77°4$ $\Delta_{P-H} = 78°0$
159	Oct. 24	W-A G-W W-A G-W G-W G-W G-W W-A G-W W-A G-W G-W	iP_N ePZ iP_N iP_Z epP_Z $i(PcP)_Z$ eS_{NE} iS_E e_E i_E iPS_E F	$20^h18^m25^s$ 20 18 26 20 18 26 20 18 29 20 18 43 20 18 52 20 27 55 20 27 56 20 28 24 20 28 29.6 20 28 32 21 15	Epicenter by J.S.A. near 33°5 S, 73°0 W. $H = 20^h07^m$ Focal depth about 100 Km. $\Delta_{S-P} = 73°6$ $\Delta_{P-H} = 74°9$

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
160	Oct. 27	G-W	iP_{NZ}	$5^h41^m37^s$	Epicenter by J.S.A.
		G-W	iPR_{1Z}	5 42 19	ϕ = 10°0 N
		G-W	iPR_{2Z}	5 42 41	λ = 84°7 W.
		G-W	iPR_{3Z}	5 42 55	H = $5^h35^m35^s$
		G-W	iZ	5 42 59	Δ_{S-P} = 29°5
		G-W	iS_N	5 46 40	Δ_{P-H} = 28°8
		G-W	i_N	5 46 50	Δ_{meas} = 29°2
		G-W	iE	5 47 46	
		G-W	iE	5 48 17	
		G-W	iE	5 48 45	
		G-W	F	8 53	

Minor Seismic Activity_

Oct. 1	21^h07^m	to 00^h13^m	
Oct. 3	11 10	to 11 49	surface waves
Oct. 5	18 24	to 18 53	surface waves
Oct. 6	20 34	to 20 54	
Oct. 7	07 09	to 08 32	
Oct.13	14 15	to 14 55	surface waves
Oct.15	7 09	to 7 30	
Oct.19	11 47	to 12 17	surface waves
Oct.30	3 41	to 4 09	surface waves
Oct.31	10 48	to 11 22	surface waves

Microseisms were recorded on the following days:

Oct 9, Oct. 17, 18, fairly strong; Oct. 20, 21 strong;
Oct. 22, 23, 24; Oct 25, strong; Oct 26, 27 28;
Oct. 29, strong; Oct. 30, 31.

James B. Macelwane, S.J.
Director

E. J. Walter
Graduate Fellow

FLORISSANT

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Bulletin for November, 1940

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
161	Nov. 1	G-W G-W G-W G-W	iP_Z iS_N iM_N F	$15^h57^m56^s$ 16 02 16 16 05 44 16 30	$\Delta S-P = 24^\circ.1$ $H = 15^h52^m40^s$ Probably in Central America
162	Nov. 2	G-W G-W G-W	eE ME F	$23^h52^m16^s$ 0 02.4± 0 37	
163	Nov. 3	G-W G-W G-W	eE ME F	$2^h28^m15^s$ 2 36.6± 2 43	
164	Nov.10	No time on records			Epicenter by J.S.A. $\phi = 45^\circ.2N, \lambda = 26^\circ.1$ E. $H = 1^h39^m14^s$ Focal depth 150 Km. by Brunner Depth Chart
165	Nov.10	G-W G-W G-W G-W G-W G-W G-W G-W	iPZ iZ $i(PR_1)_Z$ iS_E iS_N iS_E M_E F	$20^h45^m45^s$ 20 45 56 20 46 05 20 49 42 20 49 49 20 49 50 20 53 31 21 41	$\Delta S-P = 21^\circ.5$ $H = 20^h40^m55^s$ Time approximately correct
166	Nov.16	G-W W-A G-W G-W G-W	iP_Z iP_{NE} eS_N ePS_N F	$2^h37^m32^s$ 2 37 33 2 46 10 2 46 40 3 47	$\Delta S-P = 63^\circ.1$ $H = 2^h27^m09^s$
167	Nov.19	W-A W-A W-A W-A W-A G-W	eS_E iS_E esS_N esS_E esS_{NE} F	$15^h25^m16^s$ 15 25 19 15 25 34 15 25 37 15 25 39 17 06	Epicenter by J.S.A. near $40^\circ.7$ N, $142^\circ.3$ E. $H = 15^h01^m47^s$ Focal depth about 50 Km. $\Delta eS-H = 88^\circ.0$ Preliminaries lost in changing records.
168	Nov.23	W-A G-W G-W G-W G-W	ePN iP_{NZ} eS_N eS_N F	$3^h55^m02^s$ 3 55 04 4 00 05 4 00 10 5 09	Epicenter by J.S.A. $\phi = 9^\circ.9$ N, $\lambda = 83^\circ.8$ W. $H = 3^h48^m55^s$ $\Delta S-P = 29^\circ.4$ $\Delta iP-H = 29^\circ.4$ $\Delta meas = 29^\circ.5$

Minor Seismic Activity: Nov 8, 10^h52^m to 13^h14^m surface waves; Nov.9, 11^h53^m to 12^h18^m surface waves; Nov.10, 22^h23^m to 22^h52^m surfacewaves; Nov.15, 14^h41^m to 15^h15^m; Nov. 17, 4^h08^m to 4^h34^m; 7^h06^m to 8^h10^m; 21^h00^m to 21^h16^m; Nov.22, 10^h00^m to 10^h27^m surface waves. Nov.26, 2^h04^m to 2^h30^m

J. B. Macelwane, S.J., Director E. J. Walter, Grad.Fellow

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No.	Date	Inst.	Phase	G.M.C.T.	Remarks
169	Dec. 7	W-A	iP_E	$22^h21^m17.7^s$	Epicenter by Pasadena
		W-A	i_E	22 21 20.4	ϕ = 31°.7 N,
		W-A	e_E	22 21 25.7	λ = 115°.1 W.
		G-W	eS_N	22 25 25	H = $22^h16.5^m$
		G-W	eS_E	22 25 29	Felt at San Diego
		W-A	iL_E	22 27 53.0	$\Delta S-P$ = 22°.6
		W-A	iL_E	22 27 53.4	
		G-W	iM_Z	22 29 47	
		G-W	F	22 35	
170	Dec.20	W-A	ePE	$7^h30^m55.7^s$	Epicenter by J.S.A.
		W-A	i_E	7 30 57.2	ϕ = 43°42' N
		W-A	iS_E	7 33 52.2	λ = 71°26' W.
		W-A	i_E	7 33 56.5	H = $7^h27^m28^s$
		W-A	i_E	7 34 41.2	Felt throughout
		W-A	i_E	7 34 50.7	New England. This
		W-A	iL_E	7 35 11.7	epicenter was deter-
		W-A	iL_E	7 35 15.4	mined by using hyper-
		W-A	F	7 54	bolas with Leet's velocity for New England, V = 8 Km/sec and assuming the arrivals at Harvard, Williamstown, Ottawa and Fordham to be the P determined by this velocity. ΔP_H = 1620 Km. Δmeas = 1657 Km or 14°.9. A joint investigation of this shock has been undertaken by Harvard and Weston.
171	Dec. 20	W-A	eP_E	$23^h46^m34^s$	Epicenter by Pasadena
		W-A	i_E	23 47 26	Region of 40°N, 124° W.
		W-A	eS_N	23 50 58	Felt in Humbolt and
		W-A	iM_E	23 55 13	Mendocino counties, Cal.
		G-W	F	00 34	$\Delta S-P$ = 24°.6
172	Dec.22	G-W	$(e)P_Z$	$12^h45^m37^s$	Epicenter by J.S.A.
		G-W	e_Z	12 46 08	Region of 13° S,
		G-W	i_Z	12 55 33	178° W. H = approxi-
		G-W	$e(SKS)_Z$	12 56 18	mately 12^h32^m
		G-W	ePS_Z	12 58 07	$\Delta PS-H$ = 96°.9
		G-W	$e(SR_1)_Z$	13 04 02	
		G-W	L_Z	13 17.0	
		G-W	M_Z	13 20.7	
		G-W	F	15 14	
173	Dec.22	G-W	iP_{NZ}	$19^h09^m18^s$	Epicenter by J.S.A.
		G-W	ipP_{NZ}	19 10 09	Region of 14° S, 71° W
		W-A	eS_N	19 16 55	H = $19^h09.2^m$
		G-W	iS_E	19 16 56	Focal depth about
		G-W	iPS_N	19 17 24	250 Km. by Brunner
		W-A	isS_E	19 18 16	Depth Chart
		W-A	isS_N	19 18 19	$\Delta P-H$ = 55°.5
		W-A	$ipPS_N$	19 18 50	
		G-W	$ipPS_E$	19 18 50	
		G-W	F	20 18	

No.	Date	Inst.	Phase	G.M.C.T.	Remarks
174	Dec. 24	W-A	eP_N	$13^h47^m15.5^s$	Epicenter by J.S.A.
		W-A	iP_E	13 47 18.5	$\phi = 43^o42'$ N,
		W-A	iE	13 49 56	$\lambda = 71^o26'$ W.
		W-A	iS_E	13 50 03.5	$H = 13^h43^m46^s$
		G-W	iZ	13 50 18.5	This shock was located
		G-W	iL_Z	13 51 31.5	at the same epicen-
		W-A	iL_E	13 51 34.5	ters as that of Dec.
		W-A	F	14 11	20, G.M.T. hyper-
					bolas were used with
					Leet's velocity for New England, V = 8 Km/sec
					assuming the first arrivals at Weston, Williamstown,
					Fordham and Ottawa to be the P defined by the velocity
					$\Delta iP-H = 15.0$ A joint investigation of this shock
					$\Delta_{meas} = 14.9$ has been undertaken by Harvard and
					Weston.
175	Dec. 28	G-W	iP_Z	$16^h51^m33^s$	Epicenter by J.S.A.
		G-W	iZ	16 52 15	$\phi = 18.^o3$ N
		G-W	eZ	16 55 12	$\lambda = 146.^o7$ E.
		G-W	$iPR1_Z$	16 55 48	$H = 16^h37^m42^s$
		G-W	$i(SKS)_Z$	17 02 28	$\Delta_{meas} = 101.^o9$
		G-W	iPS_E	17 04 48	$\Delta P-H = 101.^o1$
		G-W	iE	17 04 57	
		G-W	F	20 12	
176	Dec. 29	G-W	eZ	$16^h50^m08^s$	
		G-W	iE	16 50 56	
		G-W	F	17 14	
177	Dec. 29	G-W	iE	$18^h18^m39^s$	
		G-W	F	18 42	

Minor Seismic Activity

Dec. 1, 21^h22^m to 21^h55^m
Dec. 16, 0 02 to 00 18
Dec. 17, 15 03 to 17 04 mainly surface waves
Dec. 18, 4 45 to 05 03 mainly surface waves
Dec. 30, 21 03 to 21 24

Microseisms: Much activity was recorded during this month on the following days: Dec. 2, starting about 21 hr. reaching a maximum about Dec. 4, 0 hr then gradually dying out on Dec. 6. Dec. 7, starting about 8 hr continuing through and dying out on Dec. 9. Dec. 11, starting about 18 hr and continuing through Dec. 12 and 13 with large amplitudes, dying on the 14 and 15, then increasing and fading on the 16th. Dec. 18, 19, 20, small amplitudes. Dec. 22, increasing on the 23rd. Dec. 30, small.

J. B. Macelwane, S.J.
Director

E. J. Walter
Graduate Fellow