THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR September 1939

Lat. 40°26.7'N. Long. 79°57.2'W. Elevation – 273 meters

Lithologic Foundation – Birmingham shale

INSTRUMENTS

Two Wenner horizontal seismographs (Orientation N30W and N60E)

One Benioff vertical seismograph

Two special horizontal seismographs (mechanical recording) (Orientation NS and EW)

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETERS FREE PERIOD T_1	PENDULUM FREE PERIOD T_o	DAMPING CONSTANT	V
Wenner N30W	Oct. 15, 1939	15 secs.	10 secs.		
Wenner N60 E	" " "	15.6 secs.	10 secs.		
Benioff Z	" " "	12.8 secs.	1 sec.		
Special NS	not yet completed				
Special EW	not yet completed				

TIME SERVICE: U. S. Naval Observatory signals automatically recorded several times daily. Secondary signals manually recorded from land line to radio station KDKA, Pittsburgh.

GNWCH DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Sept. 8	Z	iP	12-15-33				Record not readable after arrival of S
	Z	[illegible]	[illegible]				U.S.C. & G.S. gives
	H_{NW}	eP[illegible]	12-19-40				λ = 51° North
	H_{NE}	iS	12-24-43			7600 kms.	φ = 175° [illegible] Depth = 60 kms. H = 12-04-45
Sept. 10	Seismic activity centering at about 18 h., G.M.T.						
Sept. 11	Seismic activity centering at about 8 hrs., G.M.T.						
Sept. 20	Near seismic activity at about 00.5 hrs. G.M.T. (Possibly same center as quake at 3 hrs. G.M.T.)						

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Sept.20	Z	eP_n	3-58-03	Δ_{Sn-Pn} =	2°.95 =	203 miles	
	Z	eP^+	3-58-07	P_n-H =	47 secs.		
	Z	eS_n ?	3-58-39	H_n = 3-57-16		G.M.T.	
	Z	eS^+	3-58-43				
	N60E	iS^+	3-58-43	$\Delta_{s^+-p^+}$ =	2°.9 =	200 miles	
	N30W	eS^+	3-58-42	P^+- H =	52 secs.		
				H_+ = 3-57- 16 (G.M.T.)			
	(Also reported by V. C. Stechschulte, S. J. at Cincinnatti as about 200 miles from that station.						
Sept.21	N60E	Seismic activity centering at about 12 hr. G.M.T.					
Sept.21	N60E	eP ?	12-50-36	Δ_{s-p} =	31°.6 =	2180 miles	
	N60E	e ?	12-52-14	H = 12-44-09			
	N60E	eS	12-55-53				
	N60E	eL	13-60-25				
Sept.21	N60E	e(P)	21-33-43	$\Delta_{(s-p)}$ =	29°.5 =	2035 miles	
	N60E	eS	21-38-45	H = 21-27-35			
	N60E	i ?	21-40-02	U.S.C. & G.S. gives		= 30° N.,	
	N60E	eL	21-42-53	φ = 114° W.	H = 21h-27-25		
	N60E	iM	21-45-50	Δ = 3320 kms.			
Sept.22	N60E	e ?	00-47-30	Some destruction in Smyrna, Turkey. (Assoc. Press)			
	Z	eP ?	00-48-29			76°.6	
	N60E	ePR_2 ?	00-52-41			8510 kws.	
	N60E	e ?	00-56-06				
	N60E	i S -	00-58-18	P-H = 11_m- 48 secs.			
				H = 00 - 36 - 41			
	N60E	ePS ?	00-58-41				
	N60E	i	00-59-11				
	N60E	e	01-01-01				
	N60E	eSR_1	01-03-22				
	N60E	eSR_2	01-06-28				
Sept.26	Seismic activity centering at about 11 hr. G.M.T.						

D. C. BRADFORD
Director

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR October 1939

Lat. 40°26.7'N. Long. 79°57.2'W. Elevation – 273 meters

Lithologic Foundation – Birmingham shale

INSTRUMENTS

Two Wenner horizontal seismographs (Orientation N30W and N60E)

One Benioff vertical seismograph

Two special horizontal seismographs (mechanical recording) (Orientation NS and EW)

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETERS FREE PERIOD T_1	PENDULUM FREE PERIOD T_o	DAMPING CONSTANT	V
Wenner N60E	Oct. 15, 1939	15.6 secs.	10 secs.		
Wenner N30W	Oct. 15, 1939	15. 0 secs.	10 secs.		
Benioff Z	Oct. 15, 1939	12.8 secs.	1 sec.		
Special (NS)	Not yet completed				
Special (EW)	Not yet completed				

TIME SERVICE: U. S. Naval Observatory signals automatically recorded several times daily. Secondary signals manually recorded from land line to radio station KDKA, Pittsburgh.

GNWCH DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Oct 4	Seismic activity centering at about		22 hr. 30 min. GMT.				
Oct 8	Seismic activity centering at about		00 hr. 8 min. GMT.				
Oct 9	Seismic activity centering at about		3 hr. GMT.				
Oct 10	Z	e ?	18-46-26	Possible epicentral	dist.=7409=8265	kms.	
	Z	e ?	18-49-00				
	N60E	iS	18-56-05	Possible depth of Focus=50	kms.		
	N60E	isS	18-56-25				
	N60E	eSR1	19-02-01				
Oct.14	Seismic activity at about 6 hr. 10 min. GMT.						

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Oct. 17	N60E N30W	iPR_1	06-41-52	U.S.C.&G.S. gives λ=16°.0 S.; φ=168°.0 E. H=06h.-22.0 m. GMT. Depth of focus approximately 100 kms. Δ=117°.0=13,000 kms.			
	N60E N30W	e ?	06-42-35				
	N60E N30W	iS_cP_cS	06-47-28				
	N60E N30W	$iS_cP_cP_cS$	06-48-44				
	N60E N30W	iPS	06-51-29				
	N60E N30W	ePPS	06-52-39				
	N60E N30W	iSR_1	06-56-26				
Oct. 19	Z	iP_n	11-56-34	Δ(S-P)=10°.3=1145 kms. P_n-H=2 min. 30 secs. H=11-54-04 U.S.C.&G.S. gives λ=48°.0 N.; 70°.0 W. H=11-54.0 G.M.T. Shook Eastern Canada and New England. Not felt in Pittsburgh.			
	Z	i?	11-56-56				
	Z	i?	11-57-10				
	Z	i?	11-57-10				
	N60E	iS_n	11-58-40				
	Z	iSR_i?					
Oct. 20	Seismic activity centering at about 19.5 hrs. G.M.T.						

D. C. Bradford,
Director.

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

November, 1939

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Nov. 13	Z	iP	07-52-15	U.S.C. & G. S. gives λ=47°35'N.,			
	Z	i ?	07-52-48	φ=123 15'W. Δ=3500 kms.			
	Z	iPR_1 ?	07-53-14	H=07h.-45 m.-49 secs. G.M.T.			
	Z	iPR_2	07-53-23	If 07-57-24 is arrival time of S,			
	Z	i ?	07-56-35	then Δ = 30.7 instead of 31.5 as given			
	Z	i ?	07-56-57	H would then be 07h.45m.-57secs.			
	Z, NE, NW	iS ?	07-57-24	Strongly felt in Puget Sound Basin			
	NE-NW	iS	07-57-30	(Very heavy microseisms)			
	Later phases obscured by microseisms on horizontal components.						
Nov. 15	Z	e ?	02-55-34	Δ= 330 miles (approximately)			
	Z	i	02-55-46	U.S.C. & G.S. gives φ=39045'N.,			
	Z	i ?	02-55-48	λ = 75°18' W. Shook Philadelphia			
	Z	i ?	02-55-49	H=02-53-48			
	Z	iS_n	02-55-55	Very weak phases. Pg, P*, & P_n not recorded.			
Nov.17	Seismic activity centering around 20h.-30m. G.M.T.						
Nov.18	Seismic activity centering around 12h., G.M.T.						
Nov.21	Local distrubance at 19h-52m., G.M.T. Nature unknown.						
Nov.21	Z	iP	11-15-02	U.S.C. & G.S. gives φ=10°N.,			
	Z	i ?	11-15-39	λ=60E°. Provisional epicenter.			
	Z	i ?	11-15-58	H=11 hr.-01 m-12 secs.			
	Z	$i(PR_1)$?	11-19-09	Δ=13,100 kms. D=200kms.			
	NE, NW	$iS_cP_cP_cS$	11-26-55				
	NE, NW	i ?	11-27-22				
	NE, NW	i ?	11-28-44				
	NE, NW	i ?	11-29-39				
	NE, NW	i ?	11-29-15				
Nov.23	Quake in Missouri partially recorded. Recording unit was being readjusted and timing mechanism was shut down						
Nov.24	Seismic activity centering around 00h.-30m. G. M.T.						
Nov.28	Seismic activity centering around 02h.-30m. G.M.T.						
Nov.29	Seismic activity centering around 04h-50m. G.M.T.						

D. C. Bradford,
Director

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR November 1939

Lat. 40°26.7'N. Long. 79°57.2'W. Elevation – 273 meters

Lithologic Foundation – Birmingham shale

INSTRUMENTS

Two Wenner horizontal seismographs (Orientation N30W and N60E)

One Benioff vertical seismograph

Two special horizontal seismographs (mechanical recording) (Orientation NS and EW)

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETERS FREE PERIOD T_1	PENDULUM FREE PERIOD T_o	DAMPING CONSTANT	V
Wenner N30°W	October 15, 1939	15 secs.	10 secs.		
Wenner N60°E	October 15, 1939	15.6 secs.	10 secs.		
Benioff Vertical	Octob er 15, 1939	12.8 secs.	1 sec.		
Special NS	Not yet completed.				
Special EW	Not yet completed.				

TIME SERVICE: U. S. Naval Observatory signals automatically recorded several times daily. Secondary signals manually recorded from land line to radio station KDKA, Pittsburgh.

GNWCH DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Nov.5	Z	i ?	02-11-25	0.2 sec.	Either near quake or blast.		
	Z	i ?	02-11-27		No information.		
	Z	i ?	02-11-30				
	Z	i ?	02-11-32				
	Z	e ?	02-12-21				
Nov.7	Seismic activity centering around 14th hour, G.M.T.						
Nov11	Seismic activity centering around 8 hour-30 minute, G.M.T.						
Nov11	Seismic activity centering around 9 hour-15 minute, G.M.T.						

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR December 19

Lat. 40°26.7'N. Long. 79°57.2'W. Elevation – 273 meters

Lithologic Foundation – Birmingham shale

INSTRUMENTS

Two Wenner horizontal seismographs (Orientation N30W and N60E)
One Benioff vertical seismograph
Two special horizontal seismographs (mechanical recording) (Orientation NS and EW)

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETERS FREE PERIOD T_1	PENDULUM FREE PERIOD T_o	DAMPING CONSTANT	V
Wenner N60E	October 15, 1939	15.6 secs.	10 secs.		
Wenner N30W	October 15, 1939	15 secs	10 secs.		
Benioff Z	October 15, 1939	12.8 secs.	1 sec.		
Special N-S	Not yet completed.				
Special E-W	Not yet completed.				

TIME SERVICE: U. S. Naval Observatory signals automatically recorded several times daily. Secondary signals manually recorded from land line to radio station KDKA, Pittsburgh.

GNWCH DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
c. 5	Z	iP	08-36-03	Δ = 26°9 (S-P)			
	Z	iPR_1	08-36-43	H = 08h-?0m-19s.			
	NW-NE	e ?	08-40-28	U.S.C. & G.S. gives provisional epicenter			
	NW-NE	i ?	08-40-30	as Lat. 14°5 N., Long. 92°5 W.			
	NW-NE	iS	08-40-46	H = 08h-30m-12s.		Δ = 27°9 = 3,100 kms.	
c. 7	Z	i ?	11-26-56	May be blasting.	No information		
c. 16	Z	iP	10-59-07	U.S.C. & G.S. gives Lat. 41°9 N., Long.			
	Z	ipP	10-59-07	147°3 E. H = 10h-46m-30s. Focus probabl			
	Z	i ?	10-59-30	about 80 kms. deep.			
	Z	iPR_1	11-02-30				
	NW-NE	iS	11-09-34				
	NW-NE	isS	11-10-04				

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

December, 1939

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Dec. 16	NE	Seismic activity centering around 18h-10m.					
Dec. 18	NE	Seismic activity centering around 07h-35m.					
Dec. 21	Z	iP	21-01-06	$\Delta_{(S-P)}$ = 29°.8 = 3,310 kms.			
	Z	e	21-01-54	H = 20h-54m-55s.			
	Z	iPR_2	21-02-12	Epicenter not yet received from			
	NE-NW	iS	21-06-04	Coast and Geodetic Survey.			
	NE-NW	iS	21-06-10				
Dec. 21	Z	iP	21-19-35	Epicenter not yet received from			
	Z	i ?	21-19-48	Coast and Geodetic Survey.			
	Z	i ?	21-20-05				
	Z	i ?	21-20-20				
	Z	i ?	21-20-37				
	Z	$i(PR_1)$?	21-23-18				
		All later phases obscured by motion of previous quake.					
Dec. 22	Z	e ?	04-50-18	Epicenter not yet received from			
	Z	i ?	04-50-22	Coast and Geodetic Survey.			
	Z	e ?	04-51-24				
	Z	i ?	04-54-57				
	NW	i ?	04-55-36				
	NE-NW	i ?	04-55-41				
Dec. 22	Z	e ?	07-10-38	Epicenter not yet recieved from			
	Z	e ?	07-13-02	Coast and Geodetic Survey.			
	NE-NW	e ?	07-14-39				
	NE-NW	i ?	07-14-50				
	NW	i ?	07-16-45				
Dec. 23.	Z	iP_n ?	12-36-52	If P_n and S_n are real, we have			
	Z	iP* ?	12-36-54	$\Delta(S_n-P_n)$ = 110 miles.			
	Z	i ?	12-36-57	H = 12h-36m-24s.			
	Z	$i(S_n)$	12-37-13	No information has been received			
	Z	i ?	12-37-15	regarding location of the Shock.			
	Z	i ?	12-37-21				
Dec. 23		Seismic activity centering around 17h-38m. Phases not quite distinct enough to read with accuracy.					

THE UNIVERSITY OF PITTSBURGH

SEISMOLOGICAL OBSERVATORY

PITTSBURGH, PENNSYLVANIA

December, 1939

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Dec. 26	Z	eP	12-01-16	$\Delta_{(S-P)}$ = 33.7 = 3,745 kms.			
	Z	i ?	12-01-54				
	NW-NE	i ?	12-05-44	H - 11h-54m-31s.			
	NW	iS	12-06-17				
	NE	i ?	12-07-26				
Dec. 27	Z	eP	00-09-45	Heavy shock in Central Turkey.			
	Z	iP	00-09-49	Epicenter not yet received from			
	Z	iP	00-09-53	Coast and Geodetic Survey.			
	Z	i ?	00-10-10	If pP phase is real, it would appear			
	Z	ipP ?	00-10-31	that focus was about 150 kms. deep.			
	NW-NE	i ?	00-11-22	$\Delta_{(S-P)}$ = 82.8 = 9,2000 kms. (Distance			
	NW-NE	i ?	00-13-57	uncorrected for depth of focus).			
	NW-NE	i ?	00-15-18	H - 23h-57m-23s. 12/26/39.			
	NW-NE	i ?	00-16-42	It would appear from these records that			
	NW-NE	i ?	00-17-06	there were three separate shocks within			
	NW-NE	i ?	00-13-55	ten seconds. Have they been noticed by			
	NW-NE	i ?	00-19-13	other stations?			
	NW-NE	i ?	00-19-40				
	NW-NE	iS	00-20-05				
		Later phases too heavy to read. Light spots moving too fast to properly expose paper.					

Donald C. Bradford
Director