THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR January 1940

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 N 30° W	October 15, 1939	15 secs.	10 secs.		
Wenner N 60° E	October 15, 1939	15.6 secs.	10 secs.		
Benioff Vertical	October 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
Jan2	Seismic activity centering around 11 h.-50 m. G.M.T.						
Jan4	Seismic activity centering around 1 h-50 m. G.M.T.						
Jan6	Seismic activity centering at about 7 h-10 m. G.M.T.						
Jan6	Seismic activity centering at about 9 h-05 m. G.M.T.						
Jan13	Seismic activity centering at 5 h-30 m. G.M.T.						
Jan17	Quake recorded, centering at 1 h-40 m. G.M.T. Heavy microseisms obsure most of preliminary phases.						
Jan26	Seismic activity centering at about 8 h. G.M.T.						
Jan28	Seismic activity centering around 8 h-50 m. G.M.T.						

D. C. Bradford
Director

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR February 19 40

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 N 30° W	October 15 1939	15 secs.	10 secs.		
Wenner N 60° E	October 15 1939	15.6 secs.	10 secs.		
Benioff Vertical	October 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
Feb 2	NE	Seismic activity centering at about 06h - 40m. G.M.T.					
Feb 7	Z	ip	17-27-00	0.5 sec.	S-P= 8-53	Δ(s-p)= 65°.7	
	Z	i ?	17-27-17	0.5 sec.	H= 17-16-20		
	NE	iS	17-35-53	9 secs.	Depth apparently greater than normal.		
	NE, NW	i(sS)?	17-36-51	7 secs.	U.S.C. and G.S. gives.		
	NE, NW	eSR_1	17-41-01		H= 17h-15m-56s Lat. 52°N, Long. 174.5°E Δ= 7500 Kms. Depth normal.		

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Feb 8	NE	e(S) ? eL F	08-19-04 08-24-30 09-10	5 secs.			
Feb 8	Seismic activity at 23h-40 min. G.C.T.						
Feb 14	Seismic activity centering about 00h-12m. G.C.T.						
Feb 16	Seismic activity centering about 14h-40m. G.C.T.						
Feb 20	Seismic activity (telesism) centering at about 04h-30min. G.C.T.						
Feb 20	Trace of telesism at 14h-30m. G.C.T.						
Feb 20	Trace of telesism at 21h-30m. G.C.T.						
Feb 22	Seismic activity centering at 07h-10m. G.C.T.						

D. C. [illegible]

Director

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR March 1940

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 N 30° W	October 15, 1939	15 secs.	12 secs.	E= 5:1	
~~Wenner N 60° E~~	~~October 15, 1939~~	~~15.6 secs.~~	~~12 secs.~~	~~E= 5:1~~	
Benioff Vertical	October 15, 1939	12.8 secs.	1 sec.	E is equal to the damping ratial	
~~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
3	Seismic activity centering at 1 hr. and 15 min. (G.M.T.)						
4	Z	eP	20-06-46	0.25s	s-p=6-08		
	NW-NE	jS	20-12-54	?	Δ (s-p)		
	NW-NE	eL	20-17-45	0.26s	H= 19h.-59m.-19s.		G.M.T.
		F	20-40				
6	NW,NE	eS	00-13-31				
	NW,NE	eL	00-20-14				
6	Seismic activity centering around 06h-20 m (G.M.T.)						
7	Seismic activity centering at 07h-50m (G.M.T.)						
9	Seismic activity centering at 05h-34m (G.M.T.)						

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
9	seismic activity centering at 16h 09 (G.M.T.)						
14	Z	i(P)	18-42-22				
	Z	i	18-42-45				
	NW	e ?	19-03-08				
	NE,NW	e	19-04-56				
	NE,NW	e	19-06-34				
	NE,NW	e	19-10-34				
	NE	i	19-11-03				
	NW	i	19-11-17				
	NW	eSR_1	19-23-57				
	NW	eL	19-34-08				
14	NE	eS	21-39-54				
		eL	21-42-38				
		F	21-50				
14	seismic activity centering at 22h 51m (G.M.T.)						
16	seismic activity centering at 21h 15m (G.M.T.)						
18	seismic activity centering at 6h 40m (G.M.T.)						
20	seismic activity centering at 1h 00m (G.M.T.)						
20	seismic activity centering at 3h 09m (G.M.T.)						
21	Z	iP	14-12-51				
	Z	i	14-12-56	Δ(SR1 - P) = 113.08			
	Z	i	14-13-02	H = 13h 58m.			
	NW	ePR_1	14-16-28	No confirmation			
	NW	e	14-23-12	May be deep Focus			
	NW	e	14-26-56				
	NW	$i(SR_1)$	14-35-21				
22	seismic activity centering at 21h 30m (G.M.T.)						
27	Z	eP	12-41-43	U.S.C.G.S. 51°N. Lat., 180° Long.			
	Z	i	12-42-20				
	NW	i	12-42-58				
	NW	i(S)?	12-51-30				
28	Z	eP	16-07-19	Δ(S - P) 98.2° = 10,910 kms.			
	NW	i	16-08-54	H = 15h 53m 41s.			
	NE,NW	eS	16-18-50	Possible depth = 50 kms.			
	NW	iS	16-18-58				
	NW	i_sS	16-19-38				
28	NW	eS	18-01-10				
	NW	eL	18-03-16				
		F	18-15				
29	NE	seismic activity centering at 4h 4m (G.M.T.)					
31		seismic activity centering at 17h 20m (G.M.T.)					

E. Sulkowski
Assistant

D.C. Bradford
Director

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR April 1940

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 N 30° W	October 15, 1939	15 secs.	12 secs.	E = 5:1	
Wenner N 60° E	October 15, 1939	15.6 secs.	12 secs.	E = 5:1	
Benioff Vertical	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
1	Seismic activity at		19 h 23 m	(G.M.T.)			
4	Seismic activity centering at		7 h	(G.M.T.)			
6	Seismic activity centering at		15 h	(G.M.T.)			
7	Seismic activity centering at		10 h	10 m (G.M.T.)			
8	Seismic activity centering at		9 h	20 m (G.M.T.)			
11	Z	i P	09-16-06	Δ (s-p) = 79° 7 = 8855Kms.			
	NE	e	09-21-31	H = 09 h - 04 m - 015			
	NE	iS	09-26-11				

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
12	NE	e S	19-19-19				
	NE	e	19-24-44				
13	Seismic activity centering at 06 h - 20 m (G.M.T.)						
14	E	iP	15-08-49	Δ (s-p) = 83° = 9220 kms.			
	NE	iS	15-19-10	H = 14 h-56m-26s			
16	NE-NW-Z	iP	06-18-40	Δ (S - P) = 66.5° = 7390 kms.			
	NE-N.W	i	06-20-02	H = 06h 07m 55s			
	NW	iPR$_1$	06-21-22	U.S.C.G.S. gives 52.6° N.Lat.,			
	NW	i.	06-23-54	175.8° E. Long.			
	NE	iS	06-27-37	H = 06h 07.7m Δ = 7540 kms.			
				(All later phases indistinguishable among surface waves on record.)			
16	Z	iP	06-54-02	(All later phases of this quake obscured in surface waves of previous disturbance.)			
16	Z	eP	07-59-34	(Later phases obscured.)			
16	Z	e	08-02-37				
18	seismic activity centering at the 07h 10m (G.M.T.)						
18	seismic activeity centering at the 20h 40m (G.M.T.)						
19	NE	e	00-26-44				
	NE	eL	00-34-40				
	NE	eM	00-42-30				
	NE	F	02-10				
19	seismic activity centering at 07 h - 10 m (G.M.T.)						
	seismic activity activity centering at 11 h - 30 m (G.M.T.)						
27	seismic activity centering at 11h (G.M.T.)						
27	seismic activity centering at 19 h (G.M.T.)						

Eugene Sulkowski
Assistant

Donald C. Bradford
Director

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR _____ 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	September 1, 1940	12.1 secs.	10 secs.	Critical	566
Wenner N30W	September 1, 1940	16.0 secs.	10 secs.	Critical	710
Benioff Z	September 1, 1940	12.8 secs.	1 sec.		
Special NS	Not yet installed				
Special EW	Not yet installed				

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
May 4	Z	eP	07-35-15			66°5	USCGS gives
	NE	eS	07-44-12	H = 07h –	24m – 30s		Δ = 7550 kms.
							H = 07h-24.1m
							53°N. Lat., 173°E Long.
May 4	Seismic activity centering about 21h-48m., GMT.						
May 5	Z	eP	02-12-13			77°2	
	Z	e	02-12-31	H = 02h-00m-21s.			
	NW	e	02-14-15				
	NW	ePR_1	02-15-11				
	NW	e	02-19-15				
	NW	iS	02-22-06				
	NW	eSR_1	02-27-16				

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
May 7	NW NW	e eL	22-46-35 22-59-30				
May 10	Seismic activity centering at about 02h. GMT.						
May 11	Z NW NW	eP eS iS	14-05-03 14-13-59 14-14-03		H = 13h-54m19s.	66°.3 USCGS gives Δ = 7,600 kms. H = 13h-54m-37s. 53°.2 N. Lat., 172° E. Long.	
May 12	NW	Seismic activity centering about 16h-36m. GMT.					
May 12	NW NE	e eL	20-57-49 21-00-39				
May 17	Z NW-NE NW-NE NE	eP ePR$_1$ eS eL	02-05-17 02-07-21 02-11-37 02-08.5		H = 01h-59m-46s.	32°.1 USCGS gives Δ = 3,620 kms. H = 01h-59m-45s. 7°.9 N. Lat., 81°.8 W. Long.	
May 18	Seismic activity centering at 05h-42m. GMT. Seismic activity centering at 06h-07m. GMT. Seismic activity centering at 07h-03m. GMT.						
May 19	Z Z NE-NW	eP iP iS	04-42-43 04-42-51 04-47-42		H = 04h-36m-40s.	29°.0 USCGS gives Δ = 3,320 kms. H = 04h-36m-48s. 32°50' N. Lat. 115°30' W. Long.	
May 19	Seismic activity centering about 06h-05m. GMT. Seismic activity centering about 06h-47m. GMT.						
May 19	Z Z	iP iPR$_1$	15-29-06 15-31-09		H = 15h-18m-00s. USCGS gives Δ = 9,000 kms.	69°.7	

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
May 1[illegible]	(continued)						H = 15h-17m55s. 51°N Lat. 148° E. Long. Depth 580 kms.
May 2[illegible]	Seismic activity centering at about 06h-39m. GMT Seismic activity centering at about 22h-01m. GMT						
May 24	Z	iP	16-42-56		USCGS gives	Δ = 5,800 kms.	
	Z	ipP	16-43-17		H = 16h-33m-46s.		
	NE-NW	iS	16-50-07		Depth = 40 kms.		
	NE-NW	iS	16-50-11		12° S. Lat., 78° W. Long.		
May 24	Z	iP	22-06-54		USCGS gives	Δ = 5,800 kms.	
	NW-NE	iS	22-14-15		H = 21h-57m-40s		
	NW-NE	i	22-16-40		Depth = 40kms.		
					12°S. Lat., 78° W. Long.		
May 26	Seismic activity centering at about 19h-34m.						
May 28	NW	e	05-01-44				
	NW	e	05-03-05				
	NW	e	05-06-53				
	NW	e	05-08-54				
	NW	e	05-11-57				
	NE	e	05-13-13				
	NE	e	05-18				
		F	07-14				
May 29	NW	eP	02-05-24		USCGS gives	Δ = 4,600 kms.	
	NE	iS	02-11-29		H = 01h-57m-36s.		
	NE	eSR_1	02-13-35		67°.9 N. Lat., 148° W. Long.		
May 30	Seismic activity centering at 01h-41m. GMT Seismic activity centering at 03h-40m. GMT						

D. C. Bradford
Director

E. Sulkowski
Assistant

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR _____ 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 N60°E	September 1, 1940	12.1 secs.	10 secs.	critical	
Wenner N30°W	September 1, 1940	16.0 secs.	10 secs.	critical	
Benioff Vertical	to be re-determined	12.8 secs.	1 sec.		?
Special NS	Not yet installed				
Special EW	Not yet installed				

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
June 3	Z	eP	18-11-28			27°.2	USC & Gs. gives
	NE	iS	18-16-13				Δ = 3,500 kms.
	NW	iS	18-16-17				H = 18h-05 4m.
	NE	i	18-16-29				G.M.T.
							Epicenter at 2[illegible]
							110[illegible] W.
June 5	NW	eP	11-08-45			35° 5	USC & GS gives
	NE	iS	11-14-50				Δ = 4,650 kms.
							H = 11h-01m-00s
							G.M.T.
							Epicenter at
							138° W.
June 7	Seismic activity centering at about 08h-31.2min. G.M.T.						

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
June 8	Seismic activity centering at about 05h-14.3m. G.M.T.						
	Seismic activity centering at about 18h-06.5m. G.M.T.						
June 9	Seismic activity centering at about 06h-31,5m, G.[illegible]T.						
June 12	Seismic activity centering at about 08h-16,3m, G.M.T.						
	Seismic activity centering at about 15h- 9,2m, G.M.T.						
June 17	Z	eP	11-37-32		Δ(S-P) = [illegible]		
	NW	eS	11-46-15		H = 11h-27m-04s.		
	NW	PS	11-46-40				
	NW	eL	11-57-13		USC & GS gives Δ [illegible]		
	NW	iM	11-59-08		H = 10h-2[illegible] Epicenter		
		F	01-47.5		at 2[illegible]°.0 [illegible] 155°.[illegible]		
June 22	Seismic activity centering at about 07h-23m. G.M.T.						
June 23	NW	e	18-52-20		USC & GS gives Δ = 3,350 km.		
	NW	iL	18-56-37		H = 2[illegible]h-41m 2[illegible] Epicenter		
					at 25°.0 N. [illegible]°.0 W.		

D. C. Bradford
Director

E. Sulkowski
Assistant

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH, PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR Aug. 1940

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	September 1, 1940	12.1 secs.	10 secs.	critical	566
Wenner N30W	September 1, 1940	10.[illegible] secs.	10 secs.	critical	710
Benioff Z	To be re-determined	12.0 secs.	1 secs.		
Special NS	Not yet installed				
Special EW	Not yet installed				

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
Aug. 1	Z	iP	15-21-11		Δ(S-P) = 88°.4		USC & GC gives
	NW	iS	15-31-58		H = 15h-08m-21s		Δ = 88°.4 ; 9820
							H = 15h-08m-21s.
							Epicenter at 41°, 140°,0E.
Aug 5.	Seismic activity centering at about 07h-08m. G.M.T.						
Aug 7.	Z	iP	03-06-48				
	NW	iS	03-14-46				
	NW	isS	03-15-24				

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

Aug. 8. Seismic activity centering at about 13h-58m. G.M.T.

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Aug. 15	NE	e	16-01-56				
	NE	e	16-02-32				
	NE	e	16-06-05				
Aug. 15	NW	e	04-49-41				
	NW	e	05-10-33				
Aug. 16	Seismic activity centering at about 06h-49m. G.M.T.						
Aug. 20	NE	i	17-41-53				
Aug. 20	Seismic activity centering at about 18h-47m. G.M.T.						
Aug. 22	E	iP	03-36-59		Δ(S-P) = 55°,3		
	NW	iS	03-44-48		H = 03h-27m-28s.		
					USC & GS gives Δ = 56.°9		
					H = 03h-27m-13s. Epicenter		
					at 51°.9N. 104°.9 E.		
Aug. 24	Seismic activity centering at about 08h-32m. G.M.T.						
Aug. 26	NE	e	05-08-29				
	NE	e	05-11-27				
	NE	i	05-17-51				
	NE	i	05-23-59				

D. C. Bradford
Director

E. Sulkowski
Assistant

UNIVERSITY OF PITTSBURGH
SEISMOGRAPH STATION
PITTSBURGH, PENNA.

SEISMOLOGICAL OBSERVATORY BULLETIN FOR July 19 40

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

Lithologic Foundation - Birmingham Scale

The Seismological Observatory was closed down for the month of July for repair and readjustment.

June out of order — after Sept. Isk! Isk!

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR Sept. 19 41

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	September 1, 1940	12.1 secs.	10 secs.	critical	566
Wenner N30W	September 1, 1940	16.0 secs.	10 secs.	critical	7
Benioff Z	To be re-determined	12.8 secs.	1 sec.		
Special NS	Not yet installed				
Special EW	Not yet installed				

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. 5	NW	Seismic activity centering at about 23h-38m				GMT	
Sept. 6	NW	Seismic activity centering at about 03h-21m				GMT	
Sept. 8	Z	i	10h-26m-14s				(quake or blast)
Sept. 12	NW-NE	Seismic activity centering at about 15h-30m				GMT	
Sept. 18	Z	iP	14h 19m 28s				
	Z	ipP	14h 19m 56s				(S-P) 6[illegible]
	NW-NE	iS	14h 27m 51s				depth [illegible]
	NW-NE	isS	14h 28m 40s				distance [illegible]
	NW-NE	i	14h 29m 23s				H = 14h-09m-3[illegible]
	NW-NE	i	14h 30m 07s				(GMT)

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Sept. 19	NE	iER$_1$	18h-40m-00s			USCGS gi[illegible]	
	NE	i	18h-40m-20s			119.7	
	NE	iScPcS	18h-45m-28s			distance [illegible] k	
	NE	iS	18h-46m-50s			H = 18h[illegible]m	
						Epicenter at 23°	
						S. Lat., 17[illegible]	
						Long.	
Sept. 20	Seismic activity centering at about 01h-09m (GMT)						
Sept. 21	NE	e(P)?	14h-06m-21s			(S-P) 42.[illegible] sec.	
	NE	e(pP)	14h-07m-19s			distance 4[illegible]	
	NE	iS	14h-12m-31s			depth 200km.	
	NE	iS	14h-14m-11s			H = 13h-55m-20	
	NE	iSR$_1$	14h-16m-26s			(GMT)	
Sept. 22	Z	iP	23h-09m-48s				
	Z	ip^P	23h-12m-08s			(S-P) 61.1 (calc	
	NW	i	23h-13m-11s			Distance 6790 km	
	NW	i	23h-15m-56s			depth 800km	
	NW	iS	23h-17m-47s			(approximate)	
	NW	isS	23h-23m-21s			H = 23h-00m-58s	
						(GMT)	
Sept. 23	NE	i	07h-29m-58s				
	NE	i	07h-34m-00s				
Sept. 26	Seismic activity centering at about 04h-02m- (GMT)						
Sept. 30	Seismic activity centering at about 12h-23m- (GMT)						

D. C. Bradford
Director

E. Sulkowski
Assistant

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR October 40

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	November 1, 1940	12.1 secs.	10 secs.	critical	566
Wenner N30W	November 1, 1940	16.0 secs.	10 secs.	critical	710
Benioff Z	To be re-determined	12.8 secs.	1 sec.		
Special NS	To be installed				
Special EW	Not yet installed				

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. 1	Z	iP	10h-53m-51s		Δ(S-P) = 71°.7 (Calc)		
	Z	i	10h-54m-05s		Distance = 7965 kms.		
	Z	ipP	10h-54m-28s		H = 10h-42m-33s (calc)		
	NW	iS	11h-08m-14s		Depth = 180 kms.		
	NW	isS	11h-04m-13s				
Oct. 1	NW	Seismic activity centering about 23h-05m (GMT)					
Oct. 2	NW	e	03h-22m-04s				
	NW	i	03h-23m-10s				
	NW	eL	03h-27m-25s				

THE UNIVERSITY OF PITTSBURGH

SEISMOLOGICAL OBSERVATORY

PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Oct. 3	Z	eP	05h-06m-53s		Δ(S-P) = 55.6 (Approx.)		
	NE-NW	iS	05h-14m-44s		Distance = 6180 km. (Approx.		
		isS	05h-15m-28s		H = 04h-57m-21s GMTC (approx)		
					Depth = 110 km (Calc) sS-S		
Oct. 4	Z	iP	08h-05m-03s		Δ(S-P) = 62.1		
	Z	ipP	08h-05m-27s		H = 07-54-35 (calc)	Δ = 6700	
	NW-NE	eS	08h-13m-24s		Depth = 110km.	km.	
	NW-NE	iS	08h-13m-29s		(calc) sS-S		
	NW-NE	i_ssS	08h-14m-05S				
Oct. 5	NW-NE	Seismic activity centering about 15h-06m- (GMT)					
Oct. 5	NW-NE	Seismic activity centering about 17h-08m (GMT)					
Oct. 6	NW-NE	Seismic activity centering about 16h-12m (GMT)					
Oct. 10	NW-NE	Seismic activity centering about 21h-02m (GMT)					
Oct. 11	Z	eP	08h-01m-41s				
	NW	epP	08h-01m-51s				
	NW	ePR_1	08h-03m-52s				
	NW	eS	08h-08m-27s				
	NW-NE	eSR_1	08h-11m-49s				
	Z	eP	18h-53m-35s		Δ(S-P) = 84.2	USCGS gives	
	Z	iPR_1	18h-56m-51s		Distance-9355kms	Δ = 9500 km	
	NW-NE	iS	19h-03m-52s		H = 18h-41m-06	H=18h-41.0m	
	NW-NE	iSR_1	19h-09m-48s		(GMTC)	45° S. Lat.	
					Depth = 30kms.	73° W. Long.	
Oct. 17	NW	Seismic activity centering about 22h-17m (GMT)					
Oct. 22	Z	iP	06h-48m-09s		Δ(S-P) = 71.7 (Calc)		
	Z-	ipP	06h-48m-43s		Distance = 7965 kms.		
	NW-NE	eS	06h-57m-19s		H = 06h-36m-51s (GMT) Calc.		
		isS	07h-58m-21s		Depth = 160kms.		
Oct. 27	Z	iP	05h-41m-53s		Δ(S-P) = 31.5°		
	NW-NE	ipR_1	05h-42m-39s		Distance 3500 Kms.		
	NW-NE	i(PR_2)	05h-43m-15s		H = 05h-35m-27s		
	NW-NE	eS	05h-47m-09s		(GMT)		

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Oct 27	NW-NE	i	05h-47m-44s			USCGS gives Δ =3400 kms. H =05h-35m-36s 9.9°N. Lat. 84.4°W. Long.	
	NW-NE	iSR$_1$	05h-48m-57s				

D. C. Bradford
Director

E. Sulkowski
Assistant

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR November 19 40

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	November 1, 1940	12.1 secs.	10 secs.	critical	566
Wenner N30W	November 1, 1940	16.0 secs.	10 secs.	critical	710
~~Benioff Z~~	~~To be re-determined~~	~~12.8 secs.~~	~~1 sec.~~		
Special NS	To be installed				
Special EW	Not yet installed				

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. 1	Seismic activity centering about 16h-18m GMT						
Nov. 3	Seismic activity centering about 0h-13m- GMT Seismic activity centering about 02h-48m GMT						
Nov. 10	Z	iP	01h-50m-18s	Δ(S-P) = 72.4° (calc)			USCGS gives
	Z	ipP	01h-50m-54s	Distance 8045 km.			Δ=8050 kms
	Z	isP	01h-51m-03s	Depth 150 kms.			H =01h-39.0m
	NE	sS	01h-59m-30s	H = 01h-38m-55s			45.0° N. Lat.
	NE	isS	02h-00m-36s				26.2° E. Long
	Z	oP	20h-45m-33s	Δ(iS-P) = 23.5°			
	Z	i	20h-45m-53s	H= 20h-40m-23s (GMT)			
	NW-NE	oS	20h-49m-45s	Distance 2610 km.			
	NW-NE	iS	20h-49m-48s				

SEISMOLOGICAL OBSERVATORY BULLETIN FOR _____ 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)

Wenner N60E November 1, 1940 12.1 secs. 10 secs. critical 566

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETERS FREE PERIOD	PENDULUM FREE PERIOD	DAMPING CONSTANT	V
Wenner N30W	November 1, 1940	16.0 secs. To	10 secs. To	critical 710	
Benioff Z	To be re-determined	12.8 secs.	1 sec.		
Special NS	To be installed				
Special EW	Not yet installed				

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

Seismic activity centering about 16h-18m GMT

GNWCH DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Nov. 9	Seismic activity centering about 0h-18m- GMT						
	Seismic activity centering about 02h-48m GMT						
Nov. 10	Z	iP	01h-50m-18s	Δ(S-P) = 72.4° (calc)			USCGS gives
	Z	ipP	01h-50m-54s	Distance 8045 km.			Δ=8050 kms
	Z	isP	01h-51m-03s	Depth 150 kms.			H =01h-39.0m
	NE	sS	01h-59m-30s	H = 01h-38m-55s			45.0° N. Lat.
	NE	isS	02h-00m-36s				26.2° E. Long
	Z	eP	20h-45m-33s	Δ(iS-P) = 23.5°			
	Z	i	20h-45m-53s	H= 20h-40m-23s (GMT)			
	NW-NE	eS	20h-49m-45s	Distance 2610 km.			
	NW-NE	iS	20h-49m-48s				

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
Nov. 16	Seismic activity centering about 03h-11m-00s (GMT)						
Nov. 17	Seismic activity centering about 04h-22m-00s (GMT)						
Nov. 19	NW-NE	i	15h-25m-46s				
	NW-NE	i	15h-26m-12s				
Nov. 23	NW-NE	e	03h-56m-10s				
	NE	i	03h-56m-29s				
	NW-NE	e	04h-00m-36s				

D. C. Bradford
Director

E. Sulkowski
Assistant

THE UNIVERSITY OF PITTSBURGH

PITTSBURGH PENNSYLVANIA

SEISMOLOGICAL OBSERVATORY BULLETIN FOR December 1940

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_0	DAMPING CONSTANT	V
Wenner N60E	December 1, 1940	12.1 secs.	10 secs.	critical	566
Wenner N30W	December 1, 1940	16.0 secs.	10 secs.	critical	710
Benioff Z	To be redetermined	12.8 secs.	1 secs.		
Special NS	To be installed				
Special EW	To be installed				

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
Dec. 1	Seismic activity centering about (21h-29m) GMT						
Dec. 10	Z	e	21h-20m-48s				
	Z	i	21h-20m-52s				
	Z	i	21h-20m-56s				
Dec. 20	Z	e	07h-29m-12s		Δ(Sn-Pn) = 7.2° (approx)		
	Z	i	07h-29m-22s		= 800 kms.		
	Z	i	07h-29m-34s				
	NW-NE	e	07h-30m-36s		H = 07 H29m - 24s		
	NW-NE	i	07h-30m-39s				

THE UNIVERSITY OF PITTSBURGH
SEISMOLOGICAL OBSERVATORY
PITTSBURGH, PENNSYLVANIA

GNWCH. DATE	COMPNT.	PHASE	GMT	PERIOD	AMPLITUDE	Δ	REMARKS
	N.-NE	i	07h-30m-57s				
	NW-NE	i	07h-31m-06s				
	NW-NE	i	07h-31m-10s				
Dec. 21	Seismic activity centering about 00h-12m (GMT)						
Dec. 22	NW-NE	i	12h-09m-45s				
	NW-NE	e	13h-05m-58s				
	NW-NE	eL	13h-21m-13s				
Dec. 22	Seismic activity centering about 20h-24m (GMT)						
Dec. 24	Z	e	13h-45m-26s		Δ(Sn-Pn) =8.1° (approx)		
	Z	i	13h-45m-35s		=905 kms.		
	Z	i	13h-45m-56s		H=13H46m 25s		
	NW-NE	e	13h-47m-01s				
	NW-NE	i	13h-47m-18s				
	NW-NE	i	13h-47m-33s				
Dec. 25	Z	i	06h-48m-41s		Δ(Sn-Pn) = 6.2° (approx)		
	Z	i	06h-49m-38s		= 690 kms.		
	Z	e	06h-49m-54s		H=06H47m 7s		
	Z	i	06h-49m-58s				
	Z	i	06h-49m-59s				
	Z	i	12h-17m-41s				
Dec. 26	Seismic activity centering about 06h-45m (GMT)						
Dec. 28	NW-NE	e	16h-56m-12s				
	NW-NE	e	16h-58m-01s				
	NW-NE	i	17h-02m-48s				
	NW-NE	i	17h-05m-42s				
	NW-NE	i	17h-06m-24s				
	NW-NE	i	17h-07m-37s				
	NW-NE	e	17h-09m-18s				
Dec. 30	Seismic activity centering at about 21h-09m (GMT)						

We wish to acknowledge with thanks the receip t of the following bulletins:

Zurich, Switzerland	Year of 1938	Received	3/3/40
Trieste, Italy	March 1939 to Sept. 1939	"	3/5/40
Richmond, Surrey, England	January 1940	"	3/5/40
Manila	December 1939	"	3/7/40
Weston, Mass. Weston College	February 1940	"	3/7/40
Nesa	February 1 to 15 1940	"	3/7/ 40
Pasadena, California	Years 1937 & 1938	"	3/7/40
Bergen, Norway	Dec. to Feb. from 1938 to 1940		3/8/40
Canada	January 1940	"	3/8/40
U.S. Coast & Geodetic	Sept. & Oct., 1937	"	3/12/40
Osaka, Japan	January to July 1939	"	3/12/40
Helwan, Egypt	Oct. & Nov., 1939	"	3/13/40
Sydney, New S. Wales Riverview College	Dec. 1939, Jan. 1940	"	3/16/40
Rio de Janeiro	Oct. 2, 1939 to Dec. 27, 1939		3/20/40
Bucarest	February 1940	"	3/23/40
Colombo, Ceylon	Year of 1938	"	3/23/40
Georgetown University Washington, D.C.	Years of 1937, 1938, 1939	"	3/25/40

Padova	L'Osservatorio Geodinamico Della R. Universita Di Padova	Received	3/ 1/40
Budapest	Die Mikroseismische Unruhe In Budapest	"	" " "
Budapest	A Foldrengeskutatas Celjaira Megfelelo Foldtani Terkep	"	" " "
Budapest	Az 1938. Evi Magyarorszagi Foldrengesek	"	" " "
Budapest	Az Orszagos Foldrengesi Observatorium	"	" " "
Budapest	Rapport Microseismique	"	" " "
Paris	Annales de L'Institut de Physique du Globe	"	" " "