SEISMOLOGICAL OBSERVATORY BULLETIN

UNIVERSITY OF PITTSBURGH

1944

PITTSBURGH, PENNSYLVANIA

Seismological Observatory Bulletin

University of Pittsburgh

VOLUME I

NO, 4

JANUARY - DECEMBER, 1944

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PITTSBURGH, PENNSYLVANIA

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(This Bulletin is issued yearly)

STATION CONSTANTS AND INSTRUMENTS

Latitude—40° 26.7′ North

Longitude—79° 57.2′ West

Lithological foundation—Birmingham Shale—Pennsylvania age.

Elevation—273 meters above sea level.

Instruments

Two Wenner horizontal seismographs (Orientation N 30° W and N 60° E)

One Benioff vertical seismograph (long period recording only)

(The above instruments operate with photographic recording)

Time Service and Control

Time marks are given by two Observatory master clocks. One is a special astronomical type (used as stand-by), while the other is a Frodsham astronomical clock (used for routine work).

Time signals are recorded automatically (or manually, depending on the weather conditions) several times daily. These signals are transmitted from Washington, D. C., via stations NSS and WWV, and from Ottawa via station CHU.

The average clock drift is one-half second per day.

Instrumental Constants

Magnification curves for the Wenner seismographs were given in No. 1 of this Bulletin. The magnification curve for the Benioff is not yet completed. The "nominal" magnification for this instrument is approximately 24,000.

The New Instrument Vault

A new instrument vault is being built in the Cathedral of Learning to house the mechanically recording pendula. Included in this vault will be an interferometer type tiltmeter and a well gage recorder. Construction has been halted for the duration of the war.

	DATE	EVALUATION
July	6 – 13	Normal
	13 – 14	Slightly above normal
	14 – 17	Normal
	17 – 20	Slightly above normal
	20 – 21	Above normal
	21 – 24	Normal
	24 – 26	Slightly above normal
	26 – 30	Above normal
	30 – 31	Slightly above normal
August	1 – 3	Slightly above normal
	3 – 6	Normal
	6 – 7	Below normal
	7 – 9	Normal
	9 – 10	Slightly above normal
	10 – 12	Normal
	12 – 14	Below normal
	14 – 16	Above normal
	16 – 18	Slightly above normal
	18 – 19	Normal
	19 – 20	Below normal
	20 – 21	Normal
	21 – 22	Slightly above normal
	22 – 23	Normal
	23 – 25	Below normal
	25 – 27	Normal
	27 – 28	Slightly above normal
	28 – 31	Above normal
	31	Normal
September	1 – 2	Normal
	2 – 5	Slightly above normal
	5 – 8	Normal
	8 – 9	Below normal
	9 – 11	Slightly above normal
	11 – 13	Above normal
	13 – 14	Slightly above normal
	14 – 15	Considerably above normal
	15 – 19	Above normal
	19 – 20	Slightly above normal

MICROSEISMIC ACTIVITY (Cont'd)

	DATE	EVALUATION
	20 – 23	Normal
	23 – 30	Slightly above normal
	30	Considerably above normal
October	1 – 2	Above normal
	2 – 6	Considerably above normal
	6 – 10	Above normal
	10 – 11	Considerably above normal
	11 – 14	Above normal
	14 – 24	Considerably above normal
	24 – 26	Above normal
	26 – 31	Considerably above normal
November	1 – 6	Above normal
	6 – 13	Considerably above normal
	13 – 16	Above normal
	16 – 18	Considerably above normal
	18 – 20	Above normal
	20 – 27	Considerably above normal
	27 – 28	Above normal
	28 – 30	Considerably above normal
December	1 – 3	Considerably above normal
	3 – 8	Above normal
	8 – 23	Considerably above normal
	23 – 24	Above normal
	24 – 25	Slightly above normal
	25 – 26	Above normal
	26 – 31	Considerably above normal

SECTION ON SEISMIC DATA

(Earthquakes for which preliminary phases have been identified, or for which preliminary epicenters have been worked out, are numbered in the left hand column as of No. 1, September 8, 1939.) It was on this date that our new station was placed in operation.

	GNWCH DATE	COMPNT.	PHASE	GMT.	
	Jan. 4	NW	e	01-08-47	
	Jan. 5	NW	e(S)	11-10-38	
	Jan. 5	NW	iPP	21-35-23	
		NW	iPPS	21-47-06	
	Jan. 10	NW-NE			
		Seismic activity centering about 20h 16m (G.M.T.) Phases indiscernible due to strong microseisms			U.S.C.G.S. gives H = 20h 10m (G.M.T.) Lat. 18.1° North Long. 100.6° West (Mexico)
	Jan. 15	NW	eL	06-00-55	
163	Jan. 15	NW	iP	24-00-52	Δ(S-P) = 71.9° = 7,989 kms.
		NE	iS	24-10-13	H = 23-49-25 (G.M.T.)
		NW	eL	24-25-21	U.S.C.G.S. gives H = 23h 49.4m (G.M.T.) Lat. 31.5° South Long. 68° West (Argentina)
	Jan. 24	NW	e(L)	06-19-26	
	Jan. 29	NW	Seismic activity centering about 02h 30m (G.M.T.) Phases indiscernible due to strong microseisms		
164	Feb. 1	NE	iP	03-34-44	Δ(S-P) = 79° = 8,780 kms.
		NE	e(S)	03-44-44	H = 03-22-37 (G.M.T.) U.S.C.G.S. gives Lat. 41° North Long. 31° East (Turkey)
165	Feb. 3	NW	eP	12-22-39	Δ(S-P) = 37.1° = 4,121 kms.
		NW	e(PP)	12-24-06	H = 12-15-25 (G.M.T.)
		NW	eS	12-28-28	U.S.C.G.S. gives H = 12h 15.2m (G.M.T.) Lat. 59.3° North Long. 138.0° West (Southeast Alaska)

	GNWCH DATE	COMPNT.	PHASE	GMT	
	Feb. 5	NW	e	00-00-58	
			e(L)	00-04-44	
	Feb. 21	NW	e(S)	11-40-10	
			e(SS)	11-42-04	
	Feb. 25	NW	eL	07-57-35	
166	Feb. 29	NE-NW	iP	03-51-14	Δ(S-P) = 54.2° = 6,022 kms.
		NW	epP	03-51-56	H = 03-42-10 (G.M.T.)
		NW	eS	03-58-36	depth = 200 kms. approx.
					U.S.C.G.S. gives
					H = 03h 42.0s (G.M.T.)
					depth slightly less than 200 kms.
					Lat. 13.7° South
					Long. 70.6° West
					(Southern Peru)
167	Feb. 29	NE-NW	iPP	16-50-03	Δ = ca 135° = ca 15,000 kms.
		NW	e(PPS)	17-02-09	H = 16-28-03 (G.M.T.)
		NW	iSS	17-07-55	
	Mar. 6	NW	iS	20-22-00	
		NW	eL	20-27-24	
	Mar. 6	NW	e(L)	21-25-56	
168	Mar. 6	NW	ePP	23-24-50	Δ = 40.2° = 4,467 kms.
		NW	eS	23-29-21	H = 23-15-34 (G.M.T.)
	Mar. 7	NW	e(M)	06-32-17	
	Mar. 7	NW	eL	08-41-23	
	Mar. 9	NW	Seismic activity centering about 22h - 30m (G.M.T.)		
	Mar. 10	NW	i(S)	07-03-50	
			eL	07-34-42	
169	Mar. 22	NW	e(F)P′	01-02-12	Δ = ca 143° = ca 15,890 kms.
		NW	ePP	01-05-26	H = 00-42-37 (G.M.T.)
		NW	eSKS	01-09-22	U.S.C.G.S. gives
			e(SKKS)	01-12-06	H = 0h 43.0m (G.M.T.)
					Lat. 7° South
					Long. 126° East
					(Banda Sea)

	GNWCH DATE	COMPNT.	PHASE	GMT	
	Mar. 31	NW	e	03-15-03	
		NW	e	03-31-34	
		NW	e(L)	04-03-00	
	Mar. 31	NW	Seismic activity centering about 20h 43m (G.M.T.) Phases indiscernible due to strong microseisms		U.S.C.G.S. gives H = 20h 34.8m (G.M.T.) Lat. 3° South Long. 81° West (Ecuador)
	Apr. 2	NW	eL	04-55-43	
	Apr. 3	NW	eL	18-42-39	
	Apr. 7	NE-NW	e(P)	13-38-41	
		NW	iS	13-44-35	
	Apr. 19	NW	e(S)	23-53-28	
	Apr. 21	NW	e	15-14-06	
			e	15-17-52	
170	Apr. 26	NW	ePP	02-15-26	Δ = ca 130° = ca 14,445 kms.
		NW	e(SKP)	02-16-43	H = 01-53-58 (G.M.T.)
					U.S.C.G.S. Gives
					H = 1h 53.9m (G.M.T.)
					Lat. 1° South
					Long. 131° East
					(Western New Guinea)
171	Apr. 27	NW	iPP	14-59-25	Δ = ca 130° = ca 14,445 kms.
			e(SKP)	15-00-43	H = 14-37-57 (G.M.T.)
			e(SKS)	15-04-19	U.S.C.G.S. gives
					H = 14h 37.9m, (G.M.T.)
					Lat. 1° South
					Long. 131° East
					(Western New Guinea)
172	Apr. 28	NW	eP	05-58-08	Δ(S-P) = 41.5° = 4,610 kms.
		NW	eS	06-04-26	H = 05-50-18 (G.M.T.)
	Apr. 29	NW	e(L)	06-52-34	
	May 4	NW	e(L)	07-48-38	

	GNWCH DATE	COMPNT.	PHASE	GMT	
	May 5	NW	e	06-09-00	
		NW	e	06-19-20	
		NW	e(L)	07-02-08	
173	May 6	NE-NW	eP	00-20-38	Δ(S-P) = 35.4° = 3,934 kms.
		NE-NW	iS	00-26-13	H = 00-13-39 (G.M.T.)
					U.S.C.G.S. gives
					H = 0h 13.7m (G.M.T.)
					Lat. 22.4° North
					Long. 44.8° West
					(Mid Atlantic)
	May 7	NW	eL	15-36-41	
	May 9	NW	e	14-38-26	
		NW	e(S)	14-42-56	
	May 15	NW	e(L)	20-23-22	
174	May 18	NW	ePP	05-03-27	Δ = ca 119° = ca 13,220 kms.
		NW	e(SKS)	05-09-07	H = 04-43-10 (G.M.T.)
		NW	ePS	05-13-08	
	May 19	NW	e	20-18-34	
175	May 19	NE-NW	ePP	00-39-29	Δ = ca 119° = ca 13,220 kms.
		NE-NW	i(SKS)	00-45-07	H = 00-19-14 (G.M.T.)
		NE-NW	iPS	00-49-13	
	May 20	NE	e	01-12-10	
		NE	e	01-13-14	
	May 21	NE-NW	e	00-37-00	
		NE-NW	e(L)	00-39-36	
	May 21	NE	e	04-59-48	
		NE-NW	e(L)	05-03-30	
	May 23	NE-NW	e	10-56-49	
		NW	e	11-08-06	
176	May 24	NW	eP	01-35-29	Δ(S-P) = 22.4° = 2,489 kms.
		NE-NW	eS	01-39-30	H = 01-30-27 (G.M.T.)
177	May 25	NE	e	01-22-20	Δ = ca 111° = ca 12,335 kms.
		NE	e(P′)	01-24-00	H = 01-06-36 (G.M.T.)
		NE	i(PP)	01-24-50	depth above 600 kms.

	GNWCH DATE	COMPNT.	PHASE	GMT	
		NE-NW	i SKS	01-29-44	U.S.C.G.S. gives
		NE-NW	iS	01-31-42	H = 1h 06m 39s (G.M.T.)
					Lat. 21.5° South
					Long. 179.0° West
					Depth probably over 600 kms.
					(Tonga Islands)
178	May 25	NE-NW	ePP	13-18-18	Δ = ca 119° = ca 13,220 kms.
		NW	e(SKS)	13-23-52	H = 12-58-03 (G.M.T.)
					U.S.C.G.S. gives
					H = 12h 58.1m (G.M.T.)
					Lat. 3° South
					Long. 152° East
					depth normal
					(New Ireland)
179	June 3	NW	e(P)	07-17-45	Δ(S-P) = 26.6° = 2,956 kms.
		NW	eS	07-22-19	H = 07-12-03
	June 7	NE	e	06-43-46	
	June 9	NW	e	20-45-44	
		NW	e	21-02-22	
	June 11	NW	e	19-26-33	
		NW	e	19-32-07	
		NW	e(L)	19-35-25	
	June 12	NW	eM	11-34-44	
180	June 16	NE	e(P)	21-57-48	Δ = 33.0° = 3,665 kms.
		NE	eS	22-03-06	H = 21-51-10 (G.M.T.)
					U.S.C.G.S. gives
					H = 21h 51.5m (G.M.T.)
					Lat. 19° North
					Long. 105° West
	June 18	NW	eL	22-27-28	
	June 18	NW	e	00-20-36	
	June 18	NW	e	03-23-15	
	June 20	NW	i	02-16-29	

	GNWCH DATE	COMPNT.	PHASE	GMT	
	June 21	NE	e	11-18-44	U.S.C.G.S. gives
		NW	e	11-23-46	H = 10h 58.3m (G.M.T.)
		NW	e(PS)	11-27-21	Lat. 21.5° South
		NW	e(SS)	11-33-45	Long. 169.8° East
					(New Hebrides Ids.)
	June 22	NE-NW	e(L)	00-26-38	
181	June 25	NE	iP	01-15-04	Δ(S-P) = 32.1° = 3,566 kms.
		NE-NW	eS	01-20-17	H = 01-08-33 (G.M.T.)
182	June 25	NE-NW	iP	17-52-56	Δ(S-P) = 65.7° = 7,297 kms.
		NE-NW	eS	18-01-42	H = 17-42-08 (G.M.T.)
					U.S.C.G.S. gives
					H = 17h 42.2m (G.M.T.)
					Lat. 1° South
					Long. 25° West
					(Mid-Atlantic)
	June 28	NE	i	05-38-37	
		NE-NW	i	05-44-06	
183	June 28	NE-NW	iP	08-04-48	Δ(S-P) = 27.3° = 3,033 kms.
		NE	i(S)	08-09-27	H = 07-59-00 (G.M.T.)
					U.S.C.G.S. gives
					H = 7h 58.9m (G.M.T.)
					Lat. 14.6° North
					Long. 92.6° West
					(Off Southern Mexico)
	June 28	NE	e	13-12-18	
		NE	e(L)	13-17-26	
	June 29	NE-NW	e(L)	01-54-26	
	July 1	NW	e	11-30-33	
	July 2	NE	e	04-08-07	
	July 2	NE-NW	e(L)	04-12-24	
184	July 2	NE	e(P)	22-18-10	Δ(S-P) = 30.4° = 3,379 kms.
		NE-NW	eS	22-23-10	H = 22-11-54 (G.M.T.)
	July 5	NE-NW	e	09-58-24	
	July 8	NE	e	01-43-03	
	July 10	NE-NW	e	13-48-48	
	July 12	NW	e	08-14-18	
		NE	e	08-16-12	

	GNWCH DATE	COMPNT.	PHASE	GMT	
185	July 12	NE	e(P)	19-36-02	Δ(S-P) = 27.8° = 3,088 kms.
		NE-NW	eS	19-40-44	H = 19-30-09 (G.M.T.)
					U.S.C.G.S. gives
					Δ = 2,850 kms.
					H = 19h 30.4m (G.M.T.)
					Lat. 44.7° North
					Long. 114.4° West (Idaho)
	July 17	NE	e	13-16-43	
		NE	e	13-17-47	
		NW	e	13-18-29	
	July 19	NW	e	10-38-47	U.S.C.G.S. gives
	July 19	NW	e	10-45-21	H = 10h 20.9m (G.M.T.)
		NE	e	10-47-21	Lat. 33° North
		NE-NW	e(SS)	10-53-08	Long. 138° East (Off Japan)
	July 20	NE-NW	e	02-49-57	
			e	02-50-53	
	July 21	NE-NW	e	12-41-34	
	July 22	NE	e(P)	11-34-24	
		NW	e(S)	11-39-34	
186	July 27	NE-NW	iP	00-13-58	Δ(S-P) = 54.5° = 6,055 kms.
		NE-NW	iS	00-21-37	H = 00-04-26 (G.M.T.)
					U.S.C.G.S. gives
					H = 0h 04.2m (G.M.T.)
					Slightly deeper than normal
					Lat. 54.5° North
					Long. 166.5° West
					(Aleutian Islands)
	Aug. 5	NE-NW	e	01-41-31	
	Aug. 5	NE	e	13-13-35	
		NE-NW	e	13-14-19	
		NE-NW	e	13-18-25	
187	Aug. 7	NE-NW	iP	03-35-10	Δ(S-P) = 56.6° = 6,289 kms.
		NE-NW	iS	03-43-02	H = 03-25-23 (G.M.T.)
					U.S.C.G.S. gives
					H = 3h 25.3m (G.M.T.)
					Lat. 16.9° South
					Long. 71.5° West (Peru)

	GNWCH DATE	COMPNT.	PHASE	GMT	
	Aug. 7	NE	e	14-01-56	
	Aug. 7	NE-NW	i	18-58-25	
		NE	e	18-59-31	
	Aug. 8	NE-NW	e	08-54-29	
		NE-NW	e	08-55-45	
		NE-NW	i	09-04-37	
	Aug. 8	NE	e	16-28-32	
	Aug. 9	NW	e	04-24-58	
188	Aug. 10	NE-NW	e(P)	02-00-17	Δ(S-P) = 33.1° = 3,676 kms.
		NE-NW	eS	02-05-35	H = 01-52-37 (G.M.T.)
					U.S.C.G.S. gives
					H = 1h 52.7m (G.M.T.)
					Lat. 51.4° North
					Long. 130.5° West
					(South of Queen Charlotte Islands,Off British Columbia)
	Aug. 10	NW	e	11-29-28	
		NE	e	11-30-31	
		NW	e(L)	11-50-37	
	Aug. 13	NE	e(S)	08-36-10	
		NE-NW	eL	08-41-22	
	Aug. 14	NE-NW	e(S)	11-22-59	
	Aug. 15	NW	e	12-16-08	
		NW	e	12-29-08	
189	Aug. 18	NW	eP	10-46-22	Δ = ca 88° = 9,780 kms.
		NW	i	10-49-08	H = 10-33-54 (G.M.T.)
		NW	i(SKS)	10-56-42	depth ca 200 kms.
		NW	isS	10-58-17	U.S.C.G.A. gives
					H = 10h 33.1m (G.M.T.)
					depth possibly 200 kms.
					Lat. 35° North
					Long. 137° East (Japan)
	Aug. 18	NE	e	19-41-01	
	Aug. 21	NW	e	20-32-36	

	GNWCH DATE	COMPNT.	PHASE	GMT	
190	Aug. 24	NE-NW	eP	23-43-29	Δ = 29.4° = 3,266 kms.
		NE-NW	epP	23-43-48	H = 23-37-29 (G.M.T.)
		NW	iS	23-48-27	depth ca 100 kms.
		NE-NW	i	23-49-05	U.S.C.G.S. gives
					Δ = 3,100 kms.
					H = 23h 37.8m (G.M.T.)
					depth slightly less than 100 kms.
					Lat. 15.0° North
					Long. = 93.0° West
					(Guatamala)
	Aug. 30	NW	e(L)	02-14-50	
	Sept. 3	NE	e	19-30-34	
		NW	e	19-33-58	
		NE-NW	e(SS)	19-44-25	
191	Sept. 5	Z	iP	04-40-14	Δ(S-P) = 5.5° = 612 kms.
		NE-NW	i(S)	04-41-18	H = 04-38-49 (G.M.T.)
					U.S.C.G.S. gives
					Δ = 650 kms.
					H = 4h 38.8m (G.M.T.)
					Lat. 45° 01′ North
					Long. 74° 44′ West
					(Cornwall, Ontario)
					(Massena, New York)
	Sept. 6	NE-NW	e	14-27-58	
192	Sept. 11	Z	iP′	10-04-34	Δ = ca 133° = ca 14,780 kms.
		NW	ePP	10-07-05	H = 09-45-16 (G.M.T.)
		NW	iSKP	10-08-07	
		NW	iPS	10-17-17	
	Sept. 19	NE	e	13-44-50	
193	Sept. 23	Z	iP	12-24-47	Δ(S-P) = 73.7° = 8,187 kms.
		NE-NW	iS	12-34-17	H = 12-13-10 (G.M.T.)
					U.S.C.G.S. gives
					Δ = 8,150 kms.
					H = 12h 13.3m (G.M.T.)
					Lat. 53.5° North
					Long. 160.7° East
					(Kamchatka)

	GNWCH DATE	COMPNT.	PHASE	GMT	
	Sept. 23	NW	e	16-25-29	
		NE	e	16-30-17	
	Sept. 27	Seismic activity centering about 17h (G.M.T.)			
	Oct. 5	Seismic activity centering about 18h (G.M.T.) Phases indiscernible due to strong microseisms.			
194	Oct. 6	Z	iP	02-46-32	Δ(S-P) = 76.3° = 8,478 kms.
		NW	iS	02-56-17	H = 02-34-40 (G.M.T.) U.S.C.G.S. gives Δ = 8,500 kms. H = 2h 34.7m (G.M.T.) Lat. 39° North Long. 27° East (Turkey)
	Oct. 14	NW	e(L)	02-23-38	
	Oct. 17	NW	Seismic activity centering about 19 h (G.M.T.) Phases indiscernible due to strong microseisms.		
195	Oct. 23	Z	iP	23-47-40	Δ(S-P) = 39.4° = 4,379 kms.
		NW	iS	23-53-42	H = 23-40-07 (G.M.T.) U.S.C.G.S. gives H = 23h 40m 03s (G.M.T.) Lat. 0.5° North Long. 80.0° West (Ecuador, S.A.)
	Oct. 29	Seismic activity centering about 00-32 (G.M.T.) Phases indiscernible due to strong microseisms.			
196	Nov. 15	NW	ePP	21-08-12	Δ = ca 127° = ca 14,110 kms.
		NW	eSKKS	21-15-04	H = 20-47-04 (G.M.T.)
		NW	ePS	21-18-14	U.S.C.G.S. gives H = 20h 47.0m (G.M.T.) Lat. 4° North Long. 128° East (Southeast of Philippine Ids.)
	Nov. 16	Seismic activity centering about 13h (G.M.T.) Traces indiscernible due to strong microseisms			U.S.C.G.S. gives H = 12h 10.9m (G.M.T.) Lat. 12° South Long. 166° East (Between Solomon and Queen Charlotte Islands)

	GNWCH DATE	COMPNT.	PHASE	GMT	
	Nov. 24	NW	e	05-14-09	U.S.C.G.S. gives
		NW	e(SKKS)	05-15-33	H = 4h 48.9m (G.M.T.) Lat. 20° South Long. 171° East (New Hebrides Region)
197	Dec. 7	Z	iP	04-43-26	Δ = ca 100° = ca 11,110 kms.
		NE	i(SKS)	05-01-04	H = 04-35-38 (G.M.T.) U.S.C.G.S. gives Δ = 11,100 kms. H = 4h 35.7m (G.M.T.) Lat. 33° North Long. 137° East (Off Japan)
	Dec. 10	Z	i	05-31-11	
198	Dec. 10	NW	e(P′)	16-43-23	Δ = ca 118° = ca 13,110 kms.
		NW	iSKS	16-50-28	H = 16-24-34 (G.M.T.)
		NW	ePS	16-54-16	U.S.C.G.S. gives Δ = 13,200 kms. H = 16h 24.9m (G.M.T.) Lat. 18° South Long. 167° East (New Hebrides Islands)
	Dec. 19	NW	e(L)	15-01-35	
199	Dec. 22	Z	iP	22-42-24	Δ(S-P) = 64° = 7,110 kms.
		NE-NW	eS	22-51-00	H = 22-31-47 (G.M.T.)
	Dec. 27	Seismic activity centering about 16h (G.M.T.) Phases indiscernible due to strong microseisms.			
	Dec. 29	Seismic activity centering about 23h-30m (G.M.T.) Phases indiscernible due to strong microseisms.			
	Dec. 30	Seismic activity centering about 22h-30m (G.M.T.) Phases indiscernible due to strong microseisms.			
	Dec. 31	NW	e	22-06-40	
		NW	e	22-11-42	