THE PENNSYLVANIA STATE COLLEGE

MINERAL INDUSTRIES EXPERIMENT STATION

GEOPHYSICAL LABORATORY

Seismograph Report X

JAN. - JUNE, 1949

School of Mineral Industries
State College, Penna., U.S.A.

Locality: The station is located in a vault under the central wing of the School of Mineral Industries Building. The instruments are mounted on a concrete pillar separated from the foundations and anchored to bedrock (dolomite). The geographic coordinates are:

ϕ - 40° 48' N λ - 77° 52' W H - 390 m

The geocentric coordinates are (according to Gutenberg and Richter):

A - 40° 36' N λ - 77° 52' W H - + 3 km.

Please address all communications to:

Geophysical Laboratory
School of Mineral Industries
State College, Pennsylvania

Date	Phase and component		G. M. C. T.	Remarks
19 Jan. '49		N		L waves recorded from 16:14: - to 16:17: -
		E		L waves recorded from 16:09: - to 16:15: -
2 Feb. '49	i	N	17:52:38	
	i	N	18:00:43	
	i	N	18:01:30	
	L	N	18:11:10	
10 Feb. '~~50~~ 49				Seismic Activity recorded between 22:52: - and 23:56: -
13 Feb. '49	i	N	18:44:22	Epicenter:
	e	N	18:54:10	33 1/2°S, 177 1/2°W
	L	N	19:15:08	Kermadec Islands
	M	N	19:27:30	Dist. = 13,500 km
				O = 18:24:18
				Courtesy U.S.C.G.S.
14 Feb. '49	i P	E	18:14:11	Epicenter:
	e PP	E	18:15:24	18 1/2°N, 105°W
	e PcP(?)	E	18:16:42	Off Coast of Mexico
	i S	E	18:19:32	Dist. = 3700 km
	L(?)	E	18:21:32	O = 18:07:30
				Courtesy U.S.C.G.S.
23 Feb. '49	e SKS	E	16:32:11	Epicenter:
	e	E	16:34:39	39 1/2°N, 85°E
	e SS	E	16:39:42	Eastern Turkistan
	e	E	16:42:12	Dist. = 10,900 km
				O = 16:07:54
				Courtesy U.S.C.G.S.
4 March '49	i	E	10:36:33	Epicenter: 37°N, 70°E
	i SKS	E	10:42:57	Afghanistan
	i S	E	10:43:47	Depth = 200 km
	i	E	10:48:21	Dist. = 10,850 km
				O = 10:19:24
				Courtesy U.S.C.G.S.
27 March '49	e PP	E	06:55:35	Epicenter:
	e	E	06:56:47	4°N, 127 1/2°E
	e	E	07:02:32	Celebes Sea, Off Southern
	e	E	07:07:35	Coast of Mindanoa
	i	E	07:12:39	Dist. = 14,700
				O = 06:34:06
				Courtesy of U.S.C.G.S.
30 March '49	e	E	15:42:16	Epicenter: 16°S, 176½°W
	e	E	15:44:27	Fiji Islands
				Dist. = 11,900 km
				O = 14:47:12
				Courtesy U.S.C.G.S.

Date	Phase and component		G.M.C.T.	Remarks
13 April '49	i P	E	20:02:07	Epicenter:
	i	E	20:02:57	47.1°N, 122.7°W
				Between Olympia and
				Tacoma, Wash.
				Depth = Deeper than
				normal
				Dist. = 3650 km
				O = 19:55:41
				Courtesy U.S.C.G.S.
20 April '49	i P	N,E	03:41:05	Epicenter: 38°S, 72½°W
	i pP	E	03:41:37	Chile
	i PP	N	03:44:03	Depth = 70 km
	i pPP	E	03:44:33	Dist. = 8700 km
	i S	N,E	03:50:52	O = 03:29:00
	i SS	E	03:55:44	
22 April '49	i P	N	17:29:41	Est. Dist. = 8800 km
	e S	N	17:39:48	
	e	N	17:41:38	
	M	N	18:04:	
23 April '49	i P'	E	11:35:05	Epicenter: 8°S, 120°E
	e PP	E	11:38:17	Flores Sea
	e P'P'	E	11:57:09	Dist. = 16,000 km
	M	E	12:55:00	O = 11:15:30
				Courtesy U.S.C.G.S.
24 April '49	e PP	E	04:39:56	Epicenter:
	e	N,E	04:46:39	27°N, 56°E
	e	N,E	04:49:26	Persian Gulf
	e SS(?)	N,E	04:54:00	Dist. = 11,200 km
	L	N	05:02:52	O = 04:22:06
25 April ~~'50~~ 49	i P	N,E	14:05:05	Epicenter:
	i pP	E	14:05:24	20°S, 69½°W
	e SP	N	14:05:31	Coast of Northern Chile
	i	N	14:06:32	Depth 100 km
	e	E	14:06:46	Dist. - 6700 km
	e	N,E	14:08:29	O = 13:55:00
	i S	N,E	14:13:17	Courtesy U.S.C.G.S.
	e SS	N	14:17:09	
	e	N	14:19:26	
	M	N	14:31:	
30 April '49	i P'	N,E	01:42:32	Epicenter: 6°N, 126°E
	i PP	N	01:44:22	South Coast of Mindanao
	i PPP	N	01:45:08	Depth = 100 km
	i SKS	N,E	01:49:21	Dist. = 14,400 km
	i	N,E	01:51:19	O = 01:23:24
	e	N,E	01:52:18	Courtesy U.S.C.G.S.
	i	N,E	01:54:20	
	e PPS(?)	N	01:55:15	

Date	Phase and component		G.M.C.T.	Remarks
2 May '49	e	E	11:41:48	
	i	E	11:41:59	
	i	E	11:43:01	
	i	E	11:43:13	
	i	E	11:44:03	
3 May '49	i P	N	06:08:43	Epicenter: 49°N, 153½°E
	i pP	N,E	06:09:14	Kurile Islands
	i S	N,E	06:18:30	Depth = 100 km
	i PS	N,E	06:20:38	Dist. = 8900 km
				O = 05:56:42
				Courtesy U.S.C.G.S.
8 May '49	i pP	N	21:35:08	Epicenter: 20°S, 71°W
	i S	N,E	21:42.47	Off Coast of Northern
	i	E	21:43:43	Chile
	i	N	21:45:15	Depth = 120 km
				Dist, = 6750 km
				O = 21:24:36
				Courtesy U.S.C.G.S.
				Time correction uncertain
				All times ± 11 sec.
9 May, 49'	i PP	N	13:58:08	Epicenter: 5°N, 95°E
	i	N	13:59:10	Near Coast of North-western Sumatra
				Dist. = 14,900 km
				O = 13:36:18
				Courtesy U.S.C.G.S.
10 May '49	i P	E	00:32:06	Epicenter: 19°N, 106½°W
	i S	E	00:36:34	Off Western Coast of Mexico
				Dist. = 3600 km
				O = 00:24:42
				Courtesy of U.S.C.G.S.
10 May '49				Seismic Activity Between 03:32:- and 04:24:-
8 June '49	i	N,E	05:26:21	Beginning can not be
	i	N,E	05:27:28	read; it is previous
	i	N,E	05:28:28	to 05:25:11
11 June '49	i P	N	07:40:54	Epicenter: 12½°N, 87½°W
	i	N	07:42:18	Nicaragua
	e S	N,E	07:46:16	Dist. = 3250 km
	M	N,E	07:54:00	O = 07:34:48
				Courtesy U.S.C.G.S.

Date	Phase and component		G.M.C.T.	Remarks
12 June '49	i P	N	18:02:37	Epicenter: 27°S, 64°W
	i sP	N	18:04:39	Northern Argentina
	i S	N,E	18:10:48	Depth = 600 km
	i ScS	N,E	18:11:29	Dist. = 7600 km
	i	N,E	18:14:27	O = 17:52:24
	e SS	E	18:15:29	Courtesy U.S.C.G.S.
	e	E	18:17:50	Record may be complicated by earthquake at 17:55.48 same epicenter.
18 June '49	e	E	00:03:31	
	e	E	00:03:49	
	e	E	00:05:39	
	e	N,E	00:06:29	
	e	N,E	00:07:19	
	e	E	00:08:06	
24 June '49	i P'	N	22:58:20	Epicenter: 7°S, 105°E
	i	N	22:58:33	Southwestern Coast
	e PP?	N	23:01:37	of Java
	e SKKS?	N	23:08:23	Distance = 16,300 km
	L	N	24:52:30	O = 22:38:16
				Courtesy U.S.C.G.S.
26 June '49	e PP	N	09:03:33	Epicenter:
	i	N	09:04:08	Celebes Is.
	e	N	09:04:40	Dist. = 15000 km
	e		09:09:11	O = 08:41:16
	i	N	09:10:00	Courtesy U.S.C.G.S.
	i	N	09:13:14	
	L	N	09:50:40	
	M	N	10:05:30	

During the first half of 1949 two seismographs were in continuous operation. Both are of the Galitzin type, being sensitive to the north-south and east-west components of horizontal motion. They record photographically.

The time is controlled by a Stromberg clock, which is compared daily with signals from radio station WWV. The time accuracy of the north-south instrument is about ± 2 secs. Because of mechanical difficulties, the drum speed of the east-west recorder is not constant, and times obtained solely from the records of this instrument may have an error of as much as 4 sec.

Both of the instruments record at the rate of 1 1/2 cms/min. The free period of each horizontal instrument is 10 seconds. Damping and sensitivity were changed several times during the interval under consideration, and no record was kept of their values.

We acknowledge with thanks receipt of the following bulletins and other publications between Feb. 9, 1950 and Mar. 7, 1950.

Bulletin	Date
Bulletin Du Bureau Central Seismologique Francais	Sept.-Dec., 1949 Jan., 1950
Harverd University - Seismological Bulletin	July-Dec., 1947 Year, 1948
Istituto Nazionale di Geofisica of Rome, Seismological Bulletin	Nov., 1949
Jahresbericht des Erdbebendienstes - der Schweizerischen Meteorologischen Zentralanstalt	Year, 1948
Observatorio Astronomico De La Universidad Nacional, Bulletin Seismological	Year, 1944 and 1947
Riverview College Observatory - Seismological Bulletin	Jan.-March, 1948
Royal Observatory - Helwan Seismological Bulletin	Dec., 1949
Seismological Report of the Central Meteorological Observatory - Tokyo, Japan	Nov., 1949
Seismological Observatory Bulletin, Univ. of Pitt.	Year, 1949
Seismological Observatory, Wellington Seismological Report for Suva, Fiji	Year, 1944, 1945, 1946
Provisional Bulletin	Sept., Oct., 1949
Seismischer Bericht des Wurttembergischen Erdabebendienstes Stuttgart	July-Sept., 1949
Schweizerisches Erdebenbulletin	Nov., Dec., 1949
Union Geodesique Et Geophysique Internationale Association De Seismologie	Year, 1948
U. S. Coast and Geodetic Survey - Preliminary Determinations	#'s 10-50 to 19-50, S5-50 to S8-50

The Geophysical Laboratory
State College, Pennsylvania
B. F. Howell, Jr., Director
J. W. Berg, Keeva Vozoff, Assistants

THE PENNSYLVANIA STATE COLLEGE

MINERAL INDUSTRIES EXPERIMENT STATION

Seismograph Report VIII

July, August, September, 1949

School of Mineral Industries
State College, Penna., U.S.A.

Locality: The station is located in a vault under the central wing of the School of Mineral Industries Building. The instruments are mounted on a concrete pillar separated from the foundations and anchored to bedrock (dolomite). The geographic coordinates are:

ϕ - 40° 48' N λ - 77° 52' W H - 390 m

The geocentric coordinates are (according to Gutenberg and Richter):

A - 40° 36' N λ - 77° 52' W H - + 3 km.

Please address all communications to:

Geophysical Laboratory
School of Mineral Industries
State College, Pennsylvania

This issue of the Reports of Pennsylvania State College Seismograph Station represents a resumption of this service after a lapse of eight years. The station has been in intermittent operation throughout this period. Except between 1941 and 1944, the records were given some study, and reports of seismic wave arrivals reported to the United States Coast and Geodetic Survey and to the Jesuit Seismological Society at St. Louis. We hope to make a study of the records from 1941 - 1944 in the near future, and eventually to issue bulletins for the whole period.

The seismograph station operates three instruments, two horizontal components at right angles and one vertical. All are of the Galitzin type. The horizontal instruments record photographically in the usual manner; but an electronic amplifier has been added to the circuit of the vertical instrument to drive a pen-type recorder. Both horizontal components have been in continuous operation during the period covered by this report, except for the first part of August when only one instrument was run each day due to a shortage of recording paper. The vertical recorder was withdrawn from service on July 22 for extensive overhall, and is not yet in operation again.

The time is controlled by a Stromberg clock, which is compared daily with signals from radio station WWV. The time accuracy of the north-south and vertical instruments is about $\pm$ 2 secs. Because of mechanical difficulties, the drum speed of the east-west recorder is not constant, and times obtained solely from the records of this instrument may have an error of as much as 4 sec.

All of the instruments record at the rate of 1 1/2 cms./min. The free period of each horizontal instrument is 10 seconds; that of the vertical is 6 seconds. Damping and sensitivity were changed several times during the interval under consideration, and no record was kept of their values.

We acknowledge with thanks receipt of the following bulletins and other publications between July 1 and Dec. 15, 1949.

Bulletin	Date
Batavia Seismological Bulletin	January to March, 1949
Bulletin Du Bureau Central Seismologique Francais	July-Nov. 1948, May-Nov. 1949
Bulletin of the Seismographic Stations	July to Dec. 1941
University of California	July to Dec. 1947
	Jan. to Sept. 1948
Bulletin Seismique - Observatoire De Tananarive	Year, 1948
California Institute of Technology	July to Dec., 1948
Seismological Laboratory Bulletin	
Preliminary Bulletin	July to Oct., 1949
Cleveland Seismological Observatory	June to Sept., 1949
John Carroll University - Seismological Bulletin	Nov., 1948
Dominion Observatory - Ottawa	Jan. to Dec., 1948
Seismological Bulletin	April to June 1949
Geodaetisk Institut - Proviantgaarden, Copenhagen	Jan.-Dec. 1944, Sept. 1946
Bulletin of the Seismological Station	Dec. 1947
Institut De Physique Du Globe De Strasbourg	May, June, Sept., Oct., 1949
Bulletin Seismique	
International Seismological Summary	Year, 1937
Istituto Nazionale Di Geofisica of Rome	May, June, July, Aug., Sept., 1949
Jesuit Seismological Association - Preliminary	April, June, July, August,
Bulletin	1949
Kandilli Rasathanesi - Observatoire de Kandilli	May and June, 1949
Bulletin Seismique Preliminaire	
Observations Seismographiques l'Observatoire	July 1947, June 1948
Meteorologique d'Uppsala	
Perth Observatory - Seismologic Station Bulletin	Jan. to Aug. 1949
Riverview College Observatory - Seismological "	Jan. to December 1947
Royal Observatory - Helwan Seismological Bulletin	May to July 1949
Saint Louis University - Institute of Technology	Jan.-Feb. 1945, Sept.-Dec.
Seismological Bulletin	1946 Jan.-May, 1947, April-June, 1949, Sept. 1948
Seismological Observatory, Wellington	Jan.-Dec. 1943, Jan.-Dec. 1946
Seismological Report for Suva, Fiji	Jan.-Dec. 1945, Jan.-Dec. 1947
Provisional Bulletin	April, May, June, July 1949
Seismological Reports	Year, 1947
Schweizerisches Erdbebenbulletin	Sept. 1948, May to Oct. 1949
Seismischer Bericht des Wurttembergischen	
Erdbebendienstes Stuttgart	April, May, June 1949
The Seismological Bulletin of The Central	
Meteorological Observatory of Japan	Year, 1939
Union Geodesique Et Geophysique International	April, May and June, 1949
Bureau Central Seismologique de Strasbourg	July, 1948
Bulletin mensuel	
U. S. Coast and Geodetic Survey Seismological	
Bulletin	July, Aug., Sept. 1945
Preliminary determinations #'s 58-49 to 109-49	
S1-49 to S25-49	
Vorlaufiger Seismischer Bericht des Wurtt	July, Aug., Sept. 1948
Erdbebendienstes, Stuttgart	

Date	Phase and component		G. M. C. T.	Remarks
2 July '49	i	N,E	20:16:09	Epicenter:
	i	N,E	20:22:11	16°N, 148°E
	i S	N,E	20:23:49	Marianas Islands
	i PS	N,E	20:25:37	Dist.- 12,300 km
	i	E	20:26:15	O - 19:57:10
	i	E	20:28:19	Courtesy U.S.C.G.S.
	e	E	20:36:20	
	e L	N,E	20:47:20	
	M	N,E	21:02:30	
2 July '49	e	N	11:50:05	Epicenter:
	e PP	E	11:50:45	52°S, 162°E
	e	E	11:55:38	Auckland Islands
	e	E	12:00:31	Dist.- 15,400 km
	e	E	12:02:05	O - 11:27:35
	e	E	12:08:34	Courtesy U.S.C.G.S.
	i	N,E	12:43:10	
4 July '49	e	N,E	04:05:10	Epicenter:
	e S	N	04:06:00	27 1/2°N, 56°E
	e ScSScS	N,E	04:18:21	Persian Gulf
	e SKPP'	E	04:23:10	Dist.- 11,100 km.
	e	N,E	04:39:30	O - 03:40:40
				Courtesy U.S.C.G.S.
6 July '49	e	E	20:23:08	Solomon Islands
	e	E	20:49:20	Dist. - 13,500 km
	M	E	21:00:30	O - 19:45:03
				Courtesy U.S.C.G.S.
7 July '49	e L	N,E	04:49:30	Epicenter:
	M	N,E	04:51:45	36 1/2°N, 36°W
				North Atlantic Ocean
				Dist. - 3800 km
				O - 04:32:17
				Courtesy U.S.C.G.S.
8 July '49	i	N	08:26:18	
	i	N,E	08:55:40	
	M	N,E	09:02:30	
8 July '49	e	N,E	12:46:38	Epicenter:
	i	N,E	12:47:26	13°N, 91°W
	i	N,E	12:51:40	Guatamala
	i	N,E	12:53:01	Dist.- 3350 km
	i	N	12:53:55	O - 12:40:30
	i	N,E	12:58:40	Courtesy U.S.C.G.S.
	M	N,E	13:01:20	
8 July '49	M	E	18:45:00	Epicenter: 72°N 0°
				Arctic Ocean - 200 mi.
				east of Jan Mayen Is.
				Dist.- 5300 km
				O - 18:18:06
				Courtesy U.S.C.G.S.

Date	Phase and component		G. M. C. T.	Remarks
9 July '49	i P	N,E	18:47:12	North Atlantic Coast
	i	N,E	18:47:21	350 miles west of
	i S	N,E	18:48:56	Bermuda
				Dist.- 1050 km
				O - 18:44:50
				Courtesy U.S.C.G.S.
10 July '49	i P	N,E	04:07:06	Epicenter:
	i	N,E	04:10:50	39°N, 71°E
	i SKS	N,E	04:17:42	Eastern Turkestan
				Dist.- 10,800 km
				O- 03:53:36
				Courtesy U.S.C.G.S.
10 July '49	e P	N	16:02:42	Aftershock
	e	N	16:05:49	Eastern Turkestan
	i SKS	N,E	16:13:17	Dist.- 10,800 km
	i PS	N,E	16:15:16	O - 15:49:14
	i	E	16:18:45	Courtesy U.S.C.G.S.
	c	N,E	16:39:00	
11 July '49	e SKS	N,E	16:35:25	Epicenter:
	i S	N,E	16:36:07	34°N, 132°E
	e PS	N	16:37:31	Honshu, Japan
	e	E	16:40:46	Dist. - 11,200 km
	e SS	E	16:43:20	O - 16:10:44
	e	N	16:50:43	Courtesy U.S.C.G.S.
	e SKPP'	E	16:53:23	
	e L	N	16:57:00	
	M	N,E	17:08:00	
12 July '49	i	N,E	04:57:56	
	i	E	04:58:08	
	e	E	05:00:09	
	i	N,E	05:00:45	
	e	N,E	05:01:36	
14 July '49	e L	E	19:54:30 to 20:04:00	
16 July '49	i P	E	10:03:32	Epicenter: Guatemala
	i	E	10:05:03	Dist.- 3500 km.
	i SSS	E	10:09:06	O - 09:57:20
	e L	N,E	10:11:00	Courtesy U.S.C.G.S.
18 July '49	e	E	00:55:24	
	e	E	01:03:30	
	e	E	01:18:12	
	e	E	01:35:00	
	M	E	01:52:30	

Date	Phase and component		G. M. C. T.	Remarks
21 July '49	i	N,E	08:11:07	Epicenter:
	i	N	08:11:31	16°S, 74°W
	i	N	08:11:46	Peru
	e	E	08:15:51	Depth 100 km
	i	N,E	08:18:50	Dist.- 6400 km
	i	N,E	08:19:38	0 - 08:01:34
	i	E	08:20:48	Courtesy U.S.C.G.S.
	i	E	08:21:35	
	i	E	08:22:39	
	i	E	08:24:26	
	i L	E	08:25:15	
	e	N,E	08:29:54	
23 July '49	i	N,E	09:12:00	
	i	N	09:12:16	
	i	N,E	09:13:11	
	i	N,E	09:14:19	
	i	E	09:14:38	
	i	E	09:14:55	
	i	E	09:15:25	
23 July '49	e	N,E	10:45:16	Epicenter:
	i	N,E	10:46:41	18 1/2°S, 169°E
	e	E	10:48:00	New Hebrides
	i	E	10:51:56	Depth 200 km
	i SKS	E	10:53:25	Dist.- 14,000 km
	i	E	10:56:25	0 - 10:26:49
	i	E	10:57:40	Courtesy U.S.C.G.S.
	i	E	10:58:42	
	i	E	11:04:11	
	i	E	11:05:55	
	i	E	11:09:36	
	i SSS	E	11:12:17	
	i	E	11:25:35	
	i	E	11:27:48	
23 July '49	i P	N,E	15:15:17	Epicenter:
	i	N,E	15:25:00	38°N, 26°E
	e	N,E	15:39:30	Turkey
	M	N,E	15:47:00	Dist.- 8250 km
				0 - 15:03:30
				Courtesy U.S.C.G.S.
25 July '49	e	E	11:35:39	Epicenter:
	e S	E	11:46:48	32°S, 111°W
	i	E	11:47:21	Easter Island
	e	E	11:48:43	Dist.- 8800
	i	E	11:52:10	0 - 11:24:40
	i	E	11:58:40	Courtesy U.S.C.G.S.

Date	Phase and component		G. M. C. T.	Remarks
27 July '49	i	N,E	11:23:58	
	i	N,E	11:24:41	
	i	N,E	11:34:11	
	i	N,E	11:36:19	
	i	E	11:42:26	
27 July '49	i PP	N,E	15:31:13	Epicenter:
	i S	E	15:37:17	29°S, 177°W
	i	N	15:39:00	Kermadec Is.
	i PS	N,E	15:40:49	Dist.- 13,000 km
	i SS	E	15:46:30	O - 15:11:35
	i	E	15:48:13	Courtesy U.S.C.G.S.
	e	N,E	16:04:07	
	M	N,E	16:13:20	
28 July '49	i	N,E	20:34:29	
	i	N,E	20:34:41	
	i	E	20:35:07	
	i	E	20:35:31	
	i	N,E	20:36:10	
	i	E	20:36:56	
	i	N,E	20:37:15	
	i	N,E	20:37:50	
	M	N,E	20:38:30	
29 July '49	e	N	21:04:46	Gulf of California
	e	N	21:05:59	Dist.- 3300 km
	e	N	21:10:20	O - 20:48:05
				Courtesy U.S.C.G.S.
29 July '49	e	N	22:03:37	Gulf of California
	e	N	22:05:05	Dist.- 3300 km
	e	N	22:07:25	O - 21:47:06
				Courtesy U.S.C.G.S.
29 July '49	e	N	22:15:31	Gulf of California
	e	N	22:16:43	Dist.- 3300 km
				O - 21:59:21
				Courtesy U.S.C.G.S.
5 Aug. '49	i P	E	19:16:42	Epicenter:
	e	E	19:18:07	1°S, 78°W
	e	E	19:18:56	Ecuador
	e	E	19:20:11	Dist.- 4600 km
	e	E	19:20:50	O - 19:08:47
	e	E	19:21:17	Courtesy U.S.C.G.S.
	e	E	19:22:16	
	i S	E	19:22:53	
	e	E	19:24:17	
	e	E	19:26:18	
	M	E	19:32:00	

Date	Phase and component		G. M. C. T.	Remarks
6 Aug. '49	i	E	08:34:58	
	i	E	08:36:03	
	i	E	08:37:55	
	i	E	08:39:40	
6 Aug. '49	i	E	00:49:50	Epicenter:
	i	E	00:50:15	19°S, 174°W
	i	E	00:50:37	Tonga
	i	E	00:53:16	Dist.- 11,900 km
	i	E	00:53:38	O - 00:35:27
	i	E	00:54:10	Courtesy U.S.C.G.S.
	i	E	00:59:29	
	e	E	01:00:25	
	M	E	01:32:00	
8 Aug. '49	o	E	14:17:41	
	i	E	14:22:31	
	i	E	14:23:30	
	i	E	14:25:00	
	M	E	14:29:30	
13 Aug. '49	i P	E	18:40:11	Epicenter:
	i PP	E	18:45:21	0°, 146°E
	o SKS	E	18:50:49	Admiralty Is.
	e	E	18:52:25	Dist.- 13,700 km
	e	E	18:55:15	O - 18:24:49
	e	E	19:07:00	Courtesy U.S.C.G.S.
	i	E	19:21:20	
17 Aug. '49	i P	N,E	18:56:38	Epicenter:
	i S	N,E	19:06:55	39°N, 40°E
	M	N,E	19:27:00	Turkey
				Dist.- 9250 km
				O - 18:44:15
				Courtesy U.S.C.G.S.
22 Aug. '49	i	E	04:09:50	Epicenter:
	e	E	04:15: ?	54°N, 133° W
				Dist.- 4600 km
				O - 04:01:12
				Magnitude 8 - Pas.
				Courtesy U.S.C.G.S.
23 Aug. '49	i S	N,E	15:31:08	Epicenter:
	M	N,E	15:50:30	Near coast of South-
				ern Peru
				O - 15:13:20
				Courtesy U.S.C.G.S.
23 Aug. '49	o	N,E	19:58:21	Epicenter:
	i	N,E	20:03:42	53°N, 132°W
				Dist.- 4500 km
				O - 19:43:35
				Foreshock
				Courtesy U.S.C.G.S.

Date	Phase and component		G. M. C. T.	Remarks
23 Aug. '49	i P	N,E	20:31:54	Epicenter:
	i PP	N,E	20:33:22	53°N, 132°W
	i S	N,E	20:37:53	Dist.- 4500 km
	i	N,E	20:40:43	O - 20:24:32
	M	N,E	20:50:10	Courtesy U.S.C.G.S.
24 Aug. '49	i S	E	06:20:07	Epicenter: 43°N, 127°W
	i	N,E	06:27:34	Off coast of Oregon
				O - 06:07:14
				Courtesy U.S.C.G.S.
24 Aug. '49	e	N	22:57:42	Epicenter: Off British
	M	E	23:01:20	Columbia
				O - 22:37:13
				Courtesy U.S.C.G.S.
25 Aug. '49	e	E	04:47:20	Epicenter:
				52 1/2°N, 178°W
				O - 04:14:25
				Courtesy U.S.C.G.S.
25 Aug. '49	e	E	18:16:14	
25 Aug. '49	i	N	23:48:33	
	i	N	23:54:40	
26 Aug. '49	e	N,E	05:47:04	Epicenter: Off British
	i	N,E	05:47:39	Columbia
				O - 05:26:00
				Courtesy U.S.C.G.S.
26 Aug. '49	e	N,E	23:00:24	Epicenter: Off British
	i	N,E	23:00:56	Columbia
				O - 22:39:40
				Courtesy U.S.C.G.S.
27 Aug. '49	e	N	15:10:42	
	i	E	15:12:39	
27 Aug. '49	e	E	21:50:35	
	i	E	21:51:15	
	i	N,E	21:52:35	
	e	N,E	21:54:07	
31 Aug. '49	e L	E	01:07:40	Epicenter: Marianas
				O - 00:08:15
				Courtesy U.S.C.G.S.
31 Aug. '49	i	E	14:08:20	Epicenter: S. Alaska
				O - 13:47:09
				Courtesy U.S.C.G.S.

Date	Phase and component		G. M. C. T.	Remarks
1 Sept. '49	e S	E	14:20:14	Epicenter: 36°S, 97°W
	M	E	14:31:20	S. E. Easter Is.
	M	N	14:41:00	O - 13:58:44
				Courtesy U.S.C.G.S.
1 Sept. '49	e	E	18:40:43	
	e	E	18:43:28	
	e	E	18:45:53	
	e	E	18:48:18	
	e	E	18:49:51	
	e	E	18:51:30	
2 Sept. '49	e	N,E	01:52:23	
2 Sept. '49	e	N,E	06:09:46	
5 Sept. '49	e	N	04:04:47	Epicenter: 17°N, 121°E
	M#1	N	04:14:30	Luzon, Philippine Is.
	M#2	N	04:38:00	Dist.- 13,500 km
				O - 03:18:09
				Courtesy U.S.C.G.S.
5 Sept. '49	i P	N,E	07:14:28	Epicenter: Off British
	i	N,E	07:14:46	Columbia
	i	N,E	07:15:04	O - 06:54:15
	i S	E	07:15:32	Courtesy U.S.C.G.S.
	i	N	07:16:54	
	i	E	07:18:24	
8 Sept. '49	e	E	15:14:32	
	i	E	15:16:19	
	e	E	15:18:48	
	i	E	15:19:36	
12 Sept. '49	i	N	14:58:17	
	e	N,E	14:58:36	
	i	N,E	14:59:02	
14 Sept. '49	e P'	N,E	20:09:36	Epicenter: 1°N, 126°E
	i	E	20:09:57	Dist.- 15,200 km
	e	N,E	20:11:45	O - 19:50:15
	i	N,E	20:11:59	Mag. - 7 1/2 - Pas.
	i	E	20:12:08	Courtesy U.S.C.G.S.
	i	N,E	20:13:07	
	i	E	20:14:48	
	i SKKKS	N,E	20:18:48	
	e	E	20:21:15	
	M	N	21:16:1/2	
16 Sept. '49	M	E	21:05:00	
16 Sept. '49	M		16:12:40	
17 Sept. '49	M	E	02:55:1/2	

Date	Phase and component		G. M. C. T.	Remarks
20 Sept. '49	e PP	E	12:15:25	Epicenter:
	i	E	12:20:47	30°S, 178°W
	i SKKS	E	12:22:04	Kermadec Islands
	e PS	E	12:24:48	Dist.- 13250 km
	i PS	N,E	12:25:05	0 - 11:55:20
	e	E	12:25:30	Courtesy U.S.C.G.S.
	e PPS	E	12:26:10	
	i SKPP'	N,E	12:38:41	
	i	E	12:41:52	
	e L	E	12:42:46	
	M	E	13:02:1/2	
21 Sept. '49	e P	N,E	13:00:57	Epicenter: Southern
	i SP	N,E	13:01:27	Mexico
	e	E	13:03:05	Dist.- 3050 km
	e PcP	N	13:04:02	0 - 12:55:05
	e S	N,E	13:05:29	Courtesy U.S.C.G.S.
	i sS	N	13:06:18	Probable Depth - 180 km
21 Sept. '49	i PS	E	18:44:23	Epicenter:
	i L	N	19:07:03	16°S, 173°W
	M	E	19:18:42	Somoa Islands
	M	N	19:23:51	Dist.-11600 km
				0 - 18:19:40
				Courtesy U.S.C.G.S.
24 Sept. '49	i SKS	N,E	04:43:41	Epicenter: 6°S, 154°E
	i	E	04:45:05	Solomon Islands
	i	E	04:48:10	Dist.-13,700 km
	e L	N	05:16:21	0 - 04:17:38
				Courtesy U.S.C.G.S.
27 Sept. '49	i PP	N,E	15:39:17	Epicenter:
	e L	N,E	15:46:00	60°N, 149°W
				Southern Alaska
				Dist.-5250 km
				0 - 15:30:43
				Courtesy U.S.C.G.S.
30 Sept. '49	i SKS	E	04:24:04	Epicenter:
	i SKKS	E	04:25:11	23°S, 176°W
	i PS	E	27:36	Tonga Is.
	e SS	E	33:53	0 - 03:58:52
				Courtesy U.S.C.G.S.
30 Sept. '49	M	E	16:24:19	Epicenter:
				21°S, 170°E
				Loyalty Islands
				0 - 15:16:00
				Courtesy U.S.C.G.S.

Date	Phase and component		G. M. C. T.	Remarks
30 Sept. '49	e PS	E	18:48:15	O - 18:19:55
	e PPS	E	18:49:22	Aftershock of
	M	E	19:19	the 03:58:52
				Courtesy U.S.C.G.S.
30 Sept. '49	e L	N,E	23:07:09	Aftershock of
				the 03:58:52 quake
				O - 22:16:55
				Dist.-12,300 km
				Courtesy U.S.C.G.S.

The Geophysical Laboratory
State College, Pennsylvania
Dec. 20, 1949
B. F. Howell, Jr., Director
J. W. Berg, Assistant
Keeva Vozoff, Assistant

THE PENNSYLVANIA STATE COLLEGE

MINERAL INDUSTRIES EXPERIMENT STATION

GEOPHYSICAL LABORATORY

Seismograph Report IX

OCTOBER, NOVEMBER, DECEMBER, 1949

School of Mineral Industries
State College, Penna., U.S.A.

Locality: The station is located in a vault under the central wing of the School of Mineral Industries Building. The instruments are mounted on a concrete pillar separated from the foundations and anchored to bedrock (dolomite). The geographic coordinates are:

ϕ - 40° 48' N λ - 77° 52' W H - 390 m

The geocentric coordinates are (according to Gutenberg and Richter):

A - 40° 36' N λ - 77° 52' W H - + 3 km.

Please address all communications to:

Geophysical Laboratory
School of Mineral Industries
State College, Pennsylvania

During the last quarter of 1949 two seismographs were in continuous operation. Both are of the Galitzin type, being sensitive to the north-south and east-west components of horizontal motion. They record photographically.

The time is controlled by a Stromberg clock, which is compared daily with signals from radio station WWV. The time accuracy of the north-south instrument is about ± 2 secs. Because of mechanical difficulties, the drum speed of the east-west recorder is not constant, and times obtained solely from the records of this instrument may have an error of as much as 4 sec.

Both of the instruments record at the rate of 1 1/2 cms/min. The free period of each horizontal instrument is 10 seconds. Damping and sensitivity were changed several times during the interval under consideration, and no record was kept of their values.

We acknowledge with thanks receipt of the following bulletins and other publications between Dec. 17, 1949 and Feb. 8, 1950.

Bulletin	Date
Batavia Seismological Bulletin	April and June, 1949
Bulletin Seismique - Observatoire De Tananarive	Jan., Feb., Mar., 1949
California Institute of Technology, Preliminary Bulletin	Jan. to March, 1949
Dominion Observatory, Ottawa, Seismological Bulletin	July to August, 1949
Institut De Physique Du Globe De Strasbourg, Bulletin Seismique	Sept., Nov., Dec., 1949
Istituto Nazionale Di Geofisica of Rome, Seis. Bull.	Sept. and Oct., 1949
Istituto Talassografico - Trieste, Pubbl. No.'s 74, 119, 144, 149, 221, 234, 246, 247, 248, 251, 254	1946, 1948, 1949
Jesuit Seismological Association, Preliminary Bulletin	May, Sept., Oct., 1949
Observations Seismographiques l'Observatoire Meteorologique d'Uppsala	June, 1949 and July, 1948
Royal Observatory - Helwan Seismological Bulletin	Oct. and Nov., 1949
Seismological Observatory, Wellington, Provisional Bulletin	August, 1949
Seismological Report	Jan. to Dec., 1947
Seismological Report of the Central Meteorological Observatory - Tokyo, Japan	Sept. and Oct., 1949
U. S. Coast and Geodetic Survey - Preliminary Determinations	#'s 110-49 to 119-49, 1-50 to 9-50, S26-49 to S28-49, S1-50 to S4-50.

Date	Phase and component		G. M. C. T.	Remarks
3 Oct. '49	M	N,E	24:25:30	Alaskan Peninsula Courtesy U.S.C.G.S.
4 Oct. '49	i P	N,E	10:31:14	Epicenter: 1°S, 21°W
	e	N,E	10:36:36	Mid Atlantic
	i	N,E	10:37:30	O - 10:20:23
	i S	N,E	10:40:04	Courtesy U.S.C.G.S.
	i	N	10:42:24	Dist.-7,500 km.
	i SS	N	10:44:36	Records complicated
	L	N	10:47:01	by earlier Earth-
	M	N	10:57:-	quake.
7 Oct. '49	i P'	N,E	12:21:56	Epicenter:
	i PP	N,E	12:25:17	33°S, 56 1/2°E
	i PPS (?)	N,E	12:37:41	Indian Ocean
	i	N,E	12:40:19	Dist.-16,000 km.
	L	N,E	13:13:41	O - 12:02:19
	M	E	13:31:03	Courtesy U.S.C.G.S.
19 Oct. '49	i	N,E	21:19:42	Epicenter:
	L	N	21:49:07	5 1/2°S, 154°E Solomon Islands O - 21:00:11 Courtesy U.S.C.G.S. Dist.-14,000
20 Oct. '49	i	N	13:06:27	Aftershock Solomon Islands Dist.-14,000 km. O - 12:44:54 Courtesy U.S.C.G.S.
21 Oct. '49	i	E	21:54:47	Epicenter:
	i PP	N	21:55:12	5 1/2°S 154°E
	e	E	21:59:48	Solomon Islands
	i PS (?)	N,E	22:04:49	O - 21:34:16
	e SS	E	22:11:26	Courtesy U.S.C.G.S.
	i SSS	N	22:16:48	Dist.-13,600
	L	E	22:34:53	
	M	E	22:48:25	
26 Oct, '49	M		10:25:40	Epicenter: Solomon Islands Dist.-14,000 km. O - 09:13:10 Courtesy U.S.C.G.S.
27 Oct. '49	e	N	04:54:20 to 04:55:41	Unidentified Activity
27 Oct. '49	L	N	08:39:53	Epicenter:
	M	N	08:41:30	Gulf of California O - 08:24:15 Courtesy U.S.C.G.S.

Date	Phase and component		G. M. C. T.	Remarks
27 Oct. '49	i	N	10:22:20 to 10:23:40	Epicenter: 23 1/2°S, 180° South of Fiji Islands Dist.-13,000 O - 10:02:05 Courtesy U.S.C.G.S.
31 October '49	M	N	00:53:-	Epicenter: Samoa Islands region O - 00:02:44 Courtesy U.S.C.G.S.
31 October '49	i P	N,E	01:47:07	Epicenter: 56°N, 135°W S. of Sitka, Alaska Dist.-4400 km. O - 01:39:32 Courtesy U.S.C.G.S.
	i PP	N,E	01:48:36	
	i S	N,E	01:55:16	
	i	N,E	01:55:59	
	e L	N,E	02:00:42	
31 October '49	e		18:17:11	Epicenter: 5°S, 152 1/2°E New Britain Depth - 100 km. Dist.-13,700 km. O - 17:55:35 Courtesy U.S.C.G.S.
	e	N,E	18:22:58	
	e SP (?)	E	18:25:56	
	i SPP(?)	N,E	18:27:20	
	i	E	18:31:52	
	e SS	E	18:32:55	
	M	E	19:10:14	
4 Nov. '49	L	N	20:57:04	Epicenter 32°N, 116 1/2°W Lower California Dist.-3550 km. O - 20:42:38 Courtesy U.S.C.G.S.
	M	N	21:00:30	
5 Nov. '49			04:54:- to 05:00:-	Seismic Activity recorded.
7 Nov. '49	e P'	E	06:18:49	Epicenter: 14°S, 166 1/2° E New Hebrides O - 05:59:35 Courtesy U.S.C.G.S. Dist.-13,600 km.
	e	E	06:24:27	
	i	N,E	06:28:38	
	e	N	06:29:19	
	e	N	06:30:58	
	i	N,E	06:32:12	
	i	N	06:35:17	
	e	E	06:35:56	
	e PSPS?	N	06:37:18	
	i	N	06:38:43	
	e P'P'?	E	06:39:14	
	e	N	06:40:40	
	i	E	06:44:04	
	e	N	06:46:00	
	M	E	07:06:-	

Date	Phase and component		G. M. C. T.	Remarks
13 Nov. '49	e	N	04:48:43	Epicenter: 11°N 86°W
	e	N	04:51:05	Southwest Coast of
	i	N	04:53:08	Nicaragua
	M	N	05:01:48	Dist.-3400 km.
				O - 04:42:35
				Courtesy U.S.C.G.S.
20 Nov. '49	e	N	07:15:34	Epicenter:
	e	N	07:16:30	28 1/2°N, 112°W
	e	N,E	07:18:00	Gulf of California
	e	N	07:20:55	Dist.-3200 km.
	M	N	07:26:-	O - 07:09:45
				Courtesy U.S.C.G.S.
22 Nov. '49	i	E	01:11:25	Epicenter:
	e	E	01:16:38	29°S, 178°W
	e	E	01:18:00	Kermadec Island region
	i	N	01:18:20	O - 00:51:32
	i	N	01:18:40	Courtesy U.S.C.G.S.
	e	E	01:19:36	Dist.-13,200 km.
23 Nov. '49	i S	E	06:23:24	Epicenter:
	e	E	06:26:11	19°N, 78 1/2°W
	M	E	06:27:-	Off N.W. Coast of
				Jamaica
				Dist.-2400 km.
				O - 06:14:39
				Courtesy U.S.C.G.S.
27 Nov. '49	i	E	09:07:06	Epicenter:
	i	E	09:07:53	18°S, 173°W
	i	E	09:10:02	Tonga Island region
	i	E	09:10:26	O - 08:42:16
	e	E	09:32:50	Courtesy U.S.C.G.S.
				Dist.-12,000 km.
2 Dec. '49		E	20:36:40 to 20:46:40	Only L Waves received Epicenter: Fiji Islands region O - 19:42:07 Courtesy U.S.C.G.S.
10 Dec. '49	e P	N,E	19:25:22	Dist.-8400 km.
	e PPP	E	19:29:42	
	e S	N,E	19:34:08	
	e PS	E	19:35:40	
	e SS	N,E	19:40:42	
	e SSS	E	19:43:32	
	e L	N,E	19:49:16	
11 Dec. '49	e	E	12:33:58	
	e S(?)	E	12:34:56	
	e	E	12:37:26	
	L	E	12:38:52	
	M	E	12:44:38	

Date	Phase and component		G. M. C. T.	Remarks
16 Dec. '49	L	E	15:05:43	Epicenter: Kermadec Island region Dist.-13,200 km. O - 14:06:25 Courtesy U.S.C.G.S.
17 Dec. '49	i P	N	07:06:53	Epicenter: 54°S, 71°W Southern Magallanes Province O - 06:53:29 Courtesy U.S.C.G.S. Dist.-10,700 km.
	e	N	07:07:13	
	e	N	07:09:41	
	e	E	07:11:59	
	i	E	07:13:43	
	e	N	07:15:52	
	e	E	07:18:05	
	M	N,E	07:49:44	
17 Dec. '49	e P	N	15:21:18	Epicenter: 54°S, 71°W Southern Magallanes Province O - 15:07:53 Courtesy U.S.C.G.S. Dist.-10,700 km.
	e	E	15:21:42	
	e	E	15:22:36	
	i	E	15:24:18	
	i	E	15:31:42	
	M	E	15:51:30	
19 Dec. '49	L	E	07:44:30	Only L Waves received
21 Dec. '49	i S?	N,E	12:40:43	Epicenter: 18 1/2°N, 67°W Near Coast of Puerto Rico Dist.-2800 km. O - 12:31:19 Courtesy U.S.C.G.S.
	M	E	12:45:-	
	M	N	12:47:30	
21 Dec. '49	i P	N,E	19:42:28	Epicenter: 20°S, 64°W Southern Bolivia Depth - 600 km. Dist.-7050 km. O - 19:33:00 Courtesy U.S.C.G.S.
	i	E	19:42:42	
	e	N	19:44:50	
	e	N	19:45:27	
	e	N	19:46:24	
	e	N	19:47:08	
	e S	N,E	19:49:57	
	i ScS(?)	N,E	19:51:19	
	e	N	19:57:45	
22 Dec. '49	i P	N,E	09:36:34	Epicenter: 16°N, 93°W Chiapas, Mexico Depth - 100 km. O - 09:30:47 Courtesy U.S.C.G.S. Dist.-2950 km.
	i PP	N,E	09:37:07	
	e	E	09:40:40	
	e S	N	09:40:47	
	M	N,E	09:47:-	

Date	Phase and component		G. M. C. T.	Remarks
25-26 Dec. '49	e	N	22:58:22	More than one Earthquake
	e	N	22:59:19	
	i	E	23:00:15	
	i	E	23:01:11	
	e	E	23:05:37	
	M	E	00:17:30	
	M	N	00:30:30	
26 Dec. '49	i PP?	E	06:43:44	Epicenter:
	e	E	06:44:36	14 1/2°S, 180°
	e SKS?	E	06:49:05	Fiji Islands region
	e	N	06:50:33	O - 06:23:54
	e	E	06:52:16	Courtesy U.S.C.G.S.
	e	N	06:55:28	Dist.-12,300
	e	N	06:56:37	
	e SS?	N	06:58:16	
	L	N	07:09:29	
	M	N	07:24:-	
	M	E	07:26:-	
28 Dec. '49	i P'	N,E	00:16:15	Epicenter:
	e	N,E	00:16:45	60°S, 22°W
	i PP	E	00:17:17	Sandwich Islands
	i	E	00:18:35	Dist.-12,500 km.
	i	N	00:22:27	O - 23:57:13
	e SKS	E	00:23:06	Courtesy U.S.C.G.S.
	e	N	00:25:39	
	e PS	E	00:25:59	
	e	E	00:27:47	
	e	N	00:31:16	- - - - -Very long period.
	M	E	00:59:-	
28 Dec. '49	M	E	06:45:-	Epicenter: Azores region Dist.-5700 km. O - 06:25:33 Courtesy U.S.C.G.S.
29 Dec. '49	e	N	03:24:00	Epicenter:
	i	E	03:24:04	18 1/2°N, 121°E
	e	E	03:24:17	Philippine Islands
	e SKKKS?	E	03:31:33	Dist.-13,500 km.
	e	N	03:34:01	O - 03:03:55
	M	N	04:15:30	Courtesy U.S.C.G.S.
29 Dec. '49	e	E	17:11:27	Epicenter:
	M	E	17:57:30	27°S, 176 1/2°W Kermadec Islands region Depth - 200 km. Dist.-13,200 km. O - 16:42:56

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