

THE PENNSYLVANIA STATE COLLEGE  
MINERAL INDUSTRIES EXPERIMENT STATION  
GEOPHYSICAL LABORATORY

Seismograph Report XIV

1 September to 31 December 1950

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:

$\phi - 40^{\circ} 48' N$                        $- 77^{\circ} 52' W$                        $H - 354 m$

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

$A - 40^{\circ} 36' N$                        $- 77^{\circ} 52' W$                        $H - + 3 km.$

Please address all communications to:

Geophysical Laboratory  
Mineral Sciences Bldg.  
State College, Pennsylvania

From 1 September to 31 December 1950 two seismographs were in continuous and one (the east-west component) in intermittent operation. After 2 October all three were in continuous operation. All are of the Galitzin type. The two horizontal components record photographically, the vertical records through an electronic amplifier which drives a pen type galvanometer. The recording rate is approximately  $1\frac{1}{2}$  cms. per minute. No record is kept of damping or sensitivity of the instruments, which is changed occasionally.

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 was about  $\pm 1$  sec. Because of mechanical difficulties, the drum speed of the east-west recorder was not constant, and times obtained solely from the records of this instrument may have an error of as much as 4 sec.

| Date         | Phase and component                                                                                                 | G. M. C. T.                                                                                                                                                        | Remarks                                                                                                                           |
|--------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1 Sept. '50  | N,E                                                                                                                 |                                                                                                                                                                    | Weak seismic activity starting about 0400                                                                                         |
| 2 Sept. '50  | i P N,E<br>e PP N,E<br>i S N,E<br>i N,E<br>e G E<br>M E<br>M N                                                      | 02:57:24<br>02:59:29<br>03:05:35<br>03:07:12<br>03:11:37<br>03:23:30<br>03:25:30                                                                                   | Epicenter: 52.5°N, 169°W<br>Aleutians<br>O = 02:47:23<br>Δ = 6550 Km.<br>Courtesy U.S.C.G.S.<br>Depth probably deeper than normal |
| 2 Sept. '50  | E                                                                                                                   |                                                                                                                                                                    | Seismic activity recognizable at approx. 1700                                                                                     |
| 3 Sept. '50  | E                                                                                                                   |                                                                                                                                                                    | Long waves recognizable at 05:06:-                                                                                                |
| 3 Sept. '50  | N,E                                                                                                                 |                                                                                                                                                                    | Seismic activity recognizable at 19:30:-                                                                                          |
| 5 Sept. '50  | N,E                                                                                                                 |                                                                                                                                                                    | Seismic activity recognizable at 04:42:-                                                                                          |
| 9 Sept. '50  | e PKS E<br>e SKS E<br>e N<br>e E<br>e SS N<br>M N                                                                   | 10:42:51<br>10:47:34<br>10:50:31<br>10:52:43<br>10:58:47<br>11:31:-                                                                                                | Epicenter: 4°S 153°E<br>New Britian Region<br>O = 10:21:40<br>Δ = 13,400 Km<br>Courtesy U.S.C.G.S.                                |
| 10 Sept. '50 | i S N,E<br>i N<br>i PS N,E<br>M N                                                                                   | 03:46:09<br>03:46:32<br>03:47:37<br>04:27:-                                                                                                                        | Epicenter: 35°N, 140°E<br>Near Coast of Hon shu, Japan<br>O = 03:21:20<br>Δ = 10,750 Km<br>Courtesy U.S.C.G.S.                    |
| 10 Sept. '50 | e P' E<br>i E<br>e N,E<br>i N,E<br>i N,E<br>i E<br>i N<br>i N<br>i PS N,E<br>i N<br>i SS E<br>i P'P'E<br>M N<br>M E | 15:34:57<br>15:35:23<br>15:35:56<br>15:37:09<br>15:41:28<br>15:42:53<br>15:43:32<br>15:44:39<br>15:46:36<br>15:52:12<br>15:52:27<br>15:53:49<br>16:09:-<br>16:20:- | Epicenter: 14°S 167°E<br>New Hebrides Islands region<br>O = 15:15:57<br>Courtesy U.S.C.G.S.<br>Δ = 13,500 Km                      |

| Date         | Phase and component |     | G. M. C. T. | Remarks                                                                      |
|--------------|---------------------|-----|-------------|------------------------------------------------------------------------------|
| 13 Sept. '50 |                     |     |             | Seismic activity recognizable around 12:00:-. Pulses obscured by microseisms |
| 13 Sept. '50 |                     |     |             | Seismic activity recognizable about 00:15:-. Pulses obscured by microseisms. |
| 14 Sept. '50 | 1 pPP               | N,E | 09:28:39    | Epicenter:                                                                   |
|              | e                   | N   | 09:34:46    | Halmahera Island                                                             |
|              | 1                   | N   | 09:35:01    | Region                                                                       |
|              | 1 pPS               | N   | 09:39:07    | O = 09:06:08                                                                 |
|              | e SS                | N,E | 09:45:25    | Depth = 206                                                                  |
|              | M                   | E   | 10:32:25    | Courtesy U.S.C.G.S.                                                          |
|              | M                   | N   | 10:37:-     | $\Delta = 14,900$ Km                                                         |
| 16 Sept. '50 | 1 S                 | N,E | 01:12:05    | Epicenter: $4^{\circ}\text{S}$ , $104.5^{\circ}\text{W}$                     |
|              | 1                   | N   | 01:12:27    | about 1000 miles                                                             |
|              | 1 ScS               | N,E | 01:14:16    | west of Galapagos                                                            |
|              | e SS                | N,E | 01:15:33    | Islands                                                                      |
|              | M                   | N   | 01:25:30    | O = 00:55:36                                                                 |
|              | M                   | E   | 01:29:00    | Courtesy U.S.C.G.S.                                                          |
|              |                     |     |             | $\Delta = 5,600$ Km                                                          |
| 16 Sept. '50 | 1 pP                | N   | 22:09:19    | Epicenter: $52.5^{\circ}\text{N}$ , $178^{\circ}\text{E}$                    |
|              | 1                   | N   | 22:10:06    | Aleutian Islands Region                                                      |
|              | 1 S                 | N   | 22:17:36    | O = 21:58:15                                                                 |
|              |                     |     |             | Depth = 100 Km                                                               |
|              |                     |     |             | $\Delta = 7,300$ Km                                                          |
|              |                     |     |             | Courtesy U.S.C.G.S.                                                          |
| 19 Sept. '50 |                     | N   |             | Seismic activity recognizable at 20:58:-. Microseisms mask activity.         |
| 21 Sept. '50 | M                   | N   | 00:21:20    | Epicenter: $9^{\circ}\text{S}$ , $67^{\circ}\text{E}$                        |
|              |                     |     |             | Indian Ocean                                                                 |
|              |                     |     |             | O = 22:51:02                                                                 |
|              |                     |     |             | Courtesy U.S.C.G.S.                                                          |
|              |                     |     |             | $\Delta = 15,200$ Km                                                         |
| 22 Sept. '50 | 1 P                 | N,Z | 08:03:42    | Epicenter:                                                                   |
|              | 1                   | N   | 08:05:09    | $25^{\circ}\text{S}$ , $114^{\circ}\text{W}$                                 |
|              | e                   | N   | 08:05:57    | Easter Island Region                                                         |
|              | 1 S                 | N   | 08:13:15    | O = 07:52:07                                                                 |
|              | e                   | N   | 08:17:31    | $\Delta = 8,200$ Km                                                          |
|              | 1                   | N   | 08:21:37    | Courtesy U.S.C.G.S.                                                          |
|              | M                   | N   | 08:34:10    |                                                                              |

| Date         | Phase and component |     | G. M. C. T. | Remarks                                                                                                             |
|--------------|---------------------|-----|-------------|---------------------------------------------------------------------------------------------------------------------|
| 23 Sept. '50 | i S                 | N   | 00:18:42    | Epicenter: 18°S, 177°W                                                                                              |
|              | e pS                | N   | 00:21:08    | Fiji Islands Region                                                                                                 |
|              | i SS                | N   | 00:26:26    | O = 23:53:29 (22 Sept. '50)                                                                                         |
|              | e                   | N   | 00:28:20    | Δ = 12,100 Km                                                                                                       |
|              | i sSS               | N   | 00:28:59    | h = 450 Km                                                                                                          |
|              | e SSS               | N   | 00:30:26    | Courtesy U.S.C.G.S.                                                                                                 |
| 27 Sept. '50 | i P                 | N   | 03:43:52    | Epicenter: 20°N, 109°W                                                                                              |
|              | i S                 | N   | 03:49:10    | off W. Coast of Mexico                                                                                              |
|              | e L                 | N   | 03:50:48    | O = 03:36:55<br>Δ = 3750 Km<br>Courtesy U.S.C.G.S.                                                                  |
| 28 Sept. '50 |                     | N   |             | Seismic activity between the hours of 0400 and 0600                                                                 |
| 28 Sept. '50 | M                   | N   | 22:08:35    | Epicenter: 54.5°N, 134.5°W<br>Queen Charlotte Islands region<br>O = 21:47:01<br>Courtesy U.S.C.G.S.<br>Δ = 4,600 Km |
| 29 Sept. '50 | e P                 | N,Z | 06:38:52    | Epicenter: 19°N, 107°W                                                                                              |
|              | i                   | N,Z | 06:38:57    | off Coast of Colima,                                                                                                |
|              | i                   | N   | 06:39:05    | Mexico                                                                                                              |
|              | i                   | N,Z | 06:39:18    | O = 06:32:14                                                                                                        |
|              | i                   | Z   | 06:39:22    | Δ = 3650 Km                                                                                                         |
|              | i                   | N,Z | 06:39:28    | Courtesy U.S.C.G.S.                                                                                                 |
|              | i                   | Z   | 06:39:44    |                                                                                                                     |
|              | i                   | Z   | 06:39:48    |                                                                                                                     |
|              | i (PP?)             | N,Z | 06:39:55    |                                                                                                                     |
|              | i PPP               | Z   | 06:40:20    |                                                                                                                     |
|              | i (PcP?)            | Z   | 06:41:27    |                                                                                                                     |
|              | i S                 | N   | 06:44:17    |                                                                                                                     |
|              | i                   | Z   | 06:44:27    |                                                                                                                     |
|              | M                   | N   | 06:51:50    |                                                                                                                     |
|              | M                   | Z   | 06:53:25    |                                                                                                                     |
| 30 Sept. '50 | e PP                | N   | 07:48:13    | Epicenter: 28°N, 94°E                                                                                               |
|              | i                   | N   | 07:50:21    | Northern Assam, India                                                                                               |
|              | i SKS               | N   | 07:54:10    | O = 07:28:54                                                                                                        |
|              | i SKKS              | N   | 07:55:02    | Courtesy U.S.C.G.S.                                                                                                 |
|              | e                   | N   | 07:57:28    | Δ = 12,400 Km                                                                                                       |
|              | i PS                | N   | 07:57:46    |                                                                                                                     |
|              | e PPS               | N   | 07:58:44    |                                                                                                                     |
|              | M                   | N   | 08:41:55    |                                                                                                                     |

| Date       | Phase and Component |       | G. M. C. T. | Remarks                                                                                                                                                                                  |
|------------|---------------------|-------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 Oct. '50 | e L                 | N     | 11:57:30    | Epicenter: 21°N, 109°W<br>off West Coast of Mexico<br>O = 11:43:30<br>Courtesy U.S.C.G.S.<br>Δ = 3,800 Km                                                                                |
|            | M                   | N     | 12:04:38    |                                                                                                                                                                                          |
| 3 Oct. '50 | M                   | E     | 09:31:5-    | Epicenter:<br>Western Alaska, 150 miles<br>Northeast of Nome<br>O = 09:04:03<br>Courtesy U.S.C.G.S.                                                                                      |
|            | M                   | N     | 09:31:5-    |                                                                                                                                                                                          |
| 3 Oct. '50 | e L                 | E     | 12:56:11-   | Epicenter: 65.5°N, 128°W<br>Western Yukon, Canada<br>O = 12:40:08<br>Δ = 4,200 Km<br>Courtesy U.S.C.G.S.                                                                                 |
|            | M                   | E     | 12:59:5-    |                                                                                                                                                                                          |
| 4 Oct. '50 |                     | N,E   |             | Seismic activity<br>recognizable between<br>00:01:- and 00:31:-                                                                                                                          |
| 4 Oct. '50 |                     | N,E   |             | Seismic activity begins<br>at 19:01:-                                                                                                                                                    |
| 5 Oct. '50 | e PS                | E     | 01:10:55    | Epicenter: 18.5°S, 170°E<br>New Hebrides Islands<br>region<br>O = 00:41:07<br>Δ = 13,250 Km<br>Courtesy U.S.C.G.S.                                                                       |
|            | e SS                | E     | 01:17:40    |                                                                                                                                                                                          |
|            | i                   | N     | 01:18:02    |                                                                                                                                                                                          |
|            | M                   | E     | 01:49:30    |                                                                                                                                                                                          |
| 5 Oct. '50 | e P                 | N,E,Z | 16:15:46    | Unable to read time<br>mark due to strong<br>activity<br>Epicenter: 10.5°N, 85°W<br>Northwestern Costa<br>Rica.<br>O = 16:09:34<br>Depth = 100 Km<br>Δ = 3,450 Km<br>Courtesy U.S.C.G.S. |
|            | i                   | Z     | 16:16:03    |                                                                                                                                                                                          |
|            | i pP                | E,Z   | 16:16:10    |                                                                                                                                                                                          |
|            | i (sP?)             | Z     | 16:16:25    |                                                                                                                                                                                          |
|            | i PP                | Z     | 16:16:54    |                                                                                                                                                                                          |
|            | i                   | Z     | 16:18:20    |                                                                                                                                                                                          |
|            | M                   | Z     | 16:29:-     |                                                                                                                                                                                          |
|            |                     |       |             |                                                                                                                                                                                          |
| 6 Oct. '50 | i P                 | N     | 08:21:06    | Epicenter: 20°N, 66°W<br>off Coast of northern<br>Puerto Rico<br>O = 08:16:02<br>Δ = 2,550 Km<br>Courtesy U.S.C.G.S.                                                                     |
|            | i S                 | N,E   | 08:25:37    |                                                                                                                                                                                          |
|            | M                   | E     | 08:29:35    |                                                                                                                                                                                          |
|            | M                   | N     | 08:35:25    |                                                                                                                                                                                          |

| Date        | Phase and component |         | G. M. / C. T. | Remarks                                                                                                               |
|-------------|---------------------|---------|---------------|-----------------------------------------------------------------------------------------------------------------------|
| 6 Oct. '50  | 1 P                 | N       | 11:25:33      | Epicenter: 17°N, 68°W<br>off Southwest Coast of<br>Puerto Rico<br>O = 11:20:05<br>Δ = 2,900 Km<br>Courtesy U.S.C.G.S. |
|             | 1 S                 | E       | 11:30:27      |                                                                                                                       |
|             | M                   | E       | 11:29:-       |                                                                                                                       |
|             |                     |         |               |                                                                                                                       |
| 6 Oct. '50  | 1 S                 | E       | 12:52:43      | Epicenter: 17°N, 68°W<br>off Southwest Coast of<br>Puerto Rico<br>O = 12:43:03<br>Δ = 2,900 Km<br>Courtesy U.S.C.G.S. |
|             | M                   | E       | 12:56:5-      |                                                                                                                       |
| 8 Oct. '50  | e P'                | N       | 03:42:32      | Epicenter: 4°S, 128°E<br>Molucca Islands<br>O = 03:23:09<br>Δ = 15,300 Km<br>Courtesy U.S.C.G.S.                      |
|             | 1                   | Z       | 03:42:36      |                                                                                                                       |
|             | 1                   | E       | 03:42:48      |                                                                                                                       |
|             | 1                   | N, E, Z | 03:45:19      |                                                                                                                       |
|             | 1 PP                | N, Z    | 03:45:35      |                                                                                                                       |
|             | 1                   | N, E    | 03:46:12      |                                                                                                                       |
|             | 1                   | Z       | 03:46:26      |                                                                                                                       |
|             | M                   | E       | 04:43:-       |                                                                                                                       |
|             | M                   | N       | 04:47:-       |                                                                                                                       |
| 8 Oct. '50  | M                   | E       | 11:26:10      | Epicenter: 32°N, 41°W<br>Mid-Atlantic Ocean<br>O = 11:09:38<br>Courtesy U.S.C.G.S.<br>Δ = 3,200 Km                    |
|             | M                   | N       | 11:27:40      |                                                                                                                       |
| 8 Oct. '50  | M                   | E       | 16:58:1-      | Epicenter 32°N, 41°W<br>Mid-Atlantic Ocean<br>O = 16:40:36<br>Courtesy U.S.C.G.S.<br>Δ = 3,200 Km.                    |
|             | M                   | N       | 16:58:5-      |                                                                                                                       |
| 10 Oct. '50 |                     | N, E    |               | Seismic Activity from<br>1700 - 1800                                                                                  |
| 11 Oct. '50 |                     | N, E    |               | Seismic Activity from<br>0200 - 0300                                                                                  |
| 14 Oct. '50 |                     | N, E    |               | Seismic Activity between<br>17:58:- and 18:08:-                                                                       |
| 15 Oct. '50 |                     | N, E    |               | Seismic Activity between<br>15:18:- and 15:42:-                                                                       |
| 17 Oct. '50 | e S                 | N, E    | 15:07:32      | Epicenter: Costa Rica<br>O = 14:56:16<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.                                        |

| Date        | Phase and component                                                             |                                                                        | G.M.C.T.                                                                                                                                     | Remarks                                                                                                                                    |
|-------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 17 Oct. '50 | M                                                                               | E                                                                      | 22:24:50                                                                                                                                     | Epicenter: 9.5°N, 85°W<br>Off West Coast of<br>Costa Rica<br>O = 22:07:23<br>Depth = slightly deeper<br>than normal<br>Courtesy U.S.C.G.S. |
| 18 Oct. '50 |                                                                                 | N,E                                                                    |                                                                                                                                              | Seismic activity begins<br>about 03:59:-                                                                                                   |
| 19 Oct. '50 |                                                                                 | N,E                                                                    |                                                                                                                                              | Seismic activity begins<br>about 10:48:-                                                                                                   |
| 20 Oct. '50 | 1 P<br>1 S<br>1<br>1<br>M<br>M                                                  | N<br>N<br>N,E<br>N,E<br>E<br>N                                         | 07:50:06<br>07:54:04<br>07:54:18<br>07:54:27<br>07:59:45<br>08:02:36                                                                         | Epicenter: 19°N, 64°W<br>Off NE Coast of Puerto<br>Rico<br>O = 07:44:30<br>Courtesy U.S.C.G.S.<br>Δ = 2850 Km                              |
| 21 Oct. '50 | 1 S<br>e pS<br>1 sS<br>e<br>e SS<br>1 sSS                                       | E<br>E<br>N,E<br>E<br>N<br>E                                           | 04:37:44<br>04:38:26<br>04:39:10<br>04:40:29<br>04:45:25<br>04:46:37                                                                         | Epicenter: 18.5°S, 174°W<br>Tunga Island region<br>O = 04:12:59<br>Courtesy U.S.C.G.S.<br>Δ = 12,000 Km<br>Depth = 200 Km                  |
| 21 Oct. '51 | e<br>e                                                                          | E<br>N,E                                                               | 09:07:22<br>09:15:36                                                                                                                         |                                                                                                                                            |
| 21 Oct. '50 | 1 P<br>e PP<br>1<br>1<br>1<br>1 S                                               | N,E,Z<br>N,E,Z<br>E,Z<br>N<br>E,Z<br>N,E                               | 09:49:30<br>09:50:32<br>09:51:15<br>09:53:00<br>09:53:28<br>09:54:58                                                                         | Epicenter: 17.5°N, 106°W<br>Off Coast of Colima,<br>Mexico<br>O = 09:42:58<br>Courtesy U.S.C.G.S.<br>Δ = 3,600 Km                          |
| 23 Oct. '50 | M                                                                               | N                                                                      | 15:15:00                                                                                                                                     | Epicenter:<br>Guatemala Foreshock<br>O = 15:03:40<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.                                                 |
| 23 Oct. '50 | 1 P<br>1pP<br>1sP<br>1<br>1<br>1 (PP?)<br>1 (sPP?)<br>1<br>1<br>1<br>1 S<br>1sS | N,E,Z<br>N,Z<br>N<br>E,Z<br>N<br>E,Z<br>Z<br>Z<br>Z<br>N<br>N,E,Z<br>Z | 16:19:22<br>16:19:40<br>16:19:55<br>16:20:02<br>16:20:13<br>16:20:18<br>16:20:46<br>16:21:43<br>16:22:42<br>16:22:58<br>16:24:25<br>16:24:47 | Epicenter: 14.5°N, 92°W<br>Near Coast of Guatemala<br>O = 16:13:24<br>Depth = 100 Km<br>Δ = 3250 Km<br>Courtesy U.S.C.G.S.                 |

| Date        | Phase and component |     | G.M.C.T. | Remarks                                                                                                                 |
|-------------|---------------------|-----|----------|-------------------------------------------------------------------------------------------------------------------------|
| 23 Oct. '50 | M                   | E   | 21:50:45 | Epicenter: Guatemala<br>aftershock<br>O = 21:32:06<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.                             |
|             | M                   | N   | 21:51:45 |                                                                                                                         |
| 24 Oct. '50 | M                   | E   | 01:11:00 | Epicenter:<br>Guatemala aftershock<br>O = 23:49:10 (23 Oct. '51)<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.               |
|             | M                   | N   | 01:12:30 |                                                                                                                         |
| 24 Oct. '50 | M                   | E   | 06:09:00 | Epicenter: 14.5°N, 92°W<br>Guatemala aftershock<br>O = 05:50:24<br>Depth = 100 Km<br>Δ = 3250 Km<br>Courtesy U.S.C.G.S. |
|             | M                   | N   | 06:10:00 |                                                                                                                         |
| 24 Oct. '50 | M                   | E   | 09:47:20 | Epicenter:<br>Guatemala aftershock<br>O = 09:28:57<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.                             |
|             | M                   | N   | 09:48:20 |                                                                                                                         |
| 24 Oct. '50 | M                   | N   | 16:14:50 | Epicenter:<br>Guatemala aftershock<br>O = 15:55:12<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.                             |
| 25 Oct. '50 |                     | N,E |          | Seismic activity<br>recognizable between<br>0500 and 0600                                                               |
| 25 Oct. '50 |                     | N   |          | Seismic activity<br>recognizable between<br>0800 and 0900                                                               |
| 25 Oct. '50 | M                   | E   | 09:55:-  | Epicenter: 6.5°S, 155°E<br>Solomon Islands region<br>O = 08:44:07<br>Courtesy U.S.C.G.S.                                |
| 25 Oct. '50 |                     | N   |          | Seismic activity between<br>14:47:- and 14:53:-                                                                         |
| 26 Oct. '50 |                     | N   |          | Seismic activity between<br>01:18:- and 01:28:-                                                                         |

| Date        | Phase and component |     | G.M.C.T. | Remarks                                                                                                             |
|-------------|---------------------|-----|----------|---------------------------------------------------------------------------------------------------------------------|
| 26 Oct. '50 | e                   | E   | 04:15:26 | Epicenter: 32°S, 178°W<br>Kermadec Islands region<br>O = 03:49:55<br>Δ = 13,050 Km<br>Courtesy U.S.C.G.S.           |
|             | i SS                | N   | 04:26:03 |                                                                                                                     |
|             | M                   | E   | 04:54:00 |                                                                                                                     |
|             |                     |     |          |                                                                                                                     |
| 26 Oct. '50 | e SKS               | E   | 16:04:22 | Epicenter: 32°S, 178°W<br>Kermadec Islands region<br>O = 15:38:43<br>Δ = 13,050 Km<br>Courtesy U.S.C.G.S.           |
|             | e                   | E   | 16:05:34 |                                                                                                                     |
|             | i PS                | E   | 16:08:38 |                                                                                                                     |
|             | e SS                | E   | 16:15:05 |                                                                                                                     |
|             | M                   | E   | 16:41:25 |                                                                                                                     |
| 28 Oct. '50 |                     | N,E |          | Seismic activity<br>recognizable between<br>1000 and 1100                                                           |
| 28 Oct. '50 | e P                 | N   | 22:21:44 | Epicenter: 15N, 91.5W<br>Western Guatemala<br>O = 22:15:48<br>Depth = 100 Km<br>Δ = 3,175 Km<br>Courtesy U.S.C.G.S. |
|             | e PcP               | N,E | 22:24:43 |                                                                                                                     |
|             | e S                 | N,E | 22:26:25 |                                                                                                                     |
|             | e SS                | N,E | 22:27:14 |                                                                                                                     |
|             | i PcS               | N,E | 22:28:20 |                                                                                                                     |
|             | M                   | E   | 22:32:29 |                                                                                                                     |
|             | M                   | N   | 22:35:18 |                                                                                                                     |
|             |                     |     |          |                                                                                                                     |
| 30 Oct. '50 |                     | E   |          | Seismic activity<br>recognizable at 03:15:-                                                                         |
| 30 Oct. '50 |                     | N,E |          | Seismic activity<br>recognizable between<br>18:24:- and 18:51:-                                                     |
| 31 Oct. '50 |                     | N,E |          | Seismic activity<br>recognizable between<br>05:21:- and 05:35:-                                                     |
| 31 Oct. '50 |                     | N,E |          | Seismic activity starting<br>about 20:40:-                                                                          |
| 31 Oct. '50 | e S                 | E   | 19:34:03 | Epicenter 1°N 26°W<br>Mid Atlantic Ocean<br>O = 19:15:22<br>Courtesy U.S.C.G.S.<br>Δ = 6750 km                      |
|             | i SS                | Z   | 19:37:47 |                                                                                                                     |
|             | e L                 | E   | 19:44:00 |                                                                                                                     |
| 31 Oct. '50 | e S                 | N   | 20:33:54 | Epicenter 23.5°N 108°W<br>Gulf of California<br>O = 20:22:30<br>Δ = 3450 km<br>Courtesy U.S.C.G.S.                  |
|             | e S                 | E   | 24:34:00 |                                                                                                                     |
| 1 Nov. '50  |                     | N   |          | Seismic activity<br>recognizable about<br>02:34:4-                                                                  |

| Date       | Phase and component |       | G. M. C. T. | Remarks                                                                                                                            |
|------------|---------------------|-------|-------------|------------------------------------------------------------------------------------------------------------------------------------|
| 1 Nov. '50 | M                   | N     | 14:05:0-    | Epicenter: 10°N, 85°W<br>Near West Coast of<br>Costa Rica<br>O = 12:45:32<br>Depth = 100 Km<br>Δ = 3,500 Km<br>Courtesy U.S.C.G.S. |
| 2 Nov. '50 | 1 P'                | N,E,Z | 15:47:15    | Epicenter: 6°S, 129.5°E                                                                                                            |
|            | 1                   | N,E,Z | 15:47:35    | Banda Sea region                                                                                                                   |
|            | 1                   | E,Z   | 15:48:07    | O = 15:27:49                                                                                                                       |
|            | 1                   | E     | 15:48:16    | Δ = 15,400 Km                                                                                                                      |
|            | 1 PP                | N     | 15:50:03    | Courtesy U.S.C.G.S.                                                                                                                |
|            | 1                   | N,E,Z | 15:50:26    |                                                                                                                                    |
|            | 1                   | N     | 15:50:51    |                                                                                                                                    |
|            | 1 SKS               | N,Z   | 15:54:26    |                                                                                                                                    |
|            | M                   | N     | 16:08:50    |                                                                                                                                    |
|            | M                   | E     | 16:45:20    |                                                                                                                                    |
| 5 Nov. '50 | 1 P                 | N     | 16:41:22    | Epicenter: 14.5°N, 92°W                                                                                                            |
|            | 1                   | E     | 16:41:39    | Near West Coast of                                                                                                                 |
|            | e S                 | E     | 16:45:44    | Guatemala                                                                                                                          |
|            | M                   | E     | 16:52:00    | O = 16:35:20                                                                                                                       |
|            | M                   | N     | 16:54:20    | Δ = 3,100 Km                                                                                                                       |
|            |                     |       |             | Courtesy U.S.C.G.S.                                                                                                                |
| 5 Nov. '50 | 1 P                 | N,E   | 17:51:18    | Epicenter: 33°N, 134.5°E                                                                                                           |
|            | 1                   | N     | 17:55:56    | Off Coast of Shikoku,                                                                                                              |
|            | 1                   | E     | 17:57:49    | Japan                                                                                                                              |
|            | 1                   | N,E   | 17:58:16    | O = 17:37:25                                                                                                                       |
|            | e                   | N     | 17:59:17    | Δ = 11,300 Km                                                                                                                      |
|            | 1 S                 | N,E   | 18:02:48    | Courtesy U.S.C.G.S.                                                                                                                |
|            | M                   | E     | 18:40:30    |                                                                                                                                    |
|            | M                   | N     | 18:43:25    |                                                                                                                                    |
| 6 Nov. '50 | e                   | E     | 22:52:28    | Epicenter: 7.5°S, 155.5°E                                                                                                          |
|            | e PS                | N     | 22:52:35    | Solomon Islands region                                                                                                             |
|            | M                   | E     | 23:33:-     | O = 22:22:05                                                                                                                       |
|            | M                   | N     | 23:31:-     | Δ = 13,650 Km                                                                                                                      |
|            |                     |       |             | Courtesy U.S.C.G.S.                                                                                                                |
| 8 Nov. '50 | 1 PP                | E     | 02:38:41    | Epicenter: 9.5°S, 159.5°E                                                                                                          |
|            | 1                   | E     | 02:40:19    | Solomon Islands region                                                                                                             |
|            | 1                   | E     | 02:44:07    | O = 02:18:09                                                                                                                       |
|            | 1 SKS               | N,E   | 02:44:15    | Δ = 13,600 Km                                                                                                                      |
|            | 1 SKKS              | E     | 02:45:28    | Courtesy U.S.C.G.S.                                                                                                                |
|            | 1                   | N,E   | 02:45:41    |                                                                                                                                    |
|            | 1 (PS?)             | N,E   | 02:48:34    |                                                                                                                                    |
|            | 1                   | N     | 02:49:39    |                                                                                                                                    |
|            | 1 (PPS?)            | E     | 02:50:10    |                                                                                                                                    |
|            | 1                   | N     | 02:53:40    |                                                                                                                                    |
|            | 1 SS                | N     | 02:54:58    |                                                                                                                                    |
|            | M                   | N     | 03:14:50    |                                                                                                                                    |
|            | M                   | E     | 03:23:3-    |                                                                                                                                    |
|            | M                   | Z     | 03:24:3-    |                                                                                                                                    |

| Date        | Phase and component |       | G. M. C. T. | Remarks                                                                                                                                          |
|-------------|---------------------|-------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 9 Nov. '50  | N,E                 |       |             | Seismic activity between the hours of 04:35:-<br>2nd 04:53:-                                                                                     |
| 10 Nov. '50 | N,E                 |       |             | Seismic activity recognizable at 02:28:-                                                                                                         |
| 11 Nov. '50 | E                   |       |             | Seismic activity between 03:49:- and 04:06:-                                                                                                     |
| 11 Nov. '50 | N,E                 |       |             | Seismic activity between 09:41:30 and 10:06:-                                                                                                    |
| 11 Nov. '50 | N,E                 |       |             | Seismic activity between 14:08:46 and 14:19:-                                                                                                    |
| 14 Nov. '50 | M                   | N     | 05:38:50    | Epicenter 11°S, 161°E<br>Solomon Islands region<br>O = 04:23:46<br>Courtesy U.S.C.G.S.<br>Δ = 13,700 Km                                          |
|             | M                   | E     | 05:39:05    |                                                                                                                                                  |
| 14 Nov. '50 | M                   | E     | 09:38:20    | Epicenter: 11°S, 161°E<br>Solomon Islands Region<br>O = 08:32:34<br>Courtesy U.S.C.G.S.<br>Δ = 13,700 Km                                         |
| 14 Nov. '50 | E                   |       |             | Weak seismic activity recognizable about 22:00:-                                                                                                 |
| 17 Nov. '50 | i P                 | N,E,Z | 19:34:36    | Epicenter: 17°N, 100.5°W<br>Near West Coast of Mexico<br>O = 19:28:18<br>Δ = 3,450 Km<br>Courtesy U.S.C.G.S.                                     |
|             | e                   | E     | 19:35:10    |                                                                                                                                                  |
|             | i S                 | N,E   | 19:39:35    |                                                                                                                                                  |
|             | i                   | E     | 19:40:55    |                                                                                                                                                  |
|             | M                   | N     | 19:50:15    |                                                                                                                                                  |
| 22 Nov. '50 | i P                 | N,E,Z | 10:27:09    | Epicenter: 51°N, 176°W<br>Aleutian Islands region<br>Depth - possibly greater than normal<br>O = 10:16:26<br>Δ = 7,200 Km<br>Courtesy U.S.C.G.S. |
|             | i                   | N,E,Z | 10:27:15    |                                                                                                                                                  |
|             | i                   | Z     | 10:28:31    |                                                                                                                                                  |
|             | i                   | Z     | 10:35:14    |                                                                                                                                                  |
|             | i S                 | N,E,Z | 10:35:37    |                                                                                                                                                  |
|             | i                   | E     | 10:36:19    |                                                                                                                                                  |
|             | i                   | N,E   | 10:36:41    |                                                                                                                                                  |
|             | i                   | E,Z   | 10:36:52    |                                                                                                                                                  |
|             | i S <sub>c</sub> S  | N     | 10:37:06    |                                                                                                                                                  |
|             | i                   | E,Z   | 10:37:29    |                                                                                                                                                  |
|             | M                   | E     | 10:54:40    |                                                                                                                                                  |
|             | M                   | N     | 10:56:10    |                                                                                                                                                  |

| Date        | Phase and component |       | G. M. C. T. | Remarks                                      |
|-------------|---------------------|-------|-------------|----------------------------------------------|
| 24 Nov. '50 | N,E                 |       |             | Seismic activity between 20:03:- and 22:00:- |
| 25 Nov. '50 | N,E                 |       |             | Seismic activity between 06:14:- and 07:00:- |
| 1 Dec. '50  | i P                 | N,Z   | 14:58:11    | Epicenter: 14°N, 47°W                        |
|             | i                   | Z     | 14:58:42    | Mid Atlantic about 800                       |
|             | i PP                | N,E,Z | 14:59:31    | miles off NE Coast of                        |
|             | i P <sub>c</sub> P  | Z     | 15:00:20    | Brazil                                       |
|             | i                   | N,E   | 15:00:49    | O = 14:51:00                                 |
|             | i                   | N     | 15:02:49    | Depth = 100 Km                               |
|             | i                   | N,E   | 15:03:21    | Courtesy U.S.C.G.S.                          |
|             | i S                 | N,E   | 15:03:55    | Δ = 4,200 Km                                 |
|             | i                   | Z     | 15:04:10    |                                              |
|             | e L                 | N,E   | 15:05:51    |                                              |
|             | M                   | E     | 15:10:-     |                                              |
| 2 Dec. '50  | i P                 | N,Z   | 15:27:13    | Epicenter: 8°S, 71.5°W                       |
|             | i                   | N     | 15:27:33    | Western Brazil                               |
|             | e P <sub>c</sub> P  | Z     | 15:28:23    | O = 15:19:20                                 |
|             | i s <sub>c</sub> P  | Z     | 15:30:17    | Depth = 650 Km                               |
|             | i s <sub>c</sub> PP | N     | 15:32:22    | Δ = 5,450 Km                                 |
|             | i S                 | N,E,Z | 15:33:23    | Courtesy U.S.C.G.S.                          |
|             | i                   | E     | 15:35:55    |                                              |
|             | i                   | N     | 15:36:00    |                                              |
|             | i s <sub>c</sub> S  | N,E   | 15:37:00    |                                              |
|             | i                   | N     | 15:37:19    |                                              |
|             | i                   | E     | 15:39:12    |                                              |
| 2 Dec. '50  | i P'                | Z     | 20:10:27    | Epicenter: 18°S, 167°E                       |
|             | i                   | N     | 20:11:20    | New Hebrides Islands                         |
|             | i                   | E     | 20:12:06    | region                                       |
|             | i PP                | N,E,Z | 20:12:20    | O = 19:51:45                                 |
|             | i                   | N     | 20:13:43    | Δ = 13,400 Km                                |
|             | i SKS               | E     | 20:17:40    | Courtesy U.S.C.G.S.                          |
|             | i                   | N     | 20:18:08    |                                              |
|             | i SKKS              | N     | 20:18:41    |                                              |
|             | i                   | N     | 20:19:01    |                                              |
|             | i PS                | E     | 20:21:47    |                                              |
|             | M                   | N     | 21:00:00    |                                              |
|             | M                   | Z     | 21:00:25    |                                              |
|             | M                   | E     | 21:01:00    |                                              |
| 3 Dec. '50  | N,E                 |       |             | Seismic activity starting about 07:30:-      |
| 3 Dec. '50  | i                   | E     | 08:17:39    | Epicenter: 17.5°S, 167°E                     |
|             | M                   | E     | 08:59:00    | New Hebrides Islands region                  |
|             |                     |       |             | O = 07:47:33                                 |
|             |                     |       |             | Courtesy U.S.C.G.S.                          |
|             |                     |       |             | Δ = 13,400 Km                                |

| Date        | Phase and component |         | G. M. C. T. | Remarks                                                                          |
|-------------|---------------------|---------|-------------|----------------------------------------------------------------------------------|
| 4 Dec. '50  | i                   | N       | 08:11:35    | Epicenter: 18°S, 167°E                                                           |
|             | M                   | N       | 08:48:13    | New Hebrides Islands region                                                      |
|             | M                   | E       | 08:49:36    | O = 07:38:02                                                                     |
|             |                     |         |             | $\Delta$ = 13,400 Km<br>Courtesy U.S.C.G.S.                                      |
| 4 Dec. '50  | e P'                | E       | 16:47:05    | Epicenter: 50°S, 153.5°E                                                         |
|             | i PP                | N, E, Z | 16:48:18    | New Britian region                                                               |
|             | i p <sup>PP</sup>   | Z       | 16:48:48    | O = 16:28:01                                                                     |
|             | i                   | E       | 16:48:58    | Depth = 100 Km                                                                   |
|             | i s <sup>PP</sup>   | N       | 16:49:05    | $\Delta$ = 13,600 Km                                                             |
|             | i                   | N       | 16:55:47    | Courtesy U.S.C.G.S.                                                              |
|             | i                   | N       | 16:56:57    |                                                                                  |
|             | e                   | N       | 16:57:40    |                                                                                  |
|             | e                   | N       | 16:58:30    |                                                                                  |
| 8 Dec. '50  | M                   | E       | 02:01:58    | Epicenter:<br>New Hebrides Islands region<br>O = 00:58:37<br>Courtesy U.S.C.G.S. |
| 9 Dec. '50  | i P                 | N, E, Z | 21:49:21    | Epicenter: 24°S, 67.5°W                                                          |
|             | i                   | Z       | 21:49:36    | Northern Argentina                                                               |
|             | i P <sub>C</sub> P  | E, Z    | 21:49:54    | China border region                                                              |
|             | i                   | E, Z    | 21:50:32    | O = 21:38:56                                                                     |
|             | i PP                | E, Z    | 21:52:09    | Depth = 200 Km                                                                   |
|             | i s <sup>PP</sup>   | E, Z    | 21:53:10    | $\Delta$ = 7,400 Km                                                              |
|             | i                   | N       | 21:53:14    | Courtesy U.S.C.G.S.                                                              |
|             | i                   | N       | 21:57:26    |                                                                                  |
|             | i S                 | N, E, Z | 21:57:48    |                                                                                  |
|             | i                   | E, Z    | 21:58:00    |                                                                                  |
| 10 Dec. '50 | i P                 | N       | 03:00:31    | Epicenter: 14.5°S, 76.5°W                                                        |
|             | i P <sub>C</sub> P  | Z       | 03:01:11    | Near South Coast of Peru                                                         |
|             | i                   | N       | 03:02:10    | O = 02:50:40                                                                     |
|             | i                   | N       | 03:03:26    | Depth = 60 Km                                                                    |
|             | e                   | N       | 03:07:24    | $\Delta$ = 6,250 Km                                                              |
|             | i S                 | N       | 03:07:45    | Courtesy U.S.C.G.S.                                                              |
| 10 Dec. '50 | i PP                | N, Z    | 13:42:28    | Epicenter: 28.5°S, 179°W                                                         |
|             | i                   | N, Z    | 13:42:45    | Kermadec Islands region                                                          |
|             | i s <sup>PP</sup>   | N       | 13:44:12    | O = 13:23:10                                                                     |
|             | i SKS               | N       | 13:47:44    | Depth = 300 Km                                                                   |
|             | i                   | N       | 13:48:57    | $\Delta$ = 12,900 Km                                                             |
|             | i S                 | N       | 13:49:54    | Courtesy U.S.C.G.S.                                                              |
|             | e                   | N       | 13:51:54    |                                                                                  |
|             | e                   | N       | 13:55:41    |                                                                                  |
|             | i                   | N       | 13:57:10    |                                                                                  |

| Date        | Phase and component |        | G. M. C. T. | Remarks                                                                                                  |
|-------------|---------------------|--------|-------------|----------------------------------------------------------------------------------------------------------|
| 12 Dec. '50 | N,E                 |        |             | Seismic activity from 02:50:- to 03:30:-                                                                 |
| 13 Dec. '50 | N,E                 |        |             | Seismic activity recognizable about 01:31:-                                                              |
| 14 Dec. '50 | i pP?               | N,E    | 02:07:48    | Epicenter: 19.5°S, 176°W                                                                                 |
|             | i                   | N      | 02:11:20    | Tonga Islands region                                                                                     |
|             | i                   | N      | 02:12:28    | O = 01:52:47                                                                                             |
|             | i                   | E      | 02:14:20    | Depth = 200 Km                                                                                           |
|             | i SKS               | N,E    | 02:17:11    | Δ = 12,100 Km<br>Courtesy U.S.C.G.S.                                                                     |
| 14 Dec. '50 | e L                 | N,E    | 13:37:15    | Epicenter: 40.1°N, 120.2°W<br>Northern California<br>O = 13:24:21<br>Δ = 3,550 Km<br>Courtesy U.S.C.G.S. |
| 14 Dec. '50 | i P                 | N,E    | 14:21:55    | Epicenter: 17°N, 98°W                                                                                    |
|             | i                   | Z      | 14:22:00    | Southern Mexico (Felt)                                                                                   |
|             | i                   | Z      | 14:24:46    | O = 14:15:50                                                                                             |
|             | i                   | N      | 14:25:39    | Δ = 3,300 Km                                                                                             |
|             | i S                 | N      | 14:27:07    | Courtesy U.S.C.G.S.                                                                                      |
| 16 Dec. '50 | N,E                 |        |             | Seismic activity begins around 11:06:-                                                                   |
| 18 Dec. '50 | i P                 | N,E,Z, | 08:10:27    | Epicenter: 15°N, 90°W                                                                                    |
|             | i PP                | N      | 08:11:38    | Guatemala                                                                                                |
|             | i                   | N      | 08:13:02    | O = 08:04:46                                                                                             |
|             | i P <sub>c</sub> P  | Z      | 08:13:21    | Depth = 200 Km                                                                                           |
|             | i S                 | N,E,Z  | 08:15:01    | Δ = 3,100 Km                                                                                             |
|             | i S <sub>c</sub> P  | N      | 08:16:25    | Courtesy U.S.C.G.S.                                                                                      |
|             | i                   | E      | 08:16:31    |                                                                                                          |
| 18 Dec. '50 | N,E                 |        |             | Seismic activity starts at about 16:07:5-                                                                |
| 19 Dec. '50 | M                   | E      | 21:45:40    | Epicenter: 15°N, 35°W                                                                                    |
|             | M                   | N      | 21:46:50    | North Atlantic Ocean<br>O = 21:27:22<br>Courtesy U.S.C.G.S.                                              |
| 22 Dec. '50 | M                   | E      | 10:28:44    | Epicenter:                                                                                               |
|             | M                   | N      | 10:32:31    | Nicaragua Islands region<br>O = 09:10:36<br>Courtesy U.S.C.G.S.                                          |

| Date        | Phase and component |      | G. M. C. T. | Remarks                                                                                          |
|-------------|---------------------|------|-------------|--------------------------------------------------------------------------------------------------|
| 24 Dec. '50 | E                   |      |             | Seismic activity between 1700 and 1800                                                           |
| 26 Dec. '50 | M                   | N, E | 14:14:09    | Epicenter: 17°N, 98°W<br>S. Mexico<br>O = 13:51:43<br>Δ = 3,250 Km<br>Courtesy U.S.C.G.S.        |
| 27 Dec. '50 | M                   | N    | 23:34:28    | Epicenter:                                                                                       |
|             | M                   | E    | 23:38:45    | Leeward Islands<br>O = 23:19:24<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.                         |
| 29 Dec. '50 | N, E                |      |             | Seismic activity recognizable around 1300                                                        |
| 29 Dec. '50 | M                   | N    | 20:30:48    | Epicenter: 17°N, 63°W                                                                            |
|             | M                   | E    | 20:36:07    | Leeward Islands<br>O = 20:16:29<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.                         |
| 30 Dec. '50 | M                   | E    | 07:44:25    | Epicenter:<br>Kermadec Islands region<br>O = 06:42:56<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.   |
| 30 Dec. '50 | M                   | E    | 13:23:45    | Epicenter: 1°S, 77°W<br>Central Equador<br>O = 13:02:20<br>Depth = 200 Km<br>Courtesy U.S.C.G.S. |
| 31 Dec. '50 | M                   | E    | 10:02:55    | Epicenter:<br>Leeward Islands<br>O = 09:46:28<br>Depth = 100 Km<br>Courtesy U.S.C.G.S.           |

We acknowledge with thanks receipt of the following bulletins and other publications between Oct. 2 and Dec. 23, 1951:

| <u>Bulletin</u>                                          | <u>Date</u>                            |
|----------------------------------------------------------|----------------------------------------|
| Cleveland Seismological Observatory -----                | March-August, 1951                     |
| Coimbra, Instituto Geofisico -----                       | Years, 1941 - 1944                     |
| Dublin Seismological Observatory - Seis. Bulletin -----  | July-Sept., 1951                       |
| Djakarta Seismological Bulletin -----                    | July-Sept., 1950                       |
| Helwan Seismological Bulletin -----                      | July-Sept., 1951                       |
| Japan Central Meteorological Observatory - Seis. Bull. - | March-May, 1951                        |
| The Results of Marine Meteorological and                 |                                        |
| Oceanographical Observations -----                       | Year, 1948                             |
| The Geophysical Magazine - Vol. XXII No. 4 -----         | August, 1951                           |
| Journal of the Meteorological Society of Japan -         |                                        |
| Vol. XXIX, No. 8 August, No. 9 Sept., No. 10 Oct.        | Year, 1951                             |
| Jesuit Seismological Association Preliminary Bulletin -  | March-May, 1951                        |
| Kandilli Rasathanesi - Bulletin Seismique Preliminaire   | August-Sept., 1951                     |
| La Plata, Republica Argentina                            |                                        |
| Observatorio Astronomico De La Universidad Nacional      |                                        |
| Boletin Seismologico -----                               | Year, 1949                             |
| Manila, Seismic Bulletin -----                           | July-August, 1951                      |
| Mexico Nacional Universidad - Instituto of Geofisica --  | Oct., 1951                             |
| New Zealand Journal of Sciences and Technology           |                                        |
| Observations of ScS near an Earthquake Epicentre         |                                        |
| Sec. B, Vol. 31, No. 2 -----                             | Sept., 1949                            |
| Wave Periods in New Zealand Local Earthquakes -----      | Oct., 1950                             |
| Ottawa Seismological Bulletin - Dominion Observatory --  | Aug.-Dec., '50 Jan.-Aug., 1951         |
| Praha Seismological Bulletin -----                       | July, 1951                             |
| Rome, Istituto Nazionale di Geofisica -----              | July-Sept., 1951                       |
| Santa Clara (California) -----                           | Sept.-Nov., 1951                       |
| Schweizerisches Erdbebenbulletin -----                   | July-Sept., 1951                       |
| Strasbourg Bureau Central Seismologique - Bulletin       |                                        |
| Mensuel -----                                            | April-Oct., 1951                       |
| Tananarive, Madagascar - Bulletin Seismique -----        | Year, 1950                             |
| U. S. Coast and Geodetic Survey - Seismological Bull. -  | April-June, 1946                       |
| Preliminary determinations of epicenter -----            | Nos. 112-51 to 145-51<br>S32-51-S50-51 |
| U. S. Dept. of Commerce - Snow Cover Surveys by          |                                        |
| Eastern Snow Conference -----                            | 1950-1951                              |
| Uppsala Meteorologiska Institutionen -----               | 1951                                   |
| Observations seismographiques l'Observatorie             |                                        |
| meteorologique d'Uppsala -----                           | July, 1949 - June, 1950                |
| Wellington Seismological Observatory - Provisional       |                                        |
| Bulletin -----                                           | June, July, 1951                       |

The Geophysical Laboratory  
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