

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

203 Collins Street,  
MELBOURNE, Vic.

PROVISIONAL SEISMOLOGICAL BULLETIN

M E L B O U R N E



Latitude: 37°49'53" S. Longitude: 144°58'24" E. Height: 28m.

Foundation: Silurian Sandstone and Mudstone

Instruments: Benioff Variable Reluctance Seismometers, 3 components  
 Seismometer periods: 1 sec.  
 Short period recorder ENZ  
 Galvanometer period: 0.25 sec.  
 Long period recorder E<sub>1</sub>N<sub>1</sub>Z<sub>1</sub>  
 Galvanometer period: 14 sec.  
 Magnification: 3750 at 1 cps  
 Milne Shaw Seismograph, E-W component,  
 Period: 12 sec.  
 Damping Coefficient: 0.7  
 Magnification: 250

| No. | Date<br>1960 | Phase             | Time<br>(G.M.T.) | Per               | Amplitude      |                |                | Remarks                                               |
|-----|--------------|-------------------|------------------|-------------------|----------------|----------------|----------------|-------------------------------------------------------|
|     |              |                   |                  |                   | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                       |
| 1   | Jan. 1       | e(P)              | Z                | h m s<br>03 24 43 |                |                |                |                                                       |
| 2   | 2            | eP                | Z                | 05 17(21)         |                |                |                | USCGS:2½N 96E                                         |
| 3   | 2            | iP                | Z                | 08 39 46          |                |                |                | Rarefaction<br>USCGS:Sandwich Is.                     |
| 4   | 2            | e(P)              | Z                | 11 19 15          |                |                |                |                                                       |
| 5   | 2            | eP                | Z                | 12 34 24          |                |                |                | Δ=9221 Km.                                            |
|     |              | eS E <sub>1</sub> |                  | 44 39             |                |                |                | H=12 22 01                                            |
|     |              | eL E <sub>1</sub> |                  | 55 ..             |                |                |                | USCGS:South Atlan-<br>tic Ocean west of<br>Bouvet Is. |
| 6   | 2            | e(P)              | Z                | 16 13 25          |                |                |                |                                                       |
| 7   | 3            | iP                | Z                | 21 32 28          |                |                |                | Compression<br>USCGS:45N 148E                         |
| 8   | 4            | iP                | Z                | 04 13 04          |                |                |                | Compression                                           |
| 9   | 6            | eL E <sub>1</sub> |                  | 13 31 ..          |                |                |                | USCGS:10½S 167E                                       |
| 10  | 6            | iP                | N                | 20 23 07          | 1              |                |                | Rarefaction                                           |
|     |              | iPP               | Z                | 23 20             |                |                |                |                                                       |
|     |              | iPcP              | Z                | 25 51             | ¾              |                |                |                                                       |
|     |              | eX E <sub>1</sub> |                  | 34 02             |                |                |                |                                                       |
| 11  | 7            | eP                | Z                | 08 26 03          |                |                |                | USCGS:6½N 94E                                         |
| 12  | 7            | iP E              | Z                | 10 59 14          |                |                |                |                                                       |
| 13  | 7            | eP                | Z                | 13 41 02          |                |                |                | Δ=9721 Km.                                            |
|     |              | eS E <sub>1</sub> |                  | 51 33             |                |                |                | H=13 28 17                                            |
|     |              | eL E <sub>1</sub> |                  | 14 05 ..          |                |                |                | USCGS:Sandwich Is.                                    |



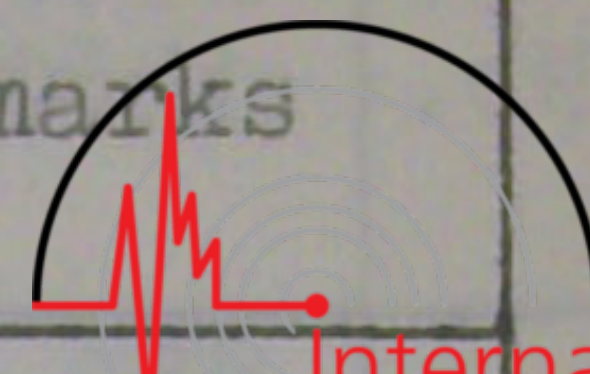
| No. | Date<br>1960 | Phase                                                                                                     |                                                                                                                                                                                                                                                                                                            | Time<br>(G.M.T.)                                                                                                             | Per.                                                            | Amplitude      |                |                | Remarks                                        |
|-----|--------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------|----------------|----------------|------------------------------------------------|
|     |              |                                                                                                           |                                                                                                                                                                                                                                                                                                            |                                                                                                                              |                                                                 | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                |
| 14  | Jan.<br>7    | eP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | <sup>h</sup> <sup>m</sup> <sup>s</sup><br>23 28 06                                                                           |                                                                 |                |                |                | USCGS: 6 $\frac{1}{2}$ N 141E                  |
| 15  | 8            | iP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 02 47 31                                                                                                                     |                                                                 |                |                |                | Compression<br>USCGS: 58 $\frac{1}{2}$ S 26W   |
| 16  | 8            | iP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 05 18 48                                                                                                                     |                                                                 |                |                |                |                                                |
| 17  | 8            | i(P)                                                                                                      | Z                                                                                                                                                                                                                                                                                                          | 07 55 22                                                                                                                     |                                                                 |                |                |                |                                                |
| 18  | 8            | eL                                                                                                        | E <sub>1</sub> Z <sub>1</sub>                                                                                                                                                                                                                                                                              | 15 31 ..                                                                                                                     |                                                                 |                |                |                | USCGS: 55 $\frac{1}{2}$ S 27 $\frac{1}{2}$ W   |
| 19  | 9            | iP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 04 27 08                                                                                                                     |                                                                 |                |                |                |                                                |
| 20  | 9            | eP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 07 49 54                                                                                                                     |                                                                 |                |                |                | USCGS: 1S 124E                                 |
| 21  | 11           | iP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 03 21 36                                                                                                                     |                                                                 |                |                |                | Compression<br>USCGS: 16N 96 $\frac{1}{2}$ E   |
| 22  | 11           | eP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 15 00 06                                                                                                                     |                                                                 |                |                |                | USCGS: 9S 127E                                 |
| 23  | 11           | iP<br>eX<br>iX                                                                                            | E N Z<br>Z<br>Z                                                                                                                                                                                                                                                                                            | 15 01 15<br>02 53<br>03 24                                                                                                   |                                                                 |                |                |                |                                                |
| 24  | 11           | iP<br>iX                                                                                                  | N Z<br>Z                                                                                                                                                                                                                                                                                                   | 23 01 08<br>01 16                                                                                                            |                                                                 |                |                |                | Compression<br>USCGS: 2S 140 $\frac{1}{2}$ E   |
| 25  | 12           | eL                                                                                                        | E <sub>1</sub> Z <sub>1</sub>                                                                                                                                                                                                                                                                              | 03 57 ..                                                                                                                     |                                                                 |                |                |                |                                                |
| 26  | 12           | e(P)                                                                                                      | Z                                                                                                                                                                                                                                                                                                          | 08 01 51                                                                                                                     |                                                                 |                |                |                |                                                |
| 27  | 12           | eL                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 09 09 ..                                                                                                                     |                                                                 |                |                |                |                                                |
| 28  | 13           | eP<br>iX                                                                                                  | Z<br>E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub>                                                                                                                                                                                                                                                          | 07 33 17<br>45 44                                                                                                            |                                                                 |                |                |                | USCGS: 3 $\frac{1}{2}$ S 140E                  |
| 29  | 13           | ePP<br>iX<br>eX<br>ipPP<br>iSKIKP<br>ePPP<br>eSKIKS<br>ePS<br>eSKSP<br>epPS<br>iSPS<br>eSKKS<br>eSSS<br>G | ZZ <sub>1</sub><br>Z <sub>1</sub><br>E <sub>1</sub> Z<br>Z<br>Z <sub>1</sub><br>Z <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>E <sub>1</sub><br>Z <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub> | 16 00 05<br>00 28<br>00 33<br>00 56<br>02 11<br>02 28<br>05 44<br>09 39<br>09 39<br>10 22<br>16 02<br>16 36<br>20 10<br>29.0 | 6<br><br>2<br>5 $\frac{1}{2}$<br><br><br><br><br>14<br>20<br>40 |                |                |                | USCGS: 16S 72W                                 |
| 30  | 13           | eP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 17 43 07                                                                                                                     |                                                                 |                |                |                | USCGS: 51 $\frac{1}{2}$ N 180                  |
| 31  | 14           | eP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 02 51 43                                                                                                                     |                                                                 |                |                |                | USCGS: Near<br>coast of<br>northern<br>Sumatra |
| 32  | 14           | iP<br>iPcP                                                                                                | Z<br>Z                                                                                                                                                                                                                                                                                                     | 10 37 21<br>37 40                                                                                                            |                                                                 |                |                |                | Compression<br>USCGS: 37N 140E                 |
| 33  | 14           | eP                                                                                                        | Z                                                                                                                                                                                                                                                                                                          | 16 06 18                                                                                                                     |                                                                 |                |                |                | USCGS: 3S 127 $\frac{1}{2}$ E                  |



| No. | Date<br>1960 | Phase                                                                                                                       | Time<br>(G.M.T.)                                  | Per.                                     | Amplitude      |                |                | Remarks                                          |
|-----|--------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------|----------------|----------------|----------------|--------------------------------------------------|
|     |              |                                                                                                                             |                                                   |                                          | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                  |
| 34  | Jan.<br>15   | ePP<br>eSIKS E <sub>1</sub><br>ePS E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub><br>eSS E <sub>1</sub>                       | h m s<br>09 49 53<br>55 42<br>59 43<br>10 05 54   |                                          |                |                |                | USCGS: 15S 75W                                   |
| 35  | 15           | iP<br>i)PcP<br>)PP                                                                                                          | Z<br>Z<br>48 42                                   | 1                                        |                |                |                | Rarefaction<br>USCGS: Northern<br>Celebes region |
| 36  | 16           | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>eSS E <sub>1</sub><br>eLR E <sub>1</sub>                              | 07 03 44<br>08 01<br>10 36                        | 1 1/4(Z)                                 |                |                |                | Compression<br>USCGS: 59 1/2S 149 1/2E           |
| 37  | 16           | iP<br>iX<br>epP                                                                                                             | Z<br>Z<br>38 57                                   |                                          |                |                |                | USCGS: 20 1/2S 178W                              |
| 38  | 16           | eP                                                                                                                          | Z<br>15 38 57                                     |                                          |                |                |                | USCGS: 20 1/2S 173 1/2E                          |
| 39  | 16           | iP<br>eLR E <sub>1</sub>                                                                                                    | Z<br>21 48 06<br>55 50                            |                                          |                |                |                | USCGS: 10S 161 1/2E                              |
| 40  | 18           | eP                                                                                                                          | Z<br>09 13 26                                     |                                          |                |                |                | USCGS: 5N 126 1/2E                               |
| 41  | 19           | eP                                                                                                                          | Z<br>02 30 07                                     |                                          |                |                |                | USCGS: 52N 158E                                  |
| 42  | 19           | iP EE <sub>1</sub> N<br>epP<br>eS E <sub>1</sub>                                                                            | Z<br>ZZ <sub>1</sub><br>22 31<br>25 42            | 1(Z)                                     |                |                |                | Compression<br>USCGS: 23S 180                    |
| 43  | 20           | iP<br>iX                                                                                                                    | Z<br>20 03 01<br>03 24                            |                                          |                |                |                | USCGS: 4 1/2S 153 1/2E                           |
| 44  | 21           | eP<br>epP E <sub>1</sub><br>ePcS E <sub>1</sub>                                                                             | Z<br>Z <sub>1</sub><br>10 50 06<br>51 42<br>56 08 |                                          |                |                |                | USCGS: 16S 179 1/2E                              |
| 45  | 21           | eP                                                                                                                          | Z<br>16 52(16)                                    |                                          |                |                |                | USCGS: 6N 126E                                   |
| 46  | 21           | iP                                                                                                                          | Z<br>17 51 33                                     |                                          |                |                |                | USCGS: 15 1/2S 174W                              |
| 47  | 22           | iP                                                                                                                          | Z<br>05 45 58                                     |                                          |                |                |                | Compression                                      |
| 48  | 22           | iP                                                                                                                          | Z<br>05 46 48                                     |                                          |                |                |                | Rarefaction                                      |
| 49  | 22           | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>iX<br>iPcP                                                            | Z<br>Z<br>13 43 49<br>43 56<br>45 45              | 1                                        |                |                |                | Rarefaction<br>USCGS: 0 125E                     |
| 50  | 23           | eP                                                                                                                          | Z<br>02 46 15                                     |                                          |                |                |                |                                                  |
| 51  | 23           | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>isP<br>is E <sub>1</sub><br>is N <sub>1</sub><br>isScS E <sub>1</sub> | Z<br>04 48 14<br>48 27<br>54 05<br>54 08<br>58 19 | 4(ZNE <sub>1</sub> )<br>1<br>8<br>8<br>6 |                |                |                | Δ=4244 Km.<br>USCGS: 4S 127 1/2E<br>H=04 40 56   |
| 52  | 23           | eP E N ZZ <sub>1</sub><br>iPcP Z <sub>1</sub><br>is N <sub>1</sub><br>isScS E <sub>1</sub>                                  | 06 31 08<br>33 03<br>36 36<br>40 34               | 4<br>4                                   |                |                |                | USCGS: 17S 177W                                  |



| No. | Date<br>1960 | Phase                                                                                                                                                                                                                                                                                                                       | Time<br>(G.M.T.)                                               | Per.          | Amplitude      |                |                | Remarks                                                                                               |
|-----|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------|----------------|----------------|----------------|-------------------------------------------------------------------------------------------------------|
|     |              |                                                                                                                                                                                                                                                                                                                             |                                                                |               | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                       |
| 3   | Jan.<br>23   | eP            N        Z<br>iX            E <sub>1</sub><br>eS            E <sub>1</sub><br>eS            N <sub>1</sub><br>iX            N <sub>1</sub><br>iScS        E <sub>1</sub>                                                                                                                                      | h m s<br>07 38 31<br>39 15<br>44 16<br>44 18<br>44 49<br>48 33 | 9<br>6<br>8   |                |                |                | Δ=4155 Km.<br>H=07 31 20<br>USCGS:4S 127 $\frac{1}{2}$ E                                              |
| 4   | 23           | eP                            Z<br>iSP                          Z<br>iS                          E <sub>1</sub><br>iX                          N <sub>1</sub><br>iScS                      E <sub>1</sub><br>Imax                    E <sub>1</sub> N <sub>1</sub>                                                          | 18 03 46<br>04 01<br>09 34<br>09 44<br>13 58<br>17.2           |               |                |                |                | Δ=4188 Km.<br>H=17 56 32<br>USCGS:4S 127 $\frac{1}{2}$ E                                              |
| 5   | 24           | eP            EE <sub>1</sub> ZZ <sub>1</sub><br>iPcP                      Z <sub>1</sub><br>iX                          Z <sub>1</sub><br>iX                          E <sub>1</sub> N <sub>1</sub><br>eS                          E <sub>1</sub> N <sub>1</sub><br>eLQ                      E <sub>1</sub> N <sub>1</sub> | 04 29 07<br>31 24<br>33 15<br>33 48<br>35 06<br>37.8           |               |                |                |                | Δ=4388 Km.<br>H=04 21 38<br>USCGS:15 $\frac{1}{2}$ S 179W                                             |
| 6   | 24           | eP                            Z                                                                                                                                                                                                                                                                                             | 09 24 09                                                       |               |                |                |                | USCGS:20 $\frac{1}{2}$ S 180                                                                          |
| 7   | 25           | eX            E    N        Z                                                                                                                                                                                                                                                                                               | 10 51 43                                                       |               |                |                |                |                                                                                                       |
| 8   | 25           | eP                            Z                                                                                                                                                                                                                                                                                             | 16 36 54                                                       |               |                |                |                | Long period<br>records confused<br>by microseisms<br>USCGS:16S 179W                                   |
| 9   | 26           | iP            E            Z                                                                                                                                                                                                                                                                                                | 22 27 43                                                       | $\frac{3}{4}$ |                |                |                | Rarefaction<br>USCGS:30S 178W                                                                         |
| 0   | 28           | iP            E            Z<br>i                          Z                                                                                                                                                                                                                                                                | 01 49 53<br>49 58                                              |               |                |                |                | Compression                                                                                           |
| 1   | 28           | iP            E    N        Z<br>iX            E    N        Z<br>eS            EE <sub>1</sub> N <sub>1</sub> N <sub>1</sub>                                                                                                                                                                                               | 23 37 29.5<br>37 31<br>37 57                                   |               |                |                |                | Local shock<br>epicentre 248Km.<br>36° E of N from<br>Melbourne. Felt:<br>Kiewa, Bright,<br>Dederang. |
| 2   | 29           | iP                            Z                                                                                                                                                                                                                                                                                             | 08 17 06                                                       | 1             |                |                |                | USCGS:4S 142 $\frac{1}{2}$ E                                                                          |
| 3   | 30           | iP                            Z                                                                                                                                                                                                                                                                                             | 04 16 54                                                       |               |                |                |                | USCGS:Kermadec I.                                                                                     |
| 4   | 30           | iP                            Z                                                                                                                                                                                                                                                                                             | 11 00 09                                                       |               |                |                |                |                                                                                                       |
| 5   | 30           | eP                            Z                                                                                                                                                                                                                                                                                             | 18 48 14                                                       |               |                |                |                | USCGS:22N 144E                                                                                        |



International  
Seismological  
Centre



COMMONWEALTH OF AUSTRALIA  
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PROVISIONAL SEISMOLOGICAL BULLETIN  
MELBOURNE



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 Galvanometer period: 0.25 sec.  
 Long period recorder  $E_1 N_1 Z_1$   
 Galvanometer period: 14 sec.  
 Magnification: 3750 at 1 cps  
 Milne-Shaw Seismograph, E-W component,  
 Period: 12 sec.  
 Damping Coefficient: 0.7  
 Magnification: 250

| No. | Date<br>1960 | Phase  | Time<br>(G.M.T.)                | Per.      | Amplitude      |       |       | Remarks                                                    |
|-----|--------------|--------|---------------------------------|-----------|----------------|-------|-------|------------------------------------------------------------|
|     |              |        |                                 |           | $A_N$          | $A_E$ | $A_Z$ |                                                            |
|     |              |        | h.m.s.                          | s.        |                |       |       |                                                            |
| 66  | Feb. 2       | eP     | Z                               | 06 36 02  |                |       |       | USCGS: $33\frac{1}{2}^{\circ}$ S $179^{\circ}$ W           |
| 67  | 2            | iP     | Z                               | 23 48 07  | 1              |       |       | Compression.<br>USCGS: $2^{\circ}$ N $126^{\circ}$ E       |
| 68  | 3            | eP     | Z                               | 02 26 39  |                |       |       | USCGS: $37^{\circ}$ S $179^{\circ}$ E                      |
|     |              | esP    | Z                               | 26 53     |                |       |       |                                                            |
|     |              | eX     | $Z_1$                           | 27 14     |                |       |       |                                                            |
| 69  | 3            | eP     | Z                               | 13 34 59  |                |       |       | USCGS: $7^{\circ}$ S $154\frac{1}{2}^{\circ}$ E            |
| 70  | 3            | iP     | Z                               | 13 50 23  | $\frac{3}{4}$  |       |       | Compression.                                               |
| 71  | 3            | eP     | Z                               | 14 36 26  |                |       |       | USCGS: $19^{\circ}$ S $173\frac{1}{2}^{\circ}$ W           |
| 72  | 4            | iP     | NN <sub>1</sub> ZZ <sub>1</sub> | 03 53 19  |                |       |       | H = 03 46 32                                               |
|     |              | ipP    | $E_1 N_1$                       | 53 30     |                |       |       | $\Delta$ = 3820Km.                                         |
|     |              | eX     | $Z_1$                           | 53 50     |                |       |       | USCGS: $4\frac{1}{2}^{\circ}$ S $153\frac{1}{2}^{\circ}$ E |
|     |              | eX     | $Z_1$                           | 54 18     |                |       |       |                                                            |
|     |              | ePP    | $N_1$                           | 54 40     |                |       |       |                                                            |
|     |              | iPPP   | $N_1 Z$                         | 54 52     | $1\frac{1}{2}$ |       |       |                                                            |
|     |              | iX     | $E_1$                           | 57 33     |                |       |       |                                                            |
|     |              | iX     | $N_1$                           | 58 16     |                |       |       |                                                            |
|     |              | iS     | $E_1 N_1$                       | 58 44     | $3\frac{1}{2}$ |       |       |                                                            |
|     |              | L max. | $E_1$                           | 04 05.3   | 15             |       |       |                                                            |
| 73  | 4            | eP     | N ZZ <sub>1</sub>               | 09 34 04  |                |       |       | H = 09 27 28                                               |
|     |              | eX     | N $Z_1$                         | 34 36     |                |       |       | $\Delta$ = 3780Km.                                         |
|     |              | iS     | $N_1$                           | 39 21     |                |       |       | h approx. 100Km.                                           |
|     |              | esS    | $E_1 N_1$                       | 39 59     |                |       |       | USCGS: $5^{\circ}$ S $154^{\circ}$ E                       |
|     |              | eSS    | $N_1$                           | 41 34     |                |       |       |                                                            |
|     |              | eSSS   | $E_1$                           | 41 57     |                |       |       |                                                            |
| 74  | 4            | iP     | Z                               | 11 08 06  | $\frac{3}{4}$  |       |       | USCGS: $4\frac{1}{2}^{\circ}$ S $153\frac{1}{2}^{\circ}$ E |
| 75  | 4            | eP     | Z                               | 17 02(32) |                |       |       | USCGS: $39^{\circ}$ N $143^{\circ}$ E                      |
|     |              | eL     | $E_1$                           | 39.0      |                |       |       |                                                            |
| 76  | 5            | iP     | E N Z                           | 05 31 11  | $\frac{3}{4}$  |       |       |                                                            |



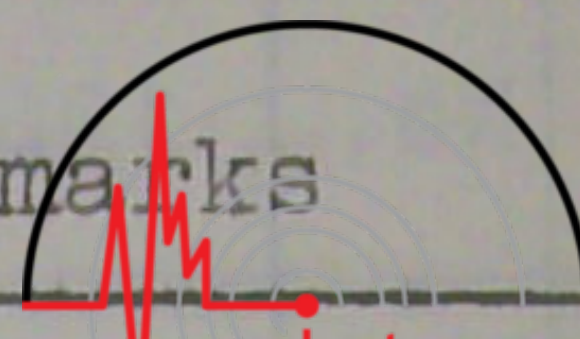
| No. | Date<br>1960 | Phase                                              | Time<br>(G.M.T.) | Per.            | Amplitude      |                |                | Remarks                                                      |
|-----|--------------|----------------------------------------------------|------------------|-----------------|----------------|----------------|----------------|--------------------------------------------------------------|
|     |              |                                                    |                  |                 | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                              |
|     |              |                                                    | h.m.s.           | s.              |                |                |                |                                                              |
| 77  | Feb. 5       | iP N Z                                             | 05 46 35         |                 |                |                |                | USCGS: 4 $\frac{1}{2}$ S 159 $\frac{1}{2}$ W                 |
|     |              | isP Z                                              | 46 49            |                 |                |                |                |                                                              |
| 78  | 6            | iP Z                                               | 17 19 36         | 1               |                |                |                | Compression.<br>USCGS: 6S 104E                               |
| 79  | 7            | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub> | 10 15 36         | 1               |                |                |                | Compression.<br>USCGS: 5N 123E                               |
|     |              | eX Z                                               | 16 27            |                 |                |                |                |                                                              |
|     |              | iPcP Z                                             | 16 56            | 1               |                |                |                |                                                              |
|     |              | iScP Z                                             | 19 51            | 1               |                |                |                |                                                              |
|     |              | eS NN <sub>1</sub>                                 | 21 48            |                 |                |                |                |                                                              |
|     |              | eSP Z                                              | 21 52            | 2               |                |                |                |                                                              |
| 80  | 7            | iP Z                                               | 11 24 57         |                 |                |                |                | USCGS: 15 $\frac{1}{2}$ S 173 $\frac{1}{2}$ W                |
| 81  | 8            | iP E N Z                                           | 01 53 00         |                 |                |                |                | Rarefaction.                                                 |
| 82  | 8            | iP N Z                                             | 09 26 25         |                 |                |                |                | Rarefaction.<br>USCGS: 5S 155E                               |
| 83  | 8            | eP Z                                               | 12 57 50         |                 |                |                |                | USCGS: 58S 67W                                               |
|     |              | eX N <sub>1</sub>                                  | 13 05 21         |                 |                |                |                |                                                              |
|     |              | i(ScS) E <sub>1</sub>                              | 08 12            |                 |                |                |                |                                                              |
|     |              | ePPS N <sub>1</sub>                                | 08 50            | 6               |                |                |                |                                                              |
|     |              | eSS N <sub>1</sub>                                 | 12 50            |                 |                |                |                |                                                              |
| 84  | 9            | iP Z                                               | 02 02 42         | $\frac{3}{4}$   |                |                |                | USCGS: 6 $\frac{1}{2}$ S 129 $\frac{1}{2}$ E                 |
| 85  | 9            | iP Z                                               | 03 06 24         |                 |                |                |                | Rarefaction.<br>USCGS: 5S 155E                               |
| 86  | 9            | eP N Z                                             | 04 15 20         |                 |                |                |                | $\Delta$ = 144Km. Small<br>local shock.                      |
|     |              | eS E N                                             | 15 36            |                 |                |                |                |                                                              |
| 87  | 9            | iP EE <sub>1</sub> N Z                             | 12 03 29         | 1 $\frac{1}{4}$ |                |                |                | Compression.<br>H = 11 56 12                                 |
|     |              | ipP Z                                              | 03 37            | 1               |                |                |                |                                                              |
|     |              | iX Z                                               | 04 18            |                 |                |                |                |                                                              |
|     |              | ePP Z                                              | 04 57            |                 |                |                |                | $\Delta$ = 4220Km.<br>USCGS: 4S 128E                         |
|     |              | eS E <sub>1</sub> N <sub>1</sub>                   | 09 19            | 6               |                |                |                |                                                              |
|     |              | eSS E <sub>1</sub>                                 | 11 50            | 5               |                |                |                |                                                              |
|     |              | i(SSS) E <sub>1</sub>                              | 12 44            | 5               |                |                |                |                                                              |
| 88  | 9            | iP Z                                               | 13 55 37         |                 |                |                |                | Rarefaction.                                                 |
| 89  | 9            | iP Z                                               | 16 41 11         |                 |                |                |                | USCGS: 6S 147E                                               |
| 90  | 10           | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub> | 00 03 05         |                 |                |                |                | Compression.<br>H = 23 55 52                                 |
|     |              | isP Z                                              | 03 21            |                 |                |                |                | $\Delta$ = 4180Km.<br>USCGS: 4S 128E                         |
|     |              | eX Z                                               | 03 52            |                 |                |                |                |                                                              |
|     |              | eX N <sub>1</sub>                                  | 04 20            |                 |                |                |                |                                                              |
|     |              | eS E <sub>1</sub>                                  | 08 52            |                 |                |                |                |                                                              |
|     |              | isS E <sub>1</sub> N <sub>1</sub>                  | 09 09            |                 |                |                |                |                                                              |
|     |              | iX E <sub>1</sub> N <sub>1</sub>                   | 10 20            |                 |                |                |                |                                                              |
|     |              | iX E <sub>1</sub>                                  | 10 37            |                 |                |                |                |                                                              |
|     |              | iScS E <sub>1</sub>                                | 13 07            |                 |                |                |                |                                                              |
| 91  | 10           | iP N Z                                             | 01 22 59         |                 |                |                |                | Rarefaction.<br>USCGS: 3 $\frac{1}{2}$ S 128E                |
| 92  | 10           | iP Z                                               | 01 38 22         |                 |                |                |                | Rarefaction.                                                 |
| 93  | 10           | iP N Z                                             | 02 06 21         | 1               |                |                |                | Compression.<br>USCGS: 3 $\frac{1}{2}$ S 128E                |
| 94  | 10           | eP Z                                               | 08 23 57         |                 |                |                |                |                                                              |
| 95  | 10           | iP N Z                                             | 15 51 37         | 1               |                |                |                | Rarefaction.<br>USCGS: 4 $\frac{1}{2}$ S 154 $\frac{1}{2}$ E |
| 96  | 10           | eL E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub>    | 23 44 ..         |                 |                |                |                | USCGS: 15 $\frac{1}{2}$ S 173W                               |
| 97  | 11           | iP ZZ <sub>1</sub>                                 | 04 05 19         |                 |                |                |                | Rarefaction.<br>USCGS: 25S 179W.                             |



| No. | Date<br>1960 | Phase     | Time<br>(G.M.T.)                                                  | Per. | Amplitude      |                |                | Remarks                           |
|-----|--------------|-----------|-------------------------------------------------------------------|------|----------------|----------------|----------------|-----------------------------------|
|     |              |           |                                                                   |      | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                   |
| 98  | Feb. 11      | iP        | h.m.s.<br>08 35 34                                                | s.   |                |                |                | Rarefaction.<br>USCGS: 6S 155E    |
| 99  | 11           | iP        | E N ZZ <sub>1</sub> 21 02 43                                      |      |                |                |                | Compression.<br>USCGS: 11½S 166½E |
| 100 | 12           | iP        | N ZZ <sub>1</sub> 01 36 34                                        |      |                |                |                | USCGS: 4½S 153½E                  |
| 101 | 13           | iP<br>iPP | NN <sub>1</sub> ZZ <sub>1</sub> 15 49 05<br>ZZ <sub>1</sub> 50 43 |      |                |                |                | Compression.<br>USCGS: 1½N 127½E  |
| 102 | 14           | iP        | E Z 12 59 03                                                      |      |                |                |                | Rarefaction.<br>USCGS: 23½S 179E  |
| 103 | 14           | iP        | E Z 15 46 21                                                      |      |                |                |                | Rarefaction.<br>USCGS: 29S 177W   |
| 104 | 14           | iP        | N Z 20 37 31                                                      | ¾    |                |                |                | Compression.<br>USCGS: 5S 154½E   |
| 105 | 15           | iP        | Z 05 23 38                                                        |      |                |                |                | Compression.<br>USCGS: 18S 177½W  |
| 106 | 15           | iP        | Z 06 37 20                                                        |      |                |                |                |                                   |
| 107 | 15           | eP        | Z 22 25 04                                                        |      |                |                |                | USCGS: 29½S 176½W                 |
| 108 | 16           | iP        | E Z 05 27 58                                                      | 1    |                |                |                | Rarefaction.<br>USCGS: 32½S 179½W |
| 109 | 17           | eL        | E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> 17 07 ..             |      |                |                |                | USCGS: 5S 142½E                   |
| 110 | 18           | iP        | Z 14 43 25                                                        |      |                |                |                | Compression.                      |
| 111 | 19           | iP        | Z 10 50 17                                                        |      |                |                |                | USCGS: 36N 70½E                   |
|     |              | ePP       | E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> 54 28                | 4    |                |                |                |                                   |
|     |              | iX        | Z <sub>1</sub> 55 00                                              |      |                |                |                |                                   |
|     |              | isPP      | E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> 55 38                | 5    |                |                |                | Very clear phase.                 |
|     |              | iX        | Z <sub>1</sub> 59 36                                              | 8    |                |                |                | Very clear phase.                 |
|     |              | eX        | E <sub>1</sub> N <sub>1</sub> 11 02 10                            |      |                |                |                |                                   |
|     |              | eSP       | Z <sub>1</sub> 03 07                                              |      |                |                |                |                                   |
|     |              | iPSP      | Z <sub>1</sub> 04 42                                              |      |                |                |                |                                   |
|     |              | eSS       | N <sub>1</sub> 08 44                                              |      |                |                |                |                                   |
| 112 | 20           | iP        | E Z 06 12 36                                                      | ¾    |                |                |                |                                   |
| 113 | 21           | iP        | E Z 00 51 47                                                      |      |                |                |                | H = 00 46 44                      |
|     |              | epP       | Z 52 00                                                           |      |                |                |                | Δ = 2590Km.                       |
|     |              | eS        | N <sub>1</sub> 55 51                                              |      |                |                |                | h = 60Km.                         |
|     |              | eLq       | N <sub>1</sub> 56 16                                              |      |                |                |                | USCGS: 42S 173E                   |
|     |              | eLr       | E <sub>1</sub> Z <sub>1</sub> 57.5                                |      |                |                |                |                                   |
| 114 | 21           | ePKP      | ZZ <sub>1</sub> 08 33 23                                          |      |                |                |                | USCGS: 36N 4½E                    |
| 115 | 21           | iP        | Z 09 45 44                                                        |      |                |                |                | USCGS: 20S 178½W                  |
| 116 | 22           | eP        | Z 03 36 17.5                                                      |      |                |                |                | Δ = 180Km. Small                  |
|     |              | iX        | Z 36 28.5                                                         |      |                |                |                | local shock.                      |
|     |              | iS        | E N 36 37.5                                                       |      |                |                |                |                                   |
| 117 | 22           | iP        | Z 05 26 21                                                        |      |                |                |                |                                   |
| 118 | 22           | iP        | Z 08 40 42                                                        |      |                |                |                | USCGS: 18S 179½W                  |
| 119 | 23           | eP        | Z 08 21(11)                                                       |      |                |                |                | USCGS: 23½N 121½E                 |
| 120 | 23           | iP        | Z 11 37 37                                                        | ¾    |                |                |                | Compression.<br>USCGS: 19S 178W   |
| 121 | 23           | iP        | N Z 16 11 25                                                      |      |                |                |                | Compression.                      |
|     |              | eS        | E <sub>1</sub> N <sub>1</sub> 16 39                               |      |                |                |                | H = 16 04 53                      |
|     |              | eLr       | E <sub>1</sub> N <sub>1</sub> 20.4                                |      |                |                |                | Δ = 3640Km.                       |
|     |              | M         | E <sub>1</sub> 23.5                                               |      |                |                |                | USCGS: 6S 154½E                   |



| No. | Date<br>1960 | Phase                                                     | Time<br>(G.M.T.)         | Per.               | Amplitude      |                |                | Remarks                                                                                                                           |
|-----|--------------|-----------------------------------------------------------|--------------------------|--------------------|----------------|----------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------|
|     |              |                                                           |                          |                    | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                                                   |
|     |              |                                                           | h.m.s.                   | s.                 |                |                |                |                                                                                                                                   |
| 122 | Feb. 24      | iP<br>ipP<br>eS<br>M<br><br>E <sub>1</sub> N <sub>1</sub> | Z<br>Z<br>48 44<br>56.5  |                    |                |                |                | Compression.<br>H = 21 37 02<br>$\Delta$ = 3620Km.<br>Long period<br>confused by<br>microseisms.<br>USCGS: 7 $\frac{1}{2}$ S 156E |
| 123 | 26           | iP                                                        | Z<br>01 13 51            |                    |                |                |                | Rarefaction.<br>USCGS: 2 $\frac{1}{2}$ S 128E                                                                                     |
| 124 | 26           | eP<br>iX<br>M<br><br>E <sub>1</sub> N                     | Z<br>Z<br>15 50<br>31.0  | $\frac{3}{4}$      |                |                |                | USCGS: 1S 138E                                                                                                                    |
| 125 | 26           | iP                                                        | Z<br>06 40 12            | 1                  |                |                |                | Rarefaction.<br>USCGS: 20S 174W                                                                                                   |
| 126 | 27           | eP                                                        | Z<br>09 02 12            |                    |                |                |                | USCGS: 30 $\frac{1}{2}$ S 179 $\frac{1}{2}$ W                                                                                     |
| 127 | 27           | iP                                                        | Z<br>09 14 32            |                    |                |                |                | Rarefaction.<br>Confused with<br>preceding.<br>USCGS: 6 $\frac{1}{2}$ S 102 $\frac{1}{2}$ E                                       |
| 128 | 27           | iP                                                        | Z<br>10 04 19            |                    |                |                |                | Compression.                                                                                                                      |
| 129 | 27           | iP                                                        | Z<br>23 14 04            |                    |                |                |                | USCGS: 2N 123E                                                                                                                    |
| 130 | 28           | iP<br>iX<br>eL<br><br>E N<br>E <sub>1</sub>               | Z<br>Z<br>12 42<br>24 06 | $\frac{3}{4}$<br>1 |                |                |                | Rarefaction.<br>USCGS: 3S 142E                                                                                                    |
| 131 | 29           | eP                                                        | Z<br>22 54 31            |                    |                |                |                |                                                                                                                                   |



International  
Seismological  
Centre

(J.M. RAYNER)  
DIRECTOR.



COMMONWEALTH OF AUSTRALIA  
DEPARTMENT OF NATIONAL DEVELOPMENT  
BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

203 Collins Street,  
MELBOURNE. VIC.

PROVISIONAL SEISMOLOGICAL BULLETIN

MELBOURNE



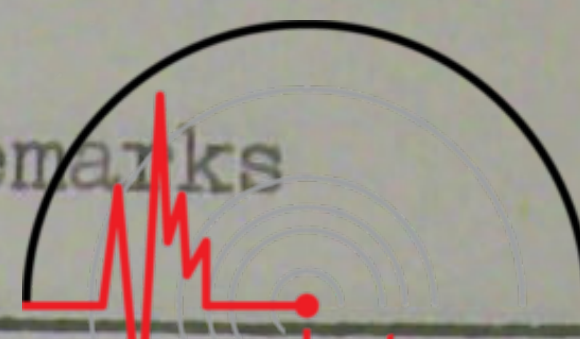
Latitude:  $37^{\circ} 49' 53''$  S. Longitude:  $144^{\circ} 58' 24''$  E. Height: 28m.

Foundation: Silurian Sandstone and Mudstone

Instruments: Benioff Variable Reluctance Seismometers, 3 components  
Seismometer periods: 1 sec.  
Short period recorder ENZ  
Galvanometer period: 0.25 sec.  
Long period recorder  $E_1 N_1 Z_1$   
Galvanometer period: 14 sec.  
Magnification: 3750 at 1 cps.  
Milne Shaw Seismograph, E-W component,  
Period: 12 sec.  
Damping Coefficient: 0.7  
Magnification: 250

| No. | Date<br>1960 | Phase                                                                                                                                                                                         | Time<br>(G.M.T.)                                                           | Per.                            | Amplitude |       |       | Remarks                                                                                                   |
|-----|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------|-----------|-------|-------|-----------------------------------------------------------------------------------------------------------|
|     |              |                                                                                                                                                                                               |                                                                            |                                 | $A_N$     | $A_E$ | $A_Z$ |                                                                                                           |
|     |              |                                                                                                                                                                                               | h.m.s.                                                                     | s.                              |           |       |       |                                                                                                           |
| 132 | Mar. 1       | eP Z                                                                                                                                                                                          | 03 33 12                                                                   |                                 |           |       |       | USCGS: $18\frac{1}{2}^{\circ}$ S $178^{\circ}$ W                                                          |
| 133 | 1            | eP Z                                                                                                                                                                                          | 22 02 07                                                                   |                                 |           |       |       | USCGS: Boeroe -<br>Ceram Is. region.                                                                      |
| 134 | 2            | iP Z                                                                                                                                                                                          | 22 14 40                                                                   | $\frac{3}{4}$                   |           |       |       | Compression.                                                                                              |
| 135 | 4            | iP NN <sub>1</sub> ZZ <sub>1</sub><br>ipP Z<br>eX ZZ <sub>1</sub><br>iS EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub>                                                                       | 04 04 07<br>04 31<br>04 40<br>13 11                                        | 3<br><br><br>6( $E_1 N_1 Z_1$ ) |           |       |       | Compression.<br>H = 03 53 01<br>$\Delta$ = 7830Km.<br>h = 100Km.<br>USCGS: $31^{\circ}$ N $129^{\circ}$ E |
| 136 | 4            | eP Z                                                                                                                                                                                          | 21 16 32                                                                   |                                 |           |       |       | USCGS: $7\frac{1}{2}^{\circ}$ N $94^{\circ}$ E                                                            |
| 137 | 5            | eP Z                                                                                                                                                                                          | 11 38 04                                                                   |                                 |           |       |       | USCGS: $29^{\circ}$ N $81^{\circ}$ E                                                                      |
| 138 | 5            | iP E N Z<br>isP Z <sub>1</sub><br>iX Z<br>ePP Z <sub>1</sub><br>eS E <sub>1</sub> N <sub>1</sub><br>iX E <sub>1</sub><br>iX E <sub>1</sub> N <sub>1</sub><br>iX E <sub>1</sub> N <sub>1</sub> | 13 57 07<br>57 20<br>57 45<br>58 48<br>14 03 18<br>04 13<br>04 42<br>06 39 |                                 |           |       |       | Compression.<br>H = 13 49 24<br>$\Delta$ = 4580Km.<br>USCGS: $1^{\circ}$ N $129^{\circ}$ E                |
| 139 | 5            | iP Z                                                                                                                                                                                          | 14 20 11                                                                   |                                 |           |       |       |                                                                                                           |
| 140 | 5            | eP Z<br>iPP Z                                                                                                                                                                                 | 15 57 45<br>59 18                                                          |                                 |           |       |       | USCGS: $1^{\circ}$ N $129^{\circ}$ E                                                                      |
| 141 | 6            | iP E N Z<br>iX E N Z                                                                                                                                                                          | 02 29 57<br>30 01                                                          |                                 |           |       |       | Rarefaction.<br>USCGS: $1^{\circ}$ N $129^{\circ}$ E                                                      |
| 142 | 7            | iP E N Z<br>iPcP N Z                                                                                                                                                                          | 05 21 13<br>23 00                                                          | 1<br>1                          |           |       |       | Compression.<br>USCGS: $1\frac{1}{2}^{\circ}$ N $125\frac{1}{2}^{\circ}$ E                                |
| 143 | 7            | iP Z                                                                                                                                                                                          | 09 44 29                                                                   |                                 |           |       |       | USCGS: $10^{\circ}$ S $160\frac{1}{2}^{\circ}$ E                                                          |
| 144 | 8            | iP Z                                                                                                                                                                                          | 11 57 57                                                                   |                                 |           |       |       | USCGS: $65^{\circ}$ S $179\frac{1}{2}^{\circ}$ E                                                          |



| No. | Date<br>1960 | Phase | Time<br>(G.M.T.)                             | Per.      | Amplitude       |                |                | Remarks                                                                                                                                                                                                                                           |
|-----|--------------|-------|----------------------------------------------|-----------|-----------------|----------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |              |       |                                              |           | A <sub>N</sub>  | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                                                                                                                                                                   |
|     |              |       | h.m.s.                                       | s.        |                 |                |                |                                                                                                                                                                                                                                                   |
| 145 | Mar. 8       | iP    | EE <sub>1</sub> N ZZ <sub>1</sub>            | 16 39 22  | 1 $\frac{1}{2}$ |                |                |  International<br>Seismological<br>Centre<br>Rarefaction.<br>H = 16 33 38<br>$\Delta$ = 3320Km.<br>h = 300Km.<br>USCGS: 16 $\frac{1}{2}$ S 168 $\frac{1}{2}$ E |
|     |              | ipP   | EE <sub>1</sub> ZZ <sub>1</sub>              | 40 16     | 1               |                |                |                                                                                                                                                                                                                                                   |
|     |              | iPP   | Z                                            | 40 25     |                 |                |                |                                                                                                                                                                                                                                                   |
|     |              | iPPP  | Z                                            | 40 55     |                 |                |                |                                                                                                                                                                                                                                                   |
|     |              | iPcP  | E Z                                          | 42 21     | 2               |                |                |                                                                                                                                                                                                                                                   |
|     |              | iS    | EE <sub>1</sub> NN <sub>1</sub>              | 43 57     | 5               |                |                |                                                                                                                                                                                                                                                   |
|     |              | iSS   | E                                            | 46 03     | 3 $\frac{1}{2}$ |                |                |                                                                                                                                                                                                                                                   |
|     |              | iSSS  | E <sub>1</sub>                               | 46 23     | 7               |                |                |                                                                                                                                                                                                                                                   |
|     |              | iX    | EE <sub>1</sub>                              | 47 46     | 6               |                |                |                                                                                                                                                                                                                                                   |
|     |              | iScS  | E                                            | 49 27     | 2               |                |                |                                                                                                                                                                                                                                                   |
| 146 | 8            | i(P)  | Z                                            | 16 49 54  | 1               |                |                | Rarefaction.                                                                                                                                                                                                                                      |
| 147 | 8            | iP    | Z                                            | 17 11 23  |                 |                |                | Rarefaction.                                                                                                                                                                                                                                      |
| 148 | 10           | eX    | N Z                                          | 00 45 47  |                 |                |                |                                                                                                                                                                                                                                                   |
| 149 | 10           | iP    | E Z                                          | 05 05 47  | 1               |                |                | Compression.<br>USCGS: 31 $\frac{1}{2}$ S 179 $\frac{1}{2}$ E                                                                                                                                                                                     |
| 150 | 10           | iP    | Z                                            | 09 51 22  |                 |                |                | USCGS: 10S 161E                                                                                                                                                                                                                                   |
| 151 | 10           | iP    | Z                                            | 13 52 25  |                 |                |                | Compression.<br>USCGS: 15S 174W                                                                                                                                                                                                                   |
| 152 | 10           | iP    | Z                                            | 14 45 08  |                 |                |                | Compression.<br>USCGS: 47N 152E                                                                                                                                                                                                                   |
| 153 | 12           | iP    | N Z                                          | 02 21 34  | 1               |                |                | Rarefaction.<br>USCGS: 4S 152 $\frac{1}{2}$ E                                                                                                                                                                                                     |
| 154 | 12           | iP    | N Z                                          | 20 37 13  |                 |                |                | Compression.<br>USCGS: 6S 152E                                                                                                                                                                                                                    |
|     |              | eX    | N <sub>1</sub>                               | 42 25     |                 |                |                |                                                                                                                                                                                                                                                   |
| 155 | 16           | eP    | E ZZ <sub>1</sub>                            | 17 47 19  |                 |                |                | Compression.<br>USCGS: 15 $\frac{1}{2}$ S 173 $\frac{1}{2}$ E                                                                                                                                                                                     |
|     |              | eL    | E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> | 18 01 ..  |                 |                |                |                                                                                                                                                                                                                                                   |
| 156 | 16           | iP    | Z                                            | 19 22 24  |                 |                |                |                                                                                                                                                                                                                                                   |
| 157 | 19           | iP    | E N Z                                        | 04 35 46  |                 |                |                | Rarefaction.<br>$\Delta$ = 63Km. Small<br>local shock. 127°<br>E of N from<br>Melbourne.                                                                                                                                                          |
|     |              | eS    | E N Z                                        | 35 53     |                 |                |                |                                                                                                                                                                                                                                                   |
| 158 | 19           | iP    | E N Z                                        | 06 54 15  |                 |                |                | $\Delta$ = 63Km. Small<br>local shock with<br>approximately<br>same epicentre as<br>No.157.                                                                                                                                                       |
|     |              | iS    | E N Z                                        | 54 22     |                 |                |                |                                                                                                                                                                                                                                                   |
| 159 | 19           | eP    | Z                                            | 09 28 58  |                 |                |                | USCGS: 2 $\frac{1}{2}$ N 127E                                                                                                                                                                                                                     |
| 160 | 19           | iP    | E N Z                                        | 19 22 34  |                 |                |                | USCGS: 3S 138E                                                                                                                                                                                                                                    |
|     |              | esP   | Z                                            | 22 58     |                 |                |                |                                                                                                                                                                                                                                                   |
|     |              | eLr   | E <sub>1</sub> N <sub>1</sub>                | 35.0      |                 |                |                |                                                                                                                                                                                                                                                   |
| 161 | 20           | eP    | Z                                            | 07 35 43  |                 |                |                | USCGS: $\frac{1}{2}$ N 99 $\frac{1}{2}$ E                                                                                                                                                                                                         |
| 162 | 20           | eP    | N Z                                          | 17 19 26  |                 |                |                | $\Delta$ = 8610Km.<br>H = 17 07 36<br>h = 60Km.<br>USCGS: 40N 143 $\frac{1}{2}$ E                                                                                                                                                                 |
|     |              | ipP)  | Z <sub>1</sub>                               | 19 40     |                 |                |                |                                                                                                                                                                                                                                                   |
|     |              | PcP)  |                                              |           |                 |                |                |                                                                                                                                                                                                                                                   |
|     |              | iX    | Z                                            | 20 02     |                 |                |                |                                                                                                                                                                                                                                                   |
|     |              | eS    | E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> | 29 12     |                 |                |                |                                                                                                                                                                                                                                                   |
|     |              | eSS   | E <sub>1</sub>                               | 34 16     |                 |                |                |                                                                                                                                                                                                                                                   |
| 163 | 21           | eP    | Z                                            | 01 57(41) |                 |                |                | USCGS: 16S 173W                                                                                                                                                                                                                                   |
|     |              | eL    | E <sub>1</sub> N <sub>1</sub>                | 02 08 ..  |                 |                |                |                                                                                                                                                                                                                                                   |
| 164 | 21           | eP    | Z                                            | 09 30(17) |                 |                |                | USCGS: 40N 143E                                                                                                                                                                                                                                   |
| 165 | 21           | eP    | Z                                            | 11 48(14) |                 |                |                | USCGS: 16 $\frac{1}{2}$ S 172 $\frac{1}{2}$ W                                                                                                                                                                                                     |



| No. | Date<br>1960 | Phase                       | Time<br>(G.M.T.)                                                                                                           | Per.                                          | Amplitude      |                |                | Remarks                                                                                              |
|-----|--------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------|----------------|----------------|------------------------------------------------------------------------------------------------------|
|     |              |                             |                                                                                                                            |                                               | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                      |
| 166 | Mar. 21      | iP                          | N Z                                                                                                                        | h.m.s.<br>16 44 35                            | s.<br>1        |                |                | Compression.<br>USCGS: 4 $\frac{1}{2}$ S 154E                                                        |
| 167 | 22           | iP<br>ipP<br>iX<br>eS<br>iX | EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>ZZ <sub>1</sub><br>Z<br>E <sub>1</sub> N <sub>1</sub><br>E <sub>1</sub> | 02 36 38<br>36 48<br>36 56<br>41 00<br>41 41  | 1              |                |                | Compression.<br>$\Delta$ = 2820Km.<br>H = 02 31 12<br>USCGS: 61 $\frac{1}{2}$ S 154E                 |
| 168 | 22           | eP                          | N Z                                                                                                                        | 13 53 53                                      |                |                |                | USCGS: 60 $\frac{1}{2}$ S 153E                                                                       |
| 169 | 23           | eP<br>eX<br>eX<br>eS<br>eSS | Z<br>Z<br>Z <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>N <sub>1</sub>                                                | 00 35(20)<br>39 08<br>41 36<br>45 10<br>50 12 |                |                |                | $\Delta$ = 8665Km.<br>H = 00 23 (23)<br>USCGS: 39 $\frac{1}{2}$ N 143E                               |
| 170 | 23           | eP                          | Z                                                                                                                          | 01 19(12)                                     |                |                |                | USCGS: 39 $\frac{1}{2}$ N 143E                                                                       |
| 171 | 23           | eP                          | Z                                                                                                                          | 22 34(40)                                     |                |                |                | USCGS: 39 $\frac{1}{2}$ N 143E                                                                       |
| 172 | 24           | eP                          | Z                                                                                                                          | 06 07(01)                                     |                |                |                | USCGS: 47N 152 $\frac{1}{2}$ E                                                                       |
| 173 | 25           | iP                          | E Z                                                                                                                        | 02 35 36                                      | 1              |                |                | Compression.<br>USCGS: 19S 177 $\frac{1}{2}$ W                                                       |
| 174 | 25           | e(P)                        | Z                                                                                                                          | 08 04 30                                      |                |                |                |                                                                                                      |
| 175 | 27           | iP<br>eS                    | E N<br>E <sub>1</sub>                                                                                                      | 03 54 45<br>59 42                             |                |                |                | $\Delta$ = 3390Km.<br>H = 03 48 23<br>No short period<br>Z record.<br>USCGS: 13 $\frac{1}{2}$ S 166E |
| 176 | 27           | eP<br>iS<br>eLq             | E N<br>E <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub>                                                                     | 09 04 11<br>09 20<br>11.7                     |                |                |                | $\Delta$ = 3570Km.<br>H = 08 57 45<br>USCGS: 13 $\frac{1}{2}$ S 166 $\frac{1}{2}$ E                  |
| 177 | 28           | eP                          | Z                                                                                                                          | 06 42 18                                      |                |                |                | USCGS: 13 $\frac{1}{2}$ S 165E                                                                       |
| 178 | 29           | eP                          | Z                                                                                                                          | 00 16 58                                      |                |                |                | No long period Z<br>record.<br>USCGS: 33 $\frac{1}{2}$ S 177 $\frac{1}{2}$ W                         |
| 179 | 29           | eP<br>iPP<br>eS             | N Z<br>N <sub>1</sub><br>E <sub>1</sub>                                                                                    | 06 36 59<br>37 45<br>41 42                    |                |                |                | $\Delta$ = 3155Km.<br>H = 06 31 06<br>USCGS: 17S 167E                                                |
| 180 | 29           | eP                          | Z                                                                                                                          | 07 40(25)                                     |                |                |                | USCGS: 0 98E                                                                                         |
| 181 | 29           | eP<br>eX                    | Z<br>E <sub>1</sub>                                                                                                        | 22 16(08)<br>21 56                            |                |                |                | USCGS: 6S 147E                                                                                       |
| 182 | 30           | eP<br>eS                    | Z<br>E <sub>1</sub>                                                                                                        | 10 56 08<br>11 01 14                          |                |                |                | $\Delta$ = 3520Km.<br>H = 10 49 45<br>USCGS: 13 $\frac{1}{2}$ S 166E                                 |
| 183 | 30           | iP                          | Z                                                                                                                          | 15 25 33                                      |                |                |                | Compression.<br>USCGS: 22 $\frac{1}{2}$ S 174E                                                       |

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203 Collins Street,  
MELBOURNE. VIC.

## SEISMOLOGICAL BULLETIN

## MELBOURNE

Latitude: 37°49'53" S. Longitude: 144°58'24" E.

Height: 28m.

Foundation: Silurian Sandstone and Mudstone.

Instruments: Benioff Variable Reluctance Seismometers, 3 components  
 Seismometer periods: 1 sec.  
 Short period recorder ENZ  
 Galvanometer period: 0.25 sec.  
 Long period recorder E<sub>1</sub>N<sub>1</sub>Z<sub>1</sub>  
 Galvanometer period: 14 sec.  
 Magnification: 3750 at 1 cps.

Milne Shaw Seismograph, E-W component,  
 Period: 12 sec.  
 Damping Coefficient: 0.7  
 Magnification: 250

International  
Seismological  
Centre

| No. | Date<br>1960 | Phase            | Time<br>(G.M.T.)                   | Per.                       | Amplitude      |                |                | Remarks                                                           |
|-----|--------------|------------------|------------------------------------|----------------------------|----------------|----------------|----------------|-------------------------------------------------------------------|
|     |              |                  |                                    |                            | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                   |
|     |              |                  | h.m.s.                             | s.                         |                |                |                |                                                                   |
| 184 | April        | 1 eP             | Z                                  | 03 01 03                   |                |                |                | USCGS: 22S 179½W                                                  |
| 185 |              | 1 eP             | Z                                  | 23 09 06                   |                |                |                | USCGS: 17½S 180                                                   |
| 186 |              | 2 iP             | Z                                  | 23 10 23                   |                |                |                | Dilatation.<br>USCGS: 11S 113E                                    |
| 187 |              | 4 eP<br>esP      | Z<br>Z <sub>1</sub>                | 08 02 35<br>03 04          |                |                |                | USCGS: 10S 161½E                                                  |
| 188 |              | 4 iP             | N Z                                | 12 52 15                   |                |                |                | Compression.<br>USCGS: 5S 152E                                    |
| 189 |              | 5 eP             | Z                                  | 12 48 32                   |                |                |                | USCGS: 60½S 25W                                                   |
| 190 |              | 7 iP<br>iX<br>iS | Z<br>Z<br>E <sub>1</sub>           | 13 53 19<br>53 32<br>58 02 |                |                |                | USCGS: 24S 179½W                                                  |
| 191 |              | 8 iP             | E N Z                              | 00 02 49                   |                |                |                | Dilatation.<br>H = 23 55 45<br>Tonga Is. region.<br>Deep?         |
| 192 |              | 12 iP            | Z                                  | 02 43 06                   |                |                |                | Dilatation.                                                       |
| 193 |              | 13 iP            | Z                                  | 14 01 37                   |                |                |                |                                                                   |
| 194 |              | 15 eL            | Z <sub>1</sub>                     | 04 11 ..                   |                |                |                | USCGS: 27S 113W                                                   |
| 195 |              | 15 iP            | N Z                                | 11 50 53                   |                |                |                | Compression.<br>USCGS: 40½N 142E                                  |
| 196 |              | 15 eP<br>iS      | Z<br>N <sub>1</sub> Z <sub>1</sub> | 22 11.5<br>16 25           |                |                |                | USCGS: 13½S 166E                                                  |
| 197 |              | 22 iP            | E Z                                | 20 48 57                   |                |                |                | Dilatation.<br>Day masked by<br>microseisms.<br>USCGS: 17½S 174½W |
| 198 |              | 23 eP<br>eS      | Z<br>E N                           | 17 25 07<br>25 35          |                |                |                | Δ = 252Km. Small<br>local shock.                                  |



| No. | Date<br>1960 | Phase                                              | Time<br>(G.M.T.) | Per.            | Amplitude      |                |                | Remarks                                                                                                              |
|-----|--------------|----------------------------------------------------|------------------|-----------------|----------------|----------------|----------------|----------------------------------------------------------------------------------------------------------------------|
|     |              |                                                    |                  |                 | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                                      |
|     |              |                                                    | h.m.s.           | s.              |                |                |                |                                                                                                                      |
| 199 | April 24     | iP EE <sub>1</sub> NN <sub>1</sub> Z               | 03 29 35         |                 |                |                |                | Compression.<br>No LP Z record.<br>H = 03 22 30<br>$\Delta$ = 4666Km.<br>h = 550Km.<br>USCGS: 6S 113 $\frac{1}{2}$ E |
|     |              | ipP NN <sub>1</sub> Z                              | 31 12            |                 |                |                |                |                                                                                                                      |
|     |              | iPP E NN <sub>1</sub> Z                            | 31 28            |                 |                |                |                |                                                                                                                      |
|     |              | iScP Z                                             | 34 06            |                 |                |                |                |                                                                                                                      |
|     |              | iS EE <sub>1</sub> NN <sub>1</sub> Z               | 35 16            | 3               |                |                |                |                                                                                                                      |
|     |              | iSPP NN <sub>1</sub> Z                             | 35 34            |                 |                |                |                |                                                                                                                      |
|     |              | iSS } EE <sub>1</sub>                              | 38 26            |                 |                |                |                |                                                                                                                      |
|     |              | ScS)                                               |                  |                 |                |                |                |                                                                                                                      |
| 200 | 27           | eL E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub>    | 18 32 ..         |                 |                |                |                | USCGS: 3 $\frac{1}{2}$ S 146 $\frac{1}{2}$ E                                                                         |
| 201 | 28           | eL E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub>    | 05 29 ..         |                 |                |                |                | USCGS: 3 $\frac{1}{2}$ S 144 $\frac{1}{2}$ E                                                                         |
| 202 | 29           | eP Z                                               | 10 14(28)        |                 |                |                |                | USCGS: 0 122E                                                                                                        |
| 203 | 29           | iP E N Z                                           | 13 41 24         | 1 $\frac{1}{4}$ |                |                |                | Dilatation.                                                                                                          |
|     |              | iPP Z                                              | 43 03            |                 |                |                |                | USCGS: 0 122E                                                                                                        |
| 204 | 29           | iP E Z                                             | 13 44 49         | $\frac{3}{4}$   |                |                |                | Dilatation.                                                                                                          |
|     |              |                                                    |                  |                 |                |                |                | USCGS: 30S 178 $\frac{1}{2}$ W                                                                                       |
| 205 | 29           | iP Z                                               | 14 52 07         |                 |                |                |                | Dilatation.                                                                                                          |
|     |              |                                                    |                  |                 |                |                |                | USCGS: Kermadec Is. region.                                                                                          |
| 206 | 29           | eP Z                                               | 19 40 19         |                 |                |                |                | H = 19 32 08                                                                                                         |
|     |              | iPP Z                                              | 42 04            |                 |                |                |                | $\Delta$ = 4955Km.                                                                                                   |
|     |              | iS E <sub>1</sub> N <sub>1</sub>                   | 46 51            |                 |                |                |                | USCGS: 0 122E                                                                                                        |
|     |              | eSS E <sub>1</sub> N <sub>1</sub>                  | 49 56            |                 |                |                |                |                                                                                                                      |
| 207 | 29           | iP N Z                                             | 20 52 35         | 1               |                |                |                | Dilatation.                                                                                                          |
|     |              |                                                    |                  |                 |                |                |                | USCGS: 0 121 $\frac{1}{2}$ E                                                                                         |
| 208 | 30           | eP E N Z                                           | 04 09 39         |                 |                |                |                | H = 04 01 36                                                                                                         |
|     |              | ePP Z                                              | 11 18            |                 |                |                |                | $\Delta$ = 4844Km.                                                                                                   |
|     |              | iS E <sub>1</sub>                                  | 16 06            |                 |                |                |                | USCGS: 0 122E                                                                                                        |
| 209 | 30           | eP Z                                               | 11 08 06         |                 |                |                |                | USCGS: 16S 173W                                                                                                      |
| 210 | 30           | eP Z                                               | 14 23 19         |                 |                |                |                | H = 14 17 03                                                                                                         |
|     |              | iX NN <sub>1</sub> ZZ <sub>1</sub>                 | 23 26            |                 |                |                |                | $\Delta$ = 3333Km.                                                                                                   |
|     |              | eS E <sub>1</sub>                                  | 28 20            |                 |                |                |                | USCGS: 9S 157E                                                                                                       |
| 211 | 30           | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub> | 22 16 31         | 1               |                |                |                | H = 22 10 19                                                                                                         |
|     |              | ipP NN <sub>1</sub> ZZ <sub>1</sub>                | 18 13            |                 |                |                |                | $\Delta$ = 4000Km.                                                                                                   |
|     |              | iPcP NN <sub>1</sub> ZZ <sub>1</sub>               | 18 35            |                 |                |                |                | h = 600Km.                                                                                                           |
|     |              | eS E <sub>1</sub>                                  | 21 30            | 4               |                |                |                | USCGS: 6S 124 $\frac{1}{2}$ E                                                                                        |
|     |              | eX E <sub>1</sub> N <sub>1</sub>                   | 21 44            |                 |                |                |                |                                                                                                                      |
|     |              | eSS E <sub>1</sub> N <sub>1</sub>                  | 24 43            | 8               |                |                |                |                                                                                                                      |
|     |              | eScS E <sub>1</sub> N <sub>1</sub>                 | 25 31            |                 |                |                |                |                                                                                                                      |

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## SEISMOLOGICAL BULLETIN

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 Galvanometer period: 0.25 sec.  
 Long period recorder  $E_1 N_1 Z_1$   
 Galvanometer period: 14 sec.  
 Magnification: 3750 at 1 cps

Milne Shaw Seismograph, E-W component,  
 Period: 12 sec.  
 Damping Coefficient: 0.7  
 Magnification: 250

| No. | Date<br>1960 | Phase                            | Time<br>(G.M.T.)        | Per.                                | Amplitude     |       |       | Remarks                                                                                                          |
|-----|--------------|----------------------------------|-------------------------|-------------------------------------|---------------|-------|-------|------------------------------------------------------------------------------------------------------------------|
|     |              |                                  |                         |                                     | $A_N$         | $A_E$ | $A_Z$ |                                                                                                                  |
| 212 | May 2        | iP                               | N Z                     | h.m.s.<br>12 18 17                  | s.<br>1       |       |       | Rarefaction.<br>No N-S long period<br>record. Day masked<br>by microseisms.<br>USCGS: 0 $121\frac{1}{2}E$        |
| 213 | 2            | iP                               | N Z                     | 17 58 01                            | $\frac{3}{4}$ |       |       | Rarefaction.<br>Approximately 17S<br>$178\frac{1}{2}W$<br>h approx. 600Km.<br>$\Delta = 4345Km.$<br>H = 17 51 23 |
| 214 | 3            | eP<br>iS                         | E Z<br>Z                | 02 20 32<br>20 51                   |               |       |       | $\Delta = 171Km.$ Local<br>shock. Day masked<br>by microseisms.                                                  |
| 215 | 3            | eP<br>eX<br>iPP )<br>PcP )<br>iX | Z<br>Z<br>Z<br>Z        | 13 30 12<br>30 18<br>32 02<br>33 02 |               |       |       | USCGS: 0 $121\frac{1}{2}E$                                                                                       |
| 216 | 3            | iP                               | Z                       | 22 33 41                            |               |       |       | Compression.<br>USCGS: 32N 140E                                                                                  |
| 217 | 5            | eP                               | Z                       | 11 39 01                            |               |       |       | USCGS: $52\frac{1}{2}N$ $158\frac{1}{2}E$                                                                        |
| 218 | 8            | eP                               | Z                       | 05 35 56                            |               |       |       | USCGS: 31S 178W                                                                                                  |
| 219 | 10           | eP                               | Z                       | 11 08 47                            |               |       |       | USCGS: $55\frac{1}{2}S$ 26W                                                                                      |
| 220 | 11           | eP<br>eS<br>eX                   | Z<br>$N_1$<br>$E_1 N_1$ | 18 43 12<br>48 58<br>49 30          |               |       |       | $\Delta = 4165Km.$<br>H = 18 36 00<br>USCGS: 3S 131E                                                             |
| 221 | 13           | eP                               | Z                       | 20 52 40                            |               |       |       | Confused by micro-<br>seisms.<br>USCGS: $32\frac{1}{2}S$ 179W                                                    |



| No. | Date<br>1960 | Phase                                                                                                                                                                               | Time<br>(G.M.T.)                                               | Per.            | Amplitude      |                |                | Remarks                                                                                                                                                                    |
|-----|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------|----------------|----------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |              |                                                                                                                                                                                     |                                                                |                 | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                                                                                            |
|     |              |                                                                                                                                                                                     | h.m.s.                                                         | s.              |                |                |                |                                                                                                                                                                            |
| 222 | May 18       | eP Z<br>iS N <sub>1</sub>                                                                                                                                                           | 06 46(04)<br>55 05                                             | 7 $\frac{1}{2}$ |                |                |                | H = 06 15 12<br>USCGS: 29W 130E                                                                                                                                            |
| 223 | 18           | iP N Z                                                                                                                                                                              | 18 16 57                                                       |                 |                |                |                | Rarefaction.<br>USCGS: Celebes                                                                                                                                             |
| 224 | 19           | eP Z<br>ePcP ZZ <sub>1</sub><br>eX Z <sub>1</sub><br>eSKS E <sub>1</sub>                                                                                                            | 10 23 15<br>23 37<br>23 47<br>33 17                            |                 |                |                |                | $\Delta$ = 8000Km.<br>H = 10 11 53<br>USCGS: 17S 66E                                                                                                                       |
| 225 | 20           | eP Z                                                                                                                                                                                | 00 30 20                                                       |                 |                |                |                | USCGS: 3 $\frac{1}{2}$ S 147 $\frac{1}{2}$ E                                                                                                                               |
| 226 | 20           | iP Z<br>iS N <sub>1</sub><br>eS E <sub>1</sub><br>iSSS N <sub>1</sub><br>L max. N <sub>1</sub>                                                                                      | 11 17 20<br>21 18<br>21 22<br>22 15<br>24.5                    | 6<br>6<br>6     |                |                |                | Compression.<br>$\Delta$ = 2480Km.<br>H = 11 12 24<br>USCGS: 28S 167 $\frac{1}{2}$ E                                                                                       |
| 227 | 21           | eP Z <sub>1</sub><br>iX Z <sub>1</sub><br>iX Z <sub>1</sub><br>ePP Z <sub>1</sub><br>eSKS E <sub>1</sub> N <sub>1</sub><br>iSS E <sub>1</sub> N <sub>1</sub><br>eSSS E <sub>1</sub> | 10 16 28<br>16 46<br>18 38<br>20 20<br>27 00<br>34 38<br>38 28 | 4<br>5          |                |                |                | USCGS: 37 $\frac{1}{2}$ S 73 $\frac{1}{2}$ W                                                                                                                               |
| 228 | 21           | eP Z                                                                                                                                                                                | 11 19 22                                                       |                 |                |                |                |                                                                                                                                                                            |
| 229 | 21           | eP Z                                                                                                                                                                                | 15 22 15                                                       |                 |                |                |                | USCGS: 37 $\frac{1}{2}$ S 73W                                                                                                                                              |
| 230 | 22           | iP E N Z                                                                                                                                                                            | 01 02 50                                                       |                 |                |                |                | H = 00 57 55<br>Norfolk Is. region.                                                                                                                                        |
| 231 | 22           | eP Z <sub>1</sub><br>e(P) Z <sub>1</sub><br>eX Z<br>eSKS E <sub>1</sub> N <sub>1</sub><br>ePS N <sub>1</sub><br>eSS N <sub>1</sub>                                                  | 10 46 20<br>50 22<br>51 05<br>56 54<br>58 56<br>11 04.1        |                 |                |                |                | USCGS: 37 $\frac{1}{2}$ S 73W                                                                                                                                              |
| 232 | 22           | e(X) Z                                                                                                                                                                              | 11 14.5                                                        |                 |                |                |                |                                                                                                                                                                            |
| 233 | 22           | eP Z <sub>1</sub><br>iSKS E <sub>1</sub> N <sub>1</sub>                                                                                                                             | 19 09 30<br>20 06                                              | 8               |                |                |                | Record confused by<br>following quakes.<br>USCGS: 38S 73 $\frac{1}{2}$ W                                                                                                   |
| 234 | 22           | eP Z<br>eSKS N <sub>1</sub>                                                                                                                                                         | 19 24 25<br>35 03                                              |                 |                |                |                | USCGS: 38S 73 $\frac{1}{2}$ W<br>Record confused by<br>preceding and follow-<br>ing shock. The P<br>phase of the largest<br>Chilean quake is<br>lost in record No.<br>234. |
| 235 | 23           | eP Z<br>e(S) N <sub>1</sub><br>eX E <sub>1</sub>                                                                                                                                    | 00 34 46<br>43 11<br>43 44                                     |                 |                |                |                |                                                                                                                                                                            |
| 236 | 23           | eP Z                                                                                                                                                                                | 03 09 27                                                       |                 |                |                |                | USCGS: 43S 75 $\frac{1}{2}$ W                                                                                                                                              |
| 237 | 23           | eP Z                                                                                                                                                                                | 07 22 05                                                       |                 |                |                |                | USCGS: 48S 77W                                                                                                                                                             |
| 238 | 23           | eP Z                                                                                                                                                                                | 10 51 09                                                       |                 |                |                |                | USCGS: 43 $\frac{1}{2}$ S 73 $\frac{1}{2}$ W                                                                                                                               |
| 239 | 24           | iP E N Z<br>iPcP Z                                                                                                                                                                  | 06 37 12<br>38 52                                              | $\frac{3}{4}$   |                |                |                | Compression.<br>H = 06 29 19<br>Halmahera region<br>Deep?                                                                                                                  |



| No. | Date<br>1960 | Phase                                              | Time<br>(G.M.T.) | Per.            | Amplitude      |                |                | Remarks                                                                                          |
|-----|--------------|----------------------------------------------------|------------------|-----------------|----------------|----------------|----------------|--------------------------------------------------------------------------------------------------|
|     |              |                                                    |                  |                 | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                  |
|     |              |                                                    | h.m.s.           | s.              |                |                |                |                                                                                                  |
| 240 | May 24       | eP Z                                               | 10 59 52         |                 |                |                |                | Local shock.  |
|     |              | eS E N                                             | 11 00 10         |                 |                |                |                | $\Delta = 162\text{Km.}$                                                                         |
| 241 | 24           | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub> | 14 50 49         |                 |                |                |                | Rarefaction.                                                                                     |
|     |              | eS E <sub>1</sub>                                  | 54 16            |                 |                |                |                | $\Delta = 2100\text{Km.}$                                                                        |
|     |              | eLq E <sub>1</sub> N <sub>1</sub>                  | 54 29            |                 |                |                |                | H = 14 46 29                                                                                     |
|     |              | eLr E <sub>1</sub>                                 | 55 26            |                 |                |                |                | USCGS: 44 $\frac{1}{2}$ S 167 $\frac{1}{2}$ E                                                    |
|     |              | eT EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub> | 15 05.6          |                 |                |                |                | Duration 9 minutes                                                                               |
| 242 | 24           | iP Z                                               | 16 44 46         |                 |                |                |                | USCGS: 50 $\frac{1}{2}$ S 74W                                                                    |
| 243 | 24           | eP Z                                               | 17 47 54         |                 |                |                |                |                                                                                                  |
| 244 | 24           | eP E Z                                             | 20 28 32         |                 |                |                |                | New Zealand.                                                                                     |
|     |              | eT Z                                               | 44.0             |                 |                |                |                |                                                                                                  |
| 245 | 25           | iP EE <sub>1</sub> ZZ <sub>1</sub>                 | 02 42 02         |                 |                |                |                | Rarefaction.                                                                                     |
|     |              | eS E <sub>1</sub>                                  | 45 38            |                 |                |                |                | $\Delta = 2200\text{Km.}$                                                                        |
|     |              | eSSS E <sub>1</sub>                                | 46 18            |                 |                |                |                | H = 02 37 32                                                                                     |
|     |              | eT Z                                               | 57.5             |                 |                |                |                | USCGS: 44S 168E                                                                                  |
| 246 | 25           | eP Z                                               | 04 04 18         |                 |                |                |                | New Zealand.                                                                                     |
|     |              | eT E Z                                             | 20.0             |                 |                |                |                |                                                                                                  |
| 247 | 25           | eP Z                                               | 08 47 34         |                 |                |                |                | USCGS: 45S 76W                                                                                   |
|     |              | e(SKS) E <sub>1</sub>                              | 58 48            | 8               |                |                |                |                                                                                                  |
|     |              | e(PS) E <sub>1</sub>                               | 09 00 31         |                 |                |                |                |                                                                                                  |
| 248 | 25           | iP Z                                               | 09 35 27         |                 |                |                |                |                                                                                                  |
| 249 | 25           | iP E N ZZ <sub>1</sub>                             | 13 46 17         | 1               |                |                |                | Rarefaction.                                                                                     |
|     |              | eS E <sub>1</sub>                                  | 52 34            |                 |                |                |                | $\Delta = 4675\text{Km.}$                                                                        |
|     |              |                                                    |                  |                 |                |                |                | H = 13 38 26                                                                                     |
|     |              |                                                    |                  |                 |                |                |                | USCGS: 1N 129 $\frac{1}{2}$ E                                                                    |
| 250 | 25           | eP Z                                               | 14 35(33)        |                 |                |                |                | USCGS: 1N 128 $\frac{1}{2}$ E                                                                    |
| 251 | 25           | iP E N ZZ <sub>1</sub>                             | 15 05 17         | 1               |                |                |                | Rarefaction.                                                                                     |
|     |              | epP Z                                              | 07 01            |                 |                |                |                | $\Delta = 3800\text{Km.}$                                                                        |
|     |              | eS E <sub>1</sub>                                  | 10 04            |                 |                |                |                | H = 14 59 19                                                                                     |
|     |              |                                                    |                  |                 |                |                |                | h = 600Km.                                                                                       |
|     |              |                                                    |                  |                 |                |                |                | USCGS: 22S 179 $\frac{1}{2}$ W                                                                   |
| 252 | 25           | iP E N ZZ <sub>1</sub>                             | 15 11 17         | 1               |                |                |                | Rarefaction.                                                                                     |
|     |              |                                                    |                  |                 |                |                |                | H = 15 05 19                                                                                     |
|     |              |                                                    |                  |                 |                |                |                | Fiji Is. Same epicentre as No.251                                                                |
| 253 | 26           | ePKIKP Z                                           | 05 29 35         |                 |                |                |                | USCGS: 40N 20E                                                                                   |
|     |              | eX Z                                               | 29 42            |                 |                |                |                |                                                                                                  |
|     |              | iPKS Z                                             | 33 12            |                 |                |                |                |                                                                                                  |
| 254 | 26           | iP Z                                               | 20 17 38         | 1 $\frac{1}{4}$ |                |                |                | Compression.                                                                                     |
|     |              |                                                    |                  |                 |                |                |                | USCGS: 27N 93E                                                                                   |
| 255 | 27           | eP Z                                               | 00 26 59         |                 |                |                |                |                                                                                                  |
| 256 | 27           | eP Z                                               | 00 30 57         |                 |                |                |                | USCGS: 22S 172E                                                                                  |
| 257 | 27           | eP Z                                               | 20 16 25         |                 |                |                |                | USCGS: 5 $\frac{1}{2}$ S 153E                                                                    |
| 258 | 31           | iPKP Z                                             | 11 22 05         |                 |                |                |                | Rarefaction.                                                                                     |
|     |              | iX E Z                                             | 22 13            | 1               |                |                |                | Masked by micro-seismic storm.                                                                   |
|     |              |                                                    |                  |                 |                |                |                | USCGS: 18N 62W                                                                                   |
| 259 | 31           | iP N Z                                             | 13 17 34         | $\frac{3}{4}$   |                |                |                | Compression.                                                                                     |
|     |              |                                                    |                  |                 |                |                |                | Approx. 7S 156 $\frac{1}{2}$ E                                                                   |
|     |              |                                                    |                  |                 |                |                |                | $\Delta = 3665\text{Km.}$                                                                        |
|     |              |                                                    |                  |                 |                |                |                | H = 13 11 00                                                                                     |

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DIRECTOR.



## DEPARTMENT OF NATIONAL DEVELOPMENT

## BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

203 Collins Street,  
MELBOURNE. VIC.

## SEISMOLOGICAL BULLETIN

## MELBOURNE

Latitude: 37°49'53" S. Longitude: 144°58'24" E. Height: 28m.

Foundation: Silurian Sandstone and Mudstone.

Instruments: Benioff Variable Reluctance Seismometers, 3 components  
 Seismometer periods: 1 sec.  
 Short period recorder ENZ  
 Galvanometer period: 0.25 sec.  
 Long period recorder E<sub>1</sub>N<sub>1</sub>Z<sub>1</sub>  
 Galvanometer period: 14 sec.  
 Magnification: 3750 at 1 cps.

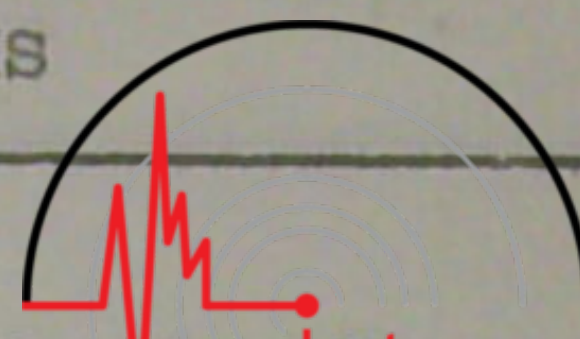
Milne Shaw Seismograph, E-W component,  
 Period: 12 sec.  
 Damping Coefficient: 0.7  
 Magnification: 250



| No. | Date<br>1960 | Phase                                                                                            | Time<br>(G.M.T.)           | Per.   | Amplitude      |                |                | Remarks                                                                   |
|-----|--------------|--------------------------------------------------------------------------------------------------|----------------------------|--------|----------------|----------------|----------------|---------------------------------------------------------------------------|
|     |              |                                                                                                  |                            |        | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                           |
|     |              |                                                                                                  | h.m.s.                     | s.     |                |                |                |                                                                           |
| 260 | June 1       | iP N Z<br>eS E N Z                                                                               | 05 19 09<br>19 22          |        |                |                |                | Compression. Small<br>local shock.<br>$\Delta = 117\text{Km}$ .           |
| 261 | 2            | eP Z                                                                                             | 02 00 34                   |        |                |                |                | USCGS: Near south<br>coast of Mindanao, P.I.                              |
| 262 | 2            | eP Z                                                                                             | 03 58 57                   |        |                |                |                |                                                                           |
| 263 | 2            | eP ZZ <sub>1</sub><br>iX ZZ <sub>1</sub>                                                         | 06 11 01<br>11 08          | 2<br>2 |                |                |                | USCGS: 46½S 74W                                                           |
| 264 | 2            | eP Z<br>ePP N <sub>1</sub><br>eX N <sub>1</sub>                                                  | 07 53 46<br>54 58<br>58 48 | 14     |                |                |                | USCGS: 5½S 151½E                                                          |
| 265 | 2            | iP E Z<br>epP Z                                                                                  | 19 05 27<br>07 11          | 1      |                |                |                | Compression.<br>USCGS: 20½S 178½W                                         |
| 266 | 2            | eP Z                                                                                             | 19 55 51                   |        |                |                |                | USCGS: 20½S 178W                                                          |
| 267 | 3            | eP Z                                                                                             | 10 36 18                   |        |                |                |                |                                                                           |
| 268 | 3            | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>iX Z<br>iS N <sub>1</sub>                  | 13 21 04<br>21 22<br>26 06 | 1      |                |                |                | Rarefaction.<br>USCGS: 17½S 179½W                                         |
| 269 | 3            | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>iX Z<br>iS EE <sub>1</sub> NN <sub>1</sub> | 13 30 04<br>30 22<br>35 06 | 1      |                |                |                | Rarefaction.<br>USCGS: 17½S 179W                                          |
| 270 | 3            | eP EE <sub>1</sub> ZZ <sub>1</sub>                                                               | 13 47 30                   | 2      |                |                |                |                                                                           |
| 271 | 3            | eP Z                                                                                             | 16 30 04                   |        |                |                |                | USCGS: 41½N 141½E                                                         |
| 272 | 4            | eP N Z                                                                                           | 06 26 00                   |        |                |                |                |                                                                           |
| 273 | 4            | iP N Z<br>iS N                                                                                   | 12 43 43<br>44 06          |        |                |                |                | Rarefaction. Local<br>shock.<br>$\Delta = 207\text{Km}$ .<br>219° E of N. |



| No. | Date<br>1960 | Phase                               | Time<br>(G.M.T.) | Per. | Amplitude      |                |                | Remarks                                                                                               |
|-----|--------------|-------------------------------------|------------------|------|----------------|----------------|----------------|-------------------------------------------------------------------------------------------------------|
|     |              |                                     |                  |      | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                       |
|     |              |                                     | h.m.s.           | s.   |                |                |                |                                                                                                       |
| 274 | June 4       | eP Z                                | 13 28(43)        |      |                |                |                | Small local shock<br>$\Delta = 207\text{Km}$ .                                                        |
|     |              | eS N                                | 29(08)           |      |                |                |                |                                                                                                       |
| 275 | 5            | eP E Z                              | 19 36 54         |      |                |                |                | USCGS: $31\frac{1}{2}\text{S}$ $177\text{W}$                                                          |
| 276 | 6            | eP $\cdot N_1$ ZZ <sub>1</sub>      | 06 08 50         |      |                |                |                | $\Delta = 10180\text{Km}$ .<br>H = 05 55 45<br>USCGS: $45\frac{1}{2}\text{S}$ $73\frac{1}{2}\text{W}$ |
|     |              | eX Z <sub>1</sub>                   | 09 29            |      |                |                |                |                                                                                                       |
|     |              | eX Z <sub>1</sub>                   | 10 25            |      |                |                |                |                                                                                                       |
|     |              | eX N <sub>1</sub>                   | 13 15            |      |                |                |                |                                                                                                       |
|     |              | iSKS E <sub>1</sub> N <sub>1</sub>  | 19 23            | 8    |                |                |                |                                                                                                       |
|     |              | iS E <sub>1</sub> N <sub>1</sub>    | 19 45            | 8    |                |                |                |                                                                                                       |
|     |              | e(PPS) N <sub>1</sub>               | 21 55            |      |                |                |                |                                                                                                       |
|     |              | eLq E <sub>1</sub>                  | 33 00            | 36   |                |                |                |                                                                                                       |
|     |              | eX E <sub>1</sub>                   | 35 12            | 20   |                |                |                |                                                                                                       |
| 277 | 6            | eP Z                                | 23 36 04         |      |                |                |                | USCGS: $23\frac{1}{2}\text{S}$ 180                                                                    |
| 278 | 7            | iP Z                                | 13 10 22         |      |                |                |                | USCGS: $53\text{N}$ $158\frac{1}{2}\text{E}$                                                          |
| 279 | 7            | iP E Z                              | 13 34 20         |      |                |                |                | USCGS: $20\text{S}$ $177\frac{1}{2}\text{W}$                                                          |
| 280 | 8            | iP Z                                | 05 17 46         |      |                |                |                | Compression.                                                                                          |
|     |              | iX Z                                | 18 25            |      |                |                |                | USCGS: $3\frac{1}{2}\text{S}$ $127\text{E}$                                                           |
|     |              | iPPP Z                              | 19 34            |      |                |                |                |                                                                                                       |
| 281 | 9            | eP Z                                | 05 12(34)        |      |                |                |                | USCGS: $9\text{S}$ $112\frac{1}{2}\text{E}$                                                           |
| 282 | 9            | eP Z                                | 11 29 53         |      |                |                |                | $\Delta = 3330\text{Km}$ .<br>H = 11 23 45<br>USCGS: $18\text{S}$ $169\text{E}$                       |
|     |              | eS E <sub>1</sub> N <sub>1</sub>    | 34 48            |      |                |                |                |                                                                                                       |
|     |              | e(SS) E <sub>1</sub> N <sub>1</sub> | 36 12            |      |                |                |                |                                                                                                       |
| 283 | 10           | iP Z                                | 09 15 59         | 1    |                |                |                | Rarefaction.                                                                                          |
|     |              |                                     |                  |      |                |                |                | USCGS: $15\frac{1}{2}\text{S}$ $174\text{W}$                                                          |
| 284 | 10           | eL E <sub>1</sub> N <sub>1</sub>    | 21 30.5          |      |                |                |                | USCGS: $15\frac{1}{2}\text{S}$ $174\text{W}$                                                          |
| 285 | 11           | iP Z                                | 15 20 15         |      |                |                |                | No long period Z                                                                                      |
|     |              | iS N <sub>1</sub>                   | 25 08            |      |                |                |                | record.                                                                                               |
|     |              | eL E <sub>1</sub>                   | 29.2             |      |                |                |                | $\Delta = 3310\text{Km}$ .<br>H = 15 14 09<br>USCGS: $9\text{S}$ $152\frac{1}{2}\text{E}$             |
| 286 | 11           | iP Z                                | 16 43 45         |      |                |                |                | $\Delta = 3420\text{Km}$ .<br>H = 16 37 30<br>USCGS: $9\frac{1}{2}\text{S}$ $152\frac{1}{2}\text{E}$  |
|     |              | iS N <sub>1</sub>                   | 48 45            | 8    |                |                |                |                                                                                                       |
|     |              | eLq E <sub>1</sub>                  | 51.6             | 18   |                |                |                |                                                                                                       |
|     |              | eL N <sub>1</sub>                   | 53.9             |      |                |                |                |                                                                                                       |
| 287 | 11           | eP Z                                | 17 29(11)        |      |                |                |                | USCGS: D'Entrecasteaux Is.                                                                            |
| 288 | 12           | iP E N Z                            | 04 02 37         | 1    |                |                |                | Compression.                                                                                          |
|     |              | iS N <sub>1</sub>                   | 07 16            | 4    |                |                |                | No long period Z                                                                                      |
|     |              |                                     |                  |      |                |                |                | record.                                                                                               |
| 289 | 12           | eP Z                                | 07 04 06         |      |                |                |                | USCGS: $22\frac{1}{2}\text{S}$ $179\text{E}$                                                          |
| 290 | 12           | eP Z                                | 07 32 19         |      |                |                |                | USCGS: $29\frac{1}{2}\text{S}$ $179\text{W}$                                                          |
|     |              | eL E <sub>1</sub> N <sub>1</sub>    | 08 00.0          |      |                |                |                | USCGS: $36\text{S}$ $98\text{W}$                                                                      |
| 291 | 12           | eP Z                                | 15 48 24         |      |                |                |                |                                                                                                       |
| 292 | 13           | iP Z                                | 06 00 06         |      |                |                |                | USCGS: $44\frac{1}{2}\text{S}$ $76\frac{1}{2}\text{W}$                                                |
| 293 | 13           | iP Z                                | 12 00 15         |      |                |                |                |                                                                                                       |
| 294 | 14           | iP Z                                | 23 44 17         |      |                |                |                | USCGS: $9\text{S}$ $152\frac{1}{2}\text{E}$                                                           |
| 295 | 15           | eP Z                                | 22 56 00         |      |                |                |                | USCGS: Solomon Is.                                                                                    |
| 296 | 15           | iP ZZ <sub>1</sub>                  | 23 35 09         |      |                |                |                | Compression.                                                                                          |
|     |              |                                     |                  |      |                |                |                | USCGS: $\frac{1}{2}\text{S}$ $133\text{E}$                                                            |
| 297 | 15           | eP Z                                | 23 37(44)        |      |                |                |                | USCGS: $26\text{S}$ $178\frac{1}{2}\text{E}$                                                          |



International  
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Centre



| No. | Date<br>1960 | Phase                                                   | Time<br>(G.M.T.) | Per.           | Amplitude      |                |                | Remarks                                                                                                                      |
|-----|--------------|---------------------------------------------------------|------------------|----------------|----------------|----------------|----------------|------------------------------------------------------------------------------------------------------------------------------|
|     |              |                                                         |                  |                | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                                              |
|     |              |                                                         | h.m.s.           | s.             |                |                |                |                                                                                                                              |
| 298 | June 16      | iP      E      Z                                        | 09 10 55         | $1\frac{3}{4}$ |                |                |                | Compression.<br>USCGS: 35S 179E                                                                                              |
| 299 | 17           | iP      E      Z                                        | 02 51 27         | 1              |                |                |                | Rarefaction.<br>$\Delta = 4310\text{Km.}$<br>H = 02 44 51<br>Approximately 18S 177 $\frac{1}{2}$ W<br>h approximately 600Km. |
| 300 | 18           | eP                      Z                               | 02 39 01         |                |                |                |                |                                                                                                                              |
| 301 | 18           | eP                      Z                               | 03 25 13         |                |                |                |                | USCGS: 9 $\frac{1}{2}$ S 152 $\frac{1}{2}$ E                                                                                 |
| 302 | 18           | eP                      Z                               | 23 41(41)        |                |                |                |                | USCGS: Near south coast<br>of Sumatra.                                                                                       |
| 303 | 19           | iP                      Z                               | 12 47 01         |                |                |                |                | USCGS: 44 $\frac{1}{2}$ N 149E                                                                                               |
| 304 | 19           | iP                      Z                               | 17 28 14         | $1\frac{1}{4}$ |                |                |                | Rarefaction.<br>USCGS: 38N 142 $\frac{1}{2}$ E                                                                               |
| 305 | 20           | eP                      Z <sub>1</sub>                  | 02 14 44         | 8              |                |                |                | $\Delta = 10830\text{Km.}$                                                                                                   |
|     |              | ePP                      N <sub>1</sub> Z <sub>1</sub>  | 18 40            | 6              |                |                |                | H = 02 01 12                                                                                                                 |
|     |              | eSKS                      E <sub>1</sub> N <sub>1</sub> | 25 16            |                |                |                |                | USCGS: 38S 73 $\frac{1}{2}$ W                                                                                                |
|     |              | eS                      E <sub>1</sub> N <sub>1</sub>   | 26 02            |                |                |                |                |                                                                                                                              |
|     |              | iX                      E <sub>1</sub> N <sub>1</sub>   | 26 18            |                |                |                |                |                                                                                                                              |
|     |              | ePS                      E <sub>1</sub> N <sub>1</sub>  | 27 30            |                |                |                |                |                                                                                                                              |
|     |              | eSS                      E <sub>1</sub> N <sub>1</sub>  | 32 40            | 20             |                |                |                |                                                                                                                              |
| 306 | 20           | eP                      Z                               | 12 12(29)        |                |                |                |                | USCGS: 3S 129E                                                                                                               |
| 307 | 20           | eP                      Z <sub>1</sub>                  | 13 13 10         |                |                |                |                | $\Delta = 10830\text{Km.}$                                                                                                   |
|     |              | ePP                      Z <sub>1</sub>                 | 17 02            |                |                |                |                | H = 12 59 38                                                                                                                 |
|     |              | iSKS                      E <sub>1</sub> N <sub>1</sub> | 23 44            | 7              |                |                |                | USCGS: 39 $\frac{1}{2}$ S 73W                                                                                                |
|     |              | iS                      N <sub>1</sub>                  | 24 28            | 7              |                |                |                |                                                                                                                              |
|     |              | iX                      N <sub>1</sub>                  | 24 44            |                |                |                |                |                                                                                                                              |
| 308 | 21           | iP                      N      Z                        | 12 51 48         | 1              |                |                |                | Compression.<br>USCGS: 3N 126 $\frac{1}{2}$ E                                                                                |
| 309 | 21           | iP                      Z                               | 18 15 59         | 1              |                |                |                | Rarefaction.<br>USCGS: 19S 178W                                                                                              |
| 310 | 22           | eP                      Z                               | 03 04(02)        |                |                |                |                | $\Delta = 3110\text{Km.}$                                                                                                    |
|     |              | eS                      N <sub>1</sub>                  | 08 38            |                |                |                |                | H = 02 58(12)                                                                                                                |
|     |              |                                                         |                  |                |                |                |                | USCGS: 62S 156 $\frac{1}{2}$ E                                                                                               |
| 311 | 23           | iP                      E      N      Z                 | 12 15 04         | 1              |                |                |                | Compression.<br>USCGS: 7S 127 $\frac{1}{2}$ E                                                                                |
| 312 | 24           | eP                      Z                               | 22 41 13         |                |                |                |                | USCGS: 30S 177 $\frac{1}{2}$ W                                                                                               |
| 313 | 25           | eP                      ZZ <sub>1</sub>                 | 02 09 06         |                |                |                |                | USCGS: 30 $\frac{1}{2}$ S 177W                                                                                               |
| 314 | 25           | eP                      Z                               | 14 47 37         |                |                |                |                | Same epicentre as No.315                                                                                                     |
| 315 | 25           | iP                      E      N      Z                 | 14 48 19         |                |                |                |                | Rarefaction.                                                                                                                 |
|     |              | eS                      E <sub>1</sub>                  | 53 29            |                |                |                |                | $\Delta = 3590\text{Km}$                                                                                                     |
|     |              | eLq                      N <sub>1</sub>                 | 55.6             |                |                |                |                | H = 14 41 51                                                                                                                 |
|     |              |                                                         |                  |                |                |                |                | USCGS: 30 $\frac{1}{2}$ S 177W                                                                                               |
| 316 | 25           | iP                      Z                               | 15 05 27         |                |                |                |                | Rarefaction.<br>USCGS: 30S 177W                                                                                              |
| 317 | 27           | eP                      Z                               | 16 56 40         |                |                |                |                | Kermadec Is. region.                                                                                                         |
|     |              | iX                      Z                               | 56 55            |                |                |                |                |                                                                                                                              |
|     |              | iX                      Z                               | 58 44            |                |                |                |                |                                                                                                                              |
| 318 | 27           | eP                      Z                               | 17 40 15         |                |                |                |                | USCGS: 31 $\frac{1}{2}$ S 178W                                                                                               |
| 319 | 27           | eP                      Z                               | 18 10(00)        |                |                |                |                |                                                                                                                              |
| 320 | 27           | iP                      Z                               | 19 15 50         |                |                |                |                |                                                                                                                              |



| No. | Date<br>1960 | Phase | Time<br>(G.M.T.)           | Per. | Amplitude      |                |                | Remarks                                        |
|-----|--------------|-------|----------------------------|------|----------------|----------------|----------------|------------------------------------------------|
|     |              |       |                            |      | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                |
|     |              |       | h.m.s.                     | s.   |                |                |                |                                                |
| 321 | June 28      | iP    | Z 16 13 52                 | 1    |                |                |                | Rarefaction.<br>USCGS: Tonga Is. region.       |
| 322 | 29           | iP    | E ZZ <sub>1</sub> 04 35 41 |      |                |                |                | Compression.<br>USCGS: 30S 177 $\frac{1}{2}$ W |
| 323 | 29           | iP    | N Z 17 04 18               | 1    |                |                |                | Compression.<br>New Britain region.            |
| 324 | 30           | eP    | Z 05 50 41                 |      |                |                |                | East of Celebes.                               |

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## MELBOURNE

|              |                                           |                                              |
|--------------|-------------------------------------------|----------------------------------------------|
| Instruments: | Benioff Variable Reluctance Seismometers, | 3 components                                 |
|              | Seismometer periods:                      | 1 sec.                                       |
|              | Short period recorder                     | ENZ                                          |
|              | Galvanometer period:                      | 0.25 sec.                                    |
|              | Long period recorder                      | E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> |
|              | Galvanometer period:                      | 14 sec.                                      |
|              | Magnification:                            | 3750 at 1 cps.                               |
|              | Milne Shaw Seismograph, E-W component,    |                                              |
|              | Period:                                   | 12 sec.                                      |
|              | Damping Coefficient:                      | 0.7                                          |
|              | Magnification:                            | 250                                          |

| No. | Date<br>1960 | Phase                                                                                                                 | Time<br>(G.M.T.)                             | Per.                               | Amplitude      |                |                | Remarks                                                               |
|-----|--------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------|----------------|----------------|----------------|-----------------------------------------------------------------------|
|     |              |                                                                                                                       |                                              |                                    | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                       |
| 325 | July 1       | iP Z<br>epP Z                                                                                                         | h.m.s.<br>17 49 24<br>49 38                  | s.                                 |                |                |                | Rarefaction.<br>USCGS: 11 $\frac{1}{2}$ N 142 $\frac{1}{2}$ E         |
| 326 | 2            | iP N Z                                                                                                                | 12 08 23                                     |                                    |                |                |                | USCGS: 56S 27W                                                        |
| 327 | 3            | eP Z<br>eSKS N <sub>1</sub><br>eS E <sub>1</sub> N <sub>1</sub><br>ePS N <sub>1</sub><br>eSPS N <sub>1</sub>          | 20 34 15<br>44 37<br>45 19<br>46 39<br>51 47 |                                    |                |                |                | $\Delta$ = 10420Km.<br>H = 20 21 00<br>USCGS: 50 $\frac{1}{2}$ N 177W |
| 328 | 4            | eL E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub>                                                                       | 05 22.0                                      |                                    |                |                |                | USCGS: 52N 131 $\frac{1}{2}$ W                                        |
| 329 | 8            | eP N Z<br>iPcP Z<br>eX Z                                                                                              | 13 02 29<br>02 46<br>03 10                   | 1 $\frac{1}{4}$<br>1 $\frac{1}{4}$ |                |                |                | USCGS: 31N 130 $\frac{1}{2}$ E                                        |
| 330 | 8            | eP Z                                                                                                                  | 14 51 37                                     |                                    |                |                |                | USCGS: 7S 129E                                                        |
| 331 | 8            | iP N Z                                                                                                                | 15 29 40                                     |                                    |                |                |                | Compression.<br>USCGS: 14S 168E                                       |
| 332 | 10           | eP Z<br>iX E Z<br>eS E <sub>1</sub> N <sub>1</sub><br>ePS E <sub>1</sub> N <sub>1</sub><br>sS)<br>eScS N <sub>1</sub> | 00 15 15<br>15 27<br>23 16<br>23 32<br>24 57 | 1 $\frac{1}{2}$                    |                |                |                | $\Delta$ = 6470Km. H=00 05 02<br>USCGS: 0 98E                         |
| 333 | 10           | iP Z                                                                                                                  | 12 12 25                                     |                                    |                |                |                |                                                                       |
| 334 | 10           | eP N Z                                                                                                                | 20 27 03                                     |                                    |                |                |                | USCGS: 53 $\frac{1}{2}$ S 134E                                        |
| 335 | 11           | eP Z<br>eX Z                                                                                                          | 07 37(38)<br>39(04)                          |                                    |                |                |                | USCGS: 54S 140 $\frac{1}{2}$ E                                        |
| 336 | 11           | iP E N Z<br>iS N <sub>1</sub>                                                                                         | 12 03 18<br>09 47                            | 1                                  |                |                |                | Rarefaction.<br>$\Delta$ = 4890Km.<br>H = 11 55 12<br>USCGS: 16S 172W |



| No. | Date<br>1960 | Phase                                                                                                                                                                                            | Time<br>(G.M.T.)                                                        | Per.            | Amplitude      |                |                | Remarks                                                                                     |
|-----|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------|----------------|----------------|----------------|---------------------------------------------------------------------------------------------|
|     |              |                                                                                                                                                                                                  |                                                                         |                 | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                             |
|     |              |                                                                                                                                                                                                  | h.m.s.                                                                  | s.              |                |                |                |                                                                                             |
| 337 | July 13      | eP Z                                                                                                                                                                                             | 08 08 28                                                                |                 |                |                |                | USCGS: 53 $\frac{1}{2}$ S 11 $\frac{1}{2}$ E                                                |
| 338 | 14           | iP E N Z<br>iS N <sub>1</sub>                                                                                                                                                                    | 10 35 23<br>42 02                                                       | $\frac{3}{4}$   |                |                |                | Rarefaction.<br>$\Delta$ = 5060Km. H=102705<br>USCGS: 5N 127 $\frac{1}{2}$ E                |
| 339 | 18           | eP E Z<br>ipP N Z<br>eS N <sub>1</sub>                                                                                                                                                           | 01 50(03)<br>50 42<br>55 12                                             |                 |                |                |                | $\Delta$ = 3780Km.<br>H = 01 43 (37)<br>h = approx. 200Km.<br>USCGS: 4 $\frac{1}{2}$ S 151E |
| 340 | 20           | iP Z                                                                                                                                                                                             | 09 43 27                                                                | 1 $\frac{1}{4}$ |                |                |                | Rarefaction.<br>USCGS: 49N 157 $\frac{1}{2}$ E                                              |
| 341 | 20           | iP E Z<br>eS E <sub>1</sub>                                                                                                                                                                      | 21 05 03<br>10 04                                                       | 1               |                |                |                | Rarefaction.<br>USCGS: 20 $\frac{1}{2}$ S 169E                                              |
| 342 | 23           | iP E N Z                                                                                                                                                                                         | 07 37 46                                                                | 1               |                |                |                | Rarefaction.<br>USCGS: 21 $\frac{1}{2}$ S 179 $\frac{1}{2}$ W                               |
| 343 | 25           | iS E <sub>1</sub>                                                                                                                                                                                | 04 05 47                                                                | 8               |                |                |                | USCGS: 55N 163E                                                                             |
| 344 | 25           | eP Z                                                                                                                                                                                             | 04 16 43                                                                |                 |                |                |                |                                                                                             |
| 345 | 25           | iP E N Z                                                                                                                                                                                         | 10 30 41                                                                | 1               |                |                |                | Rarefaction.<br>USCGS: 17 $\frac{1}{2}$ S 178W                                              |
| 346 | 25           | eP N ZZ <sub>1</sub><br>epP N ZZ <sub>1</sub><br>ePP Z <sub>1</sub><br>iSKS N <sub>1</sub><br>iS E <sub>1</sub> N <sub>1</sub><br>isS E <sub>1</sub><br>iSP Z <sub>1</sub><br>iSS E <sub>1</sub> | 11 25 03<br>25 38<br>28 47<br>35 19<br>35 53<br>36 59<br>37 07<br>42 01 | 6<br>6          |                |                |                | $\Delta$ = 10330Km.<br>H = 11 12 07<br>h = approx. 120Km.<br>USCGS: 54N 159E                |
| 347 | 25           | eP Z                                                                                                                                                                                             | 21 43(42)                                                               |                 |                |                |                | USCGS: 3S 148E                                                                              |
| 348 | 27           | eP Z                                                                                                                                                                                             | 09 05 17                                                                |                 |                |                |                | USCGS: 5.6S 103.6E                                                                          |
| 349 | 27           | iP ZZ <sub>1</sub>                                                                                                                                                                               | 10 17 53                                                                |                 |                |                |                | USCGS: 44.7S 75.1W                                                                          |
| 350 | 29           | iP Z<br>eS E <sub>1</sub>                                                                                                                                                                        | 00 30 05<br>34 54                                                       |                 |                |                |                | $\Delta$ = 3240Km.<br>H = 00 24 05<br>USCGS: 19 $\frac{1}{2}$ S 170 $\frac{1}{2}$ E         |
| 351 | 29           | iP Z<br>iS E <sub>1</sub> N <sub>1</sub>                                                                                                                                                         | 17 43(34)<br>53(20)                                                     |                 |                |                |                | No time-marks.<br>USCGS: 40.1N 142.3E                                                       |
| 352 | 31           | eP Z<br>iS E <sub>1</sub> N <sub>1</sub><br>iSS N <sub>1</sub><br>iScS N <sub>1</sub>                                                                                                            | 03 02 13<br>07 21<br>09 09<br>12 42                                     |                 |                |                |                | $\Delta$ = 3560Km.<br>H = 02 55 48<br>USCGS: 5.6S 150.0E                                    |
| 353 | 31           | eL E <sub>1</sub> N <sub>1</sub>                                                                                                                                                                 | 07 19.5                                                                 |                 |                |                |                | USCGS: 6.0S 150.0E                                                                          |
| 354 | 31           | iP Z                                                                                                                                                                                             | 09 24 41                                                                |                 |                |                |                | USCGS: 6.5S 129.6E                                                                          |
| 355 | 31           | iP Z                                                                                                                                                                                             | 18 53 07                                                                |                 |                |                |                | Rarefaction.<br>USCGS: 2.8S 148.2E                                                          |



International  
Seismological  
Centre

(J.M. RAYNER)  
DIRECTOR.



203 Collins Street,  
MELBOURNE. VIC.

Milne Shaw Seismograph, E-W component,  
 Period 12 sec.  
 Damping Coefficient: 0.7  
 Magnification: 250

| No. | Date<br>1960 | Phase                                           | Time<br>(G.M.T.) | Per. | Amplitude      |                |                | Remarks                             |
|-----|--------------|-------------------------------------------------|------------------|------|----------------|----------------|----------------|-------------------------------------|
|     |              |                                                 |                  |      | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                     |
|     |              |                                                 | h.m.s.           | s.   |                |                |                |                                     |
| 356 | August 2     | eP Z                                            | 05 13 03         |      |                |                |                | H = 05 07 16                        |
|     |              | epP Z <sub>1</sub>                              | 13 30            |      |                |                |                | Δ = 3190Km.                         |
|     |              | iPP N <sub>1</sub> Z <sub>1</sub>               | 13 53            |      |                |                |                | h approx. 130Km.                    |
|     |              | iS E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> | 17 41            | 6    |                |                |                | USCGS: 22.2S 171.5E                 |
|     |              | iX E <sub>1</sub> N <sub>1</sub>                | 18 43            |      |                |                |                |                                     |
|     |              | iScS E <sub>1</sub> N <sub>1</sub>              | 23 43            | 5    |                |                |                |                                     |
| 357 | 2            | eP Z                                            | 09 37 01         |      |                |                |                | USCGS: 28.2S 176.6W                 |
| 358 | 2            | iP Z                                            | 10 12 55         |      |                |                |                | Rarefaction.<br>USCGS: 28.4S 176.8W |
| 359 | 4            | eP Z                                            | 07 48 07         |      |                |                |                | USCGS: 51.4N 179.1E                 |
|     |              | iS EE <sub>1</sub> N <sub>1</sub>               | 59 18            |      |                |                |                |                                     |
|     |              | iX E <sub>1</sub>                               | 59 34            | 8    |                |                |                |                                     |
| 360 | 5            | iP Z                                            | 16 19 24         | 1    |                |                |                | Rarefaction.                        |
|     |              | iX Z                                            | 19 40            | 1    |                |                |                | USCGS: 50.1N 156.8E                 |
| 361 | 6            | iP E Z                                          | 14 00 34         |      |                |                |                |                                     |
| 362 | 6            | iP E N Z                                        | 21 18 00.5       |      |                |                |                | Δ = 266Km, Small local shock.       |
|     |              | iS E N                                          | 18 30            |      |                |                |                |                                     |
| 363 | 9            | eL E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> | 08 32.0          |      |                |                |                |                                     |
| 364 | 9            | eP Z                                            | 16 53 16         |      |                |                |                | USCGS: 24.5S 177.1W                 |
|     |              | ePP Z <sub>1</sub>                              | 54 42            |      |                |                |                |                                     |
|     |              | eSSS E <sub>1</sub> N <sub>1</sub>              | 17 01 36         |      |                |                |                |                                     |
| 365 | 9            | eP Z                                            | 23 43 19         |      |                |                |                | USCGS: 11.5S 166.3E                 |
| 366 | 10           | eP Z                                            | 10 31 55         |      |                |                |                | USCGS: 9.4S 119.0E                  |
| 367 | 11           | eP Z                                            | 03 01(22)        |      |                |                |                | USCGS: 0.0 121.0E                   |
|     |              | iPcP Z                                          | 04 08            |      |                |                |                |                                     |
| 368 | 11           | iP N Z                                          | 04 59 21         | 1    |                |                |                | Compression.<br>USCGS: 8.8N 126.1E  |



| No. | Date<br>1960 | Phase                             | Time<br>(G.M.T.) | Per.          | Amplitude      |                |                | Remarks                                |
|-----|--------------|-----------------------------------|------------------|---------------|----------------|----------------|----------------|----------------------------------------|
|     |              |                                   |                  |               | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                        |
|     |              |                                   | h.m.s.           | s.            |                |                |                |                                        |
| 369 | August 13    | eP Z                              | 07 22 59         |               |                |                |                | USCGS: 40.6N 142.0E                    |
| 370 | 13           | eP ZZ <sub>1</sub>                | 14 28 15         |               |                |                |                | H = 14 14 59                           |
|     |              | iPP Z <sub>1</sub>                | 32 01            |               |                |                |                | $\Delta$ = 10440Km.                    |
|     |              | eSKS N <sub>1</sub>               | 38 51            |               |                |                |                | USCGS: 39.7S 74.8W                     |
|     |              | iPS E <sub>1</sub> N <sub>1</sub> | 40 42            |               |                |                |                |                                        |
| 371 | 16           | iP Z                              | 22 34 29         |               |                |                |                | Rarefaction.                           |
|     |              | iX E <sub>1</sub>                 | 47 02            |               |                |                |                | USCGS: 7.6S 128.8E                     |
| 372 | 17           | iP N Z                            | 18 15 40         |               |                |                |                | USCGS: 1.7S 138.6E                     |
|     |              | iX N Z                            | 15 48            |               |                |                |                |                                        |
|     |              | M E <sub>1</sub>                  | 29 18            |               |                |                |                |                                        |
| 373 | 18           | iP E Z                            | 15 06 47         |               |                |                |                | Approx. 34S 135E                       |
|     |              | iS N Z                            | 08 28            |               |                |                |                | H = 15 04 40                           |
|     |              | iX NN <sub>1</sub>                | 09 08            |               |                |                |                | $\Delta$ = 980Km.                      |
| 374 | 18           | eP Z                              | 20 59 37         |               |                |                |                | USCGS: 44.5N 147.6E                    |
| 375 | 20           | iP Z                              | 22 30 52         |               |                |                |                | USCGS: 0.5N 122.0E                     |
|     |              | epP E N Z                         | 31 10            |               |                |                |                |                                        |
|     |              | iPcP Z                            | 32 50            |               |                |                |                |                                        |
| 376 | 21           | eP Z                              | 00 24 40         |               |                |                |                | USCGS: 4.3S 143.3E                     |
| 377 | 21           | iP E N Z                          | 01 05 44         | 1             |                |                |                | Compression.                           |
|     |              |                                   |                  |               |                |                |                | USCGS: 5.5S 149.5E                     |
| 378 | 21           | iP Z                              | 12 57 49         | 1             |                |                |                | Rarefaction.                           |
|     |              | ipP Z                             | 58 28            | 1             |                |                |                | H = 12 49 37                           |
|     |              | iPcP Z                            | 59 20            | $\frac{3}{4}$ |                |                |                | $\Delta$ = 5200Km.                     |
|     |              | iS E <sub>1</sub> N <sub>1</sub>  | 13 04 24         | 4             |                |                |                | h approx. 180Km.                       |
|     |              | esS E <sub>1</sub>                | 05 31            |               |                |                |                | USCGS: 4.9N 125.1E                     |
| 379 | 21           | eP Z                              | 17 13 48         |               |                |                |                | USCGS: 7.2N 127.8E                     |
| 380 | 21           | eP Z                              | 17 28 38         |               |                |                |                | USCGS: 15.3S 176.0W                    |
| 381 | 22           | iP Z                              | 20 53 06         | 1             |                |                |                | Rarefaction.                           |
| 382 | 23           | eP Z                              | 22 52 35         |               |                |                |                | USCGS: 14.5S 176.4W                    |
| 383 | 24           | eP Z                              | 05 56 37         |               |                |                |                | USCGS: 19.0S 174.1W                    |
| 384 | 24           | iP Z                              | 19 39 41         |               |                |                |                | USCGS: 24.4N 95.0E                     |
|     |              | ipP Z                             | 40 07            |               |                |                |                |                                        |
| 385 | 26           | eP Z                              | 11 54(47)        |               |                |                |                | USCGS: 11.1S 123.7E                    |
|     |              | eX Z                              | 12 00 29         |               |                |                |                |                                        |
| 386 | 26           | eP Z                              | 15 03 44         |               |                |                |                |                                        |
| 387 | 26           | iP Z                              | 18 33 30         |               |                |                |                | Compression.                           |
|     |              | eLr E <sub>1</sub>                | 43.0             |               |                |                |                | USCGS: 13.5S 165.9E                    |
| 388 | 26           | eP Z                              | 20 23 41         |               |                |                |                |                                        |
| 389 | 27           | iP Z                              | 12 57 30         | $\frac{3}{4}$ |                |                |                | Compression.                           |
|     |              |                                   |                  |               |                |                |                | USCGS: 22.4S 179.1W                    |
| 390 | 27           | iP Z                              | 18 28 45         |               |                |                |                | Compression.                           |
|     |              | ipP Z                             | 29 26            |               |                |                |                | USCGS: 49.9N 153.7E                    |
| 391 | 30           | eP Z                              | 21 26 39         |               |                |                |                | $\Delta$ = 477Km. Local.               |
|     |              | iS N                              | 27 32            |               |                |                |                |                                        |
| 392 | 31           | iP Z                              | 02 16 49         |               |                |                |                | Compression.                           |
|     |              | eS N                              | 18 19            |               |                |                |                | H = 02 14 52                           |
|     |              | iX NN <sub>1</sub>                | 19 10            |               |                |                |                | $\Delta$ = 910Km.                      |
|     |              |                                   |                  |               |                |                |                | Eyre's Peninsular,<br>South Australia. |

(J.M. RAYNER - DIRECTOR)



COMMONWEALTH OF AUSTRALIA  
DEPARTMENT OF NATIONAL DEVELOPMENT  
BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

203 Collins Street,  
MELBOURNE. VIC.

PROVISIONAL SEISMOLOGICAL BULLETIN

MELBOURNE

Latitude: 37° 49' 53" S. Longitude: 144° 58' 24" E.

Height: 28m.

Foundation: Silurian Sandstone and Mudstone.

Instruments: Benioff Variable Reluctance Seismometers, 3 components,  
Seismometer periods: 1 sec.  
Short period recorder  
Galvanometer period: 0.2 sec. nominal  
Magnification: Vertical about 25,000 at 1 c.p.s.  
Horizontal about 17,000 at 1 c.p.s.  
Long period recorder  
Galvanometer period: 14 sec.  
Magnification: about 3750 at 1 c.p.s.  
Milne Shaw Seismograph, E-W component,  
Period: 12 sec.  
Damping Coefficient: 0.7  
Magnification: 250

| No. | Date<br>1960<br>SEPTEMBER | Phase                                           | Time<br>(G.M.T.)<br>h.m.s. | Per.<br>s. | Amplitude      |                |                | Remarks              |
|-----|---------------------------|-------------------------------------------------|----------------------------|------------|----------------|----------------|----------------|----------------------|
|     |                           |                                                 |                            |            | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                      |
| 393 | 1                         | iP Z                                            | 07 41 21                   | 0.7        |                |                | +              | USCGS: 27.6S, 176.9W |
|     |                           | ipP Z                                           | 42 57                      |            |                |                |                |                      |
| 394 | 1                         | eP Z                                            | 09 34 19                   | 2.2        |                |                |                | H = 09 28 13         |
|     |                           | eX Z                                            | 35 12                      |            |                |                |                | USCGS: 16.8S, 167.6E |
|     |                           | eS M N <sub>1</sub>                             | 39 12                      |            |                |                |                |                      |
| 395 | 1                         | eP Z                                            | 10 41 03                   | 2.2        |                |                |                | H = 09 35 02         |
|     |                           | eX Z <sub>1</sub>                               | 44 51                      |            |                |                |                | USCGS: 16.5S, 167.6E |
|     |                           | eS N <sub>1</sub>                               | 45 53                      |            |                |                |                |                      |
|     |                           | isS N <sub>1</sub>                              | 46 25                      |            |                |                |                |                      |
| 396 | 1                         | eP Z                                            | 12 04 36                   | 0.8        |                |                |                | USCGS: 27.7S, 176.2E |
| 397 | 1                         | eP Z                                            | 18 48 37                   |            |                |                |                | USCGS: 15.8S, 179E   |
| 398 | 1                         | iP Z                                            | 20 09 22                   |            |                |                | -              | USCGS: 16.1S, 179.6W |
|     |                           | esP Z                                           | 10 13                      |            |                |                |                |                      |
|     |                           | iPP Z                                           | 11 03                      |            |                |                |                |                      |
|     |                           | eS M                                            | 15(27)                     |            |                |                |                |                      |
| 399 | 2                         | iP Z                                            | 10 58 16                   | 0.9        |                |                | -              | USCGS: 15.2S, 167.4E |
| 400 | 3                         | iP E N Z                                        | 12 47 32                   | 0.7        | -              |                | +              | Δ = 3580Km.          |
|     |                           | ipP E <sub>1</sub> Z                            | 48 51                      |            |                |                |                | h = 420Km.           |
|     |                           | iPP E <sub>1</sub> N <sub>1</sub>               | 49 04                      |            |                |                |                | H = 12 41 39         |
|     |                           | ePcP E <sub>1</sub>                             | 50 01                      |            |                |                |                | USCGS: 6.1S, 154.5E  |
|     |                           | iX E <sub>1</sub>                               | 50 41                      |            |                |                |                |                      |
|     |                           | iS E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub> | 52 15                      |            |                |                |                |                      |
|     |                           | iX E <sub>1</sub> Z <sub>1</sub>                | 52 20                      |            |                |                |                |                      |
|     |                           | iScP E <sub>1</sub> Z <sub>1</sub>              | 53 10                      |            |                |                |                |                      |
|     |                           | eSS N <sub>1</sub>                              | 54(44)                     |            |                |                |                |                      |



| No. | Date<br>1960<br>SEPTEMBER | Phase                                      | Time<br>(G.M.T.)<br>h. m. s.                                                                                                               | Per.<br>s. | Amplitude      |                |                | Remarks                                                                       |
|-----|---------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|----------------|----------------|-------------------------------------------------------------------------------|
|     |                           |                                            |                                                                                                                                            |            | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                               |
| 401 | 3                         | iP                                         | EE <sub>1</sub> Z                                                                                                                          |            |                |                |                | USCGS: 20.1S, 178.6W                                                          |
| 402 | 3                         | eP                                         | Z                                                                                                                                          |            |                |                |                | USCGS: 34.7S, 179.7W                                                          |
| 403 | 3                         | iP<br>eX                                   | E N Z<br>N <sub>1</sub>                                                                                                                    | 1.5        | +              | +              | +              | USCGS: 48.5S, 126.3E                                                          |
| 404 | 3                         | eP<br>eX                                   | Z<br>N Z                                                                                                                                   |            |                |                |                | USCGS: 44.6N, 149.1E                                                          |
|     | 4                         | eSKS                                       | Z <sub>1</sub>                                                                                                                             |            |                |                |                |                                                                               |
| 405 | 5                         | iP                                         | Z                                                                                                                                          | 1          |                |                | +              | USCGS: 48.9S, 121.2E                                                          |
| 406 | 6                         | iP                                         | Z                                                                                                                                          |            |                |                |                | USCGS: 34.0S, 179.2W                                                          |
| 407 | 6                         | iP                                         | Z                                                                                                                                          |            |                |                | -              | USCGS: 35.7S, 179.3E                                                          |
| 408 | 6                         | iP<br>iX<br>eS                             | Z<br>Z<br>E <sub>1</sub>                                                                                                                   |            |                |                | -              | USCGS: 20.4S, 169.4E                                                          |
| 409 | 7                         | iP                                         | Z                                                                                                                                          |            |                |                | -              |                                                                               |
| 410 | 7                         | eP                                         | Z                                                                                                                                          |            |                |                |                | USCGS: 0, 125.0E                                                              |
| 411 | 7                         | iP                                         | Z                                                                                                                                          |            |                |                | -              | USCGS: 44.3N, 149.1E                                                          |
| 412 | 8                         | iP<br>ipP<br>iPP                           | Z<br>Z<br>N                                                                                                                                | 1          | -              | -              | +              | USCGS: 6.2N, 126.2E                                                           |
| 413 | 8                         | iP                                         | Z                                                                                                                                          |            |                |                | -              | USCGS: 52.5N, 158.8E                                                          |
| 414 | 10                        | iP<br>iX<br>ipP<br>iS<br>iSP<br>iScS<br>iX | E N ZZ <sub>1</sub><br>Z<br>Z<br>E <sub>1</sub> MNN <sub>1</sub><br>EE <sub>1</sub> ZZ <sub>1</sub><br>N<br>E <sub>1</sub> NN <sub>1</sub> | 1          | -              | +              | +              | $\Delta = 5270\text{Km.}$<br>h = 692Km. H = 10 44 52<br>USCGS: 4.0N 122.6E    |
| 415 | 10                        | eP                                         | Z                                                                                                                                          |            |                |                |                | USCGS: 12.2S, 163.1E                                                          |
| 416 | 10                        | eP                                         | Z                                                                                                                                          |            |                |                |                | USCGS: 6.6N, 93.8E                                                            |
| 417 | 11                        | eP                                         | Z                                                                                                                                          |            |                |                |                | USCGS: 33.5N, 179.1W                                                          |
| 418 | 12                        | eP<br>ipP                                  | Z<br>N ZZ <sub>1</sub>                                                                                                                     |            |                |                |                | USCGS: 27.3N, 128.4E                                                          |
| 419 | 12                        | eP<br>ipP<br>iX<br>iS                      | ZZ <sub>1</sub><br>Z<br>Z<br>EE <sub>1</sub>                                                                                               | 0.7        | +              | -              | -              | $\Delta = 4480\text{Km.}$<br>h = 686Km. H = 16 02 10.5<br>USCGS: 7.0S, 117.0E |
| 420 | 14                        | iP                                         | Z                                                                                                                                          | 0.8        | -              |                | -              | USCGS: 17.5S, 173.9W                                                          |
| 421 | 15                        | iP<br>iPcP                                 | N Z<br>Z                                                                                                                                   |            |                |                |                | USCGS: 21.4N, 142.9E                                                          |
| 422 | 17                        | eP                                         | N Z <sub>1</sub>                                                                                                                           |            |                |                |                | USCGS: 49.3N, 155.4E                                                          |
| 423 | 17                        | iP                                         | N Z <sub>1</sub>                                                                                                                           |            |                |                |                | USCGS: 49.4N, 155.2E                                                          |
| 424 | 17                        | eL                                         | E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub>                                                                                               |            |                |                |                |                                                                               |





| No. | Date<br>1960<br>SEPTEMBER | Phase                                         | Time<br>(G.M.T.)<br>h. m. s.                                                                                                                                            | Per.<br>s.                                                     | Amplitude      |                |                | Remarks |                                 |
|-----|---------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------|----------------|----------------|---------|---------------------------------|
|     |                           |                                               |                                                                                                                                                                         |                                                                | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |         |                                 |
| 425 | 18                        | iP<br>eS<br>ePcS<br>eL<br>eScS                | EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>N <sub>1</sub><br>EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>E <sub>1</sub> | 09 47 09<br>52 24<br>53 24<br>54 00<br>57 19                   | 1.3            | +              | -              | -       | USCGS: 6.8S, 129.2E             |
| 426 | 19                        | e                                             | M                                                                                                                                                                       | 03 57 48                                                       |                |                |                |         | USCGS: 15.6N, 120.0E            |
| 427 | 20                        | iP                                            | Z                                                                                                                                                                       | 00 48 06                                                       | 1.0            |                |                |         | USCGS: 29.8S, 177.9W            |
| 428 | 20                        | iP                                            | Z                                                                                                                                                                       | 03 10 17                                                       |                |                |                | -       | USCGS: 36.9S, 177.2E            |
| 429 | 20                        | eP<br>iX                                      | Z<br>N Z                                                                                                                                                                | 03 42 03<br>42 10                                              |                |                |                |         | USCGS: 28.2S, 177.9W            |
| 430 | 21                        | iP                                            | Z                                                                                                                                                                       | 07 31 40                                                       |                |                |                |         | USCGS: 27.9S, 177.8W            |
| 431 | 21                        | iP<br>iX                                      | N Z<br>Z                                                                                                                                                                | 16 18 48<br>19 08                                              |                |                |                |         |                                 |
| 432 | 22                        | eL                                            | E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub>                                                                                                                            | 10 02 ..                                                       |                |                |                |         | USCGS: 3.3S, 29.3E              |
| 433 | 23                        | iP<br>iS                                      | Z<br>E                                                                                                                                                                  | 06 09 10.5<br>09 29.2                                          |                |                |                |         | Δ = 169Km.<br>Small local shock |
| 434 | 23                        | eL                                            | N                                                                                                                                                                       | 23 23 ..                                                       |                |                |                |         | USCGS: 22.2S, 174.8W            |
| 435 | 27                        | iP<br>iX                                      | Z<br>Z                                                                                                                                                                  | 07 25 09<br>25 16                                              |                |                |                |         | USCGS: 00.9S, 134.5E            |
| 436 | 27                        | iP                                            | N Z                                                                                                                                                                     | 18 44 54                                                       |                |                |                | +       | USCGS: 14.4N, 145.8E            |
| 437 | 28                        | iP                                            | E N Z                                                                                                                                                                   | 17 41 21                                                       | 0.9            | -              | -              | +       | USCGS: 18S, 178.8W              |
| 438 | 29                        | iP<br>ePP<br>iPPP<br>iScP<br>iS<br>iSP<br>isS | Z<br>Z <sub>1</sub><br>Z<br>ZZ <sub>1</sub><br>E <sub>1</sub> M N <sub>1</sub> ZZ <sub>1</sub><br>Z <sub>1</sub><br>N <sub>1</sub>                                      | 11 27 59<br>30 12<br>31 30<br>32 06<br>35 20<br>35 30<br>38 11 |                |                |                | -       | USCGS: 18.9N, 144.7E            |



International  
Seismological  
Centre

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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

203 Collins Street,  
MELBOURNE. VIC.

PROVISIONAL SEISMOLOGICAL BULLETIN

MELBOURNE



Latitude:  $37^{\circ} 49' 53''$  S. Longitude:  $144^{\circ} 58' 24''$  E. Height: 28m.

Foundation: Silurian Sandstone and Mudstone.

Instruments: Benioff Variable Reluctance Seismometers, 3 components  
Seismometer periods: 1 sec.

Short period recorder:  
Galvanometer period: 0.2 sec. nominal  
Magnification: Vertical about 25,000 at 1 c.p.s.  
Horizontal about 17,000 at 1 c.p.s.

Long period recorder  
Galvanometer period: 14 sec.  
Magnification: about 3750 at 1 c.p.s.

Milne Shaw Seismograph, E-W component,  
Period: 12 sec.  
Damping Coefficient: 0.7  
Magnification: 250

| No. | Date<br>1960<br>OCTOBER | Phase                                                                                                                                                        | Time<br>(G.M.T.)<br>h. m. s. | Per.<br>s.                                                                                | Amplitude |       |       | Remarks                                                                 |
|-----|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------|-----------|-------|-------|-------------------------------------------------------------------------|
|     |                         |                                                                                                                                                              |                              |                                                                                           | $A_N$     | $A_E$ | $A_Z$ |                                                                         |
| 439 | 1                       | iP                                                                                                                                                           | Z                            | 03 12 42                                                                                  |           |       |       | USCGS: 23.3N,94.6E                                                      |
| 440 | 2                       | iP                                                                                                                                                           | Z                            | 16 40 14                                                                                  | 0.8       |       | -     | USCGS: 3.1N,127.7E                                                      |
| 441 | 2                       | iP                                                                                                                                                           | Z                            | 18 19 37.5                                                                                | 1.0       |       | +     | USCGS: 18.6N,94.9E                                                      |
| 442 | 3                       | iP<br>eLg ? $E_1 M$                                                                                                                                          | Z                            | 10 19 01                                                                                  |           |       |       | USCGS: 3.3S,137.8E                                                      |
| 443 | 3                       | eP                                                                                                                                                           | Z                            | 19 59 49                                                                                  |           |       |       | USCGS: 5.7S,103.0E                                                      |
| 444 | 4                       | eP<br>eS $N_1$                                                                                                                                               | Z                            | 09 57 29<br>10 02 41                                                                      |           |       |       | USCGS: 7.5S,155.3E                                                      |
| 445 | 5                       | iP                                                                                                                                                           | Z                            | 21 14 43                                                                                  | 1.0       |       | -     | $\Delta$ = 4350Km.<br>h = 670Km.<br>H = 21 08 08                        |
| 446 | 7                       | eiP $EE_1 NN_1 ZZ_1$<br>ipP $Z_1$<br>eX $E_1$<br>iS $N_1$<br>e(ScP) $E N_1 Z$<br>(PcS)                                                                       |                              | 15 25 03<br>25 13<br>30 18<br>30 23<br>31 30                                              | 1.1       |       |       | $\Delta$ = 3740Km.<br>h = 30Km.<br>H = 15 18 23<br>USCGS: 7.4S,130.7E   |
| 447 | 8                       | iP $MNN_1 ZZ_1$<br>ipP $ZZ_1$<br>ePP $Z_1$<br>iS $E_1 M N_1$<br>iScS $E_1$<br>i(SKS) $N_1 Z_1$<br>e(SPP) $Z_1$<br>i(PS) $E_1$<br>i(PPS) $N_1$<br>isS $E_1 M$ |                              | 06 04 07<br>06 17<br>07 19<br>13 19<br>13 38<br>14 01<br>14 40<br>16 00<br>16 25<br>17 00 | 0.8       | (-)   | +     | $\Delta$ = 8820Km.<br>h = 610Km.<br>H = 05 53 02<br>USCGS: 40.0N,129.7E |



| No. | Date<br>1960<br>OCTOBER | Phase                                                                                                                                                                            | Time<br>(G.M.T.)<br>h. m. s.                                                                       | Per.<br>s. | Amplitude      |                |                | Remarks                                                          |
|-----|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------|----------------|----------------|----------------|------------------------------------------------------------------|
|     |                         |                                                                                                                                                                                  |                                                                                                    |            | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                  |
| 448 | 8                       | eP<br>eX<br>E                                                                                                                                                                    | Z<br>45 45                                                                                         |            |                |                |                | USCGS: 35.9S, 176.9E                                             |
| 449 | 8                       | iP<br>epP<br>eL<br>M                                                                                                                                                             | Z<br>Z<br>21 15 ..                                                                                 | 1.3        |                |                | -              | USCGS: 7.9S, 92.9E                                               |
| 450 | 9                       | iP<br>iX<br>ePP<br>eS<br>E N                                                                                                                                                     | ZZ <sub>1</sub><br>Z<br>ZZ <sub>1</sub><br>N <sub>1</sub><br>09 12 31<br>12 56.5<br>15 25<br>22 18 | 1.5        |                |                | +              | USCGS: 40.8N, 141.2E                                             |
| 451 | 10                      | eL<br>M                                                                                                                                                                          | 15 12 ..                                                                                           |            |                |                |                |                                                                  |
| 452 | 13                      | eP<br>iSKS<br>iS<br>isS<br>N <sub>1</sub><br>E <sub>1</sub> M N <sub>1</sub><br>E <sub>1</sub>                                                                                   | Z<br>16 16<br>16 58<br>17 17                                                                       |            |                |                |                | USCGS: 54.8N, 161.2E                                             |
| 453 | 13                      | iP<br>ipP<br>iX<br>N Z                                                                                                                                                           | 18 47 03<br>47 47<br>47 54                                                                         | 1.0        |                |                | +              | USCGS: 3.8S, 152.4E                                              |
| 454 | 14                      | iP<br>iPcP<br>E N                                                                                                                                                                | ZZ <sub>1</sub><br>Z<br>15 37 04<br>38 37                                                          | 0.9        |                |                | +              | USCGS: 4.8N, 125.5E                                              |
| 455 | 14                      | eP<br>iX<br>iX<br>iX<br>N <sub>1</sub><br>E <sub>1</sub>                                                                                                                         | Z<br>Z <sub>1</sub><br>Z <sub>1</sub><br>37 28                                                     |            |                |                | +              | USCGS: 51.7N, 172.1W                                             |
| 456 | 16                      | iP                                                                                                                                                                               | Z<br>04 59 49                                                                                      |            |                |                |                | USCGS: 22.9S, 179.3E                                             |
| 457 | 20                      | iP<br>iPcP<br>eS<br>eSS<br>eX<br>EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>N <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub>                                              | 11 12 25<br>15 14<br>17 38<br>19(10)<br>20 42                                                      | 1.3        | +              | +              | -              | USCGS: 11.0S, 164.9E                                             |
| 458 | 20                      | iP*, Pn<br>iPg<br>iS*<br>iSn, Sg<br>E N Z<br>E N Z<br>E                                                                                                                          | 20 22 29.5<br>22 34.5<br>22 48.4<br>22 50.9                                                        |            |                |                | -              | Δ = 156Km. Local shock near Pt. Welshpool, Gippsland.            |
| 459 | 21                      | iP<br>iX<br>N Z<br>N Z                                                                                                                                                           | 06 32 02<br>33 23                                                                                  | 0.7        | +              |                | +              | USCGS: 6.9S, 127.6E                                              |
| 460 | 21                      | iP*, Pn<br>iS*<br>iX<br>iX<br>iX<br>E N Z<br>E N Z<br>E <sub>1</sub> N <sub>1</sub><br>N <sub>1</sub>                                                                            | 14 48 25.4<br>48 44.5<br>48 48.0<br>49 11.5<br>49 37.0                                             |            |                |                |                | Δ = 158Km. Local shock, near Pt. Welshpool, Gippsland.           |
| 461 | 21                      | iPn, P*<br>iS*<br>iSn, Sg<br>iX<br>E N Z<br>E N Z<br>Z                                                                                                                           | 18 29 11.0<br>29 30.2<br>29 32.0<br>29 36.6                                                        |            |                |                |                | Δ = 158Km. After-shock of 460.                                   |
| 462 | 22                      | iP<br>ipP<br>isP<br>iS<br>e(PcS)<br>iSS<br>i(G)<br>EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>Z<br>N <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub><br>EE <sub>1</sub> | 08 28 14.6<br>28 33.6<br>28 46<br>33 23<br>34 22<br>35 32<br>36 08                                 | 1.7        | -              | -              | +              | Δ = 3620Km.<br>h = 80Km.<br>H = 08 21 52<br>USCGS: 10.3S, 161.2E |



| No. | Date<br>1960<br>OCTOBER | Phase                                              | Time<br>(G.M.T.)<br>h. m. s.                                                                                                                 | Per.<br>s.                                                                  | Amplitude      |                |                | Remarks                                                                     |
|-----|-------------------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------|----------------|----------------|-----------------------------------------------------------------------------|
|     |                         |                                                    |                                                                                                                                              |                                                                             | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                             |
| 463 | 22                      | eP*, Pn<br>iPg<br>iS*<br>iSn, Sg<br>iX<br>eX       | E N Z<br>E Z<br>E N Z<br>E<br>E Z<br>E Z                                                                                                     | 16 07 23.3<br>07 25.1<br>07 42.4<br>07 43.3<br>07 49.1<br>08 11.8           |                |                |                | $\Delta = 158\text{Km.}$ Local shock, same as No.460.                       |
| 464 | 24                      | iP<br>eX<br>ipP                                    | E N Z<br>N Z<br>Z                                                                                                                            | 05 18 06.6<br>18 12<br>18 36                                                | 0.9            |                |                | USCGS: 15.0S 167.4E                                                         |
| 465 | 24                      | eX<br>eL                                           | E <sub>1</sub> M<br>E <sub>1</sub> N <sub>1</sub>                                                                                            | 17 20 42<br>27 ..                                                           |                |                |                | USCGS: 6.0S, 150.0E                                                         |
| 466 | 26                      | iP<br>iX                                           | E N Z<br>N                                                                                                                                   | 17 41 00.0<br>41 09.3                                                       | 0.6            | +              | -              | USCGS: 17.8S, 178.6W                                                        |
| 467 | 26                      | iP                                                 | E N Z                                                                                                                                        | 19 59 27.2                                                                  | 1.0            | +              | -              | USCGS: 2.0S, 125.9E                                                         |
| 468 | 27                      | iP                                                 | Z                                                                                                                                            | 19 49 29.8                                                                  | 0.9            |                | -              | USCGS: 6.3S, 154.7E                                                         |
| 469 | 27                      | iP<br>iX<br>i(pP)<br>iS<br>eX                      | E N Z<br>E Z<br>Z<br>E <sub>1</sub> N <sub>1</sub><br>E N <sub>1</sub> Z                                                                     | 22 35 25.0<br>35 33<br>36 07.3<br>41 22<br>41 29                            | 0.7            | +              | -              | USCGS: 15.2S, 175.0W                                                        |
| 470 | 28                      | iPKP                                               | N <sub>1</sub> Z                                                                                                                             | 04 38 22.2                                                                  | 1.0            |                | +              | USCGS: 71.3N, 8.6W                                                          |
| 471 | 28                      | iP<br>ipP<br>esP<br>iX<br>eSKS<br>iS<br>epS<br>isS | N ZZ <sub>1</sub><br>N ZZ <sub>1</sub><br>Z<br>Z<br>N <sub>1</sub><br>EE <sub>1</sub> M N <sub>1</sub><br>N <sub>1</sub><br>E <sub>1</sub> M | 13 31 08.5<br>31 37.8<br>31 45<br>32 02<br>41 25<br>41 57<br>42 37<br>42 44 | 1.0            |                | +              | $\Delta = 9990\text{Km.}$<br>h = 96Km. H = 13 18 20<br>USCGS: 52.0N, 141.1E |
| 472 | 28                      | eP<br>eS                                           | Z<br>E <sub>1</sub> N <sub>1</sub>                                                                                                           | 22 40 57<br>50 13                                                           |                |                |                | USCGS: 34.4N, 141.1E                                                        |
| 473 | 29                      | eP                                                 | E ZZ <sub>1</sub>                                                                                                                            | 09 45 37                                                                    | 1.0            |                |                | USCGS: 15.8S, 172.9W                                                        |
| 474 | 30                      | iP<br>ipP<br>iX                                    | Z<br>Z<br>E                                                                                                                                  | 15 58 28.6<br>58 43.8<br>59 11                                              | 1.0            |                | +              | USCGS: 1.0S, 127.0E                                                         |

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MELBOURNE

Latitude:  $37^{\circ} 49' 53''$  S.      Longitude:  $144^{\circ} 58' 24''$  E.      Height: 28m.

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Short period recorder:  
Galvanometer period: 0.2 sec. nominal  
Magnification: Vertical about 25,000 at 1 c.p.s.  
Horizontal about 17,000 at 1 c.p.s.  
Long period recorder  
Galvanometer period: 14 sec.  
Magnification: about 3750 at 1 c.p.s.  
Milne Shaw Seismograph, E-W component,  
Period: 12 sec.  
Damping Coefficient: 0.7  
Magnification: 250

| No. | Date<br>1960<br>NOVEMBER | Phase                                                                    | Time<br>(G.M.T.)<br>h. m. s.                                                                                                                                                                                                           | Per.<br>s.                                                                                                          | Amplitude      |                |                | Remarks             |                                                                                  |
|-----|--------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|---------------------|----------------------------------------------------------------------------------|
|     |                          |                                                                          |                                                                                                                                                                                                                                        |                                                                                                                     | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                     |                                                                                  |
| 475 | 1                        | eP<br>ePP                                                                | ZZ <sub>1</sub><br>ZZ <sub>1</sub>                                                                                                                                                                                                     | 08 59 22<br>09 03 17                                                                                                |                |                |                | USCGS: 38.4S, 74.4W |                                                                                  |
| 476 | 2                        | iP<br>iX<br>ipP<br>iX<br>iX<br>iX<br>iPcP<br>iS<br>iX<br>iX<br>iSS<br>iL | E <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>E N Z<br>E Z<br>Z<br>Z <sub>1</sub><br>Z<br>Z<br>E <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>N <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub> | 17 21 18.0<br>21 19.5<br>21 29<br>22 18<br>22 27<br>23 26.5<br>24 08.5<br>26 31<br>26 34<br>27 06<br>28 36<br>30 16 | 0.8            | +              | +              | -                   | $\Delta = 3620\text{Km.}$<br>h = 40Km.<br>H = 17 14 47.5<br>USCGS: 10.9S, 164.9E |
| 77  | 3                        | eL                                                                       | N <sub>1</sub>                                                                                                                                                                                                                         | 03 03 $\frac{1}{2}$                                                                                                 |                |                |                |                     | USCGS: 22.1S, 175.1W                                                             |
| 78  | 4                        | eiP<br>epP                                                               | ZZ <sub>1</sub><br>Z                                                                                                                                                                                                                   | 14 25 49.5<br>26 01.5                                                                                               | 0.8            |                |                |                     | USCGS: 1.1S, 126.5E                                                              |
| 79  | 6                        | eP<br>ipP<br>eS                                                          | Z<br>ZZ <sub>1</sub><br>E <sub>1</sub>                                                                                                                                                                                                 | 04 51 23.2<br>51 34.1<br>05 02 22                                                                                   |                |                |                |                     | $\Delta = 1030\text{Km.}$<br>h normal.<br>H = 04 38 14<br>USCGS: 53.0N, 159.8E   |



| No. | Date<br>1960<br>NOVEMBER | Phase                                                      | Time<br>(G.M.T.)<br>h. m. s.                                                                                                                                                                                             | Per.<br>s.                                                                                     | Amplitude      |                |                | Remarks                                                                                                                                                                                      |
|-----|--------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |                          |                                                            |                                                                                                                                                                                                                          |                                                                                                | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                                                                                                                                              |
| 480 | 6                        | iP<br>iX<br>iX<br>iX<br>eX<br>eX<br>iS<br>iLq<br>eX<br>eLr | Z<br>EE <sub>1</sub> ZZ <sub>1</sub><br>NN <sub>1</sub><br>Z<br>E <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub><br>N <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub> Z <sub>1</sub>                                  | 06 21 11.5<br>21 12.5<br>21 16<br>21 21.0<br>22 39<br>25 27<br>26 20<br>28 57<br>29 20<br>30.5 |                | +              | +              | USCGS: 31.0S, 177.7W                                                                                                                                                                         |
| 481 | 7                        | e(S)<br>eLq                                                | N <sub>1</sub><br>M                                                                                                                                                                                                      | 16 38 15<br>40 40                                                                              |                |                |                | USCGS: 10.7S, 163.0E                                                                                                                                                                         |
| 482 | 8                        | iP<br>e(pP)<br>eX                                          | Z<br>E ZZ <sub>1</sub><br>E Z                                                                                                                                                                                            | 00 02 56.8<br>03 06<br>03 36                                                                   |                |                | -              | USCGS: 30.6S, 177.5W                                                                                                                                                                         |
| 483 | 8                        | iP<br>epP                                                  | E Z<br>Z                                                                                                                                                                                                                 | 11 06 07<br>06 19                                                                              | 0.7            |                | -              | USCGS: 31.1S, 177.6W                                                                                                                                                                         |
| 484 | 9                        | iP<br>iX<br>ipP<br>isP<br>iPP<br>iS<br>iSP<br>iSS          | NN <sub>1</sub> Z<br>EE <sub>1</sub><br>Z <sub>1</sub><br>N Z<br>N <sub>1</sub> Z <sub>1</sub><br>E <sub>1</sub> M Z <sub>1</sub><br>Z <sub>1</sub><br>N <sub>1</sub>                                                    | 03 30 15.0<br>30 20.0<br>30 25.5<br>30 28.5<br>33 29<br>40 26<br>40 54<br>45 55                | 0.9            |                | +              | Δ = 9000Km.<br>Normal depth.<br>H = 03 18 02<br>USCGS: 60.7S, 24.8W                                                                                                                          |
| 485 | 9                        | iP<br>iS ?                                                 | ZZ <sub>1</sub><br>N <sub>1</sub>                                                                                                                                                                                        | 10 55 54.7<br>11 05 50                                                                         | 0.8            |                | -              | USCGS: 32.7N, 103.4E                                                                                                                                                                         |
| 486 | 9                        | iP                                                         | E Z                                                                                                                                                                                                                      | 19 39 00.6                                                                                     | 0.9            |                | -              | USCGS: 30.7S, 177.1W                                                                                                                                                                         |
| 487 | 9                        | eL                                                         | E <sub>1</sub>                                                                                                                                                                                                           | 21 06.1                                                                                        |                |                |                | USCGS: 23.2S, 70.6W                                                                                                                                                                          |
| 488 | 10                       | iP<br>iX<br>iX<br>iS<br>iScP<br>iPcS<br>iSS<br>e(SSS)      | EE <sub>1</sub> MNN <sub>1</sub> ZZ <sub>1</sub><br>N <sub>1</sub><br>E<br>E <sub>1</sub> MNN <sub>1</sub> Z<br>ZZ <sub>1</sub><br>E <sub>1</sub> M N <sub>1</sub><br>E <sub>1</sub> M N <sub>1</sub><br>EE <sub>1</sub> | 14 51 43.8<br>52 14.5<br>57 09<br>57 15<br>57 46<br>57 50<br>59 11<br>15 00 05                 | 1              | -              | +              | USCGS: 2.6S, 139.4E                                                                                                                                                                          |
| 489 | 10                       | e(PP)                                                      | ZZ <sub>1</sub>                                                                                                                                                                                                          | 16 36 04                                                                                       |                |                |                | USCGS: 22.0S, 171.6E                                                                                                                                                                         |
| 490 | 12                       | iP<br>i(S)<br>eX<br>eL                                     | Z<br>N Z<br>N<br>E N Z                                                                                                                                                                                                   | 23 05 09.7<br>06 52<br>07 09<br>07 30                                                          |                |                |                | Δ = 949Km.<br>h = 185Km.<br>H = 23 03 08<br>About 12 miles S.E.<br>of Lock, Eyre Penin-<br>sula, S.Aust. depth<br>= 185Km. from reading<br>at Adelaide. Only<br>other record is<br>Canberra. |





| No. | Date<br>1960<br>NOVEMBER | Phase                                                                                         | Time<br>(G.M.T.)<br>h. m. s.                                                                                                                                                                                                                                                                                                                           | Per.<br>s.                                                                                                                           | Amplitude      |                |                | Remarks               |
|-----|--------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|-----------------------|
|     |                          |                                                                                               |                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                      | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                       |
| 491 | 13                       | iP<br>iX<br>iX<br>iPP<br>iX<br>eScP<br>iS<br>i(PS)(sS)<br>eX<br>iSS<br>eX<br>iScS<br>iX<br>eL | EE <sub>1</sub> MN <sub>1</sub> ZZ <sub>1</sub><br>Z <sub>1</sub><br>N <sub>1</sub><br>M N <sub>1</sub> ZZ <sub>1</sub><br>E <sub>1</sub> M<br>Z<br>EE <sub>1</sub> M N <sub>1</sub> Z <sub>1</sub><br>E <sub>1</sub><br>M N <sub>1</sub><br>E <sub>1</sub> M<br>N <sub>1</sub><br>E <sub>1</sub> M Z <sub>1</sub><br>E <sub>1</sub><br>N <sub>1</sub> | 06 44 58.6<br>45 07<br>45 17<br>46 37<br>50 28<br>50 31<br>51 10.2<br>51 50<br>52 07<br>54 14<br>54 29<br>54 31<br>55 18<br>07 00 .. |                |                |                | USCGS: 1.4N, 127.2E   |
| 492 | 13                       | iP<br>iSKS<br>eS<br>eX<br>eSS<br>eX<br>iX<br>eL                                               | Z<br>E <sub>1</sub> M N <sub>1</sub> Z <sub>1</sub><br>E <sub>1</sub> M N <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>E <sub>1</sub> M<br>E <sub>1</sub><br>E <sub>1</sub> Z <sub>1</sub><br>N <sub>1</sub>                                                                                                                                       | 09 34 10.0<br>44 47<br>45 33<br>51 16<br>52 04<br>56 02<br>58 00<br>10 03 10                                                         |                |                |                | USCGS: 51.1N, 168.8W  |
| 493 | 15                       | eS<br>eL                                                                                      | E <sub>1</sub><br>E <sub>1</sub> M N <sub>1</sub>                                                                                                                                                                                                                                                                                                      | 06 33 22<br>37(20)                                                                                                                   |                |                |                | USCGS: 62.5N, 161.7W  |
| 494 | 15                       | eP<br>epP<br>eS                                                                               | Z<br>E <sub>1</sub> ZZ <sub>1</sub><br>E <sub>1</sub>                                                                                                                                                                                                                                                                                                  | 21 45 53<br>46 16<br>50 53                                                                                                           |                |                |                | USCGS: 35.0S, 178.4E  |
| 495 | 17                       | iP<br>ipP                                                                                     | E Z<br>Z                                                                                                                                                                                                                                                                                                                                               | 04 14 19.7<br>14 34.6                                                                                                                | 1.0            | +              |                | USCGS: 30.8S, 177.7W  |
| 496 | 17                       | iP<br>iX<br>iX<br>iX<br>iX<br>iX<br>iX                                                        | E N Z<br>N Z<br>Z<br>Z<br>Z<br>E N<br>N                                                                                                                                                                                                                                                                                                                | 05 06 42<br>06 57<br>07 05<br>07 16<br>07 26<br>07 33<br>07 39                                                                       | 0.8            | +              |                | Brisbane, Q'ld: Felt. |
| 497 | 19                       | iP<br>iX                                                                                      | Z<br>E N Z                                                                                                                                                                                                                                                                                                                                             | 07 11 25.5<br>11 26.0                                                                                                                | 0.7            | -              | -              | USCGS: 17.6S, 179.0W  |
| 498 | 20                       | iPP<br>iSKKS<br>eSP<br>ePS<br>eSS<br>e(SKKS)<br>eX<br>e(SKKS)<br>eX<br>eL                     | ZZ <sub>1</sub><br>E <sub>1</sub> M Z <sub>1</sub><br>Z <sub>1</sub><br>E <sub>1</sub> M N <sub>1</sub><br>N <sub>1</sub><br>E <sub>1</sub> M Z <sub>1</sub><br>N <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub>                                                                                     | 22 22 06.0<br>28 30<br>31 40<br>31 46<br>38 08<br>38 32<br>39 32<br>41 16<br>42 10<br>59 ..                                          |                |                |                | USCGS: 6.8S, 80.7W    |
| 499 | 22                       | eL                                                                                            | N <sub>1</sub>                                                                                                                                                                                                                                                                                                                                         | 03 53 $\frac{1}{2}$                                                                                                                  |                |                |                | USCGS: 7.0S, 80.8W    |



| No. | Date<br>1960<br>NOVEMBER | Phase                                                                      | Time<br>(G.M.T.)<br>h. m. s.                                                                                                                                                                                                                                                                                 | Per.<br>s.                                                                                                        | Amplitude      |                |                | Remarks                                                            |
|-----|--------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|--------------------------------------------------------------------|
|     |                          |                                                                            |                                                                                                                                                                                                                                                                                                              |                                                                                                                   | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                    |
| 500 | 22                       | eP<br>eL                                                                   | E<br>Z<br>Z <sub>1</sub>                                                                                                                                                                                                                                                                                     | 06 33 03.3<br>55 ..                                                                                               | 0.9            |                | -              | USCGS: 35.9S, 52.3E                                                |
| 501 | 23                       | iP<br>iX<br>isP<br>iS                                                      | N Z<br>Z<br>N Z<br>EE <sub>1</sub> NN <sub>1</sub>                                                                                                                                                                                                                                                           | 04 17 36.4<br>18 17.4<br>20 12<br>22 31                                                                           | 0.9            |                | -              | Δ = 3860Km.<br>h = 550Km.<br>H = 04 11 30.4<br>USCGS: 4.9s, 153.8E |
| 502 | 23                       | eP<br>iX<br>isP<br>iX<br>iX<br>iX<br>i(P)<br>iX<br>iX<br>i(S)<br>iSS<br>iX | E N Z<br>Z <sub>1</sub><br>N <sub>1</sub> Z<br>E N Z<br>N Z<br>E Z<br>EE <sub>1</sub> ZZ <sub>1</sub><br>N <sub>1</sub> Z <sub>1</sub><br>E <sub>1</sub> Z <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub><br>Z <sub>1</sub>                                                                    | 14 19 20.0<br>19 24<br>19 30<br>19 35.9<br>19 57.3<br>20 10<br>20 43<br>22 00<br>24 08<br>25 13<br>27 53<br>28 05 | 0.9            |                | (+)            | USCGS: 24.2S, 176.1W                                               |
| 503 | 23                       | iP                                                                         | EE <sub>1</sub> N <sub>1</sub> ZZ <sub>1</sub>                                                                                                                                                                                                                                                               | 17 00 26.7                                                                                                        | 0.8            | +              | +              | USCGS: 4.6N, 125.8E                                                |
| 504 | 23                       | eP                                                                         | Z                                                                                                                                                                                                                                                                                                            | 17 39 49.4                                                                                                        | 0.8            |                |                | USCGS: 24.5S, 176.4W                                               |
| 505 | 23                       | iP<br>iX<br>iX<br>eL                                                       | E<br>ZZ <sub>1</sub><br>ZZ <sub>1</sub><br>Z<br>N <sub>1</sub>                                                                                                                                                                                                                                               | 18 03 33.7<br>03 42.5<br>03 46.7<br>15 36                                                                         | 2              |                | -              | USCGS: 24.0S, 176.3W                                               |
| 506 | 24                       | eP<br>iX<br>esP<br>iPP<br>eS<br>eX<br>eX<br>ePcS<br>eX<br>eX<br>eScS       | N<br>ZZ <sub>1</sub><br>Z<br>Z <sub>1</sub><br>N <sub>1</sub> Z <sub>1</sub><br>N <sub>1</sub> Z <sub>1</sub><br>EE <sub>1</sub> M<br>E <sub>1</sub> M N <sub>1</sub><br>NN <sub>1</sub> ZZ <sub>1</sub><br>Z <sub>1</sub><br>N <sub>1</sub><br>EE <sub>1</sub> M                                            | 04 56 52.9<br>57 03.6<br>57 27<br>58 11<br>05 02 12<br>02 14<br>02 43<br>03 12<br>04 45<br>05 32<br>07 13         | 0.9            |                |                | USCGS: 4.6S, 153.0E                                                |
| 507 | 24                       | iP<br>ipP<br>iPP<br>iX<br>i(S)<br>iScP<br>iX<br>eX<br>eL, SS               | EE <sub>1</sub> M N N <sub>1</sub> ZZ <sub>1</sub><br>Z <sub>1</sub><br>EE <sub>1</sub> M N <sub>1</sub> ZZ <sub>1</sub><br>N <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub> | 06 59 40<br>59 48<br>07 01 13<br>03 00<br>05(12)<br>05 24<br>06 55<br>07 35<br>08(10)                             | 1.0<br><br>3   |                | +0.08          | USCGS: 24.2S, 176.1W                                               |
| 508 | 24                       | iP                                                                         | E Z                                                                                                                                                                                                                                                                                                          | 08 23 44.3                                                                                                        | 0.9            |                | +              | USCGS: 24.4S, 176.3W                                               |
| 509 | 24                       | eP                                                                         | Z                                                                                                                                                                                                                                                                                                            | 08 33 13                                                                                                          |                |                |                | USCGS: 24.5S, 175.9W                                               |





| No. | Date<br>1960<br>NOVEMBER | Phase    | Time<br>(G.M.T.)<br>h. m. s.         | Per.<br>s.          | Amplitude      |                |                | Remarks                                                                     |
|-----|--------------------------|----------|--------------------------------------|---------------------|----------------|----------------|----------------|-----------------------------------------------------------------------------|
|     |                          |          |                                      |                     | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                             |
| 510 | 24                       | eP       | Z                                    | 09 35 11            |                |                |                | USCGS: 24.1S, 176.6W                                                        |
| 511 | 26                       | iP<br>iS | N ZZ <sub>1</sub><br>E <sub>1</sub>  | 18 24 15.4<br>27 16 | 1.3            | (-)            | -              | USCGS: 53.9S, 141.5E                                                        |
| 512 | 27                       | iP       | Z                                    | 07 24 56.8          | 0.8            |                | -              | USCGS: 23.3S, 179.7W                                                        |
| 513 | 27                       | iP       | ZZ <sub>1</sub>                      | 15 29 18.6          | 1.3            |                | +              | USCGS: 42.8S, 143.3E                                                        |
| 514 | 27                       | iP<br>eL | Z<br>E <sub>1</sub> M N <sub>1</sub> | 19 03 29.3<br>08 19 |                |                | -              | USCGS: About 400<br>miles West of<br>Macquarie Is. region<br>say 54S, 150E. |
| 515 | 27                       | eL       | E <sub>1</sub> M                     | 20 59 06            |                |                |                | Probably same place<br>as No. 514.                                          |
| 516 | 28                       | eX       | EE <sub>1</sub>                      | 02 58 33            |                |                |                | Possibly same shock<br>as Port Moresby -<br>eP 02 42 22<br>e(S) 46(04)      |
| 517 | 29                       | iP       | ZZ <sub>1</sub>                      | 07 20 09.7          |                |                | +              | USCGS: 24.9S, 180                                                           |

(J.M. RAYNER)  
DIRECTOR



COMMONWEALTH OF AUSTRALIA  
DEPARTMENT OF NATIONAL DEVELOPMENT  
BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

203 Collins Street,  
MELBOURNE. VIC.

PROVISIONAL SEISMOLOGICAL BULLETIN

MELBOURNE



Latitude:  $37^{\circ} 49' 53''$  S.      Longitude:  $144^{\circ} 58' 24''$  E.      Height: 28m

Foundation: Silurian Sandstone and Mudstone.

Instruments: Benioff Variable Reluctance Seismometers, 3 components  
Seismometer periods: 1 sec.  
Short period recorder:  
Galvanometer period: 0.2 sec. nominal  
Magnification: Vertical about 25,000 at 1 c.p.s.  
Horizontal about 17,000 at 1 c.p.s.

Long period recorder:  
Galvanometer period: 14 sec.  
Magnification: about 3750 at 1 c.p.s.

Milne Shaw Seismograph, E-W component,  
Period: 12 sec.  
Damping Coefficient: 0.7  
Magnification: 250

| No.  | Date<br>1960<br>DECEMBER | Phase                                                                     | Time<br>(G.M.T.)<br>h. m. s.                                                                                              | Per.<br>s.                                               | Amplitude      |                |                | Remarks              |
|------|--------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|----------------|----------------|----------------|----------------------|
|      |                          |                                                                           |                                                                                                                           |                                                          | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                      |
| 518  | 1                        | eP<br>eX<br>eX <sub>1</sub><br>e(S)<br>iX <sub>2</sub><br>eX <sub>2</sub> | Z<br>E N Z<br>E N ZZ <sub>1</sub><br>EE <sub>1</sub><br>EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>E <sub>1</sub> | 09 45 01.<br>45 32<br>45 48<br>50 18<br>51 50<br>55 41   | 1<br>1         |                |                | USCGS: 6.9S, 128.9E  |
| 519  | 1                        | iP                                                                        | (-) Z                                                                                                                     | 10 18 11.0                                               |                |                | +              | USCGS: 5.7S, 145.9E  |
| 520  | 1                        | eL                                                                        | E <sub>1</sub> N <sub>1</sub>                                                                                             | 21 45 ..                                                 |                |                |                | USCGS: 48.8N, 129.3W |
| 521  | 2                        | iP<br>eL<br>eL                                                            | N Z<br>E <sub>1</sub><br>N <sub>1</sub> Z <sub>1</sub>                                                                    | 04 43 55.0 (1.5)<br>53 $\frac{1}{2}$<br>56 $\frac{1}{2}$ |                |                | (+)            | USCGS: 6.6S, 152.5E  |
| 522  | 2                        | ePP<br>eSKS<br>ePS<br>eL                                                  | ZZ <sub>1</sub><br>M<br>E <sub>1</sub> M N <sub>1</sub><br>M                                                              | 09 30 03<br>36(14)<br>39 34<br>10 02 $\frac{1}{2}$       |                |                |                | USCGS: 24.5S, 69.9W  |
| 522A | 2                        | eX                                                                        | Z                                                                                                                         | 09 40 24                                                 |                |                |                |                      |
| 523  | 3                        | iP<br>iPP<br>eSKS<br>eS<br>eX                                             | E N ZZ <sub>1</sub><br>Z <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>E <sub>1</sub> N <sub>1</sub><br>N <sub>1</sub> | 04 37 10<br>40 35<br>47 38<br>47 59<br>49 06             | 1.9            | +              | -              | USCGS: 42.8N, 104.5E |



| No. | Date<br>1960<br>DECEMBER | Phase                                        | Time<br>(G.M.T.)<br>h. m. s.                                                                                                                             | Per.<br>s.                                                       | Amplitude      |                |                | Remarks             |
|-----|--------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------|----------------|----------------|---------------------|
|     |                          |                                              |                                                                                                                                                          |                                                                  | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                     |
| 523 | continued<br>Dec.3       | e(PS)<br>eSS<br>eX<br>e(Lq)<br>e(Lr)         | E <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub><br>E <sub>1</sub><br>N <sub>1</sub> Z <sub>1</sub>                                  | 04 49 11<br>53 50<br>55 47<br>05 10.5<br>17.7                    |                |                |                |                     |
| 524 | 4                        | iP<br>e(PP)                                  | Z<br>Z                                                                                                                                                   | 15 55 37.0<br>57 21                                              | 1              | (-)            | +              | USCGS: 1.1N,120.6E  |
| 525 | 6                        | eLq                                          | M                                                                                                                                                        | 09 49 ..                                                         |                |                |                | USCGS: 21.4S,69.0W  |
| 526 | 6                        | eP<br>e(pP)<br>eL                            | Z<br>Z<br>M                                                                                                                                              | 21 43 30<br>43 40<br>22 03 ..                                    | 1              |                |                | USCGS: 2.6S,101.5E  |
| 527 | 7                        | eP<br>epP<br>eX                              | Z<br>Z<br>Z                                                                                                                                              | 03 05 26<br>05 35<br>05 48                                       |                |                |                | USCGS: 35.7S,179.6W |
| 528 | 7                        | iP                                           | Z                                                                                                                                                        | 16 27 20.6                                                       | 1.1            |                | -              | USCGS: 1.2N,121.8E  |
| 529 | 8                        | eP                                           | Z                                                                                                                                                        | 01 07 15                                                         |                |                |                | USCGS: 35.2S,179.6W |
| 530 | 8                        | iP                                           | E N ZZ <sub>1</sub>                                                                                                                                      | 01 30 18                                                         | 1.0            |                | -0.05          | USCGS: 21.8S,179.4W |
| 531 | 8                        | iP                                           | E Z                                                                                                                                                      | 14 39 01.7                                                       | 0.8            |                | -0.02          | USCGS: 30.2S,178.2W |
| 532 | 8                        | eL                                           | Z                                                                                                                                                        | 19 21 08.1                                                       |                |                |                | USCGS: 9.8N,125.5E  |
| 533 | 8                        | iP                                           | Z                                                                                                                                                        | 21 43 11.2                                                       | 0.7            |                | +0.01          | USCGS: 6.2S,129.6E  |
| 534 | 10                       | e(P)<br>eL                                   | E <sub>1</sub> M<br>Z                                                                                                                                    | 13 40(24)<br>56.9                                                |                |                |                | USCGS: 15.0S,172.3W |
| 535 | 10                       | iP<br>iX                                     | E N ZZ <sub>1</sub><br>Z                                                                                                                                 | 14 02 56.0<br>03 02.8                                            | +              | -              | -1.5           | USCGS: 1.5N,124.3E  |
| 536 | 11                       | iP<br>eX<br>iS<br>iX<br>iX<br>i(ScP)<br>iScS | E N Z<br>E<br>M N <sub>1</sub> Z <sub>1</sub><br>(E <sub>1</sub> M)N <sub>1</sub><br>E <sub>1</sub> (N <sub>1</sub> )<br>E <sub>1</sub> M N <sub>1</sub> | 00 06 48.4<br>07 21<br>11 16<br>11 25<br>11 31<br>13 23<br>17 26 | (0.7)          |                | (+)            | USCGS: 22.1S,171.4E |
| 537 | 11                       | iX<br>iP<br>iPcP<br>eL                       | N Z<br>Z<br>Z<br>N <sub>1</sub> Z <sub>1</sub>                                                                                                           | 03 26 07.8<br>26 17.8<br>28 02<br>48 ..                          |                |                | +              | USCGS: 1.6N,126.4E  |
| 538 | 11                       | iP<br>eS<br>eSS                              | Z<br>E <sub>1</sub> M N <sub>1</sub><br>E <sub>1</sub> M(N <sub>1</sub> Z <sub>1</sub> )                                                                 | 18 59 05.5<br>19 03 52<br>05 44                                  | 1.9            |                | +              | USCGS: 15.7S,166.9E |
| 539 | 11                       | eL                                           | M                                                                                                                                                        | 21 23.8                                                          |                |                |                |                     |



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| No. | Date<br>1960<br>DECEMBER | Phase                                                                                                                                                                                                                                                                                                                                                                      | Time<br>(G.M.T.)<br>h. m. s.                                                                             | Per.<br>s.                                 | Amplitude                                 |                                             |                                           | Remarks                                                           |
|-----|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------|---------------------------------------------|-------------------------------------------|-------------------------------------------------------------------|
|     |                          |                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                          |                                            | A <sub>N</sub>                            | A <sub>E</sub>                              | A <sub>Z</sub>                            |                                                                   |
| 540 | 12                       | eL M                                                                                                                                                                                                                                                                                                                                                                       | 04 37 ..                                                                                                 |                                            |                                           |                                             |                                           | USCGS: 10.7S, 164.8E                                              |
| 541 | 12                       | iP Z<br>iX Z<br>iS E<br>eX E <sub>1</sub> N <sub>1</sub>                                                                                                                                                                                                                                                                                                                   | 10 08 44.0<br>08 48.0<br>12 48<br>13 38                                                                  |                                            |                                           | +                                           |                                           | USCGS: 28.8S, 167.6E                                              |
| 542 | 13                       | eP EE <sub>1</sub> MNN <sub>1</sub> ZZ <sub>1</sub><br>i(PP) E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub><br>iX E <sub>1</sub><br>iX N <sub>1</sub> Z <sub>1</sub><br>iX N <sub>1</sub> Z <sub>1</sub><br>iX N <sub>1</sub> Z <sub>1</sub><br>iX E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub><br>iX E <sub>1</sub> N <sub>1</sub> Z <sub>1</sub><br>eT E<br>iT (-) Z       | 07 40 26.3<br>40 51<br>41 06<br>41 08.5<br>42 07<br>44 16<br>44 18<br>44 22<br>45 11.5<br>54 35<br>55 07 | 3.1<br><br><br><br><br><br><br><br><br>1.5 | +1<br><br><br><br><br><br><br><br><br>1/3 | -3/4<br><br><br><br><br><br><br><br><br>1/3 | +1<br><br><br><br><br><br><br><br><br>1/2 | USCGS: 52.1S, 160.9E                                              |
| 543 | 13                       | iP Z<br>iS E <sub>1</sub> N <sub>1</sub>                                                                                                                                                                                                                                                                                                                                   | 10 16 07.5<br>24 50                                                                                      |                                            |                                           | -                                           |                                           | USCGS: 27.7S, 142.4E                                              |
| 544 | 13                       | eL M                                                                                                                                                                                                                                                                                                                                                                       | 14 36.5                                                                                                  |                                            |                                           |                                             |                                           |                                                                   |
| 545 | 14                       | eP N ZZ <sub>1</sub><br>e(PP) Z <sub>1</sub><br>eS N <sub>1</sub><br>eX E <sub>1</sub> M<br>eX N <sub>1</sub>                                                                                                                                                                                                                                                              | 01 03 52<br>05 24<br>09 08<br>09 13<br>12 12                                                             | (2)                                        | (-)                                       | +0.1                                        |                                           | USCGS: 10.8S, 165.4E                                              |
| 546 | 14                       | iP EE <sub>1</sub> NN <sub>1</sub> ZZ <sub>1</sub><br>isP N <sub>1</sub> Z <sub>1</sub><br>iX E <sub>1</sub> M<br>eX N <sub>1</sub><br>e(S) M<br>eSS E <sub>1</sub> N <sub>1</sub><br>eX E <sub>1</sub> N <sub>1</sub><br>eL N <sub>1</sub><br>eL E <sub>1</sub> Z <sub>1</sub>                                                                                            | 14 27 35.3<br>27 54<br>28 34<br>29 14<br>31(00)<br>31 08<br>31 40<br>32.2<br>32.6                        | 1.1                                        | +                                         | -                                           | +0.07                                     | USCGS: 51.9S, 160.7E                                              |
| 547 | 14<br>15                 | iP EE <sub>1</sub> MNN <sub>1</sub> ZZ <sub>1</sub><br>ipP EE <sub>1</sub> N ZZ <sub>1</sub><br>iX N <sub>1</sub> Z <sub>1</sub><br>iX (N <sub>1</sub> ) Z <sub>1</sub><br>iS EE <sub>1</sub> MNN <sub>1</sub><br>iPS EE <sub>1</sub> NN <sub>1</sub><br>iX EE <sub>1</sub> M<br>eX N <sub>1</sub><br>eSS M<br>iScS E <sub>1</sub> M N <sub>1</sub> Z <sub>1</sub><br>iX M | 23 59 33.6<br>59 46<br>00 00 06<br>02 28<br>06 01<br>06 23<br>06 29<br>06 58<br>09 10<br>09 20<br>09 30  | 1.3                                        | +0.1                                      | -0.05                                       | -0.45                                     | Δ = 5000Km.<br>h = 50Km.<br>H = 23 51 30.0<br>USCGS: 2.9N, 126.5E |
| 548 | 15                       | iP Z                                                                                                                                                                                                                                                                                                                                                                       | 18 40 06.0                                                                                               | 0.9                                        |                                           | -0.04                                       |                                           | USCGS: 18.1S, 178.5W                                              |
| 549 | 16                       | eL M                                                                                                                                                                                                                                                                                                                                                                       | 09 11 ..                                                                                                 |                                            |                                           |                                             |                                           | USCGS: 16.3S, 178.0E                                              |



| No. | Date<br>1960<br>DECEMBER | Phase                                                        | Time<br>(G.M.T.)<br>h. m. s.                                                                                                                                                                                                                                   | Per.<br>s.                                                                                            | Amplitude      |                |                | Remarks                                                            |
|-----|--------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|--------------------------------------------------------------------|
|     |                          |                                                              |                                                                                                                                                                                                                                                                |                                                                                                       | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                                                                    |
| 550 | 17                       | eL                                                           | E <sub>1</sub> M N <sub>1</sub>                                                                                                                                                                                                                                | 02 22 ..                                                                                              |                |                |                | Also recorded at<br>Riverview, Canberra<br>Port Moresby. Centre    |
| 551 | 17                       | eL                                                           | M                                                                                                                                                                                                                                                              | 05 34.5                                                                                               |                |                |                | Also recorded at<br>Wilkes.                                        |
| 552 | 17                       | iP<br>isP<br>iPP<br>is<br>eX<br>eSS<br>eX<br>iX              | EE <sub>1</sub> MNN <sub>1</sub> ZZ <sub>1</sub><br>ZZ <sub>1</sub><br>ZZ <sub>1</sub><br>E <sub>1</sub> M N <sub>1</sub><br>N <sub>1</sub><br>E <sub>1</sub> M<br>Z<br>E <sub>1</sub> M                                                                       | 10 45 05.5<br>46 42.0<br>46 54<br>51 24.5<br>53 54<br>54 44<br>55 02<br>59 30                         | 1.2            | +0.15          | -0.15 -0.4     | Δ = 5050Km.<br>h = 300Km.<br>H = 10 37 25.0<br>USCGS: 6.4S, 109.3E |
| 553 | 17                       | eL                                                           | M                                                                                                                                                                                                                                                              | 16 22 ..                                                                                              |                |                |                |                                                                    |
| 554 | 18                       | iP<br>eS<br>eSS                                              | Z<br>N <sub>1</sub><br>(E <sub>1</sub> )M N <sub>1</sub>                                                                                                                                                                                                       | 18 29 40.8<br>36 48<br>40 27                                                                          |                |                | (-)            | USCGS: 8.5N, 125.9E                                                |
| 555 | 19                       | eL                                                           | E <sub>1</sub> M                                                                                                                                                                                                                                               | 22 28 ..                                                                                              |                |                |                | USCGS: 12.6S, 166.8E                                               |
| 556 | 20                       | eL                                                           | E <sub>1</sub> M                                                                                                                                                                                                                                               | 22 17.1                                                                                               |                |                |                | South Tasman Sea?                                                  |
| 557 | 21                       | eP                                                           | ZZ <sub>1</sub>                                                                                                                                                                                                                                                | 21 02 37                                                                                              |                |                |                | USCGS: 11.2N, 141.3E                                               |
| 558 | 21                       | e(S)<br>e(SS)<br>eLr                                         | N <sub>1</sub><br>E <sub>1</sub> M<br>Z <sub>1</sub>                                                                                                                                                                                                           | 22 40 44<br>41 43<br>43.3                                                                             |                |                |                | USCGS: 62.5S, 167.1E                                               |
| 559 | 22                       | eL                                                           | M                                                                                                                                                                                                                                                              | 03 42 ..                                                                                              |                |                |                | USCGS: 9.4N, 94.2E                                                 |
| 560 | 22                       | eX<br>iP<br>epP<br>eX<br>iX<br>eL                            | E Z<br>E ZZ <sub>1</sub><br>E Z<br>E Z<br>Z<br>E <sub>1</sub>                                                                                                                                                                                                  | 06 37 46<br>37 47.4<br>38 01<br>38 07<br>38 14<br>48 13                                               | 0.9            | -<br>+         | +<br>-0.05     | USCGS: 30.8S, 177.1W                                               |
| 561 | 22                       | e(P)<br>eX<br>eL                                             | Z<br>E <sub>1</sub> M<br>N <sub>1</sub>                                                                                                                                                                                                                        | 14 18 56.9<br>20(33)<br>29(47)                                                                        |                |                |                | USCGS: 27.8S, 176.1W                                               |
| 562 | 22                       | iP<br>iX<br>iX<br>iP<br>iPP<br>iX<br>isP<br>iX<br>is<br>iScP | E NN <sub>1</sub> ZZ <sub>1</sub><br>E<br>NN <sub>1</sub> ZZ <sub>1</sub><br>N <sub>1</sub> Z <sub>1</sub><br>NN <sub>1</sub> ZZ <sub>1</sub><br>N<br>N <sub>1</sub> Z <sub>1</sub><br>Z<br>EE <sub>1</sub> MNN <sub>1</sub><br>N <sub>1</sub> ZZ <sub>1</sub> | 21 08 33.5<br>08 35.2<br>08 36.1<br>09 51.5<br>09 58.2<br>10 21<br>10 37<br>10 42<br>13 14.5<br>14 14 | 0.9            | +0.2           | +<br>-0.31     | Δ = 3560Km.<br>h = 430Km.<br>H = 21 02 43.2<br>USCGS: 6.8S, 155.3E |



| No.           | Date<br>1960 | Phase | Time<br>(G.M.T.)               | Per.       | Amplitude      |                |                | Remarks              |
|---------------|--------------|-------|--------------------------------|------------|----------------|----------------|----------------|----------------------|
|               |              |       |                                |            | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                      |
|               |              |       | h. m. s.                       | s.         |                |                |                |                      |
| 562 continued |              |       |                                |            |                |                |                |                      |
| Dec. 22       |              | e(G)  | E <sub>1</sub> N <sub>1</sub>  | 21 15 44   |                |                |                |                      |
|               |              | i(SS) | N <sub>1</sub> Z <sub>1</sub>  | 16 02      |                |                |                |                      |
|               |              | eX    | EE <sub>1</sub> N <sub>1</sub> | 17 30      |                |                |                |                      |
|               |              | iX    | E <sub>1</sub> Z <sub>1</sub>  | 17 46      |                |                |                |                      |
|               |              | eScS  | E <sub>1</sub>                 | 18 12      |                |                |                |                      |
| 563           | 23           | iP    | E N Z                          | 09 50 49.7 | 1.2            | +              | +0.1           | USCGS: 3.3S, 101.9E  |
|               |              | eX    | Z                              | 51 06      |                |                |                |                      |
|               |              | eX    | Z                              | 51 46      |                |                |                |                      |
|               |              | ePeP  | Z                              | 52 00      |                |                |                |                      |
| 564           | 23           | eP    | Z                              | 10 56 49   |                |                |                | USCGS: 8.2N, 125.7E  |
|               |              | epP   | N ZZ <sub>1</sub>              | 57 05      |                |                |                |                      |
| 565           | 23           | iP    | Z                              | 19 13 21.4 |                |                |                | USCGS: 27.8S, 177.2W |
| 566           |              |       |                                |            |                |                |                |                      |





| No. | Date<br>1960 | Phase | Time<br>(G.M.T.)                                 | Per. | Amplitude      |                |                | Remarks                     |
|-----|--------------|-------|--------------------------------------------------|------|----------------|----------------|----------------|-----------------------------|
|     |              |       |                                                  |      | A <sub>N</sub> | A <sub>E</sub> | A <sub>Z</sub> |                             |
|     |              |       | h. m. s.                                         | s.   |                |                |                |                             |
| 567 | 26           | iP    | Z                                                |      |                |                |                |                             |
| 568 | 26           | iP    | ZZ <sub>1</sub>                                  |      |                |                |                | USCGS: 23.7S, 176.9W        |
|     |              | eS    | E <sub>1</sub> M                                 |      |                |                |                | (-) USCGS: 33.8S, 136.2E    |
| 569 | 26           | iP    | ZZ <sub>1</sub>                                  |      |                |                |                |                             |
|     |              | epP   | ZZ <sub>1</sub>                                  |      |                |                |                | + $\Delta = 9350\text{Km.}$ |
|     |              | iS    | EE <sub>1</sub> MNN <sub>1</sub>                 |      |                |                |                | h = 100Km.                  |
|     |              |       |                                                  |      |                |                |                | H = 04 32 42                |
|     |              |       |                                                  |      |                |                |                | USCGS: 57.4S, 26.2W         |
| 570 | 26           | eL    | E <sub>1</sub> M                                 |      |                |                |                |                             |
| 571 | 26           | iP    | Z                                                |      |                |                |                |                             |
|     |              | iX    | Z                                                |      |                |                |                | - USCGS: 49.4S, 164.3E      |
|     |              | eS    | E <sub>1</sub> M N <sub>1</sub>                  |      |                |                |                |                             |
|     |              | eT    | Z                                                |      |                |                |                |                             |
| 572 | 27           | eL    | E <sub>1</sub> M                                 |      |                |                |                | USCGS: 41.3N, 124.9W        |
| 573 | 27           | iP    | Z                                                |      |                |                |                | - USCGS: 41.4N, 125.2W      |
| 574 | 29           | eP    | Z                                                |      |                |                |                | USCGS: 18.4S, 174.7W        |
|     |              | ePP   | EE <sub>1</sub> MNN <sub>1</sub> ZZ <sub>1</sub> |      |                |                |                |                             |
|     |              | ePcP  | Z <sub>1</sub>                                   |      |                |                |                |                             |
|     |              | eX    | N <sub>1</sub>                                   |      |                |                |                |                             |
|     |              | eS    | M                                                |      |                |                |                |                             |
|     |              | eScS  | E <sub>1</sub> M                                 |      |                |                |                |                             |
|     |              | eX    | N <sub>1</sub>                                   |      |                |                |                |                             |
| 575 | 29           | iP    | ZZ <sub>1</sub>                                  |      |                |                |                | USCGS: 44.8S, 75.6W         |
|     |              | eX    | ZZ <sub>1</sub>                                  |      |                |                |                |                             |
|     |              | ePP   | EE <sub>1</sub>                                  |      |                |                |                |                             |
| 576 | 29           | iP    | Z                                                |      |                |                |                | USCGS: 5.5S, 146.1E         |
|     |              | iX    | Z                                                |      |                |                |                |                             |
|     |              | i(pP) | N                                                |      |                |                |                |                             |
|     |              | iX    | Z                                                |      |                |                |                |                             |
| 577 | 31           | eX    | Z                                                |      |                |                |                | USCGS: 7.8S, 120.1E         |
|     |              | eL    | E <sub>1</sub> M                                 |      |                |                |                |                             |
| 578 | 31           | iP    | ZZ <sub>1</sub>                                  |      |                |                |                | USCGS: 43.9S, 75.0W         |
| 579 | 31           | iX    | E N Z                                            |      |                |                |                | USCGS: 6.6S, 129.1E         |
| 580 | 31           | eP    | Z                                                |      |                |                |                | USCGS: 5.0S, 151.4E         |

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