

M.O. 627

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR JANUARY, 19 57.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"

(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>$T_1$<br>sec. | PENDULUM FREE PERIOD<br>$T$<br>sec. | DAMPING CONSTANT<br>$\mu^2$ . | $\frac{Ak}{\pi l}$<br>sec. <sup>-1</sup> |
|------------|----------------------------------|---|-------------------------------------|-------------------------------|--|
| N.         | 25 August, 1954                  | 21.7                                      | 21.2                                | +0.01                         | 54.4                                     |
| E.         | 26 August, 1954                  | 21.3                                      | 21.4                                | +0.01                         | 52.6                                     |
| Z.         | 1 September, 1954                | 11.3                                      | 11.4                                | +0.05                         | 115.                                     |

(ii) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.  
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.  
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |    |    | PERIOD. | AMPLITUDE. | $\Delta$                  | REMARKS.  |
|-------|--------|--------|--------|----|----|---------|------------|---------------------------|---|
|       |        |        | h.     | m. | s. |         |            |                           |   |
| 21    | ZV,Z   | iP     | 00     | 51 | 16 | 17      | 11         | 8480                      | Compression.<br><br>53°N., 168½°W. Fox Islands,<br>Aleutian Islands.<br>Mag. 6½-6¾ (Pas) U.S.C.G.S. |
|       |        | e      |        | 51 | 26 |         |            |                           |   |
|       | E      | eS     | 01     | 00 | 57 |         |            |                           |   |
|       | N      | iScS   | 01     | 01 | 12 |         |            |                           |   |
|       | NE     | ePS    | 01     | 01 | 44 |         |            |                           |   |
|       | N      | e      | 10.1   | -  | -  |         |            |                           |   |
|       | E      | eL     | 11     | -  | -  |         |            |                           |   |
|       | EN     | eL2    | 20½    | -  | -  |         |            |                           |   |
|       | N      | M      | 30     | -  | -  |         |            |                           |   |
|       | E      | M      | 32     | -  | -  |         |            |                           |   |
| 2     | ZV,Z   | iP     | 02     | 29 | 27 | 16      | 12         | 8500                      | Compression.<br><br>52½°N., 168°W. Fox Islands.<br>Aleutian Islands.<br>Mag. 6¾ (Pas). U.S.C.G.S.   |
|       |        | e      |        | 29 | 32 |         |            |                           |   |
|       | ZV,Z   | ePP    | 32     | 16 |    |         |            |                           |   |
|       | E      | eS     | 39     | 09 |    |         |            |                           |   |
|       | N      | eSKS   | 39     | 21 |    |         |            |                           |   |
|       | NE     | eScS   | 39     | 28 |    |         |            |                           |   |
|       | N      | iPS    | 39     | 50 |    |         |            |                           |   |
|       | N      | iPPS   | 40     | 06 |    |         |            |                           |   |
|       | N      | e      | 44     | 44 |    |         |            |                           |   |
|       | E      | e(SSS) | 47.0   | -  |    |         |            |                           |   |
|       | N      | e      | 48.0   | -  |    |         |            |                           |   |
|       | E      | eL     | 49     | -  |    |         |            |                           |   |
|       | NE     | eL2    | 58½    | -  |    |         |            |                           |   |
|       | Z      | M      | 03     | 10 | -  |         |            |                           |   |
| E     | M      | 13     | -      | 18 |    |         |            |                           |   |
| N     | M      | 13     | -      | 19 |    |         |            |                           |   |
|       | F      | -      | -      | -  |    |         |            | overlapped by next shock. |   |

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**SEISMOLOGICAL BULLETIN.**

JANUARY, 19 57.

| DATE | COMPT. | PHASE.          | G.M.T. |     |      | PERIOD. | AMPLITUDE. | Δ      | REMARKS.  |
|------|--------|-----------------|--------|-----|------|---------|------------|--------|---|
|      |        |                 | h.     | m.  | s.   |         |            |        |   |
| 2    | ZV,Z   | iP              | 03     | 24  | 44   |         |            | (8500) | Confused by previous shock.<br>53°N., 168°W. Fox Islands.<br>Aleutian Islands. Mag. 7 (Pas).<br>U.S.C.G.S.<br>overlapped by next shock. |
|      | E      | e(S)            |        | 34  | 25   |         |            |        |   |
|      | E      | M               | 04     | 00  | -    | 19      | 16         |        |   |
|      | N      | M               |        | 04  | -    | 19      | 23         |        |   |
|      | Z      | M               |        | 04  | -    | 18      | 12         |        |   |
|      |        | F               | -      | -   | -    |         |            |        |   |
| 2    | ZV     | eP              | 03     | 42  | 23   |         |            |        | Fox Islands aftershock. U.S.C.G.S.  |
| 2    | ZV,Z   | iP              | 04     | 00  | 36.5 |         |            | 8510   | Compression.<br>53°N., 168°W. Fox Islands.<br>Aleutian Islands. Mag. 7-7¼ (Pas).<br>U.S.C.G.S.<br><br>overlapped by next shock.         |
|      | ZV,Z   | e               |        | 00  | 46   |         |            |        |   |
|      | E      | eS              |        | 10  | 19   |         |            |        |   |
|      | E      | M               |        | 36  | -    | 19      | 31         |        |   |
|      | N      | M               |        | 39  | -    | 18      | 33         |        |   |
|      | Z      | M               |        | 39  | -    | 18      | 22         |        |   |
|      |        | F               | -      | -   | -    |         |            |        |   |
| 2    | ZV,Z   | iP              | 04     | 15  | 20   |         |            |        | Dilatation.<br><br>52½°N., 169°W. Fox Islands,<br>Aleutian Islands. U.S.C.G.S.  |
|      | ZV,Z   | iPP             |        | 18  | 19   |         |            |        |   |
|      | E      | M               |        | 57¼ | -    | 17      | 10         |        |   |
|      | N      | M               |        | 59¼ | -    | 18      | 15         |        |   |
|      | Z      | M               | 05     | 00½ | -    | 15      | 9          |        |   |
|      |        | F               | 06     | 55  | -    |         |            |        |   |
| 2    | ZV,Z   | iP              | 11     | 01  | 18   |         |            |        | 52½°N., 168°W. Fox Islands<br>aftershock. Mag. 6½ (Pas).<br>U.S.C.G.S.  |
|      | N      | e(ScS)          |        | 11  | 18   |         |            |        |   |
|      | NE     | eL <sub>2</sub> |        | 30½ | -    |         |            |        |   |
|      | E      | M               |        | 40  | -    | 17      | 3          |        |   |
|      | N      | M               |        | 40  | -    | 17      | 4          |        |   |
|      | F      | 12              | 40     | -   |      |         |            |        |   |
| 2    | N      | e               | 13     | 35  | -    |         |            |        | Very small. 53°N., 168°W.<br>Fox Islands aftershock. U.S.C.G.S.   |
|      |        | F               |        | 50  | -    |         |            |        |   |
| 3    | ZV,Z   | iP              | 00     | 52  | 50   |         |            |        | Compression. Small.<br>53°N., 168°W. Fox Islands<br>aftershock. U.S.C.G.S.  |
|      | N      | eL              | 01     | 22  | -    |         |            |        |   |
|      |        | F               |        | 55  | -    |         |            |        |   |
| 3    | ZV,ZN  | iP              | 12     | 59  | 17   | 6       | 11(Z)      | 8380   | Dilatation. Depth = 570 Km.   |
|      | ZV,ZN  | iPcP            |        | 59  | 25   |         |            |        |   |
|      | ZV,Z   | ipP             | 13     | 01  | 17   | 7       | 7(Z)       |        | Dilatation.   |
|      | ZV,Z   | ipPcP           |        | 01  | 29   |         |            |        |   |
|      | ZV,Z   | esP             |        | 02  | 11   |         |            |        |   |
|      | ZV,ZNE | iPP             |        | 02  | 18   |         |            |        | 44°N., 130°E. Southern Manchuria.<br>Mag. 7 (Pas). h about 600 Km.<br>U.S.C.G.S.  |
|      | Z      | ipPP            |        | 03  | 53   |         |            |        |   |
|      | ZV,ZN  | iPPP            |        | 04  | 10   |         |            |        |   |
|      | NE     | iS              |        | 08  | 11   | 11      | 33(E)      |        |   |
|      | ZNE    | iScS            |        | 08  | 34   | 10      | 11(N)      |        |   |
|      | ZV,ZN  | i               |        | 08  | 52   |         |            |        |   |
|      | E      | e               |        | 11  | 30   |         |            |        |   |
|      | N      | e               |        | 12  | 09   |         |            |        |   |
|      | E      | i(ssS)          |        | 16  | 32   |         |            |        |   |
|      | N      | e               |        | 16  | 46   |         |            |        |   |
| NE   | e      |                 | 17.9   | -   |      |         |            |        |   |
| E    | i      |                 | 19     | 38  |      |         |            |        |   |
|      | F      |                 | 14     | 20  | -    |         |            |        |   |

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| DATE. | COMPT.                       | PHASE.                               | G.M.T.   |  |                              | PERIOD.  | AMPLI-<br>TUDE. | Δ | REMARKS.  |
|-------|------------------------------|--------------------------------------|----------|--|------------------------------|----------|-----------------|---|---|
|       |                              |                                      | h.       | m.                                     | s.                           |          |                 |   |   |
| 3     | ZV                           | iP                                   | 13       | 54                                     | 19                           |          |                 |   | Dilatation. Manchuria aftershock.<br>U.S.C.G.S.   |
| 6     | NE                           | eL<br>F                              | 00       | 48<br>50                               | -<br>-                       |          |                 |   | Very small. Confused by<br>microseisms. $1/2^{\circ}$ S., $20^{\circ}$ W.<br>Mid-Atlantic Ocean. U.S.C.G.S.                         |
| 9     | NE<br>E<br>N<br>NE<br>N<br>E | e(S)<br>i<br>eL<br>eL<br>M<br>M<br>F | 08       | 14<br>15<br>30<br>38<br>44<br>46 $1/2$ | 32<br>03<br>-<br>-<br>-<br>- | 18<br>18 | 8<br>8          |   | Confused by microseisms.<br><br>53 $^{\circ}$ N., 167 $1/2^{\circ}$ W. Fox Islands<br>aftershock. Mag. 6 $1/2$ (Pas).<br>U.S.C.G.S. |
| 10    | NE                           | eL<br>F                              | 05       | 03<br>40                               | -<br>-                       |          |                 |   | Small.<br>6 $^{\circ}$ N., 95 $1/2^{\circ}$ E. Northern Sumatra.<br>U.S.C.G.S.  |
| 11    | E                            | e(PS)                                | 23       | 56                                     | 15                           |          |                 |   | Very small. 27 $^{\circ}$ N., 127 $1/2^{\circ}$ E.<br>Ryukyu Islands. U.S.C.G.S.  |
| 12    | EN                           | eL<br>F                              | 00       | 20<br>35                               | -<br>-                       |          |                 |   |   |
| 13    | ZV,Z<br>EZ                   | iP<br>eL<br>F                        | 11<br>12 | 47<br>10<br>25                         | 14<br>-<br>-                 |          |                 |   | Confused by microseisms.<br>38 $1/2^{\circ}$ N., 71 $^{\circ}$ E. Tadshik, U.S.S.R.<br>U.S.C.G.S.                                   |
| 19    | ZV<br>ZV<br>ZV               | iPKP<br>e<br>ePP                     | 05       | 35<br>35<br>38                         | 20<br>28<br>50               |          |                 |   | Dilatation.<br>20 $1/2^{\circ}$ S., 179 $^{\circ}$ W. Fiji Islands.<br>Mag. 6 $1/2$ (Berk) U.S.C.G.S.                               |
| 20    | ZV<br>ZV                     | i(pP)<br>e(sP)                       | 18       | 22<br>22                               | 24<br>46                     |          |                 |   | 36 $1/2^{\circ}$ N., 72 $^{\circ}$ E. Hindu Kush. h about<br>200 Km. U.S.C.G.S.   |
| 23    | NE                           | e<br>F                               | 17       | 37<br>50                               | -<br>-                       |          |                 |   | Small. Confused by microseisms.<br>37 $^{\circ}$ N., 22 $^{\circ}$ E. Greece. U.S.C.G.S.  |
| 24    | NE<br>NE                     | eL<br>M<br>F                         | 08       | 00<br>07 $1/2$<br>25                   | -<br>-<br>-                  |          |                 |   | Small. Confused by strong<br>microseisms. 12 $1/2^{\circ}$ S., 78 $^{\circ}$ W.<br>Near coast of Peru. U.S.C.G.S.                   |
| 25    | NE<br>NE                     | e(S)<br>eL<br>F                      | 03<br>04 | 58<br>10<br>50                         | 36<br>-<br>-                 |          |                 |   | Confused by strong microseisms.<br>51 $1/2^{\circ}$ N., 177 $^{\circ}$ W. Andreanof Islands.<br>Mag. 6 $1/2$ (Pas). U.S.C.G.S.      |



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SEISMOLOGICAL BULLETIN FOR FEBRUARY, 1957.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"  
(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>T.<br>sec. | PENDULUM FREE PERIOD<br>T.<br>sec. | DAMPING CONSTANT<br>$\mu^2$ . | Ak<br>wl<br>sec. <sup>-1</sup> |
|------------|----------------------------------|--|------------------------------------|-------------------------------|--------------------------------|
| N.         | 25 August, 1954                  | 21.7                                   | 21.2                               | +0.01                         | 54.4                           |
| E.         | 26 August, 1954                  | 21.3                                   | 21.4                               | +0.01                         | 52.6                           |
| Z.         | 1 September, 1954                | 11.3                                   | 11.4                               | +0.05                         | 115.                           |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.  
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.  
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD. | AMPLITUDE. | $\Delta$  | REMARKS. |
|-------|--------|--------|--------|------------------|----|---------|------------|---|----------|
|       |        |        | h.     | m.               | s. |         |            |   |          |
| 2     | ZV, Z  | ePKP   | 12     | 05               | 26 |         |            | 21 $\frac{1}{2}$ °S., 170°E. Loyalty Islands region. U.S.C.G.S.                                 |          |
|       | ZV,    | e      |        | 05               | 34 |         |            |   |          |
|       | ZV     | e      |        | 05               | 40 |         |            |   |          |
|       | N      | eL     | 13     | 10               | -  |         |            |   |          |
| 3     | N      | F      |        | 20               | -  | 16      | 11         | Small. Confused by strong microseisms. Kamchatka foreshock. U.S. C.G.S.                         |          |
|       |        | eL     | 17     | 47               | -  |         |            |   |          |
| 3     | E      | F      |        | 55               | -  | 14      | 13         | 53 $\frac{1}{2}$ °N., 159°E. Kamchatka. Mag. 6 $\frac{1}{2}$ -6 $\frac{3}{4}$ (Pas). U.S.C.G.S. |          |
|       |        | eL     | 18     | 03 $\frac{1}{2}$ | -  |         |            |   |          |
|       |        | eL     |        | 05 $\frac{1}{2}$ | -  |         |            |   |          |
|       |        | M      |        | 12               | -  |         |            |   |          |
| 3     | E      | F      |        | 15               | -  |         |            | Small. Confused by strong microseisms. Kamchatka aftershock. U.S.C.G.S.                         |          |
|       |        | eL     | 21     | 55               | -  |         |            |   |          |
| 3     | NE     | F      |        | 22               | -  |         |            | Small. Confused by strong microseisms. Kamchatka aftershock. U.S.C.G.S.                         |          |
|       |        | e      | 23     | 40               | -  |         |            |   |          |
| 6     | NE     | F      |        | 55               | -  |         |            | Small. Confused by strong microseisms. Kamchatka aftershock. U.S.C.G.S.                         |          |
|       |        | eL     | 13     | 48               | -  |         |            |   |          |
| 5     | ZV     | ePKP   | 04     | 21               | 17 |         |            | 18°S., 176 $\frac{1}{2}$ °W. Fiji Islands. U.S.C.G.S.   |          |
| 6     | NE     | F      | 14     | 10               | -  |         |            | Small. 20°N., 91°W. Galapagos Islands region. Mag. 6(Pas). U.S.C.G.S.                           |          |



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|------|--------|---------|--------|-----|----|---------|------------|---------------------------|---|
|      |        |         | h.     | m.  | s. |         |            |                           |   |
| ✓ 6  | ZV,Z   | iP      | 20     | 45  | 10 |         |            | (6850)                    | Confused by microseisms.<br><br>50°N., 106°E. Lake Baikal region,<br>U.S.S.R. U.S.C.G.S.                  |
|      | ZV     | e       |        | 45  | 20 |         |            |                           |   |
|      | ZV     | e(PcP)  |        | 45  | 48 |         |            |                           |   |
|      | ZV     | e(PP)   |        | 47  | 26 |         |            |                           |   |
|      | E      | e(S)    |        | 53  | 28 |         |            |                           |   |
|      | NE     | eL      | 21     | 05  | -  |         |            |                           |   |
|      | E      | M       |        | 15  | -  | 14      | 10         |                           |   |
|      | N      | M       |        | 15  | -  | 14      | 9          |                           |   |
|      | Z      | M       |        | 15  | -  | 14      | 10         |                           |   |
|      |        | F       |        | 40  | -  |         |            |                           |   |
| 9    | ZV     | iPKP    | 13     | 49  | 11 |         |            |                           | 34°S., 180° Off coast of New Zealand. Mag. 6¼(Pas) U.S.C.G.S.   |
| ✓ 9  | NE     | eL      | 17     | 16  | -  |         |            |                           | Confused by microseisms.<br>41½°N., 126°W. Near coast of Northern California. Mag. 6¼-6½(Pas). U.S.C.G.S. |
|      | E      | M       |        | 24  | -  | 16      | 4          |                           |   |
|      | N      | M       |        | 24  | -  | 16      | 5          |                           |   |
|      |        | F       |        | 35  | -  |         |            |                           |   |
| 9    | ZV     | ePKP    | 18     | 15  | 48 |         |            |                           | Tonga Islands. U.S.C.G.S.   |
| ✓ 10 | ZV     | eP      | 05     | 54  | 03 |         |            |                           | Compression.<br>35½°N., 35°W. Azores Islands region. Mag. 5¾(Pas). U.S.C.G.S.                             |
|      | ZV,Z   | i       |        | 54  | 09 |         |            |                           |   |
|      | N      | eL      | 06     | 00½ | -  |         |            |                           |   |
|      | E      | M       |        | 03  | -  | 16      | 5          |                           |   |
|      | N      | M       |        | 03  | -  | 14      | 7          |                           |   |
|      |        | F       |        | 12  | -  |         |            |                           |   |
| ✓ 10 | E      | e(SKS)  | 22     | 57  | 04 |         |            |                           | Confused by microseisms.<br><br>10°N., 126°E. Mindanao foreshock.<br>Mag. 6½-6¾(Pas). U.S.C.G.S.          |
|      | N      | e(S)    |        | 58  | 02 |         |            |                           |   |
|      | NE     | e(PS)   |        | 59  | 40 |         |            |                           |   |
|      | N      | e(PKKP) | 23     | 02  | 34 |         |            |                           |   |
|      | NE     | eL      |        | 13½ | -  |         |            |                           |   |
|      | E      | M       |        | 31  | -  | 21      | 15         |                           |   |
|      | N      | M       |        | 31  | -  | 21      | 20         |                           |   |
|      | N      | M       |        | 39½ | -  | 17      | 21         |                           |   |
|      | Z      | M       |        | 39½ | -  | 17      | 10         |                           |   |
|      |        | F       | -      | -   | -  |         |            | overlapped by next shock. |   |
| ✓ 10 | E      | e(SKS)  | 23     | 15  | 42 |         |            |                           | Confused by microseisms.<br><br>10½°N., 126½°E. Mindanao Philippine Islands.<br>Mag. 6¾(Pas). U.S.C.G.S.  |
|      | N      | e(S)    |        | 16  | 44 |         |            |                           |   |
|      | E      | e(PS)   |        | 18  | 22 |         |            |                           |   |
|      | E      | M       |        | 49½ | -  | 20      | 20         |                           |   |
|      | N      | M       |        | 49½ | -  | 20      | 30         |                           |   |
|      | N      | M       |        | 58  | -  | 18      | 33         |                           |   |
|      | Z      | M       |        | 59½ | -  | 18      | 13         |                           |   |
|      |        |         | F      | 01  | 00 | -       |            |                           |   |
| ✓ 11 | E      | e(SKS)  | 01     | 39  | 33 |         |            |                           | Confused by microseisms.<br><br>10°N., 126°E. Mindanao aftershock.<br>Mag. 6½(Pas). U.S.C.G.S.            |
|      | N      | e(S)    |        | 40  | 32 |         |            |                           |   |
|      | NE     | e(PS)   |        | 42  | 18 |         |            |                           |   |
|      | E      | e(P-S)  |        | 43  | 10 |         |            |                           |   |
|      | NE     | eL      |        | 55½ | -  |         |            |                           |   |
|      | E      | M       | 02     | 13½ | -  | 20      | 17         |                           |   |
|      | N      | M       |        | 13½ | -  | 20      | 22         |                           |   |
|      | N      | M       |        | 23½ | -  | 18      | 19         |                           |   |
|      | Z      | M       |        | 23½ | -  | 18      | 15         |                           |   |
|      |        | F       | 03     | 10  | -  |         |            |                           |   |



M.O. 627

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN.

FEBRUARY, 1957

| DATE. | COMPT. | PHASE. | G.M.T. |      |      | PERIOD. | AMPLI-<br>TUDE. | Δ    | REMARKS.  |
|-------|--------|--------|--------|------|------|---------|-----------------|------|---|
|       |        |        | h.     | m.   | s.   |         |                 |      |   |
| 11    | N      | eL     | 04     | 42   | -    | 17      | 3               | 165  | Confused by microseisms.<br>Mindanao aftershock. U.S.C.G.S.   |
|       |        | M      | 05     | 52   | -    |         |                 |      |   |
|       |        | F      | 05     | 00   | -    |         |                 |      |   |
| ✓ 11  | N      | eL     | 15     | 20   | -    | 20      | 5               | 165  | Confused by microseisms.<br>10°N., 126°E. Mindanao<br>aftershock. Mag. 6¼(Pas).<br>U.S.C.G.S.   |
|       |        | M      |        | 24   | -    |         |                 |      |   |
|       |        | M      |        | 26   | -    |         |                 |      |   |
|       |        | M      |        | 32   | -    |         |                 |      |   |
|       |        | M      |        | 32   | -    |         |                 |      |   |
|       |        | F      |        | 55   | -    |         |                 |      |   |
| 11    | ZV,ZN  | iPn    | 15     | 43   | 26.5 | 8       | 34              | 165  | Dilatation.<br>Dilatation.<br>Ho = 15 43 00<br>52.8°N., 1.3°W. England. Felt<br>over Midland and neighbouring<br>counties. One person injured,<br>slight property damage.<br>Confused by microseisms. |
|       |        | iPg    |        | 43   | 31   |         |                 |      |   |
|       |        | iSn    |        | 43   | 46   |         |                 |      |   |
|       |        | i(Sg)  |        | 43   | 51   |         |                 |      |   |
|       |        | i      |        | 44   | 00   |         |                 |      |   |
|       |        | M      |        | 44.1 | -    |         |                 |      |   |
|       |        | M      |        | 44.1 | -    |         |                 |      |   |
|       |        | F      |        | 48.0 | -    |         |                 |      |   |
| 12    | N      | eL     | 09     | 36   | -    | 8       | 8               | 165  | Small. Confused by microseisms.<br>48½°N., 155°E. Northern Kurile<br>Islands. U.S.C.G.S.  |
|       |        | F      |        | 55   | -    |         |                 |      |   |
| 13    | ZV     | iPn    | 00     | 00   | 08   | 8       | 8               | 165  | Dilatation.<br>Midland aftershock.  |
|       |        | eSn    |        | 00   | 27   |         |                 |      |   |
|       |        | e      |        | 00   | 44   |         |                 |      |   |
|       |        | F      |        | 02.0 | -    |         |                 |      |   |
| ✓ 13  | NE     | eL     | 01     | 13   | -    | 17      | 4               | 165  | Confused by strong microseisms.<br>10°N., 126½°E. Mindanao aftershock<br>U.S.C.G.S.   |
|       |        | M      |        | 36   | -    |         |                 |      |   |
|       |        | M      |        | 36   | -    |         |                 |      |   |
|       |        | M      |        | 36   | -    |         |                 |      |   |
|       |        | F      | 02     | 10   | -    |         |                 |      |   |
| 14    | NE     | e      | 23     | 53   | -    | 8       | 8               | 165  | Small.  |
|       |        | F      | 24     | 10   | -    |         |                 |      |   |
| ✓ 17  | ZV     | iP     | 15     | 59   | 02   | 20      | 2               | 9250 | 16°N., 96½°W. Oaxaca, Mexico.<br>h about 60 Km. Mag. 5¾-6(Pas)<br>U.S.C.G.S.  |
|       |        | eS     | 16     | 09   | 19   |         |                 |      |   |
|       |        | e      |        | 09   | 20   |         |                 |      |   |
|       |        | eScS   |        | 09   | 27   |         |                 |      |   |
|       |        | eL     |        | 27   | -    |         |                 |      |   |
|       |        | M      |        | 35   | -    |         |                 |      |   |
|       |        | F      |        | 45   | -    |         |                 |      |   |
| 18    | N      | eL     | 08     | 34   | -    | 8       | 8               | 9250 | Very small.   |
|       |        | F      |        | 47   | -    |         |                 |      |   |
| 18    | NE     | e      | 15     | 07   | -    | 8       | 8               | 9250 | Very small. 25½°N., 45½°W.<br>Mid-Atlantic Ocean. Mag. 6¼-6½(Pas).<br>U.S.C.G.S.  |
|       |        | F      |        | 25   | -    |         |                 |      |   |
| 19    | ZV     | eP     | 00     | 02   | 48   | 8       | 8               | 9250 | Depth 80 Km. 11½°S., 78°W. Near<br>coast of Peru. Mag. 6½-6¾(Pas).<br>U.S.C.G.S.  |
|       |        | epP    |        | 03   | 10   |         |                 |      |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

FEBRUARY, 1957.

| DATE. | COMPT. | PHASE.  | G.M.T. |      |                  | PERIOD. | AMPLI-<br>TUDE. | Δ     | REMARKS.  |      |
|-------|--------|---------|--------|------|------------------|---------|-----------------|-------|---|------|
|       |        |         | h.     | m.   | s.               |         |                 |       |   | sec. |
| V 19  | ZV,Z   | eP      | 07     | 48   | 51               |         |                 | 2480  | Mag. = 6.2<br>Ho = 07 43 55<br><br>37°N., 20 $\frac{3}{4}$ °E. Off coast of Peloponese. B.C.I.S.  |      |
|       | ZV,Z   | i       |        | 49   | 16               |         |                 |       |   |      |
|       | ZV,Z   | ePP     |        | 49   | 29               |         |                 |       |   |      |
|       | N      | iS      |        | 52   | 49               |         |                 |       |   |      |
|       | E      | e       |        | 52   | 52               |         |                 |       |   |      |
|       | NE     | eLq     |        | 54.0 | -                |         |                 |       |   |      |
|       | NE     | iL2     |        | 57   | 02               |         |                 |       |   |      |
|       | E      | M       |        | 57.4 | -                | 17      | 19              |       |   |      |
|       | N      | M       |        | 57.4 | -                | 17      | 70              |       |   |      |
|       | Z      | M       |        | 57.6 | -                | 17      | 20              |       |   |      |
|       | F      |         | 08     | 45   | -                |         |                 |       |   |      |
| 19    | NE     | e       | 20     | 42   | -                |         |                 |       | Very small. 56°N., 164°E. Kamchatka. U.S.C.G.S.   |      |
|       |        | F       | 21     | 00   | -                |         |                 |       |   |      |
| V 20  | ZV,Z   | iP      | 04     | 45   | 01               |         |                 | 1920  | Mag = 5.6<br><br>36 $\frac{1}{2}$ °N., 9°E. Northern Tunisia. 13 killed, many injured and extensive property damage. U.S.C.G.S.   |      |
|       | ZV,Z   | i       |        | 45   | 07               |         |                 |       |   |      |
|       | E      | eS      |        | 48   | 11               |         |                 |       |   |      |
|       | NZ     | e       |        | 48   | 17               |         |                 |       |   |      |
|       | NE     | eLq     |        | 49   | -                |         |                 |       |   |      |
|       | N      | M       |        | 51.3 | -                | 16      | 8               |       |   |      |
|       | Z      | M       |        | 51.5 | -                | 16      | 8               |       |   |      |
|       | E      | M       |        | 52.0 | -                | 12      | 8               |       |   |      |
|       | F      |         | 05     | 10   | -                |         |                 |       |   |      |
| 20    | N      | eL      | 22     | 51   | -                |         |                 |       | Very small. 2°N., 97°E. Near coast of Sumatra. U.S.C.G.S.   |      |
|       |        | F       | 23     | 15   | -                |         |                 |       |   |      |
| 21    | N      | e       | 01     | 26   | 27               |         |                 |       | Small.  |      |
|       |        | eL      |        | 35   | -                |         |                 |       |   |      |
|       | NE     | F       | 02     | 00   | -                |         |                 |       |   |      |
| 22    | NE     | e       | 18     | 00   | -                |         |                 |       | Very small. Confused by strong microseisms.   |      |
|       |        | F       |        | 12   | -                |         |                 |       |   |      |
| 23    | NE     | e       | 13     | 51   | -                |         |                 |       | Small. Confused by microseisms.   |      |
|       |        | F       | 14     | 00   | -                |         |                 |       |   |      |
| V 23  | ZV,Z   | eP I    | 20     | 39   | 10               |         |                 | 10000 | Possibly two shocks. Confused by strong microseisms.<br><br>24°N., 122°E. Formosa. 11 killed many injured and extensive property damage at Hualien and Taipei. Mag. 7-7 $\frac{1}{4}$ (Pas) U.S. C.G.S. |      |
|       | ZV,Z   | i       |        | 39   | 14               |         |                 |       |   |      |
|       | ZV,Z   | i (PII) |        | 39   | 35               |         |                 |       |   |      |
|       | ZV,Z   | iPP     |        | 42   | 42               |         |                 |       |   |      |
|       | ZV,Z   | i       |        | 43   | 02               |         |                 |       |   |      |
|       | NE     | iSKS    |        | 49   | 40               |         |                 |       |   |      |
|       | NE     | iS I    |        | 49   | 58               |         |                 |       |   |      |
|       | NE     | i (SII) |        | 50   | 23               |         |                 |       |   |      |
|       | NE     | i       |        | 51   | 21               |         |                 |       |   |      |
|       | N      | eSS     |        | 55   | 35               |         |                 |       |   |      |
|       | N      | eSSS    |        | 59   | 39               |         |                 |       |   |      |
|       | NE     | eLq     |        | 21   | 02 $\frac{1}{2}$ | -       |                 |       |   |      |
|       | NE     | eLR     |        |      | 09               | -       |                 |       |   |      |
|       | N      | M       |        |      | 14 $\frac{1}{2}$ | -       | 28              |       |   | 153  |
|       | E      | M       |        |      | 15               | -       | 26              |       |   | 98   |
|       | E      | M       |        |      | 24               | -       | 17              |       |   | 76   |
| N     | M      |         |        | 24   | -                | 17      | 97              |       |   |      |
| Z     | M      |         |        | 24   | -                | 16      | 79              |       |   |      |
|       | F      |         | 23     | 00   | -                |         |                 |       |   |      |



M.O. 627

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN.

FEBRUARY, 19 57

| DATE. | COMPT. | PHASE. | G.M.T. |    |    | PERIOD. | AMPLI-<br>TUDE. | Δ | REMARKS.    |
|-------|--------|--------|--------|----|----|---------|-----------------|---|-------------|
|       |        |        | h.     | m. | s. |         |                 |   |             |
| 26    | NE     | e      | 03     | 54 | -  |         |                 |   | Very small. |
|       |        | F      | 04     | 07 | -  |         |                 |   |             |
| 27    | NE     | e      | 15     | 43 | -  |         |                 |   | Very small. |
|       |        | F      | 16     | 03 | -  |         |                 |   |             |



627

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR.....MARCH.....1957.....

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"

(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>T.<br>sec. | PENDULUM FREE PERIOD<br>T.<br>sec. | DAMPING CONSTANT<br>$\mu^2$ . | $\frac{Ak}{\pi l}$<br>sec. <sup>-1</sup> |
|------------|----------------------------------|--|------------------------------------|-------------------------------|--|
| N.         | 25 August, 1954                  | 21.7                                   | 21.2                               | +0.01                         | 54.4                                     |
| E.         | 26 August, 1954                  | 21.3                                   | 21.4                               | +0.01                         | 52.6                                     |
| Z.         | 1 September, 1954                | 11.3                                   | 11.4                               | +0.05                         | 115.                                     |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.

TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.

SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |          |                                | PERIOD.<br>sec. | AMPLI-<br>TUDE.<br>μ | Δ<br>km. | REMARKS.  |
|-------|--------|--------|--------|----------|--------------------------------|-----------------|----------------------|----------|---|
|       |        |        | h.     | m.       | s.                             |                 |                      |          |   |
| 1     | NE     | e<br>F | 00     | 28       | -                              |                 |                      |          | Very small.   |
| 2     | ZV,Z   | iP     | 00     | 38       | 37                             |                 |                      | 7800     | Mag = 6.4<br><br>18 <sup>1</sup> / <sub>2</sub> N., 78 <sup>0</sup> W. Jamaica. Moderate property damage at Montego Bay and Kingston. 2 killed and 5 injured. Mag. 6 <sup>3</sup> / <sub>4</sub> (Pas) U.S.C.G.S. |
|       | ZV,ZE  | i      |        | 38       | 45                             |                 |                      |          |   |
|       | ZE     | e(PcS) |        | 43       | 16                             |                 |                      |          |   |
|       | NE     | e      |        | 47       | 39                             |                 |                      |          |   |
|       | N      | iS     |        | 47       | 45                             | <del>13</del>   | <del>10(SF)</del>    |          |   |
|       | ZE     | ePS    |        | 48       | 13                             |                 |                      |          |   |
|       | E      | eScS   |        | 48       | 31                             |                 |                      |          |   |
|       | N      | i      |        | 48       | 44                             |                 |                      |          |   |
|       | NE     | eSS    |        | 52       | 01                             |                 |                      |          |   |
|       | NE     | eSSS   |        | 55       | 07                             |                 |                      |          |   |
|       | N      | eLq    |        |          | 56 <sup>1</sup> / <sub>2</sub> |                 |                      |          |   |
|       | ZNE    | eLR    |        | 01       | 00                             |                 |                      |          |   |
| Z     | iPKPKP |        |        | 06       | 57                             |                 |                      |          |   |
| E     | M      |        |        | 10       | -                              | 18              | 9                    |          |   |
| N     | M      |        |        | 10       | -                              | 18              | 5                    |          |   |
| Z     | M      |        |        | 10       | -                              | 18              | 7                    |          |   |
|       | F      |        | 02     | 20       | -                              |                 |                      |          |   |
| 2     | ZV     | ePKP   | 08     | 29       | 37                             |                 |                      |          | Mag = 6.2   |
|       | ZV     | e      |        | 29       | 56                             |                 |                      |          |   |
|       | N      | M      | 09     | 28       | -                              | 20              | 3                    |          | 6 <sup>0</sup> S., 151 <sup>0</sup> E. Near south coast of New Britain. U.S.C.G.S.  |
|       | E      | M<br>F |        | 29<br>15 | -<br>-                         | 20              | 2                    |          |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 19 57.

| DATE. | COMPT.   | PHASE.   | G.M.T. |      |    | PERIOD. | AMPLITUDE.          | Δ    | REMARKS.   |
|-------|--|--|--------|------|----|---------|---------------------|------|--|
|       |  |  | h.     | m.   | s. |         |                     |      |  |
| 3     | E  | eL<br>F  | 04     | 01   | -  |         |                     |      | Small. 8½°N., 103°W. Off coast of Mexico. Mag. 5¼ (Pas) U.S.C.G.S.   |
| 3     | N<br>N   | eL<br>M<br>F   | 23     | 56½  | -  | 16      | 2                   |      |  |
| 5     | ZV,Z<br>ZV,Z<br>NE<br>N<br>N<br>NE<br>E<br>N<br>Z                    | eP<br>e<br>eS<br>eSS<br>eLQ<br>eLR<br>M<br>M<br>M<br>F             | 12     | 31   | 24 |         |                     | 3820 | Mag = 6.1<br><br>31½°N., 38½°W. North Atlantic Ocean. B.C.I.S.   |
|       |  |  |        | 31   | 34 |         |                     |      |  |
|       |  |  |        | 36   | 49 |         |                     |      |  |
|       |  |  |        | 39   | 00 |         |                     |      |  |
|       |  |  |        | 39½  | -  |         |                     |      |  |
|       |  |  |        | 41   | -  |         |                     |      |  |
|       |  |  |        | 42½  | -  | 18      | 13                  |      |  |
|       |  |  |        | 43   | -  | 16      | 12                  |      |  |
|       |  |  |        | 43   | -  | 17      | 8                   |      |  |
|       |  |  | 13     | 40   | -  |         |                     |      |  |
| 6     | N  | eL<br>F  | 17     | 48   | -  |         |                     |      | Very small.  |
|       |  |  |        | 55   | -  |         |                     |      |  |
| 8     | N<br>N   | e<br>M<br>F  | 06     | 39   | -  |         |                     |      | Very small.  |
|       |  |  |        | 41   | -  |         |                     |      |  |
|       |  |  |        | 43   | -  |         |                     |      |  |
| 8     | N<br>N   | e<br>M<br>F  | 07     | 27   | -  |         |                     |      | Very small.  |
|       |  |  |        | 28½  | -  |         |                     |      |  |
|       |  |  |        | 33   | -  |         |                     |      |  |
| 8     | ZV,Z<br>ZV,ZNE<br>Z<br>Z<br>Z<br>ZNE<br>ZNE<br>N<br>E<br>N<br>Z<br>E | iP<br>i<br>i<br>iPP<br>i<br>iS<br>i<br>eL<br>M<br>M<br>M<br>M<br>F | 12     | 18   | 53 | 6<br>7  | 14 (PZ)<br>14 (PH)  | 2260 | Compression.<br>Compression.<br>Mag = 6.7<br><br>Ho = 14h. 14m. 16s.<br>39.5°N., 22.8°E. (B.C.I.S.)<br>Eastern Greece foreshock.   |
|       |  |  |        | 18   | 55 |         |                     |      |  |
|       |  |  |        | 19   | 09 |         |                     |      |  |
|       |  |  |        | 19   | 17 |         |                     |      |  |
|       |  |  |        | 19   | 46 |         |                     |      |  |
|       |  |  |        | 22   | 35 | 9       | 71 (SH)             |      |  |
|       |  |  |        | 22   | 39 |         |                     |      |  |
|       |  |  |        | 23½  | -  |         |                     |      |  |
|       |  |  |        | 25.7 | -  | 19      | 99                  |      |  |
|       |  |  |        | 25.8 | -  | 18      | 288                 |      |  |
|       |  |  |        | 27.6 | -  | 10      | 123                 |      |  |
|       |  |  |        | 27.7 | -  | 10      | 157                 |      |  |
|       |  |  | -      | -    | -  |         |                     |      | overlapped by next shock.  |
| 8     | ZV,Z<br>ZV,Z<br>E<br>N<br>Z<br>E                                     | iP<br>iS<br>M<br>M<br>M<br>i (PKKP)<br>F                           | 12     | 25   | 52 | 6<br>10 | 18 (PZ)<br>107 (SH) | 2250 | Compression.<br>Mag = 6.9<br>Ho = 12h. 21m. 16s.<br>39.5°N. 22.8°E. (B.C.I.S.)<br>Eastern Greece, 3 dead many injured and moderate property damage at Farsala, Larissa and Volos. U.S.C.G.S. |
|       |  |  |        | 29   | 33 |         |                     |      |  |
|       |  |  |        | 32.7 | -  | 18      | 199                 |      |  |
|       |  |  |        | 32.8 | -  | 18      | 553                 |      |  |
|       |  |  |        | 34.7 | -  | 10      | 163                 |      |  |
|       |  |  |        | 53   | 17 |         |                     |      |  |
|       |  |  | 14     | 20   | -  |         |                     |      |  |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 1957.

| DATE. | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD.       | AMPLITUDE.        | Δ                       | REMARKS.  |
|-------|--------|--------|--------|------------------|----|---------------|-------------------|-------------------------|---|
|       |        |        | h.     | m.               | s. |               |                   |                         |   |
| 8     | ZV,Z   | iP     | 20     | 42               | 38 |               |                   | 2300                    | Mag = 5.6<br>Ho = 20h. 37m. 58s.<br>39.5°N., 22.8°E. (B.C.I.S.)<br>Eastern Greece aftershock.   |
|       | NE     | eS     |        | 46               | 22 |               |                   |                         |   |
|       | N      | eL     |        | 48               | -  |               |                   |                         |   |
|       | E      | M      |        | 49 $\frac{1}{2}$ | -  | 17            | 3                 |                         |   |
|       | N      | M      |        | 49 $\frac{1}{2}$ | -  | 16            | 7                 |                         |   |
|       | Z      | M      |        | 51 $\frac{1}{2}$ | -  | 10            | 5                 |                         |   |
|       | E      | M      |        | 51 $\frac{1}{2}$ | -  | 12            | 8                 |                         |   |
| 8     | ZV,Z   | iP     | 21     | 03               | -  |               |                   | 2260                    | Compression.<br>Mag = 6.1<br>Ho = 23h. 35m. 12s.<br>39.5°N., 22.8°E. (B.C.I.S.)<br>Eastern Greece aftershock.   |
|       | Z      | i      | 23     | 39               | 49 |               |                   |                         |   |
|       | E      | iS     |        | 43               | 31 | <del>8</del>  | 11(SH)            |                         |   |
|       | N      | eL     |        | 44               | -  |               |                   |                         |   |
|       | E      | M      |        | 46.8             | -  | 17            | 20                |                         |   |
|       | N      | M      |        | 46.8             | -  | 17            | 63                |                         |   |
|       | Z      | M      |        | 48.6             | -  | 10            | 30                |                         |   |
| 9     | ZV     | eP     | 24     | 35               | -  |               |                   | 8560                    | Mag = 5.2<br>Eastern Greece aftershock.   |
|       | N      | M      | 04     | 06               | 23 | 16            | 2                 |                         |   |
|       |        | F      |        | 17               | -  |               |                   |                         |   |
| 9     | ZV,    | eP     | 14     | 34               | 19 |               |                   | 8560                    | Multiple shock.<br>Mag = 7.6<br>PH = 16sec 44μ<br>51°N., 175°W. Andreanof Islands,<br>Aleutian Islands. Seismic sea wave<br>caused destruction of two villages<br>and \$ 3,000,000 damage on Oahu and<br>Kauai. T.H. Mag 8-8 $\frac{1}{2}$ (Pas) USCGS. |
|       | ZV,ZN  | iP     |        | 34               | 28 |               |                   |                         |   |
|       | ZV,ZN  | iP     |        | 34               | 38 |               |                   |                         |   |
|       | ZV,ZN  | iP     |        | 35               | 02 | 14            | 57(PZ)            |                         |   |
|       | E      | iS     |        | 44               | 47 | 21            | 88(SH)            |                         |   |
|       | N      | iScS   |        | 45               | 09 |               |                   |                         |   |
|       | E      | iSS    |        | 50               | 07 |               |                   |                         |   |
|       | E      | M      |        | 19               | -  | -             | -                 |                         |   |
|       | N      | M      |        | 21               | -  | 20            | 590               |                         |   |
|       | Z      | M      |        | 21               | -  | 19            | 480               |                         |   |
| 9     | ZV,Z   | iP     | 14     | 44               | 39 |               |                   | 8560                    | Aleutian Islands aftershock.<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "<br>" " "   |
|       | ZV     | iP     | 14     | 45               | 07 |               |                   |                         |   |
|       | ZV     | iP     | 15     | 02               | 17 |               |                   |                         |   |
|       | ZV     | iP     | 15     | 22               | 31 |               |                   |                         |   |
|       | ZV     | iP     | 15     | 53               | 52 |               |                   |                         |   |
|       | ZV     | iP     | 16     | 44               | 32 |               |                   |                         |   |
|       | ZV     | eP     | 16     | 57               | 35 |               |                   |                         |   |
|       | ZV     | iP     | 16     | 57               | 52 |               |                   |                         |   |
|       | ZV     | iP     | 20     | 12               | 54 |               |                   |                         |   |
|       | ZV     | iP     | 20     | 13               | 07 |               |                   |                         |   |
|       | ZV     | iP     | 20     | 33               | 55 |               |                   |                         |   |
|       | ZV,ZN  | iP     | 20     | 51               | 06 | 10            | 12(PZ)            |                         |   |
|       | Z      | iPP    |        | 53               | 59 | <del>16</del> | <del>12(PH)</del> |                         |   |
|       | E      | iS     | 21     | 00               | 51 | <del>18</del> | <del>19(SH)</del> |                         |   |
|       | N      | iSKS   |        | 01               | 09 |               |                   |                         |   |
|       | N      | i      |        | 01               | 27 |               |                   |                         |   |
|       | NZ     | iPS    |        | 01               | 37 |               |                   |                         |   |
| NE    | iSS    |        | 05     | 47               |    |               |                   |                         |   |
| E     | iSSS   |        | 08     | 55               |    |               |                   |                         |   |
| E     | eLq    |        | 11     | -                |    |               |                   |                         |   |
| E     | M      |        | 31     | -                | 19 | 36            |                   |                         |   |
| N     | M      |        | 31     | -                | 19 | 99            |                   |                         |   |
| Z     | M      |        | 31     | -                | 19 | 62            |                   |                         |   |
|       | F      |        | 24     | 50               | -  |               |                   |                         |   |
| 9     | ZV     | iP     | 22     | 08               | 12 |               |                   | Fox Islands aftershock. |   |
| 9     | ZV     | iP     | 23     | 11               | 24 |               |                   | " " "                   |   |
| 9     | ZV     | i      |        | 11               | 36 |               |                   | " " "                   |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 19 57.

| DATE. | COMPT. | PHASE. | G.M.T. |    |    | PERIOD. | AMPLITUDE. | Δ    | REMARKS.   |
|-------|--------|--------|--------|----|----|---------|------------|------|--|
|       |        |        | h.     | m. | s. |         |            |      |  |
| 9     | ZV     | eP     | 23     | 33 | 41 |         |            |      | Fox Islands aftershock.  |
| 10    | ZV     | iP     | 01     | 57 | 43 |         |            |      | Fox Islands aftershock.  |
| 10    | ZV,Z   | iP     | 03     | 18 | 07 | 8       | 4(PZ)      | 8660 | Mag = 6.7  |
|       | NE     | eS     | 27     | 59 |    | 15      | 7(SH)      |      | PH = 14sec 4μ  |
|       | N      | iPS    | 28     |    | 43 |         |            |      |  |
|       | N      | iSS    | 33     |    | 40 |         |            |      |  |
|       | E      | eLQ    | 39     |    | -  |         |            |      | 52°N., 176°W. Andreanof Islands,   |
|       | E      | M      | 58     |    | -  | 18      | 21         |      | Aleutian Islands. Mag 6 <sup>1</sup> / <sub>2</sub> -6 <sup>3</sup> / <sub>4</sub> (Pas) |
|       | N      | M      | 58     |    | -  | 18      | 18         |      | U.S.C.G.S.   |
|       | N      | M      | 04     | 01 | -  | 19      | 27         |      |  |
|       | Z      | M      | 01     |    | -  | 19      | 21         |      |  |
|       |        | F      | -      | -  | -  |         |            |      | obscured by aftershock.  |
| 10    | ZV     | iP     | 03     | 20 | 55 |         |            |      | Aleutian Island aftershock.  |
| 10    | ZV     | iP     | 03     | 39 | 51 |         |            |      | Compression. Aleutian Islands aftershock.  |
| ✓ 10  | ZV,Z   | iP     | 11     | 32 | 43 |         |            | 8670 | Compression. Confused by microseisms.  |
|       | ZV     | i      |        | 33 | 25 |         |            |      | Mag = 6.3  |
|       | E      | eS     |        | 42 | 34 |         |            |      |  |
|       | N      | e      |        | 42 | 40 |         |            |      |  |
|       | N      | e      |        | 43 | 01 |         |            |      | 52°N., 171°W. Fox Islands,   |
|       | E      | eL     |        | 57 | -  |         |            |      | Aleutian Islands. U.S.C.G.S.   |
|       | Z      | M      | 12     | 12 | -  | 18      | 9          |      |  |
|       | N      | M      |        | 12 | -  | 18      | 10         |      |  |
|       | E      | M      |        | 13 | -  | 18      | 5          |      |  |
|       |        | F      | -      | -  | -  |         |            |      |  |
| ✓ 10  | ZV,Z   | iP     | 12     | 48 | 07 |         |            |      | Confused by microseisms.   |
|       | N      | eL     | 13     | 12 | -  |         |            |      | Mag = 6.1  |
|       | E      | M      |        | 27 | -  | 18      | 3          |      | 51°N., 171°W. Fox Islands,   |
|       | N      | M      |        | 28 | -  | 18      | 5          |      | Aleutian Islands. U.S.C.G.S.   |
|       |        | F      | -      | -  | -  |         |            |      |  |
| ✓ 10  | ZV     | eP     | 12     | 57 | 35 |         |            |      | Confused by microseisms.   |
|       | ZV     | e      |        | 57 | 50 |         |            |      | Mag = 5.9  |
|       | ZV     | e      |        | 58 | 30 |         |            |      |  |
|       | E      | M      | 13     | 38 | -  | 18      | 2          |      | 51°N., 177°W. Andreanof Islands,   |
|       | N      | M      |        | 38 | -  | 18      | 3          |      | Aleutian Islands. U.S.C.G.S.   |
|       |        | F      | -      | -  | -  |         |            |      |  |
| ✓ 10  | ZV,Z   | eP     | 13     | 22 | 13 |         |            | 8560 | Confused by microseisms.   |
|       | E      | eS     |        | 31 | 58 |         |            |      | Mag = 6.2  |
|       | E      | M      | 14     | 02 | -  | 19      | 5          |      |  |
|       | N      | M      |        | 02 | -  | 19      | 6          |      | 51 <sup>1</sup> / <sub>2</sub> °W. 180°W. Andreanof Islands,                             |
|       |        | F      | -      | -  | -  |         |            |      | U.S.C.G.S.   |
| ✓ 10  | ZV     | eP     | 13     | 40 | 31 |         |            |      | Confused by microseisms.   |
|       | E      | M      | 14     | 22 | -  | 18      | 5          |      | Mag = 6.2  |
|       | N      | M      |        | 23 | -  | 18      | 6          |      | 51 <sup>1</sup> / <sub>2</sub> °N., 179°W. Andreanof Islands.                            |
|       | Z      | M      |        | 23 | -  | 18      | 6          |      | U.S.C.G.S.   |
| 10    | ZV,Z   | eP     | 15     | 38 | 18 | 12      | 4(PZ)      | 8780 | Confused by microseisms.   |
|       | ZV     | e      |        | 38 | 30 | 12      | 2(PH)      |      |  |
|       | E      | eS     |        | 48 | 13 | 18      | 5(SH)      |      | Mag = 6.4  |
|       | N      | iScS   |        | 48 | 45 |         |            |      |  |
|       | N      | iPS    |        | 48 | 59 |         |            |      | 52°N., 173°W. Andreanof Islands.   |
|       | NE     | eL     |        | 57 | -  |         |            |      | Aleutian Islands. Mag 6 <sup>3</sup> / <sub>4</sub> (Berk)                               |
|       | E      | M      | 16     | 19 | -  | 18      | 14         |      | U.S.C.G.S.   |
|       | N      | M      |        | 19 | -  | 18      | 16         |      |  |
|       | Z      | M      |        | 19 | -  | 18      | 15         |      |  |
|       |        | F      | 17     | 40 | -  |         |            |      |  |
| ✓ 10  | N      | eL     | 17     | 49 | -  |         |            |      | Mag = 6.0  |
|       | N      | M      |        | 59 | -  | 18      | 4          |      |  |
|       | E      | M      | 18     | 00 | -  | 18      | 3          |      | Aleutian Islands aftershock.   |
|       |        | F      |        | 45 | -  |         |            |      |  |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 19 57

| DATE. | COMPT. | PHASE. | G.M.T. |    |    | PERIOD.       | AMPLITUDE.         | Δ      | REMARKS.   |
|-------|--------|--------|--------|----|----|---------------|--------------------|--------|--|
|       |        |        | h.     | m. | s. |               |                    |        |  |
| 10    | ZV     | eP     | 19     | 30 | 32 |               |                    |        | Andreanof Islands aftershock.                                  |
| 10    | N      | e      | 20     | 13 | -  |               |                    |        | Very small. Aleutian Islands aftershock.                       |
|       |        | F      |        | 45 | -  |               |                    |        |  |
| 10    | ZV     | eP     | 21     | 08 | 46 |               |                    |        | Aleutian Islands aftershock.                                   |
| 10    | ZV     | eP     | 23     | 48 | 43 |               |                    |        | " " "  |
| 11    | ZV     | eP     | 00     | 08 | 38 |               |                    |        | Fox Islands aftershock.  |
|       | N      | M      |        | 46 | -  |               |                    |        |  |
| 11    | N      | e      | 00     | 57 | -  |               |                    |        | Very small. Fox Islands aftershock.                            |
|       |        | F      | 01     | 25 | -  |               |                    |        |  |
| 11    | ZV,Z   | eP     | 03     | 24 | 43 |               |                    | 8740   |  |
|       | ZV,Z   | iP     |        | 24 | 54 | 16            | 7 (PZ)             |        |  |
|       | Z      | i      |        | 25 | 11 | <del>16</del> | <del>4</del> (PH)  |        | Mag = 6.7  |
|       | ZN     | i      |        | 25 | 58 |               |                    |        |  |
|       | N      | iS     |        | 34 | 36 | <del>20</del> | <del>11</del> (SH) |        |  |
|       | N      | iScS   |        | 35 | 04 |               |                    |        |  |
|       | E      | iPS    |        | 35 | 17 |               |                    |        |  |
|       | NE     | iPPS   |        | 35 | 37 |               |                    |        |  |
|       | N      | iSS    |        | 39 | 40 |               |                    |        | 51°N., 177°W. Andreanof Islands.                               |
|       | N      | iSSS   |        | 43 | 40 |               |                    |        | Aleutian Islands. Mag 6 $\frac{3}{4}$ -7 (Pas)                 |
|       | N      | eL2    |        | 57 | -  |               |                    |        | U.S.C.G.S.   |
|       | E      | M      | 04     | 02 | -  | 21            | 50                 |        |  |
|       | N      | M      |        | 02 | -  | 21            | 51                 |        |  |
|       | E      | M      |        | 06 | -  | 20            | 30                 |        |  |
|       | N      | M      |        | 06 | -  | 20            | 57                 |        |  |
|       | Z      | M      |        | 10 | -  | 18            | 36                 |        |  |
|       |        | F      | 06     | 30 | -  |               |                    |        |  |
| 11    | ZV     | eP     | 07     | 03 | 51 |               |                    |        | Fox Islands aftershock.  |
| 11    | N      | e      | 07     | 28 | -  |               |                    |        | Very small. Fox Islands aftershock.                            |
|       |        | F      |        | 35 | -  |               |                    |        |  |
| 11    | ZV     | e(P)   | 09     | 35 | 51 |               |                    | (2300) |  |
|       | NE     | e(S)   |        | 39 | 36 |               |                    |        |  |
|       | NE     | eL     |        | 42 | -  |               |                    |        |  |
|       | E      | M      |        | 43 | -  | 12            | 3                  |        |  |
|       | N      | M      |        | 43 | -  | 12            | 5                  |        |  |
|       | NZ     | e      |        | 44 | 38 |               |                    |        |  |
|       |        | F      |        | 50 | -  |               |                    |        |  |
| 11    | ZV,Z   | iP     | 10     | 10 | 34 | 9             | 11 (PZ)            | (8500) | Mag = 7.0  |
|       | ZV,Z   | i      |        | 10 | 49 | <del>15</del> | <del>12</del> (PH) |        |  |
|       | ZN     | iPP    |        | 13 | 27 |               |                    |        |  |
|       | N      | eSS    |        | 25 | 14 |               |                    |        | S phase lost due to break in recording.                        |
|       | N      | i      |        | 25 | 59 |               |                    |        |  |
|       | N      | e      |        | 29 | 26 |               |                    |        |  |
|       | NE     | eL     |        | 31 | -  |               |                    |        | 53°N., 164 $\frac{1}{2}$ °W. Fox Islands.                      |
|       | E      | M      |        | 49 | -  | 19            | 67                 |        | Aleutian Islands. Mag 6 $\frac{3}{4}$ -7 (Pas)                 |
|       | N      | M      |        | 50 | -  | 18            | 85                 |        | U.S.C.G.S.   |
|       | Z      | M      |        | 50 | -  | 17            | 52                 |        |  |
|       |        | F      | 14     | 05 | -  |               |                    |        |  |
| 11    | N      | eL     | 13     | 50 | -  |               |                    |        |  |
|       | N      | M      |        | 52 | -  | 12            | 4                  |        |  |
|       |        | F      | -      | -  | -  |               |                    |        |  |
| 11    | ZV,ZN  | iP     | 15     | 07 | 18 | 9             | 11 (PZ)            | 8690   | Mag = 7.0  |
|       | Z      | i      |        | 07 | 34 | <del>45</del> | <del>9</del> (PH)  |        |  |
|       | Z      | i      |        | 07 | 54 |               |                    |        |  |
|       | NE     | iS     |        | 17 | 09 |               |                    |        |  |
|       | NE     | e      |        | 17 | 19 |               |                    |        |  |
|       | N      | iPPS   |        | 18 | 06 | 22            | 41                 |        |  |
|       | N      | eSS    |        | 22 | 13 |               |                    |        |  |
|       | N      | i      |        | 22 | 50 |               |                    |        | 51 $\frac{1}{2}$ °N., 178 $\frac{1}{2}$ °W. Andreanof Islands. |
|       | N      | iSSS   |        | 26 | 08 |               |                    |        | Aleutian Islands. Mag 6 $\frac{3}{4}$ (Pas)                    |
|       | E      | eL     |        | 28 | -  |               |                    |        | U.S.C.G.S.   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 1957

| DATE.  | COMPT. | PHASE.   | G.M.T. |                  |    | PERIOD. | AMPLITUDE. | Δ      | REMARKS.  |
|--------|--------|----------|--------|------------------|----|---------|------------|--------|---|
|        |        |          | h.     | m.               | s. |         |            |        |   |
| contd. |        |          |        |                  |    |         |            |        |   |
| ✓ 11   | N      | i (SKKS) | 15     | 33               | 06 |         |            |        |   |
|        | N      | M        |        | 42 $\frac{1}{2}$ | -  | 20      | 51         |        |   |
|        | E      | M        |        | 44 $\frac{1}{2}$ | -  | 20      | 42         |        |   |
|        | Z      | M        |        | 52 $\frac{1}{2}$ | -  | 17      | 28         |        |   |
|        |        | F        | -      | -                | -  |         |            |        |   |
| ✓ 11   | ZV,Z   | eP       | 15     | 47               | 53 |         |            |        | Mag = 6.5   |
|        | E      | M        | 16     | 24               | -  | 18      | 14         |        | 51 $\frac{1}{2}$ N., 178°W. Andreanof Islands.                |
|        | N      | M        |        | 27 $\frac{1}{2}$ | -  | 18      | 15         |        | Aleutian Islands. Mag 6 $\frac{1}{2}$ (Pas)                   |
|        |        | F        | -      | -                | -  |         |            |        | U.S.C.G.S.  |
| 12     | ZV     | eP       | 01     | 14               | 30 |         |            |        | Very small.   |
|        | N      | M        |        | 55               | -  |         |            |        | 52°N., 174 $\frac{1}{2}$ °W. Andreanof Islands.               |
|        |        | F        | 02     | 15               | -  |         |            |        | Aleutian Islands. U.S.C.G.S.                                  |
| 12     | NE     | e        | 05     | 53               | -  |         |            |        | Very small. Fox Islands.                                      |
|        |        | F        | 06     | 10               | -  |         |            |        | Aleutian Islands. U.S.C.G.S.                                  |
| ✓ 12   | ZN     | eP       | 07     | 40               | 41 | 12      | 3 (PZ)     | 8690   | Mag = 6.5   |
|        | E      | eS       |        | 50               | 32 | 14      | 3 (PH)     |        |   |
|        | N      | eSKS     |        | 50               | 48 |         |            |        |   |
|        | N      | eSS      |        | 55               | 50 |         |            |        | 51 $\frac{1}{2}$ N., 173 $\frac{1}{2}$ °W. Andreanof Islands, |
|        | N      | eSSS     |        | 59               | 33 |         |            |        | Aleutian Islands. Mag 6 $\frac{1}{4}$ -6 $\frac{1}{2}$ (Pas)  |
|        | N      | eL       | 08     | 06               | -  |         |            |        | U.S.C.G.S.  |
|        | N      | M        |        | 16               | -  | 20      | 19         |        |   |
|        | E      | M        |        | 22 $\frac{1}{2}$ | -  | 18      | 18         |        |   |
|        | Z      | M        |        | 24               | -  | 19      | 13         |        |   |
|        |        | F        | -      | -                | -  |         |            |        |   |
| ✓ 12   | ZV,Z   | iP       | 07     | 51               | 15 |         |            |        | 52°N., 178°W. Andreanof Islands.                              |
|        | ZV,Z   | e        |        | 52               | 32 |         |            |        | Mag 6 $\frac{1}{4}$ -6 $\frac{1}{2}$ (Pas) U.S.C.G.S.         |
| 12     | ZV     | eP       | 08     | 15               | 12 |         |            |        | Andreanof Islands aftershock.                                 |
| 12     | Z      | iP       | 11     | 56               | 56 |         |            | 8740   | Mag = 7.0   |
|        | Z      | i        |        | 57               | 03 |         |            |        |   |
|        | ZN     | i        |        | 57               | 16 |         |            |        |   |
|        | ZN     | e        |        | 57               | 26 |         |            |        |   |
|        | NE     | iS       | 12     | 06               | 49 |         |            |        |   |
|        | N      | iScS     |        | 07               | 14 |         |            |        | 51°N., 177°W. Andreanof Islands.                              |
|        | NZ     | iPPS     |        | 07               | 42 |         |            |        | Aleutian Islands. Mag 7-7 $\frac{1}{4}$ (Pas).                |
|        | N      | e        |        | 11               | 26 |         |            |        | U.S.C.G.S.  |
|        | N      | iSS      |        | 12               | 10 |         |            |        |   |
|        | N      | eSSS     |        | 14               | 56 |         |            |        |   |
|        | E      | eLq      |        | 18.0             | -  |         |            |        |   |
|        | E      | M        |        | 30 $\frac{1}{2}$ | -  | 24      | 88         |        |   |
|        | N      | M        |        | 33               | -  | 24      | 106        |        |   |
|        | Z      | M        |        | 40               | -  | 16      | 48         |        |   |
|        |        | F        | -      | -                | -  |         |            |        |   |
| 12     | Z      | iP       | 12     | 58               | 08 |         |            |        | Fox Islands. U.S.C.G.S.                                       |
| 12     | Z      | ePKP     | 19     | 30               | 08 |         |            |        | 16°S., 176 $\frac{1}{2}$ °W. Fiji Islands.                    |
|        |        |          |        |                  |    |         |            |        | h about 400 km. U.S.C.G.S.                                    |
| 12     | Z      | eP       | 21     | 35               | 32 |         |            | (9300) | Very small. 2 $\frac{1}{2}$ °S., 80°W. Near                   |
|        | E      | e (SKS)  |        | 45               | 44 |         |            |        | coast of Ecuador. U.S.C.G.S.                                  |
|        |        | F        | 22     | 15               | -  |         |            |        |   |
| 13     | N      | e        | 00     | 30               | -  |         |            |        | Very small. Andreanof Islands.                                |
|        |        | F        | 01     | 10               | -  |         |            |        | U.S.C.G.S.  |
| ✓ 13   | N      | e (S)    | 03     | 10               | 00 |         |            |        | Mag = 6.1   |
|        | E      | eL       |        | 22               | -  |         |            |        |   |
|        | Z      | M        |        | 40               | -  | 16      | 3          |        | 52°N., 171 $\frac{1}{2}$ °W. Andreanof Islands.               |
|        | N      | M        |        | 41               | -  | 18      | 4          |        | U.S.C.G.S.  |
|        | E      | M        |        | 42               | -  | 16      | 4          |        |   |
|        |        | F        | 04     | 35               | -  |         |            |        |   |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 19 57

| DATE. | COMPT. | PHASE. | G.M.T. |                                |    | PERIOD.       | AMPLI-<br>TUDE.   | Δ   | REMARKS.  |      |           |
|-------|--------|--------|--------|--------------------------------|----|---------------|-------------------|---|---|------|-----------|
|       |        |        | h.     | m.                             | s. |               |                   |   |   | sec. | μ         |
| 13    | N      | e      | 09     | 47                             | -  |               |                   |   | Small.<br>52 <sup>1</sup> / <sub>2</sub> N., 170 <sup>0</sup> W. Fox Islands.<br>U.S.C.G.S. |      |           |
|       | N      | M      | 10     | 00                             | -  |               |                   |   |   |      |           |
| 13    | ZV,Z   | iP     | 15     | 54                             | 03 |               |                   | 8640  | Mag = 6.6   |      |           |
|       | ZV,Z   | i      |        | 54                             | 11 |               |                   |   |   |      |           |
|       | ZV,Z   | i      |        | 54                             | 53 |               |                   |   |   |      |           |
|       | Z      | ePP    |        | 57                             | 00 |               |                   |   |   |      |           |
|       | N      | iS     | 16     | 03                             | 52 |               |                   |   |   |      |           |
|       | N      | eSKS   |        | 04                             | 12 |               |                   |   |   |      |           |
|       | E      | i      |        | 04                             | 20 |               |                   |   |   |      |           |
|       | N      | eL     |        | 18                             | -  |               |                   |   |   |      |           |
|       | E      | M      |        | 30                             | -  | 23            | 19                |   |   |      |           |
|       | N      | M      |        | 30                             | -  | 23            | 23                |   |   |      |           |
| Z     | M      |        | 35     | -                              | 17 | 14            |                   |   |   |      |           |
| 13    | ZV,Z   | iP     | 18     | 55                             | -  |               |                   | Mag = 6.1   |   |      |           |
|       | N      | M      | 20     | 11                             | 04 |               |                   |   |   |      |           |
|       | E      | M      |        | 46 <sup>1</sup> / <sub>2</sub> | -  | 20            | 5                 |   |   |      |           |
| 13    | Z      | M      |        | 47                             | -  | 20            | 3                 | 54 <sup>0</sup> N., 166 <sup>0</sup> W. Fox Islands.<br>Aleutian Islands. U.S.C.G.S.  |   |      |           |
|       | Z      | M      |        | 47                             | -  | 20            | 4                 |   |   |      |           |
| 14    | N      | F      | 21     | 35                             | -  |               |                   | Very small.   |   |      |           |
|       | N      | M      | 00     | 37                             | -  |               |                   |   |   |      |           |
| 14    | NE     | F      | 01     | 00                             | -  |               |                   | Very small.<br>52 <sup>1</sup> / <sub>2</sub> N., 169 <sup>0</sup> W. Fox Islands.<br>U.S.C.G.S.  |   |      |           |
|       | NE     | M      | 02     | 33                             | -  |               |                   |   |   |      |           |
| 14    | NE     | F      | 03     | 43                             | -  |               |                   | Very small. 53 <sup>1</sup> / <sub>2</sub> N., 163 <sup>1</sup> / <sub>2</sub> W.<br>Off south coast of Unimak Island.<br>U.S.C.G.S.  |   |      |           |
|       | NE     | M      | 03     | 10                             | -  |               |                   |   |   |      |           |
| 14    | ZV,Z   | iP     | 02     | 58                             | 49 |               |                   | 8620  | Multiple shock.<br>Compression.   |      |           |
|       | N      | M      | 03     | 39                             | -  |               |                   |   |   |      |           |
| 14    | ZV,Z   | eP     | 14     | 59                             | 38 |               |                   | Mag = 7.0   |   |      |           |
|       | ZV,Z   | i(P)   |        | 59                             | 44 |               |                   |   |   |      |           |
|       | ZV,ZN  | i(P)   | 15     | 00                             | 08 | 10            | 11 (PZ)           |   |   |      |           |
|       | ZV,ZN  | i(P)   |        | 00                             | 29 | <del>14</del> | <del>8 (PH)</del> |   |   |      |           |
|       | ZV,ZN  | i(P)   |        | 00                             | 47 |               |                   |   |   |      |           |
|       | ZV,ZN  | iPP    |        | 02                             | 34 |               |                   |   |   |      |           |
|       | N      | e      |        | 09                             | 19 |               |                   |   |   |      |           |
|       | N      | iS     |        | 09                             | 26 | 16            | 28                |   |   |      |           |
|       | NE     | i(S)   |        | 09                             | 53 |               |                   |   |   |      |           |
|       | N      | i(S)   |        | 10                             | 23 |               |                   |   |   |      |           |
| 14    | E      | iLQ    |        | 20                             | 50 |               |                   | 51 <sup>1</sup> / <sub>2</sub> N., 177 <sup>0</sup> W. Andreanof Islands,<br>Aleutian Islands. Mag 7 <sup>1</sup> / <sub>2</sub> (Pas),<br>7 <sup>1</sup> / <sub>4</sub> -7 <sup>1</sup> / <sub>2</sub> (Berk) U.S.C.G.S. |   |      |           |
|       | E      | M      |        | 45                             | -  | 17            | 86                |   |   |      |           |
|       | N      | M      |        | 45                             | -  | 18            | 83                |   |   |      |           |
|       | N      | M      |        | 50 <sup>1</sup> / <sub>4</sub> | -  | 17            | 89                |   |   |      |           |
|       | Z      | M      |        | 50 <sup>1</sup> / <sub>2</sub> | -  | 16            | 38                |   |   |      |           |
|       |        | F      | 19     | 10                             | -  |               |                   |   |   |      |           |
|       | NE     | e      | 22     | 58                             | -  |               |                   |   |   |      |           |
|       |        | F      | 23     | 20                             | -  |               |                   |   |   |      |           |
|       | 15     | ZV,ZN  | iP     | 03                             | 03 | 56            |                   |   |   | 8550 | Mag = 6.4 |
|       |        | NE     | eS     |                                | 13 | 41            |                   |   |   |      |           |
| N     |        | e      |        | 14                             | 08 |               |                   |   |   |      |           |
| N     |        | eSS    |        | 18                             | 32 |               |                   |   |   |      |           |
| N     |        | eSSS   |        | 22                             | 44 |               |                   |   |   |      |           |
| E     |        | eL     |        | 25                             | -  |               |                   |   |   |      |           |
| Z     |        | M      |        | 41                             | -  | 15            | 9                 |   |   |      |           |
| E     |        | M      |        | 43                             | -  | 17            | 15                |   |   |      |           |
| N     |        | M      |        | 43                             | -  | 19            | 14                |   |   |      |           |
|       |        | F      | 06     | 00                             | -  |               |                   |   |   |      |           |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 1957

| DATE. | COMPT. | PHASE. | G.M.T. |      |    | PERIOD. | AMPLITUDE. | Δ    | REMARKS.   |
|-------|--------|--------|--------|------|----|---------|------------|------|--|
|       |        |        | h.     | m.   | s. |         |            |      |  |
| 16    | ZV     | iP     | 00     | 51   | 31 |         |            | 4800 | Mag = 5.6<br>35°N., 53°E. Northern Iran.<br>U.S.C.G.S.   |
|       | N      | e(S)   |        | 57   | 55 |         |            |      |  |
|       | N      | eL     | 01     | 07   | -  |         |            |      |  |
|       | N      | M      |        | 11½  | -  | 22      | 2          |      |  |
| 16    | ZV,Z   | iP     | 02     | 46   | 09 |         |            | 8660 | Mag = 6.9<br><br>52°N., 179°W. Andreanof Islands,<br>Aleutian Islands. Mag 6¼(Pas),<br>7 (Berk) U.S.C.G.S.<br><br>Large amplitude. |
|       | ZV,ZN  | i(P)   |        | 46   | 14 |         |            |      |  |
|       | ZV,ZN  | i(P)   |        | 46   | 20 | 13      | 9 (PZ)     |      |  |
|       | ZV,Z   | i      |        | 46   | 39 | 18      | 12 (PH)    |      |  |
|       | ZV,Z   | i      |        | 46   | 53 |         |            |      |  |
|       | ZV,Z   | iPP    |        | 49   | 13 |         |            |      |  |
|       | E      | iS     |        | 56   | 09 | 28      | 58 (SH)    |      |  |
|       | N      | iSKS   |        | 56   | 22 |         |            |      |  |
|       | NZ     | iPS    |        | 56   | 43 |         |            |      |  |
|       | N      | iPPS   |        | 56   | 59 | 23      | 55         |      |  |
|       | N      | iSS    | 03     | 01   | 06 |         |            |      |  |
|       | E      | eLQ    |        | 07   | -  |         |            |      |  |
|       | E      | M      |        | 26   | -  | 19      | 46         |      |  |
|       | N      | M      |        | 26   | -  | 19      | 75         |      |  |
| E     | M      |        | 33     | -    | 17 | 49      |            |      |  |
| N     | M      |        | 33     | -    | 17 | 74      |            |      |  |
| Z     | M      |        | 33     | -    | 17 | 40      |            |      |  |
| 17    | NE     | eL     | 00     | 45   | -  |         |            |      | Small.   |
|       |        | F      | 01     | 10   | -  |         |            |      |  |
| 17    | ZV,Z   | eP     | 08     | 05   | 49 |         |            | 8600 | Mag = 6.0<br><br>51°N., 179°W. Andreanof Islands.<br>U.S.C.G.S.  |
|       | E      | e(S)   |        | 15   | 36 |         |            |      |  |
|       | E      | M      |        | 49   | -  | 17      | 3          |      |  |
|       | N      | M      |        | 49   | -  | 17      | 3          |      |  |
| 17    | ZV,Z   | eP     | 16     | 29   | 05 |         |            |      | Confused by microseisms.<br><br>52½°N., 166°W. Fox Islands,<br>Aleutian Islands. U.S.C.G.S.<br>Compression.                        |
|       | ZV,Z   | i      |        | 29   | 09 |         |            |      |  |
|       | E      | eL     |        | 48   | -  |         |            |      |  |
|       |        | F      | 17     | 20   | -  |         |            |      |  |
| 17    | ZV,Z   | iP     | 22     | 56   | 27 | 6       | 3(PZ)      | 8540 | Mag = 6.5<br><br>54°N., 166°W. Fox Islands,<br>Aleutian Islands. Mag 6½(Pas)<br>U.S.C.G.S.   |
|       | ZV,Z   | i      |        | 56   | 38 |         |            |      |  |
|       | NE     | eS     | 23     | 06   | 11 |         |            |      |  |
|       | N      | eSS    |        | 11.2 | -  |         |            |      |  |
|       | E      | eLQ    |        | 17   | -  |         |            |      |  |
|       | N      | M      |        | 34   | -  | 18      | 12         |      |  |
|       | E      | M      |        | 36   | -  | 18      | 11         |      |  |
|       | Z      | M      |        | 36   | -  | 16      | 7          |      |  |
| 18    | ZV,Z   | eP     | 02     | 37   | 16 |         |            |      | Mag = 6.0<br>52½°N., 171°W. Fox Islands,<br>Aleutian Islands. U.S.C.G.S.   |
|       | E      | eL     |        | 58   | -  |         |            |      |  |
|       | N      | M      | 03     | 13   | -  | 20      | 3          |      |  |
| 18    | NE     | e      | 05     | 50   | -  |         |            |      | 51½°N., 179°W. Andreanof Islands.<br>U.S.C.G.S.  |
|       | N      | M      | 06     | 05   | -  | 20      | 2          |      |  |
| 18    | N      | e(PKS) | 21     | 36   | 50 |         |            |      | Mag = 6¼<br>6°S., 152°E. New Britain.<br>U.S.C.G.S.  |
|       | NE     | eL     | 22     | 17   | -  |         |            |      |  |
|       | N      | M      |        | 29   | -  | 24      | 4          |      |  |
| 18    | ZV,Z   | eP     | 23     | 22   | 38 |         |            |      | Small.   |
|       | ZV,Z   | e      |        | 22   | 43 |         |            |      |  |
|       | NE     | M      |        | 34   | -  |         |            |      |  |
|       |        | F      |        | 45   | -  |         |            |      |  |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

..... MARCH, ..... 19 57.

| DATE. | COMPT. | PHASE. | G.M.T. |      |    | PERIOD. | AMPLI-<br>TUDE. | Δ  | REMARKS.  |
|-------|--------|--------|--------|------|----|---------|-----------------|--|---|
|       |        |        | h.     | m.   | s. |         |                 |  |   |
| 19    | ZV,Z   | eP     | 11     | 40   | 54 |         |                 | 8690   | Mag = 5.9<br><br>51½°N., 176½°W. Andreanof Islands.<br>Aleutian Islands. U.S.C.G.S.               |
|       | NE     | eS     |        | 50   | 45 |         |                 |  |   |
|       | N      | eSS    |        | 56.0 | -  |         |                 |  |   |
|       | N      | eL     | 12     | 03   | -  |         |                 |  |   |
|       | E      | M      |        | 21   | -  | 20      | 2               |  |   |
| 19    | ZV,Z   | eP     | 13     | 02   | 54 |         |                 | 8620   | Mag = 6.6<br><br>51½°N., 175°W. Andreanof Islands,<br>Aleutian Islands. Mag 6¼(Pas)<br>U.S.C.G.S. |
|       | ZV,Z   | iP     |        | 02   | 58 | 6       | 3(PZ)           |  |   |
|       | ZV,Z   | e      |        | 03   | 19 |         |                 |  |   |
|       | Z      | i      |        | 03   | 38 |         |                 |  |   |
|       | Z      | iPP    |        | 05   | 55 |         |                 |  |   |
|       | NZ     | e      |        | 12   | 34 |         |                 |  |   |
|       | NE     | iS     |        | 12   | 46 | 16      | 8(SH)           |  |   |
|       | N      | iScS   |        | 13   | 13 |         |                 |  |   |
|       | N      | iPS    |        | 13   | 35 |         |                 |  |   |
|       | N      | eSS    |        | 18.0 | -  |         |                 |  |   |
|       | N      | i      |        | 21   | 24 |         |                 |  |   |
|       | E      | eLQ    |        | 23   | -  |         |                 |  |   |
|       | E      | M      |        | 35½  | -  | 26      | 29              |  |   |
|       | E      | M      |        | 35½  | -  | 24      | 31              |  |   |
|       | E      | M      |        | 42   | -  | 19      | 26              |  |   |
| N     | M      |        | 42     | -    | 20 | 16      |                 |  |   |
| Z     | M      |        | 48     | -    | 16 | 14      |                 |  |   |
| 19    | NE     | F      | 15     | 55   | -  |         |                 | Small. Aleutian Islands aftershock.  |   |
|       |        | F      | 16     | 37   | -  |         |                 |  |   |
| 19    | N      | F      | 17     | 00   | -  |         |                 | Very small. 52½°N., 171°W.<br>Fox Islands. U.S.C.G.S.  |   |
|       |        | F      | 17     | 50   | -  |         |                 |  |   |
| 20    | ZV     | eP     | 00     | 34   | 14 |         |                 | Small. 53°N., 169°W. Fox Islands,<br>Aleutian Islands. U.S.C.G.S.  |   |
|       | N      | M      | 01     | 19   | -  |         |                 |  |   |
| 21    | NE     | eL     | 09     | 25   | -  |         |                 | 14½°N., 93°W. Near coast of<br>Chiappas, Mexico. U.S.C.G.S.  |   |
|       | E      | M      |        | 30   | -  | 18      | 3               |  |   |
|       |        | F      |        | 55   | -  |         |                 |  |   |
| 21    | NE     | eL     | 17     | 34   | -  |         |                 | Small.   |   |
|       | E      | M      |        | 48   | -  | 23      | 4               |  |   |
|       | N      | M      |        | 48   | -  | 23      | 4               |  |   |
| 21    | NE     | F      | 18     | 15   | -  |         |                 | Small.   |   |
|       |        | F      | 18     | 25   | -  |         |                 |  |   |
| 22    | NE     | eL     | 11     | 18   | -  |         |                 | Small.   |   |
|       | E      | M      |        | 20½  | -  | 16      | 4               |  |   |
| 22    | N      | M      |        | 20½  | -  | 16      | 2               | 8260<br>Compression.<br>Mag = 6.9<br><br>Ee<br><br>54°N., 166°W. Fox Islands.<br>Aleutian Islands. Mag 7(Pas), (Berk).<br>U.S.C.G.S. |   |
|       | ZV, ZN | iP     | 14     | 32   | 47 | 8       | 10(PZ)          |  |   |
|       | ZN     | iPP    |        | 35   | 37 | 18      | 10(PH)          |  |   |
|       | NE     | iS     |        | 42   | 18 | 20      | 22(SH)          |  |   |
|       | ZNE    | iSKS   |        | 42   | 39 |         |                 |  |   |
|       | N      | iPS    |        | 42   | 55 |         |                 |  |   |
|       | NE     | ePPS   |        | 43   | 12 |         |                 |  |   |
|       | ZNE    | i      |        | 43   | 36 |         |                 |  |   |
|       | N      | iSS    |        | 46   | 58 |         |                 |  |   |
|       | N      | iSSS   |        | 50   | 16 |         |                 |  |   |
|       | E      | eLQ    |        | 53.0 | -  |         |                 |  |   |
|       | ZNE    | eL2    |        | 59.8 | -  |         |                 |  |   |
|       | E      | M      |        | 15   | 01 | -       | 27              |  | 84  |
|       | N      | M      |        |      | 05 | -       | 23              |  | 62  |
|       | E      | M      |        |      | 09 | -       | 20              |  | 51  |
| N     | M      |        |        | 10   | -  | 20      | 46              |  |   |
| Z     | M      |        |        | 16   | -  | 19      | 36              |  |   |
|       | F      |        | 18     | 20   | -  |         |                 |  |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 1957

| DATE. | COMPT.  | PHASE.  | G.M.T.   |                      |   | PERIOD.  | AMPLITUDE.  | Δ         | REMARKS.   |
|-------|---|---|----------|----------------------|---|----------|---|-----------|--|
|       |   |   | h.       | m.                   | s.  |          |   |           |  |
| 22    | ZV,Z<br>NE  | eP<br>e<br>F  | 19       | 56                   | 20  |          |   |           | Very small.<br>37.9°N., 122.6°W. Northern California. Mag. 5 $\frac{1}{4}$ -5 $\frac{1}{2}$ (Pas). USCGS. Depth about 60 Km. |
| 23    | ZV,Z<br>ZV,Z<br>ZV,Z<br>E<br>N<br>E<br>E<br>N<br>N<br>EN<br>N<br>N<br>N<br>Z<br>E | ePKP<br>ePP<br>e<br>eSKKS<br>eS<br>esS<br>ePS<br>esPS<br>eSS<br>isSS<br>iSSS<br>e<br>eL<br>M<br>M<br>M<br>F | 05       | 32                   | 03<br>32<br>43<br>33<br>47<br>39<br>23<br>40<br>13<br>40<br>41<br>42<br>24<br>42<br>48<br>48<br>10<br>48<br>48<br>52<br>12<br>52<br>48<br>06<br>00<br>--<br>24<br>--<br>24<br>--<br>28<br>--<br>07<br>40<br>--<br>02<br>16<br>--<br>22<br>--<br>30<br>--<br>08<br>00<br>--<br>17<br>--<br>35<br>--<br>08<br>33<br>35<br>42<br>48<br>43.3<br>--<br>54<br>--<br>09<br>02 $\frac{1}{2}$<br>--<br>18<br>8<br>03 $\frac{1}{2}$<br>--<br>18<br>8<br>03 $\frac{1}{2}$<br>--<br>18<br>6<br>35<br>--<br>11<br>44<br>--<br>12<br>01<br>--<br>17<br>4<br>02<br>--<br>18<br>4<br>--<br>--<br>--<br>--<br>12<br>24<br>--<br>18<br>3<br>24<br>--<br>19<br>5<br>55<br>--<br>00<br>51<br>15<br>01<br>23<br>--<br>40<br>--<br>06<br>49<br>12<br>49<br>29<br>49<br>34<br>51.0<br>--<br>14<br>55<br>--<br>15<br>10<br>--<br>19<br>40<br>--<br>50<br>--<br>22<br>04<br>--<br>09<br>--<br>18<br>3<br>11<br>--<br>18<br>2<br>55<br>--<br>03<br>45<br>--<br>04<br>01<br>--<br>18<br>2<br>02<br>--<br>18<br>2<br>20<br>-- | 2300     | 9<br>5<br>9<br>3<br>8<br>8<br>6<br>4<br>4<br>3<br>5 | Mag = 6.5 |  |
| 24    | NE<br>NE  | e<br>M<br>F   | 02       | 16                   | --  |          |   |           | Very small.  |
| 24    | NE<br>N   | eL<br>M<br>F  | 08       | 00                   | --  | 18       | 3   |           |  |
| 24    | ZV,Z<br>NE<br>N<br>NE<br>E<br>N<br>Z  | eP<br>eS<br>eSS<br>eL<br>M<br>M<br>M<br>F   | 08       | 33                   | 35<br>42<br>48<br>43.3<br>--<br>54<br>--<br>09<br>02 $\frac{1}{2}$<br>--<br>18<br>8<br>03 $\frac{1}{2}$<br>--<br>18<br>8<br>03 $\frac{1}{2}$<br>--<br>18<br>6<br>35<br>--<br>11<br>44<br>--<br>12<br>01<br>--<br>17<br>4<br>02<br>--<br>18<br>4<br>--<br>--<br>--<br>--<br>12<br>24<br>--<br>18<br>3<br>24<br>--<br>19<br>5<br>55<br>--<br>00<br>51<br>15<br>01<br>23<br>--<br>40<br>--<br>06<br>49<br>12<br>49<br>29<br>49<br>34<br>51.0<br>--<br>14<br>55<br>--<br>15<br>10<br>--<br>19<br>40<br>--<br>50<br>--<br>22<br>04<br>--<br>09<br>--<br>18<br>3<br>11<br>--<br>18<br>2<br>55<br>--<br>03<br>45<br>--<br>04<br>01<br>--<br>18<br>2<br>02<br>--<br>18<br>2<br>20<br>--   | 7900     | 8<br>8<br>6<br>4<br>4<br>3<br>5                     | Mag = 6.3 |  |
| 24    | NE<br>E<br>N  | eL<br>M<br>M<br>F   | 11       | 44                   | --  |          |   |           |  |
| 24    | E<br>N  | M<br>M<br>F   | 12       | 24                   | --  | 18       | 3<br>5  |           | overlapped by next shock.  |
| 25    | ZV<br>N   | iP<br>eL<br>F   | 00       | 51                   | 15  |          |   |           | Very small.  |
| 25    | ZV<br>ZV<br>ZV,ZN   | e(Lg)<br>e<br>e<br>F  | 06       | 49                   | 12<br>29<br>34<br>51.0  |          |   |           | Ho = 06h. 46m. 13s.<br>46°03'N., 3°27'E.<br>Southern France. B.C.I.S.  |
| 25    | NE  | e<br>F  | 14       | 55                   | --  |          |   |           | Very small.  |
| 25    | N   | e<br>F  | 15       | 10                   | --  |          |   |           | Very small.  |
| 25    | N<br>E<br>N   | eL<br>M<br>M<br>F   | 19       | 40                   | --<br>50<br>--  |          |   |           |  |
| 25    | N<br>E<br>N   | eL<br>M<br>M<br>F   | 22       | 04                   | --<br>09<br>--<br>11<br>--  | 18<br>18 | 3<br>2  |           |  |
| 26    | NE<br>E<br>N  | e<br>M<br>M<br>F  | 03<br>04 | 45<br>01<br>02<br>20 | --<br>--<br>--<br>--  | 18<br>18 | 2<br>2  |           |  |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MARCH, 1957

| DATE. | COMPT. | PHASE.  | G.M.T. |                  |    | PERIOD. | AMPLITUDE. | Δ     | REMARKS.  |
|-------|--------|---------|--------|------------------|----|---------|------------|-------|---|
|       |        |         | h.     | m.               | s. |         |            |       |   |
| 26    | N      | eL<br>F | 23     | 24 $\frac{1}{2}$ | -  |         |            |       | Very small.   |
| 28    | N      | e       | 20     | 30               | -  |         |            |       |   |
|       | N      | M       |        | 59 $\frac{1}{2}$ | -  | 18      | 3          |       |   |
|       | E      | M<br>F  | 21     | 00               | -  | 18      | 2          |       |   |
| 28    | ZV,Z   | eP      | 22     | 30               | 41 |         |            | 2250  | Mag = 5 $\frac{1}{2}$                                       |
|       | ZV,Z   | i       |        | 30               | 45 |         |            |       | Ho = 22h. 26m. 00s.   |
|       | NE     | eS      |        | 34               | 26 |         |            |       | 39 $\frac{1}{2}$ °N., 23 $\frac{3}{4}$ °E. Region of Volos, |
|       | NE     | eL      |        | 37               | -  |         |            |       | Greece. B.C.I.S.  |
|       | N      | M       |        | 38 $\frac{1}{4}$ | -  | 11      | 4          |       |   |
|       | E      | M       |        | 39 $\frac{1}{2}$ | -  | 12      | 4          |       |   |
|       | Z      | M<br>F  |        | 39               | -  | 10      | 4          |       |   |
|       |        |         |        | 55               | -  |         |            |       |   |
| 29    | ZV,Z   | iP      | 05     | 22               | 13 | 9       | 4 (PZ)     | 834.0 | Compression.  |
|       | ZV,Z   | i       |        | 22               | 24 | 48      | 5 (PH)     |       |   |
|       | ZV,Z   | i       |        | 22               | 48 |         |            |       |   |
|       | Z      | iPP     |        | 25               | 04 | 9       | 3 (PPZ)    |       | Mag = 6.5   |
|       | N      | iS      |        | 31               | 47 | 48      | 5 (SH)     |       | Ee  |
|       | N      | iSKS    |        | 32               | 07 |         |            |       | Ee  |
|       | N      | iScS    |        | 32               | 20 |         |            |       |   |
|       | NE     | iPPS    |        | 32               | 44 |         |            |       |   |
|       | N      | eSS     |        | 36.6             | -  |         |            |       |   |
|       | E      | eL      |        | 43               | -  |         |            |       |   |
|       | E      | M       |        | 50               | -  | 27      | 38         |       |   |
|       | N      | M       |        | 53               | -  | 24      | 37         |       |   |
|       | Z      | M       |        | 06               | 02 | -       | 16         | 12    |   |
| N     | M      |         |        | 02 $\frac{1}{2}$ | -  | 20      | 27         |       |   |
| E     | M<br>F |         |        | 04 $\frac{1}{2}$ | -  | 19      | 21         |       |   |
| 29    | Z      | eP      | 08     | 25               | -  |         |            | 8700  | Mag = 6.1   |
|       | NE     | eS      | 23     | 01               | 40 |         |            |       |   |
|       | E      | e       |        | 11               | 32 |         |            |       |   |
|       | NE     | eL      |        | 12               | 12 |         |            |       |   |
|       | N      | M       |        | 31               | -  |         |            |       |   |
|       | E      | M       |        | 39               | -  | 19      | 4          |       |   |
| 30    | NE     | F       |        | 42               | -  | 20      | 3          |       |   |
|       |        | F       | 24     | 20               | -  |         |            |       |   |
|       |        | F       | 09     | 55               | -  |         |            |       | Very small.   |
| 31    | NE     | F       | 10     | 20               | -  |         |            |       | Very small.   |
|       |        | F       | 10     | 50               | -  |         |            |       |   |
|       |        | F       | 11     | 15               | -  |         |            |       |   |

All the magnitudes are the "unified magnitudes" denoted by "m".



N.O. 627

**AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.**

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN FOR..... APRIL..... 19 57.**

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"

(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD T.<br>1.<br>sec. | PENDULUM FREE PERIOD T.<br>sec. | DAMPING CONSTANT $\mu^2$ . | $\frac{Ak}{\pi l}$<br>sec. <sup>-1</sup> |
|------------|----------------------------------|---|---------------------------------|----------------------------|--|
| N.         | 25 August, 1954                  | 21.7                                      | 21.2                            | +0.01                      | 54.4                                     |
| E.         | 26 August, 1954                  | 21.3                                      | 21.4                            | +0.01                      | 52.6                                     |
| Z.         | 1 September, 1954                | 11.3                                      | 11.4                            | +0.05                      | 115.                                     |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.  
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.  
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT.                            | PHASE.      | G.M.T. |                |             | PERIOD. | AMPLITUDE. | $\Delta$ | REMARKS.  |
|-------|-----------------------------------|-------------|--------|----------------|-------------|---------|------------|----------|---|
|       |                                   |             | h.     | m.             | s.          |         |            |          |   |
| ✓ 1   | ZV,Z<br>N<br>N<br>E               | eP          | 11     | 47             | 32          | 18      | 2          | 8690     | 51°N., 173°W. Andreanof Islands,<br>Aleutian Islands. U.S.C.G.S.  |
|       |                                   | eS          |        | 57             | 23          |         |            |          |   |
|       |                                   | eL          | 12     | 13             | -           |         |            |          |   |
|       |                                   | M<br>F      |        | 30<br>45       | -<br>-      |         |            |          |   |
| ✓ 2   | ZV,Z<br>ZV,Z<br>E<br>NE<br>N<br>E | iP          | 00     | 51             | 43          | 18      | 1<br>2     | 8670     | 51°N., 173°W. Andreanof Islands,<br>Aleutian Islands. U.S.C.G.S.  |
|       |                                   | e           |        | 51             | 55          |         |            |          |   |
|       |                                   | eS          | 01     | 01             | 33          |         |            |          |   |
|       |                                   | eL          |        | 17             | -           |         |            |          |   |
|       |                                   | M<br>F      |        | 32<br>34       | -<br>-      |         |            |          |   |
|       |                                   |             | 02     | 05             | -           |         |            |          |   |
| 2     | N<br>N                            | eL          | 05     | 07             | -           | 14      | 1          |          |   |
|       |                                   | M<br>F      |        | 09<br>13       | -<br>-      |         |            |          |   |
|       |                                   |             |        |                |             |         |            |          |   |
| ✓ 2   | ZV,Z<br>NE<br>N<br>E              | eP          | 20     | 28             | 57          | 18      | 1<br>2     | 8690     | 51½°N., 173°W. Andreanof Islands,<br>Aleutian Islands. U.S.C.G.S. |
|       |                                   | eL          |        | 54             | -           |         |            |          |   |
|       |                                   | M           | 21     | 09             | -           |         |            |          |   |
|       |                                   | M<br>F      |        | 11<br>35       | -<br>-      |         |            |          |   |
|       |                                   |             |        |                |             |         |            |          |   |
| ✓ 2   | ZV,Z<br>ZV,Z<br>N<br>N<br>E       | eP          | 21     | 39             | 56          | 18      | 1<br>2     | 8690     | 51°N., 173°W. Andreanof Islands,<br>Aleutian Islands. U.S.C.G.S.  |
|       |                                   | e           |        | 40             | 08          |         |            |          |   |
|       |                                   | eS          |        | 49             | 47          |         |            |          |   |
|       |                                   | eL          | 22     | 06             | -           |         |            |          |   |
|       |                                   | M<br>M<br>F |        | 20<br>22<br>45 | -<br>-<br>- |         |            |          |   |
|       |                                   |             |        |                |             |         |            |          |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

APRIL, 19 57.

| DATE.  | COMPT. | PHASE.          | G.M.T. |     |    | PERIOD. | AMPLI-TUDE. | Δ     | REMARKS.                             |
|--------|--------|-----------------|--------|-----|----|---------|-------------|-------|--------------------------------------|
|        |        |                 | h.     | m.  | s. |         |             |       |                                      |
| contd. |        |                 |        |     |    |         |             |       |                                      |
| 10     | E      | eL <sub>Q</sub> | 11     | 59  | -  |         |             |       |                                      |
|        | NZ     | eL <sub>R</sub> | 12     | 03  | -  |         |             |       |                                      |
|        | E      | M               |        | 06  | -  | 27      | 87          |       |                                      |
|        | N      | M               |        | 10  | -  | 23      | 91          |       |                                      |
|        | E      | M               |        | 16  | -  | 19      | 72          |       |                                      |
|        | N      | M               |        | 17  | -  | 18      | 81          |       | Mag. = 7.0                           |
|        | Z      | M               |        | 17  | -  | 17      | 45          |       |                                      |
|        |        | F               | 16     | 15  | -  |         |             |       |                                      |
| 11     | N      | eL              | 02     | 26  | -  |         |             |       | Very small.                          |
|        |        | F               |        | 50  | -  |         |             |       |                                      |
| 11     | NE     | e               | 18     | 25  | -  |         |             |       | Very small. 52°N., 168½°W.           |
|        |        | F               |        | 50  | -  |         |             |       | Fox Island. U.S.C.G.S.               |
| 12     | NE     | e               | 16     | 26  | -  |         |             |       | Very small.                          |
|        |        | F               | 17     | 05  | -  |         |             |       |                                      |
| 13     | NE     | e               | 04     | 04  | 43 |         |             |       | 48½°N., 128°W. Off coast of          |
|        | E      | M               |        | 23  | -  | 20      | 2           |       | Vancouver Island. British            |
|        | N      | M               |        | 23  | -  | 20      | 3           |       | Columbia. U.S.C.G.S.                 |
|        |        | F               |        | 50  | -  |         |             |       | Mag. = 5.9                           |
| 13     | NE     | e               | 05     | 55  | -  |         |             |       | Very small. 52½°N., 168½°W.          |
|        |        | F               | 06     | 20  | -  |         |             |       | Fox Island. Aleutian Islands.        |
|        |        |                 |        |     |    |         |             |       | U.S.C.G.S.                           |
| 14     | Z,ZV   | iP              | 07     | 22  | 27 | 4       | 3           | 7110  | Dilatation.                          |
|        | Z,ZV   | e(PcP)          |        | 23  | 05 |         |             |       |                                      |
|        | NE     | eS              |        | 30  | 59 | 12      | 6(SH)       |       |                                      |
|        | ZE     | ePS             |        | 31  | 17 |         |             |       |                                      |
|        | E      | eScS            |        | 32  | 17 |         |             |       | 31°N., 84½°E. Southern Tibet.        |
|        | N      | e               |        | 32  | 24 |         |             |       | Mag. 6¼(Pas). U.S.C.G.S.             |
|        | N      | eSS             |        | 35  | 15 |         |             |       |                                      |
|        | N      | eL <sub>Q</sub> |        | 38  | -  |         |             |       |                                      |
|        | NE     | eL <sub>R</sub> |        | 43½ | -  |         |             |       |                                      |
|        | NE     | eL <sub>2</sub> |        | 47½ | -  |         |             |       |                                      |
|        | E      | M               |        | 48½ | -  | 20      | 40          |       |                                      |
|        | M      | M               |        | 48½ | -  | 20      | 110         |       |                                      |
|        | Z      | M               |        | 54  | -  | 14      | 11          |       | Mag. = 6.6                           |
|        |        | F               | 09     | 10  | -  |         |             |       |                                      |
| 14     | ZV     | eP              | 16     | 47  | 25 |         |             |       |                                      |
|        | N      | eL              | 17     | 09  | -  |         |             |       |                                      |
|        | E      | M               |        | 13  | -  | 19      | 2           |       |                                      |
|        | N      | M               |        | 13  | -  | 19      | 4           |       |                                      |
|        |        | F               |        | 25  | -  |         |             |       |                                      |
| 14     | ZV,ZN  | ePKP            | 19     | 37  | 33 |         |             | 15950 |                                      |
|        | ZV,Z   | i               |        | 37  | 39 |         |             |       |                                      |
|        | ZN     | i               |        | 37  | 45 |         |             |       |                                      |
|        | ZV,Z   | i               |        | 37  | 57 |         |             |       |                                      |
|        | Z      | iPP             |        | 40  | 46 |         |             |       | 15½°S., 173°W. Samoa Islands.        |
|        | ZN     | iPKS            |        | 40  | 59 |         |             |       | Mag. 8(Pas). 7½-7¾(Berk). U.S.C.G.S. |
|        | ZN     | i               |        | 41  | 15 |         |             |       |                                      |
|        | N      | i               |        | 41  | 55 |         |             |       |                                      |
|        | Z      | iPPP            |        | 43  | 54 |         |             |       |                                      |
|        | N      | iSKKS           |        | 47  | 35 |         |             |       | via antipodes.                       |
|        | Z      | iPPP            |        | 52  | 07 |         |             |       |                                      |
|        | N      | iPPS            |        | 53  | 17 |         |             |       |                                      |

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

APRIL, 1957.

| DATE.  | COMPT. | PHASE.          | G.M.T. |     |    | PERIOD. | AMPLI-<br>TUDE. | Δ     | REMARKS.                          |
|--------|--------|-----------------|--------|-----|----|---------|-----------------|-------|-----------------------------------|
|        |        |                 | h.     | m.  | s. |         |                 |       |                                   |
| contd. |        |                 |        |     |    |         |                 |       |                                   |
| ✓ 14   | NE     | eSKKS           | 19     | 53  | 43 |         |                 |       |                                   |
|        | NE     | iSS             |        | 59  | 25 |         |                 |       |                                   |
|        | N      | eSSS            | 20     | 04  | 29 |         |                 |       |                                   |
|        | E      | eL              |        | 18  | -  |         |                 |       |                                   |
|        | N      | eL <sub>R</sub> |        | 26  | -  |         |                 |       |                                   |
|        | Z      | M               |        | 38  | -  | 20      | 87              |       |                                   |
|        | N      | M               |        | 38  | -  | 20      | 159             |       |                                   |
|        | E      | M               |        | 39  | -  | 20      | 81              |       | Mag. = 7.3                        |
|        |        | F               | 24     | 10  | -  |         |                 |       |                                   |
| 14     | ZV,Z   | iP              | 21     | 11  | 05 |         |                 |       | Dilatation. 50½°N., 179°W.        |
|        | ZV     | e               |        | 11  | 13 |         |                 |       | Andreanof Islands. U.S.C.G.S.     |
|        |        | F               | -      | -   | -  |         |                 |       |                                   |
| 15     | N      | e               | 03     | 25  | -  |         |                 |       | Very small.                       |
|        |        | F               |        | 32  | -  |         |                 |       |                                   |
| ✓ 15   | ZV,Z   | eP              | 10     | 50  | 35 |         |                 |       |                                   |
|        | N      | eL              | 11     | 15  | -  |         |                 |       | 51½°N., 179°W. Andreanof Islands, |
|        | N      | M               |        | 30  | -  | 20      | 3               |       | Aleutian Islands. U.S.C.G.S.      |
|        |        | F               | 12     | 05  | -  |         |                 |       |                                   |
| ✓ 15   | ZV,Z   | eP              | 21     | 44  | 56 |         |                 | 8580  |                                   |
|        | ZV,Z   | i               |        | 45  | 11 |         |                 |       |                                   |
|        | Z      | ePP             |        | 47  | 51 |         |                 |       |                                   |
|        | NE     | eS              |        | 54  | 42 | 9       | 3 (SH)          |       | 52½°N., 167°W. Fox Islands,       |
|        | E      | eScS            |        | 55  | 17 |         |                 |       | Aleutian Islands. U.S.C.G.S.      |
|        | NE     | eL              | 22     | 11  | -  |         |                 |       |                                   |
|        | N      | M               |        | 23  | -  | 19      | 2               |       |                                   |
|        |        | F               | 23     | 00  | -  |         |                 |       | Mag. = 6¼                         |
| ✓ 16   | ZV,Z   | iP              | 04     | 17  | 11 | 6       | 3               | 11640 | Dilatation. Depth = 590 Km.       |
|        | ZV,Z   | epP             |        | 19  | 19 |         |                 |       |                                   |
|        | ZV,Z   | esP             |        | 20  | 25 |         |                 |       |                                   |
|        | ZV,Z   | i(PKP)          |        | 21  | 34 |         |                 |       |                                   |
|        | ZV,Z   | iPP             |        | 21  | 41 | 6       | 6.4 (PZ)        |       | Compression.                      |
|        | Z      | epPP            |        | 23  | 30 | 7       | 4.0 (SH)        |       |                                   |
|        | Z      | iPPP            |        | 23  | 58 |         |                 |       |                                   |
|        | E      | iSKS            |        | 26  | 54 | 8       | 12              |       |                                   |
|        | N      | iS              |        | 28  | 10 |         |                 |       | Ee                                |
|        | ZN     | ePS             |        | 30  | 52 |         |                 |       |                                   |
|        | E      | isSKS           |        | 31  | 00 |         |                 |       | 4½°S., 107½°E. Western Java Sea.  |
|        | NE     | esPS            |        | 33  | 30 |         |                 |       | h about 600 Km. Mag. 7½ (Pas).    |
|        | NE     | eSS             |        | 35  | 36 |         |                 |       | U.S.C.G.S.                        |
|        | N      | esSS            |        | 38  | 53 |         |                 |       |                                   |
|        | N      | eSSS            |        | 39  | 50 |         |                 |       |                                   |
|        |        | F               | 06     | 15  | -  |         |                 |       | Mag. = 7.2                        |
| 17     | NE     | eL              | 02     | 29  | -  |         |                 |       | Very small. 44°N., 12°E. Italy.   |
|        |        | F               |        | 32  | -  |         |                 |       | B.C.I.S.                          |
| 17     | ZV,Z   | iPKP            | 08     | 27  | 29 |         |                 |       | Depth about 180 Km.               |
|        | ZV,Z   | epPKP           |        | 28  | 16 |         |                 |       | 20°S., 176°W. Tonga Islands.      |
|        | N      | e(sPKS)         |        | 32  | 32 |         |                 |       | U.S.C.G.S.                        |
| ✓ 17   | NE     | eL              | 08     | 46  | -  |         |                 |       |                                   |
|        | N      | M               |        | 47½ | -  | 16      | 1               |       | 44°N., 12°E. Italy. B.C.I.S.      |
|        |        | F               |        | 54  | -  |         |                 |       |                                   |



**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

APRIL, 19 57

| DATE. | COMPT.  | PHASE.  | G.M.T.   |                |  | PERIOD.                        | AMPLITUDE.                                    | Δ    | REMARKS.   |
|-------|---|---|----------|----------------|--|--------------------------------|---|------|--|
|       |   |   | h.       | m.             | s.   |                                |   |      |  |
| 17    | NE  | eL<br>F   | 10       | 10             | -  |                                |   |      | Small. Confused by microseisms.<br>52 <sup>10</sup> N., 171 <sup>0</sup> W. Fox Island. USCGS.   |
| ✓ 17  | ZV,Z<br>NE<br>N   | eP<br>eL<br>M<br>F  | 13<br>14 | 36<br>03       | 47<br>-  |                                |   |      | Confused by microseisms.<br>52 <sup>10</sup> N., 169 <sup>0</sup> W. Fox Island, Aleutian.<br>U.S.C.G.S.   |
| ✓ 17  | E<br>E  | eL<br>M<br>F  | 18<br>19 | 50<br>55<br>20 | -<br>-   |                                |   |      | Confused by microseisms.<br>14 <sup>10</sup> N., 92 <sup>0</sup> W. Mexico-Guatamala<br>border. U.S.C.G.S.   |
| ✓ 19  | N<br>N<br>N   | e(S)<br>eL<br>M<br>F  | 16       | 06             | 39<br>-<br>-   |                                |   |      | 51 <sup>10</sup> N., 168 <sup>10</sup> W. Fox Islands. USCGS.  |
| ✓ 19  | ZN<br>Z<br>Z<br>Z<br>NE<br>N<br>NE<br>N<br>N<br>E<br>NZ<br>E<br>N<br>Z                    | iP<br>i<br>i<br>ePP<br>iS<br>iSKS<br>iScS<br>iPPS<br>iSS<br>eLq<br>eLr<br>M<br>M<br>M<br>F    | 22       | 31             | 19<br>34<br>49<br>11<br>02<br>17<br>33<br>03<br>06<br>-<br>-<br>-<br>-   | 6<br>7<br>8                    | 14 (PZ)<br>5.5 (PH)<br>23 (SH)                | 8520 | Dilatation.<br>Intermediate depth ?<br><br>52 <sup>0</sup> N., 166 <sup>10</sup> W. Fox Island,<br>Aleutian Islands. Mag. 7-7 <sup>1</sup> / <sub>4</sub> (Pas).<br>U.S.C.G.S.<br><br>Mag. = 7.2 |
| 20    | NE  | e<br>F  | 08       | 00             | -  |                                |   |      | Small. 54 <sup>10</sup> S., 148 <sup>10</sup> E.<br>South Pacific Ocean. U.S.C.G.S.  |
| ✓ 20  | E<br>N<br>NE<br>N<br>N<br>E<br>Z  | ePKS<br>ePPS<br>eL<br>M<br>M<br>M<br>M<br>F   | 12<br>13 | 53             | 13<br>07<br>-<br>-<br>-<br>-<br>-  |                                |   |      | 6 <sup>0</sup> S., 147 <sup>10</sup> E. Near coast of New<br>Guinea. U.S.C.G.S.<br><br>Mag. = 6 <sup>1</sup> / <sub>2</sub>  |
| ✓ 21  | ZV<br>ZV,Z<br>ZV,Z<br>ZV,Z<br>NE<br>N<br>E<br>ZNE<br>E<br>N<br>N<br>E<br>N<br>E<br>Z<br>Z | eP<br>iP<br>i<br>iPcP<br>eS<br>i<br>eScS<br>iPPS<br>iSS<br>i<br>eLq<br>eL<br>M<br>M<br>M<br>F | 21       | 24             | 00<br>03<br>10<br>16<br>24<br>28<br>02<br>21<br>04<br>06<br>43 <sup>1</sup> / <sub>2</sub><br>-<br>-<br>-<br>- | 5<br>6<br>16<br>20<br>20<br>20 | 5 (PZ)<br>4 (PH)<br>28 (SH)<br>43<br>53<br>44 | 8130 | 7 <sup>0</sup> N., 72 <sup>0</sup> W. Colombia-Venezuela<br>border. Mag. 6 <sup>1</sup> / <sub>2</sub> -6 <sup>3</sup> / <sub>4</sub> (Pas). U.S.C.G.S.<br><br>Mag. = 7.0                        |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

APRIL, 19 57.

| DATE | COMPT.   | PHASE.   | G.M.T. |                                |    | PERIOD. | AMPLITUDE. | Δ    | REMARKS.  |
|------|--|--|--------|--------------------------------|----|---------|------------|------|---|
|      |  |  | h.     | m.                             | s. |         |            |      |   |
| 22   | ZV<br>N  | eP<br>M<br>F   | 00     | 28                             | 51 |         |            |      |   |
|      |  |  |        | 55                             | -  | 20      | 2          |      | 30 <sup>1</sup> / <sub>2</sub> ° N., 84 <sup>1</sup> / <sub>2</sub> ° E. Tibet. U.S.C.G.S.  |
|      |  |  | 01     | 05                             | -  |         |            |      |   |
| ✓ 22 | ZV<br>ZV<br>N<br>E   | iP<br>i<br>M<br>M<br>F   | 01     | 52                             | 52 |         |            |      |   |
|      |  |  |        | 52                             | 55 |         |            |      | 30 <sup>1</sup> / <sub>2</sub> ° N., 84 <sup>1</sup> / <sub>2</sub> ° E. Tibet. U.S.C.G.S.  |
|      |  |  | 02     | 18 <sup>1</sup> / <sub>2</sub> | -  | 20      | 5          |      |   |
|      |  |  |        | 18 <sup>1</sup> / <sub>2</sub> | -  | 20      | 2          |      |   |
|      |  |  |        | 28                             | -  |         |            |      | Mag. = 6.0  |
| 22   | N  | e<br>F   | 06     | 05                             | -  |         |            |      | Very small. 31° N., 91° E. Tibet. U.S.C.G.S.  |
|      |  |  |        | 10                             | -  |         |            |      |   |
| 23   | E<br>NE<br>E<br>N  | eSKKS<br>eL<br>M<br>M<br>F   | 22     | 23                             | 16 |         |            |      |   |
|      |  |  |        | 48                             | -  |         |            |      | 27° S., 68° W. Northern Chile-Argentina border. U.S.C.G.S.  |
|      |  |  | 23     | 00                             | -  | 18      | 2          |      |   |
|      |  |  |        | 00                             | -  | 18      | 1          |      |   |
|      |  |  |        | 30                             | -  |         |            |      |   |
| ✓ 24 | ZV,Z<br>ZV,Z<br>ZV,Z<br>ZV,Z<br>ZV,ZNE<br>ZV,ZN<br>ZNE<br>ZNE<br>ZNE<br>N<br>E<br>N<br>E | iP<br>i<br>i<br>i<br>i<br>iP<br>iS<br>i<br>iS<br>i<br>M<br>M<br>M<br>F | 19     | 15                             | 37 | 6       | 3(PZ)      | 2780 | Compression.<br>Multiple shock.   |
|      |  |  |        | 15                             | 46 |         |            |      |   |
|      |  |  |        | 15                             | 57 |         |            |      |   |
|      |  |  |        | 16                             | 05 |         |            |      |   |
|      |  |  |        | 16                             | 31 |         |            |      |   |
|      |  |  |        | 16                             | 43 | 10      | 27(PZ)     |      | PH 11sec. 24 μ  |
|      |  |  |        | 19                             | 56 |         |            |      |   |
|      |  |  |        | 20                             | 27 |         |            |      | Ho = 19h. 10m. 16s., 36.3° N., 29.1° E. B.C.I.S.  |
|      |  |  |        | 20                             | 45 | 16      | 97(SH)     |      | Turkey foreshock. Mag. 6 <sup>3</sup> / <sub>4</sub> -7 Pas. U.S.C.G.S.   |
|      |  |  |        | 21                             | 31 |         |            |      |   |
|      |  |  |        | 24 <sup>1</sup> / <sub>2</sub> | -  | 27      | 195        |      |   |
|      |  |  |        | 25                             | -  | 22      | 232        |      |   |
|      |  |  |        | 25 <sup>1</sup> / <sub>2</sub> | -  | 22      | 139        |      | Mag.: first shock = 6 <sup>1</sup> / <sub>4</sub><br>greatest shock = 6.9   |
|      |  |  | 21     | 35                             | -  |         |            |      |   |
| ✓ 25 | ZV,ZNE<br>ZV,ZNE<br>ZV,ZNE<br>ZV,ZNE<br>ZN<br>ZNE<br>ZNE<br>Z<br>N<br>E<br>Z             | iP<br>iP<br>iPP<br>iPPP<br>i<br>iS<br>i<br>i(sS)<br>M<br>M<br>M<br>F   | 02     | 31                             | 05 |         |            | 2890 | Compression,<br>Depth = 80 Km.  |
|      |  |  |        | 31                             | 23 |         |            |      |   |
|      |  |  |        | 31                             | 43 |         |            |      |   |
|      |  |  |        | 31                             | 54 |         |            |      | Ho = 02h. 25m. 44s.<br>36.3° N., 29.1° E.   |
|      |  |  |        | 35                             | 09 |         |            |      | Depth about 100 Km. B.C.I.S.  |
|      |  |  |        | 35                             | 28 |         |            |      | Near south coast of Turkey,<br>Mag. 7-7 <sup>1</sup> / <sub>4</sub> (Pas). 15 killed at<br>Fethiye, many injured and<br>extensive property damage. USCGS. |
|      |  |  |        | 35                             | 47 |         |            |      |   |
|      |  |  |        | 36                             | 01 |         |            |      | Mag. = 7 <sup>1</sup> / <sub>4</sub>  |
|      |  |  |        | 40                             | -  | 24      | > 540      |      |   |
|      |  |  |        | 41                             | -  | 24      | > 220      |      |   |
|      |  |  |        | 44                             | -  | 15      | 99         |      |   |
|      |  |  | 06     | 00                             | -  |         |            |      |   |
| 25   | NE   | e<br>F   | 07     | 45                             | -  |         |            |      | Small.  |
|      |  |  |        | 55                             | -  |         |            |      |   |
| 25   | NE   | e<br>F   | 08     | 00                             | -  |         |            |      | Small.  |
|      |  |  |        | 30                             | -  |         |            |      |   |
| ✓ 26 | ZV,<br>ZV,<br>ZV,Z<br>NE<br>N<br>E<br>ZE   | eP<br>e<br>e<br>eL<br>M<br>M<br>iScS<br>F                              | 06     | 39                             | 18 |         |            |      | 36.3° N., 29.1° E. B.C.I.S.<br>Turkey aftershock.   |
|      |  |  |        | 39                             | 22 |         |            |      |   |
|      |  |  |        | 41                             | 26 |         |            |      |   |
|      |  |  |        | 44 <sup>1</sup> / <sub>2</sub> | -  |         |            |      |   |
|      |  |  |        | 48                             | -  | 20      | 25         |      |   |
|      |  |  |        | 49                             | -  | 20      | 12         |      |   |
|      |  |  |        | 50                             | 15 |         |            |      | Mag. = 6.0  |
|      |  |  | 07     | 25                             | -  |         |            |      |   |

26

M.O. 627

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.
SEISMOLOGICAL BULLETIN.

APRIL, 19 57

| DATE. | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD. | AMPLI-<br>TUDE. | Δ              | REMARKS.  |
|-------|--------|--------|--------|------------------|----|---------|-----------------|----------------|---|
|       |        |        | h.     | m.               | s. |         |                 |                |   |
| 26    | ZV,Z   | iP     | 15     | 20               | 35 |         |                 | 8900           | Compression.<br>45°N., 148°E. Kurile Islands.<br>U.S.C.G.S.   |
|       | E      | eS     |        | 30               | 37 |         |                 |                |   |
|       |        | F      | 16     | 10               | -  |         |                 |                |   |
| 28    | Z      | e (FP) | 01     | 42               | 23 |         |                 | 22<br>18<br>18 | 7°N., 127°E. Off coast of<br>Mindanao. P.I. Mag. 5 $\frac{3}{4}$ -6 (Pas)<br>(U.S.C.G.S.)<br><br>Mag. = 6.4 |
|       | NE     | eL     | 02     | 13               | -  |         |                 |                |   |
|       | E      | M      |        | 29               | -  |         |                 |                |   |
|       | N      | M      |        | 31 $\frac{1}{2}$ | -  |         |                 |                |   |
|       | Z      | M      |        | 31 $\frac{1}{2}$ | -  |         |                 |                |   |
|       | F      | 03     | 10     | -                |    |         |                 |                |   |
| 28    | ZV,Z   | eP     | 15     | 00               | 44 |         |                 | 18             | 52 $\frac{1}{2}$ °N., 168 $\frac{1}{2}$ °W. Fox Islands.<br>U.S.C.G.S.                                      |
|       | E      | M      |        | 40               | -  |         |                 |                |   |
|       |        | F      | 16     | 15               | -  |         |                 |                |   |
| 29    | ZV,Z   | eP     | 04     | 41               | 53 |         |                 |                | Very small.<br>52 $\frac{1}{2}$ °N., 168 $\frac{1}{2}$ °W. Fox Islands.<br>U.S.C.G.S.                       |
|       | NE     | M      | 05     | 20               | -  |         |                 |                |   |
|       |        | F      |        | 40               | -  |         |                 |                |   |
| 29    | ZV     | e (P)  | 09     | 34               | 51 |         |                 |                |   |
| 29    | NE     | e      | 21     | 54               | -  |         |                 |                | Small.  |
|       |        | F      | 22     | 35               | -  |         |                 |                |   |

All the magnitudes are the  
"unified magnitudes" denoted  
by "m".

M.O. 627

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR..... MAY,..... 19 57.

Lat. 51° 28' 0" N. Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"

(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD T. sec. | PENDULUM FREE PERIOD T. sec. | DAMPING CONSTANT $\mu^2$ . | $\frac{Ak}{wI}$ sec. <sup>-1</sup> |
|------------|----------------------------------|----------------------------------|------------------------------|----------------------------|------------------------------------|
| N.         | 25 August, 1954                  | 21.7                             | 21.2                         | +0.01                      | 54.4                               |
| E.         | 26 August, 1954                  | 21.3                             | 21.4                         | +0.01                      | 52.6                               |
| Z.         | 1 September, 1954                | 11.3                             | 11.4                         | +0.05                      | 115.                               |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.

TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.

SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE.  | G.M.T.                |                  |    | PERIOD. | AMPLITUDE.   | $\Delta$  | REMARKS. |
|-------|--------|---------|-----------------------|------------------|----|---------|--|---|----------|
|       |        |         | h.                    | m.               | s. |         |  |   |          |
| 1     | N      | eL<br>F | 01                    | 13 $\frac{1}{2}$ | -  |         |  | Small. 41 $\frac{1}{2}$ <sup>o</sup> N., 78 $\frac{1}{2}$ <sup>o</sup> E.<br>Kirgiz-China border. U.S.C.G.S.                |          |
| 2     | NE     | eL<br>F | 00                    | 10               | -  |         |  | Very small. 52 $\frac{1}{2}$ <sup>o</sup> N., 171 <sup>o</sup> W.<br>Fox Islands. U.S.C.G.S.                                |          |
| 2     | N      | e<br>F  | 02<br>03              | 57<br>15         | -  |         |  | Very small. 4 $\frac{1}{2}$ <sup>o</sup> S., 153 <sup>o</sup> E.<br>Near New Britain. U.S.C.G.S.                            |          |
| 2     | ZV,Z   | iP      | 04                    | 02               | 31 |         | 4000   | Compression.  |          |
|       | ZV,Z   | e       |                       | 02               | 39 |         |  |   |          |
|       | NE     | eS      |                       | 08               | 07 |         |  | 72 <sup>o</sup> N., 67 $\frac{1}{2}$ <sup>o</sup> W. Baffin Bay<br>Mag. 6 $\frac{1}{4}$ -6 $\frac{1}{2}$ (Pas). U.S.C. G.S. |          |
|       | N      | eL      |                       | 12               | -  | 18      | 5  |   |          |
|       | N      | M       |                       | 16               | -  | 16      | 6  |   |          |
|       | E      | M<br>F  |                       | 17<br>05         | -  |         |  | Mag. = 5.8  |          |
|       | ZV,Z   | ePKP    | 10                    | 54               | 08 |         | 16600  |   |          |
| ZV,Z  | e      |         | 54                    | 20               |    |         |  |   |          |
| Z     | e      |         | 56                    | 11               |    |         |  |   |          |
| Z     | ePP    |         | 57                    | 42               |    |         | 56 $\frac{1}{2}$ <sup>o</sup> S., 123 <sup>o</sup> W. South Pacific<br>Ocean. U.S.C.G.S. |   |          |
| N     | eSKKS  | 11      | 04                    | 32               |    |         |  |   |          |
| EZ    | eL     |         | 48                    | -                |    |         |  |   |          |
| E     | M      |         | 52 $\frac{1}{2}$      | -                | 20 | 8       |  |   |          |
| N     | M      |         | 52 $\frac{1}{2}$      | -                | 20 | 8       | Mag. = 6 $\frac{1}{2}$   |   |          |
| Z     | M<br>F |         | 52 $\frac{1}{2}$<br>- | -                | 20 | 7       | overlapped by next shock.  |   |          |
| 2     | ZV,Z   | eP      | 11                    | 41               | 03 |         |  | 52 $\frac{1}{2}$ <sup>o</sup> N., 169 <sup>o</sup> W. Fox Islands.USCGS.  |          |
|       | ZV     | e<br>F  | -                     | 41               | 15 |         |  | overlapped by next shock.   |          |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

.....MAY,.....19.....57

| DATE. | COMPT. | PHASE. | G.M.T. |                                |    | PERIOD. | AMPLITUDE.                           | Δ   | REMARKS.  |      |   |
|-------|--------|--------|--------|--------------------------------|----|---------|--------------------------------------|---|---|------|---|
|       |        |        | h.     | m.                             | s. |         |                                      |   |   | sec. | μ |
| ✓ 21  | ZV     | e(pP)  | 01     | 26                             | 10 | .11     | 4(SH)                                | 10800   | 21 <sup>1</sup> / <sub>2</sub> °N., 14 <sup>1</sup> / <sub>2</sub> °E. Mariana Islands, h about 100 Km. U.S.C.G.S.  |      |   |
|       | ZV,Z   | ePP    |        | 29                             | 48 |         |                                      |   |   |      |   |
|       | ZV,Z   | epPP   |        | 30                             | 12 |         |                                      |   |   |      |   |
|       | NE     | iSKS   |        | 36                             | 07 |         |                                      |   |   |      |   |
|       | NE     | iS     |        | 36                             | 56 |         |                                      |   |   |      |   |
|       | N      | e      |        | 37                             | 28 |         |                                      |   |   |      |   |
|       | E      | esS    |        | 37                             | 44 |         |                                      |   |   |      |   |
|       | ZNE    | ePS    |        | 38                             | 36 |         |                                      |   |   |      |   |
|       | Z      | e      |        | 39                             | 06 |         |                                      |   |   |      |   |
|       | N      | iPSP   |        | 39                             | 32 |         |                                      |   |   |      |   |
|       | NE     | eL     | 02     | 00                             | -  |         |                                      |   |   |      |   |
|       | N      | M      |        | 08                             | -  |         |                                      |   |   | 22   | 8 |
|       | E      | M      |        | 09                             | -  |         |                                      |   |   | 21   | 9 |
|       | N      | M      |        | 16                             | -  |         |                                      |   |   | 18   | 9 |
| Z     | M      |        | 16     | -                              | 18 | 4       |                                      |   |   |      |   |
|       | F      | 03     | 15     | -                              |    |         | Mag. = 7                             |   |   |      |   |
| ✓ 21  | ZV,Z   | eP     | 11     | 47                             | 57 | 14      | 3                                    | 2670  | Deeper than normal ?<br>38 <sup>1</sup> / <sub>2</sub> °N., 14°E. Near north coast of Sicily. Felt. U.S.C.G.S.  |      |   |
|       | Z      | ePP    |        | 48                             | 26 |         |                                      |   |   |      |   |
|       | N      | eL     |        | 53                             | -  |         |                                      |   |   |      |   |
|       | N      | M      |        | 54 <sup>1</sup> / <sub>2</sub> | -  |         |                                      |   |   |      |   |
|       | F      | 12     | 15     | -                              |    |         | Mag. = 5 <sup>1</sup> / <sub>2</sub> |   |   |      |   |
| 21    | N      | e      | 12     | 26                             | -  | 19      | 2                                    | 36 <sup>1</sup> / <sub>2</sub> °N., 14 <sup>1</sup> / <sub>2</sub> °E. Near east coast of Honshu, Japan. U.S.C.G.S. |   |      |   |
|       | N      | M      |        | 32                             | -  |         |                                      |   |   |      |   |
|       |        | F      |        | 50                             | -  |         |                                      |   |   |      |   |
| ✓ 21  | ZV,Z   | iP     | 13     | 28                             | 57 | 14      | 7                                    | 2670  | Compression.<br>39 <sup>1</sup> / <sub>4</sub> °N., 23°E. Region of Volos, Greece. B.C.I.S.   |      |   |
|       | NE     | eS     |        | 32                             | 39 |         |                                      |   |   |      |   |
|       | ZE     | ePcP   |        | 33                             | 18 |         |                                      |   |   |      |   |
|       | N      | eL     |        | 34 <sup>1</sup> / <sub>2</sub> | -  |         |                                      |   |   |      |   |
|       | E      | M      |        | 36                             | -  |         |                                      |   |   |      |   |
|       | N      | M      |        | 36                             | -  |         |                                      |   |   |      |   |
|       | ZE     | eScS   |        | 40                             | 26 |         |                                      |   |   |      |   |
|       | F      | 13     | 55     | -                              |    |         | Mag. = 6                             |   |   |      |   |
| ✓ 22  | ZV,Z   | eP     | 13     | 41                             | 50 | 21      | 4                                    | 8900  | 50°N., 177°W. Andreanof Islands, Aleutian Islands. Mag. 6 <sup>1</sup> / <sub>2</sub> (Pas) (Berk) U.S.C.G.S.   |      |   |
|       | ZV,Z   | i      |        | 41                             | 54 |         |                                      |   |   |      |   |
|       | N      | eS     |        | 51                             | 51 |         |                                      |   |   |      |   |
|       | N      | eScS   |        | 52                             | 12 |         |                                      |   |   |      |   |
|       | N      | eSS    |        | 57.1                           | -  |         |                                      |   |   |      |   |
|       | N      | eSSS   | 14     | 00.5                           | -  |         |                                      |   |   |      |   |
|       | N      | eL     |        | 07                             | -  |         |                                      |   |   |      |   |
|       | E      | M      |        | 20                             | -  |         |                                      |   |   |      |   |
|       | N      | M      |        | 21                             | -  |         |                                      |   |   |      |   |
|       |        | F      | 15     | 30                             | -  |         |                                      |   |   |      |   |
| 22    | NE     | e      | 22     | 33                             | -  | 23      | 00                                   | -   | Very small.   |      |   |
|       |        | F      | 23     | 00                             | -  |         |                                      |   |   |      |   |
| ✓ 24  | ZV,ZE  | iP     | 02     | 49                             | 47 | 7       | 5(SH)                                | 8700  | Compression.<br>3°N., 76 <sup>1</sup> / <sub>2</sub> °W. Colombia. Mag. 6 <sup>3</sup> / <sub>4</sub> (Pas), 6 <sup>1</sup> / <sub>2</sub> (Berk). U.S.C.G.S. |      |   |
|       | ZV,Z   | e      |        | 50                             | 01 |         |                                      |   |   |      |   |
|       | ZV,Z   | i      |        | 50                             | 08 |         |                                      |   |   |      |   |
|       | ZV,Z   | i      |        | 50                             | 14 |         |                                      |   |   |      |   |
|       | ZV,Z   | ePP    |        | 52                             | 44 |         |                                      |   |   |      |   |
|       | ZV,Z   | ePPP   |        | 54                             | 44 |         |                                      |   |   |      |   |
|       | NE     | iS     |        | 59                             | 39 |         |                                      |   |   |      |   |
|       | E      | iSKS   |        | 59                             | 55 |         |                                      |   |   |      |   |
|       | Z      | i      | 03     | 00                             | 37 |         |                                      |   |   |      |   |
|       | N      | eLQ    |        | 11                             | -  |         |                                      |   |   |      |   |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

MAY, 19 57

| DATE.  | COMPT. | PHASE. | G.M.T. |     |    | PERIOD. | AMPLITUDE. | Δ    | REMARKS.   |
|--------|--------|--------|--------|-----|----|---------|------------|------|--|
|        |        |        | h.     | m.  | s. |         |            |      |  |
| contd. |        |        |        |     |    |         |            |      |  |
| ✓ 24   | E      | eLR    | 03     | 14  | -  |         |            |      |  |
|        | E      | M      |        | 17  | -  | 28      | 8          |      |  |
|        | N      | M      |        | 18  | -  | 26      | 4          |      |  |
|        |        | F      |        | 45  | -  |         |            |      | Mag. = 6½  |
| ✓ 24   | N      | eL     | 04     | 16  | -  |         |            |      |  |
|        | N      | M      |        | 25  | -  | 20      | 5          |      |  |
|        | E      | M      |        | 27  | -  | 18      | 3          |      |  |
|        |        | F      | 05     | 15  | -  |         |            |      | 53°N., 167½°W. Fox Islands,<br>Aleutian Islands. Mag. 6-6¼<br>(Berk). U.S.C.G.S.<br>Mag. = 6                                   |
| 25     | N      | eL     | 16     | 25  | -  |         |            |      |  |
|        | N      | M      |        | 30  | -  |         |            |      |  |
|        |        | F      |        | 40  | -  |         |            |      |  |
| ✓ 26   | ZV,ZNE | iP     | 06     | 38  | 52 | 6       | 16         | 2700 | Dilatation.  |
|        | ZV,ZNE | i      |        | 38  | 56 |         |            |      |  |
|        | ZE     | iPP    |        | 39  | 25 | 6       | 11         |      |  |
|        | E      | i(PcP) |        | 42  | 27 |         |            |      | 41°N., 31°E. Bolu Province,<br>Turkey. 53 killed, 70 injured,<br>and major property damage.<br>Mag. 7(Pas), (Berk). U.S.C.G.S. |
|        | Z      | i      |        | 42  | 39 |         |            |      |  |
|        | NE     | iS     |        | 43  | 06 |         |            |      |  |
|        | N      | i      |        | 43  | 17 |         |            |      |  |
|        | N      | M      |        | 50  | -  | 19      | >720       |      |  |
|        | E      | M      |        | 51  | -  | 19      | >320       |      | Mag. = 7   |
|        | Z      | M      |        | 51  | -  | 14      | >230       |      |  |
|        |        | F      | -      | -   | -  |         |            |      | overlapped by next shock.  |
| ✓ 26   | ZV,Z   | eP     | 09     | 41  | 55 |         |            | 2730 |  |
|        | ZV,Z   | i      |        | 41  | 57 |         |            |      |  |
|        | NE     | eS     |        | 46  | 11 |         |            |      | Turkey aftershock. Felt. U.S.C.G.S.  |
|        | N      | eL     |        | 47½ | -  |         |            |      |  |
|        | E      | M      |        | 52  | -  | 20      | 38         |      |  |
|        | N      | M      |        | 52  | -  | 20      | 77         |      |  |
|        | Z      | M      |        | 52½ | -  | 11      | 12         |      | Mag. = 6¼  |
|        |        | F      | 10     | 50  | -  |         |            |      |  |
| 27     | ZV     | eP     | 11     | 06  | 49 |         |            |      |  |
|        | ZV     | e      |        | 07  | 23 |         |            |      | Galitzin's not recording.  |
|        | ZV     | e      |        | 07  | 34 |         |            |      |  |
| 28     | N      | eL     | 00     | 19½ | -  |         |            |      |  |
|        | N      | M      |        | 24  | -  | 21      | 7          |      |  |
|        |        | F      | 01     | 00  | -  |         |            |      |  |
| 28     | N      | eL     | 01     | 32  | -  |         |            |      |  |
|        | N      | M      |        | 38  | -  | 20      | 3          |      |  |
|        |        | F      |        | 55  | -  |         |            |      |  |
| 28     | N      | e      | 05     | 40  | -  |         |            |      | Small.   |
|        |        | F      | 06     | 00  | -  |         |            |      |  |
| ✓ 28   | ZV,Z   | eP     | 06     | 03  | 11 |         |            | 8020 |  |
|        | ZV,Z   | iPcP   |        | 03  | 30 |         |            |      | Deeper than normal ?   |
|        | NE     | eS     |        | 12  | 30 |         |            |      |  |
|        | NE     | eFPS   |        | 13  | 14 |         |            |      |  |
|        | N      | eL     |        | 30  | -  |         |            |      |  |
|        | N      | M      |        | 34  | -  | 20      | 5          |      |  |
|        |        | F      | 07     | 20  | -  |         |            |      | Mag. = 6¼  |

M.O. 627... 32

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.
SEISMOLOGICAL BULLETIN.

MAY, 1957.

| Date | Compt. | Phase | G.M.T. |    |    | Period | Amplitude | Δ    | Remarks                             |     |
|------|--------|-------|--------|----|----|--------|-----------|------|-------------------------------------|-----|
|      |        |       | h.     | m. | s. |        |           |      |                                     | sec |
| 29   | N      | eL    | 10     | 29 | -  |        |           |      |                                     |     |
|      | E      | M     |        | 33 | -  | 18     | 2         |      |                                     |     |
|      | N      | M     |        | 34 | -  | 16     | 2         |      |                                     |     |
|      |        | F     |        | 55 | -  |        |           |      |                                     |     |
| 29   | ZV,Z   | eP    | 18     | 44 | 10 |        |           | 2410 | Dilatation.                         |     |
|      | ZV,Z   | e     |        | 44 | 37 |        |           |      |                                     |     |
|      | NE     | eS    |        | 48 | 03 |        |           |      |                                     |     |
|      | E      | e     |        | 48 | 46 |        |           |      |                                     |     |
|      |        | e     |        | 48 | 49 |        |           |      |                                     |     |
|      | N      | F     |        | 58 | -  |        |           |      |                                     |     |
| 29   | N      | e     | 21     | 43 | -  |        |           |      | Very small.                         |     |
|      |        | F     |        | 50 | -  |        |           |      |                                     |     |
| 30   | Z      | ePKP  | 00     | 38 | 44 |        |           |      |                                     |     |
|      | N      | eL    | 01     | 38 | -  |        |           |      |                                     |     |
|      |        | M     |        | 46 | -  | 20     | 2         |      |                                     |     |
|      | N      | M     |        | 46 | -  | 20     | 2         |      |                                     |     |
| F    |        |       | 03     | 05 | -  |        |           |      |                                     |     |
| 30   | N      | e     | 20     | 35 | -  |        |           |      | Very small.                         |     |
|      |        | F     | 22     | 20 | -  |        |           |      |                                     |     |
| 31   | ZV,Z   | iPKP  | 02     | 28 | 58 |        |           |      |                                     |     |
|      | ZN     | e     |        | 36 | 48 |        |           |      |                                     |     |
|      | E      | e     |        | 38 | 39 |        |           |      |                                     |     |
|      |        | e     |        | 42 | 36 |        |           |      |                                     |     |
|      | N      | eL    | 03     | 48 | -  |        |           |      |                                     |     |
|      |        | M     |        | 59 | -  | 20     | 3         |      |                                     |     |
| N    | F      | 05    | 10     | -  |    |        |           |      |                                     |     |
| 31   | ZV,Z   | eP    | 22     | 09 | 44 |        |           | 8740 | Ee<br><br>overlapped by next shock. |     |
|      | N      | iS    |        | 19 | 37 |        |           |      |                                     |     |
|      |        | eScS  |        | 20 | 00 |        |           |      |                                     |     |
|      | N      | eL    |        | 31 | -  |        |           |      |                                     |     |
|      |        | M     |        | 48 | -  | 20     | 2         |      |                                     |     |
| N    | F      | -     | -      | -  |    |        |           |      |                                     |     |
| 31   | ZV,    | eP    | 22     | 29 | 09 |        |           |      |                                     |     |
|      | ZV     | e     |        | 29 | 22 |        |           |      |                                     |     |
|      | E      | M     | 23     | 12 | -  | 19     | 2         |      |                                     |     |
|      |        | M     |        | 13 | -  | 18     | 2         |      |                                     |     |
| N    | F      | 24    | 10     | -  |    |        |           |      |                                     |     |

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.
KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.
SEISMOLOGICAL BULLETIN FOR JUNE, 19 57.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"

(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>T.<br>1.<br>sec. | PENDULUM FREE PERIOD<br>T.<br>sec. | DAMPING CONSTANT<br>$\mu^2$ . | $\frac{Ak}{\pi l}$<br>sec. <sup>-1</sup> |
|------------|----------------------------------|--|------------------------------------|-------------------------------|--|
| N.         | 25 August, 1954                  | 21.7   | 21.2                               | +0.01                         | 54.4                                     |
| E.         | 26 August, 1954                  | 21.3   | 21.4                               | +0.01                         | 52.6                                     |
| Z.         | 1 September, 1954                | 11.3   | 11.4                               | +0.05                         | 115.                                     |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.

TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.

SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD.<br>sec. | AMPLI-<br>TUDE.<br>$\mu$ | $\Delta$<br>km.        | REMARKS.   |
|-------|--------|--------|--------|------------------|----|-----------------|--------------------------|------------------------|--|
|       |        |        | h.     | m.               | s. |                 |                          |                        |  |
| 1     | Z      | eP     | 05     | 32               | 08 | 18              | 3                        | 2800                   | 40 $\frac{1}{2}$ N., 31 $\frac{1}{2}$ E. Northern Turkey<br>aftershock. USCGS. |
|       | N      | eS     |        | 36               | 30 |                 |                          |                        |  |
|       | N      | eL     |        | 38               | -  |                 |                          |                        |  |
|       | E      | M      |        | 42               | -  |                 |                          |                        |  |
|       | N      | M      |        | 42               | -  |                 |                          |                        |  |
|       |        | F      | 06     | 15               | -  |                 |                          | Mag. = 5 $\frac{1}{2}$ |  |
| 1     | E      | eL     | 20     | 17               | -  | 16              | 3                        | 2750                   | Small.<br>1 $\frac{1}{2}$ N., 91 $\frac{1}{2}$ W. Galapagos Islands.<br>USCGS. |
|       | N      | eL     |        | 22               | -  |                 |                          |                        |  |
|       |        | F      |        | 40               | -  |                 |                          |                        |  |
| 1     | ZV     | eP     | 21     | 13               | 34 | 16              | 3                        | 2750                   | Northern Turkey aftershock. USCGS.   |
|       | NE     | eS     |        | 17               | 52 |                 |                          |                        |  |
|       | N      | eL     |        | 20               | -  |                 |                          |                        |  |
|       | N      | M      |        | 23 $\frac{1}{2}$ | -  |                 |                          |                        |  |
|       |        | F      |        | 40               | -  |                 |                          |                        |  |
| 1     | N      | eL     | 23     | 13               | -  | 21              | 4                        | 2800                   |  |
|       | N      | M      |        | 15 $\frac{1}{2}$ | -  |                 |                          |                        |  |
|       |        | F      |        | 50               | -  |                 |                          |                        |  |
| 2     | ZV,Z   | eP     | 01     | 17               | 14 | 16              | 2                        | 2800                   | Northern Turkey aftershock. USCGS.   |
|       | N      | eS     |        | 21               | 35 |                 |                          |                        |  |
|       | N      | eL     |        | 24               | -  |                 |                          |                        |  |
|       | N      | M      |        | 27               | -  |                 |                          |                        |  |
|       |        | F      |        | 40               | -  |                 |                          |                        |  |
| 2     | N      | eL     | 22     | 07               | -  |                 |                          |                        | Very small. 52 $\frac{1}{2}$ ° N., 160° E.<br>Near Kamchatka. USCGS.           |
|       |        | F      |        | 35               | -  |                 |                          |                        |  |

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JUNE, 19 57

| DATE. | COMPT.  | PHASE.  | G.M.T.         |  |   | PERIOD.              | AMPLITUDE.         | Δ     | REMARKS.   |
|-------|---|---|----------------|--|---|----------------------|--------------------|-------|--|
|       |   |   | h.             | m.   | s.  |                      |                    |       |  |
| 4     | ZV,Z<br>Z   | ePKP<br>e   | 17             | 23<br>27   | 48<br>00  |                      |                    |       | 17½°S., 178°W. Fiji Islands.<br>h about 550 Km. USCGS.         |
| 5     | ZV,Z<br>N<br>N<br>N<br>N<br>E<br>Z  | iP<br>eS<br>i<br>eL<br>M<br>M<br>M<br>F                                 | 07             | 21<br>24<br>25<br>26<br>28<br>28<br>28                               | 07<br>58<br>02<br>-<br>-<br>-<br>-                                    | 16<br>16<br>16<br>16 | 25<br>11<br>7<br>5 | 2380  | 52½°N., 35°W. North Atlantic<br>Ocean. USCGS.<br><br>Mag. = 5¾ |
| 5     | N   | eL<br>F   | 14<br>15       | 40<br>10   | -<br>-  |                      |                    |       | Small. 53°N., 162½°E. Off coast<br>of Kamchatka. USCGS.        |
| 5     | N<br>N  | eL<br>M<br>F  | 22<br>23       | 56<br>02½<br>35  | -<br>-<br>-   | 20                   | 2                  |       |  |
| 6     | N   | e<br>F  | 01             | 36<br>50   | -<br>-  |                      |                    |       | Very small.  |
| 6     | N   | e<br>F  | 04             | 15<br>30   | -<br>-  |                      |                    |       | Very small. 52°N., 178°W.<br>Andreanof Islands. USCGS.         |
| 6     | N<br>N  | eL<br>M<br>F  | 20<br>21       | 43<br>56<br>25   | -<br>-<br>-   | 23                   | 5                  |       | 3°N., 126½°E. Molucca Passage.<br>Mag. = 6¼                    |
| 7     | ZV<br>N<br>N  | eP<br>eL<br>M<br>F  | 00             | 12<br>32<br>33<br>45   | 43<br>-<br>-<br>-   | 16                   | 1                  |       | 44½°N., 81°E. Sinkiang Province,<br>China. USCGS.              |
| 8     | N<br>N  | eL<br>M<br>F  | 04             | 33<br>39½<br>55  | -<br>-<br>-   | 20                   | 2                  |       | 3°S., 147½°E. Bismark Sea. USCGS.                              |
| 8     | N   | e<br>F  | 05             | 09<br>20   | -<br>-  |                      |                    |       | Very small.  |
| 8     | N<br>N  | eL<br>M<br>F  | 07             | 14<br>23<br>35   | -<br>-<br>-   | 20                   | 2                  |       | 2½°S., 150°E. New Ireland. USCGS.                              |
| 8     | Z,ZV<br>Z,ZV<br>N   | ePKP<br>e<br>eL<br>F  | 22<br>23<br>24 | 46<br>46<br>51<br>10   | 06<br>11<br>-<br>-  |                      |                    |       | Very small.<br>19½°S., 168°E. Loyalty Islands.<br>USCGS.       |
| 10    | ZV,Z<br>ZV,Z<br>ZV,Z<br>Z<br>NE<br>NE<br>NE<br>N<br>N<br>E<br>N<br>M<br>F | iPKP<br>ePP<br>e<br>ePKS<br>eSKS<br>e<br>ePPS<br>e<br>eL<br>M<br>M<br>F | 01             | 18<br>19<br>19<br>21<br>25<br>29<br>30<br>36<br>55<br>06<br>08<br>50 | 41<br>29<br>39<br>57<br>16<br>23<br>03<br>19<br>-<br>-<br>-<br>-<br>- | 22<br>22             | 4<br>8             | 12300 | 9°S., 117°E. Sumbawa Island.<br>USCGS.<br><br>Mag. = 6½        |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JUNE, 1957.

| DATE. | COMPT. | PHASE.            | G.M.T.                               |                                      |          | PERIOD. | AMPLITUDE. | Δ     | REMARKS.   |
|-------|--------|-------------------|--------------------------------------|--------------------------------------|----------|---------|------------|-------|--|
|       |        |                   | h.                                   | m.                                   | s.       |         |            |       |  |
| V10   | ZV,Z   | e(PF)             | 03                                   | 31                                   | 55       |         |            |       |  |
|       | N      | eL                | 04                                   | 10                                   | -        |         |            |       |  |
|       | N      | M<br>F            | 20 <sup>1</sup> / <sub>2</sub><br>40 | -                                    | -        | 20      | 2          |       | 13 <sup>1</sup> / <sub>2</sub> °N., 143 <sup>1</sup> / <sub>2</sub> °E. Mariana Islands.<br>Mag. 6 <sup>3</sup> / <sub>4</sub> -7(Pas). USCGS. |
| 10    | N      | e<br>F            | 20                                   | 43<br>55                             | -<br>-   |         |            |       | Very small.  |
| 11    | N      | eL                | 04                                   | 46                                   | -        |         |            |       |  |
|       | N      | M<br>F            | 05                                   | 52<br>10                             | -<br>-   | 19      | 3          |       | 54°N., 165°W. Unimak Islands<br>region. USCGS.   |
|       | ZV,Z   | eP                | 05                                   | 06                                   | 08       |         |            |       | Small.   |
| 11    | N      | eL<br>F           |                                      | 23<br>35                             | -<br>-   |         |            |       | 36 <sup>1</sup> / <sub>2</sub> °N., 70°E. Hindu Kush.<br>h about 200 Km. USCGS.  |
|       | Z,ZV   | iPKP              | 15                                   | 09                                   | 37       |         |            | 17300 | Compression.   |
|       | Z,ZV   | ePKP <sub>2</sub> |                                      | 10                                   | 13       |         |            |       |  |
| 11    | Z      | i                 |                                      | 10                                   | 20       |         |            |       |  |
|       | Z,ZV   | ePP               |                                      | 13                                   | 50       |         |            |       |  |
|       | NZ     | eSKKS             |                                      | 19                                   | 54       |         |            |       | 30°S., 178°W. Kermadec Islands,<br>h about 100 Km. Mag. 6 <sup>3</sup> / <sub>4</sub> -7(Pas),<br>6 <sup>3</sup> / <sub>4</sub> (Berk). USCGS. |
|       | Z      | e                 |                                      | 22                                   | 21       |         |            |       |  |
|       | N      | eSKSP             |                                      | 23                                   | 59       |         |            |       |  |
|       | E      | eSSS              |                                      | 40.4                                 | -        |         |            |       |  |
|       | N      | eL                | 16                                   | 06                                   | -        |         |            |       |  |
|       | E      | M                 |                                      | 15                                   | -        | 24      | 10         |       |  |
|       | N      | M                 |                                      | 23                                   | -        | 21      | 29         |       |  |
|       | Z      | M<br>F            |                                      | 23<br>17                             | -<br>45  | 20      | 7          |       | Mag. = 6 <sup>3</sup> / <sub>4</sub>   |
|       | 11     | Z,ZV              | iP                                   | 19                                   | 02       | 44      |            |       | 10300  |
| NE    |        | iSKS              |                                      | 13                                   | 16       |         |            |       |  |
| N     |        | eS                |                                      | 13                                   | 44       | 18      | 8(SH)      |       |  |
| ZE    |        | iPS               |                                      | 15                                   | 00       |         |            |       | 18°N., 120 <sup>1</sup> / <sub>2</sub> °E. Near coast of<br>Luzon, Philippine Islands.<br>Moderate property damage at<br>Vigan. USCGS.         |
| N     |        | eSS               |                                      | 20                                   | 06       |         |            |       |  |
| NE    |        | eL                |                                      | 35                                   | -        |         |            |       |  |
| E     |        | M                 |                                      | 46                                   | -        | 22      | 29         |       |  |
| N     |        | M                 |                                      | 47 <sup>1</sup> / <sub>2</sub>       | -        | 21      | 73         |       |  |
| Z     |        | M<br>F            |                                      | 49<br>21                             | -<br>30  | 17      | 15         |       | Mag. = 6 <sup>3</sup> / <sub>4</sub>   |
| 12    |        | Z                 | eP                                   | 00                                   | 05       | 53      |            |       | 8660   |
|       | N      | eSKS              |                                      | 15                                   | 59       |         |            |       |  |
|       | N      | eSS               |                                      | 21                                   | 28       |         |            |       | 52°N., 176°W. Andreanof Islands,<br>Aleutian Islands. USCGS.   |
|       | N      | eSSS              |                                      | 24                                   | 46       |         |            |       |  |
|       | NE     | eL                |                                      | 35                                   | -        |         |            |       |  |
|       | N      | M                 |                                      | 45 <sup>1</sup> / <sub>2</sub>       | -        | 19      | 6          |       |  |
|       | E      | M<br>F            |                                      | 47 <sup>1</sup> / <sub>2</sub><br>01 | -<br>50  | 19      | 2          |       | Mag. = 6.1   |
|       | N      | e<br>F            |                                      | 02<br>03                             | 15<br>00 | -<br>-  |            |       | Very small. 52 <sup>1</sup> / <sub>2</sub> °N., 175 <sup>1</sup> / <sub>2</sub> °W.<br>Andreanof Islands. USCGS.                               |
| 12    | ZV,Z   | eP                | 08                                   | 40                                   | 57       |         |            | 9170  |  |
|       | N      | iS                |                                      | 51                                   | 10       | 7       | 2.5(SH)    |       | Ee.  |
|       | N      | i                 |                                      | 51                                   | 23       |         |            |       | 41 <sup>1</sup> / <sub>2</sub> °N., 142 <sup>1</sup> / <sub>2</sub> °E. Near south coast<br>of Hokkaido, Japan. USCGS.                         |
|       | N      | eSS               |                                      | 56.5                                 | -        |         |            |       |  |
|       | E      | M                 |                                      | 09                                   | 18       | 18      | 5          |       |  |
|       | N      | M                 |                                      | 20                                   | -        | 20      | 11         |       |  |
|       | Z      | M<br>F            |                                      | 22<br>10                             | -<br>05  | 18      | 3          |       | Mag. = 6.4   |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JUNE, 19 57

| DATE. | COMPT. | PHASE. | G.M.T. |     |    | PERIOD. | AMPLITUDE. | Δ    | REMARKS.                          |
|-------|--------|--------|--------|-----|----|---------|------------|------|-----------------------------------|
|       |        |        | h.     | m.  | s. |         |            |      |                                   |
| 12    | ZV     | e      | 12     | 06  | 03 |         |            |      |                                   |
|       | ZV,Z   | e      |        | 06  | 39 |         |            |      |                                   |
|       |        | F      |        | 07  | 08 |         |            |      |                                   |
| 12    | ZV     | e      | 16     | 47  | 03 |         |            |      |                                   |
|       | ZV     | e      |        | 47  | 31 |         |            |      |                                   |
|       |        |        |        | 48  | 00 |         |            |      |                                   |
| 13    | ZV,Z   | iP     | 10     | 52  | 36 |         |            | 8670 | Compression.                      |
|       | NE     | eS     | 11     | 02  | 26 |         |            |      |                                   |
|       | NE     | iSKS   |        | 02  | 43 |         |            |      |                                   |
|       | N      | iPPS   |        | 03  | 20 |         |            |      | 51½°N., 175°W. Andreanof Islands. |
|       | N      | eSS    |        | 07  | 57 |         |            |      | Aleutian Islands. Mag. 7(Pas).    |
|       | N      | eSSS   |        | 11  | 27 |         |            |      | USCGS.                            |
|       | N      | eL     |        | 16  | -  |         |            |      |                                   |
|       | Z      | M      |        | 33  | -  | 20      | 33         |      |                                   |
|       | N      | M      |        | 33  | -  | 20      | 105        |      |                                   |
|       | E      | M      |        | 34  | -  | 20      | 40         |      | Mag. = 6.9                        |
|       | F      |        | 15     | 10  | -  |         |            |      |                                   |
| 14    | Z      | eP     | 06     | 36  | 14 |         |            | 8600 |                                   |
|       | NE     | eS     |        | 46  | 01 |         |            |      | 52°N., 175½°W. Andreanof Islands, |
|       | N      | M      | 07     | 20  | -  | 17      | 5          |      | Aleutian Islands. USCGS.          |
|       | E      | M      |        | 21  | -  | 17      | 2          |      | Mag. = 6                          |
|       | F      |        | 08     | 20  | -  |         |            |      |                                   |
| 14    | N      | eL     | 12     | 07  | -  |         |            |      | 32°N., 67°E. Southern Afganistan. |
|       | N      | M      |        | 11  | -  | 19      | 5          |      | USCGS.                            |
|       | E      | M      |        | 12  | -  | 16      | 1          |      |                                   |
|       |        | F      |        | 30  | -  |         |            |      | Mag. = 5.9                        |
| 15    | N      | ePS    | 01     | 10  | 58 |         |            |      |                                   |
|       | N      | eSS    |        | 16  | 22 |         |            |      | 34°S., 56°E. Indian Ocean.        |
|       | NE     | eL     |        | 32  | -  |         |            |      | Mag. 6-6½(Pas). USCGS.            |
|       | N      | M      |        | 46  | -  | 17      | 10         |      |                                   |
|       | E      | M      |        | 46  | -  | 17      | 3          |      |                                   |
|       | Z      | M      |        | 46  | -  | 17      | 3          |      |                                   |
|       | F      |        | 03     | 25  | -  |         |            |      | Mag. = 6.4                        |
| 15    | ZV     | eP     | 18     | 30  | 10 |         |            |      |                                   |
|       | N      | eL     | 19     | 00  | -  |         |            |      | 52°N., 171°W. Fox Islands.        |
|       | E      | M      |        | 09  | -  | 18      | 3          |      | Mag. 6(Berk). USCGS.              |
|       | N      | M      |        | 10  | -  | 18      | 4          |      | Mag. = 6                          |
|       | F      |        | 20     | 15  | -  |         |            |      |                                   |
| 17    | N      | eL     | 07     | 25  | -  |         |            |      | 15°S., 173½°W. Samoa Islands      |
|       | N      | M      |        | 36½ | -  | 20      | 3          |      | region. Mag. 5½ (Berk). USCGS     |
|       |        | F      | 07     | 50  | -  |         |            |      |                                   |
| 18    | ZV,Z   | iP     | 02     | 24  | 40 | 8       | 2          | 9250 | Dilatation.                       |
|       | ZV,Z   | e      |        | 24  | 46 |         |            |      |                                   |
|       | Z      | ePP    |        | 27  | 51 |         |            |      |                                   |
|       | N      | eS     |        | 34  | 57 |         |            |      | 14½°N., 96°E. Gulf of Martaban,   |
|       | E      | eScS   |        | 35  | 09 |         |            |      | Burma. USCGS.                     |
|       | NZ     | ePS    |        | 35  | 43 |         |            |      |                                   |
|       | N      | eL     |        | 56  | -  |         |            |      |                                   |
|       | N      | M      | 03     | 06  | -  | 18      | 9          |      |                                   |
|       | E      | M      |        | 09  | -  | 17      | 4          |      |                                   |
|       | Z      | M      |        | 09  | -  | 16      | 3          |      | Mag. = 6.3                        |
|       | F      |        | 04     | 15  | -  |         |            |      |                                   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

.....JUNE,.....1957.....

| DATE. | COMPT. | PHASE.      | G.M.T. |      |    | PERIOD. | AMPLITUDE. | Δ    | REMARKS.  |
|-------|--------|-------------|--------|------|----|---------|------------|------|---|
|       |        |             | h.     | m.   | s. |         |            |      |   |
| 18    | N<br>N | e<br>M<br>F | 12     | 05   | -  |         |            |      |   |
|       |        |             |        | 16   | -  | 19      | 4          |      |   |
|       |        |             |        | 35   | -  |         |            |      |   |
| 18    | ZV,Z   | iP          | 15     | 00   | 47 | 8       | 3          | 9250 | Dilatation.   |
|       | N      | iS          |        | 11   | 04 | 10      | 4          |      |   |
|       | E      | iSoS        |        | 11   | 17 |         |            |      |   |
|       | E      | i           |        | 11   | 33 |         |            |      |   |
|       | N      | i           |        | 11   | 40 |         |            |      | 14° ., 96°E. Gulf of Martaban,<br>Burma. USCGS.                 |
|       | N      | eL          |        | 32   | -  |         |            |      |   |
|       | E      | M           |        | 38½  | -  | 20      | 7          |      |   |
|       | E      | M           |        | 38½  | -  | 20      | 22         |      |   |
|       | E      | M           |        | 45   | -  | 18      | 10         |      |   |
|       | Z      | M           |        | 45   | -  | 16      | 7          |      |   |
|       |        | F           | 17     | 05   | -  |         |            |      | Mag. = 6.6  |
| 18    | Z      | ePKP        | 18     | 16   | 05 |         |            |      |   |
|       | ZV,Z   | ePKP2       |        | 16   | 21 |         |            |      | 25°S., 170°E. Loyalty Islands<br>region. Mag. 6(Pas).<br>USCGS. |
|       | N      | eL          | 19     | 10   | -  |         |            |      |   |
|       | E      | M           |        | 24   | -  | 22      | 5          |      |   |
|       | N      | M           |        | 25½  | -  | 21      | 20         |      |   |
|       | Z      | M           |        | 25½  | -  | 20      | 7          |      |   |
|       |        | F           | 21     | 00   | -  |         |            |      | Mag. = 6½   |
| 19    | Z      | ePKP        | 01     | 49   | 40 |         |            |      |   |
|       | ZV,Z   | ePKP2       |        | 50   | 07 |         |            |      |   |
|       | NE     | eSS         | 02     | 13.0 | -  |         |            |      | 24°S., 175½°W. Tonga Islands.<br>Mag. 6½-6½(Pas). USCGS.        |
|       | N      | eL          |        | 48   | -  |         |            |      |   |
|       | H      | M           |        | 57   | -  | 20      | 4          |      |   |
|       | E      | M           | 03     | 01   | -  | 19      | 2          |      |   |
|       |        | F           | 04     | 15   | -  |         |            |      | Mag. = 6.3  |
| 19    | Z,ZV   | ePKP        | 08     | 21   | 10 |         |            |      |   |
|       | Z,ZV   | i           |        | 21   | 35 |         |            |      |   |
|       | ZN     | e           |        | 21   | 48 |         |            |      | 16½°S., 176½°E. Fiji Islands.<br>Mag. 6½(Pas), 6¾(Berk). USCGS. |
|       | N      | e           |        | 29   | 50 |         |            |      |   |
|       | N      | eSKKS       |        | 32   | 04 |         |            |      |   |
|       | E      | eSS         |        | 43   | 18 |         |            |      |   |
|       | N      | e           |        | 43   | 59 |         |            |      |   |
|       | N      | e           |        | 49   | 08 |         |            |      |   |
|       | E      | M           | 09     | 27½  | -  | 21      | 7          |      |   |
|       | N      | M           |        | 27½  | -  | 21      | 15         |      |   |
|       | Z      | M           |        | 42   | -  | 16      | 3          |      | Mag. = 6.7  |
|       |        | F           | 11     | 00   | -  |         |            |      |   |
| 19    | ZV     | e           | 11     | 11   | 38 |         |            |      |   |
|       | ZV     | e           |        | 11   | 42 |         |            |      |   |
|       | ZV,Z   | e           |        | 12   | 18 |         |            |      |   |
|       | ZV     | e           |        | 12   | 40 |         |            |      |   |
|       |        | F           |        | 13   | 00 |         |            |      |   |
| 20    | N      | e           | 02     | 00   | -  |         |            |      | Small. 20°N., 145½°E. Mariana<br>Islands. USCGS.                |
|       |        | F           |        | 20   | -  |         |            |      |   |
| 21    | ZV     | eF          | 18     | 50   | 11 |         |            |      |   |
|       | ZV,Z   | e           |        | 50   | 23 |         |            |      |   |
|       | N      | eL          | 19     | 22   | -  |         |            |      | Kurile Islands region.  |
|       | E      | M           |        | 31   | -  | 17      | 1          |      |   |
|       | N      | M           |        | 31   | -  | 18      | 4          |      |   |
|       |        | F           | 20     | 15   | -  |         |            |      |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JULY, 1957

| DATE. | COMPT. | PHASE.  | G.M.T. |     |    | PERIOD. | AMPLI-<br>TUDE. | Δ      | REMARKS.                             |
|-------|--------|---------|--------|-----|----|---------|-----------------|--------|--------------------------------------|
|       |        |         | h.     | m.  | s. |         |                 |        |                                      |
| 21    | N      | e       | 22     | 53  | -  | 22      | 3               |        |                                      |
|       | N      | M       |        | 56½ | -  |         |                 |        |                                      |
|       |        | F       | 23     | 20  | -  |         |                 |        |                                      |
| 22    | N      | e       | 00     | 03  | -  |         |                 | Small. |                                      |
|       |        | F       |        | 35  | -  |         |                 |        |                                      |
| 22    | Z      | iP      | 06     | 31  | 16 | 6       | 5               | 9000   | Compression. ZVe                     |
|       | ZV,Z   | i       |        | 31  | 18 |         |                 |        | Dilatation.                          |
|       | ZV,Z   | e       |        | 31  | 37 |         |                 |        |                                      |
|       | ZV,Z   | e(pP)   |        | 31  | 55 |         |                 |        |                                      |
|       | ZV,Z   | e(sP)   |        | 32  | 16 |         |                 |        | 16°N., 94°W. Near coast of           |
|       | E      | e       |        | 41  | 14 |         |                 |        | Chiapas, Mexico. Mag. 6½(Pas).       |
|       | NE     | iS      |        | 41  | 21 | 8       | 7(SW)           |        | USCGS.                               |
|       | ZNE    | iSKS    |        | 41  | 29 |         |                 |        |                                      |
|       | ZE     | iPS     |        | 42  | 12 |         |                 |        |                                      |
|       | N      | eL      |        | 54  | -  |         |                 |        |                                      |
| 22    | E      | M       | 07     | 00  | -  | 28      | 12              |        |                                      |
|       | N      | M       |        | 01  | -  | 26      | 17              |        | Mag. = 6.7                           |
|       |        | F       | 08     | 20  | -  |         |                 |        |                                      |
| 22    | N      | eL      | 19     | 43  | -  | 20      | 2               | 12900  | 16°N., 45½°W. Mid-Atlantic           |
|       | N      | M       |        | 45½ | -  |         |                 |        |                                      |
|       |        | F       |        | 55  | -  |         |                 |        |                                      |
| 23    | Z,ZV   | e       | 00     | 09  | 21 |         |                 |        |                                      |
|       | Z      | e(P)    |        | 10  | 05 |         |                 |        |                                      |
|       | ZN     | e       |        | 10  | 35 |         |                 |        |                                      |
|       | NE     | e       |        | 13  | 24 |         |                 |        |                                      |
|       | NE     | eSKS    |        | 15  | 42 |         |                 |        | 1½°S., 137°E. Near north coast of    |
|       | NE     | e(S)    |        | 17  | 35 |         |                 |        | New Guinea. Mag. 7¼(Pas), 7-7¼(Berk) |
|       | N      | e       |        | 18  | 23 |         |                 |        | USCGS.                               |
|       | NE     | ePPS    |        | 20  | 21 |         |                 |        |                                      |
|       | ZNE    | e       |        | 22  | 06 |         |                 |        |                                      |
|       | NE     | e(SKKS) |        | 27  | 09 |         |                 |        |                                      |
|       | N      | eL      |        | 39  | -  |         |                 |        |                                      |
|       | E      | eL      |        | 44  | -  |         |                 |        |                                      |
|       | 23     | Z       | M      | 01  | 03 | -       | 20              | 67     |                                      |
| E     |        | M       |        | 03  | -  | 20      | 130             |        |                                      |
| N     |        | M       |        | 05  | -  | 20      | 254             |        | Mag. = 7¼                            |
|       |        | F       | 04     | 30  | -  |         |                 |        |                                      |
| 23    | ZV     | eP      | 03     | 37  | 47 |         |                 |        | 58½°N., 137°W. Near coast of         |
|       |        |         |        |     |    |         |                 |        | Alaska. USCGS.                       |
| 24    | N      | eL      | 04     | 42  | -  | 17      | 3               |        |                                      |
|       | N      | M       |        | 43  | -  |         |                 |        |                                      |
|       |        | F       |        | 50  | -  |         |                 |        |                                      |
| 24    | ZV,Z   | iP      | 10     | 01  | 57 | 26      | 2               |        | Compression.                         |
|       | ZV,Z   | e(pP)   |        | 02  | 36 |         |                 |        |                                      |
|       | N      | M       |        | 32  | -  |         |                 |        |                                      |
|       |        | F       |        | 50  | -  |         |                 |        |                                      |
| 24    | N      | e       | 12     | 20  | -  |         |                 |        | Very small.                          |
|       |        | F       | 13     | 00  | -  |         |                 |        |                                      |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JUNE, 19 57

| DATE. | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD.       | AMPLI-<br>TITUDE. | Δ           | REMARKS.  |
|-------|--------|--------|--------|------------------|----|---------------|-------------------|-------------|---|
|       |        |        | h.     | m.               | s. |               |                   |             |   |
| 25    | ZV,Z   | eP     | 10     | 23               | 54 |               |                   |             |   |
|       | N      | eL     |        | 58               | -  |               |                   |             |   |
|       | N      | M      | 11     | 07               | -  | 20            | 2                 |             |   |
|       |        | F      |        | 25               | -  |               |                   |             |   |
| 26    | N      | e(SKS) | 03     | 11               | 51 |               |                   |             |   |
|       | N      | eL     |        | 36               | -  |               |                   |             |   |
|       | N      | M      |        | 47               | -  | 18            | 2                 |             |   |
|       |        | F      | 04     | 15               | -  |               |                   |             |   |
| 27    | ZV,Z   | iP     | 00     | 19               | 42 | 9             | 47                | 7070        | Dilatation.<br><br>Lake Baikal region USSR.<br><br>Mag. = 7.6 |
|       | ZV,Z   | i      |        | 19               | 51 | <del>9</del>  | <del>51(H)</del>  |             |   |
|       | NZ     | iPP    |        | 22               | 05 | 8             | 13                |             |   |
|       | NZ     | iPPP   |        | 23               | 29 |               |                   |             |   |
|       | NE     | iS     |        | 28               | 12 | <del>10</del> | <del>68(SH)</del> |             |   |
|       | NE     | i      |        | 28               | 23 |               |                   |             |   |
|       | N      | iPPS   |        | 28               | 43 |               |                   |             |   |
|       | N      | iSS    |        | 32               | 13 |               |                   |             |   |
|       | E      | M      |        | (50)             | -  | (600)         |                   |             |   |
|       | N      | M      |        | (50)             | -  | (700)         |                   |             |   |
|       | F      |        | 05     | 20               | -  |               |                   |             |   |
| 27    | EZ     | e      | 07     | 19               | 22 |               |                   |             |   |
|       | N      | eL     |        | 21 $\frac{1}{2}$ | -  |               |                   |             |   |
|       | N      | M      |        | 22 $\frac{1}{2}$ | -  | 14            | 6                 |             |   |
|       | F      |        | 30     | -                |    |               |                   |             |   |
| 28    | ZV,Z   | eP     | 21     | 27               | 11 |               |                   |             |   |
|       | E      | eL     |        | 31               | -  |               |                   |             | 36°N., 1°E.   |
|       | E      | M      |        | 32               | -  | 15            | 6                 |             | Orleansville region, Algeria.                                 |
|       | N      | M      |        | 33 $\frac{1}{2}$ | -  | 14            | 5                 |             | BCIS.   |
|       | Z      | M      |        | 34               | -  | 13            | 3                 |             | Mag. = 5 $\frac{1}{2}$  |
|       | F      |        | 55     | -                |    |               |                   | Very small. |   |
| 29    | N      | e      | 04     | 53               | -  |               |                   |             |   |
|       |        | F      | 05     | 03               | -  |               |                   |             |   |
| 29    | ZV,Z   | eP     | 08     | 00               | 09 |               |                   | 8710        | Aleutian Islands.   |
|       | N      | eS     |        | 10               | 01 |               |                   |             |   |
|       | N      | e      |        | 10               | 21 |               |                   |             |   |
|       | N      | eL     |        | 26               | -  |               |                   |             |   |
|       | N      | M      |        | 37               | -  | 20            | 2                 |             |   |
|       | F      |        | 09     | 05               | -  |               |                   |             |   |
| 29    | ZV     | eP     | 22     | 44               | 08 |               |                   |             |   |
|       | N      | eL     | 23     | 06               | -  |               |                   |             | Lake Baikal aftershock.                                       |
|       | N      | M      |        | 10               | -  | 18            | 2                 |             | Mag. = 5 $\frac{3}{4}$  |
|       | F      |        | 30     | -                |    |               |                   |             |   |
| 29    | NE     | eL     | 23     | 54 $\frac{1}{2}$ | -  |               |                   |             |   |
|       | E      | M      |        | 55 $\frac{1}{2}$ | -  | 15            | 5                 |             |   |
|       | N      | M      |        | 56 $\frac{1}{2}$ | -  | 12            | 3                 |             |   |
|       | Z      | M      |        | 56 $\frac{1}{2}$ | -  | 12            | 2                 |             |   |
|       |        | F      |        | 24               | 05 | -             |                   |             |   |

All the magnitudes are the "unified magnitudes" denoted by "m".

M.O. 627
KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.
SEISMOLOGICAL BULLETIN.

..... MAY, ..... 19 57.

CORRECTIONS TO MAY 1957

The following corrections should be applied to the times reported in the Bulletin for May 1957 :

|          |          |                    |
|----------|----------|--------------------|
| 12th May | — 1 sec. |                    |
| 17th "   | — 1 "    |                    |
| 18th "   | — 2 "    |                    |
| 20th "   | — 2 "    | (first shock only) |
| 26th "   | — 3 "    |                    |
| 27th "   | — 2 "    |                    |
| 28th "   | — 2 "    |                    |
| 29th "   | — 2 "    |                    |
| 30th "   | — 2 "    |                    |
| 31st "   | — 1 "    | (first shock only) |



AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR JULY, 1957.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"  
(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>T.<br>sec. | PENDULUM FREE PERIOD<br>T.<br>sec. | DAMPING CONSTANT<br>$\mu^2$ . | $\frac{Ak}{\pi}$<br>sec. <sup>-1</sup> |
|------------|----------------------------------|--|------------------------------------|-------------------------------|--|
| N.         | 25 August, 1954                  | 21.7                                   | 21.2                               | +0.01                         | 54.4                                   |
| E.         | 26 August, 1954                  | 21.3                                   | 21.4                               | +0.01                         | 52.6                                   |
| Z.         | 1 September, 1954                | 11.3                                   | 11.4                               | +0.05                         | 115.                                   |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.

TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.

SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD. | AMPLITUDE. | $\Delta$  | REMARKS. |
|-------|--------|--------|--------|------------------|----|---------|------------|---|----------|
|       |        |        | h.     | m.               | s. |         |            |   |          |
| 1     | N      | eL     | 13     | 36               | -  |         |            | Atlantic Ocean foreshock. USCGS.  |          |
|       |        | M      |        | 40 $\frac{1}{2}$ | -  | 20      | 2          |   |          |
|       |        | F      | -      | -                | -  |         |            |   |          |
| 1     | N      | M      | 13     | 53 $\frac{1}{2}$ | -  | 20      | 2          | Mid-Atlantic Ocean near Ascension Island. USCGS.  |          |
|       |        | F      | 14     | 05               | -  |         |            |   |          |
| 1     | ZV,Z   | iP     | 19     | 41               | 52 |         |            | 8220<br>Compression.<br>Depth = 75 Km.<br><br>25°N., 94°E. India-Burma border.<br>USCGS.<br><br>surface waves poorly developed.   |          |
|       |        | i      |        | 41               | 56 |         |            |   |          |
|       |        | iP     |        | 42               | 12 |         |            |   |          |
|       |        | e      |        | 42               | 15 |         |            |   |          |
|       |        | ePP    |        | 44               | 39 |         |            |   |          |
|       |        | iS     |        | 51               | 16 | 14      | 5          |   |          |
|       |        | iS     |        | 51               | 18 | 14      | 4          |   |          |
|       |        | iS     |        | 51               | 51 |         |            |   |          |
|       |        | iS     |        | 51               | 53 |         |            |   |          |
|       |        | ePPS   |        | 52               | 18 |         |            |   |          |
|       |        | eSS    |        | 56.1             | -  |         |            |   |          |
|       |        | eSSS   |        | 59.6             | -  |         |            |   |          |
|       |        | eL     | 20     | 03               | -  |         |            |   |          |
|       |        | M      |        | 12               | -  | 20      | 10         |   |          |
|       |        | M      |        | 12               | -  | 22      | 38         |   |          |
| M     |        | 18     | -      | 14               | 6  |         |            |   |          |
| 2     | ZV,Z   | F      | 21     | 30               | -  |         |            | Mag. = 6 $\frac{1}{2}$<br><br>4540<br>Compression.<br>PH 12 sec. 11 $\mu$ .<br><br>36°N., 53°N., Northern Iran.<br>Mag. 7 $\frac{1}{4}$ -7 $\frac{1}{2}$ (Pas). Approximately<br>1500 dead & extensive property |          |
|       |        | iP     | 00     | 50               | 02 | 8       | 22         |   |          |
|       |        | iPP    |        | 51               | 39 | 9       | 19         |   |          |
|       |        | iPP    |        | 51               | 40 | 12      | 16 (PPH)   |   |          |
|       |        | iS     |        | 56               | 11 | 14      | 45         |   |          |
|       |        | iS     |        | 56               | 12 | 14      | 17         |   |          |
|       |        | i      |        | 58               | 44 |         |            |   |          |
| i     |        | 58     | 58     |                  |    |         |            |   |          |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JULY, 19 57

| DATE.         | COMPT. | PHASE.          | G.M.T. |      |    | PERIOD. | AMPLI-<br>TUDE. | Δ    | REMARKS.   |
|---------------|--------|-----------------|--------|------|----|---------|-----------------|------|--|
|               |        |                 | h.     | m.   | s. |         |                 |      |  |
| contd.<br>✓ 2 | N      | eL              | 00     | 59   | -  |         | "               | km.  | damage throughout northern Iran.<br>USCGS.                 |
|               | N      | eL <sub>2</sub> | 01     | 05   | -  |         |                 |      |  |
|               | N      | M               |        | 08   | -  | 20      | 74              |      |  |
|               | N      | M               |        | 10   | -  | 21      | 280             |      |  |
|               | Z      | M               |        | 14   | -  | 13      | 33              |      |  |
|               |        | F               | 05     | 00   | -  |         |                 |      | Mag. = 6.9   |
| 3             | N      | e               | 02     | 21   | -  |         |                 |      | 52°N., 159°E. Near south coast<br>of Kamchatka. USCGS.     |
|               | N      | M               |        | 41   | -  | 20      | 2               |      |  |
|               |        | F               | 03     | 00   | -  |         |                 |      |  |
| 13            | ZV, Z  | iP              | 12     | 36   | 45 | 4       | 1.4             | 8830 | Dilatation.  |
|               | N      | eS              |        | 46   | 42 | 12      | 2.6             |      |  |
|               | N      | eSS             |        | 51.5 | -  |         |                 |      |  |
|               | N      | eL              | 13     | 02   | -  |         |                 |      |  |
|               | N      | M               |        | 12   | -  | 22      | 2               |      |  |
|               |        | F               |        | 14   | -  | 22      | 7               |      | Mag. = 6.2   |
|               |        | F               | 14     | 15   | -  |         |                 |      |  |
| 3             | N      | e               | 17     | 49   | -  |         |                 |      | Very small. 54°N., 165°W.<br>Fox Islands. USCGS.           |
|               |        | F               | 18     | 00   | -  |         |                 |      |  |
| 3             | N      | e               | 21     | 21   | -  |         |                 |      | Very small.  |
|               |        | F               | 22     | 20   | -  |         |                 |      |  |
| 4             | N      | e               | 03     | 18   | -  |         |                 |      | Very small.  |
|               |        | F               |        | 25   | -  |         |                 |      |  |
| 4             | N      | eL              | 13     | 16   | -  |         |                 |      | 34°N., 137°E. Near south coast<br>of Honshu, Japan. USCGS. |
|               | N      | M               |        | 24   | -  | 18      | 1               |      |  |
|               | N      | M               |        | 24   | -  | 18      | 3               |      |  |
|               |        | F               |        | 45   | -  |         |                 |      |  |
| 4             | N      | e               | 23     | 08   | -  |         |                 |      | Very small. Arizona-Mexico<br>foreshock. USCGS.            |
|               |        | F               |        | 25   | -  |         |                 |      |  |
| 5             | N      | e               | 00     | 05   | -  |         |                 |      | Very small. Arizona-Mexico<br>foreshock. USCGS.            |
|               |        | F               |        | 20   | -  |         |                 |      |  |
| 5             | N      | eL              | 01     | 38   | -  |         |                 |      | 32°N., 114°W. Arizona-Mexico<br>border. USCGS.             |
|               | N      | M               |        | 43   | -  | 16      | 1.4             |      |  |
|               |        | F               | 02     | 05   | -  |         |                 |      |  |
| 5             | N      | e               | 13     | 50   | -  |         |                 |      | 28½°S., 179°W. Kermadec Islands.<br>USCGS.                 |
|               | N      | M               | 14     | 07   | -  | 20      | 1.6             |      |  |
|               |        | F               |        | 45   | -  |         |                 |      |  |
| 5             | NE     | eL              | 16     | 00   | -  |         |                 |      | Eastern Belgian Congo. USCGS.                              |
|               | E      | M               |        | 06   | -  | 15      | 2               |      |  |
|               | N      | M               |        | 06   | -  | 17      | 4               |      |  |
|               |        | F               |        | 45   | -  |         |                 |      |  |
| 7             | ZV, Z  | iP              | 06     | 05   | 08 |         |                 |      | 39°N., 40°E. Turkey. USCGS.                                |
|               | N      | eL              |        | 11½  | -  |         |                 |      |  |
|               | E      | M               |        | 18½  | -  | 20      | 3               |      |  |
|               | N      | M               |        | 18½  | -  | 18      | 7               |      |  |
|               | Z      | M               |        | 22   | -  | 14      | 2               |      |  |
|               |        | F               |        | 50   | -  |         |                 |      | Mag. = 5¾  |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JULY, 1957.

| DATE. | COMPT. | PHASE. | G.M.T. |     |    | PERIOD. | AMPLITUDE. | Δ   | REMARKS.   |
|-------|--------|--------|--------|-----|----|---------|------------|---|--|
|       |        |        | h.     | m.  | s. |         |            |   |  |
| ✓ 7   | Z,ZV   | ePKP   | 16     | 30  | 30 |         |            | (14000)   | 6½°S., 156°E. Solomon Islands.<br>Mag. 6¼(Pas). USCGS.                   |
|       | Z,ZV   | e      |        | 30  | 42 |         |            |   |  |
|       | Z      | ePKS   |        | 33  | 50 |         |            |   |  |
|       | N      | e      |        | 33  | 52 |         |            |   |  |
|       | Z      | e      |        | 34  | 11 |         |            |   |  |
|       | N      | eSS    |        | 49  | 04 |         |            |   |  |
|       | N      | eL     | 17     | 04  | -  |         |            |   |  |
|       | E      | M      |        | 20  | -  | 24      | 3          |   |  |
|       | N      | M      |        | 23  | -  | 24      | 9          |   |  |
|       | N      | F      |        | 19  | 40 | -       |            |   |  |
| ✓ 9   | N      | eL     | 10     | 42  | -  |         |            | 6°S., 104°E. Near south coast of Sumatra. h about 60 Km. USCGS. |  |
|       | N      | M      | 11     | 03½ | -  | 20      | 6          |   |  |
|       | E      | M      |        | 05  | -  | 20      | 2          |   |  |
|       |        | F      | 12     | 00  | -  |         |            | Mag. = 6¼.  |  |
| 9     | Z,ZV   | eP     | 20     | 39  | 29 |         |            | 2280  | Region of Jan Mayen.   |
|       | N      | eS     |        | 43  | 12 |         |            |   |  |
|       | N      | eL     |        | 44  | -  |         |            |   |  |
|       | E      | M      |        | 45½ | -  | 20      | 1          |   |  |
|       | N      | M      |        | 46  | -  | 20      | 2          |   |  |
|       | F      |        | 57     | -   |    |         |            |   |  |
| 9     | ZV,ZN  | eP     | 21     | 24  | 49 |         |            | 2300  | Region of Jan Mayen.   |
|       | N      | eS     |        | 28  | 34 |         |            |   |  |
|       | N      | eL     |        | 30  | -  |         |            |   |  |
|       | E      | M      |        | 31  | -  | 19      | 1          |   |  |
|       | N      | M      |        | 31  | -  | 20      | 2          |   |  |
|       | F      |        | 43     | -   |    |         |            |   |  |
| 9     | N      | eL     | 22     | 52  | -  |         |            |   |  |
|       | N      | M      | 23     | 04  | -  | 13      | 2          |   |  |
|       |        | F      |        | 15  | -  |         |            |   |  |
| 10    | N      | e      | 05     | 23  | -  |         |            |   | 52½°N., 170°W. Fox Islands. USCGS.                                       |
|       | N      | M      |        | 35  | -  | 18      | 1.5        |   |  |
|       |        | F      |        | 06  | 00 | -       |            |   |  |
| 10    | Z      | eP     | 06     | 10  | 13 |         |            | 2300  | Region of Jan Mayen.   |
|       | N      | eS     |        | 13  | 59 |         |            |   |  |
|       | N      | M      |        | 16  | -  | 20      | 1½         |   |  |
|       |        | F      |        | 28  | -  |         |            |   |  |
| ✓ 10  | Z,ZV   | eP     | 09     | 16  | 17 | 5       | 2.5        | 8890  | 8°N., 82½°W. Near coast of Panama. Mag. 6½-6¾ (Pas), 6¾-7 (Berk). USCGS. |
|       | Z      | i      |        | 16  | 20 |         |            |   |  |
|       | Z,ZV   | i      |        | 16  | 26 |         |            |   |  |
|       | Z      | e      |        | 16  | 39 |         |            |   |  |
|       | Z      | eFP    |        | 19  | 23 |         |            |   |  |
|       | NE     | eS     |        | 26  | 17 |         |            |   |  |
|       | N      | eSKS   |        | 26  | 27 |         |            |   |  |
|       | NE     | ePS    |        | 26  | 57 |         |            |   |  |
|       | N      | eLQ    |        | 37  | -  |         |            |   |  |
|       | E      | eLR    |        | 41  | -  |         |            |   |  |
|       | N      | eL2    |        | 45  | -  |         |            |   |  |
|       | Z      | M      |        | 45½ | -  | 22      | 18         |   |  |
|       | E      | M      |        | 45½ | -  | 22      | 17         |   |  |
|       | N      | M      |        | 47½ | -  | 21      | 15         |   |  |
|       | F      | 12     | 00     | -   |    |         |            |   |  |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JULY, 19 57

| DATE | COMPT. | PHASE.             | G.M.T. |     |    | PERIOD. | AMPLITUDE. | Δ     | REMARKS.   |
|------|--------|--------------------|--------|-----|----|---------|------------|-------|--|
|      |        |                    | h.     | m.  | s. |         |            |       |  |
| 10   | N      | e                  | 23     | 46  | 31 |         |            |       |  |
|      | N      | M                  |        | 52  | -  | 14      | 2          |       |  |
|      |        | F                  | 24     | 03  | -  |         |            |       |  |
| 12   | N      | e                  | 22     | 00  | -  |         |            |       | 3°S., 148½°E. Bismark Sea. USCGS.                    |
|      | N      | M                  |        | 12  | -  | 22      | 2          |       |  |
|      |        | F                  |        | 35  | -  |         |            |       |  |
| 12   | Z      | eP                 | 22     | 25  | 52 |         |            |       |  |
|      | N      | eL                 |        | 50  | -  |         |            |       | 22½°N., 122½°E. Off east coast of Formosa. USCGS.    |
|      | N      | M                  | 23     | 04  | -  | 20      | 2          |       |  |
|      |        | F                  |        | 25  | -  |         |            |       |  |
| 13   | N      | eL                 | 01     | 41  | -  |         |            |       |  |
|      | N      | M                  |        | 51½ | -  | 20      | 4          |       | 52°N., 169½°W. Fox Islands. USCGS.                   |
|      | E      | M                  |        | 54½ | -  | 20      | 2          |       |  |
|      |        | F                  | 02     | 25  | -  |         |            |       | Mag. = 6   |
| 13   | ZE     | eP                 | 03     | 36  | 22 |         |            | 2380  |  |
|      | NE     | eS                 |        | 40  | 13 |         |            |       |  |
|      | Z      | e                  |        | 40  | 14 |         |            |       |  |
|      | N      | eL                 |        | 42½ | -  |         |            |       |  |
|      | N      | M                  |        | 44  | -  | 14      | 3          |       |  |
|      | E      | M                  |        | 45  | -  | 12      | 2          |       |  |
|      |        | F                  |        | 50  | -  |         |            |       | Mag. = 5½  |
| 14   | ZV,Z   | eP                 | 02     | 39  | 03 |         |            |       |  |
|      | N      | eL                 | 03     | 08  | -  |         |            |       | 46°N., 151½°E. Kurile Islands. USCGS.                |
|      | N      | M                  |        | 15  | -  | 21      | 3          |       |  |
|      |        | F                  |        | 40  | -  |         |            |       |  |
| ✓14  | ZV,Z   | iPKP <sub>1</sub>  | 06     | 43  | 31 | 8       | 4          | 17100 | Dilatation.  |
|      | ZV,Z   | i                  |        | 43  | 40 |         |            |       | Depth = 200 Km.                                      |
|      | ZV,Z   | iPKP <sub>2</sub>  |        | 43  | 57 | 9       | 6          |       |  |
|      | ZN,Z   | ipPKP <sub>1</sub> |        | 44  | 23 |         |            |       |  |
|      | ZV     | ipPKP <sub>2</sub> |        | 44  | 50 |         |            |       |  |
|      | Z      | e                  |        | 45  | 07 |         |            |       |  |
|      | ZN     | iPP                |        | 47  | 33 | 9       | 5          |       | PPH = 9s. 6 μ  |
|      | Z,ZV   | e                  |        | 47  | 50 |         |            |       |  |
|      | NZ     | ipPP               |        | 48  | 20 |         |            |       |  |
|      | Z      | esPP               |        | 48  | 39 |         |            |       |  |
|      | N      | i                  |        | 54  | 06 |         |            |       | 27½°S., 177°W. Tonga Islands region. h about 200 Km. |
|      | Z      | i                  |        | 54  | 50 |         |            |       | Mag. 7-7¼ (Pas) 6¾ (Berk). USCGS.                    |
|      | Z      | iSKSP              |        | 57  | 24 |         |            |       |  |
|      | N      | ePSKS              |        | 57  | 48 |         |            |       |  |
|      | E      | eSS                | 07     | 07  | 02 |         |            |       |  |
|      | E      | esSS               |        | 08  | 18 |         |            |       |  |
|      | N      | eLQ                |        | 28  | -  |         |            |       |  |
|      | E      | M                  |        | 53  | -  | 20      | 4          |       |  |
|      | N      | M                  |        | 53  | -  | 21      | 8          |       | Mag. = 7¼  |
|      | Z      | M                  |        | 53  | -  | 20      | 4          |       |  |
|      |        | F                  | -      | -   | -  |         |            |       | overlapped by next shock.                            |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

..... JULY, ..... 19 57.....

| DATE. | COMPT. | PHASE.            | G.M.T. |                                |                                | PERIOD. | AMPLITUDE.                    | Δ   | REMARKS.  |                                      |
|-------|--------|-------------------|--------|--------------------------------|--------------------------------|---------|-------------------------------|---|---|--------------------------------------|
|       |        |                   | h.     | m.                             | s.                             |         |                               |   |   | sec.                                 |
| ✓ 14  | ZV,Z   | ePKP              | 08     | 30                             | 45                             |         |                               | 17500   | 30°S., 177°W. Kermadec Islands.<br>Mag. 6 <sup>3</sup> / <sub>4</sub> (Pas). 7 (Berk). USCGS.   |                                      |
|       | ZV,Z   | iPKP <sub>2</sub> |        | 31                             | 18                             |         |                               |   |   |                                      |
|       | Z      | ePP               |        | 34                             | 56                             |         |                               |   |   |                                      |
|       | N      | e                 |        | 45                             | 13                             |         |                               |   |   |                                      |
|       | N      | ePPS              |        | 48                             | 24                             |         |                               |   |   |                                      |
|       | EN     | eSS               |        | 55.2                           | -                              |         |                               |   |   |                                      |
|       | N      | i                 |        | 55                             | 54                             |         |                               |   |   |                                      |
|       | N      | e                 |        | 09                             | 03                             | 40      |                               |   |   |                                      |
|       | E      | M                 |        |                                | 40                             | -       | 20                            |   |   | 8                                    |
|       | N      | M                 |        |                                | 44                             | -       | 20                            |   |   | 23                                   |
| Z     | M      |                   |        | 45                             | -                              | 20      | 8                             |   |   |                                      |
|       | F      |                   | -      | -                              | -                              |         |                               | Mag. = 6 <sup>3</sup> / <sub>4</sub><br>overlapped by next shock.   |   |                                      |
| ✓ 14  | ZV,Z   | ePKP              | 10     | 02                             | 15                             |         |                               |   | 20°S., 174 <sup>1</sup> / <sub>2</sub> °W. Tonga Islands.<br>USCGS.   |                                      |
|       | ZV,Z   | e                 |        | 02                             | 30                             |         |                               |   |   |                                      |
|       | E      | M                 |        | 11                             | 07                             | -       | 20                            |   |   | 2                                    |
|       | N      | M                 |        |                                | 07                             | -       | 21                            |   |   | 4                                    |
|       | F      |                   | -      | -                              | -                              |         |                               | Mag. = 6 <sup>1</sup> / <sub>4</sub><br>overlapped by next shock.   |   |                                      |
| 15    | NE     | eL                | 09     | 44 <sup>1</sup> / <sub>2</sub> | -                              |         |                               |   | 36°N., 7 <sup>1</sup> / <sub>2</sub> °W. West of Gibraltar.<br>USCGS.   |                                      |
|       | E      | M                 |        | 46                             | -                              | 15      | 3                             |   |   |                                      |
|       | N      | M                 |        | 46                             | -                              | 15      | 4                             |   |   |                                      |
|       |        | F                 |        | 55                             | -                              |         |                               |   |   | Mag. = 5 <sup>1</sup> / <sub>2</sub> |
| 15    | N      | eL                | 23     | 38                             | -                              |         |                               |   | 39°N., 70°E. West Pakistan. USCGS.  |                                      |
|       | N      | M                 |        | 43                             | -                              | 20      | 2                             |   |   |                                      |
|       |        | F                 |        | 24                             | 10                             | -       |                               |   |   |                                      |
| ✓ 17  | ZV,Z   | ePKP              | 11     | 29                             | 37                             | 8       | 2                             | 14900   | Depth = 120 Km.<br>PPH = 10s. 2 μ<br>11°S., 167°E. Santa Cruz Islands,<br>Mag. 6 <sup>1</sup> / <sub>4</sub> -6 <sup>1</sup> / <sub>2</sub> (Pas). USCGS. |                                      |
|       | Z      | epPKP             |        | 30                             | 09                             |         |                               |   |   |                                      |
|       | Z      | ePP               |        | 32                             | 22                             | 10      | 2                             |   |   |                                      |
|       | Z      | epPP              |        | 32                             | 55                             |         |                               |   |   |                                      |
|       | N      | iPKS              |        | 33                             | 11                             | 12      | 7                             |   |   |                                      |
|       | N      | ipPKS             |        | 33                             | 42                             |         |                               |   |   |                                      |
|       | E      | M                 |        | 12                             | 19 <sup>1</sup> / <sub>2</sub> | -       | 26                            |   |   | 3                                    |
|       | N      | M                 |        |                                | 19 <sup>1</sup> / <sub>2</sub> | -       | 26                            |   |   | 10                                   |
|       | F      |                   | -      | -                              | -                              |         |                               | Mag. = 6 <sup>1</sup> / <sub>4</sub> .<br>overlapped by next shock. |   |                                      |
| 17    | N      | M                 | 13     | 39                             | -                              | 21      | 3                             |   | 2°S., 137°E. New Guinea. USCGS.   |                                      |
|       | E      | M                 |        | 39 <sup>1</sup> / <sub>2</sub> | -                              | 20      | 2                             |   |   |                                      |
|       | Z      | M                 |        | 39 <sup>1</sup> / <sub>2</sub> | -                              | 20      | 4                             |   |   |                                      |
|       |        | F                 |        | 14                             | 30                             | -       |                               |   |   | Mag. = 6 <sup>1</sup> / <sub>4</sub> |
| 17    | NE     | eL                | 19     | 06                             | -                              |         |                               |   | 1°S., 13°W. Mid-Atlantic Ocean.<br>USCGS.   |                                      |
|       | E      | M                 |        | 09                             | -                              | 18      | 3                             |   |   |                                      |
|       | N      | M                 |        | 12                             | -                              | 18      | 6                             |   |   |                                      |
|       | Z      | M                 |        | 12                             | -                              | 18      | 3                             |   |   |                                      |
|       | F      |                   | 35     | -                              |                                |         | Mag. = 6                      |   |   |                                      |
| 18    | N      | eL                | 01     | 50                             | -                              |         |                               |   | 53°N., 169°W. Fox Islands. USCGS.   |                                      |
|       | N      | M                 |        | 02                             | 07                             | -       | 20                            |   |   | 2                                    |
|       | F      |                   |        | 35                             | -                              |         |                               |   |   |                                      |
| ✓ 18  | N      | eL                | 12     | 20                             | -                              |         |                               |   | 5°S., 146°E. Near north coast of<br>New Guinea. USCGS.  |                                      |
|       | N      | M                 |        | 31                             | -                              | 19      | 2                             |   |   |                                      |
|       |        | F                 |        | 35                             | -                              |         |                               |   |   |                                      |
| ✓ 19  | NE     | eSKS              | 13     | 25                             | 23                             |         |                               |   | 25°N., 122 <sup>1</sup> / <sub>2</sub> °E. Near north coast<br>of Formosa. USCGS.   |                                      |
|       | N      | eS                |        | 25                             | 39                             | 12      | 2 <sup>1</sup> / <sub>2</sub> |   |   |                                      |
|       | NE     | e                 |        | 26                             | 25                             |         |                               |   |   |                                      |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JULY, 1957

| DATE.          | COMPT. | PHASE.            | G.M.T. |        |    | PERIOD. | AMPLI-TUDE. | Δ    | REMARKS.  |
|----------------|--------|-------------------|--------|--------|----|---------|-------------|------|---|
|                |        |                   | h.     | m.     | s. |         |             |      |   |
| contd.<br>✓ 19 | NE     | eL                | 13     | 47     | -  |         |             |      |   |
|                | E      | M                 |        | 52     | -  | 24      | 2           |      |   |
|                | N      | M                 |        | 52     | -  | 24      | 4           |      | Mag. = 6  |
|                |        | F                 | 14     | 30     | -  |         |             |      |   |
| 19             | N      | eL                | 22     | 30     | -  |         |             |      |   |
|                | N      | M                 |        | 51     | -  | 20      | 1           |      | 3 1/2° S., 142° E. New Guinea. USCGS.   |
|                |        | F                 | 23     | 00     | -  |         |             |      |   |
| 20             | N      | eS                | 10     | 17     | 43 | 11      | 2(SH)       |      |   |
|                | E      | e                 |        | 17     | 45 |         |             |      |   |
|                | NE     | eL                |        | 39     | -  |         |             |      |   |
|                | E      | M                 |        | 47     | -  | 16      | 1           |      |   |
|                | N      | M                 |        | 47     | -  | 14      | 2           |      |   |
|                | Z      | M                 |        | 47     | -  | 12      | 1           |      |   |
|                |        | F                 | 11     | 10     | -  |         |             |      |   |
| ✓ 20           | N      | eL                | 14     | 53     | -  |         |             |      |   |
|                | E      | M                 | 15     | 00     | -  | 18      | 1           |      | 43° N., 145° E. Near east coast of Hokkaido, Japan. USCGS.                              |
|                | N      | M                 |        | 00     | -  | 20      | 3           |      |   |
|                |        | F                 |        | 30     | -  |         |             |      |   |
| ✓ 20           | ZV,Z   | ePKP              | 15     | 58     | 37 |         |             |      |   |
|                | N      | eL                | 16     | 53     | -  |         |             |      |   |
|                | N      | M                 |        | 59     | -  | 20      | 2           |      | 19 1/2° S., 174° W. Tonga Islands. USCGS.   |
|                |        | F                 | 17     | 30     | -  |         |             |      |   |
| ✓ 21           | N      | eL                | 06     | 41 1/2 | -  |         |             |      |   |
|                | E      | M                 |        | 49     | -  | 20      | 2           |      | 14 1/2° N., 92° W. Near coast of Guatemala. h about 100 Km. Mag. 5 3/4-6 (Berk). USCGS. |
|                | N      | M                 |        | 49     | -  | 20      | 2           |      |   |
|                | Z      | M                 |        | 49     | -  | 20      | 2           |      |   |
|                |        | F                 | -      | -      | -  |         |             |      | overlapped by next shock.   |
| 21             | N      | eL                | 07     | 20     | -  |         |             |      |   |
|                | N      | M                 |        | 38     | -  | 18      | 3           |      | 62 1/2° S., 154° E. Balleny Islands region. USCGS.                                      |
|                | E      | M                 |        | 38     | -  | 20      | 1           |      |   |
|                |        | F                 | 08     | 20     | -  |         |             |      |   |
| ✓ 22           | ZV,Z   | ePKP <sub>1</sub> | 06     | 36     | 59 |         |             |      |   |
|                | ZV,Z   | e                 |        | 37     | 20 |         |             |      |   |
|                | ZV,Z   | ePKP <sub>2</sub> |        | 37     | 45 |         |             |      | 33 1/2° S., 178° W. Kermadec Islands region. USCGS.                                     |
|                | N      | eL                | 07     | 22     | -  |         |             |      |   |
|                | N      | M                 |        | 51     | -  | 20      | 3           |      |   |
|                | Z      | M                 |        | 51     | -  | 20      | 2           |      |   |
|                | E      | M                 |        | 54     | -  | 20      | 1           |      | Mag. = 6 1/4  |
|                |        | F                 | 08     | 50     | -  |         |             |      |   |
| ✓ 23           | ZV,ZN  | eP                | 00     | 57     | 09 | 9       | 1 1/2       | 8640 | Compression. PH = 13sec. 2 u  |
|                | ZV,Z   | ePP               | 01     | 00     | 15 |         |             |      |   |
|                | E      | eS                |        | 06     | 58 |         |             |      |   |
|                | NE     | eSKS              |        | 07     | 15 |         |             |      |   |
|                | N      | e                 |        | 07     | 32 |         |             |      | 52° N., 177° W. Andreanof Islands, Aleutian Islands. Mag. 6 1/4-6 1/2 (Pas) USCGS.      |
|                | N      | ePFS              |        | 07     | 53 |         |             |      |   |
|                | N      | eSS               |        | 12     | 44 |         |             |      |   |
|                | N      | eSSS              |        | 16     | 04 |         |             |      |   |
|                | E      | eL                |        | 27     | -  |         |             |      |   |
|                | N      | eL                |        | 29     | -  |         |             |      |   |
|                | E      | M                 |        | 44     | -  | 18      | 6           |      |   |
|                | N      | M                 |        | 44     | -  | 18      | 21          |      |   |
|                | Z      | M                 |        | 44     | -  | 18      | 9           |      | Mag. = 6 1/2  |
|                |        | F                 | 04     | 15     | -  |         |             |      |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JULY, 1957

| DATE. | COMPT. | PHASE.          | G.M.T. |                                |    | PERIOD. | AMPLITUDE.        | Δ   | REMARKS.   |
|-------|--------|-----------------|--------|--------------------------------|----|---------|-------------------|---|--|
|       |        |                 | h.     | m.                             | s. |         |                   |   |  |
| 23    | N      | eL              | 07     | 44                             | -  |         |                   |   | 20 <sup>1</sup> / <sub>2</sub> °S., 170°E. Loyalty Islands<br>USCGS.   |
|       | N      | M               |        | 48                             | -  | 20      | 1                 |   |  |
|       |        | F               |        | 52                             | -  |         |                   |   |  |
| 23    | ZV     | eP              | 19     | 45                             | 25 |         |                   |   |  |
| 24    | Z      | eP              | 02     | 11                             | 26 |         |                   | 11200   |  |
|       | Z      | ePP             |        | 15                             | 36 |         |                   |   |  |
|       | NE     | eSKS            |        | 21                             | 57 |         |                   |   | 30°S., 70 <sup>1</sup> / <sub>2</sub> °W. Central Chile-<br>Argentina border. Slightly<br>deeper than normal.<br>Mag. 6 <sup>1</sup> / <sub>2</sub> (Pas). USCGS.  |
|       | E      | eSKKS           |        | 22                             | 23 |         |                   |   |  |
|       | N      | eL              |        | 42                             | -  |         |                   |   |  |
|       | E      | M               |        | 53                             | -  | 24      | 4                 |   |  |
|       | N      | M               |        | 57 <sup>1</sup> / <sub>2</sub> | -  | 19      | 6                 |   |  |
|       | Z      | M               |        | 57 <sup>1</sup> / <sub>2</sub> | -  | 19      | 2                 |   |  |
|       |        | F               | 04     | 20                             | -  |         |                   | Mag. = 6 <sup>1</sup> / <sub>2</sub>                                |  |
| 24    | ZV,Z   | ePKP            | 10     | 16                             | 42 |         |                   |   | 18°S., 169 <sup>1</sup> / <sub>2</sub> °E. New Hebrides.<br>USCGS.   |
| 24    | ZV,Z   | ePKP            | 11     | 22                             | 13 |         |                   |   |  |
|       | ZV,Z   | i               |        | 22                             | 17 |         |                   |   |  |
|       | Z      | i               |        | 22                             | 26 |         |                   |   | 20°S., 169°E. New Hebrides<br>Islands. Mag. 6 <sup>1</sup> / <sub>2</sub> (Pas). USCGS.  |
|       | N      | eL              | 12     | 06                             | -  |         |                   |   |  |
|       | N      | M               |        | 18                             | -  | 28      | 6                 |   |  |
|       | N      | M               |        | 30                             | -  | 20      | 5                 |   |  |
|       | E      | M               |        | 36                             | -  | 20      | 2                 |   |  |
|       | Z      | M               |        | 36                             | -  | 20      | 2                 |   |  |
|       |        | F               | 13     | 30                             | -  |         |                   | Mag. 6 <sup>1</sup> / <sub>4</sub> -6 <sup>1</sup> / <sub>2</sub> . |  |
| 25    | ZV,Z   | eP              | 07     | 54                             | 23 |         |                   |   |  |
|       | N      | M               | 08     | 42                             | -  | 17      | 4                 |   | 51°N., 177°W. Andreanof Island,<br>Aleutian Islands. Mag. 6 <sup>1</sup> / <sub>4</sub> (Berk).<br>USCGS.<br>Mag. = 6  |
|       | E      | M               |        | 42                             | -  | 17      | 2                 |   |  |
|       | Z      | M               |        | 42                             | -  | 17      | 3                 |   |  |
|       |        | F               | 09     | 30                             | -  |         |                   |   |  |
| 25    | N      | e               | 20     | 10                             | -  |         |                   |   | Very small.  |
|       |        | F               |        | 25                             | -  |         |                   |   |  |
| 27    | N      | e               | 19     | 50                             | -  |         |                   |   | 6 <sup>1</sup> / <sub>2</sub> °S., 151 <sup>1</sup> / <sub>2</sub> °E. New Britain region.<br>USCGS.   |
|       | N      | M               | 20     | 01                             | -  | 20      | 1                 |   |  |
|       |        | F               |        | 10                             | -  |         |                   |   |  |
| 28    | ZV,Z   | iP              | 08     | 52                             | 28 |         |                   | 9300  | NEe. Compression.  |
|       | ZV,Z   | i               |        | 52                             | 37 |         |                   |   |  |
|       | ZV,ZNE | i(P2)           |        | 52                             | 43 | 14      | 65                |   | Dilatation. PH = 18sec. 36 u   |
|       | ZV,Z   | iPP             |        | 55                             | 45 | 14      | 43                |   |  |
|       | NE     | iPP             |        | 55                             | 49 | 20      | <del>33(PH)</del> |   |  |
|       | E      | iSKS            | 09     | 02                             | 55 |         |                   |   | 17°N., 99°W. Guerrero, Mexico.<br>66 dead, many injured. Heavy<br>property damage in Mexico City<br>and Acapulco. Mag. 7 <sup>1</sup> / <sub>2</sub> (Pas), 7 <sup>1</sup> / <sub>4</sub> -7 <sup>1</sup> / <sub>2</sub><br>(Berk). USCGS. |
|       | NE     | iS              |        | 03                             | 02 |         |                   |   |  |
|       | NE     | iScS            |        | 03                             | 11 |         |                   |   |  |
|       | Z      | i               |        | 03                             | 19 |         |                   |   |  |
|       | NE     | i               |        | 03                             | 20 |         |                   |   |  |
|       | E      | i               |        | 03                             | 33 |         |                   |   |  |
|       | NE     | iPS             |        | 03                             | 52 |         |                   |   |  |
|       | Z      | i               |        | 03                             | 54 |         |                   |   |  |
|       | NE     | iSS             |        | 07                             | 45 |         |                   |   |  |
|       | NE     | i               |        | 08                             | 34 |         |                   |   |  |
|       | N      | iSSS            |        | 11                             | 31 |         |                   |   |  |
|       | N      | eL <sub>0</sub> |        | 14 <sup>1</sup> / <sub>2</sub> | -  |         |                   |   |  |
|       | E      | eL <sub>R</sub> |        | 19                             | -  |         |                   |   |  |
|       | N      | eL <sub>2</sub> |        | 23 <sup>1</sup> / <sub>2</sub> | -  |         |                   |   |  |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

JULY, 1957

| DATE.          | COMPT. | PHASE. | G.M.T. |     |    | PERIOD. | AMPLITUDE. | Δ   | REMARKS.  |
|----------------|--------|--------|--------|-----|----|---------|------------|---|---|
|                |        |        | h.     | m.  | s. |         |            |   |   |
| contd.<br>✓ 28 | E      | (M)    | 09     | 26  | -  | 24      | 260        |   | Break in recording between<br>09h. 27m. - 09h. 32m.<br><br>Mag. = 7.7 |
|                | N      | (M)    |        | 26  | -  | 25      | 410        |   |   |
|                | Z      | (M)    |        | 26  | -  | 23      | 370        |   |   |
|                |        | F      | 13     | 30  | -  |         |            |   |   |
| 28             | ZV,Z   | eP     | 13     | 46  | 43 |         |            | 17½°N., 99°W. Mexico aftershock.<br>USCGS.  |   |
|                | E      | M      | 14     | 24  | -  | 20      | 1          |   |   |
|                |        | F      |        | 35  | -  |         |            |   |   |
| ✓ 29           | Z      | iP     | 17     | 28  | 50 | 6       | 2          | 10600<br><br>Compression.<br><br>23½°S., 71½°W. Near coast of<br>Chile, Mag. 7-7¼ (Pas). 6¾ (Berk).<br>USCGS.<br><br>Mag. = 6.8 |   |
|                | Z      | eFP    |        | 32  | 43 | 6       | 2½         |   |   |
|                | E      | iSKS   |        | 39  | 26 |         |            |   |   |
|                | ZE     | ePS    |        | 41  | 32 |         |            |   |   |
|                | NE     | eLQ    |        | 57  | -  |         |            |   |   |
|                | ZE     | eL     | 18     | 05  | -  |         |            |   |   |
|                | E      | M      |        | 08½ | -  | 22      | 25         |   |   |
|                | N      | M      |        | 08½ | -  | 21      | 18         |   |   |
|                | Z      | M      |        | 09½ | -  | 20      | 22         |   |   |
|                |        | F      | 20     | 20  | -  |         |            |   |   |

All the magnitudes are the "unified magnitudes" denoted by "m".

M.O. 627

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR AUGUST 1957

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"  
(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1918).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>T.<br>sec. | PENDULUM FREE PERIOD<br>T.<br>sec. | DAMPING CONSTANT<br>$\mu^2$ . | $\frac{Ah}{\pi I}$<br>sec. <sup>-1</sup> |
|------------|----------------------------------|--|------------------------------------|-------------------------------|--|
| N.         | 1 August 1957                    | 21.2                                   | 21.2                               | 0.00                          | 62.5                                     |
| E.         | 1 August 1957                    | 21.1                                   | 21.1                               | 0.00                          | 52.0                                     |
| Z.         | 1 September 54                   | 11.3                                   | 11.4                               | +0.05                         | 115.                                     |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.  
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.  
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |          |         | PERIOD.<br>sec. | AMPLI-<br>TUDE.<br>$\mu$ | $\Delta$<br>km. | REMARKS.  |
|-------|--------|--------|--------|----------|---------|-----------------|--------------------------|-----------------|---|
|       |        |        | h.     | m.       | s.      |                 |                          |                 |   |
| 1     | N      | e<br>F | 17     | 05       | -       |                 |                          |                 | Very small. 52°N., 170°W.<br>Fox Is. USCGS.   |
| 4     | Z      | e      | 01     | 00       | -       |                 |                          |                 | 3½°S., 145°E. Near north coast of<br>New Guinea. USCGS<br><br>Mag. = 6¼                             |
|       | NE     | eL     |        | 35       | -       |                 |                          |                 |   |
|       | E      | M      |        | 55       | -       | 19              | 3                        |                 |   |
|       | N      | M      |        | 56       | -       | 19              | 5                        |                 |   |
|       | Z      | M<br>F |        | 56<br>03 | -<br>05 | 19              | 4                        |                 |   |
| 4     | Z,ZV   | eP     | 06     | 19       | (01)    | 5               | 1                        | 9300            | beginning in minute break<br>17°N., 100°W. Mexico aftershock.<br>Mag. 6¼ (Pas) USCGS<br><br>Mag. 6¼ |
|       | Z,ZV   | e      |        | 19       | 17      |                 |                          |                 |   |
|       | Z      | eFP    |        | 22       | 16      | 8               | ½ 95                     |                 |   |
|       | E      | e      |        | 29       | 47      |                 |                          |                 |   |
|       | E      | M      | 07     | 04       | -       | 16              | 1                        |                 |   |
|       | N      | M      |        | 04       | -       | 16              | 1                        |                 |   |
|       | Z      | M<br>F |        | 04<br>25 | -<br>-  | 16              | 1                        |                 |   |
| 4     | ZV,Z   | eP     | 14     | 28       | 42      | 5               | 1                        |                 | Compression<br>17°N., 99½°W. Mexico aftershock.<br>Mag. 6¼ (Pas) USCGS<br><br>Mag. = 6¼             |
|       | E      | e      |        | 39       | 22      |                 |                          |                 |   |
|       | E      | M      | 15     | 12       | -       | 16              | 1                        |                 |   |
|       | N      | M      |        | 12       | -       | 16              | 1                        |                 |   |
|       | Z      | M<br>F |        | 14<br>35 | -<br>-  | 16              | 1                        |                 |   |
| 4     | Z      | eP     | 21     | 22       | 41      |                 |                          | 11300           | 45°S., 35°E. Prince Edward Islands<br>region. USCGS   |
|       | Z      | eFP    |        | 26       | 55      | 8               | 1                        |                 |   |
|       | N      | eSKS   |        | 33       | 36      | 14              | 2½ 5                     |                 |   |
|       | N      | ePS    |        | 35       | 50      |                 |                          |                 |   |

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

AUGUST

1957

| DATE.  | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD. | AMPLITUDE. | Δ   | REMARKS.   |
|--------|--------|--------|--------|------------------|----|---------|------------|-----|--|
|        |        |        | h.     | m.               | s. |         |            |     |  |
| contd. |        |        |        |                  |    | sec.    | μ          | km. |  |
| 4      | NE     | eSS    | 21     | 41               | 36 |         |            |     |  |
|        | NE     | eSSS   |        | 45.2             | -  |         |            |     |  |
|        | NE     | eL     |        | 57               | -  |         |            |     |  |
|        | E      | M      | 22     | 07               | -  | 20      | 10         |     |  |
|        | N      | M      |        | 10               | -  | 20      | 11         |     |  |
|        | Z      | M      |        | 10               | -  | 20      | 7          |     |  |
|        |        | F      | 23     | 20               | -  |         |            |     | Mag. $6\frac{1}{4}$ - $6\frac{1}{2}$                   |
| 5      | N      | e      | 03     | 25               | -  |         |            |     |  |
|        | N      | M      |        | 31 $\frac{1}{2}$ | -  | 16      | 1          |     |  |
|        |        | F      |        | 40               | -  |         |            |     |  |
| 5      | NE     | e      | 05     | 45               | -  |         |            |     | Very small.  |
|        |        | F      | 06     | 30               | -  |         |            |     |  |
| 5      | N      | e      | 22     | 58               | -  |         |            |     | Very small. Kermadec Islands region. USCGS             |
|        |        | F      | 23     | 35               | -  |         |            |     |  |
| 5      | N      | e      | 23     | 55               | -  |         |            |     | Very small. Northern Ryukyu Islands. USCGS             |
|        |        | F      | 24     | 10               | -  |         |            |     |  |
| 7      | N      | eL     | 06     | 30               | -  |         |            |     | Very small. Near coast of Kamchatka. USCGS             |
|        |        | F      | 07     | 10               | -  |         |            |     |  |
| 7      | ZV,Z   | iPKP   | 19     | 59               | 36 |         |            |     | 17 $\frac{1}{2}$ °S., 179°W. Fiji Islands              |
|        | ZV,Z   | e      | 20     | 01               | 43 |         |            |     | h about 550km. USCGS                                   |
| 8      | N      | e      | 01     | 23               | -  |         |            |     | Very small. 32 $\frac{1}{2}$ °N., 25 $\frac{1}{2}$ °E. |
|        |        | F      |        | 35               | -  |         |            |     | Near coast of Egypt. USCGS                             |
| 8      | N      | e      | 20     | 22               | -  |         |            |     | Very small. Sinkiang Province, China. USCGS            |
|        |        | F      |        | 35               | -  |         |            |     |  |
| 8      | NE     | eS     | 22     | 51               | 18 |         |            |     | 7°S., 13°W., Ascension Island region                   |
|        | NE     | eL     |        | 57               | -  |         |            |     | USCGS  |
|        | E      | M      | 23     | 05               | -  | 19      | 2          |     |  |
|        | N      | M      |        | 09               | -  | 20      | 2          |     |  |
|        | Z      | M      |        | 09               | -  | 20      | 1          |     |  |
|        |        | F      |        | 20               | -  |         |            |     | Mag. = $5\frac{3}{4}$ - 6                              |
| 8      | NE     | eL     | 23     | 22               | -  |         |            |     | Ascension Island region                                |
|        | E      | M      |        | 30               | -  | 19      | 2          |     |  |
|        | N      | M      |        | 34               | -  | 20      | 1          |     |  |
|        |        | F      |        | 45               | -  |         |            |     | Mag. = $5\frac{3}{4}$                                  |
| 9      | N      | e      | 02     | 59               | -  |         |            |     | 2°S., 137°E. New Guinea. USCGS.                        |
|        | N      | eL     | 03     | 18               | -  |         |            |     |  |
|        | NE     | eL     |        | 24               | -  |         |            |     |  |
|        | E      | M      |        | 44               | -  | 19      | 3          |     |  |
|        | N      | M      |        | 44               | -  | 20      | 7          |     |  |
|        | Z      | M      |        | 44               | -  | 19      | 4          |     |  |
|        |        | F      | 05     | 10               | -  |         |            |     | Mag. = $6\frac{1}{4}$                                  |
| 9      | ZV,Z   | eP     | 11     | 11               | 46 |         |            |     | Kurile Islands USCGS                                   |
| 10     | ZV     | iP     | 00     | 13               | 39 |         |            |     | Kurile Islands USCGS                                   |
| 10     | N      | e      | 05     | 14               | -  |         |            |     | Very small. 17°S., 172°W.                              |
|        |        | F      |        | 35               | -  |         |            |     | Tonga Islands. USCGS                                   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

AUGUST

1957

| DATE. | COMPT. | PHASE.      | G.M.T. |     |    | PERIOD.       | AMPLITUDE.       | Δ     | REMARKS.   |
|-------|--------|-------------|--------|-----|----|---------------|------------------|-------|--|
|       |        |             | h.     | m.  | s. |               |                  |       |  |
| 10    | N<br>N | e<br>M<br>F | 20     | 39  | -  |               |                  |       |  |
|       |        |             |        | 44  | -  | 16            | 3                |       |  |
|       |        |             |        | 55  | -  |               |                  |       |  |
| 11    | Z,ZV   | ePKP        | 21     | 57  | 48 |               |                  |       | Confused by microseisms<br>17½°S., 169°E. New Hebrides<br>Islands. Mag. 6¾ (Pas) USCGS |
|       | Z,ZV   | e           |        | 57  | 57 |               |                  |       |  |
|       | Z      | e(PKS)      | 22     | 01  | 23 |               |                  |       |  |
|       | NE     | eL          |        | 45  | -  |               |                  |       |  |
|       | Z      | M           | 23     | 09  | -  | 19            | 2                |       |  |
|       | N      | M           |        | 09  | -  | 19            | 2                |       |  |
|       | E      | M           |        | 11  | -  | 20            | 2                |       |  |
|       |        | F           |        | 55  | -  |               |                  |       | Mag. 6¼  |
| 13    | N      | eL          | 13     | 10  | -  |               |                  |       |  |
|       | E      | M           |        | 23  | -  | 16            | ½                |       |  |
|       | N      | M           |        | 26  | -  | 17            | 1                |       |  |
|       |        | F           |        | 35  | -  |               |                  |       |  |
| 13    | N      | e           | 16     | 40  | -  |               |                  |       | Very small. Near East coast of<br>Formosa. USCGS                                       |
|       |        | F           |        | 55  | -  |               |                  |       |  |
| 14    | N      | eL          | 02     | 57½ | -  |               |                  |       | 35½°N., 28°E. Dodecanese Islands.<br>BCIS  |
|       | N      | M           |        | 59½ | -  | 16            | 3                |       |  |
|       | E      | M           | 03     | 00  | -  | 16            | 1                |       |  |
|       |        | F           |        | 10  | -  |               |                  |       |  |
| 15    | ZV     | eP          | 20     | 45  | 31 |               |                  |       | 36.4°N., 1.4°E. Algeria. BCIS  |
|       | E      | eL          |        | 49½ | -  |               |                  |       |  |
|       | E      | M           |        | 50½ | -  | 14            | 1                |       |  |
|       | N      | M           |        | 52  | -  | 14            | 1                |       |  |
|       | Z      | M           |        | 52  | -  | 14            | ½                |       |  |
|       |        | F           | 21     | 00  | -  |               |                  |       |  |
| 15    | ZV,Z   | e(sPKP)     | 21     | 06  | 12 |               |                  |       | 4½°S., 155°E. Solomon Islands<br>region. about 550 Km. USCGS                           |
|       | Z      | e(pFP)      |        | 07  | 44 |               |                  |       |  |
|       | Z      | e           |        | 14  | 59 |               |                  |       |  |
| 16    | Z      | eP          | 23     | 44  | 58 | 7             | 1                | 10200 | 10½°N., 104°W. Pacific Ocean. Mag.<br>6½ - 6¾ (Pas) (Berk) USCGS                       |
|       | Z      | ePP         |        | 48  | 35 | 10            | ½                |       |  |
|       | E      | eSKS        |        | 55  | 34 |               |                  |       |  |
|       | NE     | eS          |        | 55  | 55 | <del>14</del> | <del>8(SE)</del> |       |  |
| 17    | N      | eSS         | 00     | 01  | 49 |               |                  |       |  |
|       | N      | eL          |        | 10  | -  |               |                  |       |  |
|       | N      | M           |        | 18  | -  | 28            | 25               |       |  |
|       | E      | M           |        | 20  | -  | 24            | 14               |       |  |
|       | N      | M           |        | 25  | -  | 20            | 8                |       |  |
|       | E      | M           |        | 26  | -  | 20            | 9                |       |  |
|       | Z      | M           |        | 27  | -  | 16            | 8                |       |  |
|       |        | F           | 02     | 30  | -  |               |                  |       | Mag. = 6.5   |
| 18    | NE     | e           | 08     | 08  | -  |               |                  |       | Small  |
|       |        | F           |        | 40  | -  |               |                  |       |  |
| 18    | E      | eSKS        | 09     | 01  | 29 |               |                  |       | 12°N., 124°E. Philippine Islands<br>USCGS  |
|       | EN     | eSKKS       |        | 01  | 56 |               |                  |       |  |
|       | N      | eS          |        | 02  | 23 |               |                  |       |  |
|       | E      | e           |        | 02  | 51 |               |                  |       |  |
|       | N      | eL          |        | 18½ | -  |               |                  |       |  |
|       | E      | M           |        | 32  | -  | 23            | 25               |       |  |

M.O. 627

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.SEISMOLOGICAL BULLETIN.

AUGUST

19 57

| DATE. | COMPT.   | PHASE.  | G.M.T.               |                                    |  | PERIOD.                   | AMPLI-<br>TUDE.          | Δ       | REMARKS.   |
|-------|--|---|----------------------|------------------------------------|--|---------------------------|--------------------------|---------|--|
|       |  |   | h.                   | m.                                 | s.   |                           |                          |         |  |
| contd |  |   |                      |                                    |  |                           |                          |         |  |
| ✓ 18  | N<br>Z   | M<br>M<br>F   | 09<br>32<br>11       | -<br>41<br>10                      | -  | 23<br>19                  | 36<br>10                 |         | Mag. = $6\frac{3}{4}$  |
| 18    | NE<br>N<br>E<br>Z                                  | e<br>M<br>M<br>M<br>F   | 21<br>22<br>01<br>01 | 43<br>00<br>01                     | -  | 20<br>18<br>18            | 2<br>3<br>3              |         | 16 $\frac{1}{2}$ °N., 99°W. Mexico aftershock<br>USCGS<br><br>overlapped by next shock                     |
| ✓ 18  | ZV,Z<br>ZV<br>N<br>E<br>N<br>N<br>E<br>E<br>N<br>Z | iP<br>i<br>eS<br>eSKS<br>ePS<br>e<br>eSS<br>eL<br>M<br>M<br>M<br>F    | 21<br>22             | 54<br>04                           | 24<br>28<br>06<br>28<br>45<br>59<br>18<br>17<br>-<br>31<br>-<br>35<br>-<br>35<br>-<br>24 | 7<br>12<br>22<br>20<br>19 | 2<br>3<br>20<br>20<br>13 | 8500    | Compression<br>50°N., 157°E. Northern Kurile<br>Islands. Mag. $6\frac{1}{2}$ (Pas) USCGS<br><br>Mag. = 6.4 |
| ✓ 19  | Z<br>N   | ePP<br>M<br>F   | 11<br>13             | 56<br>04                           | 42<br>-  | 20                        | 1 $\frac{1}{2}$          |         | 10°S., 161°E. Solomon Islands<br>foreshock Mag. $6\frac{1}{2}$ (Pas) USCGS                                 |
| 19    | ZV,Z<br>N<br>N                                     | eP<br>eS<br>eL<br>F   | 21<br>22             | 43<br>15                           | 52<br>44<br>-  |                           |                          | 8700    | 51 $\frac{1}{2}$ °N., 171°W. Fox Islands<br>USCGS  |
| ✓ 20  | Z<br>NE<br>NE<br>E<br>N                            | e(P)<br>e(FKS)<br>e<br>M<br>M<br>F                                    | 06<br>07             | 48<br>07                           | 28<br>25<br>18<br>-  | 20<br>20                  | 2<br>2                   |         | 10°S., 161°E. Solomon Islands<br>foreshock. Mag. 6 - $6\frac{1}{4}$ (Pas)<br>USCGS<br><br>Mag. = 6         |
| ✓ 20  | Z<br>Z<br>Z<br>N<br>NE<br>NE<br>N<br>E<br>N<br>Z   | e(P)<br>e(FP)<br>e(FKS)<br>e<br>eSS<br>eSSS<br>eL<br>M<br>M<br>M<br>F | 12<br>13             | 21<br>23<br>24<br>24<br>42<br>47.1 | 22<br>48<br>48<br>54<br>08<br>-  | 21<br>21<br>20            | 3<br>4<br>2              | (14600) | 10°S., 161°E. Solomon Islands<br>Mag. $6\frac{1}{2}$ (Pas) USCGS<br><br>Mag. = $6\frac{1}{4}$              |
| 20    | ZV,Z   | eP  | 15                   | 29                                 | 53   |                           |                          |         | 37°N., 71 $\frac{1}{2}$ °E. Hindukush. USCGS   |
| 20    | N<br>N   | eL<br>M<br>F  | 18                   | 39<br>40<br>42                     | -<br>-   | 16                        | 1 $\frac{1}{2}$          |         |  |
| 20    | N  | e<br>F  | 23                   | 05<br>15                           | -<br>-   |                           |                          |         | Very small. Andreanof Islands.   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

AUGUST 19 57

| DATE | COMPT. | PHASE. | G.M.T.   |          |    | PERIOD. | AMPLITUDE. | Δ       | REMARKS.   |
|------|--------|--------|----------|----------|----|---------|------------|---------|--|
|      |        |        | h.       | m.       | s. |         |            |         |  |
| 21   | ZV,Z   | iP     | 15       | 46       | 10 |         |            |         | Dilatation Kurile Islands<br>USCGS                                 |
| 21   | N      | e<br>F | 20       | 15<br>30 | -  |         |            |         | Very small. Fox Islands USCGS                                      |
| 22   | N      | e<br>F | 04       | 24<br>35 | -  |         |            |         | Very small. Near Hokaido, Japan.<br>USCGS                          |
| 22   | NE     | e      | 07       | 00       | -  |         |            |         |  |
|      | E      | M      |          | 01       | -  | 13      | 1          |         |  |
|      | N      | M      |          | 01       | -  | 13      | 1/2        |         |  |
|      | Z      | M      |          | 01       | -  | 12      | 1          |         |  |
|      |        | F      |          | 04       | -  |         |            |         |  |
| 22   | NE     | e<br>F | 08<br>09 | 52<br>10 | -  |         |            |         | Very small. 1°N., 126°E.<br>Molucca Passage. USCGS                 |
| 22   | N      | e<br>F | 19       | 00<br>10 | -  |         |            |         | Very small   |
| 23   | Z      | e(PKS) | 02       | 22       | 26 |         |            |         | 6°S., 154 1/2°E. New Britain<br>aftershock. Mag. 6 1/2 (Pas) USCGS |
|      | NE     | e      |          | 22       | 41 |         |            |         |  |
|      | N      | eL     | 03       | 53       | -  | 26      | 2          |         |  |
|      | E      | M      |          | 12       | -  | 27      | 8          |         |  |
|      | N      | M      |          | 12       | -  |         |            |         |  |
|      |        | F      |          | 04       | 15 |         |            |         |  |
| 23   | N      | eL     | 12       | 30       | -  |         |            |         | 24°N., 122°E. Off east coast of<br>Formosa. USCGS                  |
|      | Z      | M      |          | 40       | -  | 18      | 3          |         |  |
|      | N      | M      |          | 40       | -  | 19      | 5          |         |  |
|      | E      | M      |          | 40 1/2   | -  | 16      | 2          |         |  |
|      |        | F      |          | 55       | -  |         |            |         |  |
| 26   | ZNE    | e(P)   | 11       | 41       | 53 |         |            | 10000   | 19°S., 63°W. Southern Bolivia.<br>Mag 6 1/4 - 6 1/2 (Pas) USCGS    |
|      | Z      | e(FP)  |          | 45       | 33 |         |            |         |  |
|      | E      | eSKS   |          | 52       | 16 |         |            |         |  |
|      | NE     | e      |          | 52       | 24 |         |            |         |  |
|      | N      | eS     |          | 52       | 41 |         |            |         |  |
|      | ZE     | ePS    |          | 53       | 49 |         |            |         |  |
|      | N      | eSS    |          | 58.8     | -  |         |            |         |  |
|      | NE     | eLQ    | 12       | 07       | -  |         |            |         |  |
|      | ZNE    | eL     |          | 15       | -  |         |            |         |  |
|      | E      | M      |          | 16       | -  | 22      | 10         |         |  |
|      | N      | M      |          | 18       | -  | 20      | 10         |         |  |
|      | Z      | M      |          | 24       | -  | 18      | 9          |         |  |
|      |        | F      | 13       | 45       | -  |         |            |         | Mag. = 6 1/2   |
| 26   | ZV,Z   | eP     | 14       | 11       | 28 |         |            | (10300) | Break in recording between<br>14h 21m - 28m                        |
|      | ZV     | e      |          | 11       | 37 |         |            |         |  |
|      | Z      | eFP    |          | 15       | 09 |         |            |         | 12°S., 81°W. Near coast of<br>Ecuador. Mag. 6 (Pas) USCGS          |
|      | E      | M      |          | 48       | -  | 18      | 11         |         |  |
|      | N      | M      |          | 48       | -  | 18      | 7          |         |  |
|      | Z      | M      |          | 48       | -  | 18      | 9          |         |  |
|      |        | F      | 16       | 40       | -  |         |            |         | Mag. = 6 1/2   |
| 27   | Z      | e      | 11       | 59       | 23 |         |            |         |  |
|      | Z      | e      | 12       | 00       | 29 |         |            |         |  |
|      | NE     | e      |          | 01       | 01 |         |            |         |  |
|      |        | F      |          | 05       | -  |         |            |         |  |

52

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

August 19 57

| DATE. | COMPT.                            | PHASE.                                    | G.M.T.   |          |  | PERIOD.        | AMPLI-<br>TUDE.         | Δ    | REMARKS.  |
|-------|-----------------------------------|---|----------|----------|--|----------------|-------------------------|------|---|
|       |                                   |   | h.       | m.       | s.                                       |                |                         |      |   |
| 28    | ZV,Z                              | e(P)                                      | 08       | 39       | 38                                       |                |                         |      |   |
| 28    | N                                 | e<br>F                                    | 09<br>10 | 43<br>35 | -<br>-                                   |                |                         |      | Very small  |
| 29    | NE<br>E<br>N                      | eL<br>M<br>M<br>F                         | 00       | 10       | -<br>-<br>-<br>-                         | 21<br>21       | 2<br>2                  |      |   |
| 30    | ZV<br>NE<br>N<br>N<br>E<br>N<br>Z | eP<br>eS<br>eSS<br>eL<br>M<br>M<br>M<br>F | 16       | 26       | (57)<br>12<br>-<br>-<br>-<br>-<br>-<br>- | 16<br>16<br>16 | 4<br>5<br>5             | 5700 | beginning in time break<br>Tadshik S.S.R.<br><br>Mag. = 6 |
| 30    | E<br>Z<br>NE<br>E<br>N<br>Z       | e(SKS)<br>e(PS)<br>eL<br>M<br>M<br>M<br>F | 20       | 27       | 4.1<br>20<br>-<br>-<br>-<br>-<br>-       | 17<br>16<br>16 | 2<br>3<br>2             |      |   |
| 31    | NE                                | e<br>F                                    | 00<br>01 | 44<br>00 | -<br>-                                   |                |                         |      | Very small.   |
| 31    | NE<br>E<br>N                      | eL<br>M<br>M<br>F                         | 12       | 09       | -<br>-<br>-<br>-                         | 16<br>16       | 1<br>3                  |      |   |
| 31    | NE<br>E<br>N<br>Z                 | e<br>M<br>M<br>M<br>F                     | 12       | 30       | -<br>-<br>-<br>-                         | 15<br>15<br>15 | 1 1/2<br>1 1/2<br>1 1/2 |      |   |
|       |                                   |   | 13       | 00       | -  |                |                         |      |   |



AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR SEPTEMBER, 1957.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"

(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1918).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD T <sub>1</sub> sec. | PENDULUM FREE PERIOD T sec. | DAMPING CONSTANT μ <sup>2</sup> . | $\frac{Ak}{\pi I}$ sec. <sup>-1</sup> |
|------------|----------------------------------|--|-----------------------------|-----------------------------------|---------------------------------------|
| N.         | 1 August 1957                    | 21.2   | 21.2                        | 0.00                              | 62.5                                  |
| E.         | 1 August 1957                    | 21.1   | 21.1                        | 0.00                              | 52.0                                  |
| Z.         | 1 September 1954                 | 11.3   | 11.4                        | +0.05                             | 115                                   |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.

TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.

SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |        |    | PERIOD. sec. | AMPLITUDE. μ | Δ km.        | REMARKS.   |       |
|-------|--------|--------|--------|--------|----|--------------|--------------|--------------|--|-------|
|       |        |        | h.     | m.     | s. |              |              |              |  |       |
| 1     | ZV,Z   | e(P)   | 12     | 59     | 05 | 17           | 1 1/2        | 8620         | 39°N., 75°E. Western Sinkiang Province, China. USCGS.                        |       |
|       | NE     | eL     | 13     | 19     | -  |              |              |              |  | 1 1/2 |
|       | N      | M      | 20     | 1/2    | -  |              |              |              |  |       |
|       | E      | M      | 25     | -      | 16 |              |              |              |  |       |
|       |        | F      | 35     | -      | -  |              |              | Mag. = 5 3/4 |  |       |
| 2     | NE     | eL     | 00     | 54     | -  | 20           | 1 1/2        | 8620         | 18°N., 147 1/2°E. Mariana Islands. USCGS.                                    |       |
|       | E      | M      | 01     | 01     | -  |              |              |              |  |       |
|       | N      | M      | 01     | -      | 20 |              |              |              |  |       |
|       |        | F      | 35     | -      | -  |              |              | Mag. = 6     |  |       |
| 2     | N      | M      | 11     | 12 1/2 | -  | 20           | 1            | 8620         | 15°S., 173 1/2°W. Samoa Islands. USCGS.                                      |       |
|       | E      | M      | 13     | -      | 20 |              |              |              |  |       |
|       |        | F      | 12     | 10     | -  |              |              |              |  |       |
| 2     | ZV,Z   | eP     | 14     | 32     | 07 | 18           | 1 1/2        | 5550         | 51 1/2°N., 168°W. Fox Islands, Aleutian Islands. USCGS.                      |       |
|       | ZV,Z   | eFP    | 34     | 51     | -  |              |              |              |  |       |
|       | N      | eS     | 41     | 55     | -  |              |              |              |  |       |
|       | N      | eL     | 58     | -      | -  |              |              |              |  |       |
|       | N      | M      | 15     | 10     | -  |              |              |              |  |       |
|       | E      | M      | 11     | -      | 16 |              |              |              |  |       |
|       |        | F      | 25     | -      | -  |              |              |              |  |       |
| 2     | ZV,Z   | iP     | 21     | 36     | 23 | 16           | 1            | 5550         | Compression. Depth = 220 Km. 37°N., 71°E. Hindu Kush. h about 200 Km. USCGS. |       |
|       | ZV,Z   | epP    | 37     | 13     | -  |              |              |              |  |       |
|       | ZV,Z   | esP    | 37     | 34     | -  |              |              |              |  |       |
|       | ZV     | e      | 37     | 46     | -  |              |              |              |  |       |
|       | ZV,Z   | e      | 38     | 07     | -  |              |              |              |  |       |
|       | NE     | eS     | 43     | 30     | -  |              |              |              |  |       |
|       | NE     | esS    | 44     | 49     | -  |              |              |              |  |       |
|       | E      | esSS   | 46     | 27     | -  |              |              |              |  |       |
|       | N      | M      | 58     | -      | -  |              |              |              |  |       |
|       | D      | D      | 22     | 15     | -  |              |              |              |  |       |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

SEPTEMBER, 19 57

| DATE. | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD. | AMPLI-<br>TUDE. | Δ  | REMARKS. |
|-------|--------|--------|--------|------------------|----|---------|-----------------|--|----------|
|       |        |        | h.     | m.               | s. |         |                 |  |          |
| 3     | Z      | eP     | 20     | 28               | 06 |         |                 | (2380)   |          |
|       | N      | e(S)   |        | 31               | 57 |         |                 |  |          |
|       | NE     | eL     |        | 33               | -  |         |                 |  |          |
|       | E      | M      |        | 34 $\frac{1}{2}$ | -  | 16      | 1 $\frac{1}{2}$ |  |          |
|       | N      | M      |        | 34 $\frac{1}{2}$ | -  | 17      | 1 $\frac{1}{2}$ |  |          |
|       | Z      | M      |        | 34 $\frac{1}{2}$ | -  | 16      | 1 $\frac{1}{2}$ |  |          |
|       |        | F      |        | 50               | -  |         |                 |  |          |
| 3     | NE     | e      | 21     | 55               | -  |         |                 | Very small.  |          |
|       |        | F      | 22     | 03               | -  |         |                 |  |          |
| 4     | NE     | e      | 05     | 25               | -  |         |                 |  |          |
|       |        | M      |        | 48               | -  | 20      | 1               |  |          |
|       |        | M      |        | 55               | -  | 17      | 1               |  |          |
|       |        | F      | 06     | 00               | -  | 16      | 1               |  |          |
|       |        | F      |        | 20               | -  |         |                 |  |          |
| 5     | ZV     | eP     | 11     | 44               | 36 |         |                 | Southern Iran. 1 killed, many injured and moderate property damage in Jahrom and Kerman.USCGS.                 |          |
|       |        | M      | 12     | 05               | -  | 20      | 1 $\frac{1}{2}$ |  |          |
|       |        | F      |        | 05               | -  | 16      | 1               |  |          |
|       |        | F      |        | 30               | -  |         |                 | Mag. = 5 $\frac{1}{2}$   |          |
| 6     | N      | e(S)   | 05     | 16               | 37 |         |                 | 51°N., 177°W. Andreanof Islands. Aleutian Islands. USCGS.  |          |
|       |        | e      |        | 16               | 51 |         |                 |  |          |
|       |        | M      |        | 54               | -  | 16      | 1 $\frac{1}{2}$ |  |          |
|       |        | F      | 06     | 10               | -  |         |                 |  |          |
| 6     | NE     | e      | 20     | 30               | -  |         |                 | Small. Southern Yugoslavia.USCGS.  |          |
|       |        | F      |        | 45               | -  |         |                 |  |          |
| 7     | ZV     | eP     | 07     | 00               | 29 |         |                 | Confused by strong microseisms. 50°N., 156°E. Northern Kurile Islands. USCGS. Mag. = 6                         |          |
|       |        | eL     |        | 24               | -  |         |                 |  |          |
|       |        | M      |        | 37               | -  | 20      | 2 $\frac{1}{2}$ |  |          |
|       |        | M      |        | 40               | -  | 20      | 2               |  |          |
|       |        | F      | 08     | 10               | -  |         |                 |  |          |
| 7     | ZV,Z   | eP     | 10     | 18               | 50 |         |                 | 51 $\frac{1}{2}$ °N., 178 $\frac{1}{2}$ °W. Andreanof Islands, Aleutian Islands. USCGS. Mag. = 6 $\frac{1}{4}$ |          |
|       |        | eL     |        | 40               | -  |         |                 |  |          |
|       |        | M      |        | 55               | -  | 24      | 7               |  |          |
|       |        | M      |        | 58 $\frac{1}{2}$ | -  | 20      | 5               |  |          |
|       |        | F      |        | 59 $\frac{1}{2}$ | -  | 18      | 9               |  |          |
|       |        | F      | 11     | 50               | -  |         |                 |  |          |
| 9     | NE     | e(SS)  | 00     | 52               | 26 |         |                 | 48°S., 100°E. South Indian Ocean. USCGS. Mag. = 6 $\frac{1}{2}$  |          |
|       |        | e      | 01     | 01.0             | -  |         |                 |  |          |
|       |        | eLQ    |        | 07 $\frac{1}{2}$ | -  |         |                 |  |          |
|       |        | eLR    |        | 22 $\frac{1}{2}$ | -  |         |                 |  |          |
|       |        | M      |        | 36               | -  | 20      | 4               |  |          |
|       |        | M      |        | 36               | -  | 19      | 4               |  |          |
|       |        | F      |        | 37               | -  | 19      | 4               |  |          |
|       |        | F      | 02     | 30               | -  |         |                 |  |          |
| 9     | N      | eL     | 10     | 10               | -  |         |                 | 15°S., 176 $\frac{1}{2}$ °W. Fiji Islands region. USCGS.   |          |
|       |        | M      |        | 26               | -  | 20      | 1 $\frac{1}{2}$ |  |          |
|       |        | M      |        | 28               | -  | 20      | 1 $\frac{1}{2}$ |  |          |
|       |        | F      | 11     | 20               | -  |         |                 |  |          |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

SEPTEMBER, 1957

| DATE. | COMPT. | PHASE. | G.M.T. |      |    | PERIOD. | AMPLI-<br>TUDE. | Δ    | REMARKS.  |      |    |
|-------|--------|--------|--------|------|----|---------|-----------------|------|---|------|----|
|       |        |        | h.     | m.   | s. |         |                 |      |   | sec. | μ  |
| 10    | N      | e      | 06     | 54   | -  |         |                 |      | Very small. 27°N., 96½°E.<br>India-Burma border. USCGS.                                   |      |    |
|       |        | F      | 07     | 03   | -  |         |                 |      |   |      |    |
| 10    | NE     | e      | 20     | 23   | -  |         |                 |      | Very small.   |      |    |
|       |        | F      |        | 45   | -  |         |                 |      |   |      |    |
| 12    | ZV     | eP     | 00     | 39   | 38 |         |                 | 8240 | Confused by microseism.<br><br>17½°N., 85°W. About 100 miles<br>north of Honduras. USCGS. |      |    |
|       | ZV     | e(pP)  |        | 39   | 50 |         |                 |      |   |      |    |
|       | ZV     | e      |        | 40   | 16 |         |                 |      |   |      |    |
|       | NE     | eS     |        | 49   | 08 |         |                 |      |   |      |    |
|       | E      | eSS    |        | 53.9 | -  |         |                 |      |   |      |    |
|       | N      | eLQ    | 01     | 00   | -  |         |                 |      |   |      |    |
|       | E      | M      |        | 10   | -  |         |                 |      |   | 18   | 5  |
|       | N      | M      |        | 14   | -  |         |                 |      |   | 18   | 4  |
| Z     | M      |        | 14     | -    | 18 | 4       | Mag. = 6        |      |   |      |    |
|       | F      | 01     | 15     | -    |    |         |                 |      |   |      |    |
| 15    | NE     | e      | 22     | 50   | -  |         |                 |      | Very small. Andreanof Islands.<br>USCGS.  |      |    |
|       |        | F      | 23     | 15   | -  |         |                 |      |   |      |    |
| 16    | NE     | e      | 14     | 37   | -  |         |                 |      | Very small.   |      |    |
|       |        | F      | 15     | 05   | -  |         |                 |      |   |      |    |
| 16    | NE     | e      | 15     | 40   | -  |         |                 |      | Very small.   |      |    |
|       |        | F      | 16     | 00   | -  |         |                 |      |   |      |    |
| 17    | N      | eL     | 21     | 21½  | -  |         |                 |      | Very small.   |      |    |
|       |        | F      |        | 27   | -  |         |                 |      |   |      |    |
| 18    | NE     | e      | 01     | 45   | -  | 16      |                 |      | 53°N., 160°E. Near east coast of<br>Kamchatka. USCGS.                                     |      |    |
|       | N      | M      |        | 51   | -  |         |                 |      |   |      |    |
|       |        | F      | 02     | 15   | -  |         |                 |      |   |      |    |
| 19    | NE     | e      | 17     | 41   | -  |         |                 |      | Very small. 79½°N., 3°E.<br>Svalbard region. USCGS.                                       |      |    |
|       |        | F      |        | 55   | -  |         |                 |      |   |      |    |
| 20    | N      | e      | 02     | 30   | -  |         |                 |      | Very small.   |      |    |
|       |        | F      |        | 35   | -  |         |                 |      |   |      |    |
| 20    | ZV     | eP     | 08     | 37   | 31 |         |                 |      | Kurile Islands. USCGS.  |      |    |
| 20    | NE     | eL     | 23     | 50   | -  | 20      |                 |      | 52°N., 170½°W. Fox Islands. USCGS.  |      |    |
|       | N      | M      |        | 58   | -  |         |                 |      |   |      |    |
|       |        | F      | 24     | 10   | -  |         |                 |      |   |      |    |
| 21    | ZV     | eP     | 20     | 22   | 29 |         |                 | 2980 | 40½°N., 34½°E.<br>Northern Turkey. USCGS.   |      |    |
|       | E      | eS     |        | 27   | 01 |         |                 |      |   |      |    |
|       | Z      | e      |        | 27   | 13 |         |                 |      |   |      |    |
|       | N      | eLQ    |        | 29   | -  |         |                 |      |   |      |    |
|       | E      | M      |        | 34   | -  |         |                 |      |   | 16   | 2  |
|       | N      | M      |        | 34   | -  |         |                 |      |   | 16   | 2½ |
| 22    | NE     | e      | 08     | 10   | -  |         |                 |      | Mag. = 5½<br>Small.   |      |    |
|       |        | F      |        | 25   | -  |         |                 |      |   |      |    |

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

SEPTEMBER, 1957.

| DATE. | COMPT. | PHASE. | G.M.T. |                                |    | PERIOD. | AMPLITUDE.                    | Δ  | REMARKS.   |
|-------|--------|--------|--------|--------------------------------|----|---------|-------------------------------|--|--|
|       |        |        | h.     | m.                             | s. |         |                               |  |  |
| 24    | ZV     | e(PKP) | 08     | 39                             | 42 |         |                               | 11670  | Confused by strong microseisms. Compression. IDe   |
|       | ZV,Z   | e      |        | 39                             | 51 |         |                               |  |  |
|       | Z      | i(PP)  |        | 40                             | 10 | 7       | 8                             |  |  |
|       | ZV     | e      |        | 40                             | 44 |         |                               |  |  |
|       | E      | e(PKS) |        | 42                             | 34 |         |                               |  |  |
|       | NE     | iSKS   |        | 46                             | 17 |         |                               |  |  |
|       | NE     | i      |        | 46                             | 52 |         |                               |  |  |
|       | N      | iS     |        | 47                             | 41 |         |                               |  |  |
|       | N      | i      |        | 48                             | 04 |         |                               |  |  |
|       | ZNN    | ePS    |        | 49                             | 20 |         |                               |  |  |
|       | NE     | i      |        | 49                             | 36 |         |                               |  |  |
|       | NE     | ePPS   |        | 50                             | 26 |         |                               |  |  |
|       | N      | iSS    |        | 55                             | 20 |         |                               |  |  |
|       | N      | iSSS   |        | 59                             | 00 |         |                               |  |  |
| 24    | N      | eLQ    | 09     | 05 <sup>1</sup> / <sub>2</sub> | -  |         |                               | 3700   | 5 <sup>1</sup> / <sub>2</sub> °N., 127°E. Near south coast of Mindanao, Philippine Islands. Mag. 7 <sup>3</sup> / <sub>4</sub> (Pas). USCGS.                                   |
|       | N      | eL2    |        | 20                             | -  |         |                               |  |  |
|       | E      | M      |        | 24                             | -  | 22      | 150                           |  |  |
|       | N      | M      |        | 24                             | -  | 24      | 240                           |  |  |
|       | Z      | M      |        | 33 <sup>1</sup> / <sub>2</sub> | -  | 20      | 105                           |  |  |
|       |        | F      | 11     | 30                             | -  |         |                               |  |  |
| 25    | ZV,Z   | eP     | 05     | 57                             | 31 |         |                               | 3700   | Confused by strong microseisms. 34°N., 38 <sup>1</sup> / <sub>2</sub> °W. Near Azores Islands. Mag. 6 <sup>1</sup> / <sub>4</sub> -6 <sup>1</sup> / <sub>2</sub> (Pas). USCGS. |
|       | NE     | e(S)   | 06     | 02                             | 49 |         |                               |  |  |
|       | N      | eL     |        | 04                             | 55 |         |                               |  |  |
|       | N      | M      |        | 06                             | -  | 18      | 22                            |  |  |
|       | E      | M      |        | 06 <sup>1</sup> / <sub>2</sub> | -  | 20      | 10                            |  |  |
|       | Z      | M      |        | 07                             | -  | 14      | 6                             |  |  |
| 25    |        | F      |        | 55                             | -  |         |                               | Mag. = 6                                     |  |
|       | N      | eL     | 17     | 25                             | -  |         |                               |  |  |
|       | N      | M      |        | 44                             | -  | 20      | 3 <sup>1</sup> / <sub>2</sub> |  |  |
|       | E      | M      |        | 45                             | -  | 20      | 2 <sup>1</sup> / <sub>2</sub> |  |  |
| 25    | Z      | M      |        | 46                             | -  | 18      | 3                             | Mag. = 6                                     |  |
|       |        | F      | 18     | 15                             | -  |         |                               |  |  |
| 25    | NE     | eL     | 23     | 10                             | -  |         |                               | Mindanao aftershock. USCGS.                  |  |
|       | N      | M      |        | 25                             | -  | 20      | 2                             |  |  |
|       | E      | M      |        | 29                             | -  | 20      | 1 <sup>1</sup> / <sub>2</sub> |  |  |
| 25    |        | F      |        | 50                             | -  |         |                               | Mag. = 6                                     |  |
|       | NE     | eL     | 19     | 42                             | -  |         |                               |  |  |
|       | N      | M      |        | 51                             | -  | 26      | 1 <sup>1</sup> / <sub>2</sub> |  |  |
| 26    |        | F      | 20     | 10                             | -  |         |                               | Small. Mindanao aftershock. USCGS.           |  |
|       | NE     | eSKS   | 04     | 33                             | 43 |         |                               |  |  |
| 27    | E      | e      |        | 34                             | 53 |         |                               | 1°S., 127°E. Spice Islands. USCGS.           |  |
|       | N      | eL     | 05     | 04                             | -  |         |                               |  |  |
|       | E      | M      |        | 17                             | -  | 20      | 3 <sup>1</sup> / <sub>2</sub> |  |  |
|       | N      | M      |        | 20                             | -  | 20      | 3                             |  |  |
|       | Z      | M      |        | 20                             | -  | 20      | 2 <sup>1</sup> / <sub>2</sub> |  |  |
|       |        | F      |        | 50                             | -  |         |                               |  |  |
| 27    | ZV     | eP     | 05     | 09                             | 32 |         |                               | 64°N., 178°E. Eastern Siberia. USCGS.        |  |
| 27    | NE     | e      | 06     | 57                             | -  |         |                               | Very small. Spice Islands aftershock. USCGS. |  |
|       |        | F      | 07     | 25                             | -  |         |                               |  |  |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

SEPTEMBER, 1957

| DATE. | COMPT. | PHASE.            | G.M.T. |    |    | PERIOD. | AMPLITUDE.                    | Δ     | REMARKS.  |
|-------|--------|-------------------|--------|----|----|---------|-------------------------------|-------|---|
|       |        |                   | h.     | m. | s. |         |                               |       |   |
| √28   | ZV, E  | eP                | 00     | 39 | 41 |         |                               | 9950  | Compression.<br>Depth = 440 Km.<br><br>30 <sup>1</sup> / <sub>2</sub> °N., 137 <sup>1</sup> / <sub>2</sub> °E. Off south coast of Honshu, Japan. h about 500 Km. Mag. 6 <sup>3</sup> / <sub>4</sub> (Pas). USCGS. |
|       | NE     | eS                |        | 49 | 51 |         |                               |       |   |
|       | N      | e                 |        | 50 | 21 |         |                               |       |   |
|       | NE     | esS               |        | 52 | 53 |         |                               |       |   |
|       | NE     | eSS               |        | 56 | 06 |         |                               |       |   |
|       | N      | eL                | 01     | 17 | -  |         |                               |       |   |
|       | E      | M                 |        | 22 | -  | 16      | 1                             |       |   |
|       | N      | M                 |        | 25 | -  | 16      | 1 <sup>1</sup> / <sub>2</sub> |       |   |
|       |        | F                 |        | 45 | -  |         |                               |       |   |
| 28    | NE     | e                 | 05     | 18 | -  |         |                               |       | Very small.   |
|       |        | F                 |        | 32 | -  |         |                               |       |   |
| 28    | NE     | e                 | 07     | 20 | -  |         |                               |       | Very small.   |
|       |        | F                 |        | 28 | -  |         |                               |       |   |
| √28   | ZV, Z  | iPKP              | 14     | 38 | 41 | 5       | 13                            | 16400 | Dilatation. NEe<br>Depth = 630 Km.<br><br>20 <sup>1</sup> / <sub>2</sub> °S., 178°W. Fiji Islands.<br>h about 650 Km. Mag. 7 <sup>1</sup> / <sub>2</sub> (Pas),<br>7-7 <sup>1</sup> / <sub>4</sub> (Berk). USCGS. |
|       | Z      | i                 |        | 38 | 46 |         |                               |       |   |
|       | Z      | ipPKP             |        | 41 | 02 |         |                               |       |   |
|       | Z      | iPP               |        | 42 | 03 | 10      | 17                            |       |   |
|       | ZV, ZN | iPKS              |        | 42 | 21 |         |                               |       |   |
|       | ZN     | enPP              |        | 44 | 13 |         |                               |       |   |
|       | ZN     | ePS               |        | 52 | 57 |         |                               |       |   |
|       | N      | i                 |        | 55 | 38 |         |                               |       |   |
|       | E      | iSS               | 15     | 00 | 46 | 18      | 58                            |       |   |
|       | E      | esSS              |        | 04 | 25 |         |                               |       |   |
|       |        | F                 | 17     | 40 | -  |         |                               |       |   |
| 28    | ZV     | iPKP              | 15     | 02 | 50 |         |                               |       |   |
| 29    | NE     | eL                | 03     | 36 | -  |         |                               |       |   |
|       | E      | M                 |        | 42 | -  | 18      | 1                             |       |   |
|       | N      | M                 |        | 42 | -  | 19      | 1 <sup>1</sup> / <sub>2</sub> |       |   |
|       |        | F                 | 04     | 20 | -  |         |                               |       |   |
| 29    | ZV, Z  | ePKP <sub>1</sub> | 08     | 32 | 21 |         |                               |       | Depth = 600 Km.   |
|       | ZV, Z  | ePKP <sub>2</sub> |        | 32 | 36 |         |                               |       | 25°S., 178 <sup>1</sup> / <sub>2</sub> °E. South of Fiji Islands. Mag. 6 <sup>1</sup> / <sub>4</sub> (Berk.) USCGS.   |
|       | ZV, Z  | epPKP             |        | 34 | 37 |         |                               |       |   |
| 29    | NE     | e                 | 18     | 43 | -  |         |                               |       | Small.  |
|       |        | F                 |        | 59 | -  |         |                               |       |   |
| 30    | NE     | eL                | 21     | 18 | -  |         |                               |       |   |
|       | N      | M                 |        | 26 | -  | 20      | 1                             |       |   |
|       |        | F                 |        | 50 | -  |         |                               |       |   |

All the magnitudes are the "unified magnitudes" denoted by "m".



AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR OCTOBER, 1957.

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FURST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"  
(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>T <sub>1</sub><br>sec. | PENDULUM FREE PERIOD<br>T.<br>sec. | DAMPING CONSTANT<br>μ. <sup>2</sup> | Ak<br>πl<br>sec. <sup>-1</sup> |
|------------|----------------------------------|--|------------------------------------|-------------------------------------|--------------------------------|
| N.         | 1 August 1957                    | 21.2   | 21.2                               | 0.00                                | 62.5                           |
| E.         | 1 August 1957                    | 21.1   | 21.1                               | 0.00                                | 52.0                           |
| Z.         | 1 September 1954                 | 11.3   | 11.4                               | +0.05                               | 115                            |

(II) VERTICAL SEISMOGRAPH, PEPIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.

TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.

SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |                                |    | PERIOD. | AMPLI-<br>TUDE.               | Δ   | REMARKS.  |
|-------|--------|--------|--------|--------------------------------|----|---------|-------------------------------|---|---|
|       |        |        | h.     | m.                             | s. |         |                               |   |   |
| 2     | ZV,Z   | eP     | 12     | 38                             | 35 |         |                               | 7140  | 11°N., 63°W. Venezuela foreshock.<br>Mag. 6 <sup>1</sup> / <sub>2</sub> -6 <sup>3</sup> / <sub>4</sub> (Pas). U.S.C.G.S.                      |
|       | N      | eS     |        | 47                             | 09 |         |                               |   |   |
|       | N      | eLQ    |        | 55                             | -  |         |                               |   |   |
|       | ZE     | eL     |        | 58 <sup>1</sup> / <sub>2</sub> | -  |         |                               |   |   |
|       | E      | M      | 13     | 02                             | -  | 20      | 5                             |   |   |
|       | N      | M      |        | 02                             | -  | 20      | 3                             |   |   |
|       | Z      | M      |        | 02                             | -  | 20      | 4                             |   |   |
|       |        | F      |        | 55                             | -  |         |                               | Mag. = 6  |   |
| 2     | ZV,Z   | eP     | 21     | 11                             | 15 |         |                               | 61°S., 69 <sup>10</sup> / <sub>2</sub> E. Chagos Islands.<br>USCGS. |   |
|       | NE     | e(SKS) |        | 21                             | 32 |         |                               |   |   |
|       | N      | eL     |        | 33                             | -  |         |                               |   |   |
|       | E      | M      |        | 40                             | -  | 22      | 2                             |   |   |
|       | N      | M      |        | 44                             | -  | 22      | 1 <sup>1</sup> / <sub>2</sub> |   |   |
|       |        | F      | 22     | 15                             | -  |         |                               | Mag. = 6  |   |
| 3     | NE     | e      | 07     | 10                             | -  |         |                               | Very small. 4°S., 134°E.<br>New Guinea. USCGS.                      |   |
|       |        | F      |        | 20                             | -  |         |                               |   |   |
| 4     | ZV,Z   | iP     | 05     | 36                             | 40 |         |                               | 7280  | Compression, Ee.<br><br>11°N., 63°W. Near coast of<br>Venezuela. h about 60 Km.<br>Mag. 6 <sup>3</sup> / <sub>4</sub> (Pas), 7 (Berk). USCGS. |
|       | ZV,Z   | i      |        | 36                             | 49 |         |                               |   |   |
|       | ZV,Z   | i      |        | 35                             | 54 |         |                               |   |   |
|       | Z      | e(PcP) |        | 37                             | 21 |         |                               |   |   |
|       | ZE     | e      |        | 37                             | 50 |         |                               |   |   |
|       | ZV,Z   | eP     |        | 38                             | 58 |         |                               |   |   |
|       | N      | iS     |        | 45                             | 21 | 12      | 6(SH)                         |   |   |
|       | E      | e      |        | 45                             | 39 |         |                               |   |   |
|       | NE     | ePS    |        | 45                             | 45 |         |                               |   |   |
|       | NE     | eScS   |        | 46                             | 21 |         |                               |   |   |
|       | E      | eSS    |        | 39                             | 45 |         |                               |   |   |
| N     | eLQ    |        | 52     | 53                             |    |         |                               |   |   |
| E     | eLR    |        | 57     | -                              |    |         |                               |   |   |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

OCTOBER, 19 57

| DATE.  | COMPT. | PHASE. | G.M.T. |     |    | PERIOD. | AMPLITUDE. | Δ      | REMARKS.  |
|--------|--------|--------|--------|-----|----|---------|------------|--------|---|
|        |        |        | h.     | m.  | s. |         |            |        |   |
| contd. |        |        |        |     |    |         |            |        |   |
| 4      | N      | M      | 06     | 00  | -  | 20      | 13         |        |   |
|        | E      | M      |        | 02  | -  | 20      | 31         |        |   |
|        | Z      | M      |        | 02  | -  | 19      | 21         |        | Mag. = 6½   |
|        |        | F      | 08     | 35  | -  |         |            |        |   |
| 4      | N      | e      | 23     | 53  | -  |         |            |        | Very small.   |
|        |        | F      | 24     | 05  | -  |         |            |        |   |
| 5      | ZV,Z   | eP     | 00     | 07  | 35 |         |            |        | Rat Islands. Aleutian Islands. USCGS.                   |
| 5      | ZV     | eP     | 11     | 42  | 18 |         |            | 3180   |   |
|        | ZV,Z   | e      |        | 42  | 26 |         |            |        |   |
|        | ZV,Z   | ePP    |        | 42  | 56 |         |            |        | 34½°N., 26½°E. Near Isle of Crete. USCGS.               |
|        | N      | eS     |        | 46  | 56 |         |            |        |   |
|        | E      | e      |        | 47  | 07 |         |            |        |   |
|        | NE     | eL     |        | 51  | -  |         |            |        |   |
|        | N      | M      |        | 52½ | -  | 16      | 2          |        |   |
|        | E      | M      |        | 54½ | -  | 14      | 2          |        |   |
|        | Z      | M      |        | 54½ | -  | 13      | 2          |        | Mag. = 5½   |
|        |        | F      | 12     | 10  | -  |         |            |        |   |
| 5      | ZNE    | e      | 16     | 05  | -  |         |            |        | Very small. Crete aftershock. USCGS.                    |
|        |        | F      |        | 13  | -  |         |            |        |   |
| 5      | ZV     | e(P)   | 22     | 49  | 38 |         |            |        |   |
|        | N      | eL     | 23     | 07  | -  |         |            |        | 38°N., 69½°E. Afganistan-Tadzhik border. USCGS.         |
|        | E      | M      |        | 14  | -  | 20      | 1½         |        |   |
|        | N      | M      |        | 14  | -  | 20      | ½          |        |   |
|        | Z      | M      |        | 14  | -  | 20      | 1          |        |   |
|        |        | F      |        | 20  | -  |         |            |        | Mag. = 5½   |
| 6      | NE     | e      | 01     | 24  | -  |         |            |        | Very small. Venezuela aftershock. USCGS.                |
|        |        | F      |        | 55  | -  |         |            |        |   |
| 6      | ZV     | eP     | 21     | 39  | 45 |         |            |        | 49½°N., 155°E. Kurile Islands. USCGS.                   |
| 7      | NE     | eL     | 05     | 51  | -  |         |            |        | Very small. Unimak Island region. USCGS.                |
|        |        | F      | 06     | 05  | -  |         |            |        |   |
| 7      | ZV     | eP     | 13     | 31  | 37 |         |            | (8800) | Confused by microseisms.                                |
|        | E      | e(S)   |        | 41  | 36 |         |            |        |   |
|        | N      | e      |        | 41  | 51 |         |            |        | 51°N., 159°E. Off south-east coast of Kamchatka. USCGS. |
|        | N      | eL     | 14     | 02  | -  |         |            |        |   |
|        | E      | M      |        | 09½ | -  | 19      | 2          |        |   |
|        | N      | M      |        | 13½ | -  | 19      | 2½         |        |   |
|        |        | F      |        | 55  | -  |         |            |        |   |
| 8      | ZV     | eP     | 07     | 05  | 16 |         |            |        | Confused by microseisms.                                |
|        | N      | eL     |        | 11  | -  |         |            |        |   |
|        | E      | M      |        | 12½ | -  | 16      | 1½         |        |   |
|        | N      | M      |        | 12½ | -  | 16      | 4½         |        |   |
|        |        | F      |        | 25  | -  |         |            |        |   |
| 10     | ZV     | eP     | 05     | 56  | 29 |         |            |        | Andreanof Islands. USCGS.                               |
| 10     | ZV     | eP     | 19     | 05  | 40 |         |            |        | Confused by microseisms.                                |
|        | NE     | eL     |        | 34  | -  |         |            |        | 54°N., 166°W. Fox Islands.                              |
|        | N      | M      |        | 42  | -  | 20      | 1½         |        | Mag. 5¾ (Berk). USCGS.                                  |
|        |        | F      | 20     | 10  | -  |         |            |        |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

OCTOBER, 1957

| DATE. | COMPT.                     | PHASE. | G.M.T.                      |                  |    | PERIOD.        | AMPLI-<br>TUDE.                         | Δ   | REMARKS.   |
|-------|----------------------------|--------|-----------------------------|------------------|----|----------------|---|---|--|
|       |                            |        | h.                          | m.               | s. |                |   |   |  |
| 11    | N<br>N                     | eL     | 07                          | 45 $\frac{1}{2}$ | -  | 13             | 2 $\frac{1}{2}$                         |   | Confused by microseisms.   |
|       |                            | M      |                             | 46 $\frac{1}{2}$ | -  |                |   |   |  |
|       |                            | F      |                             | 52               | -  |                |   |   |  |
| 12    | N<br>N                     | e      | 17                          | 40               | -  | 19             | $\frac{1}{2}$                           |   | Sandwich Islands region. USCGS.  |
|       |                            | M      |                             | 48               | -  |                |   |   |  |
|       |                            | F      |                             | 55               | -  |                |   |   |  |
| 12    | E<br>N<br>N<br>E           | e(SKS) | 19                          | 22               | 35 | 23<br>24       | 1 $\frac{1}{2}$<br>1                    |   | 8°S., 111°E., Near south coast<br>of Java. USCGS.  |
|       |                            | eL     |                             | 47               | -  |                |   |   |  |
|       |                            | M      | 20                          | 01               | -  |                |   |   |  |
|       |                            | M      | 04                          | -                |    |                |   |   |  |
|       |                            | F      | 25                          | -                |    |                |   |   |  |
| 12    | N                          | e      | 23                          | 12               | -  |                |   | Very small.   |  |
|       |                            | F      |                             | 25               | -  |                |   |   |  |
| 13    | E<br>N<br>E<br>E<br>N<br>Z | e(S)   | 04                          | 40               | 38 | 18<br>17<br>17 | 4 $\frac{1}{2}$<br>3 $\frac{1}{2}$<br>3 |   | 52 $\frac{1}{2}$ °N., 160°E. Off southeast<br>coast of Kamchatka. USCGS.                       |
|       |                            | e      |                             | 41               | 27 |                |   |   |  |
|       |                            | eL     | 50                          | -                |    |                |   |   |  |
|       |                            | M      | 05                          | 09               | -  |                |   |   |  |
|       |                            | M      | 13                          | -                |    |                |   |   |  |
|       |                            | M      | 13                          | -                |    |                |   |   |  |
|       |                            | F      | 50                          | -                |    |                |   |   |  |
|       |                            | 13     | NE<br>N<br>N<br>E<br>N<br>Z | eSS              | 21 |                |   |   |  |
| eL    | 50                         |        |                             | -                |    |                |   |   |  |
| M     | 22                         |        |                             | 02 $\frac{1}{2}$ | -  |                |   |   |  |
| M     | 23                         |        |                             | -                |    |                |   |   |  |
| M     | 23                         |        |                             | -                |    |                |   |   |  |
| F     | 23                         |        |                             | -                |    |                |   |   |  |
| 15    | ZV<br>ZV<br>E              | eP     | 04                          | 14               | 16 | 20             | $\frac{1}{2}$                           |   | 9°N., 84°W. Near south coast of<br>Costa Rica. USCGS.  |
|       |                            | e      |                             | 14               | 39 |                |   |   |  |
|       |                            | M      |                             | 45               | -  |                |   |   |  |
|       |                            | F      |                             | 55               | -  |                |   |   |  |
| 16    | NE                         | e      | 19                          | 05               | -  |                |   | Small. Confused by microseisms.   |  |
|       |                            | F      |                             | 30               | -  |                |   |   |  |
| 17    | NE                         | e      | 12                          | 18               | -  |                |   | Small. Confused by microseisms.   |  |
|       |                            | F      |                             | 28               | -  |                |   |   |  |
| 17    | NE                         | e      | 14                          | 37               | -  |                |   | Confused by strong microseisms.<br>North Atlantic foreshock. USCGS.           |  |
|       |                            | F      |                             | 43               | -  |                |   |   |  |
| 17    | NE<br>E<br>N               | e      | 14                          | 46               | -  | 16<br>14       | 1 $\frac{1}{2}$<br>2 $\frac{1}{2}$      |   | Confused by strong microseisms.<br>47°N., 27 $\frac{1}{2}$ °W. North Atlantic<br>Ocean. USCGS. |
|       |                            | M      |                             | 48               | -  |                |   |   |  |
|       |                            | M      | 48                          | -                |    |                |   |   |  |
|       |                            | F      | 15                          | 03               | -  |                |   |   |  |
| 17    | NE                         | e      | 17                          | 44               | -  |                |   | Confused by strong microseisms.<br>North Atlantic Ocean aftershock.<br>USCGS. |  |
|       |                            | F      |                             | 55               | -  |                |   |   |  |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

OCTOBER, 1957.

| DATE. | COMPT. | PHASE. | G.M.T. |                  |    | PERIOD. | AMPLITUDE.     | Δ    | REMARKS.   |
|-------|--------|--------|--------|------------------|----|---------|----------------|------|--|
|       |        |        | h.     | m.               | s. |         |                |      |  |
| 18    | ZV     | e(P)   | 01     | 55               | 52 |         |                |      | Confused by microseisms.<br>Central Greece. USCGS.<br><br>Mag. = $5\frac{1}{4}$  |
|       | N      | M      |        | 03               | -  | 14      | $2\frac{1}{2}$ |      |  |
|       | E      | M      |        | 04               | -  | 16      | $1\frac{1}{2}$ |      |  |
|       |        | F      |        | 10               | -  |         |                |      |  |
| 19    | ZV,Z   | eP     | 18     | 41               | 50 | 8       | 2              | 9910 | 23 $\frac{1}{2}$ <sup>o</sup> N., 122 <sup>o</sup> E. Near east coast of Formosa. Several killed and slight property damage.<br>Mag. $6\frac{1}{2}$ - $6\frac{3}{4}$ (Pas). USCGS.<br><br>Mag. = 6.6   |
|       | ZV,Z   | i      |        | 41               | 54 |         |                |      |  |
|       | Z      | eFP    |        | 45               | 21 | 9       | 2              |      |  |
|       | NE     | eSKS   |        | 52               | 21 |         |                |      |  |
|       | NE     | eS     |        | 52               | 35 |         |                |      |  |
|       | E      | e      |        | 52               | 55 |         |                |      |  |
|       | E      | ePS    |        | 53               | 45 |         |                |      |  |
|       | N      | eSS    |        | 58               | 29 |         |                |      |  |
|       | E      | e      |        | 58               | 54 |         |                |      |  |
|       | N      | eL     | 19     | 07               | -  |         |                |      |  |
|       | E      | M      |        | 17 $\frac{1}{2}$ | -  | 25      | 67             |      |  |
|       | N      | M      |        | 17 $\frac{1}{2}$ | -  | 26      | 77             |      |  |
|       | E      | M      |        | 27               | -  | 17      | 44             |      |  |
|       | N      | M      |        | 27               | -  | 17      | 67             |      |  |
| Z     | M      |        | 27     | -                | 16 | 59      |                |      |  |
|       | F      |        | 21     | 05               | -  |         |                |      |  |
| 19    | ZV,Z   | iP     | 21     | 53               | 57 | 4       | 2              | 8900 | Deep.<br>44 $\frac{1}{2}$ <sup>o</sup> N., 146 <sup>o</sup> E. Off northeast coast of Hokkaido, Japan. h about 150 Km. Mag. $6\frac{1}{2}$ - $6\frac{3}{4}$ (Pas). USCGS.<br><br>Mag. = $6\frac{1}{2}$ |
|       | ZV     | i      |        | 54               | 08 |         |                |      |  |
|       | ZV     | i      |        | 54               | 17 |         |                |      |  |
|       | ZV,NE  | iS     | 22     | 03               | 50 | 6       | 6(SH)          |      |  |
|       | E      | M      |        | 28               | -  | 24      | 1              |      |  |
|       | M      |        | 28     | -                | 24 | 1       |                |      |  |
|       | F      |        | 50     | -                |    |         |                |      |  |
| 20    | ZV,Z   | eP     | 12     | 13               | 45 | 8       | $1\frac{1}{2}$ | 5900 | 11 $\frac{1}{2}$ <sup>o</sup> N., 42 <sup>o</sup> W. Atlantic Ocean.<br>USCGS.<br><br>Mag. = $6\frac{1}{4}$  |
|       | Z      | e      |        | 16               | 40 |         |                |      |  |
|       | NE     | eS     |        | 21               | 11 | 14      | 8              |      |  |
|       | Z      | e      |        | 21               | 16 |         |                |      |  |
|       | E      | e      |        | 21               | 35 |         |                |      |  |
|       | N      | eSS    |        | 24               | 49 |         |                |      |  |
|       | NE     | eLQ    |        | 26 $\frac{1}{2}$ | -  |         |                |      |  |
|       | E      | M      |        | 33               | -  | 20      | 12             |      |  |
|       | N      | M      |        | 33               | -  | 19      | 7              |      |  |
|       | Z      | M      |        | 33               | -  | 20      | 11             |      |  |
|       | F      |        | 13     | 35               | -  |         |                |      |  |
| 22    | ZV     | iP     | 20     | 56               | 56 |         |                |      | Dilatation. 43 $\frac{1}{2}$ <sup>o</sup> N., 146 <sup>o</sup> E.<br>Near northeast coast of Hokkaido, Japan. USCGS.   |
|       | N      | eL     | 21     | 27               | -  |         |                |      |  |
|       | N      | M      |        | 32               | -  | 26      | $1\frac{1}{2}$ |      |  |
|       |        | F      |        | 45               | -  |         |                |      |  |
| 23    | ZV     | eP     | 04     | 48               | 38 |         |                |      | 19 <sup>o</sup> N., 64 <sup>o</sup> W. Puerto Rico. USCGS.   |
|       | E      | M      | 05     | 09               | -  | 20      | 1              |      |  |
|       |        | F      |        | 15               | -  |         |                |      |  |
| 23    | ZV,Z   | eP     | 06     | 08               | 41 |         |                | 8600 | 52 $\frac{1}{2}$ <sup>o</sup> N., 169 $\frac{1}{2}$ <sup>o</sup> W. Fox Islands, Aleutian Islands. Mag. $6\frac{1}{4}$ (Pas). USCGS.<br><br>Mag. = $6\frac{1}{4}$                                      |
|       | NE     | eS     |        | 18               | 28 |         |                |      |  |
|       | E      | eL     |        | 29               | -  |         |                |      |  |
|       | E      | M      |        | 48 $\frac{1}{4}$ | -  | 19      | 6              |      |  |
|       | N      | M      |        | 48 $\frac{1}{2}$ | -  | 20      | 7              |      |  |
|       | Z      | M      |        | 48 $\frac{1}{2}$ | -  | 20      | 7              |      |  |
|       | F      |        | 07     | 45               | -  |         |                |      |  |

M.O. 627

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN.

OCTOBER, 19 57

| DATE. | COMPT.   | PHASE.   | G.M.T. |                  |    | PERIOD. | AMPLI-<br>TUDE.      | Δ    | REMARKS.  |
|-------|--|--|--------|------------------|----|---------|----------------------|------|---|
|       |  |  | h.     | m.               | s. |         |                      |      |   |
| 23    | N<br>N   | e<br>M<br>F  | 08     | 25               | -  |         |                      |      |   |
|       |  |  |        | 37               | -  | 20      | $\frac{1}{2}$        |      |   |
|       |  |  |        | 50               | -  |         |                      |      |   |
| 24    | N<br>E<br>N                                    | eL<br>M<br>M<br>F  | 01     | 34               | -  |         |                      |      | 14 $\frac{1}{2}$ S., 167 $\frac{1}{2}$ E. New Hebrides<br>Islands. Mag. 6 $\frac{1}{2}$ (Pas). USCGS.   |
|       |  |  |        | 40               | -  | 22      | 1                    |      |   |
|       |  |  |        | 40               | -  | 22      | 1 $\frac{1}{2}$      |      |   |
|       |  |  | 02     | 25               | -  |         |                      |      |   |
| 24    | ZV<br>E<br>N<br>N<br>E                         | eP<br>eS<br>eL<br>M<br>M<br>F                                  | 02     | 38               | 26 |         |                      | 2800 | 40°N., 30°E. Turkey. BCIS.  |
|       |  |  |        | 42               | 47 |         |                      |      |   |
|       |  |  |        | 45               | -  | 14      | 2 $\frac{1}{2}$      |      |   |
|       |  |  |        | 47 $\frac{1}{2}$ | -  | 14      | 1 $\frac{1}{2}$      |      |   |
|       |  |  | 03     | 00               | -  |         |                      |      | Mag. = 5 $\frac{1}{2}$  |
| 24    | N<br>E<br>N                                    | eL<br>M<br>M<br>F  | 20     | 52               | -  |         |                      |      | Confused by microseisms.  |
|       |  |  | 21     | 05 $\frac{1}{2}$ | -  | 19      | 1 $\frac{1}{2}$      |      | 29°S., 69°W. Argentina. USCGS.  |
|       |  |  |        | 06               | -  | 19      | 1 $\frac{1}{2}$      |      |   |
|       |  |  |        | 30               | -  |         |                      |      |   |
| 24    | N<br>N<br>NE<br>N<br>N<br>E<br>N               | e(S)<br>eSS<br>eLQ<br>M<br>M<br>M<br>M<br>F                    | 22     | 07               | 01 |         |                      |      | Confused by microseisms.  |
|       |  |  |        | 12               | 17 |         |                      |      |   |
|       |  |  |        | 18               | -  |         |                      |      | 25°N., 109 $\frac{1}{2}$ W. Gulf of<br>California.  |
|       |  |  |        | 25               | -  | 26      | 9                    |      |   |
|       |  |  |        | 29               | -  | 17      | 9                    |      | Mag. 6(Pas). USCGS.   |
|       |  |  |        | 32               | -  | 17      | 12                   |      |   |
|       |  |  |        | 32               | -  | 15      | 7                    |      |   |
|       |  |  | 23     | 10               | -  |         |                      |      | Mag. 6 $\frac{1}{4}$ -6 $\frac{1}{2}$   |
| 25    | ZV<br>N<br>E<br>N                              | e(P)<br>e<br>M<br>M<br>F                                       | 02     | 23               | 13 |         |                      |      |   |
|       |  |  |        | 29               | 56 |         |                      |      |   |
|       |  |  |        | 35               | -  | 19      | 2                    |      |   |
|       |  |  |        | 35               | -  | 19      | 1 $\frac{1}{2}$      |      |   |
|       |  |  |        | 50               | -  |         |                      |      |   |
| 25    | N  | eL<br>F  | 05     | 23               | -  |         |                      |      | Very small. Fox Islands. USCGS.   |
|       |  |  |        | 35               | -  |         |                      |      |   |
| 25    | N<br>E<br>N<br>Z                               | eL<br>M<br>M<br>M<br>F   | 07     | 07               | -  |         |                      |      | 21 $\frac{1}{2}$ N., 121°E. Off coast of<br>Formosa. USCGS.   |
|       |  |  |        | 16 $\frac{1}{4}$ | -  | 20      | 1 $\frac{1}{2}$      |      |   |
|       |  |  |        | 17 $\frac{1}{4}$ | -  | 20      | 2                    |      |   |
|       |  |  |        | 18 $\frac{1}{2}$ | -  | 14      | 2                    |      |   |
|       |  |  |        | 30               | -  |         |                      |      | Mag. = 6  |
| 25    | ZV,Z<br>N<br>E<br>N<br>NF<br>NE<br>E<br>N<br>Z | eP<br>eS<br>eScS<br>eFSS<br>eSS<br>eL<br>M<br>M<br>M<br>M<br>F | 10     | 15               | 24 | 6       | 2 $\frac{1}{2}$      | 8450 | Compression.  |
|       |  |  |        | 25               | 04 | 45      | 3 $\frac{1}{2}$ (SH) |      |   |
|       |  |  |        | 25               | 34 |         |                      |      | 50 $\frac{1}{2}$ N., 156 $\frac{1}{2}$ E. Near south coast<br>of Kamchatka. Mag. 6 $\frac{3}{4}$ (Pas). |
|       |  |  |        | 26               | 00 |         |                      |      | 6 $\frac{1}{2}$ (Berk). USCGS.  |
|       |  |  |        | 30.4             | -  |         |                      |      |   |
|       |  |  |        | 36               | -  |         |                      |      |   |
|       |  |  |        | 51               | -  | 20      | 16                   |      |   |
|       |  |  |        | 51               | -  | 20      | 13                   |      |   |
|       |  |  |        | 57 $\frac{1}{2}$ | -  | 16      | 7                    |      |   |
|       |  |  | 12     | 05               | -  |         |                      |      | Mag. = 6 $\frac{1}{2}$  |
| 26    | NE   | e<br>F   | 05     | 30               | -  |         |                      |      | Very small.   |
|       |  |  |        | 55               | -  |         |                      |      |   |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

OCTOBER, 19 57

| DATE. | COMPT. | PHASE. | G.M.T.           |                  |    | PERIOD. | AMPLI-<br>TUDE. | Δ      | REMARKS.  |
|-------|--------|--------|------------------|------------------|----|---------|-----------------|--------|---|
|       |        |        | h.               | m.               | s. |         |                 |        |   |
| 26    | ZV     | e(PKP) | 08               | 45               | 01 |         |                 |        |   |
| 26    | ZV     | eFP    | 14               | 35               | 49 |         |                 |        | 2°S., 116°E. Borneo. USCGS.<br><br>Mag. = 6 $\frac{1}{4}$   |
|       | NE     | eSSS   |                  | 54               | 27 |         |                 |        |   |
|       | N      | eL     | 15               | 09               | -  |         |                 |        |   |
|       | N      | M      |                  | 28               | -  | 19      | 3 $\frac{1}{2}$ |        |   |
|       | E      | M      |                  | 29               | -  | 18      | 3               |        |   |
|       | Z      | M      |                  | 29               | -  | 18      | 3               |        |   |
|       |        | F      | 16               | 00               | -  |         |                 |        |   |
| 26    | ZV     | eP     | 14               | 44               | 32 |         |                 |        |   |
| 27    | ZV,Z   | iP     | 22               | 43               | 49 |         |                 | (7900) | Confused by strong microseisms.<br>56°N., 161°E. Kamchatka.<br>Mag. 6 $\frac{1}{2}$ -6 $\frac{3}{4}$ (Pas). USCGS.                    |
|       | ZV     | e      |                  | 44               | 12 |         |                 |        |   |
|       | NE     | e(S)   |                  | 53               | 02 |         |                 |        |   |
|       |        | F      | 23               | 50               | -  |         |                 |        |   |
| 30    | NE     | eS     | 01               | 53               | 12 |         |                 |        | Confused by strong microseisms.<br>35 $\frac{1}{2}$ °N., 27°E. Karpathos Isle<br>region, Greece. BCIS.<br><br>Mag. 5 $\frac{3}{4}$ -6 |
|       | N      | eL     |                  | 55 $\frac{1}{2}$ | -  |         |                 |        |   |
|       | N      | M      |                  | 58               | -  | 17      | 15              |        |   |
|       | E      | M      |                  | 59 $\frac{1}{2}$ | -  | 17      | 7               |        |   |
|       |        | F      | 02               | 20               | -  |         |                 |        |   |
| 30    | NE     | eS     | 07               | 40               | 32 |         |                 |        | Confused by microseisms.<br>35 $\frac{1}{2}$ °N., 27°E. Karpathos Isle<br>region, Greece. BCIS.<br><br>Mag. = 6                       |
|       | N      | eL     |                  | 43 $\frac{1}{4}$ | -  |         |                 |        |   |
|       | N      | M      |                  | 45 $\frac{1}{4}$ | -  | 16      | 19              |        |   |
|       | E      | M      |                  | 46 $\frac{1}{4}$ | -  | 16      | 11              |        |   |
|       | Z      | M      |                  | 48 $\frac{1}{2}$ | -  | 14      | 6               |        |   |
|       |        | F      | 08               | 15               | -  |         |                 |        |   |
| 31    | ZV     | eP     | 10               | 20               | 09 |         |                 | 8980   | Confused by microseisms.<br><br><br><br><br><br><br><br><br>Mag. = 6 $\frac{1}{2}$  |
|       | ZV,Z   | i      |                  | 20               | 12 |         |                 |        |   |
|       | ZV,Z   | i      |                  | 20               | 20 |         |                 |        |   |
|       | NE     | eS     |                  | 30               | 13 |         |                 |        |   |
|       | E      | ePS    |                  | 31               | 05 |         |                 |        |   |
|       | E      | eSS    |                  | 35               | 36 |         |                 |        |   |
|       | E      | eSSS   |                  | 38               | 59 |         |                 |        |   |
|       | NE     | eL     |                  | 41 $\frac{1}{2}$ | -  |         |                 |        |   |
|       | E      | M      |                  | 51               | -  | 23      | 17              |        |   |
|       | N      | M      |                  | 52 $\frac{1}{2}$ | -  | 20      | 7               |        |   |
| Z     | M      |        | 52 $\frac{1}{2}$ | -                | 20 | 7       |                 |        |   |
|       |        | F      | 12               | 15               | -  |         |                 |        |   |
| 31    | ZV,Z   | eP     | 16               | 37               | 06 |         |                 |        | Confused by strong microseisms.   |
|       | E      | M      | 17               | 08               | -  | 26      | 4               |        |   |
|       |        | F      |                  | 25               | -  |         |                 |        |   |

All the magnitudes are the "unified magnitudes" denoted by "m".

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR NOVEMBER, 1957

Lat. 51° 28' 6" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"

(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>T.<br>sec. | PENDULUM FREE PERIOD<br>T.<br>sec. | DAMPING CONSTANT<br>$\mu^2$ . | $\frac{Ak}{\pi l}$<br>sec. <sup>-1</sup> |
|------------|----------------------------------|--|------------------------------------|-------------------------------|--|
| N.         | 1 August 1957                    | 21.2                                   | 21.2                               | 0.00                          | 62.5                                     |
| E.         | 1 August 1957                    | 21.1                                   | 21.1                               | 0.00                          | 52.0                                     |
| Z.         | 1 September 1954                 | 11.3                                   | 11.4                               | +0.05                         | 115                                      |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.

TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.

SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |    |    | PERIOD.<br>sec. | AMPLI-<br>TUDE.<br>$\mu$ | $\Delta$<br>km.  | REMARKS. |
|-------|--------|--------|--------|----|----|-----------------|--------------------------|--|----------|
|       |        |        | h.     | m. | s. |                 |                          |  |          |
| ✓ 2   | N      | eL     | 19     | 36 | -  |                 |                          | Confused by microseisms.<br>13°S., 166½°E. New Hebrides<br>Islands. USCGS.<br>Mag. = 6¼                      |          |
|       | N      | M      |        | 50 | -  | 24              | 3½                       |  |          |
|       | E      | M<br>F |        | 53 | -  | 22              | 2½                       |  |          |
| ✓ 6   | ZV     | e(P)   | 13     | 25 | 11 |                 |                          | 45°N., 149½°E. Kurile Islands.<br>USCGS.   |          |
|       | N      | eL     |        | 55 | -  |                 |                          |  |          |
|       | N      | M<br>F | 14     | 03 | -  | 20              | 1½                       |  |          |
| 7     | N      | eL     | 07     | 44 | -  |                 |                          | 24°S., 112½°W. South Pacific Ocean.<br>USCGS.  |          |
|       | N      | M<br>F | 08     | 10 | -  | 20              | 1½                       |  |          |
|       |        |        |        | 25 | -  |                 |                          |  |          |
| 10    | E      | e(S)   | 00     | 04 | 27 |                 |                          | Confused by microseisms.<br>38.5°N., 23.3°E.<br>Greece. BCIS.  |          |
|       | NE     | eL     |        | 07 | -  |                 |                          |  |          |
|       | E      | M      |        | 08 | -  | 13              | 2                        |  |          |
|       | N      | M<br>F |        | 08 | -  | 14              | 3½                       |  |          |
| 10    | NZ     | ePKS   | 02     | 59 | 03 |                 |                          | Confused by microseisms.<br>7°S., 155½°E. Solomon Islands.<br>USCGS.<br>Mag. 6¼<br>overlapped by next shock. |          |
|       | NE     | eL     | 03     | 35 | -  |                 |                          |  |          |
|       | E      | M      | 04     | 00 | -  | 19              | 2½                       |  |          |
|       | N      | M<br>F | -      | -  | -  | 20              | 3                        |  |          |
| 10    | N      | M      | 05     | 10 | -  | 20              | 1½                       | Confused by microseisms.<br>Solomon Islands. USCGS.  |          |
|       |        | F      |        | 35 | -  |                 |                          |  |          |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

NOVEMBER, 19 57

| DATE. | COMPT. | PHASE. | G.M.T. |     |    | PERIOD. | AMPLITUDE. | Δ  | REMARKS.  |
|-------|--------|--------|--------|-----|----|---------|------------|--|---|
|       |        |        | h.     | m.  | s. |         |            |  |   |
| √10   | ZV     | e(PKP) | 05     | 48  | 20 |         |            |  | Confused by microseisms.<br>24½°S., 175½°W. Tonga Islands region. USCGS.<br><br>Mag. = 6¼ |
|       | NE     | eL     | 06     | 35  | -  |         |            |  |   |
|       | E      | M      | 07     | 08  | -  | 20      | 1½         |  |   |
|       | N      | M      | 08     | 08  | -  | 19      | 3          |  |   |
|       |        | F      |        | 30  | -  |         |            |  |   |
| 10    | E      | M      | 09     | 16  | -  | 18      | 1½         | 34½°N., 139°E. Near south coast of Honshu, Japan. USCGS.<br>Mag. = 5¾-6.   |   |
|       | N      | M      |        | 16  | -  | 18      | 1½         |  |   |
|       |        | F      |        | 35  | -  |         |            |  |   |
| 10    | ZV,Z   | eP     | 10     | 32  | 52 |         |            | 8°N., 74½°W. Northern Colombia. USCGS.   |   |
|       | ZV     | e(pP)  |        | 33  | 11 |         |            |  |   |
|       | N      | eL     |        | 58  | -  |         |            |  |   |
|       |        | F      | 11     | 25  | -  |         |            |  |   |
| 10    | ZV,Z   | eP     | 19     | 32  | 56 |         |            | Confused by microseisms.<br>34°N., 139½°E. Near east coast of Honshu, Japan. USCGS.<br><br>Mag. = 6¼                           |   |
|       | N      | e      |        | 42  | 56 |         |            |  |   |
|       | N      | eL     |        | 56  | -  |         |            |  |   |
|       | E      | M      | 20     | 09½ | -  | 20      | 9          |  |   |
|       | N      | M      |        | 09½ | -  | 20      | 7          |  |   |
|       | Z      | M      |        | 19½ | -  | 12      | 3          |  |   |
|       |        | F      | 21     | 15  | -  |         |            |  |   |
| 12    | N      | eL     | 02     | 42  | -  |         |            | 6°S., 149½°E. New Britain. USCGS.  |   |
|       | N      | M      |        | 50  | -  | 20      | 1          |  |   |
|       |        | F      | 03     | 00  | -  |         |            |  |   |
| √13   | ZV,Z   | ePKP   | 17     | 42  | 44 |         |            | 17800<br><br>33°S., 179°W. Kermadec Islands region. Mag. 6½-6¾(Pas), 6¾(Berk). USCGS.<br><br>> 180°<br>> 180°<br><br>Mag. = 6¾ |   |
|       | ZV,Z   | e      |        | 42  | 58 |         |            |  |   |
|       | ZV,Z   | ePKP2  |        | 43  | 28 |         |            |  |   |
|       | Z      | ePP    |        | 47  | 11 |         |            |  |   |
|       | Z      | e      |        | 47  | 24 |         |            |  |   |
|       | Z      | ePP    |        | 50  | 23 |         |            |  |   |
|       | N      | eSKKS  |        | 54  | 00 |         |            |  |   |
|       | Z      | ePPP   |        | 55  | 38 |         |            |  |   |
|       | NE     | eSS    | 18     | 07½ | -  |         |            |  |   |
|       | N      | eL     |        | 39  | -  |         |            |  |   |
|       | Z      | M      |        | 54½ | -  | 20      | 11         |  |   |
|       | N      | M      |        | 54½ | -  | 21      | 15         |  |   |
|       | E      | M      |        | 55  | -  | 20      | 12         |  |   |
|       |        | F      | 20     | 20  | -  |         |            |  |   |
| 14    | N      | e      | 14     | 25  | -  |         |            | Very small.  |   |
|       |        | F      |        | 33  | -  |         |            |  |   |
| 15    | NE     | eL     | 08     | 34  | -  |         |            | 8½°N., 124°E. Mindanao Islands, Philippine Islands. USCGS.<br><br>Mag. = 6   |   |
|       | N      | M      |        | 57  | -  | 20      | 3          |  |   |
|       | E      | M      |        | 58  | -  | 19      | 2          |  |   |
|       | Z      | M      |        | 58  | -  | 20      | 2½         |  |   |
|       | F      | 09     | 20     | -   |    |         |            |  |   |
| 15    | ZV,Z   | eP     | 16     | 42  | 16 | 6       | 1.2        | 8400<br><br>51½°N., 158°E. Near east coast of Kamchatka. USCGS.<br><br>Mag. = 6  |   |
|       | N      | eS     |        | 51  | 54 |         |            |  |   |
|       | E      | eSKS   |        | 52  | 16 |         |            |  |   |
|       | EN     | eL     | 17     | 06  | -  |         |            |  |   |
|       | N      | M      |        | 11  | -  | 28      | 4½         |  |   |
|       | N      | M      |        | 18  | -  | 20      | 2½         |  |   |
|       | E      | M      |        | 19  | -  | 20      | 3½         |  |   |
|       |        | F      |        | 55  | -  |         |            |  |   |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

NOVEMBER, 19 57

| DATE. | COMPT.   | PHASE.   | G.M.T.   |  |  | PERIOD.        | AMPLITUDE.     | Δ    | REMARKS.  |
|-------|--|--|----------|--|--|----------------|----------------|------|---|
|       |  |  | h.       | m.   | s.   |                |                |      |   |
| 15    | N  | e<br>F   | 17<br>18 | 53<br>03   | -<br>-   |                |                |      | Very small.   |
| 16    | NE<br>N  | eL<br>M<br>F   | 02<br>03 | 30<br>43<br>05   | -<br>-<br>-  | 19             | 1              |      | 51½°N., 177°W. Andreanof Islands.<br>USCGS.   |
| 17    | ZV,Z<br>ZV<br>E  | iP<br>epP<br>e(S)<br>F                                       | 06       | 09<br>10<br>18   | 05<br>28<br>24<br>-  |                |                | 8500 | Depth = 370 Km.<br>49°N., 148½°E. Sea of Okhotsk.<br>USCGS.   |
| 17    | E  | e<br>F   | 07       | 30<br>40   | -<br>-   |                |                |      | Very small.   |
| 17    | NE<br>E<br>N   | eL<br>M<br>M<br>F  | 16       | 36<br>45<br>45<br>25   | -<br>-<br>-<br>-   | 22<br>20       | 2<br>1½        |      |   |
| 17    | N<br>N   | eL<br>M<br>F   | 20       | 37<br>39½<br>43  | -<br>-<br>-  | 16             | 1              |      |   |
| 18    | NE<br>N  | eL<br>M<br>F   | 10<br>11 | 52<br>11<br>30   | -<br>-<br>-  | 18             | 1½             |      | 51½°N., 179½°W. Andreanof Islands.<br>USCGS.  |
| 18    | ZV   | eP   | 15       | 25   | 12   |                |                |      | Kurile Islands (Upsala)   |
| 19    | N  | e<br>F   | 04       | 00<br>15   | -<br>-   |                |                |      | Very small. Confused by<br>microseisms.   |
| 19    | ZV   | eP   | 16       | 25   | 25   |                |                |      | Kurile Islands (Upsala)   |
| 20    | ZV,ZN<br>ZV,ZN<br>E<br>EN<br>EN<br>N<br>E<br>E<br>N<br>Z | eP<br>e<br>eS<br>e<br>ePPS<br>eSS<br>eLQ<br>M<br>M<br>M<br>F | 12       | 52<br>52<br>01<br>01<br>02<br>06.7<br>12<br>26<br>28<br>28<br>15 | 06<br>16<br>39<br>59<br>37<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>-<br>- |                |                | 8300 | Compression. Confused by<br>microseisms.<br>54°N., 165° . Unimak Island.<br>Mag. 6¼-6½ (Berk). USCGS. |
| 23    | ZV<br>NE<br>E<br>N                                       | eP<br>eL<br>M<br>M<br>F                                      | 01       | 10<br>36<br>46<br>48<br>20                                       | 23<br>-<br>-<br>-<br>-   | 20<br>20       | 1½<br>1½       |      | Confused by microseisms.<br>52½°N., 168°W. Fox Islands,<br>Aleutian Islands. USCGS.<br>Mag. = 6       |
| 25    | E<br>E<br>N<br>Z   | eL<br>M<br>M<br>M<br>F                                       | 19       | 28<br>36<br>39<br>39<br>55                                       | -<br>-<br>-<br>-<br>-  | 20<br>18<br>18 | 1½<br>1½<br>1½ |      |   |

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.
SEISMOLOGICAL BULLETIN.

NOVEMBER, 1957

| DATE. | COMPT. | PHASE. | G.M.T.           |                  |    | PERIOD.         | AMPLI-<br>TUDE.      | $\Delta$                              | REMARKS.   |
|-------|--------|--------|------------------|------------------|----|-----------------|----------------------|---------------------------------------|--|
|       |        |        | h.               | m.               | s. |                 |                      |                                       |  |
| 25    | NE     | e      | 21               | 00               | -  |                 |                      |                                       |  |
|       | E      | M      |                  | 13               | -  | 20              | 1                    |                                       |  |
|       | N      | M      |                  | 17               | -  | 18              | 1                    |                                       |  |
|       |        | F      |                  | 25               | -  |                 |                      |                                       |  |
| /25   | ZE     | ePP    | 22               | 53               | 53 |                 |                      |                                       |  |
|       | ZE     | ePS    | 23               | 03               | 09 |                 |                      |                                       | 1 $\frac{1}{2}$ °S., 116°E. Near east coast of               |
|       | NE     | eSS    |                  | 09               | 00 |                 |                      |                                       | Borneo. USCGS  |
|       | N      | eL     |                  | 26               | -  |                 |                      |                                       |  |
|       | E      | M      |                  | 47               | -  | 17              | 3                    |                                       |  |
|       | N      | M      |                  | 47               | -  | 18              | 5                    |                                       |  |
|       | Z      | M      |                  | 47               | -  | 17              | 2 $\frac{1}{2}$      |                                       |  |
|       | F      |        | 24               | 20               | -  |                 |                      |                                       | Mag. 6 $\frac{1}{4}$   |
| 26    | E      | e      | 00               | 55               | -  |                 |                      |                                       |  |
|       |        | F      | 01               | 04               | -  |                 |                      |                                       | Very small.  |
| /26   | ZE     | ePP    | 05               | 28               | 54 |                 |                      |                                       |  |
|       | ZE     | ePS    |                  | 38               | 07 |                 |                      |                                       | 2°S., 116°E. Near east coast of                              |
|       | NE     | eL     | 06               | 00               | -  |                 |                      |                                       | Borneo. USCGS.   |
|       | N      | M      |                  | 19               | -  | 20              | 3                    |                                       |  |
|       | E      | M      |                  | 22               | -  | 18              | 3                    |                                       |  |
|       | Z      | M      |                  | 22               | -  | 17              | 1 $\frac{1}{2}$      |                                       |  |
|       |        | F      |                  | 45               | -  |                 |                      |                                       | Mag. = 6-6 $\frac{1}{4}$                                     |
| 26    | ZV,Z   | eP     | 08               | 20               | 03 |                 |                      | 2350                                  |  |
|       | E      | eS     |                  | 23               | 51 | 8               | 2 $\frac{1}{2}$      |                                       | 39 $\frac{1}{4}$ °N., 22 $\frac{3}{4}$ °E.                   |
|       | N      | eL     |                  | 26               | -  |                 |                      |                                       | Thessaly, Greece foreshock. BCIS                             |
|       | N      | M      |                  | 27               | -  | 12              | 4 $\frac{1}{2}$      |                                       |  |
|       | E      | M      |                  | 29               | -  | 12              | 5 $\frac{1}{2}$      |                                       |  |
|       | Z      | M      |                  | 29               | -  | 11              | 5                    |                                       |  |
|       |        | F      |                  | 37               | -  |                 |                      |                                       | Mag. = 5 $\frac{1}{2}$                                       |
| /26   | ZV,Z   | eP     | 11               | 54               | 44 |                 |                      | 2260                                  |  |
|       | E      | eS     |                  | 58               | 26 | 9               | 3                    |                                       |  |
|       | Z      | e      |                  | 58               | 33 |                 |                      |                                       | Thessaly, Greece foreshock. BCIS.                            |
|       | N      | e      | 12               | 00               | -  |                 |                      |                                       |  |
|       | N      | M      |                  | 01 $\frac{1}{2}$ | -  | 13              | 11                   |                                       |  |
|       | E      | M      |                  | 03 $\frac{1}{2}$ | -  | 12              | 4                    |                                       |  |
|       | Z      | M      |                  | 03 $\frac{1}{2}$ | -  | 10              | 3                    |                                       |  |
|       | F      |        | 15               | -                |    |                 |                      | Mag. 5 $\frac{1}{2}$ -5 $\frac{3}{4}$ |  |
| 26    | NE     | eL     | 12               | 18               | -  |                 |                      |                                       | 51 $\frac{1}{2}$ °N., 176°W. Andreanof Islands.              |
|       | E      | M      |                  | 30               | -  | 18              | 2                    |                                       | USCGS.   |
|       | N      | M      |                  | 30               | -  | 19              | 2 $\frac{1}{2}$      |                                       |  |
|       |        | F      | 13               | 15               | -  |                 |                      |                                       | Mag. = 6   |
| 26    | N      | e      | 19               | 55               | -  |                 |                      |                                       |  |
|       | N      | M      | 20               | 06               | -  | 18              | 1 $\frac{1}{2}$      |                                       |  |
|       | F      |        | 15               | -                |    |                 |                      |                                       |  |
| 27    | ZV,Z   | eP     | 03               | 12               | 43 | 6               | 2 $\frac{1}{2}$      | 2300                                  |  |
|       | ZV,Z   | i      |                  | 12               | 46 |                 |                      |                                       |  |
|       | NE     | eS     |                  | 16               | 27 | 9               | 4 $\frac{1}{2}$ (SH) |                                       | 39 $\frac{1}{2}$ °N., 22 $\frac{3}{4}$ °E. Thessaly, Greece. |
|       | Z      | e      |                  | 16               | 31 |                 |                      |                                       | BCIS.  |
|       | N      | eL     |                  | 18 $\frac{1}{2}$ | -  |                 |                      |                                       |  |
|       | N      | M      |                  | 20               | -  | 12              | 13                   |                                       |  |
|       | E      | M      |                  | 21 $\frac{1}{2}$ | -  | 12              | 9 $\frac{1}{2}$      |                                       |  |
| Z     | M      |        | 21 $\frac{1}{2}$ | -                | 10 | 6 $\frac{1}{2}$ |                      |                                       |  |
|       | F      |        | 40               | -                |    |                 |                      | Mag. = 5 $\frac{3}{4}$                |  |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN.**

NOVEMBER, 1957

| DATE. | COMPT.   | PHASE.  | G.M.T. |     |     | PERIOD. | AMPLITUDE. | Δ    | REMARKS.  |
|-------|--|---------|--------|-----|-----|---------|------------|------|---|
|       |  |         | h.     | m.  | s.  |         |            |      |   |
| ✓ 28  | ZV,Z   | e(PKP)  | 21     | 09  | 43  |         |            |      |   |
|       | N  | M       | 22     | 13  | -   | 20      | 1½         |      |   |
|       | E  | M       |        | 17  | -   | 18      | 1          |      |   |
|       |  | F       | 23     | 00  | -   |         |            |      |   |
| 29    | ZV,Z   | e(P)    | 18     | 03  | 17  |         |            |      |   |
|       | ZV   | e       |        | 03  | 30  |         |            |      |   |
| ✓ 29  | ZV,Z   | eP      | 22     | 32  | 35  |         |            | 9600 | Dilatation.   |
|       | ZV,Z   | iP      |        | 32  | 38  | 4       | 4          |      | Compression.  |
|       | ZV,Z   | epP     |        | 33  | 31  |         |            |      | Depth = 230 Km.   |
|       | ZV,ZNE   | ipP     |        | 33  | 34  | 7       | 19         |      |   |
|       | ZV,Z   | eSP     |        | 33  | 56  |         |            |      | Amplitudes of pP and pPP are much larger than P or PP.          |
|       | Z  | ipPP    |        | 37  | 11  | 7       | 22         |      |   |
|       | ZNE  | iSKS    |        | 42  | 47  |         |            |      |   |
|       | E  | i(S)    |        | 42  | 55  | 18      | 150(SH)    |      |   |
|       | ZE   | isS     |        | 44  | 26  |         |            |      |   |
|       | NE   | iPPS    |        | 45  | 04  |         |            |      |   |
|       | E  | isSS    |        | 49  | 39  |         |            |      |   |
|       | NE   | iSSS    |        | 51  | 31  |         |            |      |   |
|       | ZV,Z   | iPKPPKP |        | 58  | 00  |         |            |      |   |
|       | ZV,Z   | i       |        | 59  | 33  |         |            |      |   |
|       | E  | M       |        | 23  | 11½ | -       | 19         | 57   |   |
|       |  |         |        | 11½ | -   | 18      | 59         |      |   |
|       |  |         |        | 11½ | -   | 18      | 43         |      |   |
|       |  |         |        | 19  | 57  |         |            |      |   |
| Z     | i  |         | 26     | 15  | -   |         |            |      | Mag. = 7½   |
|       |  |         |        |     |     |         |            |      |   |
| 30    | ZV   | eP      | 02     | 11  | 15  |         |            |      |   |
| ✓ 30  | E  | M       | 22     | 36  | -   |         |            |      |   |
|       |  |         |        | 46  | -   | 18      | 3          |      |   |
|       |  |         |        | 46  | -   | 20      | 2½         |      |   |
|       |  |         |        | 49  | -   | 16      | 2½         |      |   |
|       | F  |         | 23     | 25  | -   |         |            |      | All the magnitudes are the "unified magnitudes" denoted by "m". |
|       |  |         |        |     |     |         |            |      |   |
|       | <u>Note</u>  |         |        |     |     |         |            |      |   |
|       | As from 1st January, 1958 these bulletins will be despatched about a fortnight later than hitherto. The December bulletin, for example, will be despatched by the middle of February. It is hoped that this change will enable us to prepare a slightly more complete and up-to-date bulletin and that the delay will not cause any inconvenience. |         |        |     |     |         |            |      |   |



**AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.**
**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**
**SEISMOLOGICAL BULLETIN FOR DECEMBER, 1957.**

Lat. 51° 28' 8" N, Long. 0° 18' 47" W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE"

(LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

| COMPONENT. | DATE FROM WHICH CONSTANTS APPLY. | GALVANOMETER FREE PERIOD<br>T <sub>1</sub><br>sec. | PENDULUM FREE PERIOD<br>T.<br>sec. | DAMPING CONSTANT<br>μ. <sup>2</sup> | $\frac{Ak}{\pi l}$<br>sec. <sup>-1</sup> |
|------------|----------------------------------|--|------------------------------------|-------------------------------------|--|
| N.         | 1 August 1957                    | 21.2   | 21.2                               | 0.00                                | 62.5                                     |
| E.         | 1 August 1957                    | 21.1   | 21.1                               | 0.00                                | 52.0                                     |
| Z.         | 1 September 1957                 | 11.3   | 11.4                               | +0.05                               | 115                                      |

(II) VERTICAL SEISMOGRAPH, PERIOD 1.5 SECS., DIRECT OPTICAL REGISTRATION (ZV).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.

TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.

SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

| DATE. | COMPT. | PHASE. | G.M.T. |     |    | PERIOD. | AMPLITUDE. | Δ    | REMARKS.   |
|-------|--------|--------|--------|-----|----|---------|------------|------|--|
|       |        |        | h.     | m.  | s. |         |            |      |  |
| 1     | ZV     | eP     | 01     | 12  | 34 |         |            |      | 47½°N., 153½°E. Kurile Islands. USCGS.   |
| ✓ 1   | ZV     | eP     | 01     | 21  | 08 |         |            |      | 47½°N., 154°E. Kurile Islands. USCGS.<br><br>Mag. = 5¼-6   |
|       | E      | eLQ    |        | 42  | -  |         |            |      |  |
|       | N      | eL     |        | 51  | -  |         |            |      |  |
|       | E      | M      | 02     | 03  | -  | 18      | 1½         |      |  |
|       | N      | M      |        | 03  | -  | 18      | 2          |      |  |
|       |        | F      |        | 35  | -  |         |            |      |  |
| 2     | ZV     | iP     | 12     | 52  | 33 |         |            |      | 36.6°N., 01.3°E. Region of Tenes, Algeria. BCIS.   |
|       | E      | eL     |        | 56½ | -  | 14      | 1½         |      |  |
|       | E      | M      | 13     | 07  | -  |         |            |      |  |
|       |        | F      |        |     |    |         |            |      |  |
| 3     | EN     | e      | 22     | 35  | -  |         |            |      | Very small. Fox Islands. USCGS.  |
|       |        | F      |        | 50  | -  |         |            |      |  |
| ✓ 4   | ZV,Z   | iP     | 03     | 48  | 04 | 5       | 21         | 7150 | NEe, Compression.<br>45½°N., 99½°E. Outer Mongolia.<br>Mag. 7.9 (Pas). USCGS.<br><br>Very confused record.<br><br>Mag. = 7.7 |
|       | ZNE    | i      |        | 48  | 12 |         |            |      |  |
|       | NE     | iPcP   |        | 48  | 33 |         |            |      |  |
|       | Z      | iPP    |        | 50  | 36 | 8       | 20         |      |  |
|       | Z      | iPPP   |        | 52  | 00 |         |            |      |  |
|       | NE     | iS     |        | 56  | 39 | 20      | 130(H)     |      |  |
|       | E      | eSS    | 04     | 00  | 52 |         |            |      |  |
|       | E      | M      |        | 17  | -  | (14)    | (360)      |      |  |
|       |        | F      | 08     | 40  | -  |         |            |      |  |
| 4     | ZV     | eP     | 05     | 11  | 12 |         |            |      |  |

M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**
**SEISMOLOGICAL BULLETIN**

DECEMBER, 1957

| DATE. | COMPT.                  | PHASE.                  | G.M.T.                     |                                   |                             | PERIOD.        | AMPLI-<br>TITUDE. | Δ | REMARKS.  |
|-------|-------------------------|-------------------------|----------------------------|-----------------------------------|-----------------------------|----------------|-------------------|---|---|
|       |                         |                         | h.                         | m.                                | s.                          |                |                   |   |   |
| 4     | NE                      | e<br>F                  | 09<br>10                   | 42<br>00                          | -<br>-                      |                |                   |   | Very small. Outer Mongolia<br>aftershock. USCGS.                            |
| 4     | N<br>E<br>N<br>Z        | eL<br>M<br>M<br>F       | 11<br>11<br>11<br>12       | 53<br>59½<br>59½<br>10            | -<br>-<br>-<br>-            | 12<br>12<br>12 | 2<br>1½<br>3      |   | 45½°N., 100½°E. Outer Mongolia<br>aftershock. USCGS.                        |
| √ 4   | ZV<br>NE<br>E<br>N<br>Z | eP<br>eL<br>M<br>M<br>F | 13<br>13<br>13<br>14<br>14 | 30<br>51<br>57<br>57½<br>00<br>25 | 35<br>-<br>-<br>-<br>-<br>- |                |                   |   | Outer Mongolia aftershock. USCGS.   |
| 4     | ZV<br>N                 | eP<br>M<br>F            | 22<br>23                   | 27<br>56<br>05                    | 18<br>-<br>-                |                |                   |   | Small. Outer Mongolia aftershock.<br>USCGS.                                 |
| 5     | N<br>N<br>E             | eL<br>M<br>M<br>F       | 14<br>14<br>14             | 08<br>10½<br>11<br>15             | -<br>-<br>-<br>-            | 15<br>16       | 2½<br>1½          |   |   |
| 5     | N<br>E                  | M<br>M<br>F             | 14<br>14<br>14             | 19½<br>20<br>25                   | -<br>-<br>-                 | 17<br>18       | 1<br>1½           |   | 71.4°N., 6.1°E. Arctic Ocean, east<br>of Jan Mayen. (Upsala)                |
| 5     | N<br>E<br>N<br>Z        | eL<br>M<br>M<br>M<br>F  | 18<br>18<br>18<br>19       | 44<br>49<br>49<br>00              | -<br>-<br>-<br>-            | 14<br>14<br>13 | 1½<br>1½<br>1½    |   | Outer Mongolia aftershock. USCGS.   |
| 6     | ZV                      | eP                      | 04                         | 01                                | 43                          |                |                   |   | 45°N., 150½°E. Kurile Islands.<br>USCGS.                                    |
| √ 6   | ZV<br>N                 | eP<br>M<br>F            | 08<br>08<br>08             | 48<br>30<br>45                    | 35<br>-<br>-                | 20             | 1½                |   | 44½°N., 150½°E. Kurile Islands.<br>USCGS.                                   |
| 6     | NE                      | e<br>F                  | 23                         | 40<br>55                          | -<br>-                      |                |                   |   | Very small.   |
| 7     | NE                      | e<br>F                  | 14<br>15                   | 45<br>00                          | -<br>-                      |                |                   |   | Small. Confused by microseisms.<br>Outer Mongolia aftershock. USCGS.        |
| √ 9   | NE<br>N<br>E            | eL<br>M<br>M<br>F       | 22<br>22<br>22<br>22       | 35<br>43<br>43<br>55              | -<br>-<br>-<br>-            | 17<br>17       | 4<br>2½           |   | Confused by strong microseisms.<br>65½°N., 133°W. Yukon. USCGS.<br>Mag. = 6 |

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN

DECEMBER, 19 57

| DATE. | COMPT. | PHASE.  | G.M.T.                         |                                |    | PERIOD. | AMPLITUDE.                    | Δ                                      | REMARKS.   |
|-------|--------|---------|--------------------------------|--------------------------------|----|---------|-------------------------------|--|--|
|       |        |         | h.                             | m.                             | s. |         |                               |  |  |
| ✓ 10  | N      | ePKS    | 14                             | 58                             | 34 |         |                               |  | Confused by strong microseisms. 60S., 154 <sup>10</sup> E. Solomon Islands. Mag. = 6 <sup>3</sup> / <sub>4</sub> (Pas), 6 <sup>1</sup> / <sub>2</sub> -6 <sup>3</sup> / <sub>4</sub> (Berk). USCGS.      |
|       | NE     | eL      | 15                             | 31                             | -  |         |                               |  |  |
|       | E      | M       |                                | 58 <sup>1</sup> / <sub>2</sub> | -  | 19      | 13                            |  |  |
|       | N      | M       |                                | 59 <sup>1</sup> / <sub>2</sub> | -  | 20      | 13                            |  |  |
|       | Z      | M       |                                | 59 <sup>1</sup> / <sub>2</sub> | -  | 16      | 7                             |  |  |
|       |        | F       | 17                             | 10                             | -  |         |                               | Mag. = 6.7                             |  |
| 13    | ZV,Z   | iP      | 01                             | 43                             | 42 |         |                               |  | Compression. Confused by strong microseisms. Depth = 60 Km. 7°N., 76°W. Colombia. Mag 6 <sup>3</sup> / <sub>4</sub> (Pas). USCGS.  |
|       | ZV,Z   | ipP     |                                | 43                             | 57 |         |                               |  |  |
|       | ZV     | e       |                                | 44                             | 07 |         |                               |  |  |
|       |        | F       | -                              | -                              | -  |         |                               |  |  |
| ✓ 13  | ZV,ZE  | iP      | 01                             | 52                             | 23 | 6       | 15                            | 4240                                   | Compression. Confused by strong microseisms. PFH 10 sec. 16 u. 34 <sup>1</sup> / <sub>2</sub> °N., 48°E. Iran. Major damage. 1062 killed, many injured. Mag. 7 <sup>1</sup> / <sub>4</sub> (Pas). USCGS. |
|       | ZV     | i       |                                | 53                             | 16 |         |                               |  |  |
|       | ZE     | iPP     |                                | 53                             | 48 | 8       | 17                            |  |  |
|       | N      | iS      |                                | 58                             | 14 |         |                               |  |  |
|       | ZV,Z   | i       |                                | 58                             | 26 |         |                               |  |  |
|       | N      | eSS     | 02                             | 01                             | 16 |         |                               |  |  |
|       | N      | eL      |                                | 02                             | -  |         |                               |  |  |
|       | N      | M       |                                | 09 <sup>1</sup> / <sub>2</sub> | -  | 18      | 75                            |  |  |
|       | E      | M       |                                | 11 <sup>1</sup> / <sub>2</sub> | -  | 18      | 71                            |  |  |
|       | Z      | M       |                                | 14                             | -  | 13      | 37                            |  |  |
|       |        | F       | 03                             | 45                             | -  |         |                               | Mag. = 7.0                             |  |
| ✓ 13  | NE     | e       | 20                             | 48                             | 20 |         |                               |  | Confused by microseisms. 52 <sup>1</sup> / <sub>2</sub> °N., 170°W. Fox Islands, Aleutian Islands. USCGS.  |
|       | NE     | eL      | 21                             | 00                             | -  |         |                               |  |  |
|       | E      | M       |                                | 18                             | -  | 20      | 5                             |  |  |
|       | N      | M       |                                | 18                             | -  | 20      | 6                             |  |  |
|       | Z      | M       |                                | 18                             | -  | 18      | 3                             |  |  |
|       |        | F       |                                | 40                             | -  |         |                               | Mag. = 6-6 <sup>1</sup> / <sub>4</sub> |  |
| ✓ 16  | NE     | eL      | 18                             | 00                             | -  |         |                               |  | Confused by microseisms. 50°N., 127°W. Vancouver Island. USCGS.  |
|       | E      | M       |                                | 06 <sup>1</sup> / <sub>2</sub> | -  | 19      | 6 <sup>1</sup> / <sub>2</sub> |  |  |
|       | N      | M       |                                | 06 <sup>1</sup> / <sub>2</sub> | -  | 19      | 5 <sup>1</sup> / <sub>2</sub> |  |  |
|       | Z      | M       |                                | 07                             | -  | 18      | 4 <sup>1</sup> / <sub>2</sub> |  |  |
|       |        | F       |                                | 35                             | -  |         |                               | Mag. = 6                               |  |
| 16    | N      | eL      | 23                             | 24                             | -  |         |                               |  | Confused by microseisms. 34 <sup>10</sup> / <sub>2</sub> °N., 48°E. Iran aftershock. USCGS.  |
|       | N      | M       |                                | 30                             | -  | 18      | 2                             |  |  |
|       |        | F       |                                | 40                             | -  |         |                               |  |  |
| ✓ 17  | ZV     | e(P)    | 05                             | 21                             | 53 |         |                               | 8300                                   | Confused by microseisms. 43 <sup>10</sup> / <sub>2</sub> °N., 162°E. Near east coast of Kamchatka. Mag. 6 <sup>3</sup> / <sub>4</sub> (Pas). USCGS.  |
|       | ZV,Z   | e(pP)   |                                | 22                             | 03 |         |                               |  |  |
|       | E      | eS      |                                | 31                             | 26 |         |                               |  |  |
|       | N      | e       |                                | 31                             | 49 |         |                               |  |  |
|       | E      | eL      |                                | 43                             | -  |         |                               |  |  |
|       | N      | eLR     |                                | 48                             | -  |         |                               |  |  |
|       | E      | M       |                                | 56 <sup>1</sup> / <sub>2</sub> | -  | 20      | 9 <sup>1</sup> / <sub>2</sub> |  |  |
|       | N      | M       |                                | 58                             | -  | 20      | 8 <sup>1</sup> / <sub>2</sub> |  |  |
|       | E      | M       | 06                             | 04                             | -  | 15      | 13                            |  |  |
|       | N      | M       |                                | 05 <sup>1</sup> / <sub>2</sub> | -  | 15      | 18                            |  |  |
| Z     | M      |         | 05 <sup>1</sup> / <sub>2</sub> | -                              | 15 | 12      |                               |  |  |
|       |        | F       | 08                             | 25                             | -  |         |                               | Mag. = 6 <sup>1</sup> / <sub>2</sub>   |  |
| ✓ 17  | ZV,Z   | ePKP    | 14                             | 09                             | 28 |         |                               | 15000                                  | Confused by microseisms. Depth = 130 Km.   |
|       | ZV,Z   | iPKP    |                                | 09                             | 36 | 7       | 27                            |  |  |
|       | ZV,Z   | i       |                                | 09                             | 57 |         |                               |  |  |
|       | ZV,Z   | i(pPKP) |                                | 10                             | 10 |         |                               |  |  |



M.O. 627

**KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.**

**SEISMOLOGICAL BULLETIN**

DECEMBER, 19 57

| DATE.  | COMPT. | PHASE. | G.M.T. |                                |    | PERIOD. | AMPLITUDE.                         | Δ   | REMARKS.   |
|--------|--------|--------|--------|--------------------------------|----|---------|------------------------------------|-----|--|
|        |        |        | h.     | m.                             | s. |         |                                    |     |  |
| contd. |        |        |        |                                |    | sec.    | μ                                  | km. |  |
| √17    | ZN     | i(pPP) | 14     | 12                             | 34 | 10      | 15                                 |     | pPPH 16 sec. 15 μ  |
|        | ZN     | iPKS   |        | 13                             | 07 |         |                                    |     |  |
|        | N      | i      |        | 13                             | 32 |         |                                    |     |  |
|        | Z      | i      |        | 13                             | 52 |         |                                    |     | 12°S., 167°E. Santa Cruz Islands.  |
|        | ZN     | i      |        | 15                             | 58 |         |                                    |     | Mag. 7 <sup>3</sup> / <sub>4</sub> (Pas). USCGS.   |
|        | N      | iSP    |        | 22                             | 38 |         |                                    |     |  |
|        | ZN     | iPPS   |        | 24                             | 45 |         |                                    |     |  |
|        | E      | eLQ    |        | 47                             | -  |         |                                    |     |  |
|        | E      | M      | 15     | 04                             | -  | 22      | 45                                 |     |  |
|        | N      | M      |        | 06                             | -  | 22      | 54                                 |     |  |
|        | Z      | M      |        | 10                             | -  | 20      | 22                                 |     |  |
|        |        | F      | 17     | 30                             | -  |         |                                    |     | Mag. = 7 <sup>1</sup> / <sub>2</sub>   |
| 20     | N      | eL     | 12     | 00                             | -  |         |                                    |     | Confused by microseisms.   |
|        | E      | M      |        | 19                             | -  | 20      | 1 <sup>1</sup> / <sub>2</sub>      |     | 30 <sup>1</sup> / <sub>2</sub> °S., 71°W. Central Chile.                                 |
|        | N      | M      |        | 20                             | -  | 20      | 2                                  |     | USCGS.   |
|        |        | F      |        | 40                             | -  |         |                                    |     | Mag. = 6   |
| 21     | ZV     | eP     | 16     | 08                             | 17 |         |                                    |     | 36°N., 2°E. Algeria. USCGS.  |
| 21     | ZV     | eP     | 18     | 57                             | 11 |         |                                    |     | 36°N., 2°E. Algeria. USCGS.  |
| √23    | NE     | eS     | 12     | 45                             | 15 | 16      | 5 <sup>1</sup> / <sub>2</sub> (SH) |     |  |
|        | NE     | eL     |        | 47.0                           | -  |         |                                    |     | 35°N., 36 <sup>1</sup> / <sub>2</sub> °W. Atlantic Ocean.                                |
|        | E      | M      |        | 48 <sup>1</sup> / <sub>2</sub> | -  | 18      | 11                                 |     | USCGS.   |
|        | N      | M      |        | 48 <sup>1</sup> / <sub>2</sub> | -  | 20      | 25                                 |     |  |
|        | Z      | M      |        | 50                             | -  | 14      | 12                                 |     |  |
|        |        | F      | 13     | 30                             | -  |         |                                    |     | Mag. = 6.0   |
| √25    | ZV     | eP     | 16     | 36                             | 42 |         |                                    |     | Confused by microseisms.   |
|        | NE     | eL     |        | 53                             | -  |         |                                    |     |  |
|        | E      | M      | 17     | 04                             | -  | 20      | 2                                  |     | 10 <sup>1</sup> / <sub>2</sub> °N., 62 <sup>1</sup> / <sub>2</sub> °W. Venezuela. USCGS. |
|        | N      | M      |        | 04                             | -  | 20      | 3                                  |     |  |
|        |        | F      |        | 35                             | -  |         |                                    |     | Mag. = 6   |
| 26     | ZV     | ePKP   | 12     | 29                             | 14 |         |                                    |     | 32 <sup>1</sup> / <sub>2</sub> °S., 178°W. Kermadec Islands.                             |
|        |        |        |        |                                |    |         |                                    |     | USCGS.   |
| 26     | ZV     | e(P)   | 12     | 32                             | 32 |         |                                    |     | Confused by strong microseisms.  |
|        | ZV     | e      |        | 32                             | 36 |         |                                    |     | 41 <sup>1</sup> / <sub>2</sub> °N., 127°W. Off coast of                                  |
|        |        | F      | 13     | 15                             | -  |         |                                    |     | California. USCGS.   |
| 27     | NE     | eL     | 07     | 56 <sup>1</sup> / <sub>2</sub> | -  |         |                                    |     |  |
|        | E      | M      |        | 57 <sup>1</sup> / <sub>2</sub> | -  | 18      | 2                                  |     |  |
|        | N      | M      |        | 57 <sup>1</sup> / <sub>2</sub> | -  | 20      | 1 <sup>1</sup> / <sub>2</sub>      |     |  |
|        |        | F      | 08     | 05                             | -  |         |                                    |     |  |
| √28    | E      | ePS    | 15     | 01                             | 36 |         |                                    |     |  |
|        | N      | eL     |        | 15                             | -  |         |                                    |     | 18°S., 64 <sup>1</sup> / <sub>2</sub> °W. Bolivia. USCGS.                                |
|        | E      | M      |        | 25                             | -  | 20      | 3                                  |     |  |
|        | N      | M      |        | 25                             | -  | 20      | 3                                  |     |  |
|        |        | F      | 16     | 10                             | -  |         |                                    |     | Mag. = 6   |
| 30     | NE     | eL     | 14     | 48                             | -  |         |                                    |     | Near north coast of Luzon,   |
|        | E      | M      |        | 58                             | -  | 20      | 1 <sup>1</sup> / <sub>2</sub>      |     | Philippine Islands. USCGS.   |
|        | N      | M      |        | 58                             | -  | 18      | 2                                  |     |  |
|        |        | F      | 15     | 15                             | -  |         |                                    |     |  |

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| DATE. | COMPT. | PHASE.            | G.M.T. |     |    | PERIOD. | AMPLI-<br>TUDE. | Δ     | REMARKS.   |     |    |
|-------|--------|-------------------|--------|-----|----|---------|-----------------|-------|--|-----|----|
|       |        |                   | h.     | m.  | s. | sec.    | μ               |       |  | km. |    |
| 31    | ZV,ZNE | eP                | 10     | 26  | 05 | 7       | 3½              | 2270  | PH 8 sec. 3 μ<br>58°N., 32°W. North Atlantic Ocean. USCGS.                                 |     |    |
|       | NE     | eS                |        | 29  | 47 |         |                 |       |  |     |    |
|       | NE     | eL                |        | 29½ | -  |         |                 |       |  |     |    |
|       | N      | M                 |        | 32  | -  | 20      | 5               |       |  |     |    |
|       | E      | M                 |        | 32½ | -  | 16      | 6               |       |  |     |    |
|       | Z      | M                 |        | 32½ | -  | 16      | 4               |       |  |     |    |
|       |        | F                 |        | 11  | 05 | -       |                 |       |  |     |    |
| 31    | Z      | eP                | 12     | 02  | 10 |         |                 |       | Very small. North Atlantic Ocean aftershock.   |     |    |
|       | N      | eL                |        | 06½ | -  |         |                 |       |  |     |    |
|       |        | F                 |        | 18  | -  |         |                 |       |  |     |    |
| 31    | Z      | eP                | 13     | 11  | 48 | 19      | 1½              | 18800 | North Atlantic Ocean aftershock.   |     |    |
|       | N      | eL                |        | 16½ | -  |         |                 |       |  |     |    |
|       | N      | M                 |        | 17½ | -  |         |                 |       |  | 17  | 2  |
|       | E      | M                 |        | 18  | -  |         |                 |       |  | 16  | 2½ |
|       | Z      | M                 |        | 18  | -  |         |                 |       |  |     |    |
|       |        | F                 |        | 35  | -  |         |                 |       |  |     |    |
| 31    | ZV,Z   | iPKP              | 14     | 48  | 23 | 5       | 2½              | 18800 | Compression.<br>45°S., 165½°E. Off coast of South Island, New Zealand. USCGS.<br>Mag. = 6½ |     |    |
|       | ZV,Z   | iPKP <sub>2</sub> |        | 49  | 37 | 6       | 3½              |       |  |     |    |
|       | ZV,Z   | iPP               |        | 53  | 27 |         |                 |       |  |     |    |
|       | NE     | e                 | 15     | 04  | 07 |         |                 |       |  |     |    |
|       | N      | eL                |        | 54  | -  | 20      | 3½              |       |  |     |    |
|       | E      | M                 |        | 07  | -  | 21      | 4½              |       |  |     |    |
|       | N      | M                 |        | 07  | -  | 20      | 3½              |       |  |     |    |
| Z     | M      |                   | 11     | -   |    |         |                 |       |  |     |    |
|       | F      |                   | 40     | -   |    |         |                 |       |  |     |    |

All the magnitudes are the "unified magnitudes" denoted by "m".

